SWL24-380-01-WFS-02

Point of Ayr Gas Terminal:

Water Features Survey

Rev	Date	Description	Prepared by:	Approved by:
P01	30.01.2026	Initial Submission	George West	Mark Pickett
P02	10.02.2026	Update after Client comments	George West	Mark Pickett

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1. Introduction

Temporary groundwater control measures (dewatering) are required during the demolition, excavation and construction works associated with a new carbon storage solution located at the Point of Ayr gas terminal, Talacre, Holywell, CH8 9RD. The area surrounding the site is primarily industrial and agricultural land use. The site location is shown in Figure 1.

In January 2026, Stuart Wells Ltd (SWL) undertook a Water Features Survey (WFS) at the Point of Ayr gas terminal (the site). The WFS was undertaken to identify sensitive receptors, obstructions, and 'pinch points' located along the proposed discharge route and other surface pathways.

This document summarises the WFS, which comprised two elements: a desk study and a site walkover. The site walkover was undertaken on 21 January 2026. A photographic record of the site walkover is provided in Appendix 1.

Figure 1: The site location.

2. Geology, Hydrogeology and Hydrology

British Geological Survey (BGS) mapping (Figures 2 and 3) indicates superficial deposits at the site are tidal flat deposits, which are comprised of silt and sand. There are no superficial lithology boundaries within or near the site. On the eastern border of the site lies a superficial geology boundary to storm beach deposits which is also tidal in origin. This beach deposit is comprised of sand and gravel.

Superficial deposits are underlain by the bedrock geology, which comprises the Pennine Middle Coal Measures Formation; a shallow marine set of sedimentary rocks (mudstone, siltstone and sandstone). Cutting (north-west to south-east) through the site lies a geological bedrock boundary to the Pennine Lower Coal Measures Formation with this geology lying on the south side. The Pennine Lower also consists of mudstone, siltstone and sandstones.

Several ground investigations have been undertaken at the Site (Stuart Wells, 2025, Soil Engineering, 2025, WSP, 2023, and Fugro, 1992). A general sequence of strata following a review of this ground investigation data is presented in Table 1.

Table 1: General sequence of strata.

Unit	Level of Top of Stratum (mAOD)	Description
Made Ground	Ground Level (Approximately 45.5)	Variable sandy gravel and sandy gravelly clay with geotextile membrane present
Tidal Flat Deposits	4.4 to 2.9	Slightly sandy slightly gravelly CALY, silty SAND and slightly sandy coarse GRAVEL
Glacial Till	-14.2 to -18.6	Stiff slightly sandy slightly gravelly CLAY
Pennine Lower Coal Measures Formation	-28.1 to -39.9	Mudstone, siltstone and sandstone

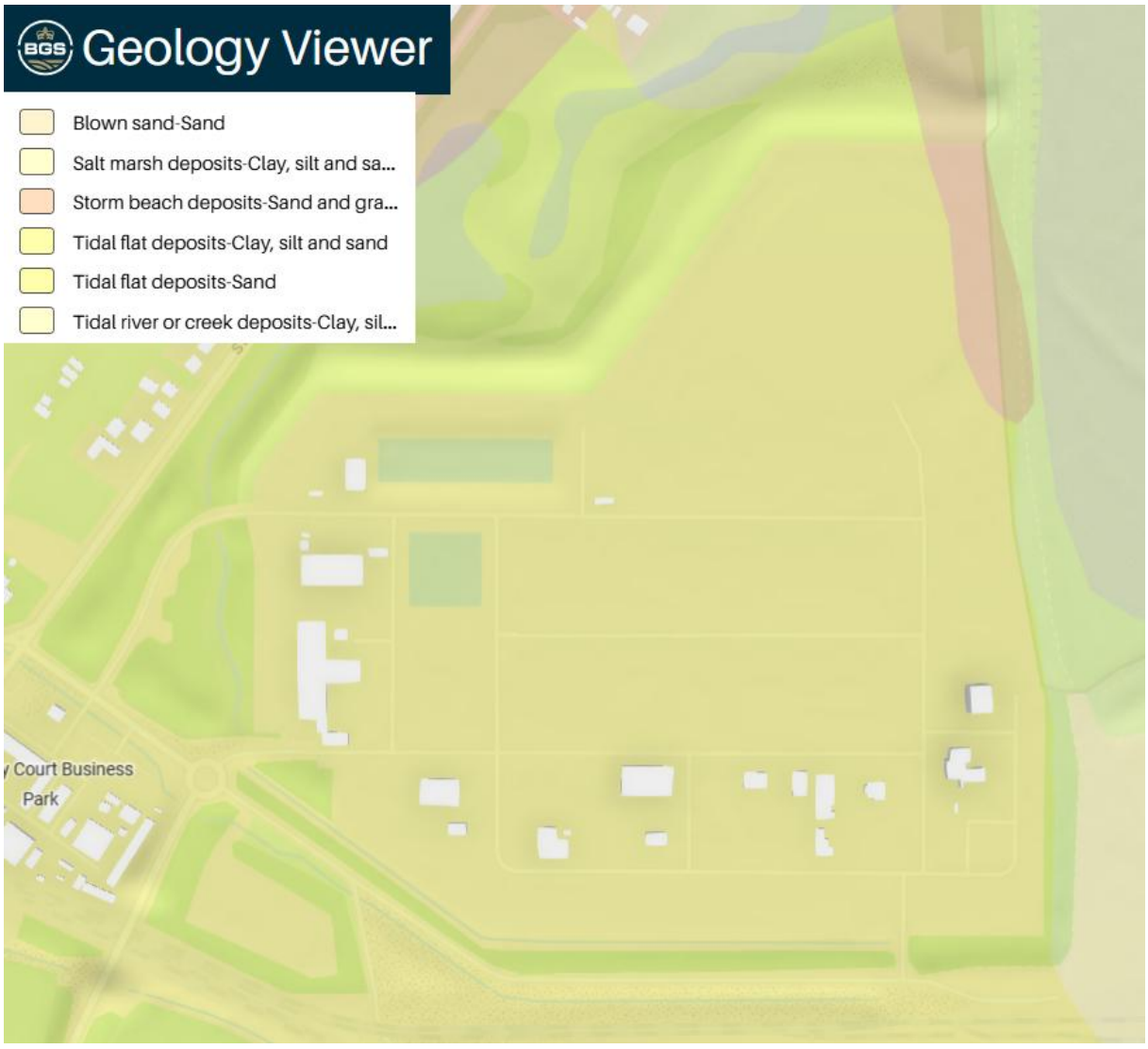


Figure 2: The site location and superficial geology within the area.

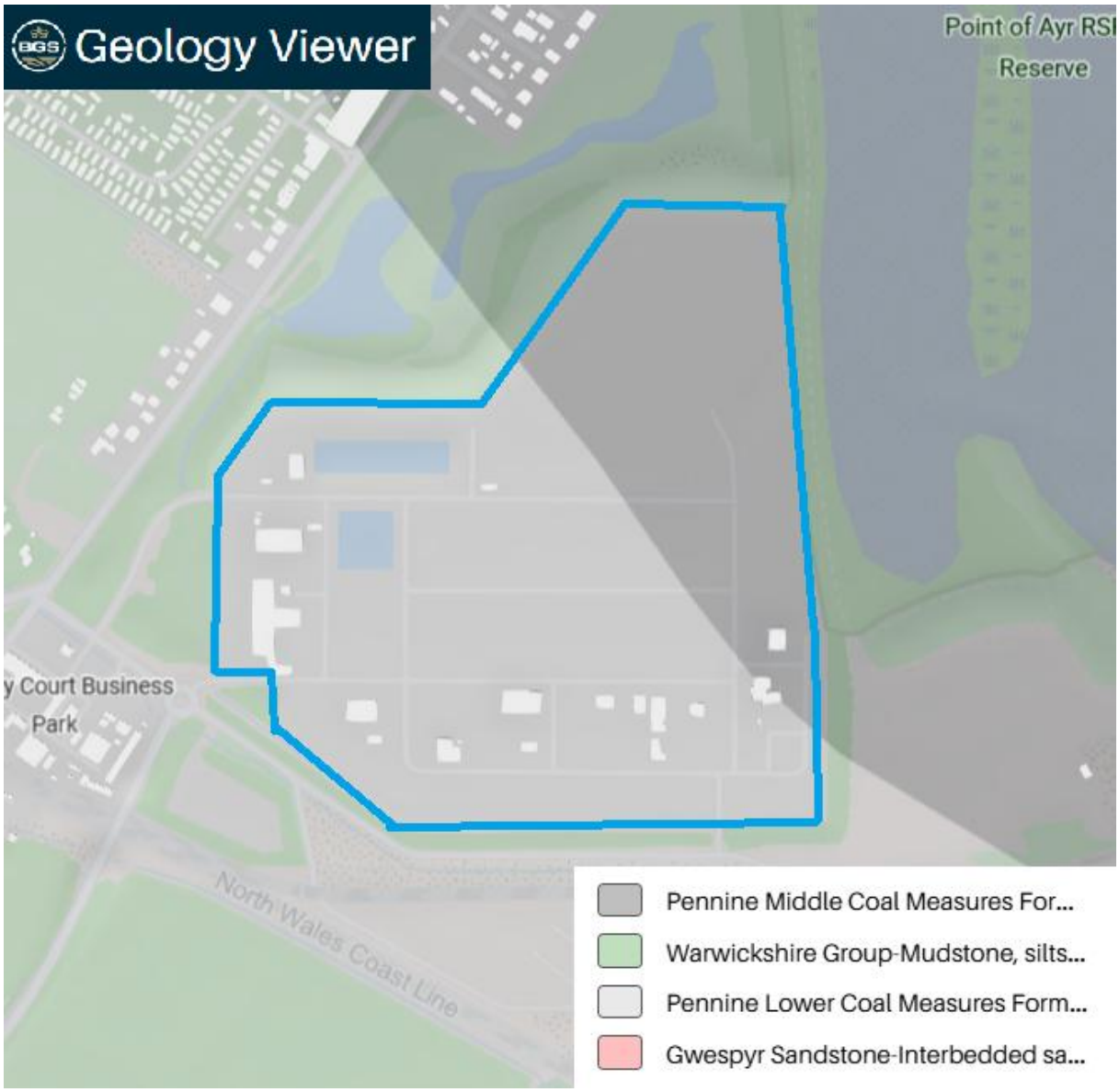


Figure 3: The site location and bedrock geology within the area.

The bedrock aquifer is a Secondary A aquifer that consists of predominantly lower permeability layers, which may store and yield limited amounts of groundwater due to localized features such as fissures, thin permeable horizons, and weathering (DEFRA, 2025).

There are no Source Protection Zones on the site or nearby (DEFRA, 2025).

One surface water body is situated on the western border of the site; it is a drainage channel/ brook named Talacre Brook. Further details of this brook are in Table 2.

There are a series of ditches (surface water bodies) within a radius of 250m from the site; these ditches are widely varied in size and are mainly disconnected from traditional drainage systems and act as natural outflows to the sea. In addition, approximately 200m south of the site across the old Colliery there is a lagoon with a lot of reed growth.

This lagoon serves as a collection system for local drainage systems, this can be seen via multiple outflow culverts, this water will then find its way to the sea via stream with a lock. Dimensional information available in Table 2.

No potential springs were identified during the desk study. Subsequently, no springs were located on site during either site walkover.

The site is generally flat, which is shown in Figure 4 by the topological survey.

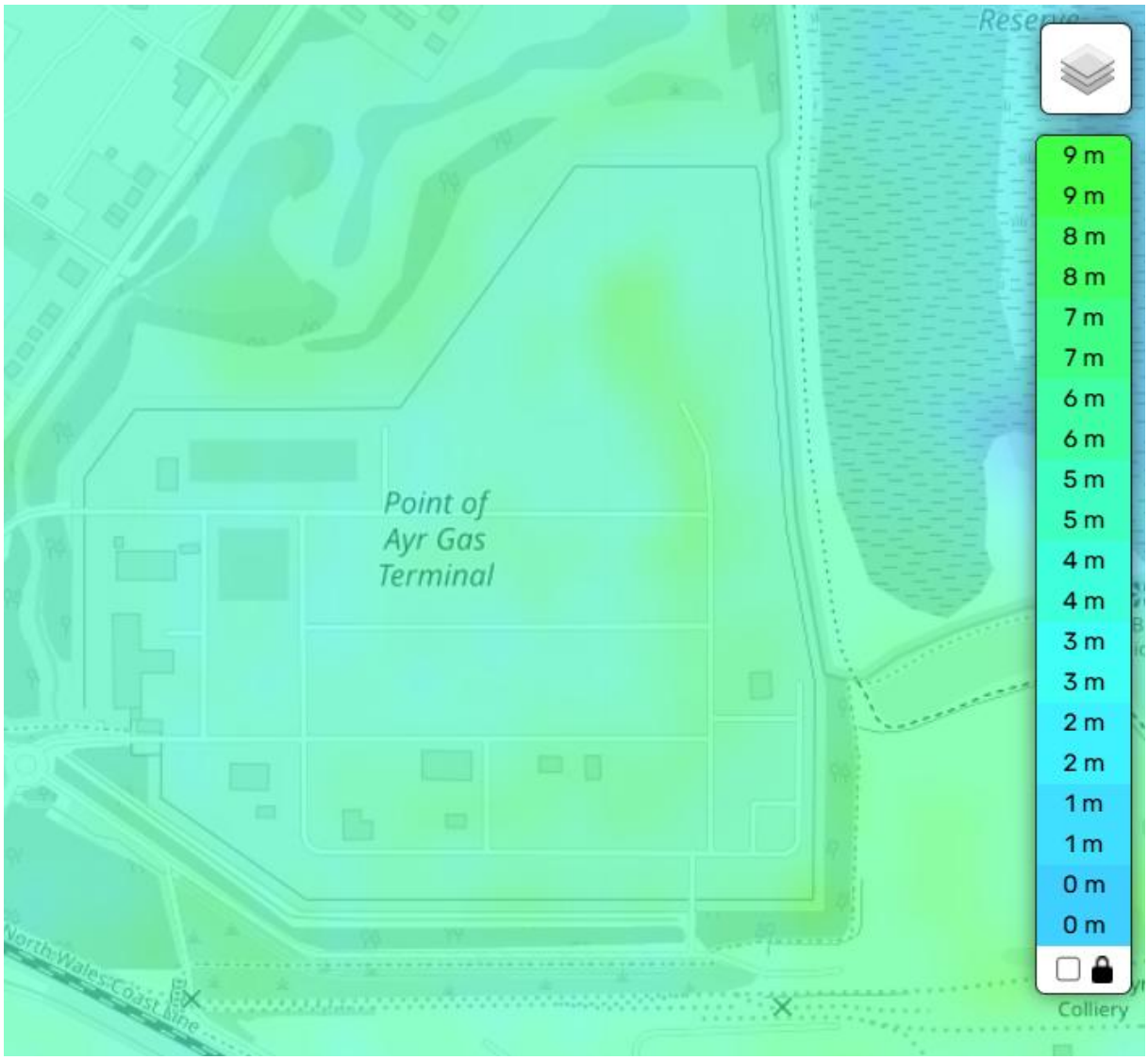


Figure 4: Site layout and elevation (taken from GB Topographic Map,2026).

3. Conservation Sites

The desk study and site walkover identified that two of Special Scientific Interest (SSSI) are present within 1.5 km of the Site: the Dee Estuary and the Talacre SSSI. The Dee Estuary is also designated as a Special Area of Conservation (SAC) and a RAMSAR site and is designated as such as it hosts a variety of habitats as the mud and sand flats are not covered by seawater at low tide. The estuary is also important for shoreline stabilisation through dissipation of erosive forces. The Talacre sand dunes are designated as a SSSI for botanical, entomological and ornithological reasons.

At its closest point, the Dee Estuary is situated approximately 110 m east of the Site while the Talacre SSSI is situated approximately 940 m north.

4. Overview

As part of the evaluation of the potential impact of any groundwater discharged during dewatering and/or excessive overground flows on the surrounding environment, sensitive water receptors have been identified along with any bottlenecks along the proposed discharged route. This has led the focus of the site walkover and thus the following are notes to take into consideration when discharging abstracted groundwater during dewatering activities. Desk study information was supplemented with a site walkover which was completed by Stuart Wells in January 2026.

Stuart Wells has conducted a study of the surrounding area. Points of interest identified during the site walkover are shown in Figures 5 and 6, while observations with recommended actions are summarised in Table 2. The photographic record of the site walkover is provided in Appendix 1.

There is a pinch point on the southwest corner of the site where a roadway has been constructed maintaining the brook with a box culvert best shown in Photograph 7 (Appendix 1). The brook is approximately 2.0 m deep and 6.5 m wide at ground level. The box culvert under the roadway is 1.4 m by 0.7 m and forms a potential bottleneck, however it is clear and could support consistent flow through. On the base of the brook silt is observed, which is from the accumulation of fine sediments and may cause sedimentary caking that will negatively impact the soakaway rates and drainage potential of the ditch. This could be mitigated via dredging.

After passing underneath the entrance roadway, the brook continues around the south side of the site where it proceeds underneath a few more culverts with diameters of 0.7 m to1.8 m. The smaller of these being directly next to the south side of the site (see Figure 5, L07).

The predominant surface water flow routes have been approximated and are shown in Figure 7. It is anticipated that abstracted groundwater will be discharged immediately offsite at the brook (Location W1 from the outfall basin) whereby the water will flow away from site along the route shown.

Table 2: Summary of Water Features Survey.

Feature(s)	Photograph ID	Notes	Action
Groundwater Abstractions	n/a	There are no noted current groundwater abstractions on site.	n/a
Surface Water Abstractions	n/a	There are no active surface water abstractions within 1.5 km of the site.	n/a
Source Protection Zones	n/a	The site is not located within a Source Protection Zone, however there is a SSSI surrounding the site, which includes the brook that water is planned to be discharged too. This means that the water to be discharged needs to be clean of pollutants.	n/a

Feature(s)	Photograph ID	Notes	Action
Water Network	4 to 12, 19	Locations L02 to L09 Immediately west of the site lies the Talacre Brook, which is planned to be the location of discharge for all dewatering works. It has heavy vegetation in the form of reed and has not recently been dredged. At the point of discharge the brook was measured to be approximately 6.5 m wide and 2.0 m deep from ground level. It continues south and wraps around eastward following the site boundary, the width varies throughout between 4.0 m to 6.5 m and varies in depth between 1.0 m to 2.5 m. At the southern border of the site it passes under a series of culverts then enters a pipe that leads it underneath the old colliery to discharge into the western end of the lagoon.	Daily photographic record during dewatering
	13 to 20	Locations L10 to L12. There is a lagoon situated approximately 225 m south of the site. The lagoon comprises of a variable width at approximately 15.0 m to 55.0 m wide narrowing at both ends. The depth of the lagoon was observed to vary within the area. At the bank of the lagoon, it was measured as 2.0 m depth.	none
	1, 2	Location L00 Directly on the site exists a surface water storage tank. This is to act as a flow through during dewatering works as all abstracted water will be pumped into the tank then subsequently pumped to the brook. This tank is approximately 50.0 m by 50.0 m.	Daily photographic record during de-watering
	3	Location L01 Directly on site there exists also a fire suppression water storage pool, this pool is bunded by a plastic liner and is approximately 120.0 m by 30.0 m. This pool can drain into the surface water tank at the discretion of the site operators. The pool is currently contaminated with PFOS/PFAS and thus would need to be treated before discharging.	Water treatment prior to discharge

Feature(s)	Photograph ID	Notes	Action
	21, 22	Locations L13 and L14 Running parallel to Talacre Brook a little further south there is a drainage ditch that acts as the main drainage system for the gas terminals external car park. It measured approximately 2.0 m wide and 1.5 m deep. It is connected to Talacre Brook and discharges to the local lagoon.	none
	N/A	North of the site lie a couple ponds, one of which can be seen feeding Talacre Brook, however due to the flat landscape the flowrate is extremely slow. Back flow from the discharge of water is less of a concern as the brook has been observed flowing the opposite direction and due to the volume of the pond and the dimensions of the banks it is not a concern.	none
Springs	N/A	No springs were identified during the desk study or observed during site walkovers.	none
Conservation Sites	N/A	The desk study determined the site is not within a Special Scientific Interest (SSSI) zone or a Special Areas of Conservation (SAC). However, the immediate surrounding area is a SSSI so any discharged water cannot include pollutants and must be completely clean.	Water treatment prior to discharge
SSSI Impact Zones and Units	N/A	The site is not within a SSSI impact zone.	none
Licensed Discharges to Controlled Waters	N/A	Existing holding tank which subsequently discharges from the tank to the brook with a maximum flow of 50 m^3 per hour	Ongoing monitoring during any dewatering activities

5. Conclusions

During the site walkover, the brook bordering the site was observed to be adequate to handle the abstracted groundwater, it is worth noting that due to the restrictions on site, all abstracted water from the dewatering will be discharged to an existing holding tank which subsequently discharges from the tank to the brook with a maximum flow of 50 m^3 per hour at location W1. This limitation of discharge is due to the existing pumps maximum capacity.

Due to the design and size of the culverts throughout Talacre Brook the volume of water throughflow should not cause significant or long-term problems.

6. References

Fugro-McClelland. 1992. *Final Report Geotechnical Investigation Hamilton Field Landfall and Terminal Facilities Volume 1: Factual Data, report No. 91/2126-1, Rev: 3 dated February 1992*.

WSP, 2023. *HyNet North West, Environmental Statement, Volume 3, Geoenvironmental Interpretive Report, HyNet Carbon Dioxide Pipeline TCPA dated March 2023*.

Soil Engineering, 2025. *Report on a Ground Investigation for LBA CSS Project – WP3 Point of Ayr Gas Plant, TA8701 Rev 02, April 2025*.

Stuart Wells Limited, 2025. *Point of Ayr Gas Terminal, Liverpool Bay Pumping Test Factual Report, SWL24-380-01-PT-02, September 2025*.

Topographic-map (n.d.*). Free topographic maps, elevation, relief*. [online] topographic-map.com. Available at: https://en-gb.topographic-map.com , accessed 28 January 2026.

DEFRA, 2025. *Department for Environment, Food and Affairs: Magic Map* [online] Available at: *https://magic.defra.gov.uk/MagicMap.html* , accessed 28 January 2026.

Figure 5: WFS Layout Map.

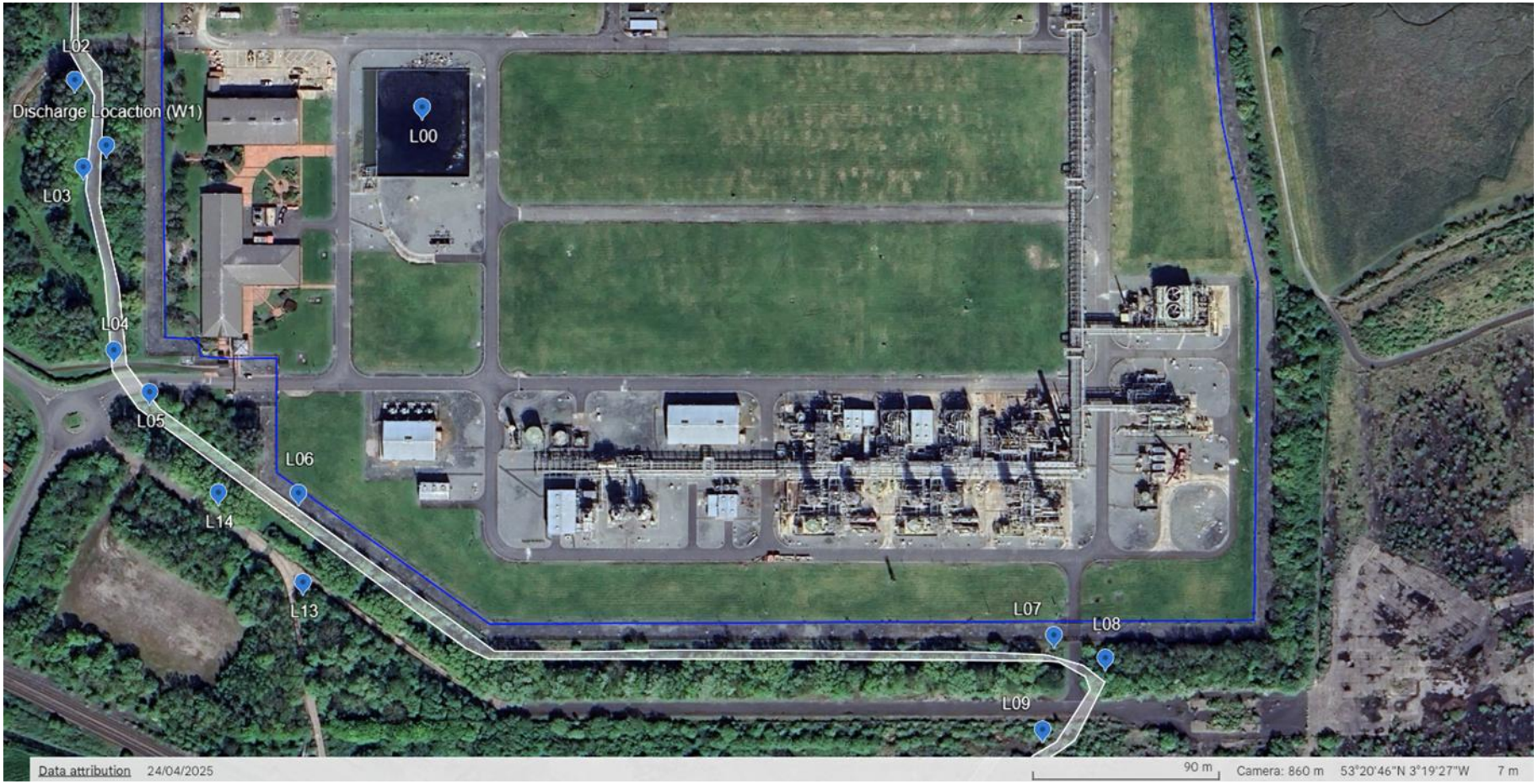


Figure 6: WFS onsite locations.

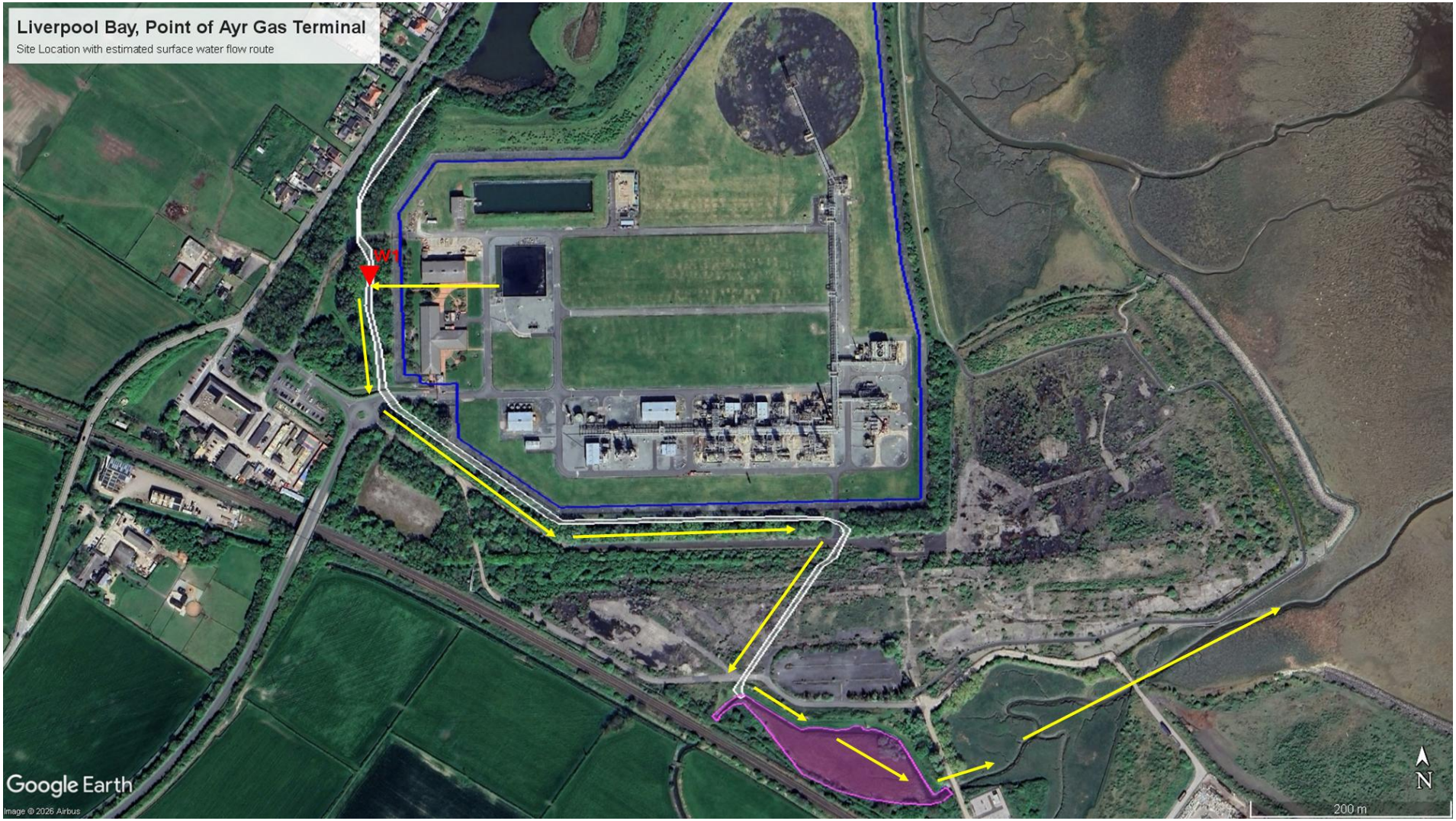


Figure 7: Site Location and anticipated surface flow routes and discharge route pathway.

Appendix 1:

Photographic Record

Photograph 1: Location 00: Surface water collection tank. 50.0m by 50.0m

Photograph 2: Location 00: Permanent installation pumps on site for the surface water storage tank (Maximum capacity of 50m^3 per hour)

Photograph 3: Location 01: View of fire suppression water collection tank. This tank is connected to and can drain to the surface water collection tank. Currently it is cut off as it is contaminated with PFOS/PFAS. 117.0m by 30.0m

Photograph 4: Location 02: Culvert underneath historic roadway, this is upstream from the discharge. Culvert is 0.8m by 0.9m box tunnel. Photo taken facing East.

Photograph 5: Location 03: Talacre Brook, ~4.5m wide and ~1.8m deep, lots of reed growth. In photograph directly opposite is the discharge outflow from the surface water storage tank. No observable flow. Photo taken facing East.

Photograph 6: Location 04: Box culvert under entrance roadway to gas terminal. Box is 1.4m by 0.7m. Brook is ~5.0m wide and ~1.5m deep with no flow observable. Photo taken facing East.

Photograph 7: Location 05: Box culvert outflow from entrance roadway for gas terminal. The culvert maintains the same shape as previous location. Box culvert is 1.4m by 0.7m and brook widens to ~6.5m wide by ~1.4m deep. No observable flow. Photo taken facing North.

Photograph 8: Location 06: Talacre Brook continued, heavy vegetation with sections that have been piled with cuttings of trees and hedge material. The brook narrows and widens regularly with widths of: ~5.0m to ~2.5m. The depth remains consistent throughout at: ~1.5m. No observable flow. Photo taken facing NNE.

Photograph 9: Location 07: Cobblestone culvert underneath historic road. The culvert is a pipe with a diameter of 0.7m. At this point Talacre brook is ~6.0m wide and ~2.0m deep with a low flow present. Difficult to photograph as heavy vegetation completely surrounding. Photo taken facing east.

Photograph 10: Location 08: Talacre Brook meandering south due to concrete construction walls diverting it underneath a road via another culvert with a pipe (diameter 1.8m). The brook is ~6.5m wide and ~2.5m deep at this point. Photo taken facing north.

Photograph 11: Location 08: Previously mentioned in Photograph 10, this is the second culvert, which is 1.8m diameter.

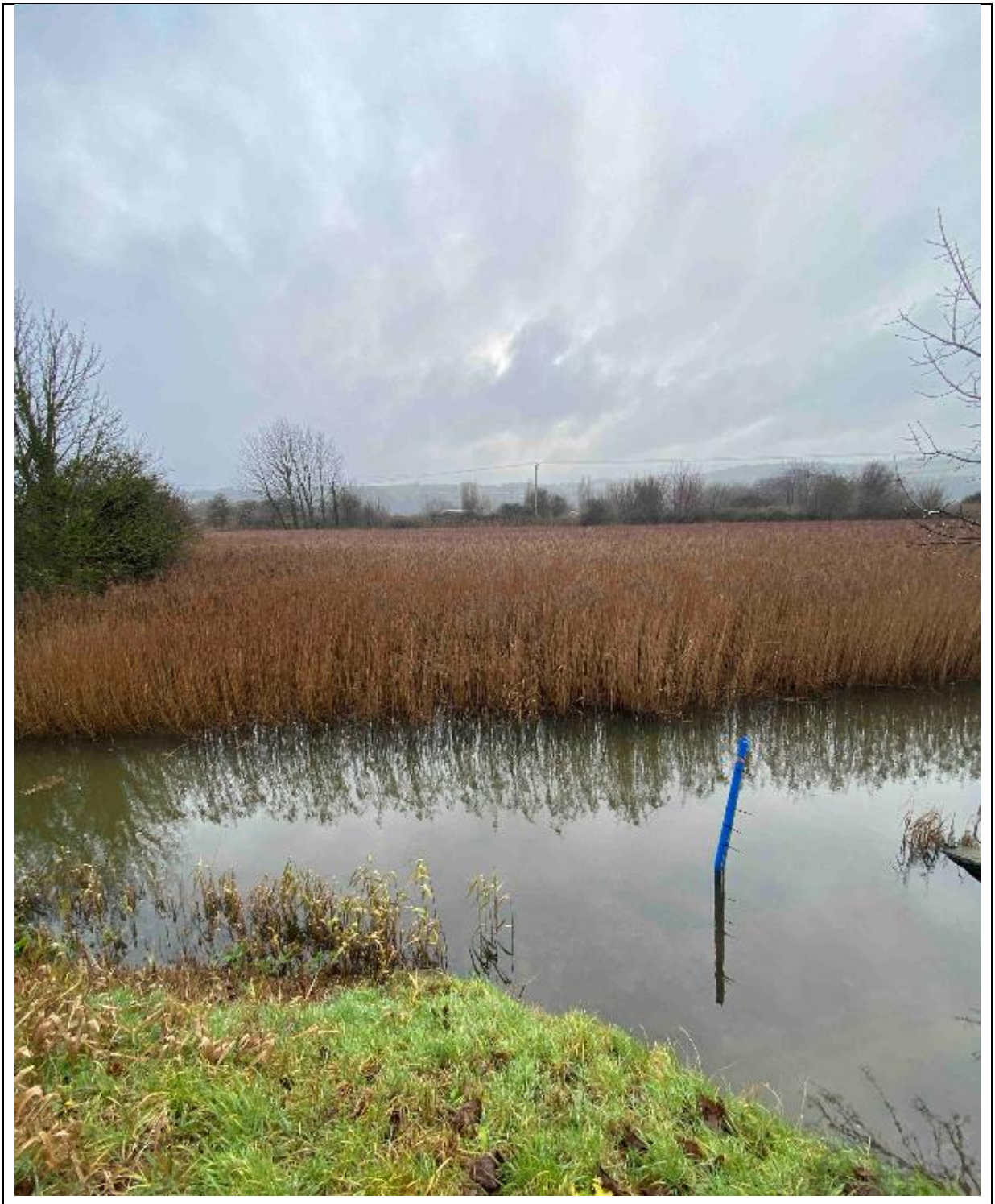
Photograph 12: Location 09: Outfall from culvert in Photograph 11, still with a diameter of 1.8m. The brook is built into a concrete channel here with a width of ~4.0m and a depth of ~2.5m. The brook then is directed into a drainage pipe that travels entirely underneath the old colliery, this pipe has a diameter of 1.5m at this entrance.

Photograph 13: Location 10: View of the lagoon from the sluice gate at the east end of the lagoon. Photo taken facing West.

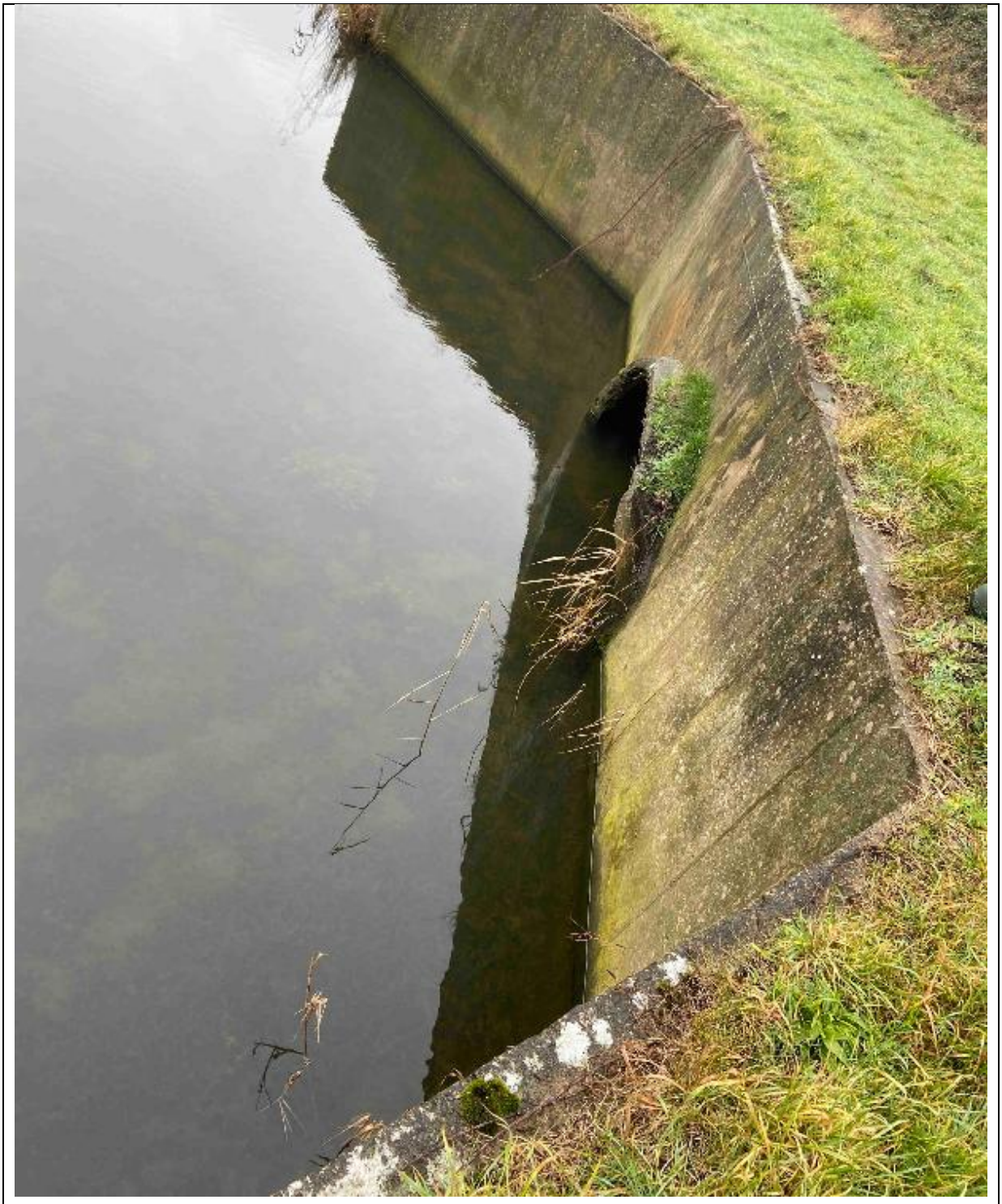
Photograph 14: Location 10: View of the outflow past the sluice gate from the lagoon. Channel is ~3.0m wide and ~1.2m deep. Photo taken facing East.

Photograph 15: Location 10: View of the sluice gate from the banks of the lagoon. Photo taken facing East.

Photograph 16: Location 11: Discharge pipe outflowing to the lagoon, 450mm diameter pipe. No flow visible.



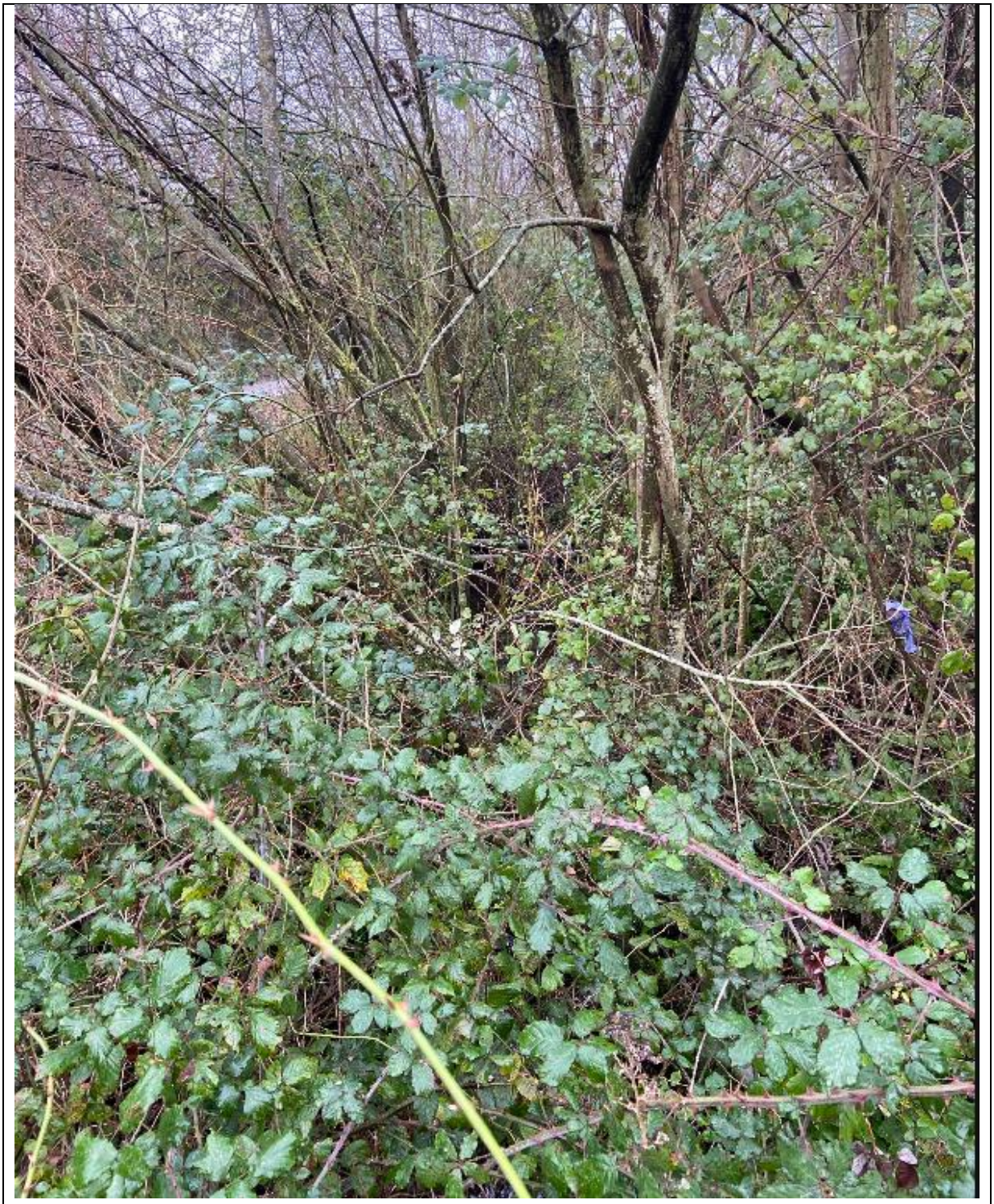
Photograph 17: Location 11: Fenland lagoon with reed vegetation, no flow observed. Photo taken facing South.



Photograph 18: Location 11**:** Discharge pipe to lagoon area with a diameter 1.8m, no flow visible.

Photograph 19: Location 12**:** Discharge pipe for Talacre Brook, pipe 0.5m diameter. Covered with vegetation but still very slow flow visible.

Photograph 20: Location 12**:** View of lagoon from the bank. This is the west end of the lagoon, where it narrows to a ditch which is ~3.0m wide and ~1.7m deep.



Photograph 21: Location 13**:** Overgrown drainage ditch acting as main drainage for the gas terminal exterior car park. Photo taken facing East.

Photograph 22: Location 14**:** The same drainage ditch as previous location, no flow visible. Width of ~2.0m and depth of ~1.5m.