



Keuper Gas Storage Project

Preliminary Environmental
Information Report – Proposed
Development Description

PREPARED FOR
Keuper Gas Storage
Limited

DATE
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ACRONYMS AND ABBREVIATIONS

Acronym	Description
AOD	Above Ordnance Datum
AGL	Above Ground Level
BS	British Standard
CA	Competent Authority
CEMP	Construction Environmental Management Plan
COMAH	Control of Major Accident Hazards
CWAC	Chester West and Chester
DCO	Development Consent Order

Acronym	Description
DEMP	Decommissioning Environmental Management Plan
DNO	Distribution Network Operator
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement and Construction
ERM	Environmental Resources Management
ES	Environmental Statement
E&I	Electrical & Instrumentation
FTE	Full Time Equivalent
GMC	Gas Marshalling Compounds
GPP	Gas Processing Plant
HAGI	Hydrogen Above Ground Infrastructure
HGV	Heavy Goods Vehicle
HSA	Hazardous Substances Authority
HSC	Hazardous Substances Consent
HSE	Health and Safety Executive
HV	High Voltage
HVAC	Heating, Ventilation and Air Conditioning
HWSA	Health and Safety at Work
KGSL	Keuper Gas Storage Limited
KGSP	Keuper Gas Storage Project
LER	Local Electrical Room
LPA	Local Planning Authority
MC	Material Change
MCM	Million Standard Cubic Metres
NB	Nominal Bore
NMC	Non-Material Change

Acronym	Description
NTS	National Transmission System
OEMP	Operational Environmental Management Plan
PCSR	Pre-Construction Safety Report
PEIR	Preliminary Environmental Information Report
POSR	Pre-Operating Safety Report
SGSP	Stublach Gas Storage Project
SMC	Solution Mining Compound
SPEN	Scottish Power Energy Networks
SRAM	Safety Report Assessment Manual

2. PROPOSED DEVELOPMENT DESCRIPTION

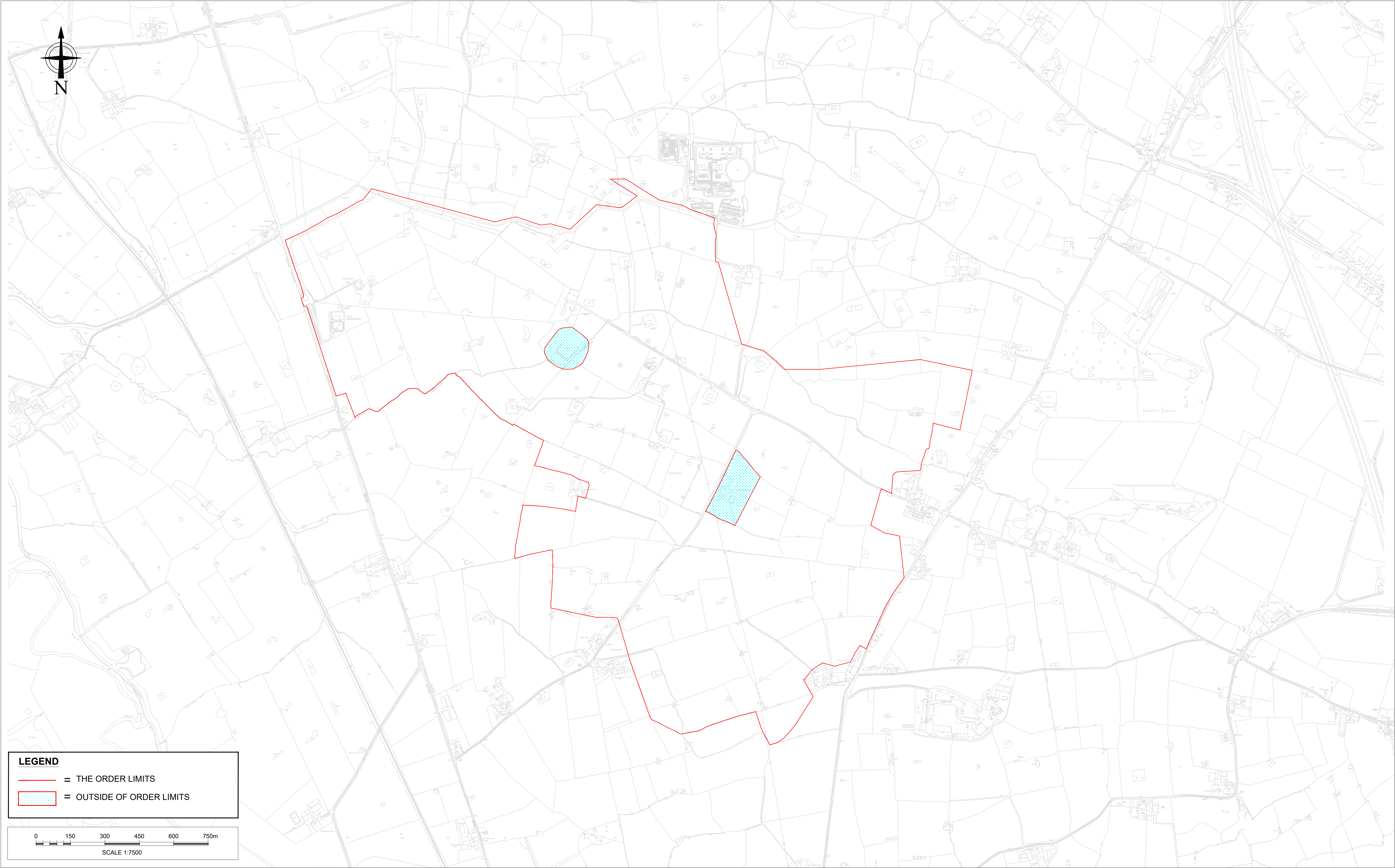
2.1 INTRODUCTION

2.1.1 OVERVIEW

- 2.1.1.1 This chapter presents the changes to the 2017 Consented DCO and the consented amendments in the Non-Material Change (NMC) (hereafter referred in the whole as the “Consented Development”) which form the Proposed Development.
- 2.1.1.2 It also describes the changes to the consented activities to be undertaken during the construction, operation and maintenance and decommissioning phases, including the Proposed Development phasing, parameters and indicative timescales.
- 2.1.1.3 This includes any further detail on any of the changes to the Proposed Development since the submission of the Scoping Report and following the receipt of the Scoping Opinion from all the key statutory consultees.
- 2.1.1.4 The alternatives that have been considered in decision-making and design for the Proposed Development are discussed in **Chapter 3, Alternatives**.

2.1.2 SITE LOCATION

- 2.1.2.1 The Site is located approximately 1 km north-west from the village of Byley, 2 km south of the village of Lach Dennis, 3 km to the north-east of the town of Middlewich and approximately 4 km from the village of Allostock.
- 2.1.2.2 The Site lies within a rural area with occasional manmade industrial features including the Holford Gas Storage Project and the Stublich Gas Storage Project which the Site is adjacent to. The topography of the Site varies between 32 – 38 m Above Ordnance Datum (AOD).
- 2.1.2.3 **Figure 2.1** shows the ‘Site Boundary’ that has been used to inform this Preliminary Environmental Information Report (PEIR). The Site Boundary is defined as the area within which the Proposed Development will be physically located, including the temporary work areas. The Site Boundary has not changed since the submission of the Scoping Report.
- 2.1.2.4 The Site Boundary includes flexibility for decisions yet to be made on aspects of siting for the Environmental Statement (ES).
- 2.1.2.5 **Figure 2.2** shows the ‘Site Layout’ including the infrastructure to be assessed as part of the Material Change (MC) application.
- 2.1.2.6 **Figure 2.3** shows a comparison of the Consented Development layout and the Proposed Development Layout.



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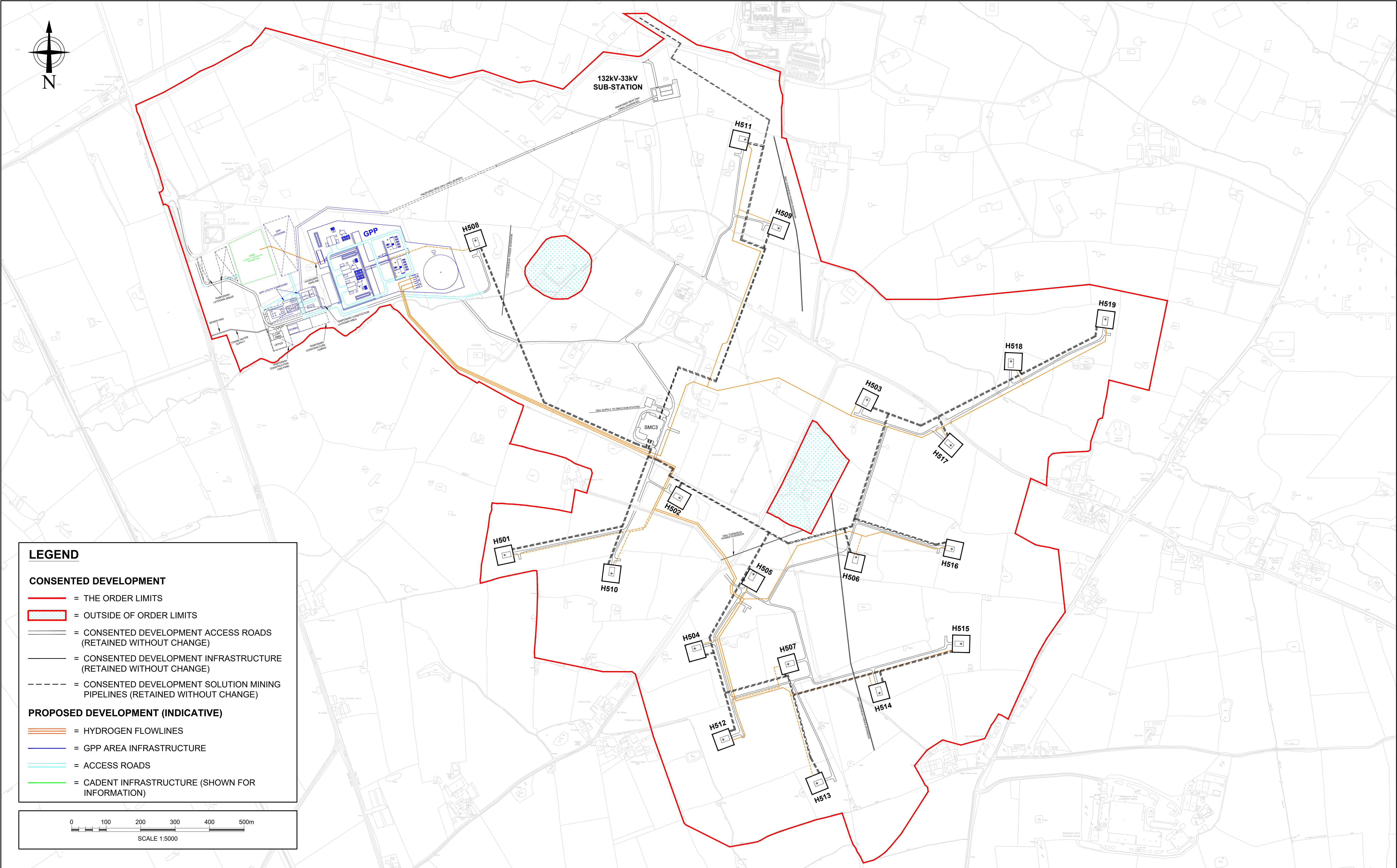


FIGURE 2.2 - HOLFORD BRINEFIELD - KGSP - GENERAL ARRANGMENT SHOWING MAIN SITE LAYOUT AREA - CONSENTED DEVELOPMENT vs PROPOSED DEVELOPMENT																			
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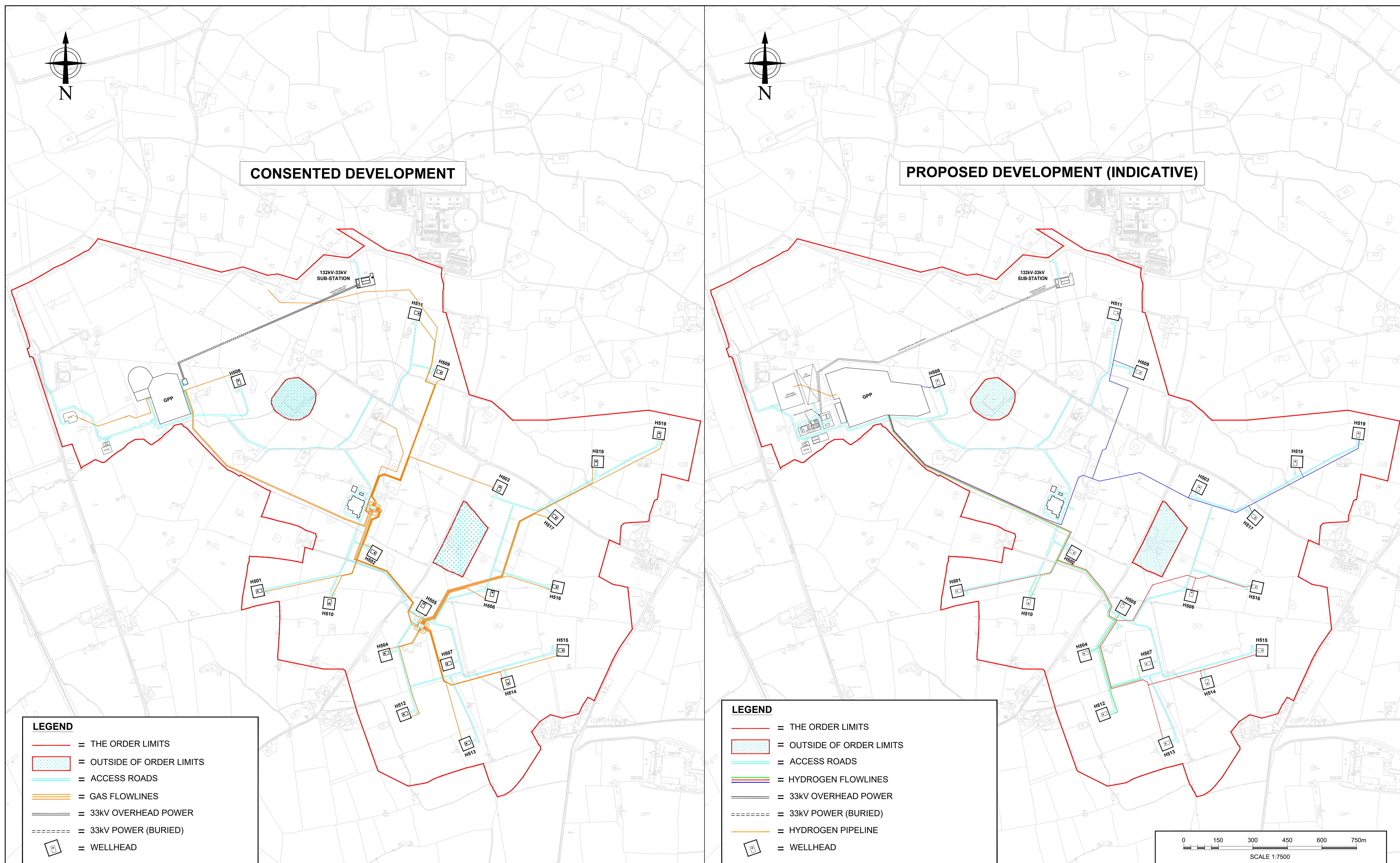


FIGURE 2.3 - HOLFORD BRINEFIELD - KGSP - GENERAL ARRANGEMENT SHOWING MAIN SITE - CONSENTED DEVELOPMENT VS PROPOSED DEVELOPMENT

[illegible]

2.2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.2.1 OVERVIEW

- 2.2.1.1 This section of the report summarises the proposed changes in relation to the Consented Development and the accompanying figures.
- 2.2.1.2 This section also includes the indicative Proposed Development programme including the key dates for the different phases of Construction, Operation & Maintenance and Decommissioning.

2.2.2 PROPOSED DEVELOPMENT CHANGES

- 2.2.2.1 The Proposed Development allows for the change from natural gas storage to hydrogen gas storage and, whilst the majority of the proposed infrastructure is the same as the Consented Development, a number of design changes are required to support this amendment.
- 2.2.2.2 Since the NMC application, the applicant has undertaken further studies including sub-surface and process safety design work. Furthermore, technologies, design standards and policy have progressed since the Consented Development. Therefore, in addition to the modification to support the change to hydrogen gas storage, the MC application will also incorporate any design developments that are required to optimise the plant and layout.
- 2.2.2.3 All proposed changes fall within the 'Site Boundary' of the Consented Development with no additional land required, as per **Figure 2.1**.

Hydrogen Storage

- 2.2.2.4 The Consented Development allows for the storage of natural gas in up to 19 underground salt caverns, with a working gas volume of approximately 550 Million Standard Cubic Metres (MCM) and an import and export capability of up to 34MCM per day.
- 2.2.2.5 The Proposed Development will store hydrogen gas rather than natural gas, with a working gas volume of approximately 400MCM and an import and export capability of up to 45MCM per day.
- 2.2.2.6 The main reason for the difference in storage capability is due to the different fluid properties of hydrogen compared to natural gas, most notably its lower density.
- 2.2.2.7 The capacity of stored gas is the only proposed change relating to the salt caverns themselves, there are no changes required to salt caverns in terms of:
- Number
 - Location
 - Size (actual volume remains the same)

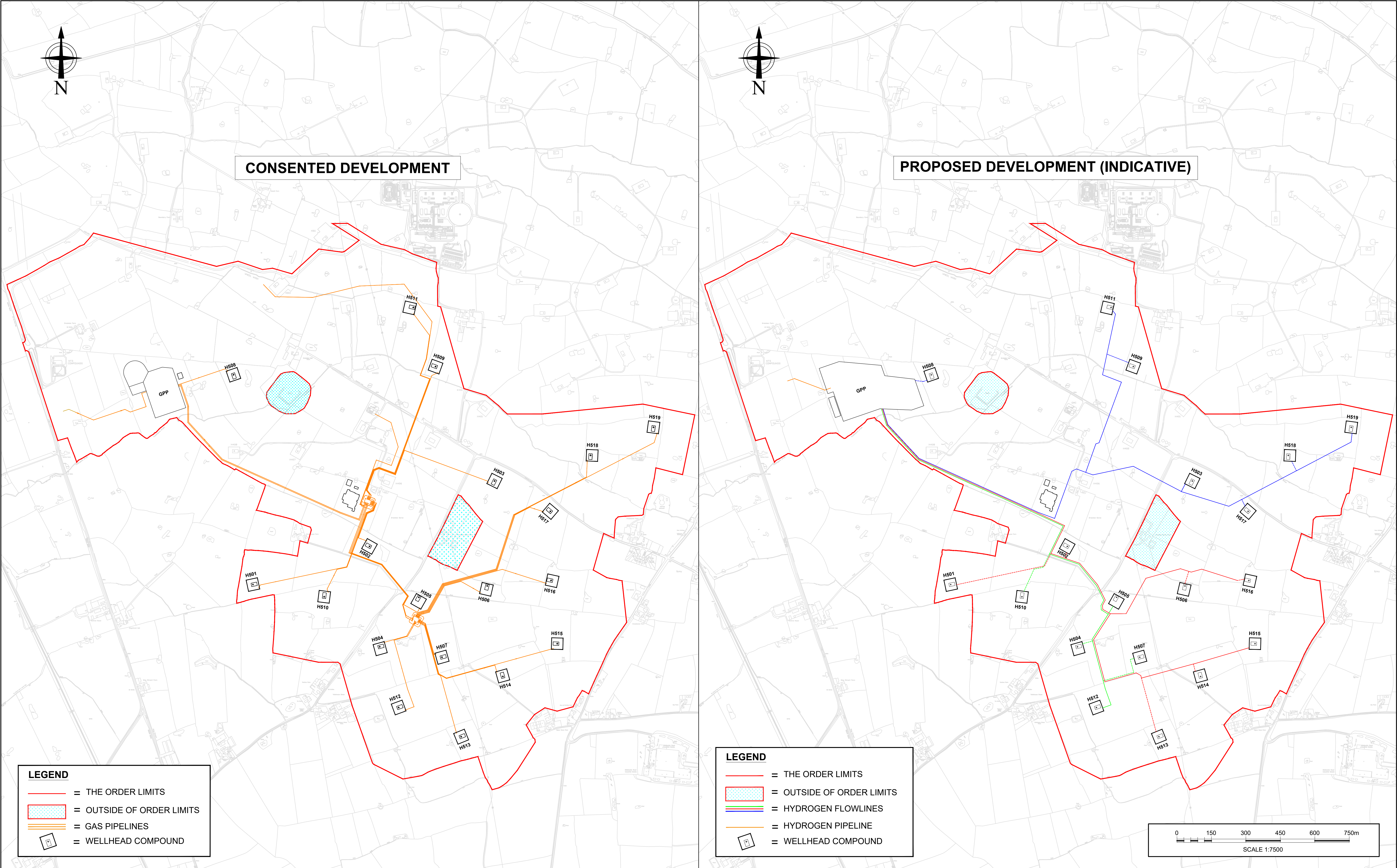
- Cavern development methodology (proven technique of solution mining)
- Wellhead compounds

2.2.2.8 A decision on the NMC application was provided by the Secretary of State in May 2024, and it was not successful for the hydrogen related amendments that had been proposed. As part of the MC application, the applicant intends to address the issues raised in response to the NMC application regarding hydrogen storage. Refer to **Chapter 4, EIA Methodology and Consultation**, for further information.

Hydrogen Pipelines

- 2.2.2.9 The Consented Development includes underground gas pipelines and Gas Marshalling Compounds (GMC) to transfer natural gas from the cavity wellheads to the Gas Processing Plant (GPP).
- 2.2.2.10 The Proposed Development will have a similar underground gas pipeline arrangement for transferring hydrogen from the cavity wellheads to the GPP.
- 2.2.2.11 However, the main differences between the two arrangements are as follows:
- Three 500-600 nominal bore (NB)¹ flowlines replace the 900 NB gas pipeline and the 200 NB first fill pipeline from the GPP to GMC3.
 - The GMC3, GMC3a, associated GMC valves and the individual gas pipelines (200-300 NB) between the GMCs and cavity wellheads are not required. Instead, the hydrogen flowlines will be routed adjacent to each wellhead compound, with individual headers then branching from the flowline to each cavity wellhead.
 - The majority of the proposed underground pipeline configuration changes will be within the open trench construction corridors as per the Consented Development. The key differences can be seen in **Figure 2.4** and **Figure 2.5**.
- 2.2.2.12 It is important to note that the desire to amend the pipelines is an operational preference, there are no significant differences from an environmental perspective between the Consented and Proposed Development pipeline arrangements.
- 2.2.2.13 The Consented Development pipework arrangement has already been confirmed as acceptable for the transfer of hydrogen gas from the cavity wellheads to the GPP (via an approved Hazardous Substances Consent (HSC)), and the Applicant may revert to this arrangement once further assessment of the implications to the HSC have been undertaken. Refer to **2.3.3.8** of this document for further information.

¹ Nominal bore" (often abbreviated as NB) refers to the approximate internal diameter of a pipe (mm), not the exact measurement, and is used as a standard way to designate pipe sizes.



TITLE				FIGURE 2.4 - HOLFORD BRINEFIELD - KGSP - GENERAL ARRANGEMENT SHOWING CONSENTED DEVELOPMENT GAS PIPELINES VS PROPOSED DEVELOPMENT HYDROGEN FLOWLINES									
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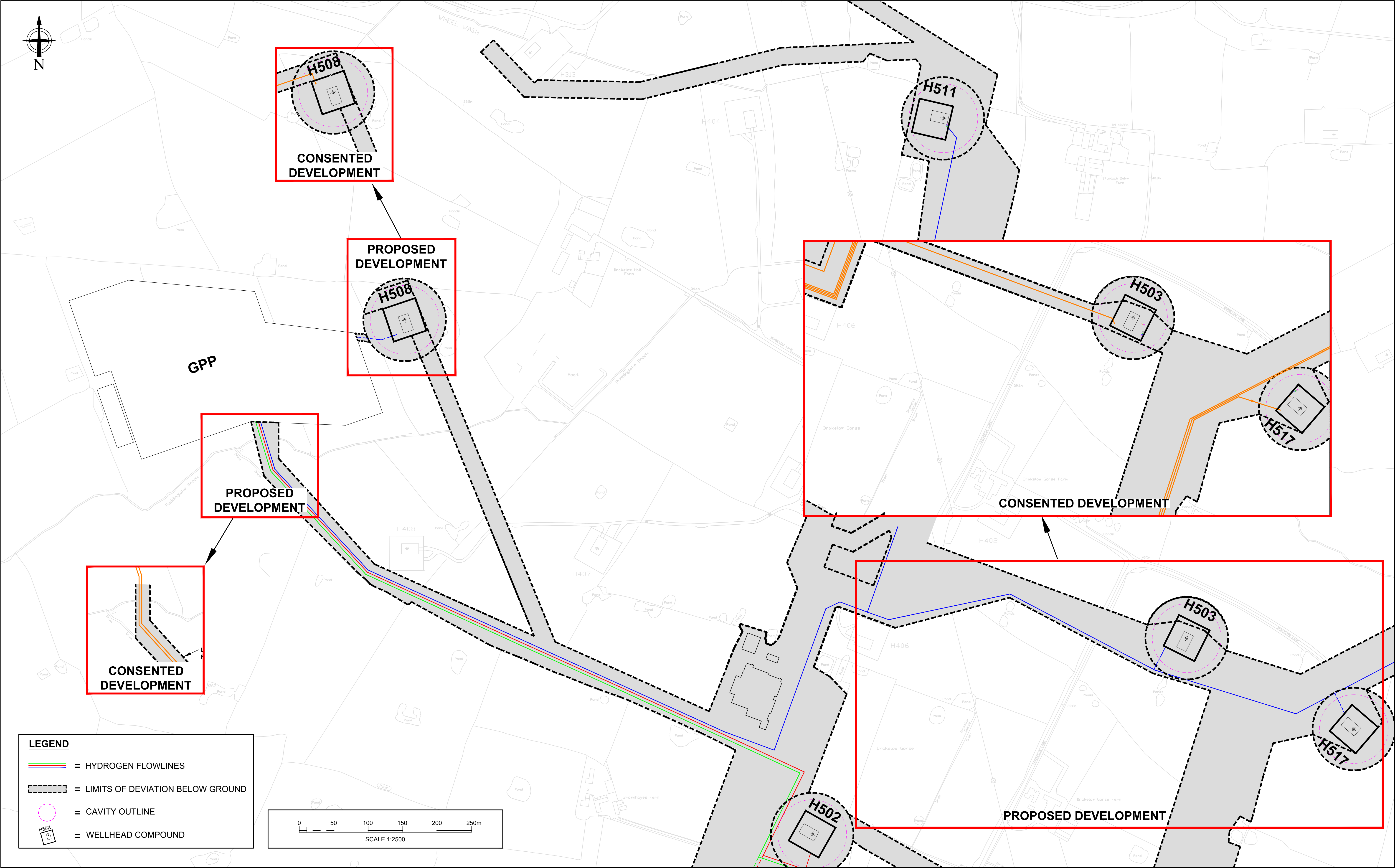


FIGURE 2.5 - HOLFORD BRINEFIELD - KGSP - HYDROGEN FLOWLINES PROPOSED BELOW GROUND LIMITS OF DEVIATION																
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Gas Processing Plant

- 2.2.2.14 The Consented Development GPP includes equipment to enable natural gas to be imported from the National Transmission System (NTS) to the underground storage cavities and to enable the export of natural gas from the underground storage cavities to the NTS.
- 2.2.2.15 The Proposed Development still requires a GPP for the same function as described above, however the gas being transferred will be hydrogen and the network connection will be a Hydrogen Above Ground Installation (HAGI) rather than the NTS.
- 2.2.2.16 The GPP for the Proposed Development will be located in the same area as the Consented Development, approximately 369886 East, 370226 North. The plant layout and certain items of equipment will be different compared to the Consented Development due to advancements in hydrogen technologies, design standards and policy.
- 2.2.2.17 The Proposed Development allows for additional space on the GPP to improve constructability and provide flexibility as the design matures with respect to process safety and the associated equipment separation distances.
- 2.2.2.18 As part of achieving this additional space, the following two layout adjustments are proposed:
- Flaring technologies (elevated flare and enclosed ground flare) have replaced the cold vent stack and the location is to move from the west to the east side of the GPP plot. This is explained in more detail below in this section.
 - The majority of the non-hydrogen infrastructure has been moved to a utility compound to the west of the GPP. This is explained in more detail below in this section.
- 2.2.2.19 A summary of the main equipment, buildings and plant that will be located in the GPP are presented below:
- Three compression train areas, consisting of the following equipment per train;
 - Compressor unit located within a building
 - 2no. Heating, Ventilation and Air Conditioning (HVAC) units located within buildings
 - Valve module/skid
 - Gas coolers (air cooled heat exchangers)
 - Local Electrical Room (LER)
 - Other minor ancillaries (connecting pipework, flowmeters, valves, knockout drums, separators, filters, lube oil skid, motor cooling water skid, cooling jacket skid, hydraulic power unit, odour removal vessels etc).

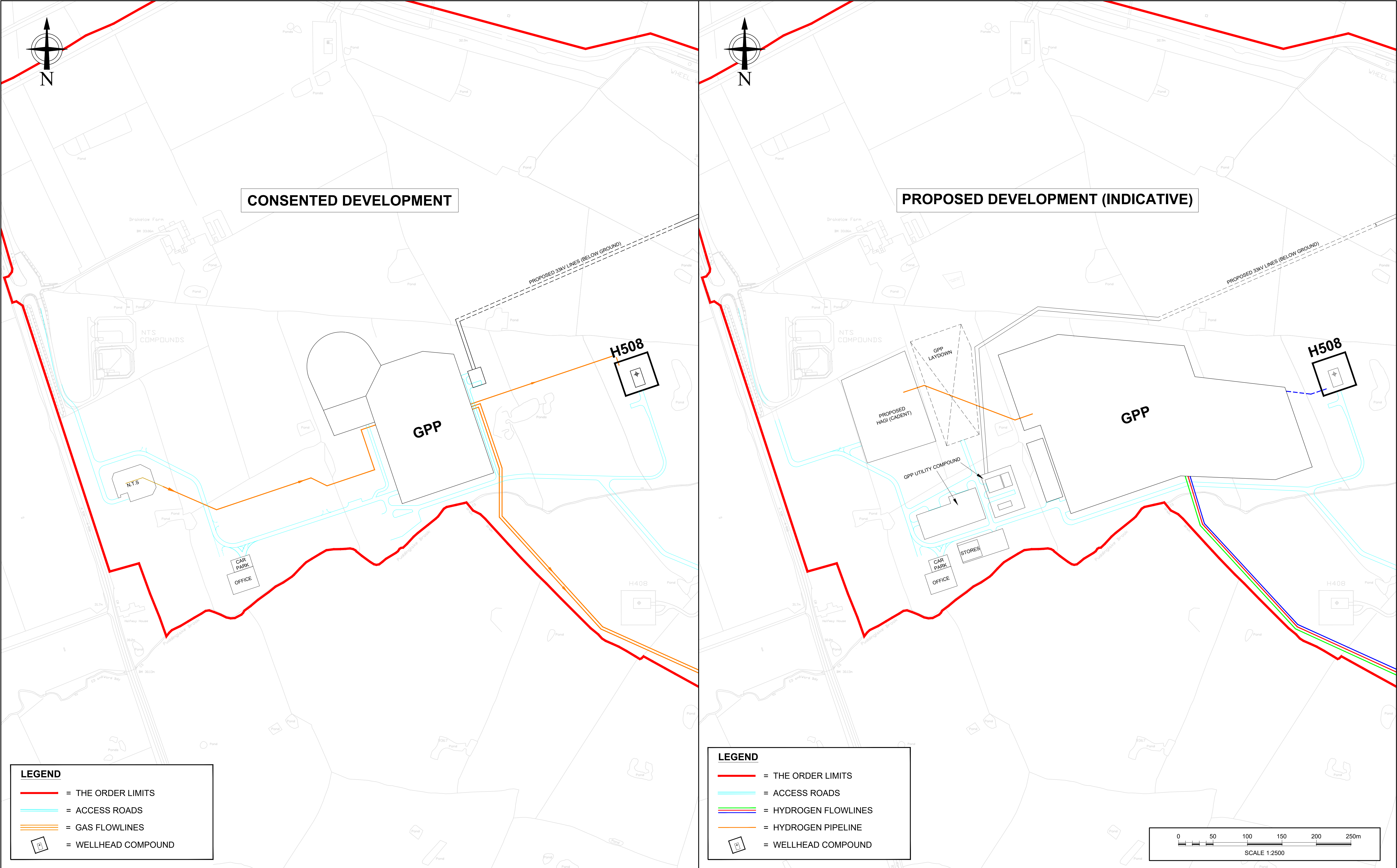
- Two dehydration trains consisting of the following equipment per train;
 - 5no. vessels
 - Valve module/skid
 - Electric regeneration heater
 - Gas coolers (air cooled heat exchangers)
 - Other minor ancillaries (connecting pipework, flowmeters, valves, knockout drums, separators etc.)
- Fiscal metering;
 - Metering package (complete with pipework, flowmeters, valves)
 - Metering package analyser room
- Pig receiving facilities
- Fire walls;
 - Low level fire walls around the pig receiving facilities and fiscal metering.
 - Fire walls may be utilised between the dehydration trains and/or compressor buildings (up to the height of the equipment).
- Elevated flare. (This is explained in more detail below in this section.)
- Enclosed ground flare. (This is explained in more detail below in this section.)
- Surface water attenuation pond.
- Access & Security (internal roads, lighting, fencing, CCTV).
- Minor ancillaries:
 - Process drainage (vessels, transfer pumps)
 - Surface water drainage (vessel, sump, transfer pumps)
 - Standby generator
 - Hydrogen/Fuel gas storage bottle rack
 - Vent/flare (knockout drum and heater, snuffing package, small bore atmospheric venting pipework/tubing)
 - Connecting pipework and valves between the main equipment areas (vast majority will be underground).

2.2.2.20 A summary of the key modifications to the GPP are detailed in **Table 2.1**:

TABLE 2.1 – GPP KEY MODIFICATIONS

Item	Consented Development	Proposed Development
GPP Plot Area	~3.8 ha ~352 ha site, GPP is 1.1% of total plot	~7.7 ha ~352 ha site, GPP is 2.2% of total plot
Compressors	3 compressors and buildings (x2 normal operation and x1 first gas fill) (20m x 28m, 10m AGL), (6m x 28m, 7m AGL)	3 compressors and buildings (24m x 28m, up to 15.2m AGL)
Dehydration	4 drying towers (4m x 4m, 10m AGL) 6 dehydration regeneration heaters (gas fired) 2 water heater buildings 2 glycol storage facilities 4 gas pre-heater boiler vents 6 glycol regeneration boiler vents	10 drying towers (5m diameter, up to 13m AGL) 2 dehydration regeneration heaters (electric)

2.2.2.21 The changes to the GPP area are shown on **Figure 2.6** and **Figure 2.7** below.



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FIGURE 2.6 - HOLFORD BRINEFIELD - KGSP - GENERAL ARRANGEMENT SHOWING GPP AREA - CONSENTED DEVELOPMENT VS PROPOSED DEVELOPMENT														
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GPP Venting & Flaring

2.2.2.22 Since the submission of the Scoping Report in April 2025, the applicant has progressed with design work on process and technical safety and have made the following design decisions regarding venting and flaring:

- **Emergency Flaring:** An elevated flare will be used to depressurise and safely shutdown the GPP in an emergency situation. There will be rare usage of the elevated flare in a typical year, however this will only be for testing and maintenance of the flare itself, completed during normal working hours.
- **Maintenance Flaring:** During normal maintenance, as much hydrogen as possible will be diverted and recovered back to the cavern storage, with only residual levels requiring flaring. An enclosed ground flare will be used for this residual hydrogen throughout the year, in order to depressurise and safely remove hydrogen from the GPP equipment so that it can undergo maintenance. This will involve the flaring of low flowrates of hydrogen during normal working hours.

2.2.2.23 A summary of the Proposed Development flaring technologies vs the Consented Development venting is presented in **Table 2.2** below:

TABLE 2.2 – MODIFICATIONS TO GPP DEPRESSURISATION

Item	Consented Development	Proposed Development
Venting / Flaring Technology	Emergency Cold Vent (emergency and maintenance events)	Elevated Flare (emergency events, 1 in 10+ years) AND Enclosed Ground Flare (maintenance events, multiple times a year)
Venting / Flaring Elevation and Arrangement	Emergency Cold Vent Stack: • Diameter = 0.6m • Height = 25m	Elevated Flare: • Diameter = 2m • Height = up to 50m AGL • No permanent pilot light Enclosed Ground Flare: • Diameter = 5m • Height = up to 15m AGL

Item	Consented Development	Proposed Development
		• Complete with fuel gas skid (12m x 8m, up to 4m AGL) • May require a continuous pilot light using hydrogen, however, this will be confirmed for the ES.

2.2.2.24 The heights of both flare options have been assessed as a worst-case for the PEIR and the rationale behind the decision to select the elevated flare and enclosed ground flare will be discussed in **Chapter 3, Alternatives.**

2.2.2.25 Whilst the configuration and layout will continue to be refined for the ES as the design of the Proposed Development progresses; it is anticipated any further changes will likely be beneficial from an environmental perspective.

2.2.2.26 Therefore, this PEIR will assess the proposed changes to the site layout from a worst-case scenario.

2.2.2.27 **Figure 2.8** details the proposed flaring arrangement and how it compares to the Consented Development.

GPP Utility Compound

- 2.2.2.28 As mentioned above, moving non-hydrogen equipment to a utility compound located to the west of the GPP will create additional space for design development and equipment separation that may be required on the GPP as the process safety design progresses.
- 2.2.2.29 The proposed utility compound is located within the limits of deviation for the Consented Development, however as this proposed change is being sought purely to allow the flexibility with the GPP design for hydrogen, it is being considered in this MC application, and subsequently the PEIR and ES.
- 2.2.2.30 The utility compound will consist of non-hydrogen infrastructure described below:
- 33kV Substation (moved from the east side of the Consented GPP to the utility compound).
 - 11kV Switchroom (moved from the Consented GPP to the utility compound).
 - Electrical & Instrumentation (E&I) building (located throughout the Consented GPP, moved to the utility compound)
 - Nitrogen Plant (moved from the Consented GPP to the utility compound).
 - Compressed Air Plant (not included in the Consented Development, now included in the utility compound).
 - Minor Ancillaries (located throughout the Consented GPP, moved to the utility compound).
- 2.2.2.31 **Figure 2.9** details the GPP Utility Compound and how it compares to the Consented Development.

GPP Laydown Area

- 2.2.2.32 The Consented Development includes 6 temporary construction laydown areas, 5 are located in or around the GPP area and the remaining laydown area is located at the GMC3 compound.
- 2.2.2.33 An additional GPP temporary construction laydown area is required to the west of the GPP for the Proposed Development, for storage of process equipment and construction materials during the GPP construction.
- 2.2.2.34 **Figure 2.9** details the GPP laydown area and how it compares to the Consented Development.

Maintenance Stores Building

- 2.2.2.35 A maintenance stores building and fenced compound/access area is required to hold critical spare parts and equipment for maintenance and operation activities.
- 2.2.2.36 This will be located adjacent to the consented Office Building. **Figure 2.9** details the maintenance stores building and how it compares to the Consented Development.

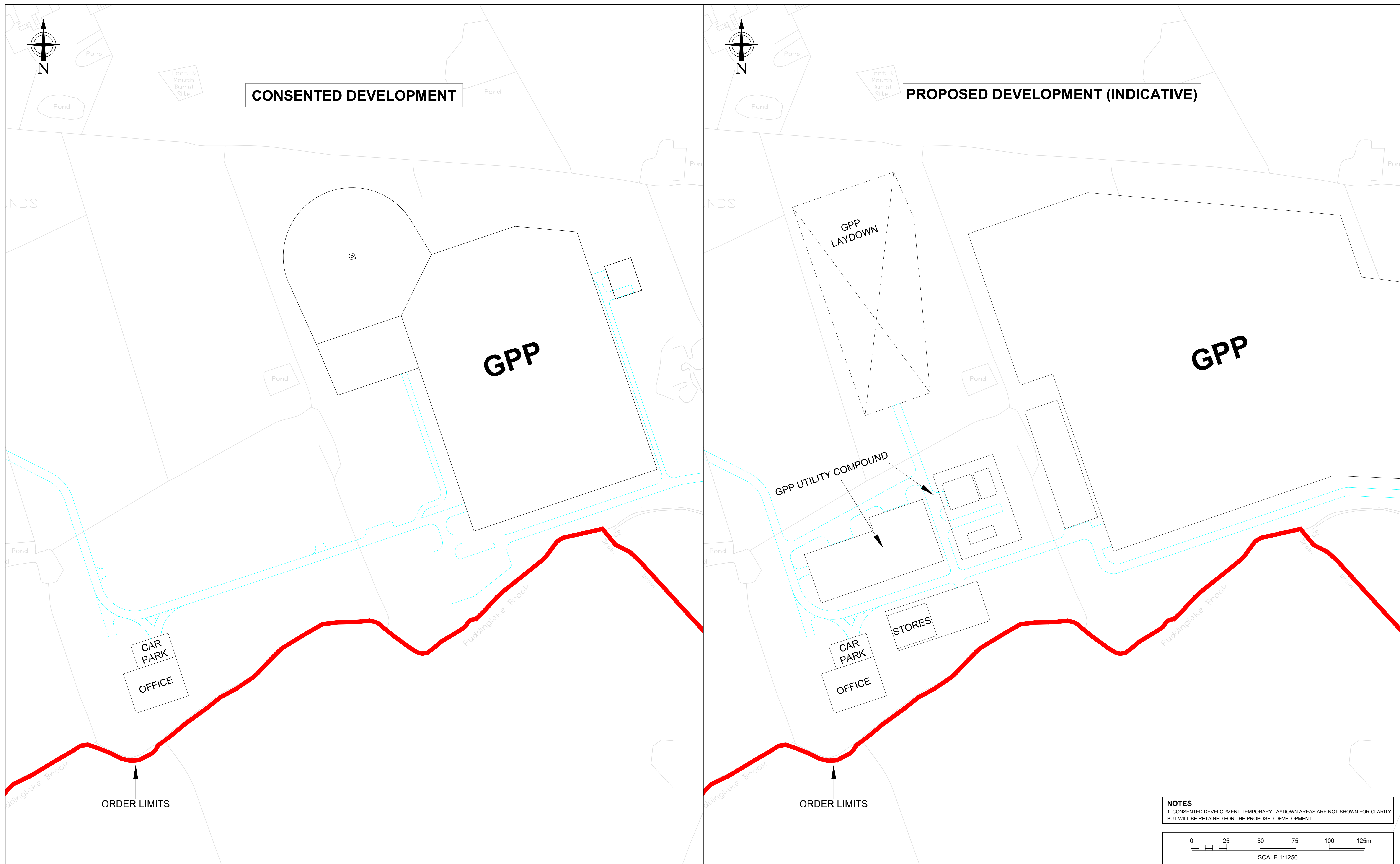


FIGURE 2.9 - HOLFORD BRINEFIELD - KGSP - CONSENTED DEVELOPMENT GPP AREA VS PROPOSED DEVELOPMENT GPP UTILITY COMPOUND & STORES

[illegible]

Hydrogen Above Ground Installation (HAGI)

- 2.2.2.37 To support the change from natural gas to hydrogen, the proposed NTS compound for natural gas is being replaced by the HAGI for connection to the HyNet hydrogen transmission system.
- 2.2.2.38 The NTS from the Consented Development will no longer be constructed, and instead the HAGI will be progressed by Cadent as part of the HyNet North West Hydrogen Pipeline project. The construction, operation & maintenance and decommissioning of the HAGI is not part of the Proposed Development, however elements of the connection infrastructure will be located within the HAGI compound. The HAGI has been included in the PEIR and layout drawings for informative purposes and to consider cumulative effects. (refer to **Figure 2.10**). The footprint of the HAGI will be assessed as part of the HyNet North West Hydrogen Pipeline DCO application.
- 2.2.2.39 Due to existing underground natural gas infrastructure, the HAGI cannot be located in the same place as the NTS, instead it will be located nearer to the west of the GPP.
- 2.2.2.40 With the replacement of the NTS with the HAGI, this PEIR will assess the GPP network connection pipework re-routing and its change from operating with natural gas to operating with hydrogen. The diameter and approximate length of the pipework remains consistent with the Consented Development.

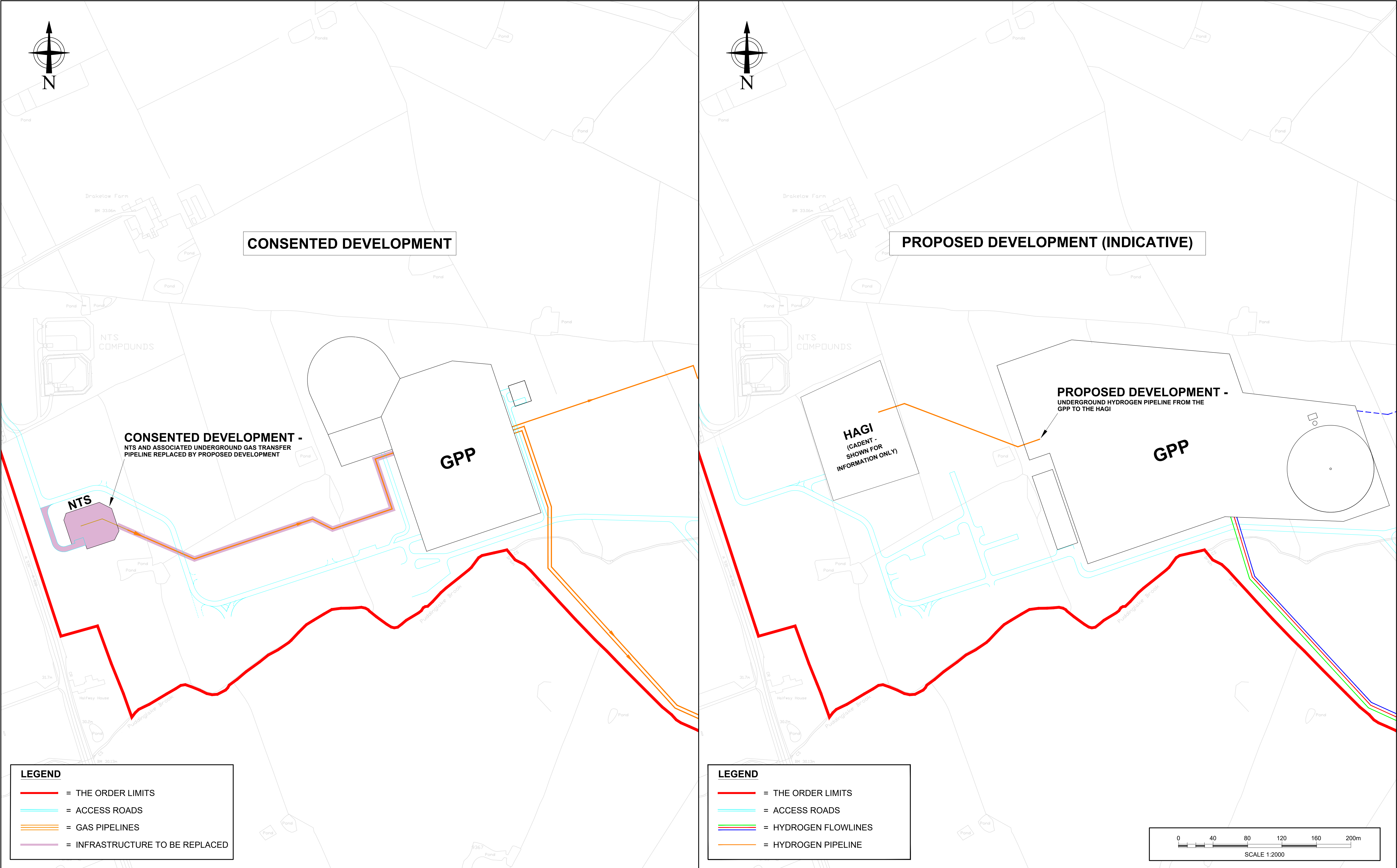


FIGURE 2.10 - HOLFORD BRINEFIELD - KGSP - GENERAL ARRANGEMENT SHOWING CONSENTED DEVELOPMENT NTS VS PROPOSED DEVELOPMENT HAGI									
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Site Roads

2.2.2.41 Modifications will be made to the internal site roads due to:

- Access to the GPP utility compound;
- Modifications to the GPP layout;
- Access to an additional GPP laydown area;
- Access to the Maintenance Stores building.

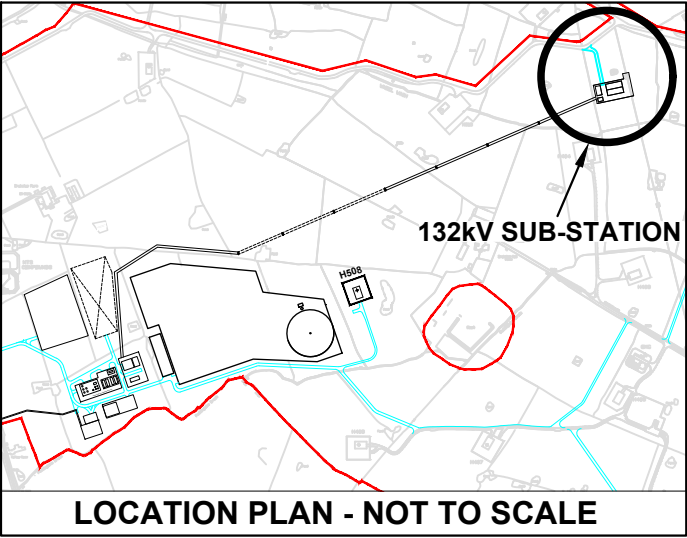
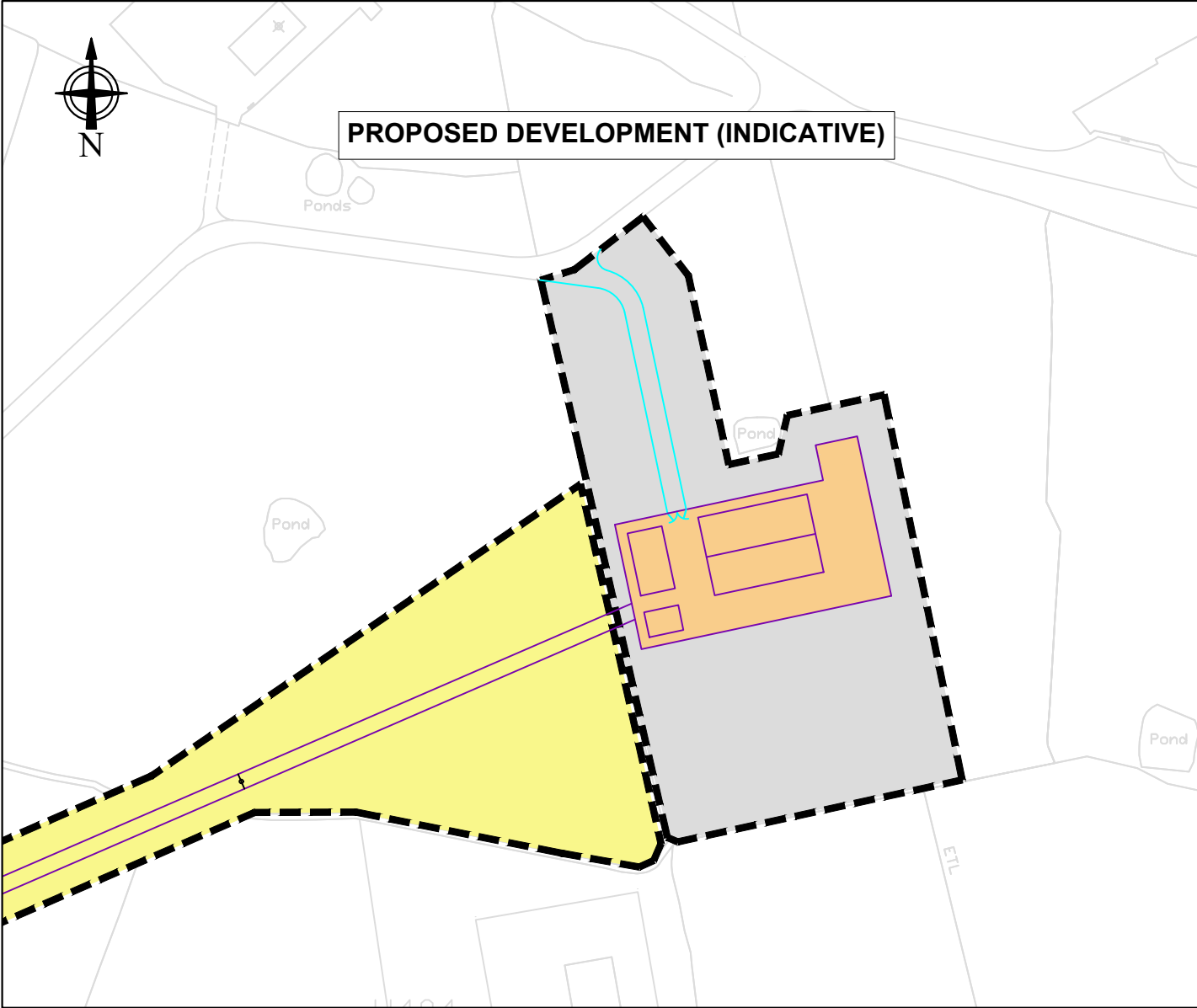
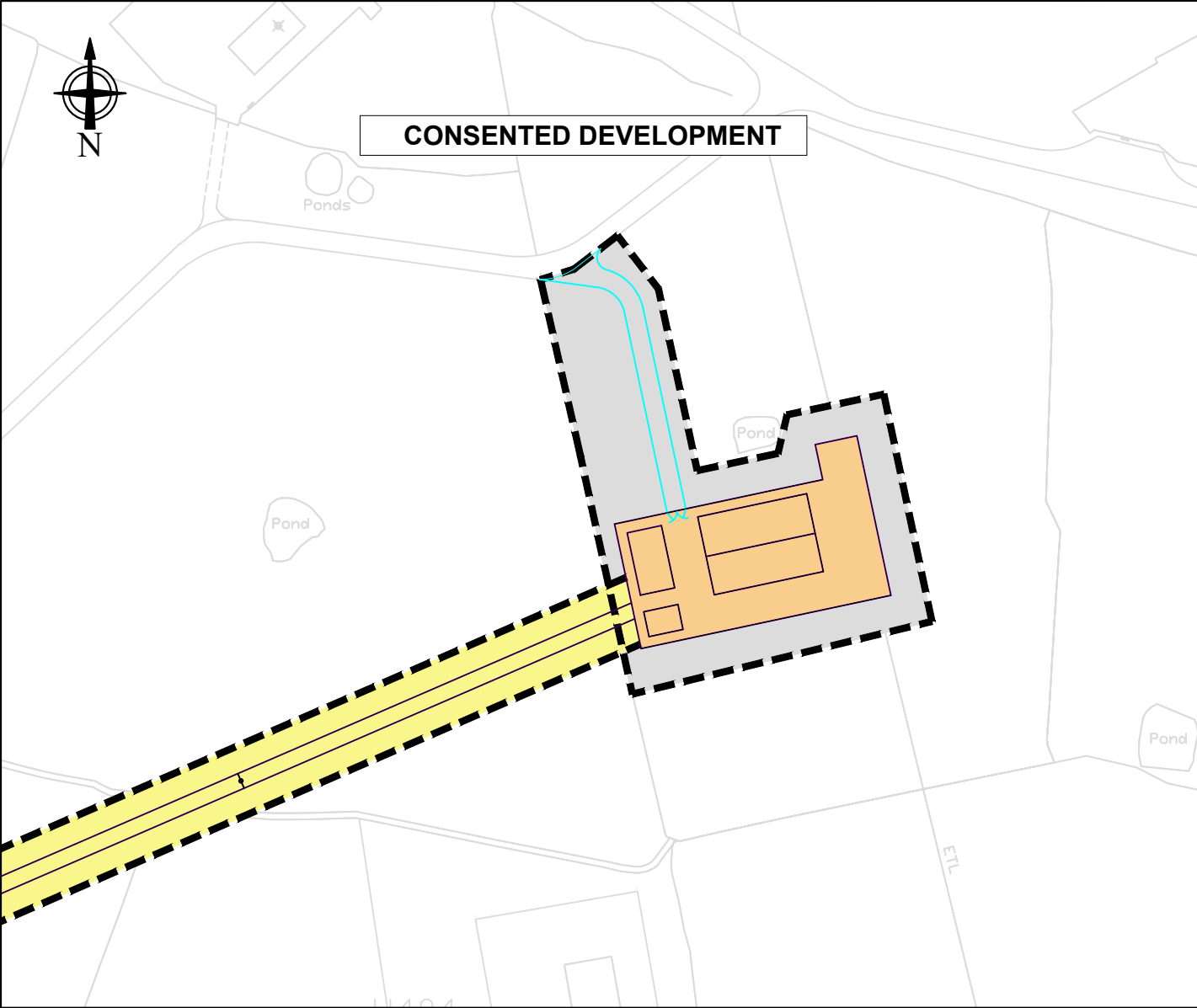
2.2.2.42 These changes are shown on below **Figure 2.11**. Any other potential road modifications will be minor and within the limits of deviation for the Consented Development; and are therefore not considered further within this PEIR.



TITLE									
FIGURE 2.11 - HOLFORD BRINEFIELD - KGSP - GENERAL ARRANGEMENT GPP AREA - SITE ROADS - CONSENTED VS PROPOSED DEVELOPMENT									
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132kV Substation

- 2.2.2.43 The Consented Development includes a 132kV substation which will power the 33 kV substation at the GPP. The connection is to be provided by Scottish Power Energy Networks (SPEN) and fed directly from the existing overhead 132kV powerlines.
- 2.2.2.44 The Proposed Development retains the need for the 132kV substation for the same function, however, since the Consented Development, a connection offer from the electrical Distribution Network Operator (DNO), SPEN, proposed that the final connection location to the existing 132kV powerlines and compound location would need to be amended compared with the preliminary design.
- 2.2.2.45 The applicant continues to work with the DNO to finalise the design and layout of the connection compound, however it should be anticipated that some flexibility will be required to allow the DNO to provide the most appropriate connection arrangement.
- 2.2.2.46 Therefore, the Proposed Development seeks to expand the limits of deviation to account for the required flexibility in final substation location.
- 2.2.2.47 There is no change proposed to the Consented Development for the height of the infrastructure, the equipment and/or the size of the compound.
- 2.2.2.48 **Figure 2.12** details the proposed 132kV substation amendments and how it compares to the Consented Development.



LEGEND

=

132kV SUB-STATION

=

ACCESS ROAD

=

LIMITS OF DEVIATION ABOVE GROUND (WORK No. 6 & 25)

=

LIMITS OF DEVIATION ABOVE GROUND (WORK No. 26)

TITLE									
FIGURE 2.12 - HOLFORD BRINEFIELD - KGSP - 132kV SUB-STATION - CONSENTED DEVELOPMENT LIMITS OF DEVIATION VS PROPOSED DEVELOPMENT LIMITS OF DEVIATION - ABOVE GROUND									
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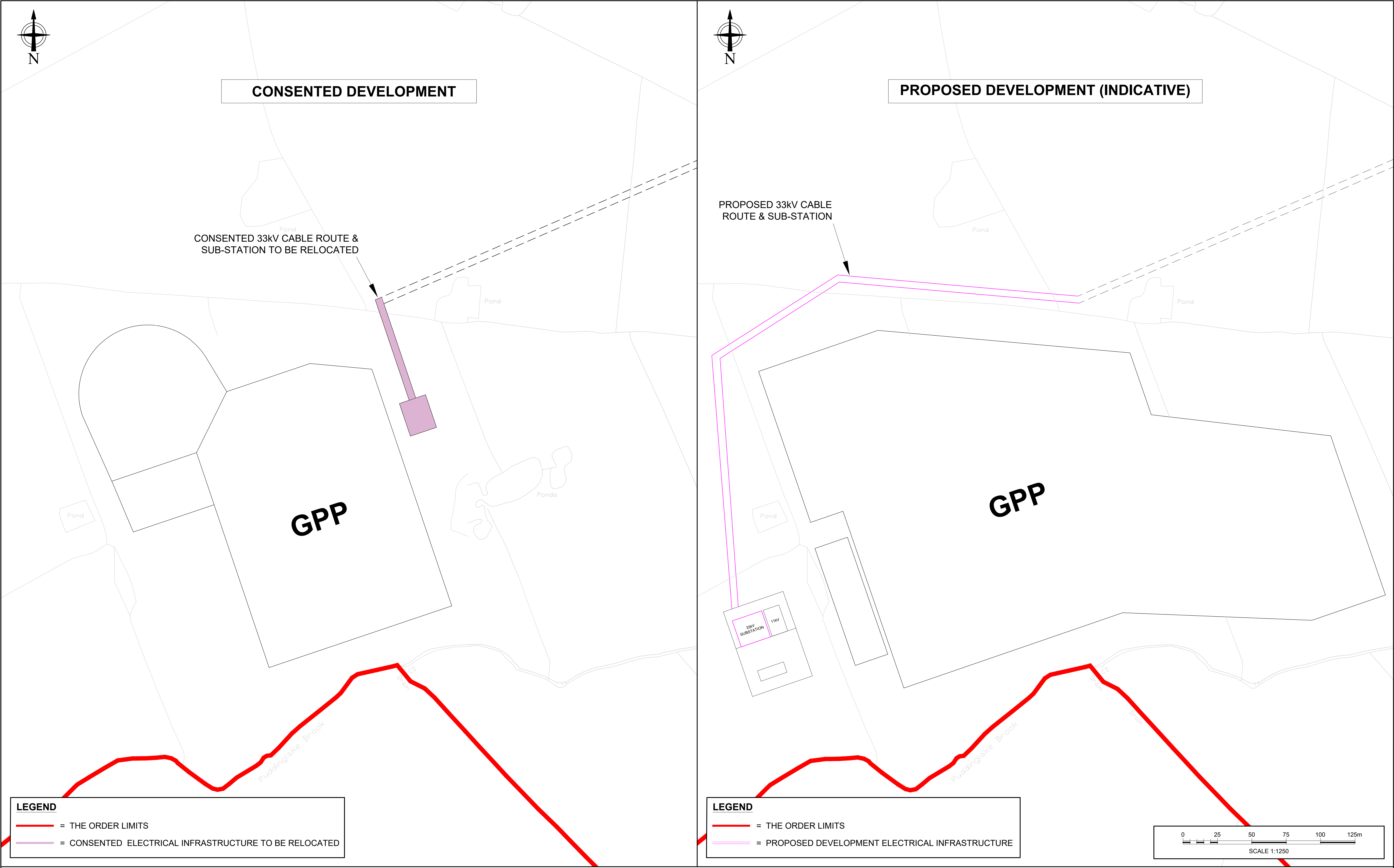
33kV Cables

2.2.2.49 The Consented Development includes 33kV cables routed from the 132kV substation, discussed above, to the 33kV substation at the GPP.

2.2.2.50 The Proposed Development will amend the 33kV cable routing due to the following aforementioned modifications:

- 33kV substation proposed to move from the Consented Development GPP location to the Proposed Development GPP Utility Compound.
- 132kV substation connection and compound location requires flexibility to allow the DNO to provide the most appropriate connection arrangement.

2.2.2.51 **Figure 2.13** details the proposed amendments to the cable routing.



TITLE										FIGURE 2.13 - HOLFORD BRINEFIELD - KGSP - GP AREA - CONSENTED ARRANGEMENT VS PROPOSED ARRANGEMENT - 33kV POWERLINES									
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SMC3

- 2.2.2.52 The infrastructure at the consented compound, known as Solution Mining Compound 3 (SMC3) in the Consented Development, will be significantly reduced. An existing SMC at Stublach Gas Storage (off-site) will be used to assist the solution mining of the underground storage cavities, with only limited utility and distribution functions required at the SMC3 compound.
- 2.2.2.53 The existing SMC at Stublach has been noted in this PEIR for completeness, however, it does not form part of this MC application as it is an operational asset to be utilised off-site and does not need to be constructed or materially altered.
- 2.2.2.54 The footprint area of SMC3 will remain as consented and all equipment will be retained as described within the Consented Development unless stated otherwise below.
- 2.2.2.55 The key elements of SMC3 that will not be constructed under the Consented Development are the pumphouse building, pumps, and the degassing tanks.

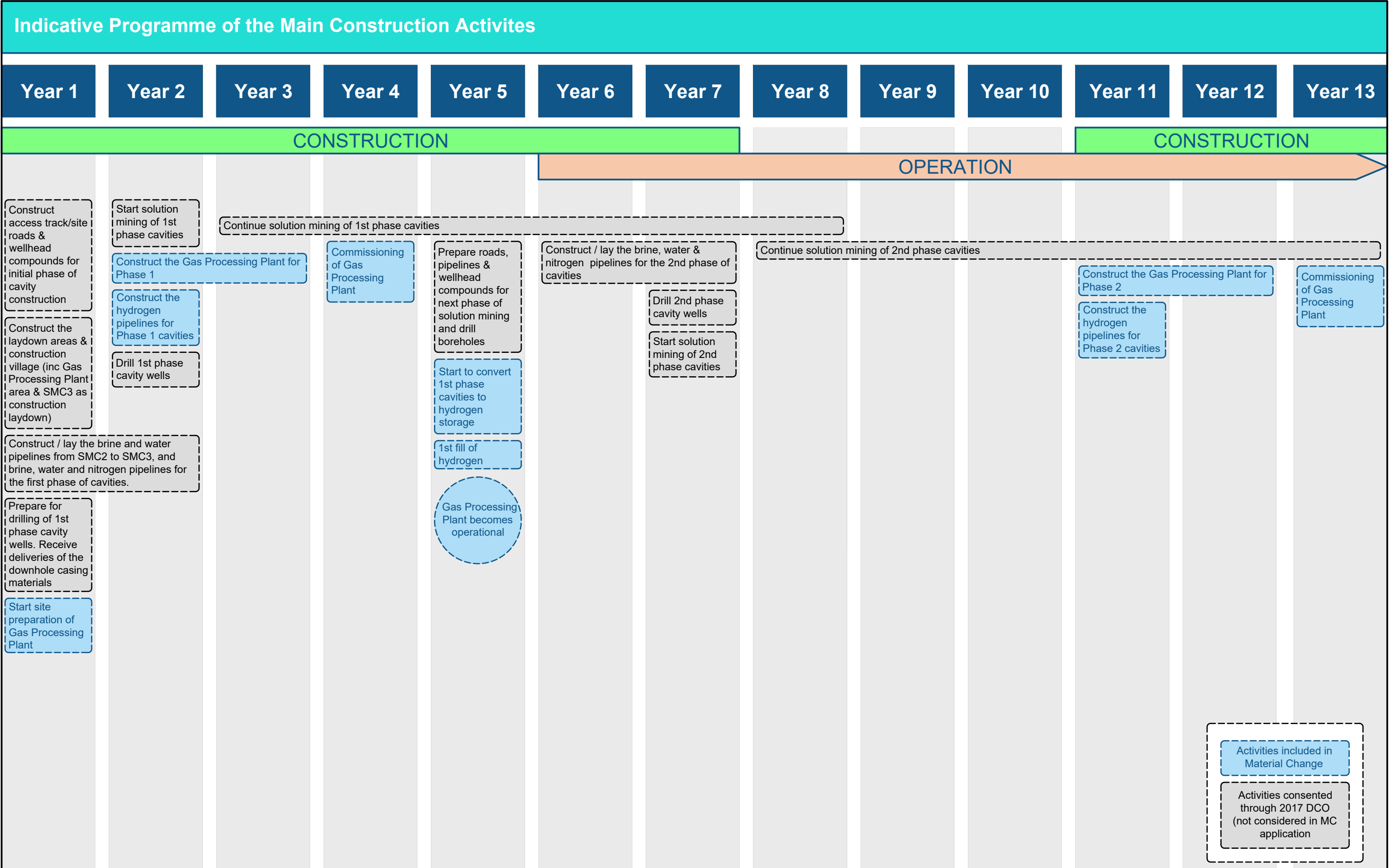
2.2.3 ITEMS REMOVED FROM MC APPLICATION SINCE SCOPING REPORT

- 2.2.3.1 There are several amendments that were discussed in the Scoping Report that have now been removed from consideration in the MC for the Proposed Development.
- 2.2.3.2 The intention is that these aspects are either no longer required or will be secured separately through the discharging of the Consented Development DCO requirements with Chester West and Chester Council (CWAC).
- 2.2.3.3 The items removed are as follows:
- Office building car park extension (2.5.2.13 of the Scoping Report).
 - Security gatehouse (2.5.2.14 of the Scoping Report).
 - New compressed air package located at SMC3 (2.5.2.17 of the Scoping Report).
 - Minor amendments to the layout of above ground equipment within each wellhead compound (2.5.2.18 of the Scoping Report).
 - 33kV power cable from SMC3 to the GPP area to provide temporary construction power (2.5.2.27 of the Scoping Report).

2.2.4 PROPOSED DEVELOPMENT PROGRAMME

- 2.2.4.1 Construction of the Consented Development began in 2022. Elements of the Consented Development, which are not proposed to be amended in this MC application, will continue to be discharged and constructed.

- 2.2.4.2 Continuing to discharge the Consented Development for the purpose of construction will be managed with the relevant Local Planning Authority (LPA), for the majority of the Consented Development, this is CWAC. Consultation has been held with CWAC to confirm the Applicants intention to continue construction of elements not proposed to change.
- 2.2.4.3 Following approval of this MC Amendment, the indicative programme for the rest of the Proposed Development is based upon assumed dates and is split into key activities as shown in **Figure 2.14**.
- 2.2.4.4 **Figure 2.14** includes construction activities for the Consented Development (shown in grey) and the construction activities for the Proposed Development (shown in blue), the latter being considered in the MC application, and subsequent PEIR and ES.



2.3 CONSTRUCTION OF THE PROPOSED DEVELOPMENT

2.3.1 OVERVIEW

- 2.3.1.1 The construction methodology for the Proposed Development has not changed materially from the Consented Development.
- 2.3.1.2 Refer to Section 5.5 of the Consented Development ES to view the general construction methodology for drilling, solution mining, gas pipelines and gas processing infrastructure.
- 2.3.1.3 The following information below has been included for completeness of the PEIR.

2.3.2 CONSTRUCTION WORKING HOURS

- 2.3.2.1 The Proposed Development does not require any changes from the Consented Development construction working hours.
- 2.3.2.2 As per the Consented Development, the construction working hours will be during the daytime from 07:00 – 19:00 between Monday to Friday, and 08:00 to 13:00 on Saturdays.
- 2.3.2.3 No construction working will take place on Sundays, or Bank or Public Holidays, unless with specific agreement with CWAC, with the exception of the 24-hour drilling of the salt caverns.
- 2.3.2.4 No construction will take place outside of the above periods without the specific agreement of CWAC and/or in the event of an emergency.

2.3.3 SAFETY AND ENVIRONMENTAL MANAGEMENT

- 2.3.3.1 The construction of the Proposed Development may require one or more permits from the relevant statutory body, which will not form part of the MC application and will be the subject of separate applications. The applicant will consult with the respective departments to confirm which permits will be required and to initiate the application process at appropriate points in the programme. Further information will be provided within the ES.
- 2.3.3.2 The Consented Development allows for the total storage of approximately 820MCM of natural gas, which given the quantity stored and nature of the fluid, brings it within the Control of Major Accident Hazards (COMAH) Regulations as an upper-tier establishment.
- 2.3.3.3 Similarly, based on the expected total storage of approximately 600MCM of hydrogen gas, the Proposed Development will still be within the scope of the COMAH Regulations as an upper-tier site, and along with all its different components will comprise the COMAH establishment.
- 2.3.3.4 The COMAH Regulations require upper-tier sites to prepare a safety report. The Applicant will demonstrate that all necessary measures

have been taken to prevent major accidents and to limit the consequences to people and the environment, during future operations.

- 2.3.3.5 The Proposed Development will closely engage with the Competent Authority (CA) throughout development to ensure that safety concerns are adequately addressed within the design and safety report. This includes all relevant risks assessed **Chapter 15, Major Accidents and Disasters**.
- 2.3.3.6 In accordance with the Planning (Hazardous Substances) Act 1990, the presence of a hazardous substance on, beneath, or above land (when exceeding specified thresholds for that substance), requires formal consent (HSC), from the designated Hazardous Substances Authority (HSA), which in this case is the LPA (CWAC).
- 2.3.3.7 CWAC will consult the Health and Safety Executive (HSE) on the application to consider whether the presence of a significant quantity (referred to as the 'Controlled Quantity') of a hazardous substance is acceptable in a particular location.
- 2.3.3.8 The Applicant has already obtained an HSC for the presence by means of storage, compression and treatment of hydrogen gas (21/04921/HAZ). However, given the potential impact of the Proposed Development (notably the preference to change to a hydrogen flowline arrangement, as described in **2.2.2.9** onwards), the Applicant is currently assessing the requirement to amend the HSC. Any amendment to the HSC is likely to be submitted to the HSA for approval prior to or alongside the submission of the MC application.
- 2.3.3.9 A Construction Environmental Management Plan (CEMP) will be updated to set out the measures to be applied for effective management of safety, health, environmental and social impacts during the construction of the Proposed Development. The CEMP will be included as part of the MC application to demonstrate there will be mechanisms in place to secure and deliver the mitigation measures described in the PEIR and ES.
- 2.3.3.10 The documents and topic-specific management plans introduced in the CEMP will be developed as the Proposed Development progresses through the FEED and detailed design processes will be adopted and further developed, monitored and maintained by the Applicant's Engineering, Procurement and Construction (EPC) contractor.
- 2.3.3.11 The appointed EPC Contractor will work with specialist advisors (e.g. ecologists, archaeologists) to ensure that construction activities are carried out in accordance with the requirements of the CEMP.
- 2.3.3.12 A CEMP for the Proposed Development (which will fully reflect and add detail to the updated Outline CEMP submitted to be included as part of the ES) will be prepared by the EPC Contractor and submitted to CWAC for review, finalisation, and approval prior to commencing

works. The CEMP will take into account the results of any discussions with regulators and consultees and include details of the requirements imposed by the MC and other permissions and consents obtained.

2.3.4 EMISSIONS, DISCHARGES AND WASTES HANDLING

Construction Waste

- 2.3.4.2 Waste will be generated from site clearance, excavations, and ancillary works during the construction stage. During site preparation and excavations, there is a residual risk of encountering contaminated materials.
- 2.3.4.3 The process to remove construction waste off-site will be the same as the Consented Development and any changes to construction waste volumes will be discussed in **Chapter 16, Waste**.

Noise Emissions

- 2.3.4.4 British Standard (BS) 5228 is of particular relevance to noise generated by the construction and decommissioning of the Proposed Development. The standard refers to the need for the protection against noise and vibration of persons living and working in the vicinity of and those working on construction and open sites.
- 2.3.4.5 For residential receptors, construction noise has been assessed using BS 5228-115 with reference to the 'ABC method'. The ABC method defines criteria at building facades on the basis of existing noise levels as set out in the British Standard.

2.3.5 CONSTRUCTION TRAFFIC

- 2.3.5.1 As per the Scoping Report, it is not anticipated there will be any changes to construction traffic for the Proposed Development and construction traffic numbers will be the same as reported for the Consented Development.
- 2.3.5.2 Construction traffic associated with the Proposed Development would continue to follow the Heavy Goods Vehicle (HGV) Routing agreement secured as part of the Consented Development. The primary access to the Proposed Development area is from the A530 King Street via a purpose-built priority junction constructed to the appropriate Industrial Estate standards and no upgrade is required.
- 2.3.5.3 As set out in **Section 12.4.8** of **Chapter 12** of the Consented Development ES, the busiest period of construction traffic for HGVs was during the initial stages of each phase when site roads are being constructed. It was expected that up to 30 HGVs per day are expected to access and egress the site, equating to 60 vehicle movements.

- 2.3.5.4 In addition, there may be limited occasions where an additional 10 HGV per day will be required (such as during times of continuous concrete pour) on site. Therefore, the assessment was carried out on the basis of 40 HGVs (equating to 80 vehicle movements) as a 'worst case' accessing the site.
- 2.3.5.5 Therefore, considering the conclusions above, construction traffic for the Proposed Development has been 'Scoped Out' for further assessment.

2.3.6 MATERIALS REQUIREMENTS

- 2.3.6.1 The Proposed Development will not use construction materials that are materially different from that of the Consented Development.
- 2.3.6.2 The Proposed Development will seek to minimise the import of fill material through reuse of excavated material on Site where such material is suitable for the purpose.

2.3.7 EMPLOYMENT

- 2.3.7.1 During construction, there will be on-going inward investment to the region, with employment and expenditure in the local economy. There will also be economic benefits arising from direct and indirect expenditure associated with the Proposed Development, for example through placing local orders for goods and services and maintenance.
- 2.3.7.2 The Proposed Development will generate approximately 921 local Full Time Equivalent (FTE) jobs per construction annum. A breakdown of the direct jobs (local and national), indirect and induced jobs is also provided in **Chapter 13, Socio-Economic Characteristics**.

2.4 OPERATION AND MAINTENANCE OF THE PROPOSED DEVELOPMENT

2.4.1 OVERVIEW

- 2.4.1.1 As per the Consented Development, the overall Operation and Maintenance strategy will be finalised as part of the MC application (as part of the ES) however, it is unlikely to change significantly. Maintenance activities will be categorised into two levels: preventive and corrective maintenance.
- 2.4.1.2 All operational amendments to the Consented Development relate to the import and export of hydrogen gas through the proposed HAGI (consented through a separate application progressed by Cadent), amended GPP and the selection of the flare technology to support events such as periodic depressurisation of hydrogen systems for maintenance.
- 2.4.1.3 The import and export amendments are detailed below in **Section 2.4.2** and the flare / venting technology is discussed in GPP Venting & Flaring below.

2.4.2 PROCESS DESCRIPTION

Import Mode

- 2.4.2.2 When hydrogen gas is imported from the network, it will pass through import metering and manifold on entering the Hydrogen Storage Facility (from the HAGI). Within the GPP, the hydrogen gas will be compressed and cooled for injection into one or more of the cavities. The hydrogen gas in each of the cavities will be stored at a downhole pressure of up to 130 bar and at a typical temperature range of 5–40°C.

Export Mode

- 2.4.2.3 The hydrogen gas will be exported from the cavities to the network. The saturated hydrogen gas withdrawn from the cavities will be de-sulphurised if required (hydrogen sulphide removal), de-pressurised and dried within the withdrawal train and exported via the fiscal metering. The Hydrogen Storage Facility will operate in either import or export mode in normal operations.

2.4.3 VENTING OR FLARING

- 2.4.3.1 Flaring of hydrogen will be required to support events such as periodic depressurisation of hydrogen systems, to allow a safe shutdown for routine and emergency situations, as well as to prevent the accumulation of a hazardous atmosphere within the plant.
- 2.4.3.2 Since the submission of the Scoping Report, following the detailed consideration of technical, health, safety and environmental guidance and further technical safety studies; the decision has been made to select an elevated flare as the preferred periodic depressurisation technology and an enclosed ground flare as the preferred option to remove hydrogen gas from the GPP to allow for equipment maintenance to take place.
- 2.4.3.3 Confirmation of the exact configurations of the elevated flare and enclosed ground flare will be given in the ES.

2.4.4 SAFETY AND ENVIRONMENTAL MANAGEMENT

- 2.4.4.1 The Proposed Development will be operated in accordance with all relevant UK Health and Safety legislation and industry good practice guidance to ensure that all aspects of Health, Safety and the Environment are properly managed during operation and maintenance.
- 2.4.4.2 The Health and Safety at Work etc. Act 1974 (HSWA)² places general duties on employers, people in control of premises, manufacturers

² UK Legislation (1974) *Health and Safety at Work etc. Act*. Available online: <https://www.legislation.gov.uk/ukpga/1974/37/contents>

and employees. Health and safety regulations^{3,4,5,6} made under this Act contain more detailed provisions. The Act provides the framework for the regulation of employment health and safety in the UK. The overriding principle is that foreseeable risks to persons in workplaces and the public must be reduced so far as is reasonably practicable and that adequate evidence must be produced to demonstrate that this has been done.

- 2.4.4.3 The Proposed Development will also be subject to the COMAH Regulations 2015⁷ which aim to prevent and mitigate the effects of major accidents involving dangerous substances which can cause serious damage/harm to people and/or the environment. The competent authority for the purposes of the COMAH Regulations in England is the HSE and the Environment Agency acting jointly.
- 2.4.4.4 Underground gas storage facilities are within the scope of the COMAH Regulations if the quantity of flammable gas stored meets or exceeds the thresholds in Schedule 1, Part 2 of the Regulations. For hydrogen, this threshold is 5 tonnes (lower-tier) and 50 tonnes (upper-tier). Based on the expected storage capacity, the Proposed Development will be an upper-tier COMAH site.
- 2.4.4.5 The Proposed Development will comprise the COMAH establishment.
- 2.4.4.6 The COMAH Regulations requires upper-tier sites to prepare and submit a Pre-Construction Safety Report (PCSR) prior to the commencement of construction activities. This report demonstrates that all necessary measures have been identified and will be implemented to prevent major accidents and limit their consequences to people and the environment.
- 2.4.4.7 A Pre-Operation Safety Report (POSr) is required to be submitted to the competent authority in a reasonable time before commencing operation (e.g. 3 to 6 months). The report must address the criteria set out in the Safety Report Assessment Manual (SRAM)⁸ for technical, predictive, descriptive, environmental and emergency response criteria.
- 2.4.4.8 The COMAH Regulations also requires upper-tier operators to prepare and test an on-site emergency plan, as well as supplying information to the local authorities and public to enable off-site emergency plans to be developed.
- 2.4.4.9 The Proposed Development will be operated in line with appropriate standards, whilst the Applicant will develop and implement an

³ The Management of Health and Safety at Work Regulations 1999

⁴ Workplace (Health, Safety and Welfare) Regulations 1992

⁵ Safety Representatives and Safety Committees Regulations 1977 (as amended)

⁶ Safety (Consultation with Employees) Regulations 1996 (as amended)

⁷ HM Government (2015) *The Control of Major Accident Hazard Regulations*. Available online: <https://www.legislation.gov.uk/uksi/2015/483/contents/made>

⁸ Health and Safety Executive (2015) *Safety Report Assessment Manual (SRAM) – 2015*. Available Online: <https://www.hse.gov.uk/comah/sram/docs/comah-sram-2015.pdf>

Operational Environmental Management Plan (OEMP). The OEMP will outline requirements and procedures including monitoring required to ensure that the Proposed Development is operating to the appropriate standard.

2.4.5 POWER SUPPLY

- 2.4.5.1 The Consented Development includes High Voltage (HV) connections and infrastructure required to power the GPP and wellhead compounds. The HV requirements of the Proposed Development remain the same as the Consented Development, with the exception of the limits of deviation for the 132kV substation will be extended to allow flexibility for connection to the existing overhead lines.
- 2.4.5.2 Connection offers and diversion details are being progressed with the DNO, who for the Proposed Development location is SPEN.

2.4.6 WATER SUPPLY

- 2.4.6.1 The following water uses are anticipated as part of the Proposed Development, although not anticipated to be materially different from the Consented Development:
- Potable water supply for GPP process equipment;
 - Potable water supply for welfare at the control building / stores building.

2.4.7 EMISSIONS, DISCHARGES AND WASTES HANDLING

- 2.4.7.1 The process is designed to reduce harmful gaseous emissions to the atmosphere as far as practicable, including no continuous operational flaring.
- 2.4.7.2 The process will apply Best Available Techniques (BAT) during normal operation to avoid or reduce the occurrence of emissions, discharges and wastes as far as practicable. A Waste Management Plan will be updated, and all waste will be disposed of by suitably qualified waste companies. The anticipated quantities and disposal route will be confirmed during detailed design. Further details on waste management are provided in **Chapter 16, Waste**.

Noise Emissions

- 2.4.7.3 The hydrogen storage facility will contain noise generating equipment that is permanently installed and will potentially be operational at any time throughout the day or night.
- 2.4.7.4 Noise level occupational health limits will typically apply in the following areas:
- Local to plant equipment;
 - In plant rooms or buildings; and
 - In controlled areas e.g. control room.

- 2.4.7.5 Noise datasheets for all potentially noisy equipment will be prepared. The noise level from any item of plant will be minimised to achieve the planning requirements and to meet the requirements of Control of Noise at Work Regulations 2005, which stipulate a maximum source noise level of 80 dB(A) at 1 m. Where this is not reasonably practicable, or in areas where noise from multiple noise sources generates noise levels in excess of 80 dB(A), then personnel access is to be restricted, and adequate hearing protection would be worn.
- 2.4.7.6 Further details on noise assessment are provided in **Chapter 9, Noise and Vibration**.

2.4.8 EMPLOYMENT AND SKILLS

- 2.4.8.1 During operation there will be on-going inward investment to the region, with employment and expenditure in the local economy. There will also be economic benefits arising from direct and indirect expenditure associated with the Proposed Development, for example through placing local orders for goods and services and maintenance.
- 2.4.8.2 The Applicant has provided data on the on-site direct employment which has determined there will be 30 FTEs in the first year of operation for the Proposed Development. A breakdown of the direct jobs (local and national), indirect and induced jobs is also provided in **Chapter 13, Socio-Economic Characteristics**.

2.5 DECOMMISSIONING OF THE PROPOSED DEVELOPMENT

- 2.5.1.1 The Proposed Development will be decommissioned in accordance with legislative requirements at the end of the plant lifetime and the Site returned to a condition that is suitable for its planned after use.
- 2.5.1.2 The design life of the below ground infrastructure (i.e. cavities and wells) will be in excess of the design life of the above ground infrastructure. The design life of the above ground infrastructure (GPP) is expected to be 50 years.
- 2.5.1.3 The GPP will be decommissioned, dismantled and removed from site. Areas of previous development that are no longer required for continued solution mining would be returned to agricultural use.
- 2.5.1.4 Ahead of decommissioning, a detailed Decommissioning Plan including a Decommissioning Environmental Management Plan (DEMP) will be prepared for the approval of the relevant planning authorities.
- 2.5.1.5 The Decommissioning Plan will be supported as necessary by technical studies addressing such matters as safety, traffic, and waste management.

2.6 CHANGES TO PLANS AND DRAWINGS

- 2.6.1.1 At the time of writing the PEIR it is not expected any plans submitted for the Consented Development will be withdrawn for the Material

Change, the proposed changes will be incorporated into revised and substitute plans which will be submitted with the MC application. A preliminary (but not exhaustive) list of the new, revised and retained plans to be updated is set out in **Table 2.3**. This list will be confirmed as the MC application develops and detailed in the ES.

TABLE 2.3 – PROPOSED LIST OF NEW, REVISED & RETAINED PLANS

Drawing number	Title	Status
KEU-HYK1G-DRG-01-0002	General arrangement showing GPP area - DCO consented arrangement vs material change indicative arrangement.	New
KEU-HYK1G-DRG-01-0028	General arrangement showing main site - consented DCO arrangement vs material change indicative arrangement	New
KEU-HYK1G-DRG-01-0041	General arrangement GPP area - GPP utility compound - consented vs proposed development	New
KEU-HYK1G-DRG-01-0042	General arrangement GPP area - site roads - consented vs proposed development	New
KEU-HYK1G-DRG-01-0052	General arrangement showing main site - Consented Development vs Proposed Development	New
13-03-01-HOL-24-201	Phases of Development	To be updated as part of MC
13-03-01-HOL-24-202	Phases of Development	To be updated as part of MC
13-03-01-HOL-24-203	Phases of Development	To be updated as part of MC
13-03-01-HOL-24-204	Phases of Development	To be updated as part of MC
13-03-01-HOL-24-230	Overall Development - Key Plan	To be updated as part of MC
13-03-01-HOL-24-231	General Arrangement Showing Main Development Area - Sheet 1 of 3	To be updated as part of MC

Drawing number	Title	Status
13-03-01-HOL-24-232	General Arrangement Showing Main Development Area - Sheet 2 of 3	To be updated as part of MC
13-03-01-HOL-24-233	General Arrangement Showing Main Development Area - Sheet 3 of 3	To be updated as part of MC
13-03-01-HOL-24-240	Landscaping Details - Key Plan	To be updated as part of MC
13-03-01-HOL-24-248	Development at Wellhead H508	To be updated as part of MC
13-03-01-HOL-24-263	Gas Processing Plant and Construction of Access Roads	To be updated as part of MC
13-03-01-HOL-24-264	Gas Processing Plant and Gas Infrastructure Construction	To be updated as part of MC
13-03-01-HOL-24-266	Final Landscaping Details - Sheet 1 of 3 (GPP Area)	To be updated as part of MC
13-03-01-HOL-24-270	KGSP elevations on gas processing plant	To be updated as part of MC
13-03-01-HOL-24-271	KGSP elevations on solution mining compound	To be updated as part of MC
13-03-01-HOL-24-301	KGSP brine, water & gas pipeline ditch crossings plus new road crossings - key plan	To be updated as part of MC
13-03-01-HOL-24-316	KGSP brook crossing GX1 for gas pipelines	To be updated as part of MC
13-03-01-HOL-24-324	KGSP gas pipeline road crossing YL1 at yatehouse lane	To be updated as part of MC
13-03-01-HOL-24-326	KGSP gas pipelines road crossing YL3 at yatehouse lane	To be updated as part of MC
13-03-01-HOL-24-504	Below Ground Works Plan	To be updated as part of MC
13-03-01-HOL-24-505	Below Ground Works Plan	To be updated as part of MC
13-03-01-HOL-24-506	Below Ground Works Plan	To be updated as part of MC

Drawing number	Title	Status
13-03-01-HOL-24-510	Above Ground Works Plan	To be updated as part of MC
13-03-01-HOL-24-511	Above Ground Works Plan	To be updated as part of MC
13-03-01-HOL-24-512	Above Ground Works Plan	To be updated as part of MC
13-03-01-HOL-24-513	Below Ground Works Plan	To be updated as part of MC
13-03-01-HOL-24-514	Above Ground Works Plan	To be updated as part of MC

REFERENCES

Health and Safety Executive (2015) *Safety Report Assessment Manual (SRAM)* – 2015. Available Online:
<https://www.hse.gov.uk/comah/sram/docs/comah-sram-2015.pdf>

HM Government (2015) *The Control of Major Accident Hazard Regulations*. Available online:
<https://www.legislation.gov.uk/ukxi/2015/483/contents/made>

Safety (Consultation with Employees) Regulations 1996 (as amended)

Safety Representatives and Safety Committees Regulations 1977 (as amended)

The Management of Health and Safety at Work Regulations 1999

UK Legislation (1974) *Health and Safety at Work etc. Act*. Available online:
<https://www.legislation.gov.uk/ukpga/1974/37/contents>

Workplace (Health, Safety and Welfare) Regulations 1992

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