The Drax Power (Generating Stations) Order

Land at, and in the vicinity of, Drax Power Station, near Selby, North Yorkshire

Environmental Statement
3 – Site and Project Description

The Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

Drax Power Limited

Drax Repower Project

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3 SITE AND PROJECT DESCRIPTION

3.1 Site Description

Existing Drax Power Station Complex

3.1.1. Drax Power Station is a large power station, comprising originally of six coal-fired units. It was originally built, owned and operated by the Central Electricity Generating Board and had a capacity of just under 2,000 MW when Phase 1 was completed in 1975. Its current capacity is 4,000 MW after the construction of Phase 2 in 1986.

3.1.2. Three of the original six coal-fired units are now converted to biomass (Units 1-3) and this is assessed as the current baseline in this ES. By the latter half of 2018, four units (Units 1-4) will run on biomass with only two units (Units 5 and 6) running on coal. This is assessed as the future baseline in this ES. One or both of Units 5 and 6 will be repowered (see paragraph 3.2.6 below) as part of the Proposed Scheme, this means the existing coal-fired units would be decommissioned and replaced with newly constructed gas-fired units utilising some of the existing infrastructure. The area, within the Existing Drax Power Station Complex where development is proposed is referred to as the Power Station Site and is approximately 53.4 ha.

Pipeline Area

3.1.3. The Gas Pipeline route is approximately 3 km in length and crosses agricultural land to the east of the Existing Drax Power Station Complex. The land within the Pipeline Construction Area is 25.4 ha and the land within the Pipeline Operational Area is 2.4 ha.

3.1.4. An additional area is located on Rusholme Lane (Rusholme Lane Area) to accommodate a potential passing place for traffic during construction of the Gas Pipeline. This is considered to be part of the Pipeline Area.

3.1.5. The Pipeline Area has changed since the publication of the PEIR, which assessed two pipeline routes; now consent is being sought for only one route in the DCO Application following consultation and further environmental survey work. The width of the Gas Pipeline route being taken forward has also reduced to cover only the land required to build and operate the Gas Pipeline. For further information on the route selection process see Chapter 4 (Consideration of Alternatives).

Site Boundary

3.1.6. The Site is approximately 78.9 ha and lies approximately 4 m Above Ordnance Datum (AOD). The Power Station Site, the carbon capture readiness reserve space and the Pipeline Area are discussed further below.

3.1.7. The Site Boundary (depicted with a red line in Chapter 1 (Introduction) Figure 1.1 represents the maximum extent of all potential permanent and temporary works required as part of the Proposed Scheme.

3.1.8. The Power Station Site, the Carbon capture readiness reserve space and the Pipeline Area (including the Rusholme Lane Area) have been divided into a number of Development Parcels shown on Chapter 1 (Introduction) Figure 1.3. Area G was described in the PEIR to allow the

use of the Drax jetty during construction works. This no longer forms part of the Proposed Scheme, as described in Chapter 4 Consideration of Alternatives.

3.1.9. The current land uses at these development parcels are described in Table 3-1 below.

Table 3-1 - Description of Development Parcels within the Power Station Site, the carbon capture readiness reserve space and Pipeline Area

Development Parcel	Description
Power Station Site and the Carbon capture Readiness Reserve Space	
A (Carbon capture reserve space)	Agricultural land owned by the applicant and leased to third parties for agricultural purposes
B (Power Station Site and carbon capture reserve space)	Scrub land within the curtilage of the Existing Drax Power Station Complex
C (Power Station Site)	Area of hardstanding within the curtilage of the Existing Drax Power Station Complex
D (Power Station Site)	Roadway from North Gate Entrance
E (Power Station Site)	Scrub land within the curtilage of the Existing Drax Power Station Complex
F (Power Station Site)	Units 5 and 6 (including, associated infrastructure), stores, contractors facilities (including, car park), sludge lagoon and National Grid substation within the curtilage of the Existing Drax Power Station Complex
G	*Drax jetty - no longer part of Proposed Scheme*
H (Power Station Site)	Hardstanding, fuel oil store, grassland and other infrastructure within the curtilage of the Existing Drax Power Station Complex
Pipeline Area	
I	Agricultural land
J	Agricultural land
K	Agricultural land
L	Agricultural land

Surrounding Area and Features within the Site

3.1.10. Drax Power Station is surrounded by the villages of Drax, approximately 700 m to the south, Long Drax, approximately 900 m north-east, Hemingbrough, approximately 2 km north, and Camblesforth, approximately 1 km south-west. Larger towns in the vicinity of the Existing Drax Power Station Complex are Selby, approximately 5 km north-west, and Goole, approximately 7.5 km south-east.

3.1.11. Rusholme Wind Farm is located approximately 3.8 km to the east of the Power Station Site and Drax Golf Club just across the A645 to the South. There is an industrial site immediately

adjacent to the Power Station Site to the south-west. Drax Skylark Centre and Nature Reserve are adjacent to the north-west of the Power Station Site.

3.1.12. There is an area of probable Roman activity in a field immediately north of the Power Station Site where ditch remains and associated pottery were recovered. Scurff Hall moated site is a scheduled monument to the south of the Pipeline Area and Drax Augustinian Priory is located to the north of the Power Station Site.

3.1.13. The nearest major surface water feature is the River Ouse, located approximately 1.5 km north east of the Existing Drax Power Station Complex. Approximately 3.5 km downstream of the Power Station Site, 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). River Derwent is the closest SAC being approximately 0.7 km to the north of the Power Station Site. There are various other sites designated for their biodiversity value within the area.

3.1.14. Public Rights of Way (PRoW) run immediately adjacent to the western and northern borders of the Power Station Site, and through Development Parcel A. A PRoW network extends across much of the surrounding area (see Figure 3.1c), with a high concentration between the village of Drax and the River Ouse to the north. The Trans-Pennine Trail long distance path and Sustrans Route 65 run on the eastern bank of the River Ouse. Further details can be found in Chapter 5 (Traffic and Transport), Chapter 10 (Landscape and Visual Amenity) and Chapter 14 (Socio-Economics).

3.1.15. The road network adjacent to the Power Station Site and within the Pipeline Area includes the A1041 and the A645, which connect the Existing Drax Power Station Complex to the wider road network including the M62 (J36) approximately 6 km south. Minor roads connect the Existing Drax Power Station Complex to the villages of Drax, Newland and isolated properties.

3.1.16. Staff and visitors access the Existing Drax Power Station Complex via the ‘South Gate’ on the A645. Contractors, deliveries and all HGV traffic use site entrances off New Road. Deliveries of coal and biomass are made predominantly by rail straight to the Existing Drax Power Station Complex.

3.1.17. The lighting environment across the Study Area is largely dominated by the lighting installations associated with the Existing Drax Power Station Complex and street lighting. A Baseline Lighting Survey Report for the Study Area is provided in Appendix 3.1.

3.1.18. Existing development at the Power Station Site is mainly associated with the operation of the Existing Power Station Complex. This includes: a coal stock yard, hard standing, contractors’ compounds, car parks and access/service roads.

3.1.19. Other land within the Power Station Site and the Carbon capture readiness reserve space includes open grassland, scrub and agricultural land. The Pipeline Area is mainly in agricultural use and includes land classified as Grade I ’Excellent’ and Grade II ‘Very Good’

in the Agricultural Land Classification's (ALC) high level dataset[1]. A full description of environmental features both within the Site and in the surrounding area is given within the chapters dealing with specific environmental topics and are shown in Figures 3.1a and 3.1b.

3.2 Project Description — the Proposed Scheme

3.2.1. The Proposed Scheme is to repower up to two existing coal-powered generating units (Units 5 and 6) at the Existing Drax Power Station Complex with new gas turbines that can operate in both combined cycle and open cycle modes. The term "repower" is used as existing infrastructure, such as the steam turbine and cooling towers, that are currently used for the coal fired units would be reutilised for the new gas fired generating units/stations.

3.2.2. The repowered units (which each constitute a new gas fired generating station) would have a new combined capacity of up to 3,600 MW in combined cycle mode (1,800 MW each), replacing existing units with a combined capacity to generate up to 1,320 MW (660 MW each).

3.2.3. Each gas generating station (or unit) would have up to two gas turbines, with each gas turbine powering a dedicated generator of up to 600 MW in capacity. The gas turbines in each generating station (or unit), therefore, would have a combined capacity of up to 1,200 MW. The gas turbines in each generating station (or unit), in combined cycle mode, would provide steam to the existing steam turbine (through Heat Recovery Steam Generators (HRSGs)) which would generate up to 600 MW per generating station (or unit). Each generating station (or unit) would have up to two HRSGs. This results in a capacity for each generating station of up to 1,800 MW and, should both Units 5 & 6 be repowered, a combined capacity of up to 3,600 MW. The new gas turbine generating stations (or units) have been designated the terms "Unit X" and "Unit Y".

3.2.4. Each of Unit X and Unit Y would have (subject to technology and commercial considerations) a battery energy storage facility with a capacity of up to 100 MW per Unit, resulting in a combined battery energy storage capacity of up to 200 MW. The two battery energy storage facilities would be stored in a single building.

3.2.5. The total combined capacity of the two gas fired generating stations, Unit X and Unit Y, and two battery storage facilities (i.e. the total combined capacity of the Proposed Scheme) is therefore 3,800 MW.

3.2.6. The DCO seeks consent for the following flexibility:

- Repowering of either Unit 5 or 6 and construction of Unit X as a gas fired generating station (this would leave either Unit 5 or 6 (depending on which had been repowered) as a coal-fired unit); or
- Repowering of both Units 5 and 6 and construction of Unit X and Unit Y as two gas fired generating stations.

[1] The Ministry of Food and Fisheries (MAFF) provisional Agricultural Land Classification mapping (Pre-1988 and Post 1988)

3.2.7. In the event that a single unit is repowered and Unit X constructed, up to two gas turbines and up to two HRSGs and (subject to technology and commercial considerations) a battery energy storage facility of up to 100 MW storage capacity would be constructed. The size of the building housing the battery storage facility would not change, as the building could house sufficient battery capacity to allow the 100 MW output to be sustained for a longer duration. However, the fuel gas station and gas insulated switchgear required for the Gas Pipeline would be smaller.

3.2.8. In the event that two units are repowered and both Unit X and Unit Y are constructed, then construction works would be undertaken consecutively rather than concurrently. It is assumed for the purposes of this ES that there would be a gap of a year between construction periods, but this could be longer depending on commercial considerations. Unit Y would mirror Unit X, with up to two gas turbines and up to two HRSGs and (subject to technology and commercial considerations) a battery energy storage facility of up to 100 MW storage capacity which would be housed in the building constructed for the battery for Unit X.

3.2.9. The proposed site layout for the repowering of one unit and the construction of one gas fired generating station (Unit X) is shown in Figure 3.2 and the layout for the repowering of two units and the construction of two gas fired generating stations (Unit X and Unit Y) is shown in Figure 3.3.

3.2.10. In order to repower to gas, a new Gas Pipeline would be constructed from the Existing Drax Power Station Complex to the National Transmission System (NTS) operated by National Grid. Pipeline infrastructure would be the same whether Unit X was constructed or whether Unit X and Unit Y was constructed.

3.2.11. A gas receiving facility (GRF) comprising Pipeline Inspection Gauge (PIG) Trap Facility (PTF), Pressure Reduction and Metering Station (PRMS) and compressor station is proposed south of woodland to the east of New Road.

3.2.12. At the connection to the NTS there will be an above ground installation (AGI) south of Rusholme Lane. The AGI involves a PIG Trap Launching station (PTF-L) which will be operated by Drax, and a Minimum Offtake Connection (MOC), which will be operated by National Grid.

3.2.13. A summary list of the main elements of the works proposed to be authorised by the DCO is given in Table 3-2, with the corresponding work number from Schedule 1 of the draft DCO (Document reference 3.1) in the left column.

Table 3-2 - Description of the works

Work No.	Title of the works
1	An electricity generating station (Unit X) fuelled by natural gas and with a gross electrical output capacity of up to 1,800 megawatts
2	An electricity generating station (Unit Y) fuelled by natural gas and with a gross electrical output capacity of up to 1,800 megawatts.
3	Up to two battery storage facilities with a combined gross storage capacity of up to 200 megawatts, housed in a single building

Work No.	Title of the works
4	Up to two new gas insulated switchgear banking buildings
5	A natural gas receiving facility
6	Above ground gas installation(s)
7	A gas pipeline
8	Electrical connections
9	Temporary construction laydown areas
10	Carbon capture readiness
11	Retained landscaping
12	Decommissioning and demolition of sludge lagoons and construction of replacement sludge lagoons
13	Removal of existing 132 kilovolt overhead line and associated towers and foundations
14	Passing place on Rusholme Lane
15	Site reconfiguration works

3.2.14. Further detail is provided below in relation to the development proposed on the Power Station Site, the Carbon capture readiness reserve space and the Pipeline Area.

Power Station Site and the carbon capture readiness reserve space

3.2.15. The new gas turbine generating units (Unit X and Unit Y) will be constructed on land in Development Parcel F currently occupied by contractor outage cabins and car parking, the Turbine Outage Store (TOS), the Learning Centre, sludge lagoons and other ancillary buildings along the western boundary of the Power Station Site.

3.2.16. To accommodate the new infrastructure, it will also be necessary to remove two existing 132 kV pylons on the Power Station Site and de-string the adjacent pylons.

3.2.17. The main elements of each of the new gas-fired generating stations (Unit X and Unit Y) are described below (which are identified as Work Number 1 and Work Number 3A in respect of Unit X and Work Number 2 and Work Number 3B in respect of Unit Y in Schedule 1 to the draft DCO):

- **Gas turbines -** It is proposed to construct up to four separate gas turbines (up to two for Unit X and up to two for Unit Y). Air will be drawn into the compressor of the gas turbine and compressed. Fuel is injected into the combustion chamber. The mixture of fuel and compressed air is ignited, producing gases at a high temperatures. As the gas expands, it rotates the turbine to produce electricity.
- **Heat Recovery Steam Generators and stacks -** It is proposed to construct up to four HRSGs (up to two for Unit X and up to two for Unit Y). When operating in CCGT mode, the HRSGs recover the heat from hot flue gases from the gas turbines. The heat is used to produce steam that will drive the existing steam turbines. Each HRSG will have a main stack, expected to be up to 120 m in height. When operating in open cycle, the HRSG will be bypassed and the exhaust gas from the gas turbine will be sent to the atmosphere

through a bypass stack (one stack for each turbine) of up to 120 m in height. Accordingly, Unit X will have up to four stacks and Unit Y will have up to four stacks (a total of up to eight stacks if both Unit X and Unit Y are developed). In OCGT mode the efficiency of the plant would be lower but higher exhaust temperatures would result in improved dispersion of pollutants. Both modes of operation are considered in this ES.

- **NOx abatement technology –** An assessment of Best Available Techniques (BAT) will be undertaken for the Proposed Scheme as part of the applicant's application for an environmental permit. This will determine whether NOx abatement technology, such as Selective Catalytic Reduction (SCR), will be built into the facility to reduce emissions of nitrogen oxides from the plant or whether BAT can be achieved without SCR using low NOx combustion techniques. If installed, SCR, would only operate in CCGT mode. We have therefore assessed the effect of the Proposed Scheme with and without an SCR capability in Chapter 6 (Air Quality) and Chapter 9 (Biodiversity).
- **Cooling solution -** Cooling for Unit X and Unit Y will be provided by the existing condensers for the steam turbines and existing cooling water infrastructure including reuse of the existing northern group of cooling towers, cooling water make-up intake and cooling water outfall and other associated infrastructure. Drax currently uses hyperbolic (natural draught) cooling towers to transfer heat and condense steam from the existing units; heat is expelled to the atmosphere. 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 in the cooling water circuit to remove heat from the steam cycle and condense the pure water generated in the steam cycle, so it can be re-used. There will be no change to the existing water abstraction and discharge as a result of the Proposed Scheme.
- **Operation/maintenance and control -** Unit X and Unit Y would be operated and controlled from the current Drax control room, which is situated onsite. The proposed generating equipment would be capable of responding to requests from National Grid to provide short-term additional generating capacity, as well as selling electricity into the market and other ancillary grid services. Gas generation allows the new units to respond rapidly to changing demands of the electricity market.
- **Battery storage -** Each of Unit X and Unit Y would (subject to technology and commercial considerations) be connected to its own battery energy storage facility, which would have a capacity of up to 100 MW and which would support the Unit X and Unit Y in providing fast and flexible electricity export and other ancillary services to the NTS. The battery energy storage facility for each of Unit X and Unit Y would be housed in a single building.

3.2.18. Works on the Power Station Site also include the following:

Electrical Connection (Work Number 4 and Work Number 8 in Schedule 1 to the draft DCO)

3.2.19. It is proposed that each of Unit X and Unit Y and their battery energy storage facility will be connected to the existing National Grid 400 kV substation.

3.2.20. For Unit X and Unit Y the output from each generating unit would be banked using Gas Insulated Switchgear (GIS) housed in a new building close to the generating units (shown in Figure 3.2 and 3.3). Connection from the GIS banking building to the existing National Grid 400 kV substation would be by underground cable for Unit X.

3.2.21. The connection for Unit Y from the GIS banking building to the existing National Grid 400 kV substation would be by either:

- An underground cable (as described above for Unit X); or
- An underground cable that terminates in a new cable sealing end compound outside of the fence line of the existing National Grid 400 kV substation and is connected to the existing equipment using overhead conductors.

3.2.22. The cable sealing end compound will be fenced to form either an individual compound or the existing substation fence will be extended to include the new equipment.

3.2.23. The Proposed Scheme will comply with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines for health protection. As works require alterations to an existing substation, limited works to existing overhead lines and a new underground connection, the impact of the change to electro-magnetic field (EMF) is likely to be minimal. Nevertheless an assessment of both occupational exposure and public exposure guidelines that apply due to proximity to a public right of way is being undertaken and will be discussed with Public Health England and submitted to the Examining Authority.

Development of Switchyard and Transmission Plant Works in Existing 400 KV National Grid Switchyard (Work Number 8 in Schedule 1 to the draft DCO)

3.2.24. Works will be required within the existing 400 kV National Grid switchyard in order to accommodate the new connections. These works will include the installation of new equipment similar in scale to the existing switchgear and equipment in order to make the new connections. As these works are within the switchyard which is owned and operated by National Grid, they may be undertaken by National Grid, alternatively these works may be undertaken by the Applicant by agreement with National Gird and are therefore included as part of the Proposed Scheme.

3.2.25. It may be necessary for additional works to be carried out outside the limit of the DCO such as reinforcement works at remote substations and/or re-stringing of existing overhead power lines during construction. If required, these works will be led by National Grid.

Carbon Capture Readiness (Work Number 10 in Schedule 1 to the draft DCO)

3.2.26. Unit X and Unit Y have been designed to be carbon capture ready and a suitable area of land has been identified for the installation of carbon capture equipment that can accommodate both Unit X and Unit Y (Development Parcels A and B as shown in Chapter 1 (Introduction) Figure 1.3). In addition, suitable connection corridors for exhaust gas ductwork from Unit X and Unit Y have been identified. Land has also been identified for the rerouting of two existing PRoWs that would need to be diverted to enable a carbon capture facility to be located on Development Parcels A and B and to provide a landscape mitigation.

3.2.27. The DCO Application for the Proposed Scheme includes a Carbon Capture Readiness report (document reference [5.7]), which sets out the feasibility of the technology, along with high level effects.

3.2.28. No construction works associated with carbon capture readiness, including vegetation clearance in Development Parcel B, will be consented under this DCO Application. If viable in the future, Drax would need to apply for a separate consent for a carbon capture facility on Development Parcels A and B.

Combined Heat and Power

3.2.29. Efficient combined heat and power (CHP) plants are usually designed to meet the demands of an identified heat load. Electrical power generation is utilised, where applicable, for local process plant, and the balance exported to the grid. The heat demands of industrial processes are usually continuous, and district heating demands are also usually continuous (albeit on a seasonal basis).

3.2.30. A CHP Readiness study (document reference 5.6) has been carried out to assess the viability of CHP at this Site and the presence of an existing suitable heat demand.

3.2.31. The CHP Readiness study reviewed potential heat loads in a 15 km radius and noted the following:

- The majority of the local heat load was domestic users spread across the area meaning the demand for heat is generally low. Existing domestic dwellings are difficult to integrate with CHP schemes due to the amount of retrofit required.
- Three large heat loads were identified. Of these, two were considered not feasible, due to technical constraints. The remaining heat load is currently partly served by a CHP scheme; however, this may be considered as a future user for a CHP scheme.
- Small industry makes up around 6% of the local heat load. The largest small industrial heat loads are based in Selby to the north of the River Ouse. These were therefore discounted on the grounds of technical and commercial feasibility. Other small industrial heat loads may be considered as future users for a CHP scheme.

3.2.32. The study therefore concluded that the Proposed Scheme would be developed as CHP Ready but would not be CHP from the outset. This conclusion was reached due to the uncertainty of future heat loads, the lack of currently available suitable heat loads and the undefined operating scheme of the Proposed Scheme.

Other Necessary Works

3.2.33. Other works which will be required as part of the Proposed Scheme (and which have therefore been assumed as being carried out for the purpose of this assessment) include:

- Removal of an existing 132 kV line and two pylons and foundations in the north of the Power Station Site (development parcels C, E and F) (Work Number 13 in Schedule 1 to the draft DCO).
- Provision of security infrastructure, including cameras and perimeter fencing (Work Numbers 1, 2, 3 and 8 in Schedule 1 to the draft DCO).
- Site lighting infrastructure, including lighting columns (Work Numbers 1, 2, 3 and 8 in Schedule 1 to the draft DCO).
- Site drainage, including a flood mitigation channel around the battery storage facility (Work Numbers 1, 2, 3 and 8 in Schedule 1 to the draft DCO)..
- Electricity, water, waste water and telecommunications and other services (applicable to all of the Proposed Scheme).
- Internal roadways, car parking, pedestrian network, cycle parking and hardstanding (Work Numbers 1, 2 and 3 in Schedule 1 to the draft DCO).
- Boundary treatments such as landscaping and ecological mitigation, as described in Chapter 9 (Biodiversity) and Chapter 10 (Landscape and Visual Amenity) (Work Numbers 1, 2, 3, 10 and 11 in Schedule 1 to the draft DCO).

Pipeline Area (Work Numbers 5, 6 and 7 in Schedule 1 to the draft DCO)

3.2.34. Unit X and Unit Y will require a new gas connection from the NTS. The connection will comprise a new pipeline approximately 3 km in length extending eastwards from the Power Station Site with a diameter of up to 600 mm nominal bore. The Gas Pipeline is shown on Chapter 1 (Introduction) Figure 1.3. The Gas Pipeline route has been updated since the publication of the PEIR, but still lies entirely within the study area presented, and consulted upon, in that report.

3.2.35. The Gas Pipeline begins at NTS feeder gas pipeline, Feeder 29, south of the River Ouse. This connection will run into a new AGI south of Rusholme Lane. A permanent access to the AGI will be constructed off Rusholme Lane. From there, the Gas Pipeline route heads north away from Feeder 29 before crossing Rusholme Lane.

3.2.36. The route then continues west where it crosses a stream, before continuing up to Main Road. The route turns north-west to cross Main Road and a field drain. The route continues north-west to avoid Woodcock Wood before turning west. The route then runs south of the dismantled railway, to avoid woodland protected by a Tree Preservation Order. It then heads west and crosses a field drain. The route continues west, south of Carr Lane, crosses Wren Hall Lane and connects to a new GRF east of New Road.

3.2.37. Crossings anticipated as part of the Gas Pipeline construction are shown in Table 3-3.

Table 3-3 - Pipeline Construction Crossings

Description	Type	Likely Technique
Crossing off Rusholme Lane (Minor Road)	Minor Road	Open Cut
Field North of Rusholme Lane	Minor Water	Trenchless
Main Road, Drax	Minor Road	Trenchless
Main Road, Drax	Minor Water	
Field West of Main Road	Overhead Electrics	Open Cut
Field South of Carr Lane	Minor Water	Trenchless
Wren Hall Lane	Overhead Electrics	Open Cut
Wrenn Hall Lane	Minor Road	Trenchless
Field in front of Drax Site	Overhead Electrics	Open Cut

Above Ground Installation (Work Number 6 in Schedule 1 to the draft DCO)

3.2.38. At the connection to the NTS there will be two above ground installations south of Rusholme Lane (as discussed above). These installations will include a PIG Trap Launching station (PTF-L) which will be operated by Drax (Work Number 6B), and a Minimum Offtake Connection (MOC), which will be operated by National Grid (Work Number 6A).

Gas Receiving Facility (Work Number 5 in Schedule 1 to the draft DCO)

3.2.39. A GRF will be installed on arable land to the east of New Road, as shown in Figure 3.2. This is required to receive the natural gas from the Gas Pipeline. Gas and electrical connections will be constructed across New Road, to provide electricity to the GRF and transport the gas to the Power Station Site.

3.2.40. The GRF will contain the following equipment:

- Emergency control valve.
- Filtration.
- Custody transfer metering stream.
- Preheating boilers.
- Heat exchangers.
- Pressure regulations.
- Gas compression.

3.2.41. The gas fired boilers will have a total installed capacity of approximately 7.2 MW thermal input. These would operate only in cold conditions. It is anticipated that this will be provided as two boiler houses. Each boiler house will operate with five 600 kW boiler units, with one spare for outages. Emissions will be through a total of four flue stacks, arranged in two pairs.

3.2.42. There will also be two electrically powered pre-heaters and electrically powered compressors.

3.2.43. Landscape and biodiversity mitigation is also proposed in this land parcel, as described in the Outline Landscape and Biodiversity Strategy.

3.2.44. Further works required for the GRF include an access road from New Road, security infrastructure, including cameras and perimeter fencing, lighting infrastructure, including lighting columns and drainage.

3.3 Construction

Site Reconfiguration Works (Work Number 15 in Schedule 1 to the draft DCO)

3.3.1. In order to construct Unit X and Unit Y and associated facilities on the Power Station Site, it is proposed to demolish, remove and relocate existing facilities at the Power Station Site. These works are known as the Site Reconfiguration Works or Stage 0 and will be completed prior to the commencement of any further construction activities. The Site Reconfiguration Works are identified as Work No. 15 in the draft DCO submitted with the DCO Application.

3.3.2. The private squash court will be demolished and not replaced, while the Learning Centre will be demolished and its functions consolidated into existing facilities.

3.3.3. Other facilities will be demolished and relocated as shown in Figure 3.2 and Figure 3.3, including car parking, Turbine Outage Stores, contractor's compounds and welfare facilities. In addition, a cooling water spray screen up to 10 m high will be built between relocated facilities and the southern cooling towers and a ditch created near the parking area in the Site Reconfiguration Works for drainage.

3.3.4. The Site Reconfiguration Works may be consented by either of the two options listed below:

- A Town and Country Planning Act 1990 (TCPA) application, applied for on 20 February 2018. Decision expected May 2018; or

- As part of the DCO Application.

3.3.5. For the purposes of this assessment, it is assumed these works are part of the Proposed Scheme consented by the DCO. Should the Site Reconfiguration Works be carried out under any planning permission that may be granted by the local planning authority, then Drax may carry out those works under that permission. When assessing the Work Nos 1 to 14 in Schedule 1 to the draft DCO (see the Table 3-2), it is assumed that the Site Reconfiguration Works have first been completed either under the DCO or other consent.

Sludge Lagoons (Work Number 12 in Schedule 1 to the draft DCO)

3.3.6. For the construction of Unit X, one existing, but disused, sludge lagoon would be brought back into operation to serve the existing coal fired units, while the southern sludge lagoon would be decommissioned and filled in, allowing the area to be used for construction laydown (Work Number 12A).

3.3.7. If Unit Y is developed, all existing sludge lagoons to the east of the northern cooling towers would be decommissioned and filled in. Up to two new lagoons would be built in Area E (See Figure 3.3) (Work Number 12B).

Construction Areas and Laydown

3.3.8. Several areas within the Power Station Site have been identified for construction parking and laydown for Units X and Y (Figure 3.5 and Figure 3.6) (Work Number 9 in Schedule 1 to the draft DCO). These areas will be used during construction for the temporary locating of construction offices, warehouses, workshops, open air storage areas and car parking. The areas will be reinstated to their original use following construction and Areas A and B will be safeguarded for carbon capture equipment as explained above.

3.3.9. A PRoW bisects Area A, travelling south east. The use of Area A for construction laydown will not require the closure of this footpath. It will remain operational and will be protected by fencing. Additionally, a PRoW travels along the boundary of Area B. Again this will remain open during construction.

3.3.10. Area A is separated from land within the current curtilage of the Existing Drax Power Station Complex by New Road, which is a public highway. To avoid staff crossing this road on foot, a temporary pedestrian bridge will be constructed.

3.3.11. For the construction of the Gas Pipeline, a temporary contractors' compounds approximately 100 m x 100 m and a pipe storage yard approximately 150 m x 60 m is required (Work Number 7B in Schedule 1 to the draft DCO). The locations of these are not yet confirmed; however they will be provided within the Pipeline Construction Area and are likely to be located at the start of the Gas Pipeline off Rusholme Lane. For the construction of the AGI, there will be one construction laydown for National Grid (Work Number 6C in Schedule 1 to the draft DCO) and one for Drax (Work Number 6D in Schedule 1 to the draft DCO) with a shared temporary construction access road off Rusholme Lane.

3.3.12. To construct the Gas Pipeline, a passing place is required which will be provided on land to the side of Rusholme Lane (the Rusholme Lane Area) (Work Number 14 in Schedule 1 to the draft DCO).

3.3.13. The potential effects of all construction activities in connection with the Proposed Scheme are assessed within the ES.

Construction Lighting

3.3.14. Temporary lighting will be provided during the construction phase in construction laydown areas, parking facilities and office areas. An electrical connection will be provided to Area A across New Road.

Construction Programme

3.3.15. Unit X and Unit Y will be constructed in stages which are referred to as Stages 1 and 2 in the assessment. During Stage 1, Unit X will be constructed. Once Unit X is ready for connection into the steam turbine, one existing coal-fired unit will be turned off so as to allow the steam turbine to be used for Unit X. At this point, there would be one remaining coal-fired unit in operation. During Stage 2, Unit Y will be constructed while Unit X is operational as a gas-fired unit. Again, once Unit Y is ready for connection into the steam turbine, the remaining coal-fired unit will be turned off so as to allow the steam turbine to be used for Unit Y. At this point, there would no remaining coal-fired units in operation at the Existing Drax Power Station Complex.

3.3.16. Each construction stage will take approximately 34 months followed by commissioning. It is anticipated that the two construction stages will be separated by up to a year, but this could be longer depending on commercial considerations. The overall programme will last at least 83 months (assuming a 12 month gap between the two construction stages) including commissioning of the second unit (i.e. Unit Y). The Gas Pipeline and the building to house the battery storage facilities (in connection with Units X and Y) will be constructed within the first half of this programme (Stage 1). The battery storage would be installed within the building in two phases of 100 MW as each unit is repowered (that is, up to 100 MW of battery energy storage during Stage 1 in connection with Unit X, and up to 100 MW of battery energy storage during Stage 2 in connection with Unit Y).

3.3.17. It is assumed that construction of Unit X will commence in 2019/2020 with OCGT capability by 2021/2022 and CCGT ready by 2022/2023. If both Unit X and Unit Y are built, the construction of Unit Y would likely commence in 2024 and be completed in 2027.

3.3.18. The peak period for construction traffic is anticipated to be between months 19 and 22, with up to around 400 car trips per day. A second, lower, peak is anticipated between months 65 and 68, with more than 350 car trips per day.

Construction of Gas Pipeline

3.3.19. The Gas Pipeline will likely be constructed using primarily open cut construction techniques, as is standard for high pressure cross country pipelines. For areas containing constraints, such as roads and drainage ditches, which must be crossed by the pipeline, Drax will consider the use of trenchless crossing techniques.

3.3.20. All construction activities would be undertaken within a temporarily fenced-off strip of land, which is referred to as the "working width". This is equivalent to the Site Boundary for the Pipeline Area shown in Chapter 1 (Introduction) Figure 1.1.

3.3.21. The Pipeline Area (in particular the Pipeline Construction Area) includes sufficient land for both the area in which the Gas Pipeline would be installed, and a working width. The working width is greater adjacent to special crossings (i.e. road crossings) to provide additional working areas and / or storage for construction materials / construction equipment / construction plant. This is provided for within the Pipeline Area. Conversely, the working width may be reduced in size in exceptional areas such as areas of environmental sensitivity or in close proximity to existing buildings, services and utilities.

3.3.22. Wherever possible, the Gas Pipeline has been routed away from significant hedgerows. However, there are occasions where hedgerows cannot be avoided. In this instance, it is likely that short sections of hedgerows will be removed. Established trees will be avoided where possible. Any hedging and trees remaining within the working width will be protected with fencing material where appropriate. For reinstatement, a new hedge (incorporating suitably matched indigenous varieties) would be planted within a suitable double post and rail / post and wire fence, which is maintained until the new hedge is established.

3.3.23. In discussion with land owners and occupiers, a pre-construction land drainage scheme will be developed for areas where a land drainage scheme is deemed necessary. This may entail the installation of new header drains to intercept the existing land drainage which will be cut by the trench of the Gas Pipeline. This serves to maintain the existing land drainage schemes during the construction period whilst minimising the possibility of surface water entering the working width. Pre-construction land drainage schemes will be installed wherever appropriate to help prevent water logging the working width, and reduce future construction drainage problems.

3.3.24. At the detailed design stage, the land drainage schemes in each field will be carefully inspected and records prepared. Any required land drainage scheme activities within third party pipeline / service / utility wayleaves will only be conducted in accordance with the safe working procedures, which will be agreed in advance of the works.

3.3.25. During construction, all land drains encountered during trench digging operations will be identified and recorded. An appropriate method of permanent reinstatement will be devised and agreed with the Land Owner / Land Occupier. Where the route of the Gas Pipeline passes under an existing land drain, the usual method of reinstatement is to install a replacement section of land drain with a permanent, rigid support carrying it over the filled-in pipe trench.

3.3.26. Where necessary, new lateral and header drains would be laid to new outfalls to replace land drains rendered inoperative by the Gas Pipeline.

3.3.27. Construction of the Gas Pipeline and associated above ground infrastructure is expected to take approximately one year during the construction of Unit X. Construction of the Gas Pipeline itself will take approximately 4 months.

3.3.28. Following the construction of the Gas Pipeline, agricultural activities can continue above the Gas Pipeline. However, there will be some restrictions surrounding activities including deep ploughing and the planting of trees.

Construction Working Hours

3.3.29. During the construction phases, it is expected that standard working hours will be Monday to Friday from 07:00 to 19:00; personnel will work a 9 hour period within this timeframe. Start-up and shutdown activities would take place on the Existing Drax Power Station Complex during a 1 hour window either side of standard working hours. Therefore, all construction worker related trips will arrive on site between 6.00 and 10.00 and depart the site between 16:00 and 20:00. On Saturdays, standard working hours will be 07:00 and 13:00.

3.3.30. It is likely that some construction activities and deliveries will be required to be 24 hours at certain times. Where work is required outside of core construction hours this will be agreed in advance with Selby District Council.

Construction Delivery and Access

3.3.31. The transportation of all construction materials will be via the road network from Junction 36 of the M62. Abnormal Indivisible Loads (AILs) will arrive via the Port of Goole, along the Goole Bypass, the M62 and then the A645 to Drax.

3.3.32. Given the size of some of the Heavy Goods Vehicles (HGV) and AILs, Drax may require certain highway powers in order to, for example, remove barriers on the highway (such as street furniture) and temporarily close part of the highway to allow the HGV / AIL to pass. The land would be reinstated to its former condition / reopened once the HGVs / AILs have delivered the construction materials. The possible construction transport routes for HGVs and AILs are shown in Figure 5.2, Figure 5.3 and Figure 5.4, and it is along these routes that Drax seeks various highway powers in the DCO Application, including temporary closure of the road and powers to remove barriers and street furniture on the highway to enable the HGVs / AILs to pass unhindered.

3.3.33. A passing place is provided for in the DCO Application on Rusholme Lane to facilitate construction access to the Gas Pipeline.

3.3.34. It is assumed that no new access to the Power Station Site will be required but new accesses will be provided to Area A and Area I from New Road.

3.3.35. Delivery or removal of materials, plant and machinery during the construction period would occur between 08:00 and 18:00 hours, Monday to Friday, and 08:00 to 13:00 hours on a Saturday. As noted above, it is likely that some construction activities and deliveries will be required to be 24 hours at certain times. Where work is required outside of core construction hours this will be agreed in advance with Selby District Council.

3.3.36. Further details are provided in Appendix 5.2 Outline Construction Traffic Management Plan.

Construction Environmental Management Plan (CEMP)

3.3.37. The construction contractor will be required to prepare and implement a Construction Environmental Management Plan (CEMP).

3.3.38. The purpose of the CEMP is to:

- Provide a mechanism for ensuring that measures to prevent, reduce and, where possible, offset potentially adverse environmental impacts identified in this ES are implemented.

- Ensure that good construction practices are adopted and maintained throughout the construction of the Proposed Scheme.
- Provide a framework for mitigating unexpected impacts during construction.
- Provide assurance to third parties that their requirements with respect to environmental performance will be met.
- Provide a mechanism for ensuring compliance with environmental legislation and statutory consents.
- Provide a framework against which to monitor and audit environmental performance.

3.3.39. As such, the CEMP will ensure work is completed in accordance with:

- The requirements of the DCO for the Proposed Scheme (the draft DCO requires the applicant to carry out the construction work in accordance with certain mitigation measures).
- The applicant's contractual requirements.
- Any environmental or other codes of conduct the applicant is required to comply with.
- Relevant site-specific mitigation measures.
- Current / prevailing best practices.

3.3.40. The implementation of the CEMP is a form of tertiary mitigation and has therefore been assumed as an inherent part of the Proposed Scheme in the assessment of environmental effects. An Outline CEMP is provided (document reference 6.5). It should be noted that following the recent European Court of Justice Case in People Over Wind and Sweetman v Coillte Teoranta (Case 323/17), the CEMP has not been taken into account at the screening stage of the Habitats Directive.

3.4 Operation and Maintenance

Operational Stages

3.4.1. Operation of the Proposed Scheme will be staged. As discussed above, it is assumed that Unit X will be operational by 2022/2023 and will operate while Unit Y is being constructed (Stage 2). If constructed, both Units X and Y are anticipated to be operational by 2027 (Stage 3). Following Stage 2 and the construction of both Unit X and Unit Y, the construction laydown / parking areas within the Power Station Site and the carbon capture reserve space will be reinstated. Construction laydown areas for the Gas Pipeline and AGI will be reinstated following Stage 1 and their construction.

3.4.2. The Proposed Scheme is designed to allow flexibility to respond to the needs of the electricity market during its lifetime. If the plant is required as a base load plant, it would operate for a large proportion of the year, most likely in CCGT mode for maximum efficiency. However, the Proposed Scheme would also be capable of responding rapidly to increased demand to operate as a peaking plant. In this case, the battery units would provide immediate response, followed quickly by the gas units in OCGT mode.

Operational Lighting

3.4.3. Existing lighting arrangements are in place at the Existing Drax Power Station Complex. It is assumed that any new lighting will comply with the same standards. Additional permanent lighting will be required on the Power Station Site and permanent switched lighting will be required at the AGI and GRF station.

3.4.4. Road and area lighting will be provided to ensure the safety of staff and effective visibility for the CCTV system. New lighting will seek to minimise any offsite effects and use specifically designed lighting equipment that reduces the upward spread of light and minimises glare.

Hours of Working

3.4.5. The Proposed Scheme will be designed to operate 24 hours per day, 7 days per week with planned and unplanned offline periods for maintenance.

Site Staff

3.4.6. During the operation of Units X and Y, there would be a reduction overall in staffing levels required for the ongoing operations at the Existing Drax Power Station Complex. Primarily, this would be in relation to maintenance staff levels and material handling staff levels. This is discussed further in Chapter 14 (Socio-Economics).

Hazard Prevention and Emergency Planning

3.4.7. Drax is and will remain regulated under the Control of Major Accident Hazards (COMAH) Regulations 2015 as a Lower Tier site. In addition, operation of the Gas Pipeline will be regulated under the Pipeline Safety Regulations 1996.

3.4.8. Under the COMAH Regulations, Drax 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 will be reviewed and updated accordingly to account for the change in inventory associated with the Proposed Scheme.

3.4.9. Under the Pipeline Safety Regulations 1996, a duty is placed on Major Accident Hazard (MAH) pipeline operators to provide information to the Health and Safety Executive (HSE) at intervals including before construction, before use, when there is a change or operator or when major modifications are planned.

3.4.10. Further details on major accident hazards are provided in Chapter 16 (Major Accidents).

3.5 Decommissioning

3.5.1. The Proposed Scheme will be designed to operate for up to 25 years after which the continued operation of infrastructure will be reviewed. If it is not appropriate to continue operation, the plant will be decommissioned. It is expected that the majority of above ground structures will be removed, while the Gas Pipeline would remain in situ. Some above ground infrastructure, such as the AGI, may need to remain in place, such as the MOC which will be owned and operated by National Grid.

3.5.2. The decommissioning phase is likely to take place over several months.

3.5.3. Prior to decommissioning, the Applicant will prepare a decommissioning environmental management plan (DEMP). This will examine, in detail, all potential environmental risks existing at the Power Station Site and make comprehensive recommendations for any remedial action required to remove such risks. Following completion of the demolition, a Final Environmental Departure Audit will be carried out to ensure that all remedial work has been completed successfully; this report will be made available to any future users of the Power Station Site.

3.5.4. Decommissioning will 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). Details of the decommissioning will be included in the Site Closure Plan which has to be included as part of the application for an Environmental Permit, which will be submitted to the Environment Agency (EA).

3.5.5. Prior to decommissioning, the decommissioning environmental management plan will be submitted to the relevant planning authority for approval. No decommissioning works will be carried out until the relevant planning authority has approved the plan. The submission, approval and implementation of the decommissioning environmental management plan will be secured by the requirements to the DCO.

3.5.6. For the purpose of the EIA, decommissioning impacts are anticipated to be no worse than those during the construction phase following the implementation of an Environmental Management Plan for the works.

3.6 Design Parameters

3.6.1. For the purposes of the environmental assessment a Rochdale envelope approach has been adopted, meaning maximum parameters have been provided. The parameters are secured in the DCO, and the Proposed Scheme will be required to be carried out in accordance with the relevant parameters.

Table 3-4 - Temporary Construction Parameters

Component	Work No.	Maximum length (m)	Maximum width (m)	Maximum height(m AGL)	Maximum height (m AOD)
Pedestrian Bridge	9A(iii)	33	10	11.5	17

Table 3-5 - Unit X Parameters

Component	Work No.	Maximum length (m)	Maximum width (m)	Maximum height (m AGL)	Maximum height (m AOD)
Turbine hall building	1A(ii)	92	22	28	34
Heat recovery steam generator building (up to two)	1A(iv)	48	23	38	44
Exhaust gas emission flue stacks (up to two)	1A(iv)	-	-	120	126
Bypass stack (up to two) (excluding supporting structures)	1A(v)	-	-	120	126

Transformers	1A(vi)	36	17	11	17
Gas turbine air inlet filter house	1A(vii)	16	19	36	42
Power control centre	1A(viii)	30	17	6	12
Turbine outage store building (up to two)	1A(xiv)	113	43	28	34
Fuel gas station	1A(xvi)	36	25	3	9
Main pipe rack	1B(i)	11	11	19	25
Battery storage facility	3A	180	60	10	16
Gas insulated switchgear banking building	4A	36	16	10	16
Gas receiving facility (GRF) Compound	5	85	85	10	16
PIG Trap Facility (Launching) Compound	6B	30	30	5	10
Minimum Offtake Connection	6A	30	30	5	10
Reinstatement of sludge lagoon	12A	82	55	-	-

Table 3-6 - Unit Y Parameters

Component	Work No.	Maximum length (m)	Maximum width (m)	Maximum height (m AGL)	Maximum height (m AOD)
Turbine hall building	2A(ii)	92	22	28	34
Heat recovery steam generator building (up to two)	2A(iv)	48	23	37.5	44
Exhaust gas emission flue stacks (up to two)	2A(iv)	-	-	120	126
Bypass stack (up to two)	2A(v)	-	-	120	126
Transformers	2A(vi)	36	17	11	17
Gas turbine air inlet filter house	2A(vii)	16	19	36	42

Component	Work No.	Maximum length (m)	Maximum width (m)	Maximum height (m AGL)	Maximum height (m AOD)
Power control centre	2A(viii)	30	17	6	12
Fuel gas station	2A(xv)	36	25	3	9
Main pipe rack	2B(i)	11	11	19	25
Gas insulated switchgear banking building or extension to 4A building	4B	25	16	10	16
Sludge lagoon (up to two)	12B	82	55	-	-
Cable Sealing End Compound	8B(ii)	35	28	20	26

Table 3-7 - Site Reconfiguration Works Parameters

Component	Work No.	Maximum length (m)	Maximum width (m)	Maximum height (m AGL)	Maximum height (m AOD)
Cooling water spray screen	15B(i)(gg)	161	1	10	16
Contractor's Store – Workshop (TCPA Ref. 1)	15B(i)(bb)	16	13	10	16
Contractor's Workshop (TCPA Ref. 2)	15B(i)(bb)	16	8	8	14
Contractor's Store (TCPA Ref. 3)	15B(i)(bb)	26	9	8	14
Contractor's Store – Workshop (TCPA Ref. 4)	15B(i)(bb)	19	19	11	17
Contractor's Store (TCPA Ref. 5)	15B(i)(bb)	5	5	7	13
Contractor's Store (TCPA Ref. 6)	15B(i)(bb)	20	9	8	14
Contractor's Store (TCPA Ref. 7)	15B(i)(bb)	8	4	7	13
Stores Containers, double stacked, each (TCPA Ref. 8)	15B(i)(bb)	6	3	10	16

Component	Work No.	Maximum length (m)	Maximum width (m)	Maximum height (m AGL)	Maximum height (m AOD)
Contractor's Offices – Welfare Block. Modular Buildings, double stacked, each (TCPA Ref. 9)	15B(i)(dd)	108	36	3.5 (7m total height)	13
Contractor's Offices. Modular Buildings, each (TCPA Ref. 12)	15B(i)(cc)	10	4	4	10

3.7 Stages and Scenarios Assessed

3.7.1. A number of options have been assessed for the Proposed Scheme. In order to ensure that these are adequately addressed, a range of scenarios and stages have been considered in this ES, as shown in Table 3-8 and 3-9.

3.7.2. Options that have been considered and discounted are described in Chapter 4 (Consideration of Alternatives).

3.7.3. The stages assessed as part of the ES are set out in Table 3-8.

Table 3-8 - Stages of the Proposed Scheme That Have Been Considered in the ES

Stage	Title	Description
-	Current baseline	Three biomass fired units and three coal fired units will be operational at the Existing Drax Power Station Complex until late 2018.
-	Future baseline	Four biomass fired units and two coal fired units will operate at the Existing Drax Power Station Complex from late 2018 onwards. After 2025 the coal fired units would meet more stringent CO_2 emissions standards prescribed by the Government; however, no additional consents are required for this.
0	Site Reconfiguration Works	As discussed earlier in this section, these works may be completed via two possible mechanisms as follows: 1. A TCPA application, applied for in 2018. 2. As part of the DCO Application. This ES considers the scenario where these works are completed under the DCO as "Stage 0".

Stage	Title	Description
		For the assessment of Stages 1, 2 and 3, it is assumed the Site Reconfiguration Works have been completed, and it is irrelevant in those scenarios what consent the works were completed under as they have to be completed prior to the commencement of Stages 1, 2 and 3.
1	Construction of Unit X	This stage assumes that the Site Reconfiguration Works have been completed. This stage refers to the construction of Unit X, along with the construction of the Gas Pipeline, GRF, AGI, the battery storage facility for Unit X, and the building to house the battery storage (for both Units X and Y). Laydown areas for the Gas Pipeline, GRF and AGI will be reinstated once construction of these facilities is complete. Once Unit X is ready for connection into the steam turbine, one existing coal-fired unit will be turned off so as to allow the steam turbine to be used for Unit X. At this point, there would be one remaining coal-fired unit in operation
2	Operation of Unit X and construction of Unit Y.	The stage refers to the operation and maintenance of Unit X, the Gas Pipeline and the battery storage facility and the construction of Unit Y (and the installation of 100MW of battery within the battery storage building constructed in Stage 1). The construction of Unit Y is assumed to take place 12 months after Unit X is complete, however this could be longer. If Unit Y is not built then this stage 2 is a worst case assessment of the operation of Unit X. Two scenarios will be considered for NOx abatement technology during the operation of Unit X. These are as follows: Low NOx combustion. Installation of Selective Catalytic Reduction (SCR) with an ammonia budget. The construction laydown / parking areas on the Carbon capture reserve space will be reinstated after Unit Y is built.
3	Operation of Unit X and Y.	This stage refers to the operation and maintenance of Unit X, Unit Y, the Gas Pipeline and the battery storage facility.

Stage	Title	Description
		Once Unit Y is ready for connection into the steam turbine, the remaining coal-fired unit will be turned off so as to allow the steam turbine to be used for Unit Y. At this point, there would no remaining coal-fired units in operation at the Existing Drax Power Station Complex. Two scenarios will be considered for NOx abatement technology of Unit X and Y. These are as follows: Low NOx Combustion. Installation of Selective Catalytic Reduction (SCR) with an ammonia budget.
4	Decommissioning	Gas Pipeline left in situ and the majority of above ground infrastructure removed / reused / recycled. Some infrastructure, such as the AGI, may need to remain in place.

3.7.4. In addition, the scenarios shown in **Error! Reference source not found.**9 are considered within this ES.

Table 3-9 - Scenarios Assessment as Part of the ES

Element	Scenario
Air quality mitigation	No NOx abatement technology
	Installation of Selective Catalytic Reduction (SCR) with an ammonia budget.
Electrical connection for Unit Y	An underground cable from the GIS banking building to the existing National Grid 400 kV substation.
	An underground cable that terminates in a new cable sealing end compound outside of the boundary of the existing National Grid 400 kV substation and is connected to the existing equipment using overhead conductors.

3.7.5. For some topics in this ES, there is no difference in the effects resulting from the assessment between scenarios referred to in the table. Where this is the case, only one scenario is assessed to represent a realistic worst case, and this is explained in the relevant chapter.

3.8 Climate Vulnerability

Introduction

3.8.1. This section describes the findings from the Climate Risk and Vulnerability Assessment (CRVA) of the Proposed Scheme. It provides a summary of the CRVA provided in Appendix 15.1, identifying the key vulnerabilities of the Proposed Scheme, existing adaptation measures and an overall resilience rating.

3.8.2. This process has been undertaken in response to the 2014 amendment to the EIA Directive (2014/15). The approach aims to assess the vulnerability of the Proposed Scheme to climate change and extreme weather events and support mainstreaming of climate risks into major projects to build resilience.

3.8.3. The Proposed Scheme consists of new generating infrastructure (comprising the gas fired generating stations and the battery facilities housed in a single building (Work Numbers 1, 2, 3 and 4 in Schedule 1 to the draft DCO), infrastructure for the fuel to the gas fired generating stations (Work Numbers 5, 6 and 7 in Schedule 1 to the draft DCO), electrical connections (Work Number 8 in Schedule 1 to the draft DCO and supporting infrastructure comprised in Work Numbers 9 to 15 in Schedule 1 to the draft DCO); these are henceforth referred to as the 'Proposed Scheme elements'. These elements are used as the lens through which the forthcoming assessment is presented and are used as the basis of the CRVA assessment.

3.8.4. For the purposes of the CRVA only, the Proposed Scheme elements were divided into the following:

- Repowering infrastructure – comprising Unit X and Unit Y (Work Numbers 1, 2 and 4), the AGI (Work Number 6) Gas Pipeline (Work Number 7) and sludge lagoons (Work Number 12); and
- Supporting infrastructure – all other development.

3.8.5. In terms of approach, the CRVA consists of four broad steps. Step 1 focusses on the identification of the Proposed Scheme receptors and legal requirements. In Step 2, a climate vulnerability assessment is undertaken, comprising a sensitivity assessment and an assessment of current and future exposure. The sensitivity assessment focusses on identifying the general vulnerability of the Proposed Scheme elements to extreme weather and climate change; the assessment of exposure has been based on projected future climate and literature review of climate hazards, taking into consideration the associated uncertainty. Combining the sensitivity and exposure assessments yields an assessment of vulnerability. In Step 3, selected Medium and High vulnerabilities have been taken forward into the risk assessment stage. In Step 4, the resilience of the Proposed Scheme has been assessed and adaptation measures identified to reduce the identified risks and to demonstrate resilience of the Proposed Scheme.

Results

3.8.6. The sensitivity assessment identified a range of climate variables and climate-related hazards that the Proposed Scheme elements are likely to be sensitive to, including sea (e.g. sea level rise and storm surge and storm tides), precipitation (e.g. drought and extreme precipitation events), temperature (e.g. extreme events, such as heatwaves), wind (e.g. gales and extreme wind events and storms, including hail and lightning), relative humidity (e.g. changes in annual average) and water quality and soils (e.g. surface runoff and soil stability). The Proposed

Scheme elements are deemed to be highly sensitive to sea level rise and storm surge/tides, as well as extreme precipitation and temperature events.

3.8.7. The assessment of exposure reviewed recent (historical) climatology and applied climate projections from the UK Climate Programme (UKCP09). These projections represent the most up-to-date projections of climate change for the UK. Projections to the end of the century (2080s mid-point) were applied in the assessment. The exposure assessment identified sea level rise, storm surge and storm tide and extreme precipitation and temperature events as the most important variables affecting climate risk (they were Highly exposed) for the Proposed Scheme elements. Other variables, including changes in annual average precipitation and temperature, drought, snow and ice, changes in solar radiation, gales and extreme wind events, storms (including hail and lightning), soil moisture and soil stability were all assessed as having Medium exposure.

3.8.8. Combining the sensitivity and exposure assessments provided an overall assessment of vulnerability. Based on this assessment, the following variables with High and Medium vulnerability ratings were taken forward into the risk assessment (Step 3). Note, those with an asterisk indicate vulnerabilities common across both Proposed Scheme elements.

Impacts on repowering infrastructure:

- Sea:
  - Sea level rise*
  - Storm surge and storm tide*
- Precipitation:
  - Drought*
  - Extreme events (including flooding)*
- Temperature:
  - Extreme temperature events

Impacts on supporting infrastructure:

- Sea:
  - Sea level rise*
  - Storm surge and storm tide*
- Precipitation:
  - Drought*
  - Extreme precipitation events (including flooding)*
- Temperature:
  - Extreme temperature events
- Wind:
  - Gales and extreme wind events
  - Storms (lightning, hail)
- Relative humidity
- Water quality and soils:

- Soil stability

3.8.9. Informed by the climate vulnerability assessment, a risk assessment was then undertaken for selected Medium and High climate vulnerabilities of the Proposed Scheme elements (see the list above). The risk assessment focused on identifying the consequence (or severity), and the likelihood, of climate impacts to the Proposed Scheme elements. These determinations were then combined to develop a climate risk rating for each project element in response to specific climate impacts associated with climate variables and hazards. To do this, a qualitative assessment, using expert judgement and the available Proposed Scheme information, was undertaken.

3.8.10. Prior to undertaking the risk assessment, an estimation of the likely hazards associated with the identified climate vulnerabilities was undertaken, disaggregated by theme (comprising: structural stability and robustness, weather proofing and detailing, material durability and site contents and business continuity). This assessment considered both the design and operational phases of the Proposed Scheme.

3.8.11. The primary risks (with a High risk rating) for repowering infrastructure were identified to be:

- Damage to structures, blockage of drainage systems and power outages due to intense rainfall and flooding
- A decrease in the number of days where maintenance can be carried out and reduced working periods (for personnel) due to extreme temperature and rainfall events
- Risks to water abstraction owing to droughts and/or long periods of dry conditions
- Owing to extreme temperature events, increased fire risk
- Damage to structures and signage due to gales and/or wind events

3.8.12. In the final stage of the CRVA (Step 4), given the identified risks and vulnerabilities, the resilience of the Proposed Scheme was assessed and associated adaptation measures identified (through engagement and dialogue with the project team). A resilience rating was assigned based on expert judgement and the available information provided by the project team. The Proposed Scheme was deemed to be Highly resilient to the following:

- Structural stability, relating to:
  - Flooding of the site and its assets, droughts, damage to structures, signage and foundations, overheating of equipment, lightning strike and fires.
- Weather proofing and detailing, relating to:
  - Guttering and drainage, the mobilisation of pollutants, dust and windborne materials and high diurnal temperature ranges.
- Material durability, relating to:
  - Deterioration of materials and damage to weather proofing.
- Site contents and business continuity, relating to:

- Loss of service due to flooding, extreme rainfall causing power outages, availability of water for abstraction, working conditions, reduced opportunities for maintenance and electrical surges caused by storms.

3.8.13. The Proposed Scheme was deemed to be Moderately resilient to the following:

- Structural stability, relating to:
  - Subsidence, failure of earthworks and shrinking/cracking of soils.

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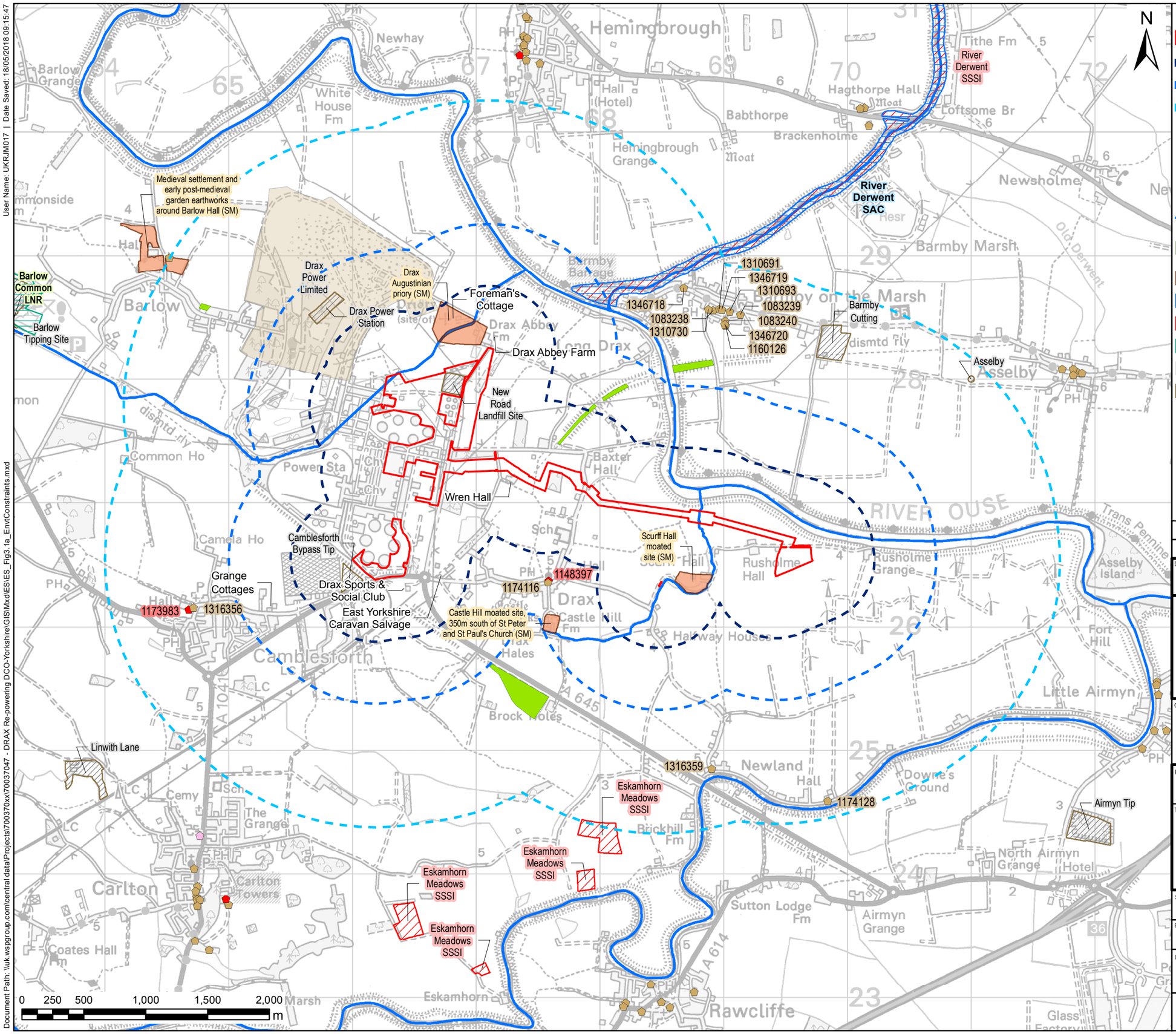

N

Key

- Site Boundary
- 500m Buffer
- 1km Buffer
- 2km Buffer

Environmental Constraints

- Grade I Listed Building
- Grade II* Listed Building
- Grade II Listed Building
- WFD Waterbody
- Site of Importance for Nature Conservation (SINC)
- Scheduled Monument (SM)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)
- Authorised Landfill
- Historic Landfill

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A	23/04/2018	RMcC	FIRST ISSUE	CS	CT

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Tel: +44 113 395 6200 Fax: +44 113 395 6201
wsp.com

CLIENT: drax

PROJECT: The Drax Power (Generating Stations) Order

TITLE: Figure 3.1a Environmental Constraints - Overview

SCALE @ A3:	CHECKED:	APPROVED:
30,000 @ A3	CS	CT

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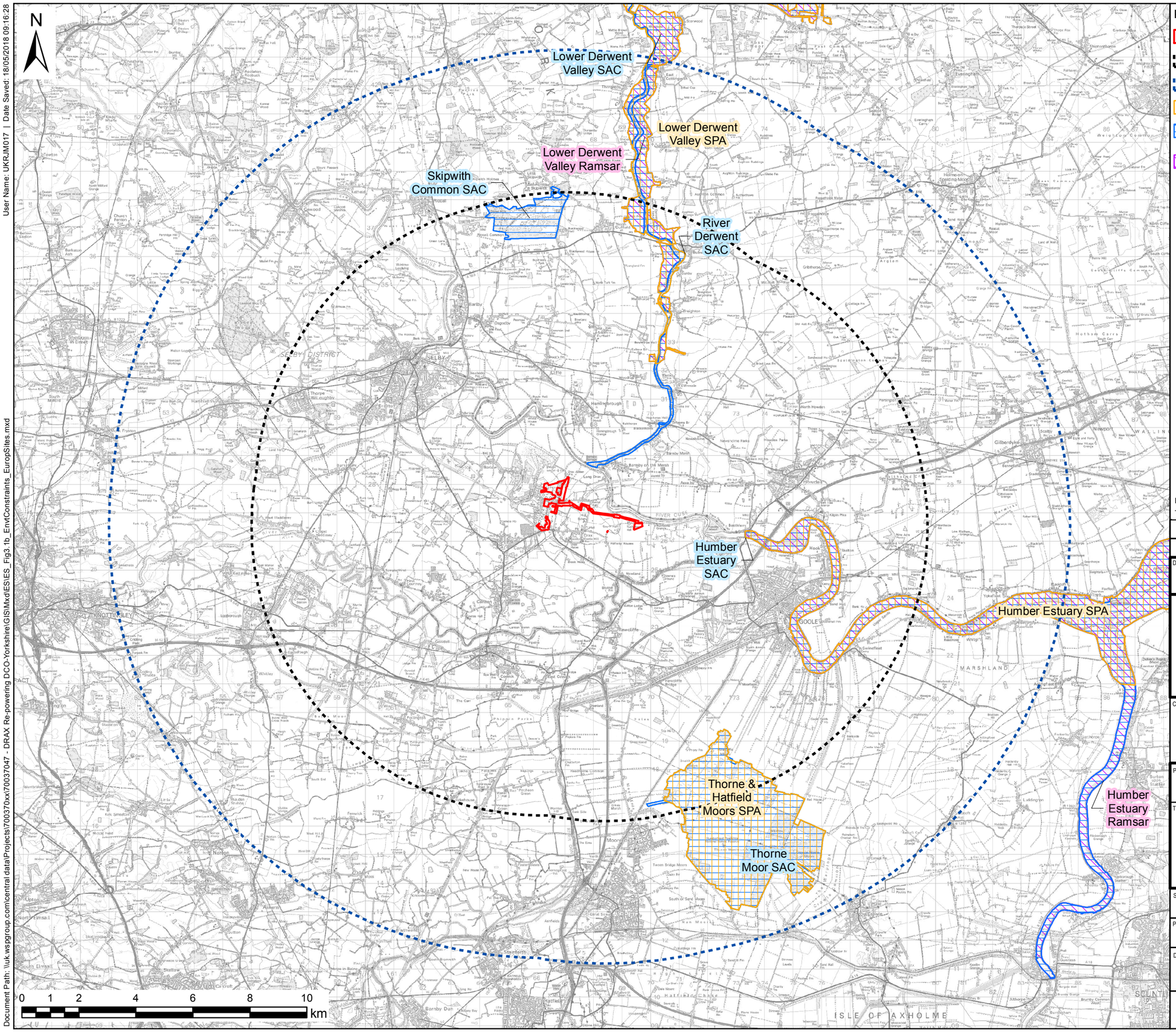

Key

- Site Boundary
- 10km Buffer
- 15km Buffer
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Ramsar Site - Wetland of International Importance

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CLIENT: drax

PROJECT: The Drax Power (Generating Stations) Order

TITLE: Figure 3.1b Environmental Constraints - European Designated Wildlife Sites within 15km

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N

0 0.25 0.5 1 1.5 2 km

Key

- Site Boundary
- 500m Study Area
- 1km Study Area

Access Routes Within 1km

- Trans-Pennine Trail (Long Distance Walking Trail)
- Trans-Pennine Trail (National Cycle Route)
- Public Rights of Way (PRoW)

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CLIENT: drax

PROJECT: The Drax Power (Generating Stations) Order

TITLE: Figure 3.1c Environmental Constraints - Access Routes within 1km

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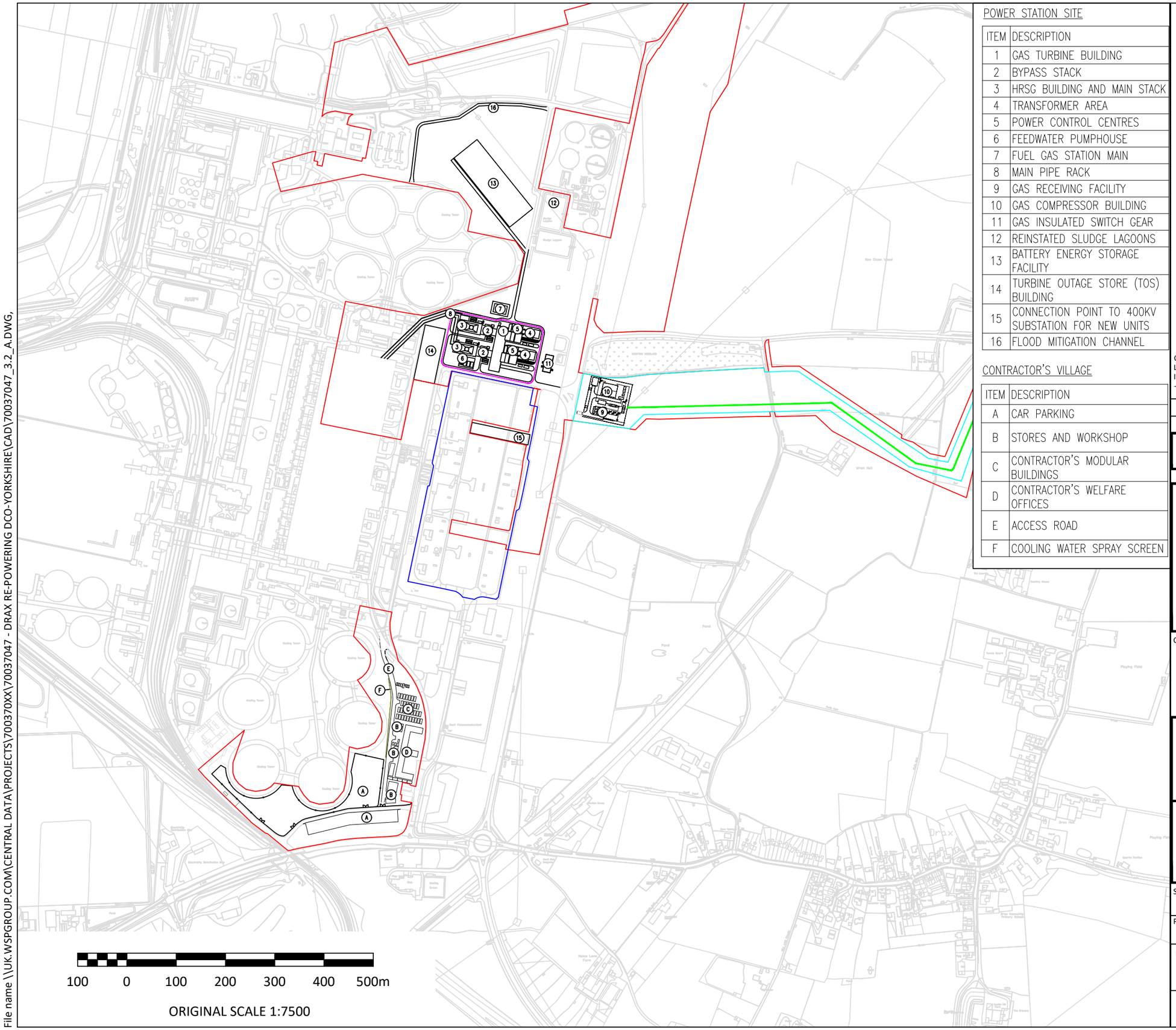

POWER STATION SITE

ITEM	DESCRIPTION
1	GAS TURBINE BUILDING
2	BYPASS STACK
3	HRSG BUILDING AND MAIN STACK
4	TRANSFORMER AREA
5	POWER CONTROL CENTRES
6	FEEDWATER PUMPHOUSE
7	FUEL GAS STATION MAIN
8	MAIN PIPE RACK
9	GAS RECEIVING FACILITY
10	GAS COMPRESSOR BUILDING
11	GAS INSULATED SWITCH GEAR
12	REINSTATED SLUDGE LAGOONS
13	BATTERY ENERGY STORAGE FACILITY
14	TURBINE OUTAGE STORE (TOS) BUILDING
15	CONNECTION POINT TO 400KV SUBSTATION FOR NEW UNITS
16	FLOOD MITIGATION CHANNEL

CONTRACTOR'S VILLAGE

ITEM	DESCRIPTION
A	CAR PARKING
B	STORES AND WORKSHOP
C	CONTRACTOR'S MODULAR BUILDINGS
D	CONTRACTOR'S WELFARE OFFICES
E	ACCESS ROAD
F	COOLING WATER SPRAY SCREEN

DO NOT SCALE

LEGEND

- SITE BOUNDARY
- 400kV SUBSTATION BOUNDARY
- INDICATIVE FUEL GAS PIPELINE ROUTE
- PIPELINE CORRIDOR
- UNIT X
- FENCELINE (IN CONTRACTOR'S VILLAGE)

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CLIENT: drax

PROJECT: The Drax Power (Generating Stations) Project

TITLE: Figure 3.2 Indicative Site Layout Single Unit Option

SCALE @ A3:	CHECKED:		APPROVED:
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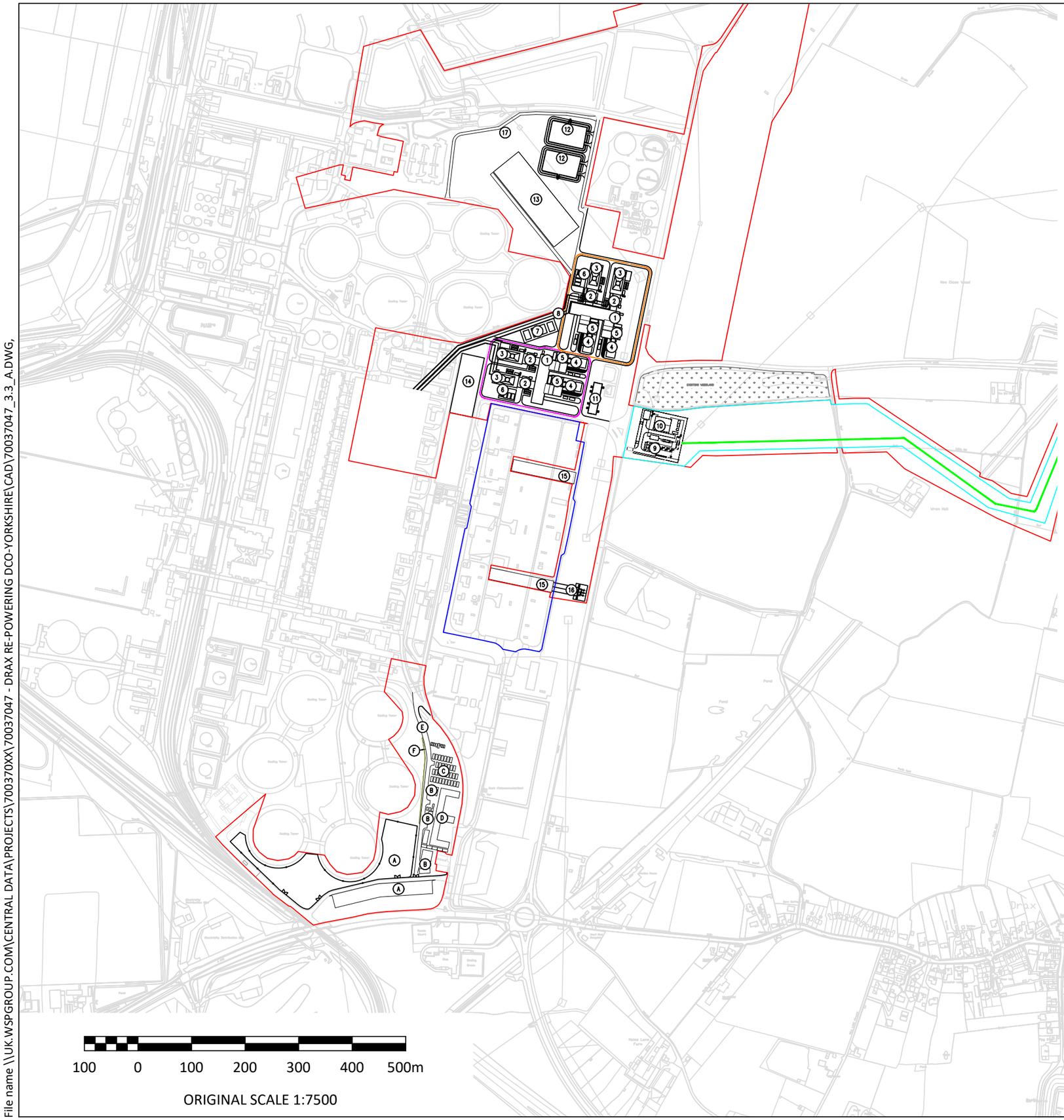

ORIGINAL SCALE 1:7500

POWER STATION SITE

ITEM	DESCRIPTION
1	GAS TURBINE BUILDING
2	BYPASS STACK
3	HRSG BUILDING AND MAIN STACK
4	TRANSFORMER AREA
5	POWER CONTROL CENTRES
6	FEEDWATER PUMPHOUSE
7	FUEL GAS STATION MAIN
8	MAIN PIPE RACK
9	GAS RECEIVING FACILITY
10	GAS COMPRESSOR BUILDING
11	GAS INSULATED SWITCH GEAR
12	SLUDGE LAGOONS
13	BATTERY ENERGY STORAGE FACILITY
14	TURBINE OUTAGE STORE (TOS) BUILDING
15	CONNECTION POINT TO 400KV SUBSTATION FOR NEW UNITS
16	CABLE SEALING END COMPOUND AND OVERHEAD CONDUCTORS
17	FLOOD MITIGATION CHANNEL

CONTRACTOR'S VILLAGE

ITEM	DESCRIPTION
A	CAR PARKING
B	STORES AND WORKSHOP
C	CONTRACTOR'S MODULAR BUILDINGS
D	CONTRACTOR'S WELFARE OFFICES
E	ACCESS ROAD
F	COOLING WATER SPRAY SCREEN

DO NOT SCALE

LEGEND

- SITE BOUNDARY
- 400kV SUBSTATION BOUNDARY
- INDICATIVE FUEL GAS PIPELINE ROUTE
- PIPELINE CORRIDOR
- UNIT X
- UNIT Y
- FENCELINE (IN CONTRACTOR'S VILLAGE)

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CLIENT: drax

PROJECT:
The Drax Power (Generating Stations) Project

TITLE:
Figure 3.3
Indicative Site Layout
Two Unit Option

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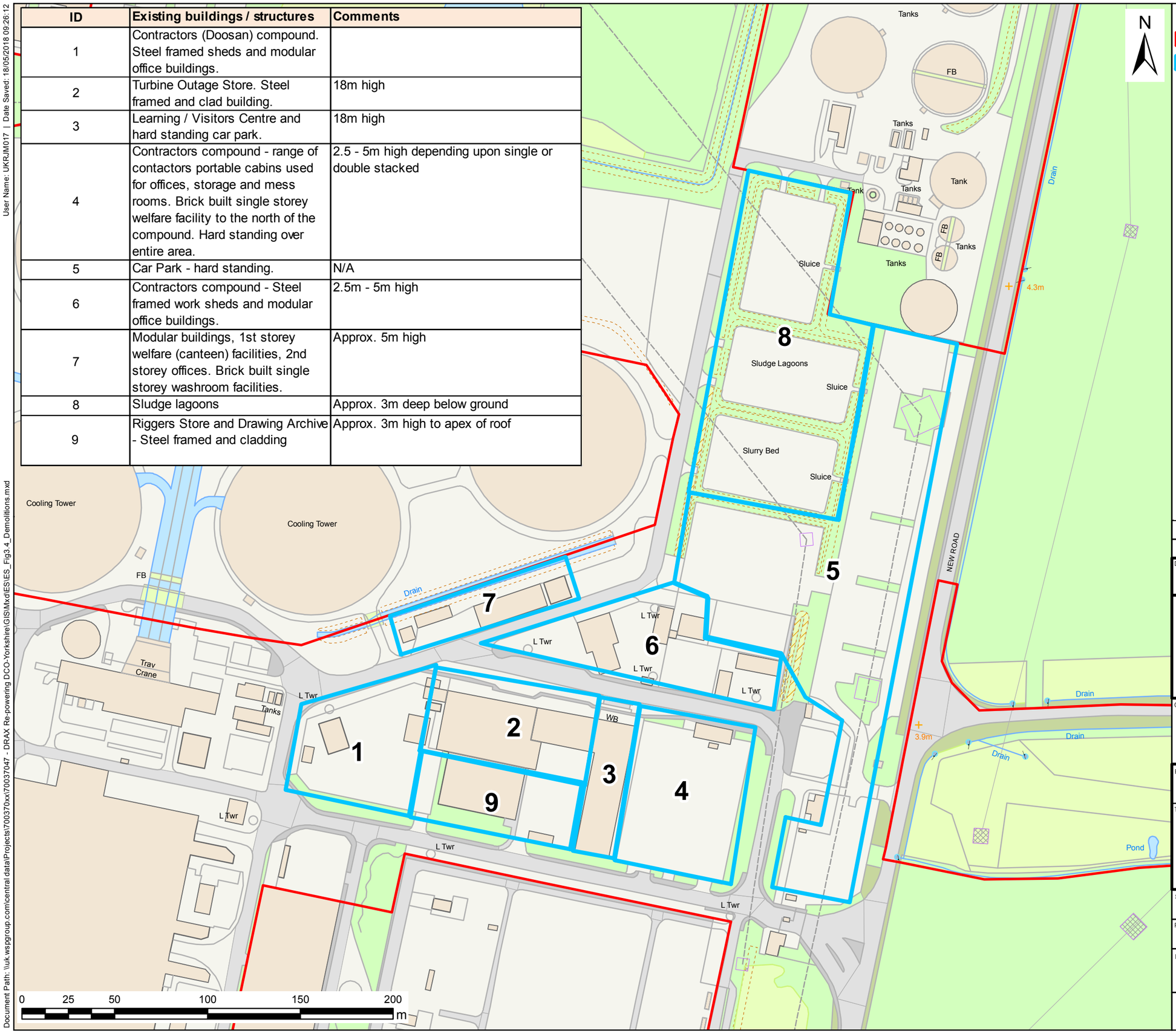
ID	Existing buildings / structures	Comments
1	Contractors (Doosan) compound. Steel framed sheds and modular office buildings.	
2	Turbine Outage Store. Steel framed and clad building.	18m high
3	Learning / Visitors Centre and hard standing car park.	18m high
4	Contractors compound - range of contactors portable cabins used for offices, storage and mess rooms. Brick built single storey welfare facility to the north of the compound. Hard standing over entire area.	2.5 - 5m high depending upon single or double stacked
5	Car Park - hard standing.	N/A
6	Contractors compound - Steel framed work sheds and modular office buildings.	2.5m - 5m high
7	Modular buildings, 1st storey welfare (canteen) facilities, 2nd storey offices. Brick built single storey washroom facilities.	Approx. 5m high
8	Sludge lagoons	Approx. 3m deep below ground
9	Riggers Store and Drawing Archive - Steel framed and cladding	Approx. 3m high to apex of roof



Key

- Site Boundary
- Areas for demolition

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CLIENT: drax

PROJECT: The Drax Power (Generating Stations) Order

TITLE: Figure 3.4 Demolitions

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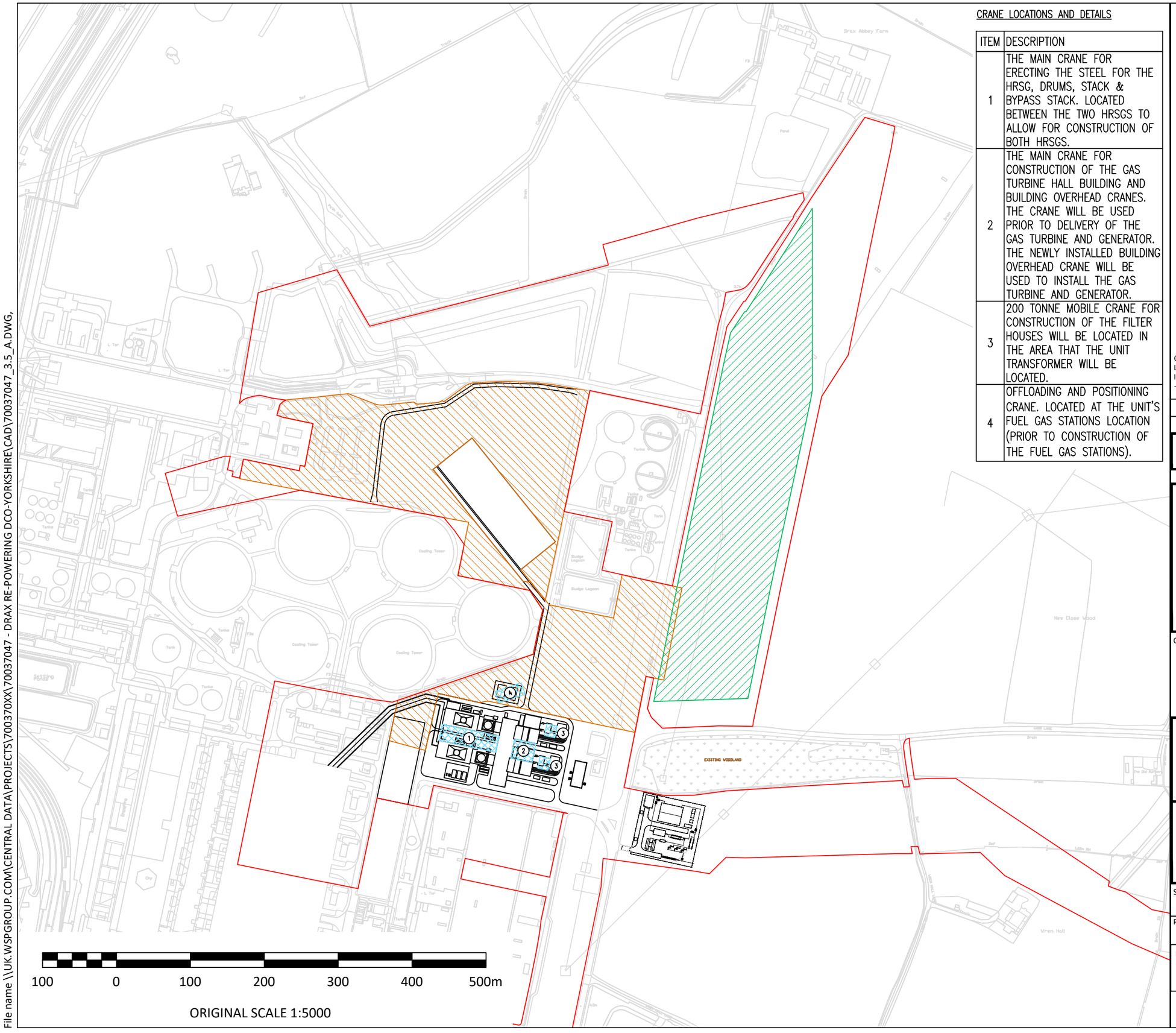

ORIGINAL SCALE 1:5000

CRANE LOCATIONS AND DETAILS

ITEM	DESCRIPTION
1	THE MAIN CRANE FOR ERECTING THE STEEL FOR THE HRSG, DRUMS, STACK & BYPASS STACK. LOCATED BETWEEN THE TWO HRSGS TO ALLOW FOR CONSTRUCTION OF BOTH HRSGS.
2	THE MAIN CRANE FOR CONSTRUCTION OF THE GAS TURBINE HALL BUILDING AND BUILDING OVERHEAD CRANES. THE CRANE WILL BE USED PRIOR TO DELIVERY OF THE GAS TURBINE AND GENERATOR. THE NEWLY INSTALLED BUILDING OVERHEAD CRANE WILL BE USED TO INSTALL THE GAS TURBINE AND GENERATOR.
3	200 TONNE MOBILE CRANE FOR CONSTRUCTION OF THE FILTER HOUSES WILL BE LOCATED IN THE AREA THAT THE UNIT TRANSFORMER WILL BE LOCATED.
4	OFFLOADING AND POSITIONING CRANE. LOCATED AT THE UNIT'S FUEL GAS STATIONS LOCATION (PRIOR TO CONSTRUCTION OF THE FUEL GAS STATIONS).

DO NOT SCALE

LEGEND

SITE BOUNDARY

CONSTRUCTION AREAS

HARDSTANDING / CAR PARKING

HARDSTANDING / CAR PARKING / PEDESTRIAN BRIDGE / SITE WELFARE OFFICES / SITE CLEARANCE

PROPOSED AREA FOR CONSTRUCTION CRANES

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CLIENT: drax

PROJECT:
The Drax Power (Generating Stations) Project

TITLE:
Figure 3.5
Indicative Construction Plan for Unit X

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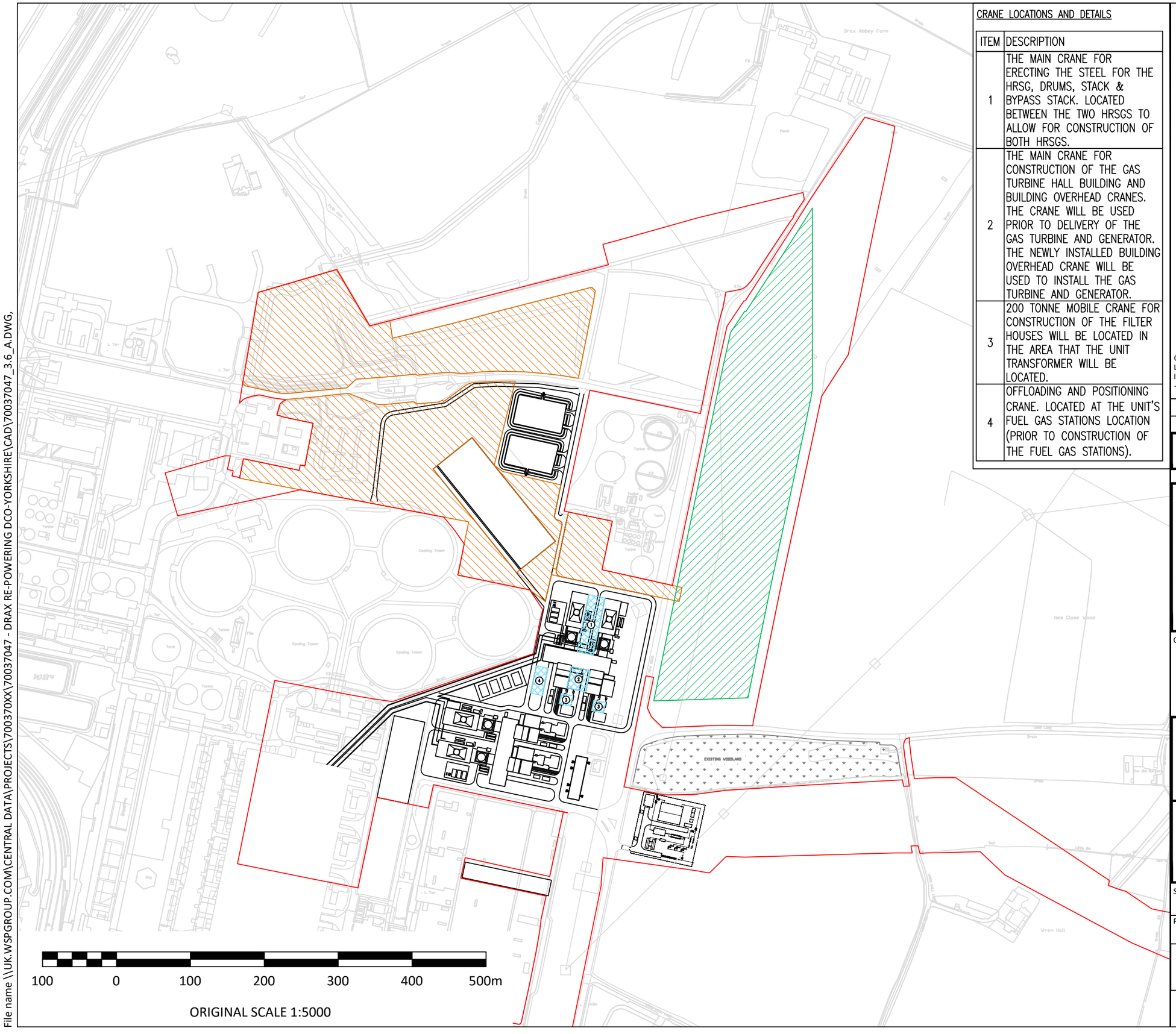

CRANE LOCATIONS AND DETAILS

ITEM	DESCRIPTION
1	THE MAIN CRANE FOR ERECTING THE STEEL FOR THE HRSG, DRUMS, STACK & BYPASS STACK. LOCATED BETWEEN THE TWO HRSGS TO ALLOW FOR CONSTRUCTION OF BOTH HRSGS.
2	THE MAIN CRANE FOR CONSTRUCTION OF THE GAS TURBINE HALL BUILDING AND BUILDING OVERHEAD CRANES. THE CRANE WILL BE USED PRIOR TO DELIVERY OF THE GAS TURBINE AND GENERATOR. THE NEWLY INSTALLED BUILDING OVERHEAD CRANE WILL BE USED TO INSTALL THE GAS TURBINE AND GENERATOR.
3	200 TONNE MOBILE CRANE FOR CONSTRUCTION OF THE FILTER HOUSES WILL BE LOCATED IN THE AREA THAT THE UNIT TRANSFORMER WILL BE LOCATED.
4	OFFLOADING AND POSITIONING CRANE. LOCATED AT THE UNIT'S FUEL GAS STATIONS LOCATION (PRIOR TO CONSTRUCTION OF THE FUEL GAS STATIONS).

DO NOT SCALE

LEGEND

SITE BOUNDARY

CONSTRUCTION AREAS

HARDSTANDING / CAR PARKING

HARDSTANDING / CAR PARKING / PEDESTRIAN BRIDGE / SITE WELFARE OFFICES / SITE CLEARANCE

PROPOSED AREA FOR CONSTRUCTION CRANES

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CLIENT: drax

PROJECT: The Drax Power (Generating Stations) Project

TITLE: Figure 3.6 Indicative Construction Plan for Unit Y

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