

5.0 CONSTRUCTION, DECOMMISSIONING AND RESTORATION

Background

5.1 This chapter describes the expected works programme and the key activities that will be undertaken as part of the Development during construction, decommissioning and restoration. Assessment of potential effects during these stages of the development and any necessary mitigation measures are provided in each relevant chapter of the ES.

Programme of Works

5.2 The current project schedule for the Development presumes that planning and Field Development Plan (FDP) approval will occur during 2014, construction commences in 2015 and gas production commences during 2016. The construction of the facilities and structures required on the Ebberston Moor South (EMS) Well Site, the Knapton Generating Station (KGS) the construction of the pipeline will occur simultaneously.

5.3 It is expected that overall, construction of the Development will be completed in 8 months. The drilling of the second borehole is anticipated to take 60 days (not consecutive).

5.4 Construction of the Development will include the following activities:

- Site preparation (including excavating and grading);
- Provision of infrastructure;
- Construction; and
- Landscaping.

Construction Activities

Site Preparation

5.5 Site preparation will involve:

- Construction of a temporary construction compound including site cabins within the west of the EMS Well Site which will contain offices and welfare facilities for management and construction workers;
- Ground modelling works including topsoil stripping and stockpiling for later use;
- Workshop facilities for maintaining the construction equipment;
- Erection of temporary fences along the boundaries of the pipeline working corridor.

Gates and stiles will be incorporated into the fence wherever access by public rights of way and farm tracks are required; and

- Installation of temporary surface water management measures for construction.

Provision of Infrastructure

- 5.6 Electricity supply at the EMS Well Site will be established by provided by a diesel generator. An uninterrupted Power Supply (UPS) System will also be established as a backup for the gas fired generator. No infrastructure to serve the Development during construction is required at KGS.

Construction

- 5.7 The construction phase will involve: foundation excavation and construction; installation of below and above ground services, the fibre optic cable and pipeline; construction of structures including separator and storage tanks; and construction of services and facilities at the EMS Well Site. A typical construction methodology is summarised below. However, the precise details of the construction methodology will be finalised once the contractor has been appointed and therefore parameters have been developed for assessment within the ES so that the worst case effects are assessed. This will mean that the conclusions of the ES will remain valid regardless of the detailed construction design. The parameters used in the assessment are provided in Appendix 5.1 and the construction methodology is summarised below.

EMS Well Site Construction

- 5.8 Site preparation will be minimal because the site is already established. Welfare facilities, offices, power, security, potable water, etc. should be established within 5 days.
- 5.9 Civil construction duration including earthworks, drainage, plinth and foundation installation is expected to be 30 days.
- 5.10 Installation of equipment, building and piping (mechanical completion) will take up to 90 days. Testing and commissioning of the pipeline and auxiliary equipment will take up to 30 days.

Gas & Water Production Well / Water Disposal Well

- 5.11 The existing borehole at the EMS Well Site will be re-entered and used as a combined gas producer, water producer and annulus injector well (further information on this process is provided in Appendix 5.2). This will require the use of a workover rig and associated equipment. Re-entry of the well is anticipated to take up to 30 days.
- 5.12 A new water production and water reinjection well is also proposed which will require the use of a workover rig and associated equipment. It is anticipated that construction of the second well will take up to 60 days. The construction of the second well is likely to take place following completion of the other elements of the Development.
- 5.13 As set out above, construction phase parameters, which includes parameters for the drill rig have been developed for assessment in the ES so that the worst case effects are assessed. This will mean that the conclusions of the ES remain valid regardless of the actual rig selected for drilling. The precise rig is not known at this stage as it would need to be leased by the Applicant. The parameters for the drill equipment are provided in Appendix 5.1 and shown on Figure 5.1 and Figure 5.2.

Pipeline between EMS Well Site and KGS

- 5.11 The 12" diameter steel pipeline 13.9km in length with a design pressure 100 barg, together with a fibre optic cable, will be laid from the EMS Well Site to KGS using an open trench for the majority of the length. However, where crossing scheduled monuments, the railway, the River Derwent and major roads, auger boring, directional drilling or alternative suitable installation techniques where appropriate will be used to limit surface disturbance. The pipeline will be constructed in accordance with relevant national design codes, BS PD 8010-1-Code of Practice for Pipelines – Steel Pipelines on Land, 2004ⁱ and IGE/TD/1 Ed 4 – Steel Pipelines for High Pressure Gas Transmission, 2005ⁱⁱ.
- 5.12 The construction working width for the pipeline will normally be 30m across as shown on Figure 3.6a and Figure 3.6b. The working corridor will be required to allow for the laying down of pipe work, the movement of construction vehicles and the use of machinery required for the construction of the pipeline. There will be short sections of the route where a 30m working width will not be possible, notably, across the Givendale Rigg Scheduled Ancient Monument (SAM) and through part of the Dalby Forest. The cross section for the pipeline and its working corridor is shown on Figure 3.6a and Figure 3.6b.

- 5.13 During construction of the pipeline, lengths of pipe will be strung out along the line parallel to the proposed trench. The pipes will then be welded together to make a continuous pipeline with all the welds subject to inspection and non-destructive testing.

Topsoil Stripping

- 5.14 Topsoil and subsoil will be stripped and left in individual rows along the edge of the construction working corridor to be distributed on completion of the construction activities. This will create the least possible disturbance to the land by limiting any potential adverse effects of the construction process and to ease the process of reinstating the land. No top or sub soil will be transported on or off the Site during construction.

Trenching

- 5.15 A trench will be excavated to a depth sufficient to provide in excess of 1m cover of the pipe. The ultimate depth of cover will be determined by safety considerations and/or by local site conditions. The preferred plant for topsoil stripping and trench excavations would be a 360 degree tracked excavator.
- 5.16 Crossings of existing high pressure pipelines, high voltage (HV) electricity or other third party services will be clearly identified by the owner of the service and hand excavated within the last metre on both sides. The work to enable the pipeline to cross the services will be undertaken in line with the requirements of the asset owners.

Lowering in of the pipe and backfilling

- 5.17 The pipeline will be lowered into the trench using side boom tractors or equivalent plant. The trench will then be backfilled with the excavated subsoil, which will be graded to avoid damage to the pipeline. The subsoil will be carefully compacted around and over the pipe up to the top of the trench.
- 5.18 The final cover of topsoil will be crowned over the pipeline to account for future settlement. The topsoil will then be ploughed back into the rest of the field in due course. The expected duration for fabrication and installation will be approximately three months, however the various sections of pipeline will be completed as quickly as possible and long lengths of ditch will not be left lying open.

Land Drainage Works

5.19 The drainage of the land crossed by the pipeline will be preserved. During construction, all drains severed by the trench digging operation will be identified and recorded and the most appropriate method of reinstatement discussed and agreed with the land owner or his agent. If necessary, new lateral and header drains will be laid to outfalls to replace drains rendered inoperative by the pipeline.

Permanent Reinstatement

5.20 Reinstatement of the surface of the land within the pipeline working corridor would be carried out within the same season as construction where possible. Walls and fences will be reinstated and hedges replanted between protective fences. Permanent pipeline markers and cathodic protection test posts will be installed at agreed locations. Finally, any temporary fencing along the working width will be removed.

Auger Boring/Directional Drilling

5.21 At crossings such as the Oxmoor, Givendale Upper and Givendale Lower Dykes complex Schedule Monuments, River Derwent, the railway or roads, auger boring, directional drilling or a suitable alternative installation technique will be used for the construction of the Development. Auger boring involves a length of pipe being moved through the ground beneath the obstacle by an auger tool in the pipe which removes the spoil from the face of the pipe. In contrast directional drilling will involve drilling the reception hole and then pulling the pipe through it. Once the pipe has reached the end of the crossing, it forms part of the permanent pipeline. These options will be used for the construction of the pipeline crossings rather than open cut techniques because they cause less surface disturbance.

Landscaping

5.22 Landscaping works will involve some ground modelling works. The works will include soil preparation, tree and vegetation planting and seeding. The ground modelling works will be undertaken concurrently with the site preparation and below ground works outlined above. The sequence of works will be:

- Felling of trees and clearance of other vegetation;
- Stripping and stockpiling of existing topsoil;
- Placement of materials recovered from excavations for foundations, roadways and pipeline and services trenches;
- Placement of topsoil; and

- Tree and vegetation planting and seeding.

Works at Knapton Generating Station (KGS)

- 5.23 Works at the KGS are limited to the installation of pipeline and pig receiver modules.
- 5.24 It is expected that construction and pre-commissioning activities at the KGS Site will be completed in 4 weeks. Site preparation work will be minimal because the KGS site is already established.
- 5.25 Installation of the pipeline and pig receiver module is expected to take up to 14 days.
- 5.26 Installation of the pipeline termination, auxiliary piping (mechanical completion) and Communication and Instrumentation (C&I) works is expected to take up to 30 days.
- 5.27 Testing and commissioning of pipeline and auxiliary equipment is expected to take up to 21 days.

Material and Resource Use

- 5.28 Construction materials to be used for the EMS Well Site will include steel, concrete, and timber while the pipeline will be made from high grade steel. Where possible materials and resources used during the construction of the Development will be sourced from the local area.
- 5.29 All structures and pipework within the EMS Well Site will be in Signal Grey (RAL 7004) with non-reflective finishes.
- 5.30 The ground modelling will require spoil to be moved around the Site. It is not anticipated that any of the spoil will need to be imported into or exported from the Site as part of the Development.

Plant and Equipment

- 5.31 Consideration has been given to the types of plant likely to be used during the construction works. The plant and equipment associated with each key element of the construction process is set out below in Table 5.1.

Table 5.1: Plant Expected to be used during Construction

Plant	Stage		
	Enabling Works and Site Preparation	Infrastructure and substructures	Construction
Tracked/wheeled 360 degree Excavators	✓	✓	✓
Excavator mounted hydraulic breakers	✓	X	X
Excavator mounted hydraulic crushers	✓	X	X
Dumpers	✓	✓	✓
Concrete Crushing Plant	✓	X	X
Mobile Craneage/Tower Cranes	✓	✓	✓
Eight-wheeler trucks	✓	✓	✓
Air Compressors	✓	✓	✓
Diamond cutting tools / saws	✓	✓	✓
Hand Held Tools including breakers (pneumatic and hydraulic)	✓	✓	✓
Power Tools including percussion drills, cutting disks, pipe-threaders	✓	✓	✓
Hand /power tools	✓	✓	✓
Wheel Washing Plant	✓	✓	✓
Scaffold	X	X	✓
Mobile access platforms	✓	✓	✓
Delivery trucks	✓	✓	✓
Skips & Skip trucks	✓	✓	✓
Forklift trucks	✓	✓	✓

Hours of Work

5.32 North Yorkshire County Council (NYCC) and North York Moors National Park Authority (NYMNP) may wish to stipulate the hours of work prior to the commencement of the construction works. It is anticipated that for general construction activities these will be 07:00 to 18:00 Monday to Friday and 07:00 to 13:00 on Saturdays. Drilling activities at the EMS Well Site (anticipated to be up to 30 days duration for the first well and up to 60 days for the second well) will be undertaken 24 hours a day. All work outside these hours will be subject to prior agreement, and/or reasonable notice, by NYCC and NYMNP which may impose certain restrictions.

Environmental Management of Construction Works

5.33 The Applicant will operate an Environmental Policy which will cover a number of key areas during the construction process. The Environmental Policy will ensure that the Applicant and its contractors operate in a responsible manner during the construction process. Broad measures to eliminate, reduce or offset adverse environmental effects, which will be set out in a Construction Environmental Management Plan (CEMP), are identified below:

- The broad plan of the phasing of the works and its context within the whole project;
- Baseline levels for noise, vibration and dust and details of any monitoring protocols that may be necessary during the works;
- Housekeeping procedures and environmental control measures;
- Any requirement for monitoring and record keeping;
- Contact details during normal working hours and emergency details outside working hours;
- Provision for reporting, public liaison, prior notification etc.;
- The mechanism for the public to register complaints and the procedures for responding to complaints;
- Prohibited or restricted operations (location, hours etc.);
- Details of construction operations highlighting any operations likely to result in disturbance and/or working hours outside the core working period, with an indication of the expected duration of key phases and dates;
- The details of proposed routes for heavy goods vehicles travelling to and from the Site; and
- Details of all works involving interference with a public highway, including temporary carriageway/footpath closures, realignment and diversions where applicable.

Traffic Management

5.34 Table 5.2 provides a summary of the construction vehicle movements required during construction of the Development.

Table 5.2: Summary of Construction Vehicle Movements

Project Activity		Vehicle Movements (no.)		Time period
		HGV*	Others	
EMS Well Site Water Injection Well	Mobilisation	126	20	7 days
	Drilling	20	35	Weekly
EMS Well Site		8	20	Daily

Pipeline		64	225	Weekly
		18	48	Daily
KGS		130	50	Weekly
		26	40	Daily
EMS Well Site Water Injection Well	Mobilisation	126	20	7 days
	Drilling	20	35	Weekly

*All categories of HGV

- 5.35 Whilst no long-term road closures are envisaged, short-term closures may be required in order to establish and remove large items of building plant and to allow modifications to the roads and their junctions to occur especially when the pipeline is constructed underneath them.
- 5.36 It will be the responsibility of the Applicant and Contractor or Construction Liaison Officer to finalise consultations with NYCC and NYMNPA. Notice regarding planned closures and diversions of roads and footpaths forming part of the Site shall be given by the Contractor/Construction Liaison Officer to NYCC, NYMNPA, the Police, the Fire Brigade and other emergency services sufficiently in advance of the required closure or diversion dates.
- 5.37 In order to minimise the amount of construction vehicles using the public highway, the following factors will be considered:
- Re-use and recycling of construction materials;
 - Control of wastage;
 - Description of permitted routes for transit of materials, avoiding sensitive areas;
 - Shared materials delivery opportunities;
 - On demand ordering;
 - Phased delivery times throughout the working day; and
 - Car sharing for operatives.
- 5.38 All construction traffic entering and leaving EMS Well Site will be closely controlled and will enter via Netherby Dale Road. Vehicles accessing the pipeline corridor will be controlled and will only be able to access it from designated controlled access points where the pipeline route crosses roads including: A170; B1415 Penniston Lane; Allerston Lane; Marishes Lane and B1258 Malton Road. Vehicles travelling to and from the Site will travel via designated routes, which will have previously agreed with NYCC, NYMNPA and other relevant authorities and bodies prior to construction commencing.
- 5.39 Site operatives will be encouraged to car share if transport is not provided by the employer.

Car parking arrangements for site operatives within or adjacent to the Site will be enforced in order to avoid uncontrolled parking on public highways.

Waste Management

- 5.40 Some waste will be generated during the clearance of on-site structures and construction works. All relevant contractors will be required to investigate opportunities to minimise waste arising at source and, where such waste generation is unavoidable, to maximise the recycling and re-use potential of construction materials. Wherever feasible, such waste will be dealt with in a manner that reduces environmental impact and maximises potential re-use of materials. Recycling of materials will largely take place off-site where noise and dust are less likely to result in effects to the occupants of surrounding properties.

Drainage

- 5.41 The assessment of potential effects resulting from the Development on water resources is presented in Chapter 11.
- 5.42 Surface water drainage especially on the well site will be controlled by appropriate SuDS and discharge arrangements will be agreed with the Environment Agency and Internal Drainage Board or, in the case of discharges to sewer, Yorkshire Water. Construction vehicle parking areas may need to be paved.
- 5.43 The Construction Liaison Officer will ensure that any water which may have come into contact with any contaminated materials during construction will be disposed of in accordance with the Water Resources Act (1991) and other legislation, and to the satisfaction of the Environment Agency and/or Yorkshire Water. In addition, any risk will be reduced by adopting good management practices and relevant measures described in the Environment Agency's Pollution Prevention Guidelines, including: PPG01 – General guide to the prevention of water pollution and PPG06 – Working at construction and demolition sites.
- 5.44 All liquids and solids of a potentially hazardous nature (for example diesel fuel, oils, solvents) will be stored on surfaced areas, with bunding to the satisfaction of the Environment Agency.

Trees and Vegetation

- 5.45 All trees to be retained (and new trees planted in the early stages of construction) will be protected from any unnecessary damage in accordance with BS5837:2012 Trees in Design,

Demolition and Construction, Recommendations.

- 5.46 All temporary material storage will be located wherever practical at adequate distances from vegetation and tree cover to avoid any physical damage. Where tree roots may be subject to potential vehicle compaction, additional temporary protection of the ground surface may be introduced.
- 5.47 Similarly, other areas of vegetation to be retained as part of the Development will be protected from adverse effects during construction through the installation of temporary fencing as appropriate. Construction traffic and storage of materials will not be permitted in these areas, ensuring that they are safeguarded throughout construction.

Protection of Ecological Habitats and Species

- 5.48 The assessment of effects on Ecology is provided in Chapter 6 Ecology and Nature Conservation. Construction effects on ecology within and around the Site will be controlled by the CEMP. Habitats to be retained within the Site will be fenced off to reduce disturbance effects, for example from increased noise and dust.
- 5.49 To limit the potential for killing and injuring a wild bird or damaging or destroying its nest, all vegetation removal will be timed to avoid the bird-breeding season (March to July inclusive) where possible.

Decommissioning and Restoration

- 5.50 At the end of the operational life of Development, nominally 15 years, all the wells will be abandoned and EMS Well Site will be restored unless planning permission for future use of the site is secured. A restoration scheme will be agreed in writing with the Department for Energy and Climate Change (DECC), NYCC and NYMNP and approved by the relevant landowners 12 months prior to the decommissioning and restoration commencing. The general aim of restoration will be to return the well site to forestry in a condition as close as practicable to its original state or to a combination of forestry and amenity uses.
- 5.51 All wells will be plugged, hydrostatically tested, and abandoned with an agreed programme or method approved by the Health and Safety Executive (HSE). The wellheads will be removed and the well casing cut off not less than 1.83m below the finished ground level, a metal plate welded on top, and a concrete slab placed on top of the plate. All plant, equipment, pipes, cables, buildings, security fencing, and surface installations, will be dismantled and removed from the well site. Concrete installations will be broken up and

removed.

- 5.52 All access roads will be removed. The tarmac wearing and base course will be broken up and removed from the well site. The remaining sub base will be broken up and excavated to the depth of the original excavated subsoil depth.
- 5.53 Pest free sub-soil and topsoil will be replaced on the well site separately to the original depth before excavation to achieve a loose, uniform fill. The finished contours on the EMS Well Site will be close to the original site contours. Any hedgerow or trees removed during construction or operation will be replanted with good nursery stock plants guarded with stock and rabbit proof fences during the first year.
- 5.54 If necessary, a scheme of drainage relevant to EMS Well Site will be prepared and agreed with the prospective post-development landowners. The drainage scheme will then be carried out by a specialist land drainage contractor in year two or earlier if appropriate.
- 5.55 The pipeline between EMS Well Site and KGS will be left in situ, filled with an inert gas at lower pressure and the ends capped. The corrosion control system will be maintained.
- 5.56 KGS has planning permission until May 2018 and at this time a revised planning application will be submitted to retain the existing buildings, plant and machinery, which will be subject to approval by Ryedale District Council.

ⁱ British Standards Institute (2004) BS PD 8010-1-Code of Practice for Pipelines – Steel Pipelines on Land

ⁱⁱ International Institute of Gas Engineers and Managers (2005) IGE/TD/1 Ed 4 – Steel Pipelines for High Pressure Gas Transmission