Keuper Gas Storage Project

Appendix 7A: Flood Risk Assessment Assessment

PREPARED FOR

Keuper Gas Storage Limited

DATE

September 2025

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EN0310001

DOCUMENT DETAILS

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CLIENT NAME	Keuper Gas Storage Limited

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
BGL	Below Ground Level
BGS	British Geological Survey
CWAC	Cheshire West and Chester
DCO	Development Consent Order
DEFRA	Department of Environment and Rural Affairs
EA	Environment Agency
EIA	Environmental Impact Assessment
ERM	Environmental Resources Management
ES	Environmental Statement
FRA	Flood Risk Assessment
GPP	Gas Processing Plant
HAGI	Hydrogen Above Ground Installation
KGSL	Keuper Gas Storage Limited
KGSP	Keuper Gas Storage Project
LFRMS	Local Flood Risk Management Strategy
LiDAR	Light Detection and Ranging

Acronym	Description
MC	Material Change
NPPF	National Planning Policy Framework
NTS	National Transmission System
PEIR	Preliminary Environmental Information Report
pFRA	Proposed Development Preliminary Flood Risk Assessment
PFRA	Preliminary Flood Risk Assessment
RoFSW	Risk of Flooding from Surface Water
SFRA	Strategic Flood Risk Assessment
WFD	Water Framework Directive

1. INTRODUCTION

1.1 PURPOSE OF THIS REPORT

1.1.1.1 Keuper Gas Storage Limited (KGSL), (hereafter referred to as 'the Applicant'); is proposing a Material Change (MC) to the Keuper Gas Storage Project (KGSP), to construct and operate an underground hydrogen storage facility (the Proposed Development) on greenfield land in the Holford Brinefield, Middlewich, in the County of Cheshire West and Chester (the Site). Further detail regarding the Proposed Development is included within **Section 3** of this report and **Chapter 2, Proposed Development Description**.

1.1.1.2 This Preliminary Flood Risk Assessment (pFRA) forms a supporting document to **Chapter 7, Hydrology and Flood Risk** and has been prepared as part of the PEIR (Preliminary Environmental Information Report). This pFRA will inform the scope and assessment of a comprehensive Flood Risk Assessment (FRA) that will be issued as an appendix to the Environmental Statement (ES).

1.1.1.3 This pFRA evaluates the potential flood risk associated with the Proposed Development. The assessment outlines the relevant policy framework, describes the methodology employed and presents the existing baseline conditions within the Site and its surrounding area.

1.2 LEGISLATION, POLICY AND GUIDANCE

1.2.1.1 The following legislation, policy and guidance has informed the approach of this pFRA:

- The Flood Risk (England and Wales) Regulations (2009)[1];
- The Flood and Water Management Act (2010)[2];
- National Planning Policy Framework (2025)[3];
- Cheshire West and Chester (CWAC) Level 1 Strategic Flood Risk Assessment (SFRA) (2016)[4];
- CWAC Local Flood Risk Management Strategy (LFRMS) (2016)[5];
- CWAC Preliminary Flood Risk Assessment Report (PFRA) (2011)[6];

[1] UK Government (2009) *The Flood Risk Regulations 2009* [online]. Available at: https://www.legislation.gov.uk/uksi/2009/3042/made. (Accessed August 2025).
[2] UK Government (2010) *Flood and Water Management Act 2010* [online]. Available at: https://www.legislation.gov.uk/ukpga/2010/29/contents. (Accessed August 2025)
[3] UK Government (2025) *National Planning Policy Framework* [online]. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2. (Accessed 26/08/2025).
[4] Cheshire West and Chester Council (2016) *Strategic Flood Risk Assessment – March 2016* [online]. Available at: https://consult.cheshirewestandchester.gov.uk/kse/event/28136. (Accessed August 2025).
[5] Cheshire West and Chester Council (2016) *Local Flood Risk Management Strategy* [online]. Available at: https://consult.cheshirewestandchester.gov.uk/kse/event/30306. (Accessed August 2025).
[6] Cheshire West and Chester Council (2011) Preliminary Flood Risk Assessment – November 2011 [online]. Available at: https://consult.cheshirewestandchester.gov.uk/kse/event/30306. (Accessed August 2025).

- CWAC Local Plan (Part One) Strategic Policies – reference to ENV 1: Flood Risk and Water Management (2015)[7]; and
- CWAC Local Plan (Part Two) Land Allocations and Detailed Polices – reference to chapter 15: Flood risk and Water Management (2019)[8].

[7] Cheshire West and Chester Council (2015*) Cheshire West and Chester Local Plan (Part One) Strategic Policies* [online]. Available at: https://consult.cheshirewestandchester.gov.uk/kse/event/24907. (Accessed August 2025).
[8] Cheshire West and Chester Council (2019) *Cheshire West and Chester Council Local Plan (Part Two) Land Allocations and Detailed Policies* [online]. Available at: https://cheshirewestandchester.objective.co.uk/portal/cwc_ldf/adopted_cwac_lp/parttwo_adopted. (Accessed August 2025).

2. EXISTING SITE

2.1 SITE LOCATION

2.1.1.1 The Site is situated adjacent to the existing Stublach Gas Storage facility (Grid Reference SJ 69644 69972), approximately 3 km to the northeast of the town of Middlewich, in the county of Cheshire West and Chester.

2.1.1.2 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.

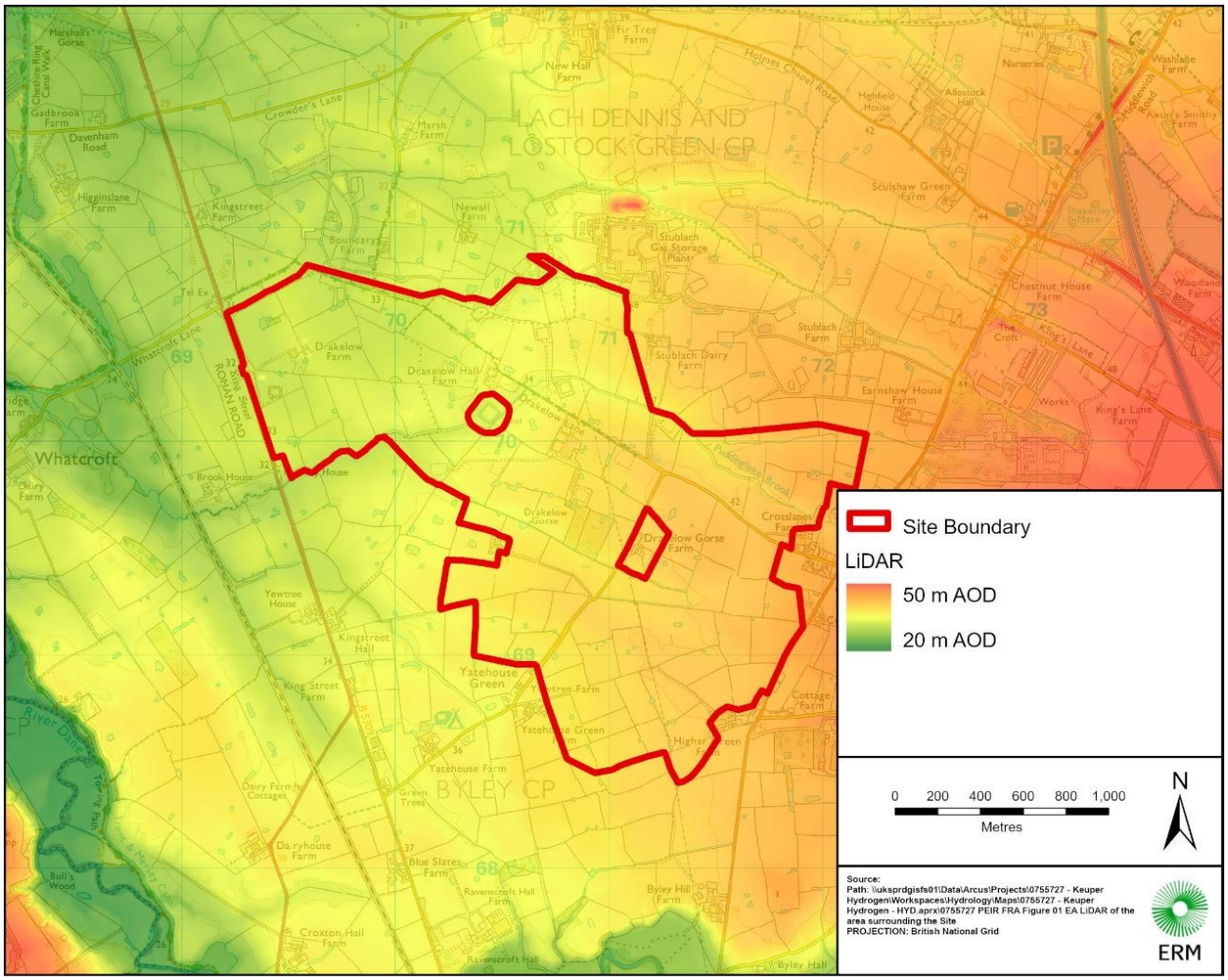
2.2 SITE TOPOGRAPHY

2.2.1.1 Topographic data at the Site and surrounding area, gathered using Light Detection and Ranging (LiDAR) aerial photogrammetric techniques, has been downloaded from the Environment Agency (EA) National LiDAR Programme[9] at a 1 metre (m) resolution.

2.2.1.2 The topography of the Site generally falls from east to west and varies from approximately 30 m Above Ordnance Datum (AOD) in the northwest to 40 m AOD in the east as shown on **Figure 2.1**, with the surrounding area being relatively flat-lying.

[9] EA (2025) *National LIDAR Programme* [online]. Available at: https://www.data.gov.uk/dataset/f0db0249-f17b-4036-9e65-309148c97ce4/national-lidar-programme. (Accessed August 2025).

FIGURE 2.1 – SITE ELEVATIONS



2.3 HYDROLOGICAL CHARACTERISTICS

2.3.1.1 The Site is located within the Weaver Gowy WFD catchment, specifically encompassing the Puddinglake Brook and Wade Brook sub-catchments.

2.3.1.2 Puddinglake Brook is an EA designated Main River which flows east to west through the Site and receives inflows from various ephemeral land drains within the Site. During the Site walkover in July 2025 the ephemeral land drains were observed to be heavily vegetated, with minimal or no discernible flow, as illustrated in **Plate 2**.

2.3.1.3 Puddinglake Brook flows into the Site approximately 380 m northwest of the village of Byley and exiting at the western boundary, adjacent to the A530. The Brook (**Plate 1**) was observed to be overgrown, incised and exhibiting low flow conditions.

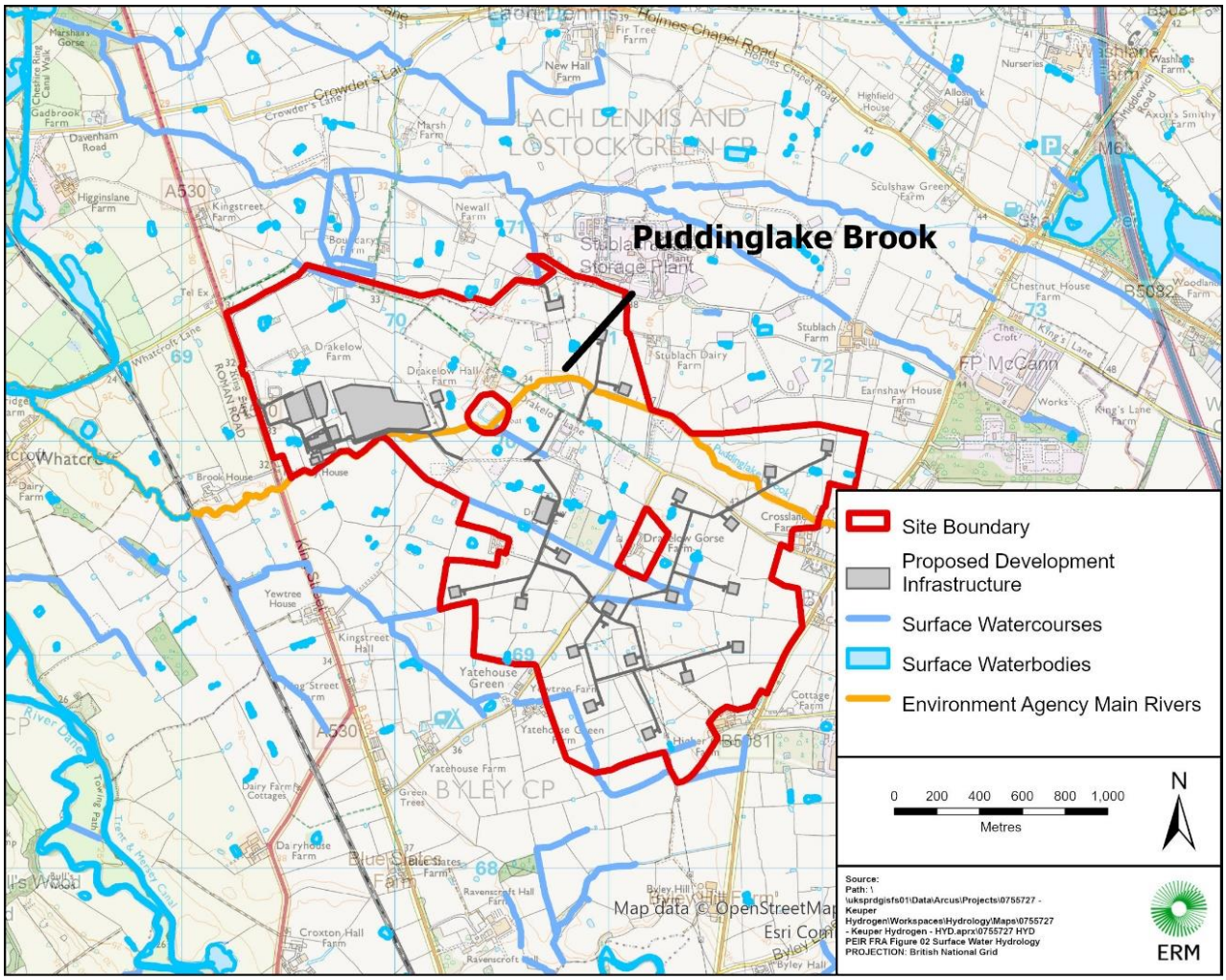
PLATE 1: VEGETATATION WITHIN PUDDINGLAKE BROOK

PLATE 2: DRY FIELD DITCH LEADING TO THE PUDDINGLAKE BROOK

2.3.1.4 Several ponds are present within the Site, located within the agricultural fields and enclosed by fencing. These ponds vary in both size and depth and serve as localised surface water storage features.

2.3.1.5 The hydrological characteristics at the Site is illustrated in **Figure 2.2** below.

FIGURE 2.2 – SURFACE WATER HYDROLOGY



2.4 GEOLOGY AND SOILS

2.4.1.1 The British Geological Survey (BGS) GeoIndex Mapping[10] provides comprehensive geological data, including information on superficial deposits, bedrock geology and borehole records.

2.4.1.2 According to the BGS 1:50,000 scale Superficial Deposits Map, the Site is predominantly underlain by Devensian diamicton till, with sporadic occurrences of peat identified along natural drainage pathways that discharge into Puddinglake Brook. Localised borehole

[10] British Geological Survey (n.d.) *GeoIndex (onshore)* [online]. (Accessed August 2025).

data offer further insight into the composition and characteristics of the diamicton strata, as summarised in **Table 2.1**.

2.4.1.3 The 1:50,000 scale Bedrock Geology Map indicates that the site is underlain by the Sidmouth Mudstone Formation.

TABLE 2.1 – LITHOLOGY AT THE SITE

Description of Strata	Depth Below Ground Level (BGL) (m)
Topsoil	0.00 - 0.30
Soft to firm brown, slightly silty clay with occasional rounded gravel	0.30 – 3.50
Medium, dense, reddish brown, very silty, fine to medium sand with occasional bands of slightly gravelly clay	3.50 – 4.50
Very stiff, brown, very silty sand - clay with some rounded gravel	4.50 – 8.00

2.5 GROUNDWATER

2.5.1.1 According to the BGS 1:625,000 scale Hydrogeology Mapping, the Site is underlain by undifferentiated Triassic rocks, comprising a predominantly argillaceous (clay-rich) sequence with occasional sandstone interbeds. These sandstones exhibit low groundwater yields (low productivity aquifer), typically less than 0.5 litres per second and may be highly mineralised, limiting their suitability for potable use. The unit is classified as a low productivity aquifer and functions as a confining layer above the more permeable and regionally significant Sherwood Sandstone aquifer.

2.5.1.2 Localised borehole records indicate variability in groundwater levels across the Site, with groundwater strikes typically encountered at approximately 3.00 m below ground level (BGL).

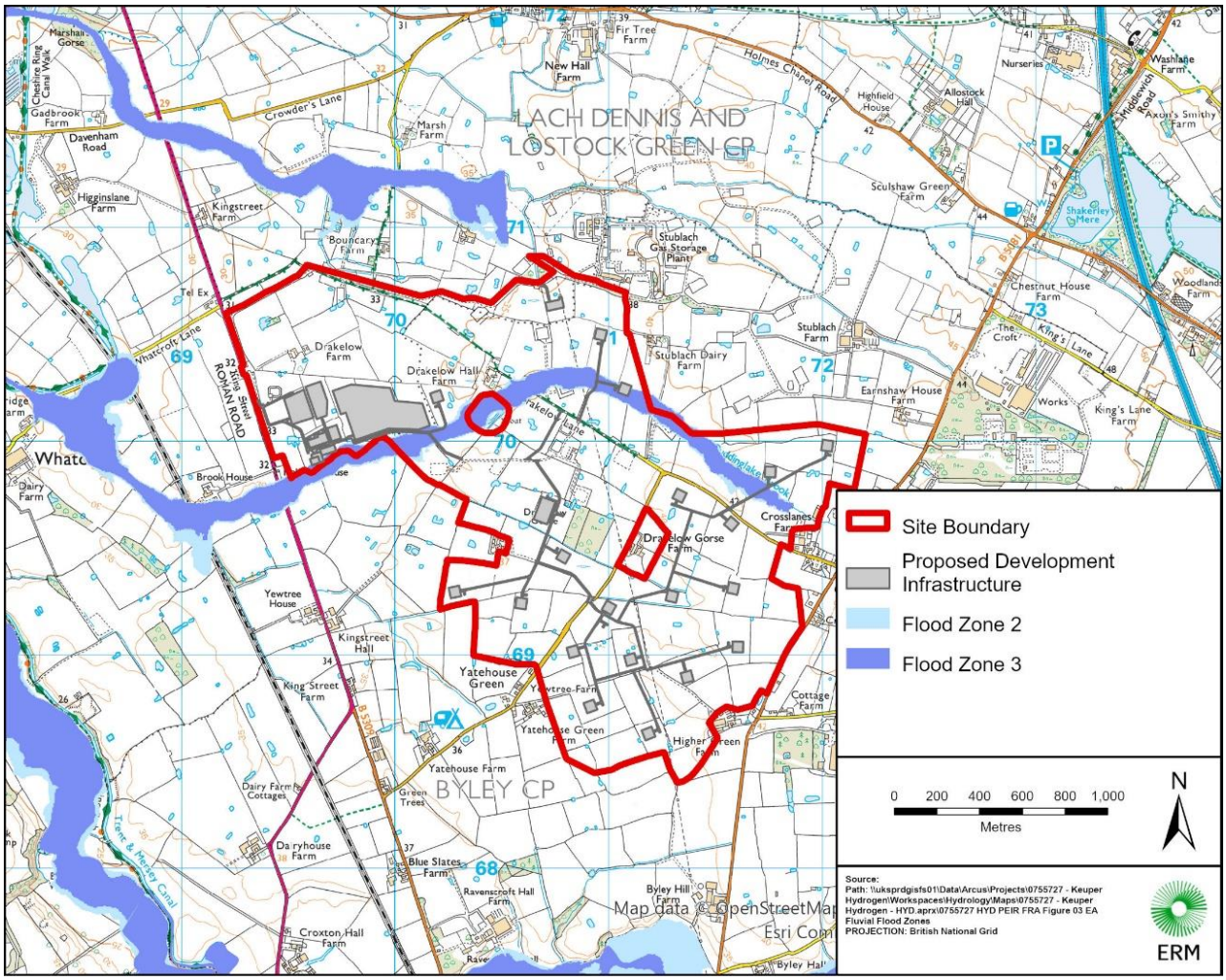
2.6 FLOOD ZONE CLASSIFICATION

2.6.1.1 The EA Flood Map for Planning[11] indicates that most of the Site is located within Flood Zone 1. Areas of Flood Zones 2 and 3 are located on land along the banks of Puddinglake Brook.

2.6.1.2 The extent of EA flood zones is illustrated in **Figure 2.3** below**.**

[11] UK Government (n.d.) *Flood map for planning* [online]. Available at: https://flood-map-for-planning.service.gov.uk/map. (Accessed August 2025).

FIGURE 2.3 – EA FLUVIAL FLOOD ZONES



2.7 FLOOD DEFENCES

2.7.1.1 The EA spatial flood defences[12] dataset identifies the presence of flood defences along the banks of Puddinglake Brook, classified as natural high ground, maintained by a private individual, company or charity. These features are attributed a standard of protection of 20%, indicating that the elevated terrain provides a level of flood defence against events with an annual exceedance probability (AEP) of 5% (1 in 20-year flood event).

2.7.1.2 The natural high ground along the banks of the Puddinglake Brook is not considered within the EA Flood Map for Planning.

2.7.1.3 However, during the Site walkover in July 2025, there was no discernible natural high ground / raised embankments along the banks of the Puddinglake Brook as shown in **Plate 1** and **Plate 3**.

[12] EA (n.d.) AIMS Spatial Flood Defences (inc. standardised attributes) [online]. Available at: https://environment.data.gov.uk/dataset/8e5be50f-d465-11e4-ba9a-f0def148f590. (Accessed August 2025).

PLATE 3: NO VISIBLE EMBANKMENTS ALONG THE BROOK

2.8 HISTORICAL FLOODING

2.8.1.1 The EA Historic Flood Map[13] shows that the Site nor area in its vicinity is situated within any areas with recorded previous fluvial (river), tidal (sea) or groundwater flooding.

2.8.1.2 The CWAC PFRA indicates that the Site nor its vicinity is situated within any areas identified as having experienced previous pluvial (surface water) flooding.

[13] EA (n.d.) *Historic Flood Map* [online] Available at: https://environment.data.gov.uk/dataset/889885c0-d465-11e4-9507-f0def148f590. (Accessed August 2025).

3. PROPOSED DEVELOPMENT

3.1 DEVELOPMENT DESCRIPTION

3.1.1.1 The key changes to the key components of the Consented Development for the Proposed Development are:

- 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;
- 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; and

3.1.1.2 The provision of localised hydrogen storage will enhance supply resilience, ensuring a reliable and flexible source of low-carbon gas for end users across the Northwest and Wales.

3.1.1.3 The Proposed Development is detailed comprehensively in **Chapter 2, Proposed Development Description** and illustrated in **Figure 2.2, Site Layout.**

3.2 FLOOD RISK VULNERABILITY CLASSIFICATION

3.2.1.1 In accordance with the NPPF, the Proposed Development is defined as 'infrastructure for electricity supply including generation, storage and distribution systems' and is therefore classified as "Essential Infrastructure". As per the NPPF, and highlighted in **Table 5.1.**; "Essential Infrastructure" is considered appropriate within Flood Zones 1, 2 and 3. However, development within Flood Zone 3 requires the application of the Exception Test. Application of the Exception Test is further detailed in **Section 5** of this Chapter.

4. FLOOD RISK ASSESSMENT

4.1 METHODOLOGY

4.1.1.1 The NPPF requires all possible forms of flood risk to be considered within FRAs and lists six forms of flooding that should be assessed. As such, this FRA will assess each of the different forms of flooding listed within the NPPF and an explanation of each is provided in **Table 4.1**.

TABLE 4.1 – FORMS OF FLOODING ASSESSED WITHIN THIS FRA

Flooding Source	Explanation
Fluvial	Watercourse flooding occurs when the water volumes and flows within a watercourse exceed the flow capacity of the channel of the watercourse. This can gradually or rapidly develop depending on the land use, topography and climate within the catchment of the watercourse. Where land is protected by flood defences, flooding can occur when defences are overtopped or breached.
Tidal and Coastal	Storm surges and high tides cause flooding of low-lying land in coastal locations. If low atmospheric pressure coincides with high tide, a tidal surge may happen which can cause serious flooding. Where land is protected by flood defences, flooding can occur when defences are overtopped or breached.
Pluvial	Intense rainfall over land that has a limited capacity to absorb water and overwhelms the drainage capacity of the area can result in rapid surface runoff and localised flooding. Where there are areas of concentrated development and hard standing, pluvial flooding is more likely to occur due to the reduction in porosity of underlying grounds.
Groundwater	Where the groundwater table exceeds the surface ground level. This is most likely to occur in areas that are underlain by permeable geology (known as aquifers). These can be extensive, regional aquifers, such as chalk or sandstone, or may be more local sand or river gravels in valley bottoms underlain by less permeable rocks
Sewers	Where the capacity of a sewer system is exceeded by extreme rainfall and/or runoff or through blockage. The likelihood of flooding depends on the capacity of the local sewerage system. Land and property can be flooded with

Flooding Source	Explanation
	water contaminated with raw sewage as a result. Rivers can also become polluted by sewer overflows.
Artificial Waterbodies	Sources such as reservoirs, canals and lakes. This form of flooding can occur through the infrastructure being overwhelmed or because of a failure.

4.1.1.2 In assessing flood risk to and from the Proposed Development, flood risk sources have been appraised and classed as the following:

- Negligible (where little or no risk is identified);
- Low (where theoretical risk is identified but mitigating factors may influence flood levels); or
- Moderate to High (where modelled levels or historical events show risk).

4.1.1.3 This classification considered several factors when attributing the risk of flooding to the Proposed Development, including:

- Depth of flooding;
- Flooding extent / ingress into the Site;
- Type of infrastructure affected; and
- Intervening structures / flood protection.

4.2 FLUVIAL SOURCES

4.2.1.1 The EA Flood Map for Planning indicates that most of the Site lies within Flood Zone 1. However, portions of the Site extend into Flood Zones 2 and 3 associated with Puddinglake Brook. Elements of the Proposed Development including the control room, car park, storage areas, GPP area and wellheads are situated within Flood Zones 2 and 3.

4.2.1.2 The EA Flood Map for Planning is based on broad-scale national JFLOW modelling intended for strategic flood risk screening across England. This modelling typically incorporates generalised hydrological and hydraulic parameters, utilising coarse-resolution topographic data and assumptions derived from watercourses of similar typology. While suitable for regional assessments, this approach lacks the spatial granularity and site-specific calibration required to accurately represent localised flood behaviour; particularly in catchments influenced by smaller, complex watercourses such as the Puddinglake Brook.

4.2.1.3 No detailed hydraulic modelling of the Puddinglake Brook or its tributaries has been undertaken to date. Consequently, the delineated flood zones may not reliably reflect flood extents, depths or interactions with local features such as channel morphology, structures, land use or drainage infrastructure. In accordance with the CWAC SFRA, where detailed hydraulic modelling is unavailable, the functional floodplain (Flood Zone 3b, typically associated with a 1 in 20-year flood event) is conservatively assumed to align with the extent of Flood Zone 3a. Site-specific FRAs are therefore advised to undertake further detailed analysis to refine the delineation and assess the associated flood risk of the functional floodplain.

4.2.1.4 As such, a 2D hydraulic model will be produced to delineate fluvial flood extents and depths, and will inform the FRA submitted as part of the ES.

4.3 TIDAL AND COASTAL SOURCES

4.3.1.1 The Site is inland and there are no tidally influenced watercourses within the vicinity of the Site. As such, the onsite tidal flood risk is Negligible.

4.4 PLUVIAL SOURCES

4.4.1.1 The EA risk of flooding from surface water (RoFSW)[14] mapping provides modelled surface water flooding extents for land with a 'High' (3.3% AEP), 'Medium' (1% AEP) and 'Low' (0.1% AEP) risk of surface water flooding.

4.4.1.2 The mapping indicates that most of the Site is at 'Very Low' risk of flooding, where the annual chance of surface water flooding is less than 0.1%. Limited areas within the Site are defined as being at 'Low', 'Medium' and 'High' risk of surface water flooding which coincide with localised topographic depressions or are confined to the channel of the Puddinglake Brook and associated tributaries.

4.4.1.3 The mapping indicates that surface water flood depths within the channel of the Puddinglake Brook may reach or exceed 1.2 m during both the 1% AEP and 0.1% AEP events. However, this extent is confined to a relatively short reach of the main channel. Additionally, isolated pockets within the Brook's tributaries show flood depths of up to approximately 0.9 m, though these are limited in spatial extent and occur only in discrete locations.

4.4.1.4 The majority of the Proposed Development is located outside the delineated surface water flood extents. However, the proposed wellhead installations situated to the south and northwest of the Site intersect areas identified as being at risk. Given that surface water flood risk in these locations is primarily confined to the channels of

[14] EA (n.d.) *Risk of Flooding from Surface Water* [online]. Available at: https://environment.data.gov.uk/dataset/b5aaa28d-6eb9-460e-8d6f-43caa71fbe0e. (Accessed August 2025).

existing watercourses, the potential flood risk to these elements of the Proposed Development will be considered under fluvial flood mechanisms in **Section 4.2**.

4.4.1.5 The EA RoFSW mapping inclusive of climate change uplift[15] delineates the surface water flood extents for the critical design scenario of a 1 in 100-year surface water flood event, projected for the 2050s epoch (2040–2060). Although the Proposed Development is anticipated to be decommissioned by 2080, the surface water flood extents for the 2050s epoch, which incorporates a 25% uplift in rainfall to account for climate change; is considered representative of the 2070s epoch, which applies a 30% uplift. The marginal 5% difference in rainfall allowance is not expected to result in a materially different surface water flood extents and is therefore deemed appropriate for assessment purposes.

4.4.1.6 Within the proposed GPP area the mapping identifies surface water flooding within two existing ponds. These ponds are proposed to be infilled, with surface water either disposed of off-site via an appropriate waste management facility or discharged to an on-site watercourse, as detailed in **Chapter 7: Hydrology and Flood Risk** and to be further elaborated in the ES. Furthermore, the mapped surface water flood extents are predominantly confined to the channel and riparian land of the Puddinglake Brook. Any components of the Proposed Development located within this corridor will be assessed under fluvial flood risk mechanisms, as discussed and detailed in **Section 4.2**.

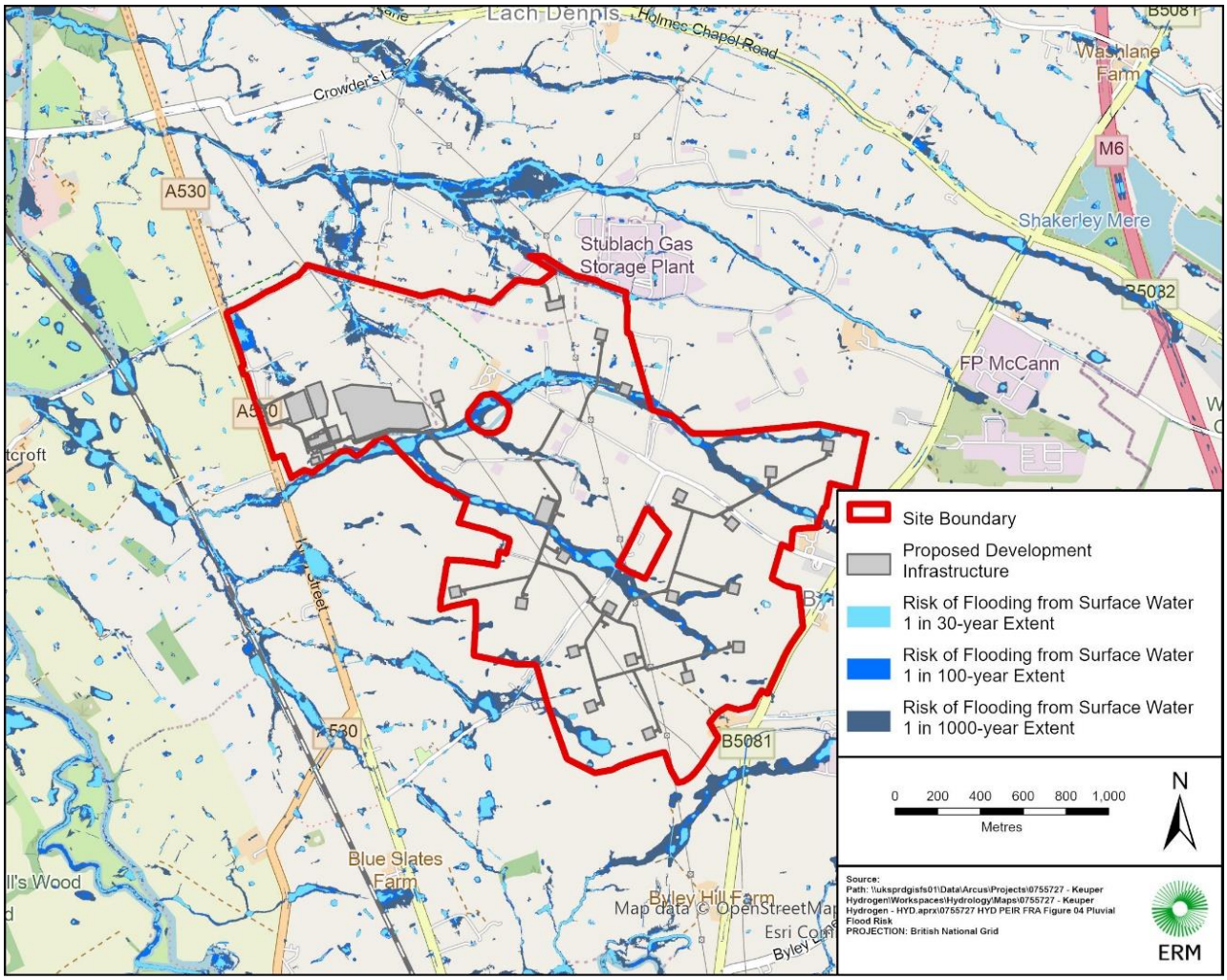
4.4.1.7 Given that the mapped surface water flood extents within the Site are primarily associated with fluvial processes addressed in **Section 4.2**, and that the two identified ponds contributing to surface water pooling are proposed to be infilled with appropriate disposal or discharge measures in place, the risk of surface water flooding is considered to be Negligible.

4.4.1.8 A surface water drainage system will be designed to attenuate surface water runoff to a 1 in 100 year plus climate change event without exceedance, in accordance with the principles set out in the Surface Water Drainage Strategy. The design details of the drainage system will be provided as part of the ES.

4.4.1.9 Surface water flood risk at the Site is delineated in **Figure 4.1** below.

[15] EA (n.d.) *Risk of Flooding from Surface Water – Climate Change 1* [online]. Available at: https://environment.data.gov.uk/dataset/e5b38de2-99b3-44ee-b10c-b244926878ef. (Accessed August 2025).

FIGURE 4.1 – EA RISK OF SURFACE WATER FLOODING



4.5 GROUNDWATER SOURCES

4.5.1.1 The CWAC SFRA includes mapping of areas considered to be susceptible to groundwater emergence, categorised into four levels of susceptibility. These categories represent the proportion of each 1 km grid square where geological or hydrogeological conditions suggest that groundwater may first reach the surface. It is important to note that this dataset does not indicate the probability of groundwater flooding occurring but rather identifies areas where groundwater emergence is more likely under conducive conditions.

4.5.1.2 The mapping indicates that the Site is greater or equal to 50% susceptible to groundwater emergence, but less than 75%. However, as outlined in **Section 2.5** of this pFRA, local borehole records typically indicate groundwater at approximately 3.00 m BGL, confined within argillaceous (clay-rich) strata that exhibit low permeability. Given the impermeable nature of these deposits, the potential for groundwater seepage is considered minimal, and the associated risk of groundwater flooding is therefore deemed as Low.

4.6 RESERVOIRS

4.6.1.1 The EA risk of flooding from reservoirs[16] mapping includes details of predicted reservoir flood extents, both on a 'dry day', if reservoir flooding were to occur when river levels are at normal levels; and on a 'wet day', should reservoir breach occur if a river is already experiencing an extreme natural flood.

4.6.1.2 This mapping indicates that the Site is predicted to remain free from flooding in the event of a reservoir breach on both a 'wet day' and a 'dry day'.

4.6.1.3 The risk of flooding from reservoirs is therefore Negligible.

4.7 MANMADE WATERCOURSES

4.7.1.1 There are no canals located within the Site or its immediate vicinity. The nearest canal is the Trent and Mersey Canal, situated approximately 560 m west of the Site's northwestern boundary. Given the absence of artificial watercourses within or adjacent to the Site, combined with the relatively flat topography of the surrounding landscape, the potential risk of flooding from manmade watercourses is considered Negligible.

4.8 SEWERS

4.8.1.1 The Site is situated within a predominantly rural setting and comprises undeveloped agricultural land. Given the nature of the surrounding area, it is anticipated that public sewerage infrastructure is not present within the Site. Instead, it is assumed that any existing sewer networks are likely to be located along primary transport routes in the vicinity, such as King Street, which lies downslope of the Site.

4.8.1.2 Thus, as a result of the Site's undeveloped nature and its separation from known public sewerage infrastructure, the potential risk of flooding from surcharged sewers is considered to be Negligible.

4.9 FLOOD RISK MITIGATION

4.9.1.1 Ongoing design development and refinement of the Proposed Development layout will be undertaken prior to finalisation of the ES. This process will incorporate consideration of flood risk from all sources as identified within this pFRA and the hydraulic modelling. Accordingly, appropriate flood risk mitigation measures will be defined and integrated within the FRA submitted as part of the ES.

[16] EA (2021*) Risk of Flooding from Reservoirs – Maximum Flood Extent (Web Mapping Service)* [online]. Available at: https://www.data.gov.uk/dataset/44b9df6e-c1d4-40e9-98eb-bb3698ecb076/risk-of-flooding-from-reservoirs-maximum-flood-extent-web-mapping-service. (Accessed August 2025).

5. NPPF SEQUENTIAL AND EXCEPTION TEST

5.1 SEQUENTIAL TEST AND EXCEPTION TEST

5.1.1.1 The Sequential Test aims to direct development towards areas with the lowest probability of flooding and is a mandatory requirement for proposals located within Flood Zone 3.

5.1.1.2 In accordance with the NPPF, *"the more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed"*. As outlined in **Section 4.2**, detailed hydraulic modelling will provide a more robust and site-specific representation of the fluvial flood risk associated with the Puddinglake Brook and associated tributaries. The results of this modelling will determine whether the Exception Test is applicable and any requirement for its application will be addressed within the FRA, which forms part of the ES.

5.1.1.3 Should the hydraulic modelling indicate that the Proposed Development lies within Flood Zone 3, the NPPF confirms that Essential Infrastructure may be considered appropriate in this zone, subject to the successful application of the Exception Test, as summarised in **Table 5.1.**

TABLE 5.1 – FLOOD RISK VULNERABILITY AND FLOOD ZONE COMPATIBILITY (SOURCE: NPPF)

	Essential Infrastructure	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water Compatible**
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	Exception Test Required	✓	✓	✓
Flood Zone 3a	Exception Test Required	✗	Exception Test Required	✓	✓
Flood Zone 3b	Exception Test Required	✗	✗	✗	✓

5.1.1.4 The Planning Practice Guidance to the NPPF also states that the two criteria set out in the Exception Test should be applied to developments. The two criteria are listed below:

- It must be demonstrated that development that must be in a flood risk area will provide wider sustainability benefits to the community that outweigh the flood risk; and
- The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

5.1.1.5 Accordingly, a comprehensive Sequential Test and, where required, Exception Test will be set out in full within the FRA.

6. CONCLUSION

6.1.1.1 This pFRA has evaluated the potential risk of flooding to and from the Proposed Development from all relevant sources, in accordance with the NPPF. Each source has been assessed on a qualitative scale ranging from Negligible to High.

6.1.1.2 The overall flood risk to the Proposed Development is assessed as Negligible to Low, except for fluvial flood risk, which will be quantified through detailed hydraulic modelling and presented within the FRA submitted as part of ES.

6.1.1.3 The EA Flood Map for Planning indicates that the majority of the Site lies within Flood Zone 1, indicating a low probability of fluvial flooding. Areas of Flood Zones 2 and 3 are confined to the riparian corridor of the Puddinglake Brook. Detailed hydraulic modelling of the watercourse will be undertaken to confirm the extent of Flood Zone 3b and flood risk to any elements of the Proposed Development located within these zones.

6.1.1.4 The Proposed Development is classified as “Essential Infrastructure” under the NPPF flood risk vulnerability classification. As such, it will be subject to the Exception Test if located within Flood Zone 3, the outcome of which will be informed by the results of the detailed hydraulic modelling.

6.1.1.5 Flood risk mitigation measures will be developed and incorporated as the site layout is refined and will be finalised prior to submission of the ES.

ERM HAS OVER 140 OFFICES ACROSS THE FOLLOWING COUNTRIES AND TERRITORIES WORLDWIDE

Argentina
Australia
Belgium
Brazil
Canada
China
Colombia
Denmark
France
Germany
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
Netherlands
New Zealand
Panama
Peru
Poland
Portugal
Romania
Singapore
South Africa
South Korea
Spain
Switzerland
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