

Technical Note

Project:	P24-227 Glan Llyn, Phase 4D
Subject:	Phase 4D - Piling Risk Assessment
Report Ref:	24227-RLL-25-XX-RP-O-0007-P01-S2
Date:	1 July 2025
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1 Introduction

Rodgers Leask Ltd (RLL) has been commissioned by Barrat Homes Ltd to provide engineering services in support of the proposed residential development within Phase 4D of the Glan Llyn development on the former Llanwern Steelworks site (as shown on RLL drawing 18669-RLL-25-XX-DR-O-0748-P02) attached. This Technical Note has been prepared to support the application to discharge the planning condition relating to the risks posed to groundwater underlying the Site from piling operations.

Phase 4D (hereon referred to as the 'Site') is situated on the south central boundary in the residential part of the wider Glan Lyn development, which comprises part of the former Llanwern Steelworks. It is proposed that the Site will be redeveloped for a residential end use. Due to the ground conditions, a piled foundation solution (concrete driven piles) is proposed for all structures; these are to be piled through the Made Ground and Tidal Flat Deposits into the underlying Mercia Mudstone Group.

This Technical Note provides a summary of the Site setting and background information to assess the risks of piling to the groundwater receptors beneath the Site. The Site has previously been assessed in accordance with the procedures identified in the Environment Agency's Land Contamination Risk Management (LCRM, updated from CLR11 'Model Procedures for the Management of Land Contamination') guidance; this document builds on the recommendations of those previous reports. This assessment has considered the Natural Resources Wales (NRW) and Welsh Local Government Association's document 'Development of Land Affected by Contamination: A Guide for Developers', the Environment Agency's guidance 'Piling into Contaminated Sites' (in the absence of specific NRW guidance) as well as the 2025 CL:AIRE guidance on Piling and Penetrative Ground Improvement Methods on land Affected by Contamination: Guidance on Pollution Prevention.

2 Sources of Information

The following reports (in chronological order) have been read in preparation of this risk assessment.

- Llanwern, Site Wide Controlled Waters Detailed Quantitate Risk Assessment, ref. 5111373-LLA-OUT-0257 rev 3.0, Atkins, dated 2017 (first issue date June 2016).
- Glan Llyn CWDQRA Update, RLL ref. 18669-RLL-19-XX-RP-O-0006_Rev A, dated August 2019.
- Phase 4D Desk Study & Phase 2 Geo-Environmental Interpretative Report, ref 18669-RLE-21-XX-RP-O-0146 Rev D, dated August 2021
- Glan Llyn, Phase 4D Remediation Strategy, ref 18669-RLL-23-XX-RP-0459-P02 dated July 2023.
- Glan Llyn Phase 4D Updated Ground Gas Risk Assessment, ref 24227-RLL-24-XX-RP-O-0001 P1, dated March 2024.
- Phase 4D Glan Llyn – Newport Earthworks Completion Letter of Reliance. Dated march 2022
- Phase 4D Geotechnical Assessment Report. RLL Ref 18669-RLL-22-XX-RP-O-0235-P01, dated February 2022
- Phase 4D Geotechnical Validation Report, RLL, Ref. 18699-RLL-22-XX-RP-O-0347-P01, dated December 2022
- Glan Llyn: Soils Validation Strategy for Protection of Controlled Waters Hannah Fraser Consulting Ref. 30937 R2, dated December 2024

3 Site Description and History

The Site is located within the Glan Llyn development at the former Llanwern Steelworks, approximately 4km to the east of Newport City Centre at approximate National Grid Reference 335898E, 186458N. The Site covers an area of approximately 3.9ha and is located on the southern boundary in the centre of the wider development. The Site historically housed conveyors, travelling booms and ore stockyards. Historically, the Site comprised agricultural land segregated into three fields by hedgerows and drains, until 1967 when the Site formed part of Llanwern Steelworks, and Approximately 80% of the Site is shown to comprise ore stocks and associated access tracks. In the south-eastern corner is part of a building, and to the north is part of a travelling boom with various associated conveyors and a lighting tower. The Site was partially demolished by 2004 and fully demolished by 2021.

Remediation comprising removal of unsuitable material identified as part of the ground investigation has been undertaken and this was followed by a turnover of all Made Ground to prepare a reengineered plot suitable for onward residential development.

4 Ground Conditions

4.1 Published Information

Information pertaining to underlying ground conditions has been obtained via the British Geological Survey's (BGS) Onshore Geoindex¹.

The published geological information shows the Site to be void of Made Ground. However, due to the Site's history, Made Ground is likely to be present associated with the previous development and subsequent demolition.

Superficial deposits are shown to comprise Tidal Flat Deposits.

Tidal Flat Deposits are described by the BGS as '*unconsolidated sediment, mainly mud and/ or sand. They may form the top surface of a deltaic deposit. Normally a consolidated soft silty clay, with layers of sand, gravel and peat.*'

The underlying bedrock is shown to be the Mercia Mudstone Group.

The Mercia Mudstone Group is described by the BGS as comprising '*predominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite bearing units in some basal areas. Thin beds of gypsum/anhydrite are widespread; sandstones are also present*'.

There is a fault approximately 1km north-east of the Site which trends roughly north to south and extends northwards away from Site.

4.2 Proven Ground Condition Summary

The ground conditions encountered prior to remedial earthworks comprised Made Ground overlying Tidal Flat Deposits, overlying the Mercia Mudstone Group. Concrete structures, piles and areas of fused slag were encountered during the investigations across the phase.

Details of the strata encountered are presented in the Phase 4D Geotechnical Assessment report and Geotechnical Validation Report and summarised within the following table. The depths given are from ground level as it existed at the time of the investigation. Detailed descriptions are presented on the logs within the respective factual report.

¹ <http://mapapps2.bgs.ac.uk/geoindex/home.html> (accessed May 2025)

Table1. Summary of ground conditions encountered.

Strata Encountered	Average Depth to top of strata (m) [range, m]	Average Depth to base of strata (m) [range, m]	Average thickness of strata (m) [range, m]
MADE GROUND Encountered in all exploratory holes and generally comprised brownish grey/black, slightly clayey fine to coarse sand, soft to firm, gravelly sandy clay, and sandy gravel. Gravel is fine to coarse, angular to subrounded of clinker, concrete, rebar, slag, sandstone, limestone, and brick. Fragments of wood, timber, and metal. Occasional cobbles of slag were also observed.	0.0	1.67 [0.2–3.2]	1.67 [0.2–3.2]
TIDAL FLAT DEPOSITS These were encountered as variable deposits of clays, silts and sand/gravel. However, the following general succession was encountered across the site:			
Soft to firm brownish grey mottled brown, silty CLAY.	1.67 [0.20-3.2]	2.7 [2.7-3.7]	1.6 [0.5-2.5]
Very soft, plastic, dark brown pseudo-fibrous PEAT with occasional wood fragments.	3.55 [3.4-3.7]	5.3 [5.0-5.6]	1.75 [1.6-1.9]
Soft to firm, very stiff bluish grey, occasionally mottled brownish orange CLAY.	2.7 [2.7-5.6]	7.7 [3.5-11.2]	3.27 [0.8-5.6]
Black, slightly silty, clayey, amorphous PEAT.	3.5	5.1	1.6
Soft to firm, bluish grey and black CLAY.	6.75 [5.1-8.4]	12.05 [12-12.1]	5.3 [3.6-7.0]
MERCIA MUDSTONE GROUP Extremely weak, red brown MUDSTONE. Extremely weak, bluish-grey and reddish-brown, MUDSTONE with frequent bands of residual clay, locally siltstone (Mercia Mudstone Grade III/II). Interpreted as Zone II after Spink & Norbury (1993) and Chandler (1969).	11.77 [11.2-12.1]	15.47* [12.92-20.1]	3.71 [1.3-8.1]
*Maximum depth proven			

4.3 Earthworks Summary

Remedial earthworks were undertaken by McCarthy Contractors (Bridgend) Ltd between June 2021 and January 2022.

Earthworks generally comprised:

- Site clearance;
- Excavation of Made Ground to natural underlying Tidal Flat Deposits;
- Removal from site Made Ground with evidence of gross visual and olfactory contamination;
- Removal of below ground obstructions;
- Cropping of piles to the level of the underlying Tidal Flat Deposits;
- Re-engineering of Made Ground;
- In situ geotechnical testing;
- Soft spot excavation; and
- Monitoring for compliance with relevant specifications.

In line with the Remediation Strategy for the Site, earthworks have been completed whereby Made Ground was excavated to the level of the underlying natural geology, then re-engineered to formation levels. The earthworks facilitated the removal of obstructions (excluding supporting piles and sheet piles) whilst forming a consistent development platform.

Full information on the earthworks undertaken on the Site are presented in the Phase 4D Letter of compliance and Geotechnical Validation Report.

5 Groundwater

5.1 Published Information

Published geological information, available from the British Geological Survey website² indicates that the underlying Tidal Flat Deposits are classified as Unproductive Strata, which are defined by the Environment Agency as '*deposits with low permeability that have negligible significance to water supply base flow*'. The Mercia Mudstone Group is classified as a Secondary B Aquifer, which is defined as comprising '*predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of former non-aquifers*'.

The uppermost layers of the Mercia Mudstone Group recorded across the wider site have been described as clay/ mudstone rather than one of the sandstone dominated layers, and is not expected to yield abstractable volumes of water in its uppermost layers, as such it may also be considered Unproductive Strata.

5.2 Recorded Conditions

Regional groundwater was only encountered in one exploratory hole within Phase 4D at the base of the Tidal Flat Deposits at a depth of 9.90mbgl, rising to up to 9.60mbgl. However, perched water was encountered in 18 locations within and towards the base of the Made Ground

² <https://mapapps.bgs.ac.uk/geologyofbritain/home.html> (Accessed May 2025)

perched on top of the natural clay. The depth below ground level was recorded from 0.60m to 3.20mbgl with an average depth of 1.49mbgl.

This is consistent with the Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA). The CWDQRA reports that natural groundwater is typically encountered within the basal gravelly fine to coarse sand of the Tidal Flat Deposits at approximately 9.0mbgl, with a rest water level of approximately 2mbgl.

The Controlled Waters Risk Assessment for the wider site concluded that regional groundwater flows towards the River Severn estuary, existing within the base of the Tidal Flat Deposits (confined to the basal sand layers) and the Mercia Mudstone; and is likely hydraulically confined from the shallow perched waters of the Made Ground due to the low permeability of the upper clay-rich Tidal Flat Deposits (TFD).

The shallow perched waters of the Made Ground is reported to flow towards the drainage reën that runs through the wider site. Monks Ditch, a main river, flows across the wider site discharging into the River Severn estuary and is considered to be the controlled water receptor as the approved drainage strategy for the Site discharges to Monks Ditch. There is no existing surface connection to Monks Ditch.

It should be noted that the Site does not lie within a groundwater Source Protection Zone. Furthermore, the local groundwater is likely to be impacted by intrusion from estuarine water and potentially by the industrial legacy of the wider surrounding area.

5.3 Controlled Waters Risk Assessment

It is understood that the Controlled Waters Risk Assessment report for the wider site concluded that the regional groundwater beneath the Site was considered to be a pathway, with the Severn Estuary as the nearest receptor.

In summary, previous reports have shown that there is not a viable groundwater resource below the Site. Groundwater within the Site area is understood to exist as follows:

- Shallow perched groundwater – sporadic across the Site within the Made Ground, perched above the cohesive Tidal Flat Deposits.
- Regional groundwater – within the basal sand at the base of the Tidal Flat Deposits and Mercia Mudstone Group.

6 Piling Risk Assessment

6.1 Human Health

Risks to Human health for end-users will be mitigated through the presence of construction materials overlying the Made Ground (i.e., hardstanding and sub-base) or clean cover in gardens and areas of landscaping.

6.2 Controlled Waters

The engineering works and installation of hardstanding and drainage infrastructure will reduce the risk of future infiltration and mobilisation of contaminants. Due to the soft, compressible nature of the underlying Tidal Flat Deposits, a concrete driven piled solution (displacement piling) is likely required as the foundation solution for the development. The installation of driven piles is not considered to create new pathways for the following reasons.

- No spoil is generated during the installation of the piles and the installation process will densify the surrounding geology as it is displaced laterally during insertion, resulting in reduced permeability around the piles, effectively creating a seal.
- The soft cohesive nature of the Tidal Flat Deposits will result in a smear zone when the pile is driven into the ground as a result of the displacement of material. The piling methodology and geology of the Site effectively creates a seal around the piles thus preventing vertical movement between the shallow and deeper groundwater bodies.
- It is also known that cohesive strata will swell against a driven pile, further decreasing the risk of a pathway developing.
- Further evidence for an effective seal is demonstrated by the sub-artesian regional groundwater being unable to travel upwards via existing piles; the evidence comes from the lack of groundwater seepage observed around pre-existing piles during reclamation works, when it is known that water is confined within the Tidal Flat Deposits.
- There is the possibility of some contamination being dragged down on the toe of a pile. This is likely to be a very small amount of material, it is unlikely to reach a depth where it may come into contact with regional groundwater; and the regional groundwater is considered to be a pathway to the estuary and not a receptor (thus its environmental setting will not have been significantly altered).

Once constructed, the potential for the piles to create new pathways is considered to be negligible due to the cohesive nature of the surrounding geology. It is understood that driven piles were used extensively during the construction of the former steelworks and have more recently been used throughout current developments, so there are numerous historical and recent precedents for this foundation solution.

6.3 Ground Gas

With respect to risks from ground-borne gas, which is known to occur in the peaty layers of the Tidal Flat Deposits, we do not believe that piles will act as a pathway for the reasons provided (i.e., clay will smear on the pile and swell to form a seal). The results of the ground gas monitoring carried out across Phase 4D indicate that Characteristic Situation 1 is appropriate.

As stated by GGS in their report, the surface emissions results provide evidence of attenuation of ground gas within the Sites soils, and the absence of a significant and viable vertical migration pathway to the surface. As such, methane and carbon dioxide present on Site is likely to be contained at depth, below the Made Ground deposits, and remain dissolved within the saturated zone.

Precast concrete driven piles are proposed for future properties. NHBC guidance NF94 entitled Hazardous Ground Gas – an essential guide for housebuilders (April 2023), states that concrete driven piles are not considered to present a risk of forming a preferential pathway for gas migration. Therefore, no ground gas protection measures are required.

7 CL:AIRE– Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention

7.1 Introduction

The guidance published in 2025 builds on recent research into the effects of piling on contamination migration and includes a better understanding of the risk posed by increased turbidity in aquifers caused by piling works. This guidance includes bearing pilers such as pre-cast driven concrete piles proposed for this site.

7.2 Pollution Scenarios

The guidance defines seven potential pollution scenarios related to foundation works and considers the generic and method-specific risks that may arise under each of these scenarios. Table 14.1 from the guidance is reproduced below and confirms that in general displacement piles carry relatively low risks, compared to other methods (In the table A indicates negligible risk, B low risk, C moderate and D is high risk.). Nevertheless, risks vary from scenario to scenario and from method to method, so additional assessment is provided below.

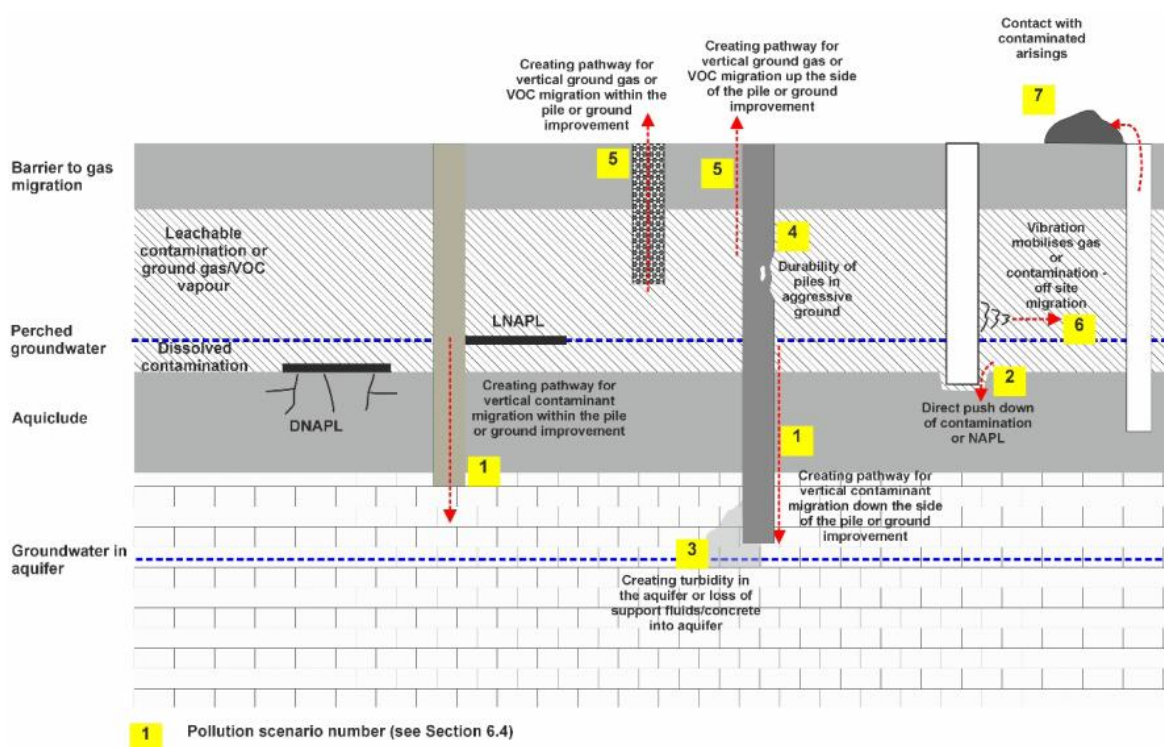
Table 14.1 extracted from CL:AIRE Guidance presenting indicative hazards for piling and ground improvement

Pollution scenario	Displacement piles	Replacement piles	Sheet piles	Penetrative ground improvement	Prefabricated vertical drains
1: Creation of preferential pathways, through a low permeability layer, to cause contamination of groundwater in an aquifer.	A-D (dependent on details of method)	A-C (dependent on details of method)	A-B	D (stone columns) A (vibro concrete columns)	D
2: The driving of solid contaminants down into an aquifer during pile driving.	A-B	A	A	A	A
3: Contamination of groundwater and, subsequently, surface waters by concrete, cement paste or grout.	A	C-D (dependent on details of method)	A	A (stone columns) D (vibro concrete columns)	A
4: Direct contact with contaminated soil or leachate causing degradation of pile materials.	A-C (dependent on pile materials and contaminants)	A-C (dependent on pile materials and contaminants)	A-C	A-B (dependent on pile materials and contaminants)	A
5: Creation of preferential pathways to allow migration of landfill gas or contaminant vapours to surface.	A	A	A	C (stone columns) A (vibro concrete columns)	D
6: Causing off site migration of ground gas or increased vertical emissions as a result of vibration or other effects from the pile installation process.	A-B	A	A	A-B	A
7: Direct contact with contaminated soil arisings which have been brought to the surface.	A	B-C (dependent on contaminants)	A	A	A

7.3 Assessment of Specific Risks

Section 5 of the guidance sets out the range of potential hazards from piling, which are summarised in the diagram below, taken from Figure 5.1 of the guidance.

Figure 5.1 repeated from the CL:AIRE Guidance indicated potential hazards



Using Figure 5.1 we can assess the risk pathways for each of the seven pollution scenarios

No.	Mechanism	Assessment	Ref from CL:AIRE Guidance ³	Risk
1	Creation of preferential pathways, through a low permeability layer, to cause contamination of groundwater in an aquifer.	The soft cohesive nature of the Tidal Flat Deposits will result in a smear zone when the pile is driven into the ground as a result of the displacement of material. The piling methodology and geology of the Site effectively creates a seal around the piles thus preventing vertical movement between the shallow and deeper groundwater bodies.	7.2	B Low
2	The driving of solid contaminants down into an aquifer during pile driving.	There is the possibility of some contamination being dragged down on the toe of a pile. This is likely to be a very small amount of material, it is unlikely to reach a depth where it may come into contact with regional groundwater; and the regional groundwater is considered to be a pathway to the estuary and not a	8.2	B Low

³ Relevant sections of the CL:AIRE Guidance are repeated below for ease of reference

No.	Mechanism	Assessment	Ref from CL:AIRE Guidance ³	Risk
		receptor (thus its environmental setting will not have been significantly altered).		
3	Contamination of groundwater and, subsequently, surface waters by concrete, cement paste or grout.	The concrete piles are pre-cast and no wet concrete will be used. Furthermore, the joints between segments of pile will be mechanical	9.1	A Negligible
4	Direct contact with contaminated soil or leachate causing degradation of pile materials.	Acidic and or high sulphate content in the Made ground could potential degrade the piles over time. However the grade of concrete specified for the piles will be selected to resist these conditions on site. Additionally, the Tidal Flat Deposits provide a barrier to vertical groundwater movement and are not acidic. The cohesive nature of the Tidal Flats and upper layers of the Merica Mudstone will tend to swell to close any opening s that could occur from degradation.	10.1	A Negligible
5	Creation of preferential pathways to allow migration of landfill gas or contaminant vapours to surface	Ground gas monitoring has identified CS1 conditions on site. Precast concrete driven piles are proposed.	11.1	A Negligible
6	Causing off site migration of ground gas or increased vertical emissions as a result of vibration or other effects from the pile installation process.	NHBC guidance, states that concrete driven piles are not considered to present a risk of forming a preferential pathway for gas migration. Therefore, no ground gas protection measures are required	12.5	A Negligible
7	Direct contact with contaminated soil arisings which have been brought to the surface.	The driven piles will displace the surrounding soil, thus no arisings will be generated.	13.1	A Negligible

Section 7.2

The soil surrounding the pile is densified and high stresses are induced in the surrounding ground when driving displacement piles. These stresses increase with size of pile and magnitude of displacement. In most soils these stresses will tend to force the soil to close up around the pile shaft, which means that the development of preferential flow paths around the outside of the piles is, in general, unlikely. This has been confirmed by research.

Section 8.2

Driven displacement piles may potentially drag down contaminated material as they penetrate underlying strata. This drag down may occur by a frictional mechanism along the shaft of the pile, or by pushing material ahead of the pile shoe. However, researchers at the University of Sheffield and others have shown that the risk of this is low, especially with conical tips. Material dragged down by shaft friction is unlikely to be displaced by more than a few centimetres, and theoretical calculations by Boutwell et al. (2000) indicate that at most a few kilograms of soil may be pushed ahead of the pile shoe.

Section 9.1

Loss of wet concrete, cement paste or grout may occur, but only in fast-flowing groundwater.

Section 10.1

There are examples where aggressive ground conditions have caused structural issues in below ground concrete, predominantly associated with high sulphates and acidity, but no known examples where this has caused contaminant migration.

Section 11.1

There are no known sites where the installation of piles or ground improvement has resulted in an incident with increased gas or vapour concentrations inside buildings or other structures off site. On sites with low gas generation potential, the main limitation is the source itself in that it is not likely to be able to generate sufficient gas to sustain the rate of gas migration required to pose a risk to off site receptors (gas has to be continuously replenished to support off site migration).

Section 12.5

Ground improvement is designed to densify the ground and therefore there is the risk of reduced volume of space for gas. The gas is far more likely to migrate up the stone columns than any distance horizontally. Therefore gas migration off site is not considered to be a significant risk when installing stone columns. For other types of improvement, the vibration is not sufficient or prolonged enough to cause significant volumes of gas to migrate off site.

Section 13.2

Displacement piling will not generally create arisings that need to be managed.

8 Conclusion

The hydrogeological setting (shallow, perched water not being in continuity with deeper groundwater and lack of a sensitive groundwater receptors) combined with the proposed piling methodology are such that the potential for creating a pathway between a source and the deeper underlying groundwater bodies is considered negligible. Furthermore, the completed development will significantly reduce the potential for infiltration of surface water into the Made Ground, with the installation of hardstanding and drainage providing interception.

The uppermost layers of the Mercia Mudstone Group below the wider Glan Llyn Site have been proven through ground investigations to comprise of clay/ mudstone rather than of sandstone dominated layers, and therefore is not anticipated to yield abstractable volumes of water in its uppermost layers. The Tidal Flat Deposits overlying the Mercia Mudstone Group are classed as Unproductive Strata, although sub-artesian groundwater has been encountered at the base of the strata on the wider Glan Llyn site.

It is also worth noting that the Site was previously extensively piled, with a significant number remaining in place. This has not been found to have caused contamination of lower groundwater bodies and it is not evident that they have altered the hydrogeological regime.

It is therefore considered that the risks posed from piling at the Site to the underlying groundwater are negligible and that the ground gas regime is unchanged. The discussion can be summarised as follows:

- A piled foundation solution will be required due to the soft Tidal Flat Deposits and depth to competent strata. Driven piles are the most viable method of piling to the required depth (c.9-10m in total, largely through Tidal Flat Deposits).
- The Tidal Flat Deposits are cohesive and will form a seal against the driven piles, hence no new pathways will be created.
- Perched water volumes will reduce as further infiltration is prevented by the construction of hardstanding and drainage, resulting in an overall reduction in the mobilisation of contamination from the Made Ground.
- Whilst laterally discontinuous groundwater may be present within the Tidal Flat Deposits and regional groundwater is present in the Mercia Mudstone Group, there are no known potable abstraction wells in the vicinity of the Site and industrial abstractions are all listed as 'historical'. The Site is not within a groundwater Source Protection Zone and the shallow geology is classed as Unproductive Strata. The Mercia Mudstone underlying the Site is not thought to contain water-bearing strata in its uppermost layers (i.e., where the piles will penetrate) and may also be considered Unproductive Strata. Therefore, no sensitive groundwater receptors are considered to be present.
- Whilst there is the possibility of some contamination being dragged down on the toe of a pile, this is likely to be a very small amount of material, it is unlikely to reach a depth where it may come into contact with regional groundwater; and the regional groundwater is considered to be a pathway to the estuary and not a receptor (thus its environmental setting will not have been significantly altered).
- No ground gas protection measures required (Characteristic Situation 1).

Therefore, it is considered that the use of driven piles on Phase 4D will not create new pathways between perched water and groundwater. We conclude that the use of driven piles is environmentally appropriate for this site.



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.
THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

Site Boundary

P02	25/06/2025	Update	ET	CW
P01	30/05/2025	First Issue	ET	CW
Rev	Date	Amendments	By	Chk



Client

Revantage

Project

P18-669
Glan Llyn

Drawing Title

Phase 4D
location plan

S2

	Drawn	Checked	Date
1:1250 @ A1	ET	CW	02/06/25

Drawing No. Rev.

18669-RLL-25-XX-DR-O-0748 P02

