



Keuper Gas Storage Project

Preliminary Environmental
Information Report – Non-Technical
Summary

PREPARED FOR

KGSL

DATE

September 2025

REFERENCE

EN0310001



INTRODUCTION

This non-technical summary of the Preliminary Environmental Information Report (PEIR) has been prepared to provide an overview of all the key information associated with a future Material Change (MC) application by Keuper Gas Storage Limited (hereafter referred to as 'the Applicant').

The application is for a MC to the Keuper Gas Storage Project (KGSP) to construct and operate an underground hydrogen storage facility on and under land in the Holford Brinefield, Middlewich, in the County of Cheshire (hereafter referred to as 'the Proposed Development').

UK Government policy is explicit that *"There is an urgent need for all types of low carbon hydrogen infrastructure to allow hydrogen to play its role in the transition to net zero."*

The Proposed Development is part of the HyNet consortium for hydrogen generation and supply in the North West of England and Wales which is shown as the "future hydrogen storage" project on **Figure 1**. The consortium is made up of several committed partners who, together, are delivering the HyNet infrastructure which includes carbon capture, storage, transport, hydrogen production, storage and distribution to support the delivery of a net zero future and decarbonisation of the North West region by 2050.

FIGURE 1 - HYNET CONSORTIUM



Storage of town gas (e.g. in above-ground cylindrical gas holders) and subsequently natural gas has always been an integral aspect of managing supply and demand fluctuations. Storage in underground salt caverns has been proven with the safe storage of natural gas at the Stublach Gas Storage facility and Holford Gas Storage facility which are operated adjacent to the Site.

Storage capacity will be an integral component in a hydrogen economy, balancing supply from production facilities with demand by consumers. Hydrogen storage therefore will play a critical role in supporting the delivery of the UK Government's legally binding net zero targets.

LEGISLATION AND POLICY: CONSENTING STRATEGY

The Proposed Development is a Nationally Significant Infrastructure Project (NSIP) under Section 14(1)(c) ("development relating to underground gas storage facilities") of the Planning Act 2008 and therefore requires a Development Consent Order (DCO) to authorise its construction.

The MC application for the Proposed Development will be submitted to the Planning Inspectorate, who will consider the application and make a recommendation to the Secretary of State for the Department of Energy Security and Net Zero (DESNZ), who will decide on whether development consent should be granted.

In accordance with the Environmental Impact Assessment (EIA) Regulations 2017, the MC application will be accompanied by an Environmental Statement (ES). The ES will inform the reader of:

- The nature of the Proposed Development, including key design information;
- The design evolution of the Proposed Development and the reasonable alternatives considered; and

- The anticipated effects of the Proposed Development upon the environment and people during its construction, operation and maintenance, and decommissioning, and the mitigation measures proposed to protect these receptors.

The requirement to consult on preliminary environmental information for NSIP's is also set out in the EIA Regulations 2017.

Whilst it is not a legal requirement to produce a PEIR as part of an MC application, this voluntary PEIR has been produced as best-practice and to provide an update / address any statutory comments which were included in the Scoping Opinion.

This PEIR shall allow consultation bodies, including members of the public and other stakeholders, to develop an informed view of the likely significant effects of the Proposed Development.

The PEIR also permits comments on particular aspects of interest prior to the finalisation and submission of the MC application and associated ES.

KEUPER GAS STORAGE MATERIAL CHANGE TO HYDROGEN STORAGE PROJECT

The Proposed Development involves the construction, operation and maintenance, and decommissioning of an underground hydrogen storage facility.

The key changes to the Consented Development for gas storage for the Proposed Development for hydrogen are the:

- the proposed storage of hydrogen gas rather than natural gas, including consolidation of pipelines;
- changes to the Gas Processing Plant (GPP) area and hydrogen compatible equipment, including a flare instead of a vent;
- moving non-hydrogen equipment to a utility compound adjacent to the GPP; and
- the National Transmission System (NTS) for natural gas is being replaced by the Hydrogen Above Ground Infrastructure (HAGI) for connection to the HyNet Hydrogen Pipeline.

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 of the town of Middlewich and approximately 4 km west of the village of Allostock.

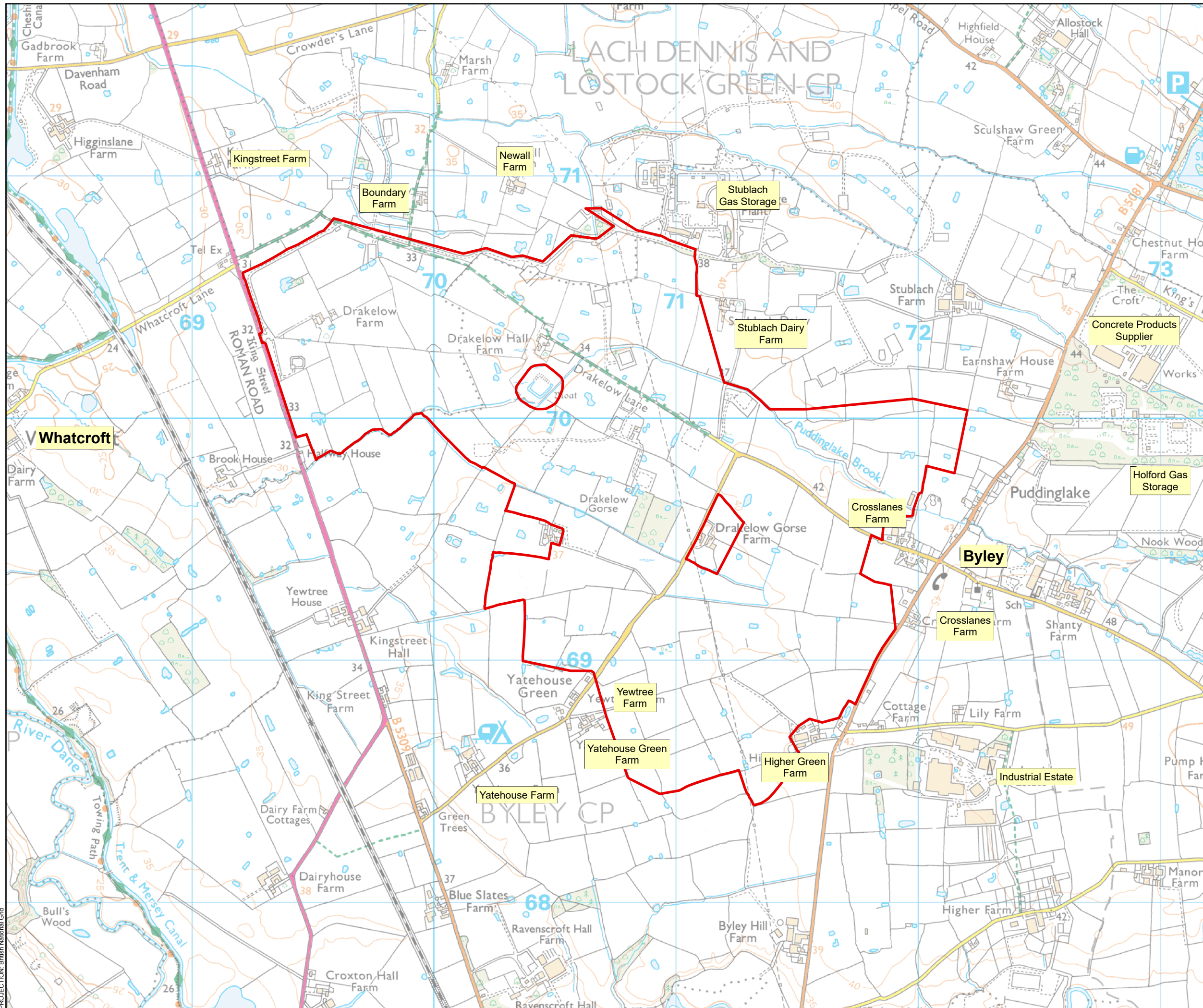
The Site lies within a rural area with occasional manmade industrial features including Stublach Gas Storage and Holford Gas Storage which the Site is adjacent to (see **Figure 2**).

The topography of the Site varies from 32 m above ordnance datum (AOD) to 38 m AOD in the north with the surrounding area being relatively flat-lying.

In order to operate, the Proposed Development will require a connection to the HyNet HAGI and its proposed hydrogen pipeline.

The HAGI and the hydrogen pipeline do not form part of the Proposed Development (they will be consented

through a separate application progressed by Cadent as part of the HyNet North West Hydrogen Pipeline DCO Project). The cumulative effects associated with the Proposed Development, the HAGI and the HyNet North West Hydrogen Pipeline will be assessed as part of the ES in **Chapter 18, Cumulative Effects Assessment**.



Site Boundary

0 100 200 300 400 500
Metres



SCALE: See Scale Bar
SIZE: A3
PROJECT: 0755727
DATE: 26/09/2025

VERSION: A01
DRAWN: MC
CHECKED: BH
APPROVED:

Figure 2
Site Layout



CONSTRUCTION OF THE PROPOSED DEVELOPMENT

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

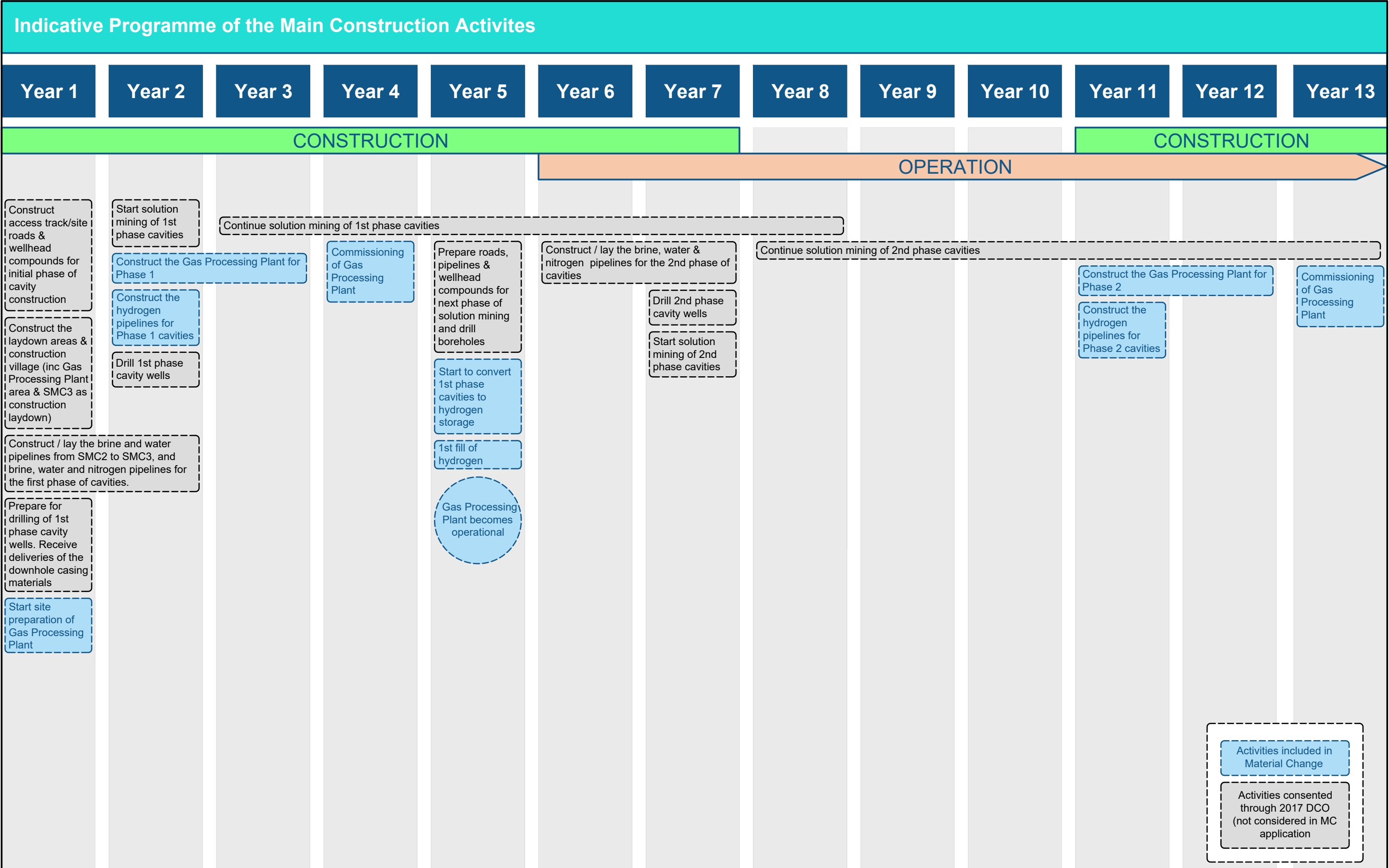
Continuing to discharge the Consented Development for the purpose of construction will be managed with the relevant Local Planning Authority (LPA), for the majority of the Consented Development, this is Chester West and Chester (CWAC). Consultation has been held with CWAC to confirm the Applicant's intention to continue construction of elements not proposed to change.

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 3**.

Figure 3 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.

The core construction period of the Proposed Development is expected to be 10 years over a 13-year period. It is expected that construction would start in 2028 with the Proposed Development becoming operational in 2032. After this, there will be a 3-year construction break and with project completing in 2040. The anticipated Proposed Development lifetime for the

above ground infrastructure is expected to be 50 years (until it will be decommissioned). A full breakdown of the Proposed Development programme can be found in **Chapter 2, Proposed Development Description**.



CONSIDERATION OF ALTERNATIVES

The Proposed Development has considered the following alternatives as part of the design evolution within

Chapter 3, Alternatives:

- The 'Do Nothing' Alternative - The 'Do Nothing' alternative would mean that the Proposed Development would continue to be progressed as per the Consented Development. This would be the development of an underground storage facility for natural gas only and not hydrogen storage.
- Site Layout- various configurations have been considered, taking account of a number of factors, including (but not limited to) the following: existing landscape bunds and planting, health and safety, environmental considerations, storage capacity, cost efficiency, use of existing infrastructure and future expansion.
- Alternative Gas Processing Plant Locations and Technology - including the GPP footprint, screening around the GPP, compressor trains, gas dehydration and hydrogen compression cooling;
- Solution Mining Compound (SMC) Design Evolution – nature of SMC3 and alternative locations to use the SMC at the neighbouring Stublach Gas Storage Site for the Proposed Development for solution mining; and

- GPP Hydrogen Equipment – notably the consideration of both flaring and venting options for periodic depressurisation of hydrogen and safe shutdown.

EIA PROCESS

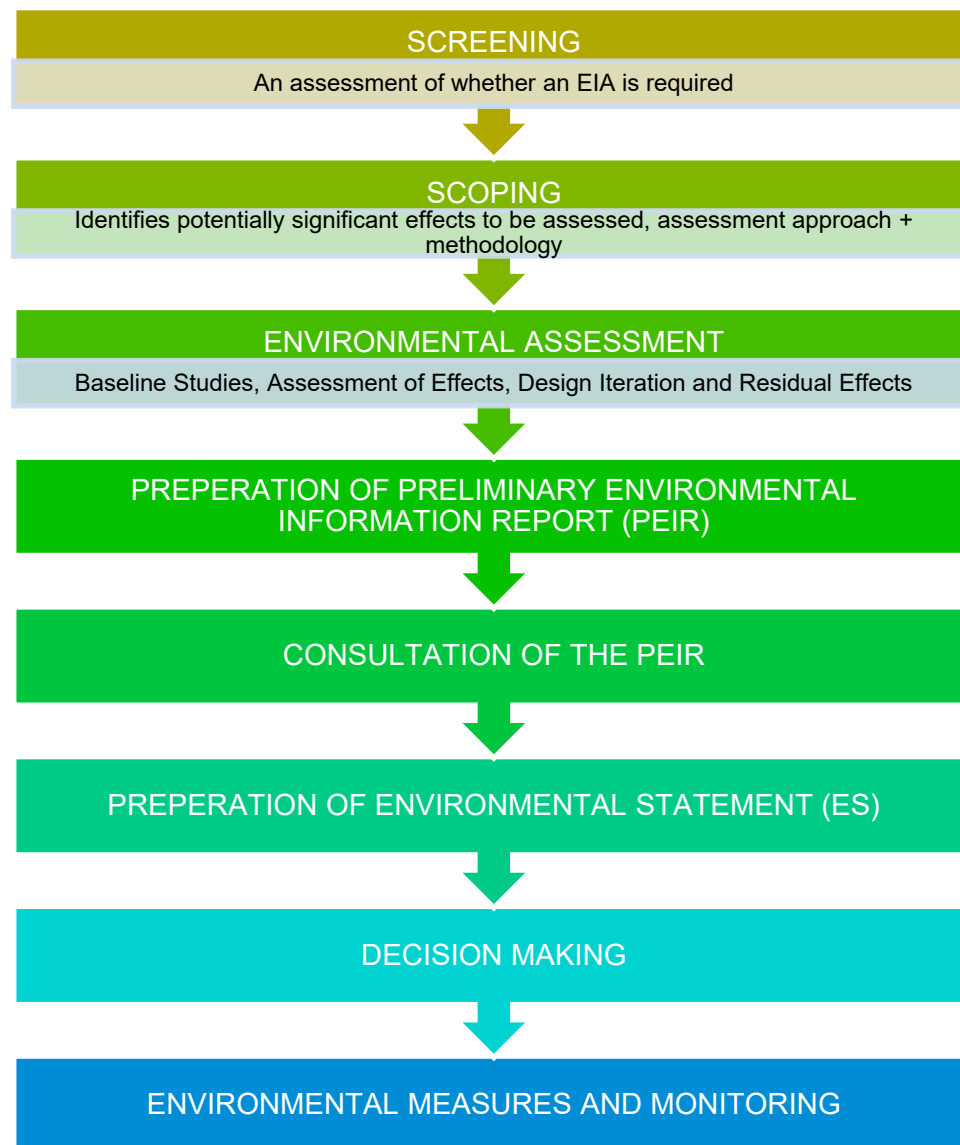
The full findings of the EIA process (**Figure 4**) will be presented in an ES that will be submitted as part of the MC application.

The ES provides the public and relevant statutory organisations with the environmental information needed to understand and comment on a development.

The ES also provides decision-makers with the environmental information to allow a decision to be made whether to grant consent for the development.

The approach to the EIA is outlined in **PEIR Chapter 4, EIA Methodology**.

FIGURE 4 - EIA PROCESS



CONSULTATION

KGSP is undertaking consultation on the proposed Material Changes to the DCO and on a range of updated environmental information associated with the proposed changes. A Statement of Engagement (SoE), which outlines how KGSL will consult with the local community and interested parties is available to read on the project website at www.kgsp.co.uk

The consultation on the proposed changes will open for 6 weeks on Thursday 9 October 2025 and close on Thursday 20 November 2025.

The consultation information that will be available includes:

- Project newsletter setting out a summary of the proposed Material Changes and circulated to those living within a radius of 3.5km of the site. This also includes a questionnaire which can be returned via Freepost.
- Proposal Summary Document providing an overview of the proposed Material Changes and a summary of the topics considered in the Preliminary Environmental Information Report and Environmental Statement.
- Preliminary Environmental Information Report (PEIR). This outlines the assessments undertaken to date, the initial findings and proposed mitigation measures.
- Plans and maps showing the site location and proposed Material Changes.

- Exhibition boards, which will be on display during the Project Information Event and subsequently available to view on the website.
- A Consultation Questionnaire to enable feedback to be submitted on the proposed Material Change. This will be available to complete and submit online and in hard copy at the planned Information Days.

How to view the consultation documents

A copy of the consultation documents and plans will be available to view and download, free of charge on the 'Consultation' page of the project website at www.kgsp.co.uk

Further information about the proposed Material Change is obtained as follows:

- Public information event at De Vere Cranage Estate on Wednesday 15 October between 3pm and 7pm
- Online Q&A on Wednesday 22 October at 6.30pm - register your interest at the project website at www.kgsp.co.uk
- Email: kgsp@fontcomms.com
- Telephone: Freephone 0800 689 1095 (Monday to Friday 9.00am to 5.30pm)
- Post: Freepost HAVE YOUR SAY (no stamp required).

Hard copies of the consultation documents can be viewed on request during the consultation period at the Storengy site from the 9 October 2025 at:

Storengy UK Stublach Site (Gatehouse), King Street, Northwich, Cheshire. CW9 7SE. Opening hours: Monday

to Friday: 9:00am-4:00pm. To arrange a viewing, contact the team on kgsp@fontcomms.com or 0800 689 1095.

A copy of the consultation documents can be posted on request or via a transfer link free of charge on request. Printed copies of the main public consultation documents including the PEIR will be available on request at £700+VAT.

Making responses to the Proposed Application

Responses and feedback to the consultation on the proposed Material Change can be sent to KGSL as follows:

- Email: kgsp@fontcomms.com
- Post: Freepost HAVE YOUR SAY (no stamp required)
- Online: Complete a feedback form at www.kgsp.co.uk
- In person: Complete a feedback form at the public information event at De Vere Cranage Estate on Wednesday 15 October between 3pm and 7pm.

Responses should be made in writing to any of the contacts mechanisms outlined above or by attending an information event. Any comments or representations on the Proposed Application must be received no later than 23:59 on 20 November 2025.

Following consultation, KGSL will prepare and submit a Consultation Report as part of the MC application, which will include details of all feedback received and how KGSL has responded.

SECURING MITIGATION AND CONTROL MEASURES

The EIA process to date has identified a number of measures to avoid, minimise and reduce impacts on people and the environment. The MC will set out 'requirements' for securing the means of implementing these measures. Typically, a requirement will require the Applicant to develop information in detail and to submit that information to the relevant statutory body (e.g. Chester West and Chester Council) for approval. For example, the Applicant will be required to prepare an future updated Construction Environmental Management Plan (CEMP) which contains detailed measures to be applied to manage and monitor impacts during construction (for example dust, noise, and species disturbance).

Additionally, specific environmental permits will be required for the licensed disposal of drilling wastes. The Proposed Development will require an Environmental Permit from the Environment Agency in order to operate. Other approvals will be required under safety legislation, e.g. from the Health and Safety Executive under the Control of Major Accident Hazards.

Looking to the end of life of the Proposed Development (at least 50 years after operation) a 'decommissioning plan' will be required, and this will be supported by a Decommissioning Environmental Management Plan (DEMP).

SUMMARY OF ENVIRONMENTAL EFFECTS

INTRODUCTION

This section provides a topic-by-topic summary of the environmental effects for the Construction, Operation and Maintenance and Decommissioning of the Proposed Development. This includes any significant effects, mitigation measures and key conclusions associated with the following:

- Geology and Ground Conditions
- Water Resources and Flood Risk
- Air Quality
- Noise and Vibration
- Ecology and Nature Conservation
- Traffic and Transport
- Archaeology and Cultural Heritage
- Landscape and Visual Impact
- Waste
- Major Accidents and Disasters
- Socioeconomic Characteristics
- Community Health
- Climate Change and Greenhouse Gas Emissions

GEOLOGY AND GROUND CONDITIONS

PEIR Chapter 6, Geology and Ground Conditions considers the potential effects of the Proposed Development on geology and ground conditions during construction, operation and maintenance and decommissioning.

Key receptors which have the potential to be directly impacted by the MC were identified as agricultural soil (in areas not assessed through of the Consented Development), safeguarded mineral resources and groundwater. In the context of Source Pathway Receptor contaminant linkages, potential effects on human health receptors, groundwater resources and property arising from ground contamination were also considered.

Further assessment will be made in relation to potential ground contamination in the form of intrusive ground investigation and / or additional data review prior to construction to enable risks to be adequately assessed and design to be refined, where practicable.

Mitigation measures will be implemented as set out in the future updated Construction Environmental Management Plan (CEMP).

Construction

Potential impacts during construction include the following:

- Loss of BMV agricultural soils in areas not assessed through the Consented Development;

- Loss of soil function, soil compaction and changes to drainage in areas not assessed through the Consented Development;
- Sterilisation of mineral resources; and
- Impact on groundwater quality and/or changes to flow regimes as a result of dewatering of excavations.

Potential impacts during the construction phase of the Proposed Development will be avoided and minimised through good construction management practices (e.g. in the future updated CEMP) and through specific mitigation measures. As such, the significance of residual effects with respect to onshore geology, hydrogeology and ground conditions during the construction of the Proposed Development have been assessed as **Not Significant**.

Operation and Maintenance

In the context of geology and ground conditions, no aspects of operation and maintenance of the Proposed Development are anticipated to be materially different to those previously assessed through the Consented Development. Therefore no additional assessment of effects has been undertaken in relation to this phase of the Proposed Development and the significance of effects remains as per the Consented Development as **Not Significant**.

Decommissioning

The environmental effects on onshore geology, hydrogeology and ground conditions from decommissioning will be no worse than those that occur

during construction, which were assessed as '**Not Significant**'.

ONSHORE WATER RESOURCES AND FLOOD RISK

PEIR Chapter 7, Hydrology and Flood Risk considers the potential effects of the Proposed Development on hydrology and flood risk during construction, operation and maintenance and decommissioning.

The Site sits within the Weaver Gow (Puddinglake Brook and Wade Brook) WFD catchments, with the Puddinglake Brook being the Environment Agency (EA) 'Main River' which flows through the centre of the Site into which several 'Ordinary Rivers' discharge.

Since submission of the Consented Development the status of the Puddinglake Brook, which runs through the Study Area, has been downgraded from Moderate to Poor ecological status and has a chemical status of "Fail" under the 2022 EA RBMP.

The Puddinglake Brook was found to be overgrown, incised, and low flowing at the time of the Site visit. Further details on the watercourse will be provided in the detailed hydrology assessment in the ES.

There are also several small ponds on Site. The ponds are fenced off within the agricultural fields and varied in size and depth. Further details will be provided in the detailed hydrology assessment in the ES.

The Site falls within Flood Zones 2 and 3. Flood Zone 2 is defined as land that has an annual probability of flooding

every year of 1 in 100 to 1 in 1,000 and Flood Zone 3 is defined as land that has an annual probability of flooding every year of 1 in 100 or less.

To minimise the risk of flooding, along Puddinglake Brook within the Site there are flood defences which are categorised as natural high ground. The defences are identified as having a standard of protection of 20%, indicating the natural high ground provides protection against flood events with a 20% annual occurrence probability. Further set mitigation measures for hydrology will be included as part of the ES for the Proposed Development.

Construction

Potential impacts during construction include the following:

- potential erosion and mobilisation of sediment and contaminants into surface water runoff;
- increased surface water runoff and flood risk due to the creation of additional impermeable surfaces.

Potential impacts during the construction phase of the Proposed Development will be minimised using good construction management practices and specific mitigation measures where appropriate. Consequently, potential residual effects are assessed as **Not Significant** during Construction.

Operation and Maintenance

Potential impacts during operation and maintenance include:

- increased surface water runoff and flood risk; and
- increased water usage during operation

Potential impacts during the operation and maintenance phase of the Proposed Development will be avoided and minimised through design and environmental management practices, in line with Environmental Permits. Therefore, overall, the residual significance of effects of the Proposed Development during operation and maintenance is assessed as **Not Significant**.

Decommissioning

Decommissioning effects are expected to be very similar to those during the construction phase of the Proposed Development, and the sensitivity of receptors and potential magnitude of impact is assumed the same as during construction. Therefore, with implementation of a DEMP for the Proposed Development, it is anticipated the effects on hydrology and flood risk will be negligible and therefore of minor effect and **Not Significant**.

AIR QUALITY

PEIR Chapter 8, Air Quality considers the potential effects of the Proposed Development on air quality during construction, operation and maintenance and decommissioning.

Construction

Whilst the construction effects of the Proposed Development on air quality were assessed as part of the

Consented Development, given there are no changes to traffic or dust as a result of any of the changes to the site infrastructure; effects during construction have been scoped out of the air quality assessment. Therefore, the conclusions remain consistent with the Consented Development ES for construction dust / traffic which were deemed **Negligible (Not Significant)**.

An assessment was conducted in the Consented Development ES. Impacts noted in the Consented Development ES would be negligible or minor with the implementation of adequate mitigation measures.

Operation and Maintenance

During operation and maintenance, the only potential activity which could impact air quality is flaring.

As outlined in PEIR Chapter 8, Air Quality, there will be no routine emissions to air from the Proposed Development, only maintenance and emergency flaring. Considering flaring will be a non-routine activity, the effects on human receptors of the Proposed Development from flaring are considered to be **Negligible to Minor (Not Significant)**.

Decommissioning

The effects on air quality during decommissioning of the Proposed Development have also been scoped out of the assessment as they will not materially change from the Consented Development and will be less significant than during Construction. Hence, they remain **Negligible (Not Significant)** for the Proposed Development.

NOISE AND VIBRATION

PEIR Chapter 9, Noise and Vibration considers the potential effects of the Proposed Development on noise and vibration during construction, operation and maintenance and decommissioning.

The key receptors for noise and vibration are the nearby residential properties / farms. The area around the Proposed Development includes several isolated properties and is located close to the villages of Byley and Lach Dennis.

The nearest noise sensitive receptors are: Newall Farm, Boundary Farm, Drakelow Farm, Halfway House, Brook House, Yewtree House, Kingstreet Hall, Brownhayes Farm, Drakelow Hall Farm, Stublach Dairy Farm, Drakelow Gorse Farm, Yatehouse Green Farm, Yewtree Farm, Dog and Partridge Farm, Higher Green Farm and Crosslanes Farm.

Construction

PEIR Chapter 9, Noise and Vibration presents the results of the noise modelling for the construction of the Proposed Development and reports the predicted construction noise levels of the Gas Processing Plant and magnitudes of impact for each noise sensitive receptor (listed above).

As reported in Section 9.8.1 of Chapter 9, calculated construction noise level impacts range from Negligible to Moderate. Where impacts are Moderate, it is expected that noise mitigation would reduce noise by approximately

10dB. This mitigation would result in impacts being no worse than **Minor adverse (Not Significant)** for all noise sensitive receptors.

Overhead cable construction has been assessed qualitatively. Impacts would be no worse than Minor on the basis that overhead cable construction would occur no closer than 135m to the nearest noise sensitive receptor. Therefore, the effect would be **Not Significant**.

Construction of access roads has been assessed qualitatively. Impacts would be Moderate or Major for noise sensitive receptors within 410m of the noisiest activities, which is likely to include most of the assessed receptors. However, it is likely that use of the noisiest plant will be relatively short term, and therefore the effect would be **Not Significant**.

As part of the plant specification and construction activity design, mitigation such as quieter rigs or screening will be used, where practicable, to reduce the noise at its source (i.e. the drilling point) which will reduce noise levels which have the potential to lead to significant noise effects.

Operation and Maintenance

With the mitigation presented it is anticipated operational noise impacts are no worse than Minor, which would be **Not Significant**.

Given their locations in relation to the proposed GPP, it is likely that the noise sensitive receptors that would be most impacted during the operation of the Proposed Development would be Drakelow Farm, Halfway House,

and Drakelow Hall Farm Therefore, it is likely that the calculated unmitigated noise impacts at these noise sensitive receptors will inform the extent of requisite noise mitigation in order to result in Minor impacts or less.

Impacts during Emergency mode are likely to be Major for several noise sensitive receptors. However, as Emergency mode is unlikely to occur more than once every ten years, these impacts are expected to be **Not Significant**.

The final design of the Proposed Development, including embedded mitigation, will be determined for the Material Change submission, and this will form the basis of the quantitative assessment in the ES.

Decommissioning

At this stage, details of works that will be required during decommissioning are not available. It is, however, likely that decommissioning works will be of a similar nature to those required during construction, therefore noise and vibration impacts during decommissioning are likely to be no worse than those during construction. For this reason, it is expected that the effects of both noise and vibration during decommissioning would be **Not Significant**.

ECOLOGY AND NATURE CONSERVATION

PEIR Chapter 10, Ecology and Nature Conservation considers the potential effects of the Proposed Development on ecology and nature conservation during construction, operation and maintenance and decommissioning.

Construction

Effects during Construction of the Proposed Development on ecology and nature conservation are anticipated to be **Not Significant**. The assessment for ecology and nature conservation in Chapter 10 includes effects on designated sites, bats, habitats, great crested newts (GCN), badgers and birds. PEIR **Appendix 10A, Desk-Study, Appendix 10B, Great Crested Newts Survey Report, Appendix 10C, Bat Surveys Report and Appendix 10E, River Condition Assessment** also present all the survey findings / results to date. The Proposed Development site provides habitats for an abundance of flora and fauna species ranging from butterflies, hares, bee orchid, ducks, grasshoppers, cows, sheep and other terrestrial / aquatic ecology species. Photographs of some of these species are shown on **Figure 5, Figure 6 and Figure 7**.

Operation and Decommissioning

Effects on ecology during the operation of the Proposed Development have been scoped out of the assessment as they are not anticipated to change from the Consented Development. Effects during decommissioning are also expected to be no worse than during Construction and are anticipated to be **Not Significant**.

FIGURE 5 - BUTTERFLY FOUND ON THE PROPOSED DEVELOPMENT SITE

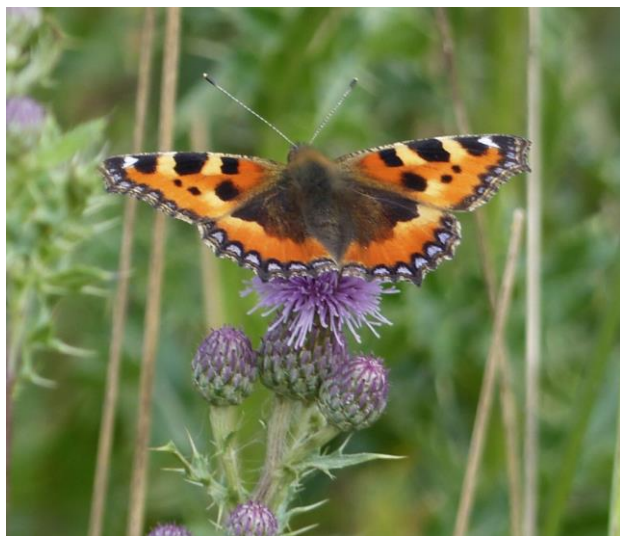


FIGURE 6 - HARE FOUND ON THE PROPOSED DEVELOPMENT SITE



FIGURE 7 – BEE ORCHID FOUND ON THE PROPOSED DEVELOPMENT SITE



LANDSCAPE AND VISUAL IMPACT ASSESSMENT

PEIR Chapter 11, Landscape and Visual Impact Assessment considers the potential effects of the Proposed Development on landscape and visual impact assessment during construction, operation and maintenance and decommissioning.

The Proposed Development is located in one Landscape Character Area (LCA) which is LCA10b Stublach Plain in Cheshire West. The remainder of the Study Area falls within LCA10c Lostock Plain, LCA10d Wimboldsley and Sproston Plain, LCA15e Dane Valley, LCA13a Peover, LCA5e East Winsford, and LCA1b Allostock. The southeastern part of the Study Area falls within Cheshire

East: LCA4e Stublach, LCA6a Rudheath, LCA10c Lower Dane, and LCA10e High Dane.

Construction

During construction of the Proposed Development, effects on landscape and visual effects on site are anticipated to be **Not Significant**.

On the landscape character areas during construction, for LCAb Stublach Plain, LCA10c Lostock Plain, LCA10d Wimboldsley and Sproston Plain, LCA15e Dane Valley, LCA13a Peover, LCA5e East Winsford, and LCA1b Allostock, effects are also anticipated to be **Not Significant**.

Operation

During operation of the Proposed Development, it is anticipated there will be a **Moderate Adverse (Significant)** effect in the north-western corner of the Site, reducing to **Minor-Moderate (Not Significant)** elsewhere on site.

During operation, effects on LCAb Stublach Plain will be **Minor-Moderate Adverse (Not Significant)**, LCAb Stublach Plain will be **Minor Adverse (Not Significant)**, LCA10c Lostock Plain will be **Minor Adverse (Not Significant)**, LCA10d Wimboldsley and Sproston Plain will be **Minor Adverse (Not Significant)**, LCA5e East Winsford will be **Minor Adverse (Not Significant)** and LCA15e Dane Valley, LCA13a Peover and LCA1b Allostock will be **Minor Adverse (Not Significant)**.

Decommissioning

Effects during decommissioning are anticipated to be **Not Significant** and no worse than during Construction.

CULTURAL HERITAGE

PEIR Chapter 12, Cultural Heritage considers the potential effects of the Proposed Development on cultural heritage during construction, operation and maintenance and decommissioning.

The cultural heritage assessment has been informed by **Appendix 12B, Cultural Heritage Desk Based Assessment**, geophysical surveys and non-intrusive field surveys, which have revealed some evidence for archaeological remains both within and in the vicinity of the Proposed Development.

These archaeological remains include several designated assets within a close distance to the Site, dating from the Roman to the post-medieval period, evidencing multi-phased use of the area. Specifically, four areas of archaeological sensitivity have been identified within the Site comprising; west of Drakelow Hall Moated Site, East of King Street Roman Road, South of 'Street Field' and within 'Brick Kiln Field'. Due to changes to the scale and layout of above ground infrastructure, there is a slightly higher potential for impacting unknown buried remains in these areas than that which was concluded in the Consented Development ES.

Due to this increased potential for encountering unknown buried archaeology, a phased archaeological investigation

is being undertaken to better our understanding and allow for a more robust impact assessment to be reported in the forthcoming ES.

Further baseline surveys consisting of geophysical survey are currently being undertaken to allow a more detailed understanding of the extent, character, condition and likely age of buried archaeological remains across the Site footprint.

An updated assessment of the potential impact of the Proposed Development on buried archaeology will be undertaken using any new information generated during these additional surveys. The results of this updated assessment will be presented in the ES.

An updated assessment of the potential impact of the Proposed Development on the setting of all heritage assets will be undertaken using any new information generated by design changes or by other topic assessments. Additional site visits will be undertaken where necessary. The results of this updated assessment will be presented in the ES.

Section 12.7 of Chapter 12 sets out the proposed mitigation measures, including, where possible, mitigation by avoidance, archaeological monitoring during construction and the establishment of additional screening methods to minimise settings effects.

The results of the intrusive surveys will be used to inform the design of any additional mitigation measures and these measures reported in the ES. These may take the form of additional exclusion zones or redesign measures to avoid areas of archaeological sensitivity. If avoidance is

not feasible then controlled archaeological excavations may also be proposed.

Construction, Operation and Maintenance and Decommissioning Based on the currently available information, the heritage assets identified (designated and non-designated) to date are expected to experience adverse effects ranging from **Minor (Not Significant) to Negligible (Not Significant)** as a result of the Proposed Development's construction, operation (and maintenance) and decommissioning.

SOCIO-ECONOMICS CHARACTERISTICS

PEIR Chapter 13, Socio-Economic Characteristics considered the potential effects of the Proposed Development on socio-economic characteristics during construction, operation and maintenance and decommissioning.

Construction

The Construction period of the Proposed Development is expected to be between 2028 to 2040. It is estimated that on a per annum basis the Proposed Development would account for 921 local Full Time Equivalents (FTE) jobs. Jobs and GVA are estimated during the construction phase from project capital expenditure (CAPEX) data. This data has been used to calculate the direct, indirect and induced FTE jobs (person years of employment) and GVA over the construction period. The magnitude of impact is assumed to be Small, locally and Negligible, nationally as impacts will be temporary and not large enough to create

significant economic growth or structural economic change. Therefore, whilst the significance of effects is positive the residual effects will be Negligible (**Not Significant**).

The estimated direct, indirect and induced GVA for the construction phase is in total £1,758 million (£1,572 million locally and £187 million nationally). The sensitivity of economic receptors in the Local and National Study Area is assessed as Low because it is receptive to and has the ability to absorb change. Therefore, whilst the significance of effects is positive the residual effects will be **Negligible (Not Significant)**.

Residual effects on wider socio-economic aspects during construction include: local labour market (**Moderate Beneficial- Not Significant**), Tourism and Recreation.

Operation and Maintenance

The operational period is estimated to be 50 years for the Proposed Development. It is estimated that the first year of operation will be 2032. OPEX data is used to estimate jobs (FTE) and GVA. It is estimated during the first year (2032) of Operation and Maintenance a total of 98 FTE will be created (91 Locally and 7 Nationally). The sensitivity of the Local and National Study Areas is assessed as Medium and Small respectively, and the significance of effect is positive **Minor Beneficial (Not Significant)**.

The estimated direct, indirect and induced GVA for the first year of the operation and maintenance phase (2031) is in total £15.9 million (£14.8 million locally and £1.1

million nationally). The sensitivity of economic receptors in the Local and National Study Area is assessed as Low and Negligible respectively, as there will be a barely perceptible alteration to the GVA. Therefore, whilst the significance of effects is positive the residual effects will be **Negligible (Not Significant)**.

Residual effects on wider socio-economic aspects during operation and maintenance include: local labour market (**Moderate Beneficial- Not Significant**), Tourism and Recreation.

POPULATION AND HUMAN HEALTH

PEIR Chapter 14, Population and Human Health considered the potential effects of the Proposed Development on population and human health during construction, operation and maintenance and decommissioning.

Construction

During construction, the following impacts have been identified:

Changes in health-related behaviours - potential changes in physical activity has been scoped into the community health assessment. The Proposed Development could potentially cause disruption to tourism and recreation assets that promote healthy lifestyles. Residual effects on changes in health-related behaviours have been ruled as **Negligible (Not Significant)**.

Changes in biophysical environment - including impacts on air quality, noise and vibration and waste. Residual

effects on each one of these changes in the biophysical environment have been ruled as **Negligible - Minor Adverse (Not Significant)**.

Changes in the Economic Environment- impacts on employment and income and education and training. A direct link exists between being in 'good' work and positive health outcomes. Evidence shows that those in decent work have a better quality of life and health outcomes and are protected against social exclusion. Increased employment opportunities can positively influence health through increasing social contact, involvement in a collective effort or activity and forming social relationships. The overall significance of effects for employment (in relation to community health) during construction would be '**Negligible**' and, therefore, '**Not Significant**'.

Changes in the Social Environment- including impacts on open space, leisure and play; transport modes, access and connections; and community safety. Residual effects on each one of these changes in the social environment have been ruled as **Negligible - Minor Adverse (Not Significant)**.

Operation and Maintenance

During operation and maintenance, the following impacts have been identified:

Changes in health-related behaviours - As noted above, IEMA guidance defines changes in health-related behaviours as a health determinant and goes on to define health-related behaviours as physical activity, risk taking

behaviours, and diet and nutrition. Residual effects on changes in health-related behaviours have been ruled as **Minor Adverse (Not Significant)**.

Changes in biophysical environment - including impacts on climate, air quality, noise and vibration and waste. Residual effects on each one of these changes in the biophysical environment have been ruled as **Negligible - Minor Adverse (Not Significant)**.

Changes in the Economic Environment- impacts on employment and economic activity. Overall the residual effects were assessed as **Negligible (Not Significant)**.

Changes in the Social Environment- including impacts on: open space, leisure and play; transport modes, access and connections; and community safety. Residual effects on each one of these changes in the social environment have been ruled as **Negligible (Not Significant)**.

Decommissioning

The potential effects of decommissioning on community health are anticipated to be similar to, and less significant than, the potential construction effects, which are assessed as not significant. Decommissioning will be undertaken in line with an Updated decommissioning plan, including an Updated DEMP, prepared upon cessation of operations. Potential effects on community health from decommissioning activities are therefore anticipated to be **Negligible (Not Significant)**.

MAJOR ACCIDENTS AND DISASTERS

PEIR Chapter 15, Major Accidents and Disasters (MADS) considered the potential effects of the Proposed Development on MADS during construction, operation and maintenance and decommissioning.

The potential of the Proposed Development to have significant effects on people or the environment has been considered using a standard hazard identification approach. The systematic approach demonstrated that with the commitment to the design and mitigation measures, all residual risks will be reduced to As Low As Reasonably Practicable (ALARP).

This assessment is a review based on information available at this stage and has adopted a worst-case approach. As is normal practice, further hazard and risk analysis will be undertaken throughout the lifecycle of the Proposed Development in accordance with the requirements of applicable legislation and industry good practice guidance, to ensure risks are managed to a level that is considered ALARP during the detailed design, construction planning and operation of the Proposed Development.

Construction

During the construction phase of the Proposed Development, the primary risk identified relates to the phased construction of the caverns, GPP, and interconnecting pipework. This introduces the potential for simultaneous operations (SIMOPs), where construction activities occur in proximity to operational infrastructure.

Such scenarios increase the number of personnel on site and the likelihood of interactions with live systems.

Enhanced Mitigation measures will include the development of a SIMOPs risk assessment, a tie-in strategy for live plant connections, and a debrining philosophy supported by appropriate permitting and human factors integration. Site layout and traffic management plans will be developed to minimise the risk of vehicle-related incidents, and lifting strategies will be implemented for the safe handling of heavy components.

With the mitigation committed to by the Proposed Development for MADS during Construction, there are no residual risks in the 'Intolerable' category. All potential construction hazards can be judged to be 'Tolerable if ALARP' or 'Broadly Acceptable' and is therefore deemed **Not Significant** in EIA terms.

Operation and Maintenance

During the operation and maintenance phase of the Proposed Development, the primary risks relate to the storage, transfer, and processing of hydrogen under high pressure. The most significant hazard is the potential for loss of containment, which could result in ignition and escalation to jet fire or explosion. These risks are particularly relevant to buried pipework, high-pressure interfaces, and areas where hydrogen may accumulate in confined spaces.

Mitigation measures embedded in the design include the use of hydrogen-compatible materials, cathodic protection for underground pipework, and the application of fire and

gas detection systems linked to ESD and EDP systems. The site layout has been developed to minimise escalation potential, with separation distances and buried infrastructure reducing the likelihood of domino effects. Hydrogen embrittlement and elastomer swelling have been addressed through material selection and specification.

During operation, with the mitigation measures committed to by the Proposed Development in place there are no residual risks within the 'Intolerable' category. All potential operational and maintenance hazards can be assessed as 'Tolerable if ALARP' or 'Broadly Acceptable' and is therefore deemed 'Not Significant' in EIA terms.

Decommissioning

The decommissioning phase has not yet been risk assessed due to availability of information. At this stage, hazards arising during the decommissioning phases are considered comparable to those expected during construction as a worst-case assumption. Decommissioning activities will follow industry best practice and risks will be managed to ALARP.

WASTE

PEIR Chapter 16, Waste considered the potential effects of the Proposed Development on waste during construction, operation and maintenance and decommissioning.

Construction

The largest volume of waste is anticipated to be generated during the construction phase of the Proposed Development, including surplus soil and rock chippings from earthworks / excavations and borehole drilling.

During construction of the Proposed Development, the contractor will be required to develop and implement a construction Site Waste Management Plan (SWMP), to be approved by the Local Planning Authority. The disposal of waste, including any surplus soil, will be managed so far as is reasonably practicable to maximise the environmental and development benefits from the use of surplus material and reduce an adverse environmental effects of waste disposal in accordance with the relevant waste management regulations.

Considering the approaches to similar type / scale of projects, embedded mitigation measures, best practice waste recovery and likely recycling opportunities; the effect on the regional landfill capacity is predicted to be **Negligible (Not Significant)**.

Operation and Maintenance

Considering the approaches to similar type / scale of projects, the waste impacts will be long term. However, considering embedded mitigation measures, best practice waste recovery and likely recycle opportunities the effect on the regional landfill capacity is predicted to be **Negligible (Not Significant)**.

Decommissioning

The decommissioning phase has been scoped out of the assessment. It is anticipated that application of the waste management hierarchy will be at the core of a future decommissioning plan.

CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

PEIR Chapter 17, Climate Change and Greenhouse Gas Emissions considered the potential effects of the Proposed Development on climate change and greenhouse gas (GHG) emissions during construction, operation and maintenance and decommissioning.

The assessment of GHG effects for the construction, operation and maintenance, and decommissioning phases of the Proposed Development will be detailed in the ES once the Proposed Development design progresses.

The confirmed significant effects associated with climate change will also be included in the ES. However, the preliminary climate change resilience review for the PEIR does include a table to outline the potential climate risks associated with Proposed Development with description on the baseline of each, mitigation for each risk and the likelihood and consequence of each risk.

The hazard risks in the preliminary climate change resilience review include Increasing Mean Temperatures; Extreme Heat, Extreme cold, Extreme Rainfall, Flooding (Pluvial), Water Stress and Drought and Wildfires. As there was no climate change chapter as part of the

Consented Development both the consented elements (i.e., Salt Caverns, Wellheads and Monitoring Systems) and the Proposed Development elements (i.e., Gas Processing Plant (GPP) Buildings and Associated Equipment; Nitrogen Package Plant; Compressed Air Package Plant; Electrical Substation; and Flare Technology) have been considered. These will be assessed fully as part of the ES.