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From: AWN Consulting Ltd.

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Reference: LRD Barrysparks and Crowscastle, Swords, Co. Dublin

RFI ITEM 5: LAND & SOILS AND WATER & HYDROLOGY

Introduction and Background

AWN Consulting, a Trinity Consultants Company, prepared Land & Soils and Water & Hydrology EIAR Chapters to support a planning application for a proposed Large-Scale residential development (LRD) on lands at Barrysparks and Crowscastle (lands generally bound by the R132 to the north, Lakeshore Drive to the west, Drynam Road to the east and the Holywell Distributor Road to the south), Swords, Co. Dublin. (ref. LRD0055/S3E).

Fingal County Council (FCC) issued a Request for Further Information (FI) seeking clarification on various items, including those associated with item (5) and more specific, with Land & Soils and Hydrology & Hydrogeology aspects. The following sections include the responses prepared by AWN.

Responses to Item 5 – Land and Soils

(i) The site investigation described in the chapter was undertaken in 2020 and is stated to be included as Appendix 5.2. Only Appendix 5a has been provided which contains reports from two other site investigations completed in August 2024 (Barrysparks Site 1) and August 2024 and January 2025 (Barrysparks Site 2). Figure 5.6 shows an incorrect site boundary. The applicant is requested to update the chapter to reflect the results of the latest site investigations undertaken at the proposed development site, as appropriate.

Response:

Reference to Appendix 5.2 at Section 5.3.4 is an error and should state Appendix 5A. As mentioned in the request, the original Appendix 5A contains site investigation reports completed in August 2024 (Barrysparks Site 1) and August 2024 and January 2025 (Barrysparks Site 2).

<u>2024 Site Investigations – Barrysparks Site 1</u>

Ground investigation and subsoil assessment of the proposed development site and surrounding lands were undertaken by IGSL in June 2024, with revised works completed in January 2025. The investigation carried out in June 2024 comprised the excavation of ten trial pits (Refer to Figure 1 below), together with geotechnical laboratory testing and a Waste Characterisation Assessment (WCA). The ground conditions encountered generally comprise the following sequence of strata:

- **Topsoil:** Encountered in trial pits located in the centre of the site (TP04, TP05, TP08, TP09, and TP10) from ground level to a maximum depth of 0.40 m below ground level (BGL).
- **Made Ground / Fill:** Encountered in TP01, TP02, TP03, TP06, and TP07 from ground level to a maximum depth of 2.10 m BGL. These deposits generally contained fragments of concrete and red brick.
- **Cohesive Deposits (Gravelly Clay):** Encountered in all trial pits to a maximum depth of 3.60 m BGL.

Trial pits were excavated to depths ranging between 2.50 m and 3.60 m BGL, with termination generally due to obstructions. These obstructions are considered likely to comprise tightly compacted cohesive

deposits containing boulders, rather than underlying bedrock. No significant groundwater seepages were observed, with only minor ingress recorded in TP01, TP02, TP03, and TP09 below depths of 2.00 m BGL. Soil samples were collected from each trial pit location and classified as non-hazardous. The full Site Investigation Report is included in Appendix 5.B.

Figure 1 – Site Investigation Points (Source: IGSL, 2024)

2024/2025 Site Investigations – Barrysparks Site 2

A supplementary site investigation was undertaken in January 2025, comprising eight trial pits, two rotary core boreholes, geotechnical laboratory testing, and a Waste Characterisation Assessment (WAC). All samples submitted for analysis were classified as non-hazardous, asbestos was not detected and met the inert Waste Acceptance Criteria (WAC). Two rotary core boreholes advanced to depths of 12.0 m and 14.7 m BGL. Bedrock was not encountered at either location. Refer to Figure 2 for the locations of these points.

The ground conditions encountered generally comprised the following sequence of strata:

- **Topsoil:** Recorded in all trial pits to depths of 0.3–0.4 m BGL. TP01 and TP07 also contained areas of Made Ground, consisting mainly of clay with fragments of brick, cans, and plastic.

- **Soft Cohesive Deposits (Soft Clay):** Encountered in all trial pits except TP02 and TP08, to a maximum depth of 1.30 m BGL.
- **Stiff Cohesive Deposits (Stiff Gravelly Clay):** Encountered in all trial pits and boreholes to a maximum depth of 14.70 m BGL.

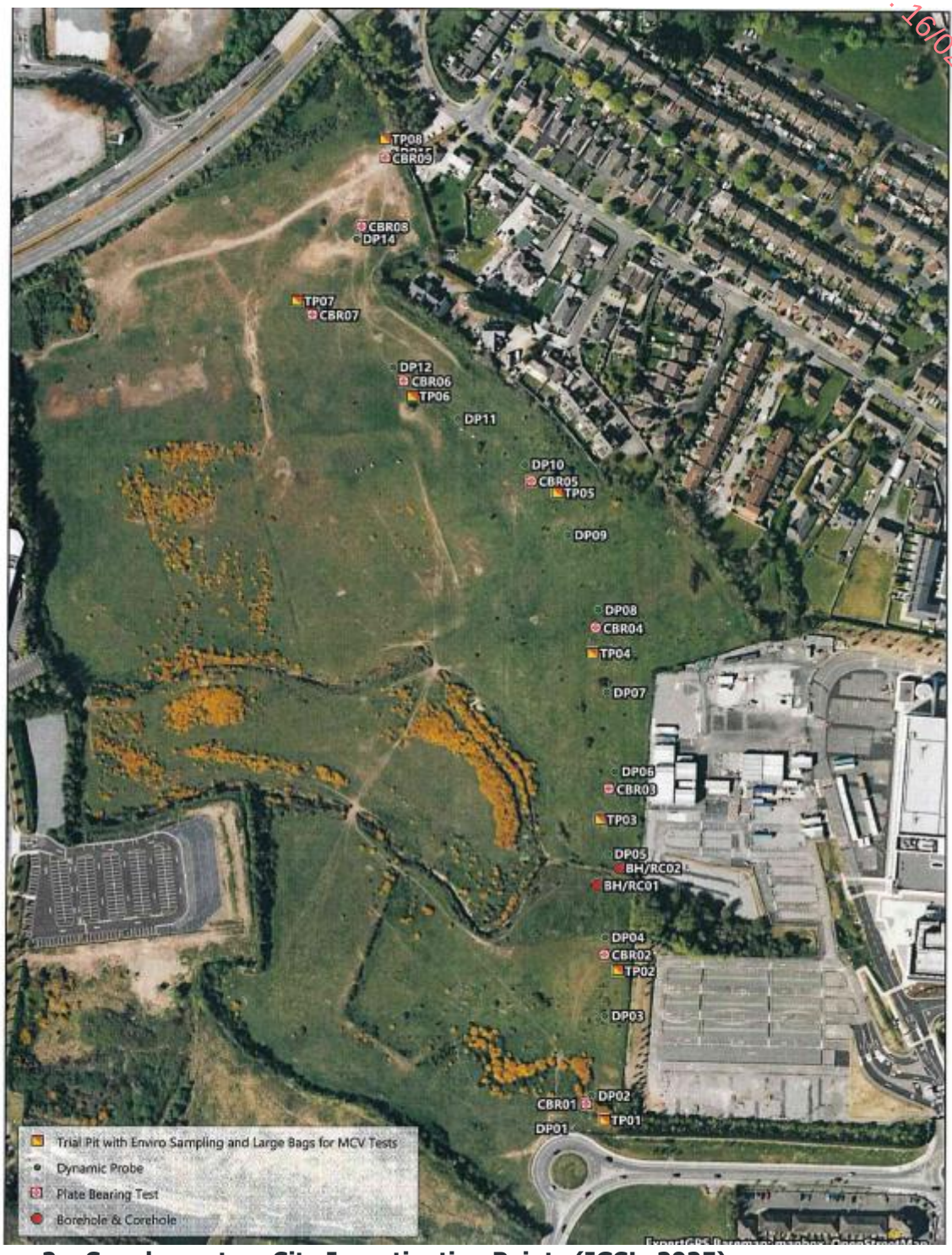


Figure 2 – Supplementary Site Investigation Points (IGSL, 2025)

Conclusions

The results of these site investigations are consistent with the findings of the previous site investigation carried out in 2020 and therefore they do not alter the characterisation and assessments presented in Chapter 5 of the EIAR.

The 2020 site investigations encountered similar ground conditions and strata, with the exception of granular deposits encountered beneath the topsoil in some locations in the middle of the site. The 2024 and 2025 results did not encounter granular deposits, which is consistent with the GSI Soils and Subsoils characterisation presented in Section 5.3.5 of the Chapter 5, in which the principal subsoil in the area is described as a low-permeability cohesive deposits (glacial till derived from limestones).

In addition, Figure 3 below present an updated Figure 5.6 which shows the location of the 2020 Site Investigation points.

Figure 3 – 2020 Site Investigation Points

(ii) The do-nothing scenario has not been assessed. The applicant is requested to assess the 'Do Nothing' scenario in the updated chapter.

Response:

Do Nothing Scenario

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no excavation or construction at this site. There would, therefore, be a neutral effect on the land, soil and geological environment.

(iii) The summary table of mitigation measures does-not capture all those mentioned in the text. The applicant is requested to include all proposed mitigation measures in the Table in Section 5.6.2.1.

Response:

An updated summary table of mitigation measures is presented in Table 1 below.

Table 1 - Summary of Mitigation Measures – Land and Soils

Construction Phase	
LS-C1	Construction Environmental Management Plan (CEMP): The CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works, where relevant. All personnel working on the Site will be trained in the implementation of the procedures.
LS-C2	Emergency Response Procedures During the project planning phase, a comprehensive emergency response plan will be developed by the construction contractor. This plan will outline a well-defined procedure for effectively managing emergencies as they arise. Furthermore, it's imperative to disseminate this emergency protocol to all site personnel during the site induction process.
LS-C3	Soil Excavation, Removal and Infill Minimisation of ground disturbance; visual inspection of excavated soils for contamination; testing where staining or odours are observed; segregation and appropriate disposal of contaminated material; controlled stockpiling and earthworks handling protocols.
LS-C4	Dust and Sediment Control Dust suppression measures, wheel washing, road sweeping and good housekeeping practices to prevent nuisance dust and off-site impacts.
LS-C5	Imported Fill and Aggregates Use of reputable, compliant suppliers; verification of material certification, environmental management practices and regulatory compliance.
LS-C6	Cement and Concrete Works Use of ready-mix concrete where possible; risk assessment for wet concreting; prevention of alkaline discharges; designated, impermeable wash-out areas with controlled removal or discharge subject to agreement.
LS-C7	Fuel and Chemical Handling Designated bunded refuelling areas; spill kits available across site; secure storage of fuels and chemicals; trained personnel; use of drip trays, spill pallets and double-skinned tanks; compliance with CIRIA guidance.
LS-C8	Environmental Procedures Site-wide standard operating procedures and spill response measures; provision of training, equipment and supervision to all relevant personnel.
Operational Phase	
LS-O1	Hardstanding Areas Hardstand protects underlying soils and aquifer; potential reduction in recharge addressed through surface water and groundwater management measures outlined in the Hydrology and Hydrogeology chapter
Monitoring	
LS-M1	Contractors will carry out regular inspections to confirm compliance with the CEMP. Daily inspections by contractors will address potential environmental impacts including dust, litter, waste management and general housekeeping. Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items. Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt control measures during construction phase is crucial to ensuring that they work as intended. They will remain in place throughout the entire.

Statement on Consequences of FI Responses – Land and Soils

The responses provided to the Further Information (FI) requests do not result in any changes to the proposed development that would alter the baseline land or soil conditions at the site. As such, there are no additional or revised impacts on land and soils arising from the FI responses, and the conclusions of the original assessment remain valid.

Comments on the Implications of Red Line Change for this EIAR Chapter

The proposed red line boundary change affects only the southern portion of the site. The revised boundary extends to the roundabout on Hollywell Distributor Road and includes the newly constructed culverted section of the Gaybrook Stream. This extension of the red line boundary is not expected to give rise to any new or additional implications for the land and soil environment within the site.

Responses to Item 5 – Water and Hydrology

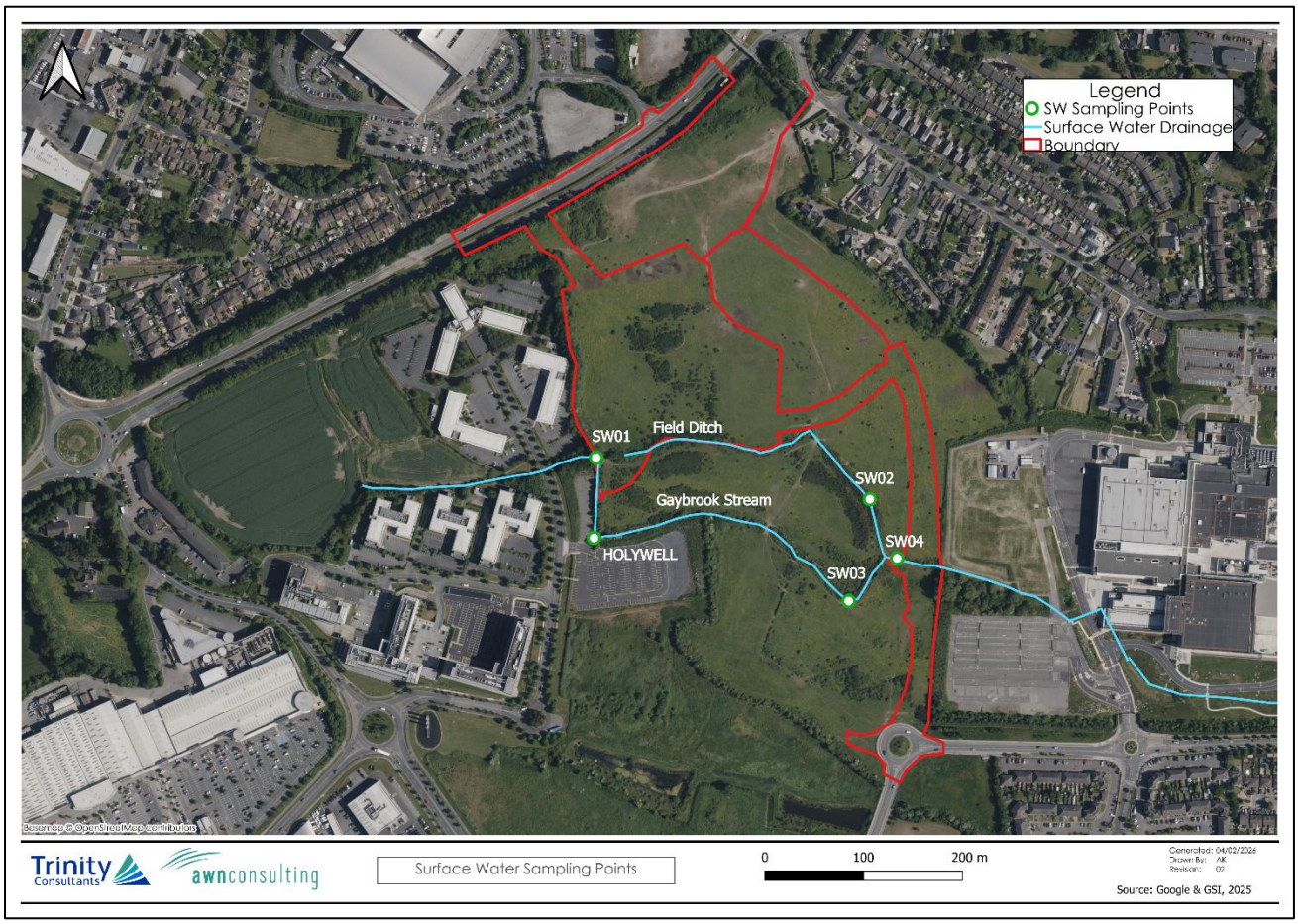
(i) The applicant is requested to provide baseline water sampling results, compared against appropriate standards, and update the assessment as required.

Response:

AWN carried out a surface water quality assessment on the 10th of December 2025 in order to compare the existing baseline water quality conditions against Surface Water EU Environmental Objectives (SI 272/2009 and 77/2019 amendments). Figure 4 below shows the proposed site location with the Local Ditch and Gaybrook Stream running south of the proposed site, as well as the surface water sampling locations.

- SW01: Gaybrook Stream upstream the Proposed Development.
- SW02: Field Ditch upstream Gaybrook Stream.
- SW03: Gaybrook Stream upstream Field Ditch.
- SW04: Gaybrook Stream downstream Field Ditch and Proposed Development.
- Holywell (upwelling well; groundwater).

Figure 4 – Surface Water Sampling Locations



It should be noted that the Local Ditch is not connected to the Gaybrook Stream upstream at the western boundary of site. The Gaybrook Stream enters the Barrysparks lands at the western boundary from Airside Business Park. The stream turns south along the western boundary and then turns east across the site to divide the site into north and south

The following suite of parameters for laboratory analysis (based on the EQS established in the aforementioned EU regulations):

- Field parameters: pH, temperature, EC.
- Dissolved metals suite.
- Hydrocarbons suite (TPH/CWG, BTEX).
- BOD, Ammonia as N, Orthophosphate as P.
- Major anions and cations.

The chemical laboratory testing for these surface water samples will be carried out at the accredited Element Environmental Testing (UK) Limited (EMT) laboratory. Appendix 1 includes the associated laboratory report. Figure 5 presents photographs of the surface water sampling locations. Table 2 below presents the on-site recorded field parameters and

Table 3 present the results compared against the Surface Water regulations.

Figure 5 – Surface Water Location Photographs

SW01 (Local Ditch)

SW02 (Local Ditch)

SW03 (Gaybrook Stream)

SW04 (Gaybrook Stream)

Holywell

Table 2 – Field Parameters Recorded

Sample ID	pH [pH Unit]	Temperature [°C]	Electrical Conductivity [µS/cm]	Observations
SW1	8.5	9.8	794	Clear colour, No odour, low flow
SW2	8.4	8.6	408	Light brown colour, Moderate flow, No odour
SW3	8.6	9.3	888	Light brown colour, No odour, Very low flow
SW4	8.8	9.1	844	Brown colour, No odour, high flow
Holywell	7.8	12.4	934	Clear colour, No odour, low flow

Table 3 – Summary of Laboratory Results

Sample ID				SW01	SW02	SW03	SW04	HOLY WELL
Parameters	**Units**	**LOD**	**SWTV**	**Sample Date: 10/12/2025**				
Dissolved Metals Note 1								
Aluminium	µg/l	<20	nv	-	-	-	-	-
Antimony	µg/l	<2	nv	3	-	-	2	-
Arsenic	µg/l	<2.5	25	-	-	-	-	
Barium	µg/l	<3	nv	55	45	57	53	84
Beryllium	µg/l	<0.5	nv	-	-	-	-	-
Boron	µg/l	<12	nv	34	-	30	25	23
Cadmium	µg/l	<0.5	0.08	-	-	-	-	-
Total Chromium	µg/l	<1.5	4.7	-	-	-	-	-
Cobalt	µg/l	<2	nv	-	-	-	-	-
Copper	µg/l	<7	30	-	-	-	-	-
Total Iron	µg/l	<20	nv	-	283	52	28	69
Lead	µg/l	<5	nv	-	-	-	-	-
Manganese	µg/l	<2	nv	27	69	321	329	6
Mercury	µg/l	<1	nv	-	-	-	-	-
Molybdenum	µg/l	<2	nv	-	4	-	-	-
Nickel	µg/l	<2	20	-	4	-	-	-
Phosphorus	µg/l	<5	nv	35	73	26	23	-
Selenium	µg/l	<3	nv	-	-	-	-	-
Thallium	µg/l	<3	nv	-	-	-	-	-
Vanadium	µg/l	<1.5	nv	-	-	-	-	-
Zinc	µg/l	<3	100	9	5	-	-	-
Hydrocarbons Suite Note 1								
MTBE	µg/l	<0.1	nv	-	-	-	-	-
Benzene	µg/l	<0.5	10	-	-	-	-	-
Toluene	µg/l	<5	nv	-	-	-	-	-
Ethylbenzene	µg/l	<1	nv	-	-	-	-	-
m/p-Xylene	µg/l	<2	10	-	-	-	-	-
o-Xylene	µg/l	<1	10	-	-	-	-	-
TPH CWG								
Aliphatics								
>C5-C6	µg/l	<10	nv	-	-	-	-	-
>C6-C8	µg/l	<10	nv	-	-	-	-	-
>C8-C10	µg/l	<10	nv	-	-	-	-	-
>C10-C12	µg/l	<5	nv	-	-	-	-	-
>C12-C16	µg/l	<10	nv	-	-	-	-	-
>C16-C21	µg/l	<10	nv	-	-	-	-	-
>C21-C35	µg/l	<10	nv	-	-	-	-	-
Total C21-C35	µg/l	<10	nv	-	-	-	-	-
Aromatics								
>C5-EC7	µg/l	<10	nv	-	-	-	-	-
>EC7-EC8	µg/l	<10	nv	-	-	-	-	-
>EC8-EC10	µg/l	<10	nv	-	-	-	-	-
>EC10-EC12	µg/l	<5	nv	-	-	-	-	-
>EC12-EC16	µg/l	<10	nv	-	-	-	-	-
>EC16-EC21	µg/l	<10	nv	-	-	-	-	-
>EC21-EC35	µg/l	<10	nv	-	-	-	-	-
Total EC21-EC35	µg/l	<10	nv	-	-	-	-	-
General Suite Note 2								
Sulphate as SO4	mg/l	<0.5	nv	78.2	-	87.3	73.4	78.4
Chloride	mg/l	<0.3	nv	45.4	22.5	55.4	51.4	78.0
Nitrate as N	mg/l	<0.05	nv	1.54	-	0.95	0.76	1.60

Sample ID				SW01	SW02	SW03	SW04	HOLY WELL
Parameters	Units	LOD	SWTV	Sample Date: 10/12/2025				
Nitrite as N	mg/l	<0.006	nv	-	-	-	-	-
Ortho Phosphate as P	mg/l	<0.03	0.035	-	-	-	-	-
Ammonia as N	mg/l	<0.03	0.065	0.04	0.04	0.06	0.06	0.06
Total Alkalinity as CaCO3	mg/l	<1	nv	282	196	296	292	292
BOD	mg/l	<1	1.5	-	<3	-	-	-
Electrical Conductivity	µS/cm	<2	nv	764	435	867	813	933
pH	pHU	<0.01	4.5-9.0	8.22	7.69	8.09	8.06	7.66
Total Dissolved Solids	mg/l	<35	nv	489	334	555	516	549
Total Suspended Solids	mg/l	<10	nv	55	59	53	31	17
Turbidity	NTU	<0.1	nv	11.3	164.0	30.5	48.1	14.4

Key
- : Concentration less than LOD
LOD: Laboratory limit of detection
nv: No Value
SWTV: Surface Water Threshold Value according to S.I.27/2009 and amendment S.I. 77/2019
Note 1: SWTV: AA-EQS (Annual Average Environmental Quality Standard) Inland Surface Waters
Note 2: SWTV: Mean value to achieve 'Good' Status in river water bodies
0.001: Concentration over SWTV

The results of the surface water quality assessment indicate that none of the analysed surface water sampling locations recorded hydrocarbons and none of the Surface Water Regulation limit values (SWTVs) were exceeded, with the likely exception of BOD at SW02. However, the laboratory was not able to determine an exact concentration of BOD for this point.

Barium, total dissolved iron, manganese, and nitrate were detected at concentrations above the analytical limits of detection; however, the recorded levels were low and remained well below the relevant regulatory thresholds. Overall, the results indicate that surface water quality within the study area is compliant with applicable standards.

(ii) The chapter references a site investigation undertaken in 2020 by GII. The site investigations presented in Appendix 5a have not been referenced. The applicant is requested to update the chapter to reflect the results of the latest site investigations undertaken at the proposed development site, as appropriate.

Response:

Refer to Response (i) to item 5- Land Soils and Geology for updated Ground Investigation

(iii) Reference is made to a wastewater pumping station rather than discharge to stream for operational phase throughout Section 6.9.2, this appears to be an error. It is unclear if outfall to Gaybrook Stream during the operational phase has been properly considered. Please address and clarify this issue.

Response:

The reference to a pumping station in Section 6.9.2.1 is an error. Foul water generated by the proposed development will be directed to gravity flow systems into proposed wastewater sewers and on to Swords Waste Water Treatment Plan. According to Uisce Eireann's 2023 Annual Environmental Report (AER), WWTP currently has adequate operational capacity to accommodate the additional flows generated by the proposed development. Following treatment, the final effluent from Swords WWTP is discharged into Broadmeadow River, which outfalls into a transitional waterbody located downstream in the estuarine system.

The above response also applies to the request of additional information associated with the Item 5 – Biodiversity (ix), which suggests clarifying a similar reference that was included in Section 6.7.1.5 of the

submitted EIAR. The reference to the pumping station in that is incorrect, as explained in the previous paragraph.

With regard to the hydrological connection between the Proposed Development and the Gaybrook Stream during the operational phase, this is clarified below.

Potential Impacts

Potential Impacts on Water Quality in Gaybrook Stream and other waterbodies

As stated in the original EIAR Water Chapter, there is an indirect hydrological connection to Gaybrook Stream, Broadmeadow Water Transitional Waterbody and Malahide Bay Coastal Waterbody during the construction and operational phase. Surface water runoff from roads, car parking, and hardstanding areas, can potentially contain minor levels of contaminants such as hydrocarbons from trafficked areas.

The surface water runoff during the operational phase will more likely impact stormwater drainage, rather than directly impact the water bodies i.e. Gaybrook Stream, Broadmeadow Water Transitional Waterbody, Malahide Bay Coastal Waterbody and Dublin and Swords groundwater bodies (GWB) underlying the site, due to the hardstand and drainage infrastructure proposed.

In the absence of mitigation measures (or design measures) the potential impacts during the operational phase on surface water and groundwater quality are negative, significant and short term.

Potential Impacts on Water Quantity in Gaybrook Stream and other waterbodies

The proposed incorporation of hardstand area and the use of SuDS design measures will have a minor effect on local recharge to ground and has the potential to result in increased run-off from the site if not adequately mitigated. An increase in surface water runoff can have an adverse effect on the hydrological regime of downstream environments via flooding and inundation to downstream properties.

As described in the original EIAR Water Chapter, there are no recorded past flood events within the proposed site development. The closest recorded event occurred approximately 400 m southeast of the site. A small section of the proposed new road connecting to the existing Holywell Roundabout on the eastern boundary of the site intersects with an area designated as Flood Zone B, it does not affect the primary development footprint. Therefore, the is a low flood risk associated with the Proposed Development site.

The design of the Proposed Development and drainage infrastructure proposed will ensure that the run-off rate is restricted to greenfield run-off. The development includes the implementation of SuDS and an attenuation system. The design includes for a 100-year plus climate change allowance and discharge surface water to the downstream network at an appropriately determined rate. There are no surface water or groundwater abstractions proposed, therefore no potential impacts on the quantity of surface water or groundwater.

The proposed measures ensures that the Proposed Development will not be impacted by predicted flood events.

In the absence of mitigation measures (or design measures) the potential impacts during the operational phase on surface water and groundwater flow and quantity are negative, slight, and short-term.

Potential Impacts due to Wastewater Discharge

As stated above, all foul water generated on the Proposed Development will be directed to gravity flow systems into proposed wastewater sewers which are currently under construction. The wastewater will be conveyed to Swords Wastewater Treatment Plant (WWTP) (D0024) for full treatment. Following treatment, the final effluent will be discharged into Broadmeadow River which outfalls as a transitional waterbody within the estuarine system. According to its 2023 Annual Environmental Report (AER), WWTP currently

has adequate operational capacity to accommodate the additional flows generated by the proposed development.

Therefore, no potential impacts are anticipated on local field ditch, Gaybrook Stream, Broadmeadow Water Transitional Waterbody, Malahide Bay Coastal Waterbody and Dublin and Swords groundwater bodies (GWB) underlying the site.

Mitigation and Design Measures during Operational Phase

Surface Water Quality

The design has taken account of the potential impacts of the development on surface water quality; measures have been incorporated in the design to mitigate these potential impacts. The proposed surface water management design establishes a direct hydrological connection to the Gaybrook Stream, located near the site, during the operational phase.

To mitigate potential contamination from surface water runoff, which may originate from roads and hardstanding areas, a sustainable drainage system (SuDS) will be implemented. This system is designed to minimize the risk of contaminants, such as hydrocarbons, entering the stormwater drainage network and subsequently impacting surface water bodies like the local field ditch, Gaybrook Stream, which discharges to the Broadmeadow Water Transitional Waterbody, and ultimately discharge to the Malahide Bay Coastal Waterbody, as well as groundwater bodies, including the Dublin and Swords groundwater bodies GWB underlying the site.

The surface water drainage strategy integrates various measures, including attenuation ponds, green roofs, swales and filter drains. These features will effectively manage surface water flows, directing them to an attenuation system and infiltration tanks to maximize their storage potential. Flow control devices will be installed downstream of the pond outlet pipes to ensure that surface water runoff is stored efficiently before entering the receiving environment.

Surface Water Quantity

The proposed incorporation of hardstand areas and SuDS design measures may slightly reduce local groundwater recharge and increase runoff if not properly managed, potentially causing flooding and affecting downstream environments. However, the overall impact on the groundwater regime is expected to be insignificant due to the site's small area relative to the total aquifer, and construction will avoid areas with localized flooding to mitigate flood risks.

To mitigate these risks, the design of the development and its drainage infrastructure will ensure that runoff rates are restricted to those of greenfield conditions. The development will incorporate SuDS and an attenuation system, with a design that up to and including the 100-year plus climate change allowance and discharge surface water to the downstream network at an appropriately determined rate. The proposed surface water management strategy aims to prevent surcharging during a 1 in 2-year storm events up to and including the 1 in 100 years plus allowance for climate change.

Furthermore, there are no proposed surface water or groundwater abstractions, eliminating potential impacts on the quantity of surface water or groundwater resources.

Monitoring Measures

No future surface water monitoring is proposed for the Proposed Development due to the low hazard potential at the site. Hydrocarbon interceptors will be maintained and cleaned out in accordance with the manufacturer’s instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

Residual Impacts

The implementation of the mitigation, design and monitoring measures detailed above, will ensure that the potential impacts on surface water quality and quantity once the Proposed Development is constructed and operational are adequately mitigated.

The residual effect on surface water quality during the operational phase is considered to be neutral, imperceptible and short-term.

(iv) The applicant is requested to provide an updated chapter which appropriately assesses the impact(s) of potential interactions between the proposed development and the Gaybrook Stream, including in-stream works, near stream works and associated mitigation measures.

Response:

This response refers to the interaction between the Proposed Development and the Gaybrook Stream during the construction phase. The interaction during the operational phase is detailed in response (iii) above.

Potential Impacts

Potential Impacts on Surface Water Quality

During construction works, the Gaybrook Stream will need to be culverted in order to construct the southern access road. During this phase both in-stream and near-stream construction activities will be required.

There is potential for run-off water to become contaminated with pollutants released during construction activity. If not mitigated, contaminated water can pose a temporary risk to the local field ditch, Gaybrook Stream, which discharges to the Broadmeadow Water Transitional Waterbody, and ultimately discharge to the Malahide Bay Coastal Waterbody. During construction of the development, the potential of contamination is associated with the following sources:

- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates)) – arising from excavation and ground disturbance;
- Excavations/ top and sub soil stripping- Increase sediment run off (erosion during rainfall periods), Pollutant mobilisation (heavy metal runoff), Loss of vegetation;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons and other construction chemicals (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms. Construction phase sewerage will be contained in a tank and taken by tanker off site for disposal at a licensed waste management facility.

In the absence of mitigation, rainfall run-off during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may in turn impact on local infiltration capacity, downstream infrastructure or watercourses. Concreting operations pose a potential risk of discharging concrete materials into exposed surfaces and percolate to the underlying groundwater. Concrete, especially the cement component, has a high alkalinity level. There is also the potential risk of unintentional discharge of stored materials like fuels, oils, and paints, which could have negative impacts on surface water bodies on-site and downstream, and the underlying groundwater.

There are no potential impacts from wastewater on the hydrological and hydrogeological environment as this will be discharged of appropriately.

In the absence of mitigation measures, the potential impacts during the construction phase on surface water quality and are negative, slight and short term.

Potential Impacts on Surface Water Quantity

The gradual introduction of impermeable surfaces and the compaction of soils across the construction site as a result of the land clearing and earthworks will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off along with sediment loading, which could potentially impact local drainage if not adequately mitigated. This increase in the rate and volume of direct surface run-off can result in increased sediment loading, scouring impacts on local drainage and watercourses, and downstream impacts.

There are no surface water or groundwater abstractions proposed, therefore no potential impacts on the existing surface water and groundwater regime.

There are no proposed permanent diversions of any waterbodies as part of the Proposed Development.

In the absence of mitigation measures the potential impacts during the construction phase on surface water quantity and flow are negative, slight and short term.

Mitigation Measures

With regard to the construction phase, surface water discharge from the site will be managed and controlled for the duration of the construction works until the surface water drainage system of the Proposed Development is complete.

The construction contractor will be required to manage suspended solids during the construction phase and will be permitted to discharge treated construction water to the established stormwater network.

The construction activities will require surface water management to prevent pollution and degradation of habitats from a chemical spill or run off containing excessive suspended solids that complies with guidelines and best practices such as "Control of Water Pollution from Construction Sites and Guidance for Consultants and Contractors" (CIRIA 532, 2001).

A surface water strategy plan has been designed to achieve the following objectives:

- Prevent sediment contamination and unfiltered surface water runoff.
- Minimise pollution risks from construction activities; and
- Maintain the existing/natural surface water flow regime across the site.

To support these objectives, the following surface water management measures will be implemented:

- Surface water runoff from the construction areas will be directed to a settlement pond with a silt traps, prior to discharge.
- The settlement pond is designed to allow for the settlement of suspended solids removal of silt from the runoff and the reduction of potential pollutants entering the water course.
- Treated surface water will then be discharged via the existing field ditch, which will serve as the designated surface water outfall.
- Silt fencing will be installed along the field ditch prior to any excavation or earth-moving works. The silt fences will help prevent soil, mud, and other fine particles from entering the ditch by trapping sediment in runoff water before it reaches the ditch. These measures will be inspected and maintained regularly throughout the construction phase and will remain in place until all works are complete.
- The silt fence will be positioned on the banks of the ditch. Unless necessary to the works, no concrete works will take place near the stream or ditch. No refuelling, material storage, or any activity with a risk of spillage will take place within near any watercourse or settlement pond.
- At a minimum a 15m buffer zone will be provided around the compound where refuelling and material storage occurs for the duration of the works. No concrete works, refuelling, material storage, or any activity with a risk of spillage will take place within this zone. This setback provides an additional layer

of protection, ensuring that any accidental runoff or spills are kept well away from the watercourse and reducing the risk of contaminated water entering the ditch or stream. The vegetation in this buffer zone will not be stripped and left in its natural state, this will further protect the stream from rum off and from construction activity.

- The buffer zone will remain in place for the duration of the building works, however this buffer zone and part of access road overlap. When the road construction occurs the silt fencing will move to the ditch bank.

Table 4 below summarises the proposed mitigation and monitoring measures during construction and operational phase.

Table 4 - Summary of Mitigation Measures – Surface Water

Construction Phase	
WH-C1	Construction Environmental Management Plan (CEMP): The CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Ecological Clerk of Works where relevant. All personnel working on the site will be trained in the implementation of the procedures and equipment.
WH-C2	Dust and Sediment Constrol As there is potential for construction runoff and suspended solids to indirectly discharge to the Gaybrook Stream, Broadmeadow Water Transitional Waterbody, and ultimately Malahide Bay Coastal Waterbody, a range of sediment control measures will be implemented during the construction phase. Earthworks will be managed to ensure exposed soils are kept stable and confined within the excavation area to minimise erosion and off-site impacts. Silt control measures, including silt traps and hydrobrakes, will be installed as required. Site roads will be managed to prevent mud tracking, with hard surfaces swept regularly and unsurfaced roads restricted to essential traffic only. Silt fencing will be installed along the field ditch prior to any excavation or earth-moving works. The silt fences will help prevent soil, mud, and other fine particles from entering the ditch by trapping sediment in runoff water before it reaches the ditch. At a minimum a 15m buffer zone will be provided around the compound where refuelling and material storage occurs for the duration of the works. Construction materials will be stored within designated secure areas, and material handling will be minimised to reduce soil disturbance. Excavations will be kept open for the shortest practicable duration, and construction activities will be planned with regard to weather conditions to minimise runoff risk.
WH-C3	Cement and Concrete Works Where feasible, ready-mixed concrete will be delivered to site. A risk assessment for wet concreting will be completed prior to works, incorporating measures to prevent the discharge of alkaline or contaminated waters to the underlying subsoil and aquifer. Concrete wash-outs will be restricted to designated impermeable areas, with wash water fully contained and removed from site by licensed tanker. The contractor will implement emergency response procedures in accordance with industry guidance, and all relevant site personnel will be appropriately trained.
WH-C4	Fuel and Chemical Handling Designated bunded refuelling areas; spill kits available across site; secure storage of fuels and chemicals; trained personnel; use of drip trays, spill pallets and double-skinned tanks; compliance with CIRIA guidance.

	Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in designated bunded refuelling areas, which will be away from surface water gulleys or drains. Fuels, oils, and other potentially polluting substances will be securely stored in designated bunded or double-skinned containers with a minimum capacity of 110% of the largest container, and all containers will be clearly labelled, quality-approved, and handled by competent personnel using appropriate equipment.
WH-C5	Excavation of Materials Excavated materials will be visually inspected for signs of contamination, with any suspect material sampled, segregated, and disposed of by a suitably licensed contractor where necessary. Refuelling of plant and machinery will be undertaken in designated bunded areas located away from surface water drains, with mobile double-skinned tanks used where off-site refuelling is required. Spill response equipment will be readily available, and all site personnel will be trained in its use.
WH-C6	Foul Water Management Foul water from the offices and welfare facilities on the site will be collected in portable sanitary facilities and disposed of appropriately by licenced contractor.
WH-C7	Surface Water Management Surface water runoff from the construction areas will be directed to a settlement pond with a silt traps, prior to discharge. The settlement pond is designed to allow for the settlement of suspended solids removal of silt from the runoff and the reduction of potential pollutants entering the water course. Treated surface water will then be discharged via the existing field ditch, which will serve as the designated surface water outfall.
Operational Phase	
WH-O1	The design has taken account of the potential impacts of the development on surface water quality; measures have been incorporated in the design to mitigate these potential impacts. The proposed surface water management design establishes a direct hydrological connection to the Gaybrook Stream, located near the site, during the operational phase. To mitigate potential contamination from surface water runoff, which may originate from roads and hardstanding areas, a sustainable drainage system (SuDS) will be implemented. This system is designed to minimize the risk of contaminants, such as hydrocarbons, entering the stormwater drainage network and subsequently impacting surface water bodies. The design of the development and its drainage infrastructure will ensure that runoff rates are restricted to greenfield conditions.
Monitoring	
WH-M1	During construction phase the following monitoring measures will be considered. Monitoring will be undertaken in accordance with planning conditions and undertaken by the contractor in compliance with the project CEMP. Contractors will carry out regular inspections to confirm compliance with the CEMP. Daily inspections by contractors will address potential environmental impacts including dust, litter, waste management and general housekeeping. A weekly monitoring regime will be implemented to assess the effectiveness of the surface water management measures. Maintenance will be conducted as required based on the results of these inspections. Responsibilities for ongoing monitoring and maintenance will be assigned to the site environmental manager or designated contractor. Regular inspection of surface water run-off and sediments controls (e.g., silt traps). Inspection and maintenance of the silt control measures during construction phase is crucial to ensuring that they work as intended. They will remain in place throughout the entire.

WH-M2	During operational phase, hydrocarbon interceptors will be maintained and cleaned out in accordance with the manufacturer's instructions. Maintenance of the surface water drainage system and foul sewers as per normal urban developments is recommended to minimise any accidental discharges to surface water.

(v) The do-nothing scenario has not been assessed. The applicant is requested to consider the do-nothing scenario in the updated chapter.

Response:

The do-nothing scenario has been now assessed. If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no excavation or construction at this site and no changes in the existing local drainage pattern and the local/regional hydrological or hydrogeological regime. There would, therefore, be a neutral effect on the hydrological and hydrogeological environment.

(vi) It is unclear how the proposed access road (both during construction and operation) will interact with the Gaybrook Stream and its tributaries. The applicant is requested to provide an updated chapter which appropriately assesses the impact(s) of potential interactions between the proposed development and the Gaybrook Stream, including in-stream works, near-stream works and associated mitigation measures.

Response:

See response (iii) and (iv) above for updated Potential impacts.

(vii) Mitigation measures refer to discharge to the established stormwater network during construction phase. This is in contradiction to the CEMP and project description elsewhere in the EIAR. The applicant is requested to confirm the proposed discharge and assess the impact and provide proposed mitigation measures as required.

Response:

To clarify, surface water runoff from the construction areas will be directed to a settlement pond/ tank prior to outfall to the drainage ditch. This aligns with the position in both the Biodiversity Chater and the OCEMP. Appropriate mitigation measures are provided in the updated Chapter 6.

Statement on Consequences of FI Responses – Water & Hydrology

The responses provided to the Further Information (FI) requests do not result in any changes to the proposed development that would alter the baseline hydrology and hydrogeology conditions at the site. As such, there are no additional or revised impacts on land and soils arising from the FI responses, and the conclusions of the original assessment remain valid.

Comments on the Implications of Red Line Change for this EIAR Chapter

The proposed red line boundary change affects only the southern portion of the site. The revised boundary extends to the roundabout on Hollywell Distributor Road and includes the newly constructed culverted section of the Gaybrook Stream. This extension of the red line boundary is not expected to give rise to any new or additional implications for the hydrological and hydrogeological environment within the site.

APPENDIX A – SURFACE WATER SAMPLING LABORATORY RESULTS

Element Materials Technology
Unit 3 Deeside Point
Zone 3
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Deeside
CH5 2UA

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F: +44 (0) 1244 833781
W: www.element.com

AWN Consulting
Tecpro Building
Clonshaugh Business & Technology Park
Dublin
Dublin 17
Ireland

Attention :	Marcello Allende
Date :	17th December, 2025
Your reference :	257501.0280
Our reference :	Test Report 25/20822 Batch 1
Location :	Barrysparks, Swords
Date samples received :	11th December, 2025
Status :	Final Report
Issue :	202512171541

Five samples were received for analysis on 11th December, 2025 of which five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 13.394 kg of CO2

Scope 1&2&3 emissions - 31.654 kg of CO2

Authorised By:

Sean Anglish
Project Coordinator

Element Materials Technology Environmental UK Limited
Registered in England and Wales
Registered Office: 3rd Floor Davidson Building, 5 Southampton Street, London WC2E 7HA
Company Registration No: 11371415

Element Materials Technology

Client Name: AWN Consulting
Reference: 257501.0280
Location: Barrysparks, Swords
Contact: Marcello Allende
EMT Job No: 25/20822

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-18	19-24	25-30						LOD/LOR	Units	Method No.
Sample ID	SW1	SW2	SW3	SW4	HOLYWELL								
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G								
Sample Date	10/12/2025	10/12/2025	10/12/2025	10/12/2025	10/12/2025								
Sample Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water								
Batch Number	1	1	1	1	1								
Date of Receipt	11/12/2025	11/12/2025	11/12/2025	11/12/2025	11/12/2025								
Dissolved Aluminium #	<20	<20	<20	<20	<20						<20	ug/l	TM30/PM14
Dissolved Antimony #	3	<2	<2	2	<2						<2	ug/l	TM30/PM14
Dissolved Arsenic #	<2.5	<2.5	<2.5	<2.5	<2.5						<2.5	ug/l	TM30/PM14
Dissolved Barium #	55	45	57	53	84						<3	ug/l	TM30/PM14
Dissolved Beryllium	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM30/PM14
Dissolved Boron	34	<12	30	25	23						<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5	<1.5	<1.5	<1.5						<1.5	ug/l	TM30/PM14
Dissolved Cobalt #	<2	<2	<2	<2	<2						<2	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	<7	<7	<7						<7	ug/l	TM30/PM14
Total Dissolved Iron #	<20	283	52	28	69						<20	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	<5	<5						<5	ug/l	TM30/PM14
Dissolved Manganese #	27	69	321	329	6						<2	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	<1	<1						<1	ug/l	TM30/PM14
Dissolved Molybdenum #	<2	4	<2	<2	<2						<2	ug/l	TM30/PM14
Dissolved Nickel #	<2	4	<2	<2	<2						<2	ug/l	TM30/PM14
Dissolved Phosphorus #	35	73	26	23	<5						<5	ug/l	TM30/PM14
Dissolved Selenium #	<3	<3	<3	<3	<3						<3	ug/l	TM30/PM14
Dissolved Thallium	<3	<3	<3	<3	<3						<3	ug/l	TM30/PM14
Dissolved Vanadium #	<1.5	<1.5	<1.5	<1.5	<1.5						<1.5	ug/l	TM30/PM14
Dissolved Zinc #	9	5	<3	<3	<3						<3	ug/l	TM30/PM14
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5						<5	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	95	102	102	102	100						<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	93	98	99	98	98						<0	%	TM15/PM10
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>C6-C8 (HS_1D_AL) #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>C8-C10 (HS_1D_AL) #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<5	<10 AA	<5	<10 AA	<5						<5	ug/l	TM5/PM16/PM30
>C12-C16 (EH_CU_1D_AL) #	<10	<20 AA	<10	<20 AA	<10						<10	ug/l	TM5/PM16/PM30
>C16-C21 (EH_CU_1D_AL) #	<10	<20 AA	<10	<20 AA	<10						<10	ug/l	TM5/PM16/PM30
>C21-C35 (EH_CU_1D_AL) #	<10	<20 AA	<10	<20 AA	<10						<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 (EH_CU+HS_1D_AL) #	<10	<20 AA	<10	<20 AA	<10						<10	ug/l	TM5/TM36/PM12/PM16/PM30

Element Materials Technology

Client Name: AWN Consulting
Reference: 257501.0280
Location: Barrysparks, Swords
Contact: Marcello Allende
EMT Job No: 25/20822

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-6	7-12	13-18	19-24	25-30						LOD/LOR	Units	Method No.
Sample ID	SW1	SW2	SW3	SW4	HOLYWELL								
Depth													
COC No / misc													
Containers	V H HN P G	V H HN P G	V H HN P G	V H HN P G	V H HN P G								
Sample Date	10/12/2025	10/12/2025	10/12/2025	10/12/2025	10/12/2025								
Sample Type	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water								
Batch Number	1	1	1	1	1								
Date of Receipt	11/12/2025	11/12/2025	11/12/2025	11/12/2025	11/12/2025								
TPH CWG													
Aromatics													
>C5-EC7 (HS_1D_AR)#	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<5	<10 AA	<5	<10 AA	<5						<5	ug/l	TM5/PM16/PM30
>EC12-EC16 (EH_CU_1D_AR)#	<10	<20 AA	<10	<20 AA	<10						<10	ug/l	TM5/PM16/PM30
>EC16-EC21 (EH_CU_1D_AR)#	<10	<20 AA	<10	<20 AA	<10						<10	ug/l	TM5/PM16/PM30
>EC21-EC35 (EH_CU_1D_AR)#	<10	<20 AA	<10	<20 AA	<10						<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 (EH_CU+HS_1D_AR)#	<10	<20 AA	<10	<20 AA	<10						<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) (EH_CU+HS_1D_Total)*	<10	<20 AA	<10	<20 AA	<10						<10	ug/l	TM5/TM36/PM12/PM16/PM30
Sulphate as SO4#	78.2	<0.5	87.3	73.4	78.4						<0.5	mg/l	TM38/PM0
Chloride#	45.4	22.5	55.4	51.4	78.0						<0.3	mg/l	TM38/PM0
Nitrate as N#	1.54	<0.05	0.95	0.76	1.60						<0.05	mg/l	TM38/PM0
Nitrite as N#	<0.006	<0.006	<0.006	0.006	<0.006						<0.006	mg/l	TM38/PM0
Ortho Phosphate as P#	<0.03	<0.03	<0.03	<0.03	<0.03						<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as N#	0.04	0.04	0.06	0.06	0.06						<0.03	mg/l	TM38/PM0
Total Alkalinity as CaCO3#	282	196	296	292	292						<1	mg/l	TM75/PM0
BOD (Settled)#	<1+	<3+ AB	<1+	<1+	<1+						<1	mg/l	TM58/PM0
Electrical Conductivity @25C#	764	435	867	813	933						<2	uS/cm	TM76/PM0
pH#	8.22	7.69	8.09	8.06	7.66						<0.01	pH units	TM73/PM0
Total Dissolved Solids#	489	334	555	516	549						<35	mg/l	TM20/PM0
Total Suspended Solids#	55	59	53	31	17						<10	mg/l	TM37/PM0
Turbidity	11.3	164.0	30.5	48.1	14.4						<0.1	NTU	TM34/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Notification of Deviating Samples

Client Name: AWN Consulting

Matrix : Liquid

Reference: 257501.0280

Location: Barrysparks, Swords

Contact: Marcello Allende

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 25/20822

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x2 Dilution
AB	x3 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

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Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma-Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM34	Turbidity by 2100P Turbidity Meter. complies with EPA 180.1 1993	PM0	No preparation is required.				
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods - TSS: USEPA 160.2 (1983), EN872:2005 and APHA SMEWW 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS.	PM0	No preparation is required.	Yes			

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Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) - All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM58	APHA SMEWW 5210B:1999 22nd Edition. Comparible with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as am	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM75	Modified US EPA method 310.1 (1978). Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			