7. Geoenvironmental Impacts and Surface Water Quality

7.1 Introduction

7.1.1 This chapter of the Environmental Statement (ES) assesses the likely significant effects of the Proposed Development with respect to soil, geology, hydrogeology, surface waters and contaminated land. The chapter should be read in conjunction with the development description presented in **Chapter 3: The Project and its Alternatives**, and with **Chapter 5: Biodiversity**, **Chapter 8: Flood Risk and Drainage**, and **Chapter 9: Long-term Radiological and Non-radiological Impacts**.

7.1.2 Note that this chapter does not address the health and safety of site operatives or site visitors, since the Applicant has well established procedures to address these, as well as there being extensive legislation that must be complied with (see **Chapter 4: Regulatory Context**).

7.1.3 This chapter does not address any risks associated with the historical asbestos and construction waste disposals within and to the north of the Application Site (location shown in **Figure 7.4**). There will be no removal of, or changes to, ground cover in these areas. In addition, the Applicant implements “permit to dig” arrangements before any intrusive works are undertaken within the entire ‘Trawsfynydd site’ (meaning the ‘Area of Land Leased by Nuclear Restoration Services (NRS) (formerly Magnox) from the Nuclear Decommissioning Authority’, as shown on Figure 7.1) to address hazards associated with asbestos, contaminated land and buried services.

7.1.4 This chapter does not consider post-Works Phase impacts (as described in **Chapter 3: The Project and its Alternatives**), which are addressed in **Chapter 9: Long-term Radiological and Non-radiological Impact**. Within **Chapter 9**, the effects of long-term migration of radioactive and non-radioactive pollutants from the disposals, including from void infill materials, are considered. Potential groundwater level and flow impacts associated with the removal and/or grouting of some under-ponds drains are also discussed there.

7.2 Relevant planning policy, legislation and technical guidance

7.2.1 **Appendix 7A** identifies the relevant national and local policy, legislation and guidance that has informed the scope of the assessment relevant to geoenvironmental impacts and surface water quality.

7.3 Data Sources

7.3.1 The Study Area (see **Figure 7.1**) for geoenvironmental impacts and surface water quality includes the area that extends 500m from the Application Site boundary.

The physical effects of developments or construction works are typically localised where geological features or soils are relevant (e.g. removal or sealing of healthy soil, removal or damage to a notable geological feature). However, the environmental setting of the Application Site boundary and the Trawsfynydd site, including but not limited to the presence of sensitive receptors (humans, ecology, property, groundwater and surface water) in the surrounding area and potential site-specific contaminant migration pathways, have also been considered.

7.3.2 Baseline data collection has been undertaken using the sources listed in **Table 7-1**. The MAGIC map[1] shows there are no statutory designations associated with geological conservation or geological diversity within the Study Area. The Study Area also has no statutory designations for the conservation of biodiversity.

Table 7-1 Data sources used to inform the geoenvironmental impacts and surface water quality assessment

Organisation	Source	Data
Department for Environment, Food and Rural Affairs (Defra)	Multi-Agency Geographic Information for the Countryside (MAGIC) interactive map[1]	Designated sites: aquifer designations and groundwater vulnerability, groundwater source protection zones (SPZ), statutory and non-statutory ecological and geological designations.
Cranfield Soil and Agrifood Institute	Soilscapes Interactive map[2]	LandIS Soilscape soil map.
British Geological Survey (BGS)	GeoIndex[3]	On-line GeoIndex 1:50,000 digital geology. Borehole Record Viewer (provides access to the National Geoscience Data Centre collection of onshore scanned boreholes, shafts and well records).
NRS	Various technical reports including: Golder Associates (UK) Ltd (2019) Hydrogeological Interpretation, November 2019. TRA-LQF-268[4]	Various reports including site-wide hydrogeological interpretation, land quality risk assessment, ongoing groundwater and surface water monitoring and

[1] Department for Environment, Food And Rural Affairs (Defra), (2022). Magic maps. [online] Available at: https://magic.defra.gov.uk/. [Accessed 10 November 2023].
[2] Cranfield University (2022). Soilscapes. [online] Available at: http://www.landis.org.uk/soilscapes/ [Accessed 10 November 2023].
[3] British Geological Society (2022). Geoindex (Onshore). [online] Available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore [Accessed 20 October 2022].
[4] Golder Associates (UK) Ltd. (2019). Hydrogeological Interpretation, November 2019. TRA-LQF-268. Golder; London, UK.

Organisation	Source	Data
	WSP (2023) Trawsfynydd Ponds Complex: Hydrogeological Conceptual Model to Support the Demolition and Disposal Project[5]	decommissioning technical reviews.
Welsh Government	Data Map Wales[6]	Data and maps from the Welsh public sector.

7.4 Baseline conditions

Current baseline

7.4.1 For a summary of the site hydrogeology, and groundwater flow conceptual model, see **Appendix 9E**. The topography of the Proposed Development is described in **Chapter 8: Flood Risk and Drainage**.

Geology and Soils

7.4.2 BGS Geoindex 1:50,000 bedrock mapping illustrated on **Figure 7.4** records the Proposed Development as underlain by the Rhinog Sandstone and Mudstone Formation (Rhinog Grits) with a fault inferred to run to the north from the northern boundary of the Proposed Development. The Hafotty Formation (mudstone) is shown slightly overlapping the very northwest corner of the Application Site boundary.

7.4.3 The bedrock comprises a layered sedimentary sequence which consists mainly of massively bedded siliceous, fine to coarse grained 'greywacke' (a silty sandstone) with occasional interbedding of siltstones and mudstones[4]. The formation is resistant to erosion and forms higher ground in the region. The bedding dips 30-35° to the north-west. The Rhinog Grits show fracturing when outcropping at surface. The fractures are sub-vertical.

7.4.4 LandIS Soilscape mapping viewed on the Soilscape interactive map[2] shows the original soils present in the area of the Proposed Development prior to construction. These comprised slowly permeable, seasonally wet, acid, loamy, and clayey, soils (indicative of impeded drainage). During construction of the ponds complex and the nearby reactor buildings, these natural soils were largely removed[7].

7.4.5 The Trawsfynydd site is shown on BGS GeoIndex[3] as being covered by artificial (made ground) deposits. The 1:50,000 superficial deposit mapping records no superficial deposits beneath the ponds complex building itself. The closest

[5] WSP (2023) Trawsfynydd Ponds Complex: Hydrogeological Conceptual Model to Support the Demolition and Disposal Project. June 2023, Ref. 21480599.601/A.2.
[6] Welsh Government (2022). Data map Wales.[online] Available at: https://datamap.gov.wales/ [Accessed 20 October 2022].
[7] Drift deposits largely removed during construction (Golder, November 2019. Hydrogeological Interpretation 1780044.620/A.2).

superficial deposits are of Diamicton Till, located approximately 10m northeast of the ponds complex.

7.4.6 Information provided by the Applicant[4] describes the Trawsfynydd Nuclear Power Station platform as having been "*levelled by blasting into the hillside and using the material removed as fill to extend the platform on the down slope side*" of the Trawsfynydd site. The rock fill was augmented, when available, with excavated superficial deposits. The composition of the rock fill is expected to vary.

7.4.7 Previous reporting[4] also records the sub-surface as reworked glacial drift and rock fill. The rock fill comprises a range of materials from large boulders to clay.

Groundwater abstractions

7.4.8 There are no groundwater abstractions for potable use within the Application Site boundary or in the Study Area. There is a groundwater abstraction system external to the south wall of Reactor 1. This was commissioned in 2021 to minimise the ingress of water to the reactor basement. Water is pumped from five boreholes and discharged to a holding tank, then flows through a plated interceptor. The plated interceptor discharges through a settlement tank and then under gravity to surface water manhole MH142, located at the southeast corner of Reactor 1. Once in the surface water drainage it is conveyed to MH103 and then to Llyn Trawsfynydd via an oil interceptor and the Diversion Culvert. This groundwater pumping system is also described further in **Appendix 9E**. It is not considered as a sensitive abstraction in the assessment.

Ponds and Associated Structures

7.4.9 The main structures on the Trawsfynydd site are founded on bedrock, using support columns and walls in some cases. The ponds complex is founded directly on bedrock in the northern part of the facility and underlain by an infilled trough in the bedrock surface in the southern part. The trough in the rock-head topography extends from beneath the Intermediate Level Waste (ILW) store, beneath the Active Effluent Treatment Plant (AETP) basement and beneath Reactor 1, and was filled with made ground during construction of the Trawsfynydd power station. A photograph of the ponds complex under construction provided by the Applicant shows granular material placed between the concrete sleeper walls that support the southern part of the ponds complex. The sleeper walls are illustrated in **Graphic 7.1**.

7.4.10 The northern nine sections of the ponds lanes sit directly onto bedrock and the southern eight are supported on a series of mass concrete sleeper walls. The sleeper walls are 0.91m in thickness and the spaces in-between are filled in with a rock fill. Compacted rock fill was emplaced around the structure up to ground level. Construction details of the ponds complex are illustrated in **Graphic 7.1**. The basal slab rests at 191.6-191.1m above Ordnance Datum (AOD) (approximately 3.9 to 4.4m below ground level [bgl]).

7.4.11 Beneath the slab are a series of 'sampling drains' which were designed to intercept possible leakage from the ponds via construction joints. In addition to the ponds themselves, the ponds complex includes a number of largely subsurface concrete vaults of similar dimensions to the ponds, principally adjoining the north-west end of the ponds. These vaults, which were formerly used for storage of

radioactive waste, do not have underlying sampling drains. The base of the main pond lanes is recorded to be 191.60m AOD.

7.4.12 Below ground concrete structures are present to the north-east of the ponds complex, including the foundation wall of the 'western' Goliath (crane) track (about 3m from the north-east wall of the main subsurface ponds complex structures) and the foundations of the reactor buildings (including bioshields and gas circulators).

Rainfall and Catchments

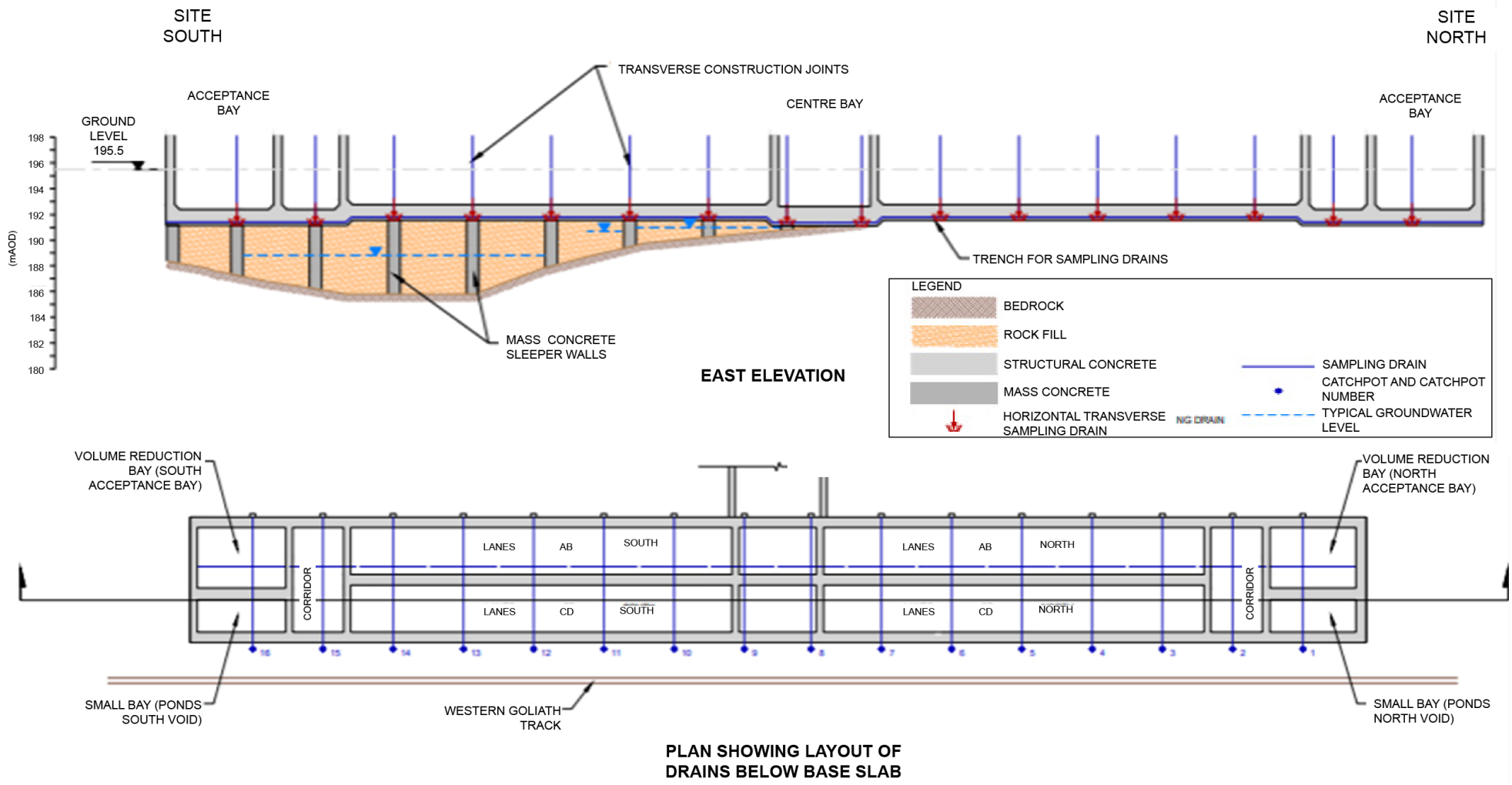
7.4.13 Rainfall at the Trawsfynydd site is high compared with much of the UK and this means that re-charge to the sub-surface in areas of the Trawsfynydd site, and within the Application Site boundary, where there are no buildings or competent hardstanding is expected to be relatively high[5]. Further detail on rainfall is provided in **Chapter 8: Flood Risk and Drainage**.

7.4.14 Information provided by the Applicant shows that a significant proportion of the effective rainfall at the Trawsfynydd site is captured by the surface water system, with as little as 10 percent entering the groundwater system. In built-up areas around the ponds complex, a high proportion of water is diverted to surface water drainage and will not reach groundwater except via drainage leaks. The 2023 Hydrogeological Conceptual Model[5] report explains that one of the main subsurface flow routes within the Application Site boundary is at the southern Cooling Pond structures, below Reactor 1. This is because a trough in the rock-head topography extending from beneath the ILW store, beneath the AETP basement and beneath Reactor 1 was filled with made ground during construction of the Trawsfynydd power station. Where shallow groundwater from the west enters the trough, it flows to a porous groundwater drainage pipe leading east into Manhole (MH) 6 , approximately 25m northeast of the Application Site boundary, to the northeast of Reactor 1. From MH6, the intercepted groundwater drains by gravity north-eastwards through solid pipes to MH7 then MH103. Surface water (storm) drains discharge into the pipe at MH103. The drain, containing a combination of Trawsfynydd site storm drainage and the intercepted groundwater, then runs to the Diversion Culvert via the Main Drains Oil Interceptor and the Diversion Culvert Pump Sumps. From there, water is pumped via Diversion Culverts No. 3 and No. 4 and is discharged to Llyn Trawsfynydd, which is the Applicant's authorised active effluent discharge route.

7.4.15 The Trawsfynydd site and consequently the Proposed Development lie within the surface water catchment of the Afon Tafarn-helyg. The Afon Tafarn-helyg flows northwards 150m northeast of the Trawsfynydd site, 300m northeast of the Application Site boundary, before joining the Afon Dwyryd, approximately 4.2km north of the Trawsfynydd site.

7.4.16 Llyn Trawsfynydd (a lake created in the 1920s through damming of the Afon Prysor at what is now the western extent of the lake) adjoins the Trawsfynydd site to the south-east and is located in a separate surface water catchment (with the exception of the flow of water released from the Gyfynys Dam through the sluice system) 166m south-east of the Application Site boundary. The reservoir water is maintained at a level between 195.65-198.25m AOD. Watercourses and dams within the Study Area are shown on **Figure 7.1**.

Graphic 7.1 Construction details of the ponds complex[5]



7.4.17 The Nant Gwylan originates from Llyn Trawsfynydd via discharges from the Gyfynys Dam which is located approximately 500m east of the Application Site. In addition, an unnamed stream runs off Craig Gyfynys located approximately 150m north-west of the Application Site boundary. The unnamed stream originates from springs on the east face of Craig Gyfynys and flows to the north-east, initially over ground near the western extent of the Application Site boundary and then beneath the Trawsfynydd site in a culvert until it resurfaces as an open stream at the north east boundary of the Trawsfynydd site and flows northwards into the Afon Tafarn-helyg. These watercourses are shown on **Figure 7.1**.

7.4.18 The unnamed stream is likely to intercept surface water flow off the higher ground to the west and potentially reduce throughflow onto the Trawsfynydd site.

Storm Water Drainage

7.4.19 Storm water drainage from most of the Trawsfynydd site, including most of the Proposed Development, is pumped to Llyn Trawsfynydd via the diversion culvert , which is outside the Application Site boundary, northeast of Reactor 1. The diversion culvert also accepts water from the groundwater drains around the Reactor buildings (the foundations of which are surrounded by French drains). The diversion culvert therefore discharges a mixture of surface water and intercepted groundwater via the pumped system to Llyn Trawsfynydd. The diversion culvert is illustrated in **Figure 7.3**. A storm overflow from the Diversion Culvert Pump Sump to the Nant Gwylan is permitted. Further details of the diversion culvert system and applicable permits are below.

7.4.20 As described in **Chapter 8 Flood Risk and Drainage**, surface runoff from the majority of the Trawsfynydd site, together with groundwater intercepted in groundwater drains around the reactor buildings, drains to the "diversion culvert sump" via the "drains diversion" oil interceptor and is pumped / discharged to Llyn Trawsfynydd at two discharge points. These discharge routes are permitted under Environmental Permitting Regulations (EPR) permit GB3835DE (for radioactivity) and EPR permit CG0087701 (non-radiological).

7.4.21 The ponds complex is surrounded by a surface water drainage system that will be largely isolated and protected from the works. Temporary surface water arrangements will be implemented (see **Chapter 3: The Project and its Alternatives**). However, most drainage from the Application Site boundary will still ultimately lead to the lake via a siltbuster (as required), oil separator, and the diversion culvert. Potentially some radioactive water extracted from voids will be discharged to the lake, as necessary via the site Active Effluent Treatment Plant, which is a permitted discharge route.

7.4.22 The Applicant has carried out CCTV camera surveys of some sections of the site drains system, and a summary of the observations and drain condition is provided in the 2023 Hydrogeological Conceptual Model[5].

7.4.23 Previous reports note that groundwater from the Trawsfynydd site is likely to discharge to surface water (the Nant Gwylan, the unnamed stream from Craig Gygynys and Afon Tafarn-helyg). This may occur directly through the subsurface or, at the unnamed stream, due to groundwater entering a smaller surface drainage system in the north-east of the Trawsfynydd site and subsequently being

discharged to that stream via the Northern Outlet Pipe. Further details of this system are given below.

7.4.24 There is a permitted storm overflow discharge from the sewage plant in the north of the Trawsfynydd site to the unnamed stream (details of all discharge points in the Study Area are provided in **Chapter 8: Flood Risk and Drainage**) via the Northern Outlet Pipe. French drains are present on the west side of the sewage plant, in the form of relatively shallow culverts for managing near-surface groundwater in this area. These connect into the smaller surface water drainage system upstream of the northern oil interceptor on the Trawsfynydd site and were installed to reduce the risk of flooding of the sewage plant. This drainage system discharges to the unnamed stream via the northern oil interceptor at the Northern Outlet Pipe. Low levels of radioactivity arising solely from storm overflows of the sewage plant are also a permitted discharge (under EPR16) from the Northern Outlet Pipe.

7.4.25 There is, theoretically, potential for contamination in groundwater at the Trawsfynydd site, and from within the Application Site boundary, to enter the drainage system described in **paragraph 7.4.24** and be discharged to the unnamed stream via the Northern Outlet Pipe. However, no radioactive contamination has been detected in these discharges during previous monitoring that indicates ongoing contaminant migration from the Trawsfynydd site, or, by extension, from within the Application Site boundary.

7.4.26 A third piped discharge route to surface water from the Trawsfynydd site is identified (see **Chapter 8 Flood Risk and Drainage**), for storm overflow from the diversion culvert sump, which is permitted to be discharged to the Nant Gwylan, which originates from a valved outlet through the Gyfynys Dam from Llyn Trawsfynydd and forms a tributary of the Afon Talarn-helyg. This discharge is permitted under Permit GB3835DE and Permit CG0409101. However, **Chapter 8 Flood Risk and Drainage** confirms that discharges from the diversion culvert sump to the Nant Gwylan have been rare since the capacity of the pump was upgraded several years ago. This discharge route is, therefore, not considered further in the assessment.

Ground conditions – land contamination

7.4.27 For a summary of the baseline condition regarding land contamination within the Application Site boundary and the wider Trawsfynydd site, see **Appendix 7B.2**. This includes a risk assessment for identified potential sources within the Proposed Development and the wider Trawsfynydd site in the context of the ongoing site use. An overview of the land quality status of the land within the Proposed Development is provided below.

7.4.28 The Application Site boundary includes areas where potential sources of radiological and non-radiological land contamination are present. The Applicant holds extensive records and assessments of the ground conditions at the Trawsfynydd site, including land within the Application Site boundary.

7.4.29 The 2020 Update of the Land Quality Qualitative Risk Assessment (QLRA)[8] provides an updated desk-based assessment of land quality for the Trawsfynydd site. This risk assessment excluded consideration of contaminated land impacts via permitted discharge routes.

7.4.30 The 2020 report[8] considers soil and groundwater data for the Trawsfynydd site from previous ground investigations (referenced in the report and dating from 2015 to 2020) to provide an updated risk assessment, based on current site condition and in accordance with the Nuclear Industry Group for Land Quality (NIGLQ)[9] methodology for risk assessment for qualitative risk assessment, for site wide land quality management issues.

7.4.31 The risk assessment found that risks to humans (workers, visitors and intruders within the site, and members of the public outside the site) are very low, risks to controlled waters (groundwater and surface water) are low or very low, and risks to ecological receptors and property (crops, produce and animals, and buildings) are very low or trivial. The risk assessment found no very high, high, or medium risks are applicable to in the context of the Proposed Development.

7.5 Future baseline

7.5.1 Climate change is predicted to result in increased rainfall seasonality, with generally wetter winters and drier summers, and high-intensity rainfall events will become more common. An increase in rainfall would increase the water balance across the Trawsfynydd site including flow through shallow groundwater.

7.5.2 The Hydrogeological Conceptual Site Model[5] considers the effects of climate change on groundwater occurrence and flow at the Trawsfynydd site up to 2080. This finds that in relation to groundwater in bedrock, it is unlikely that climate change induced variation to annual average recharge will have a marked effect on the typical groundwater levels and pressures.

7.5.3 The Hydrogeological Conceptual Site Model[5] also concluded that climate change effects are unlikely to lead to widespread continuous saturation of made ground at a higher level than now on the sawtooth rock-head profile within the Application Site boundary (described in **paragraph 7.13.15** in **Appendix 7B.1**). Nor, it was concluded, is it likely that the groundwater level in the trough (under the southern part of the ponds complex and under the northern part of Reactor 1) will increase in level. Again, this is because of the way in which groundwater levels in the made ground are controlled by the topography of the relatively impermeable bedrock.

7.5.4 Therefore, groundwater levels are not expected to change significantly relative to current baseline conditions prior to, and during the Works Phase as a result of climate change.

[8] Golder (2020) Trawsfynydd Site: 2020 Update of the Land Quality Qualitative Risk Assessment, September 2020, Ref. 19123725.605/A.1.

[9] Nuclear Industry Group for Land Quality (2012) industry Guidance: Qualitative Risk Assessment for Land Contamination, including Radioactive Contamination. Version 1.1, June 2021. (Online). Available at: https://www.gov.uk/government/publications/industry-guidance-qualitative-risk-assessment-for-land-contamination-including-radioactive-contamination. Accessed January 2024.

7.6 Consultation and engagement

Scoping Opinion

7.6.1 A summary of the relevant responses received in the Scoping Opinion in relation to soil, geology, hydrogeology, surface waters and contaminated land, and confirmation of how these have been addressed within the assessment is presented in

7.6.2 **Table 7-2.**

Table 7-2 Responses to Scoping Opinion (Eryri National Park Authority (ENPA) / Natural Resources Wales)

Consideration (abridged)	How addressed in this Environmental Statement
The Authority disagrees with elements of the Scoping Report relating to this section. In particular the scoping out of certain receptors. We do not agree with the scoping out of the effects from impacts on groundwater behaviours. We advise that it is too early a stage to scope out such an important element. The breakage of hardstanding and excavation works (around pipes for example) may result in greater infiltration and could mobilise contaminants.	Further detail on the justification for how receptors that require assessment have been identified is provided within **Appendix 7C**.
There is now recognition of the importance of groundwater monitoring, both during and postimplementation within the scoping process. This is a key requirement due to the degree of uncertainty at the site in the short, medium and long term and the long duration over which activities will be occurring at the wider site. As it is understood there will be many activities occurring at the site which may influence groundwater conditions and that phasing of different works may be subject to change. **It is important to recognise the need to develop meaningful monitoring strategies in support of the application and Environmental Statement that will be scrutinised and set to operate over many decades to minimise uncertainties as the project progresses. We would welcome the development of a strategized and adaptive monitoring regime and a Water Management Plan (WMP)).**	Groundwater and surface water monitoring are proposed. The post-Works Phase monitoring (which is subject to controls through environmental permitting) is summarised in the Project Description within this ES (see **Chapter 3**). The Works Phase monitoring has been submitted with the planning application to ENPA (as part of the Construction and Demolition Environmental Management Plan). Note that the term “WMP” is not being used in this context, as it has another specific meaning within environmental permitting (“Waste Management Plan”).

The Environmental Statement should include an in-combination assessment of engineering works which may interact with groundwater on the site.	There are not expected to be any significant concurrent engineering works at the Trawsfynydd site that will interact with the ponds demolition to result in potentially significant effects on environmental receptors, including groundwater.

7.7 Scope of the assessment

7.7.1 This section addresses the potential for significant effects on soils, groundwater or surface water quality, human health or ecology as a result of radioactive or non-radioactive contamination by considering activities during the Proposed Development that may increase the mobilisation of existing ground contamination or create new contamination (for example through potential spills of polluting substances). This chapter only considers the potentially significant effects of the Proposed Development resulting from activities during the Works Phase.

7.7.2 The proposed methodology set out in **Section 7.11** has been developed further since the EIA Scoping Report was prepared and subsequent Scoping Opinion received (see **Section 7.6**).

7.7.3 This is in response to comments received during community consultation events[10] after the Scoping Report was prepared where members of the public expressed that increased clarity in the EIA reports would be appreciated. The updated methodology in **Section 7.11** provides further explanation of how the assessment of significance of potential land contamination effects is undertaken in the chapter.

7.7.4 As described in **Chapter 3: The Project and its Alternatives**, the duration of the Works Phase is approximately twenty-four months.

7.8 Potential receptors

7.8.1 The potential geoenvironmental and surface water quality receptors that may experience potentially significant effects as a result of the Proposed Development are identified in **Table C-1** in **Appendix 7C**. The geoenvironmental and surface water quality receptors that are unlikely to be significantly affected by the Proposed Development and are therefore scoped out of further assessment are summarised in **Table C-2** in **Appendix 7C.**

7.9 Potentially significant effects

7.9.1 The effects of the Proposed Development on receptors which have the potential to be significant and that will be assessed are summarised in **Table 7-3**, with details of the potential effect.

[10] Avison Young (2023) Statement of Community Involvement. Avison Young Reference: AY/17C1000085/SCI/01, Magnox (Client) Reference: TRAWS-23-043 Issue 01, December 2023.

Table 7-3 Works Phase effects which have the potential to be significant

Activity	Effect	Receptor(s)
Stockpiled demolition materials **Note: the assessment of potential long-term effects from infilling of voids with site-derived material is covered in Chapter 9: Long-term Radiological and Non-radiological Impacts.**	Stockpiles of demolition materials during the Works Phase: interaction with rainwater and surface run-off resulting in releases of contaminants to land or water.	Human health (members of the public outside the Trawsfynydd site). Controlled waters: groundwater or surface water (via groundwater release from drainage outfalls). Ecology of the local water bodies.
Changes to ground surface cover	Changes to ground surface cover: removal of existing ground cover e.g. during the installation of drainage channels, resulting in increased interaction of infiltrating rainwater with historical radioactive land contamination and subsequent impacts on groundwater or surface water.	Human health (members of the public outside the Trawsfynydd site). Controlled waters: groundwater or surface water (via groundwater release from drainage outfalls). Ecology of the local water bodies.
Construction vehicles and plant operation	Construction vehicles and plant operation: spills and leaks from vehicles and operating plant during the Works Phase resulting in land contamination with potential to impact human health.	Human health (members of the public outside the Trawsfynydd site) Controlled waters: groundwater or surface water (via groundwater release from drainage outfalls). Ecology of the local water bodies.

7.9.2 The effects scoped out from further assessment are:

- Effects on geology, soil and geodiversity, due to the absence of designated geological sites within the Study Area and the limited presence of natural soils due to the affected land being previously developed.
- Effects of the Proposed Development on ground stability are scoped out on the basis that the Application Site boundary is not within an area affected by coal mining. The design for the Proposed Development will comply with good practice in structural design including compliance with the Eurocodes and relevant British Standards. The design will account for the expected ground conditions and design loads, accounting for the effects of climate change. The

design of the Proposed Development will be completed in accordance with CDM 2015.

- Effects on hydrogeology in relation to the availability (quantity) of the groundwater resource for offsite (third-party) abstraction or for provision of baseflow to surface watercourses. This is based on the well-developed conceptual understanding of the hydrogeological regime at the Trawsfynydd site (see **Section 7.4** and **Appendix 9E**), the absence of licensed groundwater abstractions, the fact that the Nant Gwylan flows are controlled via the dam, and that no ground dewatering is proposed as part of this development. See also **Appendix 9C**.
- Effects on property (on or off site).

7.10 Mitigation measures

7.10.1 As part of the design process, several environmental impact mitigation measures are proposed to reduce the potential for impacts, as summarised in **Table 7-4**. Existing controls under other regulatory regimes that will have to be complied with have informed the development of the Project Description as part of the design process. As such, there are several measures that are an integral part of the development that will reduce the potential for impacts. However, for brevity these are not presented as mitigation measures as they are already incorporated by design.

Table 7-4 Mitigation measures

Receptor	Measures	Compliance Mechanism
Groundwater **Surface water** **Off-site ecology** **Off-site people**	A Works Phase Water Monitoring Plan has been prepared, a summary of which is included in the Construction and Demolition Environmental Management Plan which will be submitted with the planning application. This includes monitoring of groundwater via previously installed boreholes, and drainage access points. This monitoring is supported by ongoing monitoring required for existing permit compliance and by other long standing commitments for on-site groundwater monitoring. This monitoring allows for investigation and, if necessary, intervention in	Planning condition requiring compliance with the Construction and Demolition Environmental Monitoring Plan.

	the event of unexpected adverse observations.	
As above	A Construction and Demolition Environmental Management Plan has been produced and submitted with the planning application. This addresses spills and leaks, "housekeeping" including road cleaning, and dust control.	Planning condition.
As above	Minimising water ingress into open voids and appropriate management of any water extracted from voids (see **Chapter 3: The Project and its Alternatives**)	Planning condition requiring compliance with this Environmental Statement.
As above	Drainage Strategy: Implementation of an appropriate Drainage Strategy for the demolition and infilling works and post-works maintenance[11]. The approach is set out in the approved Drainage Strategy[11] and further developed in the Drainage Design Commentary document[12].	If required, SAB approval.
As above	"Waste" acceptance criteria for emplacement of demolition arisings, such that only suitable wastes and materials are used for void infill as agreed with NRW.	The revised environmental permit. This issue will be regulated by NRW.
As above	During the Works Phase, construction strategies will be implemented that will seek to maximise the reuse of excavated materials or demolition derived materials	Planning condition requiring compliance with this Environmental Statement.

[11] Mott MacDonald (2022). *ponds complex – Detailed SuDS Drainage Design Proposal (doc ref – TPC-MML-FB25-XX-T-C-0001)*. May 2022.

[12] Mott MacDonald (2023). *Trawsfynydd Decommissioning Site: ponds complex – Drainage Design Commentary* (doc ref – TPC-MML-FB25-XX-T-C-0002_Rev06). August 2023.

	that are suitable for the intended use and in accordance with the planning permission. Prior to construction, a materials management plan (MMP) will be prepared that outlines how materials will be managed to minimise environmental impacts.	

7.11 Assessment Methodology

Overview

7.11.1 The proposed generic project-wide approach to the assessment methodology is set out in **Chapter 1: Introduction**, and specifically in **Section 1.6**. Whilst this has informed the approach used in this chapter, it has been adapted as appropriate, to address the specific needs of the geoenvironmental and surface water quality guidance (see **Appendix 7A**) for use in the assessment reported in this Environmental Statement.

7.11.2 The assessment, presented in **Section 7.12,** uses as its basis the well-established process of contaminated land risk assessment under regulatory frameworks such as the planning system. Initially, potential sources of contamination, potential receptors that could be affected by the contaminant(s), and potential pathways to receptors are identified. When all three occur, there is a possible “source (contaminant) – pathway – receptor linkage". A contaminated land risk assessment will then consider the impact (also known as “severity of the consequence”) ”) of a linkage, and the likelihood that the linkage will occur based on the conceptual site model (the use of the site and surrounding area by people, the site’s environmental setting and other site specific factors such as environmental management measures), these values are combined to derive a level of risk.

7.11.3 For nuclear sites, the industry guidance typically applied to assess land contamination risks to receptors is known as NIGLQ[9] (2012) (see **paragraph 7.4.30**). This guidance is designed for assessing risks based on a current site use or a proposed future (post development) use. In this assessment, it has been used to qualitatively define likely impacts on sensitive geoenvironmental or surface water receptors, and likelihood of impacts occurring, as described in **paragraph 7.11.5**, during the Works Phase of the Proposed Development, which will last for approximately twenty-four months. The guidance defines impacts on receptors as either negligible, mild, moderate or severe, these categories have been applied in this assessment and are presented in **Table D-1** in **Appendix 7D.**

7.11.4 In the context of EIA, the question asked in the EIA regulations[13] is whether a planned development, with the mitigation measures in place, is likely to introduce

[13] The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017.

significant effects on (geo-environmental) receptors. Significant effects could potentially arise where a development would result in an increased level of risk for an existing source – pathway – receptor linkage e.g., due to disturbance to ground with pre-existing contamination, or where a development introduces new contaminants which could be released to land and pose a risk to receptors, such as bulk fuel storage with potential for leaks or spills.

7.11.5 The Proposed Development will include activities which could disturb pre-existing contamination and could introduce potential sources of contamination which could affect geoenvironmental receptors and surface water. However, the mitigation measures (see **Section 7.10**) will lower the severity of potential impacts and lower the likelihood of impacts occurring e.g., regular monitoring of the permitted discharge from an outfall should quickly identify an off-specification discharge, enabling response measures to be put in place to prevent further release and limit the volume of contaminant(s) released. Similarly implementation of best practice for pollution prevention will lower the likelihood of leaks and spills occurring or reaching the ground.

7.11.6 Since there is an established framework for contaminated land under legislative frameworks such as the planning system and environmental permitting / licensing, it would be unusual for an assessment to identify that there is potential for significant negative effects on land contamination receptors, as sufficient controls should be in place to limit the potential for future land contamination to occur. However, negative effects are possible e.g., where a development will interact with contaminants in the ground that have not been recently disturbed and where developments can make changes to ground conditions or in-ground structures which affect contaminant mobility.

7.11.7 The foundation for the assessment is the process of managing land contamination, as set out in the LCRM guidance[14] is based on risk assessment, and for the Trawsfynydd site the assessment methodology is also informed by relevant Nuclear Industry Guidance[15] for undertaking risk assessment. The assessment of risks from land contamination is based upon the identification and subsequent assessment of a contaminant linkage. A contaminant linkage requires the presence of a source of contamination, a receptor capable of being adversely affected by the contamination, and either a functioning pathway capable of exposing a receptor to the contaminant. The risk assessment aims to assess the significance of each potential contaminant linkage. The key to the classification is that the designation of risk is based upon the consideration of both of the following:

- The magnitude of the potential consequence (severity of consequence). It takes into account both the potential severity of the hazard and the sensitivity of the receptor; and
- The magnitude of probability (likelihood of consequence occurring). It takes into account both the presence of the hazard and receptor and the integrity of the pathway.

7.11.8 The LCRM guidance also advocates consideration of the effects of climate change. The Applicant is already undertaking such assessment for the

Trawsfynydd site, including for the Proposed Development, as the 2023 Hydrogeological Conceptual Site Model[5] considers the possible effects of climate change on the site's hydrogeological regime. However, given the relatively short period until the Works Phase, little of significance is expected to change by then.

7.11.9 The definitions for the qualitative risk assessment have been taken from Nuclear Industry Group for Land Quality (NIGLQ) Guidance[15]. The magnitude of the potential consequence of a contaminant linkage takes into account the sensitivity of a given receptor to a particular source or contaminant of concern under consideration. It is based on full exposure via the linkage being examined. The classification of potential severity of consequence is presented in **Table D-1** in **Appendix 7D** based on Table 5 of the NIGLQ guidance[9].

Significance evaluation methodology

7.11.10 The assessment of the significance of the potential effects of the Proposed Development due to possible impacts on environmental and surface water receptors takes into account the mitigations (as summarised in **Table 7-4**) and controls inherent in the design that will lower the likelihood that an impact will occur, and in the event that an impact does occur, limit its severity. The resulting likely worst-case impact is then used to determine the significance of the effect, based on the criteria below in **Table 7-5** and the fact that there is zero 'impact' (over and above the baseline condition) without the works occurring.

7.11.11 In the assessment of the significance of the potential effects of the Proposed Development below, the sensitivity of the receptors is also considered when defining the consequence or severity of an impact. The sensitive receptors considered in the assessment are described in **Table C-1** in **Appendix 7C**.

7.11.12 The significance evaluation methodology considers the likelihood of an effect on a receptor occurring, with the mitigation measures, and the degree of impact (which for geoenvironmental and surface water receptors is the consequence of a contaminant – pathway – receptor linkage being realised).

7.11.13 The significance evaluation methodology in **Table 7-5** shows how the significance of potential effects is derived from the degree of impact and likelihood of an impact on a receptor occurring, with the mitigation measures. As in contaminated land risk assessment, the likelihood of an impact occurring is assessed using professional judgement, taking into account the site-specific conditions, including the conceptual model, the nature of the Proposed Development, the timescales involved etc. along with the mitigation measures and controls inherent in the design which lower the likelihood of impacts occurring.

7.11.14 For example, in the assessment in **Table 7-5**, where a possible 'mild' impact is likely or very likely to occur, this is assessed to be a medium (negative) effect which is potentially significant in EIA terms, and potentially requiring further action.

Table 7-5 Geoenvironmental and surface water quality conditions effect significance evaluation matrix

Likelihood[a]	Probability	Impact – severity of consequence (degree of impact) (For full impact classification descriptions see Table D-1 in Appendix 7D)	Effect	Effect significance evaluation
Very likely/ certain	>95%	Negligible (e.g., a negligible impact could be a potentially discernible but inconsequential effect on controlled waters receptor, or people being exposed to contaminants at levels representing negligible / minimal risk to health)	Minor negative	Not significant
Likely **(45 to 95%)**	45 to 95%		Minor negative	Not significant
Unlikely	5 to 44%		Negligible to minor negative	Not significant
Very unlikely	<5%		Negligible	Not significant
Extremely unlikely	<1%		Negligible	Not significant
Very likely/ certain	>95%	Mild (e.g., a mild impact could be contaminants released to a controlled water receptor with discernible but "minimal" effect, not in breach of water quality standards, or people being exposed to contaminants in soil or other media at levels which have a low likelihood of leading to "significant harm" as defined in Part 2A of the EPA)	Medium negative	**Potentially significant**
Likely	45 to 95%		Minor to medium negative	**Potentially significant**
Unlikely	5 to 44%		Minor negative	Not significant

Very unlikely	<5%		Negligible to minor negative	Not significant
Extremely unlikely	<1%		Negligible	Not significant
Very likely/ certain	>95%	Moderate (e.g., a moderate impact could be contaminants of concern detectable above applicable groundwater quality standards in an aquifer, but not reaching a relevant assessment point, or people being exposed to contaminants in soil or other media that give rise to reasonable concern about the possibility of "significant harm" to human health as defined in Part 2A of the EPA)	Medium or major negative	**Significant**
Likely	45 to 95%		Medium negative	**Potentially significant**
Unlikely	5 to 44%		Minor to medium negative	**Potentially significant**
Very unlikely	<5%		Minor negative	Not significant
Extremely unlikely	<1%		Negligible or minor negative	(not significant)
Very likely/ certain	>95%	Severe (e.g., a severe impact could be a significant pollution incident to a surface watercourse, classified as a "high level impact" by Natural Resources Wales[16], or people being exposed to contaminants in soil or other media at levels that could reasonably be construed as	Major negative	**Significant**
Likely	45 to 95%		Major negative	**Significant**
Unlikely	5 to 44%		Medium negative	**Potentially significant**

[16] Natural Resources Wales (2017) Incident Categorisation, Reference GN019. [Online]. Available at: https://cdn.naturalresources.wales/media/682038/gn019-incident-categorisation.pdf?mode=pad. Accessed February 2024.

Very unlikely	<5%	indicative of SPOSH [significant possibility of significant harm] to human health as defined in Part 2A of the EPA)	Minor to medium negative	**Potentially significant**
Extremely unlikely	<1%		Minor negative	**Potentially significant**

[a] The likelihood of a sensitive receptor being impacted is assigned based on the mitigation measures being in place.

7.12 Assessment of potential geoenvironmental and surface water quality impacts

7.12.1 Full descriptions of the effects with potential to be significant, which are assessed below, are provided in **Table 7-3**.

7.12.2 The assessment considers the mitigation measures summarised in **Table 7-4** and the existing controls under other regulatory regimes which will have to be complied with. For brevity, the integral controls under the regulatory regimes that have informed the development of the project description, set out in **Chapter 3: The Project and its Alternatives,** as part of the design process are not presented as mitigation measures as they are already incorporated by design.

Stockpiled demolition materials

7.12.3 The Proposed Development Works Phase will require handling and stockpiling of demolition materials that have the potential to release contaminants as dust or via runoff / leaching from stockpiles, with subsequent impacts to land (to soil and subsequently groundwater) or water quality through drainage discharges. The potential for run-off from stockpiles to reach land (soil, and subsequently groundwater) will be highest where stockpiles are located on permeable ground or where run-off from hardstanding areas can drain to adjacent permeable areas. In hardstanding areas there could be potential for runoff or leachate to enter an unsuitable drainage system. The quality of runoff / leachate from stockpiles will depend on the materials being stockpiled but could include silty runoff, runoff / leachate with elevated pH (from crushed concrete).

7.12.4 The Construction and Demolition Environmental Management Plan gives the following mitigation measures:

- Temporary, secured sheeting of stockpiled material will be adopted to minimise windblown dust and rainwater run-off.
- All potentially contaminated (radiologically or otherwise) stockpiles including demolition arisings stored on impermeable hard-standings shall be bunded to prevent uncontrolled run off of contaminated water into storm drains systems. Captured run-off water will be routed for treatment prior to discharge.
- No potentially contaminated (radiologically or otherwise) stockpiles including of demolition arisings shall be stored on open, permeable ground.
- Temporary stockpiles of uncontaminated materials may be stored on open, permeable ground but only if underlain by separation and filtration membrane to prevent intermixing of waste with existing granular layers and to prevent ingress of fines.

7.12.5 **Table 7-6** identifies the potential receptors that may be affected by contaminants from stockpiled demolition materials, defines the likelihood that an effect will occur during the Proposed Development Works Phase, the maximum expected impact magnitude (with the mitigations) and the significance in EIA terms.

7.12.6 For all receptors potentially affected, the effect of the Proposed Development Works Phase will be **Negligible (Not Significant)** or **Minor Negative (Not Significant)**.

Table 7-6 Proposed Development Works Phase assessment of significance of effects from stockpiling of demolition materials

Receptor	Proposed Development Works Phase Assessment of likelihood of impact, impact magnitude (with mitigation) and significance		
	Likelihood	Impact Magnitude	Significance
People (off site)	Unlikely	Negligible Based on compliance with the measures in the Construction and Demolition Environmental Management Plan for stockpile management, groundwater and surface water monitoring limiting the duration and scale of any impact.	Negligible to minor negative (Not significant)
Controlled waters (groundwater)	Unlikely	Negligible Based on compliance with the measures in the Construction and Demolition Environmental Management Plan for stockpile management, groundwater monitoring limiting the duration and scale of any impact.	Negligible to minor negative (Not significant)
Controlled waters (surface water – Llyn Trawsfynydd)	Unlikely	Negligible Based on compliance with the measures in the Construction and Demolition Environmental Management Plan for stockpile management, groundwater and surface water monitoring limiting the duration and scale of any impact.	Negligible to minor negative (Not significant)
Controlled waters (surface water – unnamed stream)	Unlikely	Negligible Based on compliance with the measures in the Construction and Demolition Environmental Management Plan for stockpile management, groundwater and surface water monitoring	Negligible to minor negative (Not significant)

Off-site ecology utilising surface water bodies (unnamed stream)	Unlikely	Negligible Based on compliance with the measures in the Construction and Demolition Environmental Management Plan for stockpile management, groundwater and surface water monitoring limiting the duration and scale of any impact.	Negligible to minor negative (Not significant)
Off-site ecology utilising surface water bodies (Llyn Trawsfynydd)	Unlikely	Negligible Based on compliance with the measures in the Construction and Demolition Environmental Management Plan for stockpile management, groundwater and surface water monitoring limiting the duration and scale of any impact.	Negligible to minor negative (Not significant)

Changes to ground surface cover

7.12.7 The assessment considers that the Proposed Development requires changes to the existing ground surface at the cooling pond where historical leakage of radioactive effluent occurred (**see Appendix 7B**). During the Works Phase there will be a period, potentially of several months in duration, where existing hard surfacing will be removed in or down gradient of the area where leakage from the pond occurred. This change to surface cover has potential to temporarily mobilise legacy contaminants due to increased rainfall infiltration. The assessment, therefore, considers that there could be a short-term increase in legacy radioactive contamination migrating in groundwater from the ponds area.

7.12.8 The assessment for the Works Phase considers the potential for effects on surface water quality resulting from the necessary changes to ground surface cover, due to the potential for a temporary increase in the mobilisation of contaminants when hard cover is removed. Specifically, if this situation occurs in the areas of known radioactively contaminated ground just east of the ponds complex then additional contamination would subsequently enter piped drainage systems which discharge to surface water via pipes, principally to the lake, due to the presence of the trough described in **Section 7.4**. The potential also exists for groundwater to reach the northern surface water drainage route, ultimately discharging to the unnamed stream at the Northern Outlet Pipe.

7.12.9 In the baseline in **Section 7.4**, a route for groundwater from the Trawsfynydd site to reach the Northern Outlet Pipe and discharge to the unnamed stream flowing to the Afon Tafarn-helyg is described. At the cooling pond leakage area, due to the location of the historical contamination, the most likely migration route is towards the diversion culvert sump and ultimately the discharge to Llyn Trawsfynydd. As

set out in the **Construction and Demolition Environmental Management Plan**, the northern flowpath for groundwater on the Trawsfynydd site, and potential for subsequent transport of contaminants into the surface water drainage system discharging to the Northern Outlet Pipe, is to be subject to ongoing surveillance. The environmental monitoring commitments in the **Construction and Demolition Environmental Management Plan** will be reviewed and updated as required in response to the findings of the investigation, in advance of the Proposed Development.

7.12.10 However, mitigation and design measures are in place and to limit both the likelihood of the Proposed Development having an effect and the maximum expected impact magnitude (severity of consequence).To minimise any increase in migration of radioactive ground contamination in the vicinity of the ponds complex, as and when it is necessary to have new and temporary uncovered ground, this will be minimised in terms of exposed area and in terms of duration (as stated in the **Construction and Demolition Environmental Management Plan**).

7.12.11 The Works Phase ground and surface water monitoring set out in the **Construction and Demolition Environmental Management Plan**, and the routine discharge monitoring required by the site's environmental permit, will be used to provide assurance that no significant impacts to controlled waters are occurring and allow for timely investigation and intervention (if necessary) in the event of unacceptable adverse findings. The permitted discharge from the diversion culvert system is regularly monitored (with samples taken daily and bulked for analysis on a weekly basis), and compliance with the discharge limits, set by the regulators for radioactive and non-radioactive contaminants is a permit requirement.

7.12.12 **Table 7-7** identifies the potential receptors that may be affected by contaminants migrating in response to changes to surface cover during the Proposed Development Works Phase. It defines the likelihood that an effect will occur during the Proposed Development Works Phase, and the maximum expected impact magnitude (with the mitigations in place).

7.12.13 For all receptors potentially affected, the effect of the Proposed Development Works Phase will be **Negligible (Not Significant)** or **Minor Negative (Not Significant)**.

Table 7-7 Proposed Development Works Phase assessment of significance of effects from changes to ground surface cover

Receptor	Proposed Development Works Phase Assessment of likelihood of impact, impact magnitude (with mitigation) and significance		
	Likelihood	Consequence	Significance
Scenario 1: migration of groundwater to the Diversion Culvert system and Llyn Trawsfynydd			
People (off site – Llyn Trawsfynydd	Unlikely	Negligible	Negligible to minor negative

anglers, swimmers, other lake users)	(due to the size of the lake, its dilution potential, and people may not be present in an impacted area, if an impact occurs)	The environmental monitoring measures in the Construction and Demolition Environmental Management Plan, and the permitting monitoring requirements, mean that any increase in levels of radioactive contaminants in the diversion culvert drainage system should be quickly identified, and will trigger further actions / environmental protection measures, limiting the duration and scale of any impact.	(Not significant)
Controlled waters (surface water – Llyn Trawsfynydd)	Likely	Negligible The environmental monitoring measures in the Construction and Demolition Environmental Management Plan, and the permitting monitoring requirements, mean that any increase in levels of radioactive contaminants in the diversion culvert drainage system should be quickly identified, and will trigger further actions / environmental protection measures, limiting the duration and scale of any impact.	Minor negative (Not significant)
Off-site ecology utilising surface water bodies (Llyn Trawsfynydd)	Likely	Negligible The environmental monitoring measures in the Construction and Demolition Environmental Management Plan, and the permitting monitoring requirements, mean that any increase in levels of radioactive contaminants in the diversion culvert drainage system should be quickly identified, and will trigger further actions / environmental protection measures, limiting the duration and scale of any impact.	Negligible to minor negative (Not significant)
Scenario 2: migration of groundwater not captured in the Diversion Culvert system (includes potential migration to the Northern Outlet Pipe)			
People (off site)	Unlikely (limited presence of	Negligible Based on the groundwater and surface water drainage monitoring	Negligible to minor negative (Not significant)

	people offsite or use of offsite surface watercourses including the unnamed stream)	measures set out in the Construction and Demolition Environmental Management Plan, as well as further investigation of the northern flowpath for groundwater, and review and update, if required, of the groundwater and surface water drainage monitoring measures in the Construction and Demolition Environmental Management Plan.	
Controlled waters (groundwater)	Likely	Negligible Some localised additional groundwater impact is possible due to mobilisation of legacy radioactive contamination. This will be limited by the environmental monitoring measures, including monitoring of groundwater, in the Construction and Demolition Environmental Management Plan. Deterioration in groundwater quality downgradient of the ponds complex will trigger further actions / environmental protection measures, limiting the duration and scale of any impact.	Minor negative (Not significant)
Controlled waters (surface water – unnamed stream)	Unlikely	Negligible Based on the groundwater and surface water drainage monitoring measures set out in the Construction and Demolition Environmental Management Plan, as well as further investigation of the northern flowpath for groundwater, and review and update, if required, of the groundwater and surface water drainage monitoring measures in the Construction and Demolition Environmental Management Plan.	Negligible to minor negative (Not significant)
Off-site ecology utilising surface water bodies (unnamed stream)	Unlikely	Negligible Based on the groundwater and surface water drainage monitoring measures set out in the Construction and Demolition	Negligible to minor negative (Not significant)

		Environmental Management Plan, as well as further investigation of the northern flowpath for groundwater, and review and update, if required, of the groundwater and surface water drainage monitoring measures in the Construction and Demolition Environmental Management Plan.	

Construction vehicles and plant operation

7.12.14 Vehicles, plant, and machinery using liquid fuels and oils are already used within the Trawsfynydd site. However, as a result of the Proposed Development, use of these items would increase on land within the Application Site boundary. In addition, the use of vehicles and plant within areas of the Proposed Development where hardstanding is absent is likely during the Works Phase and there is some potential for leakages to reach the ground (soil and groundwater). Existing controls under other regulatory regimes that will have to be complied with have informed the development of the Project Description as part of the design process. As such, there are several measures that are an integral part of the development that will reduce the potential for impacts. However, for brevity these are not presented as mitigation measures as they are already incorporated by design.

7.12.15 **Table 7-4**Existing controls under other regulatory regimes that will have to be complied with have informed the development of the Project Description as part of the design process. As such, there are several measures that are an integral part of the development that will reduce the potential for impacts. However, for brevity these are not presented as mitigation measures as they are already incorporated by design.

7.12.16 **Table 7-4**Measures summarised within **Table 7-4** include the implementation of a **Construction and Demolition Environmental Management Plan**, which in combination with the Applicant's internal procedural controls for contractors, will minimise the potential for vehicles, plant and machinery to release oils, fuels or other contaminants to ground. This reduces the likelihood of an effect occurring and the severity of the consequence. For all receptors potentially affected the effect is, therefore, **Negligible** (**Not Significant**) or **Minor Negative (Not Significant)**.

Table 7-8 Proposed Development Works Phase assessment of significance of effects from construction vehicles and plant operation

Receptor	Proposed Development Works Phase Assessment of likelihood of impact and impact magnitude (with mitigation)		
	Likelihood	Consequence	Significance
People (off site)	Extremely unlikely (At Llyn Trawsfynydd, due to the size of the lake, its dilution potential, and people may not be present in an impacted area, if an impact occurs. Elsewhere, limited presence of people offsite or use of offsite surface watercourses including the unnamed stream.)	Negligible Based on measures in the Construction and Demolition Environmental Management Plan requiring compliance with best practice guidance for pollution prevention limiting the frequency and volumes of spills / leakages, and groundwater and surface water monitoring.	Negligible (Not significant)
Controlled waters (groundwater)	Unlikely	Negligible Based on measures in the Construction and Demolition Environmental Management Plan requiring compliance with best practice guidance for pollution prevention limiting the frequency and volumes of spills / leakages, and groundwater and surface water monitoring.	Negligible to minor negative (Not significant)
Controlled waters (surface water – unnamed stream)	Unlikely	Negligible Based on measures in the Construction and Demolition Environmental Management Plan requiring compliance with best practice guidance for pollution prevention limiting the frequency and volumes of spills / leakages, and environmental monitoring.	Negligible to minor negative (Not significant)

Controlled waters (surface water – Llyn Trawsfynydd)	Unlikely	Negligible Based on measures in the Construction and Demolition Environmental Management Plan requiring compliance with best practice guidance for pollution prevention limiting the frequency and volumes of spills / leakages, and groundwater and surface water monitoring.	Negligible to minor negative (Not significant)
Off-site ecology utilising surface water bodies (unnamed stream)	Unlikely	Negligible Based on measures in the Construction and Demolition Environmental Management Plan requiring compliance with best practice guidance for pollution prevention limiting the frequency and volumes of spills / leakages, and environmental monitoring.	Negligible to minor negative (Not significant)
Off-site ecology utilising surface water bodies (Llyn Trawsfynydd)	Unlikely	Negligible Based on measures in the Construction and Demolition Environmental Management Plan requiring compliance with best practice guidance for pollution prevention limiting the frequency and volumes of spills / leakages, and groundwater and surface water monitoring.	Negligible to minor negative (Not significant)

7.13 Conclusions of significance evaluation

7.13.1 A summary of the results of the assessment is provided in **Table 7-9**.

Table 7-9 Summary of effects – Works Phase

Receptor and potential effects	Receptor	Significance
Stockpiled demolition materials	People (off site)	Negligible to minor negative (Not significant)
	Controlled waters (groundwater)	Negligible to minor negative (Not significant)
	Controlled waters (surface water – Llyn Trawsfynydd)	Negligible to minor negative (Not significant)
	Controlled waters (surface water – unnamed stream)	Negligible to minor negative (Not significant)
	Off-site ecology utilising surface water bodies (unnamed stream)	Negligible to minor negative (Not significant)
	Off-site ecology utilising surface water bodies (Llyn Trawsfynydd)	Negligible to minor negative (Not significant)
Changes to ground surface cover	People (off site) (excluding effects due to the permitted discharge to Llyn Trawsfynydd via the Diversion Culvert caused by ingestion of, or dermal contact with, contaminants in surface water)	Negligible to minor negative (Not significant)
	People (off site) (effects due to the permitted discharge to Llyn Trawsfynydd via the Diversion Culvert caused by ingestion of, or dermal contact with, contaminants in surface water)	Negligible to minor negative (Not significant)
	Controlled waters (groundwater)	Minor negative (Not significant)
	Controlled waters (surface water – unnamed stream)	Negligible to minor negative (Not significant)

Receptor and potential effects	Receptor	Significance
	Controlled waters (surface water – Llyn Trawsfynydd)	Minor negative (Not significant)
	Off-site ecology utilising surface water bodies (unnamed stream)	Negligible to minor negative (Not significant)
	Off-site ecology utilising surface water bodies (Llyn Trawsfynydd)	Negligible to minor negative (Not significant)
Construction vehicles and plant operation	People (off site)	Negligible (Not significant)
	Controlled waters (groundwater)	Negligible to minor negative (Not significant)
	Controlled waters (surface water – unnamed stream)	Negligible to minor negative (Not significant)
	Controlled waters (surface water – Llyn Trawsfynydd)	Negligible to minor negative (Not significant)
	Off-site ecology utilising surface water bodies (unnamed stream)	Negligible to minor negative (Not significant)
	Off-site ecology utilising surface water bodies (Llyn Trawsfynydd)	Negligible to minor negative (Not significant)

Appendix 7A
Relevant planning policy, legislation, and technical guidance

Planning policy

A summary of the relevant planning policies is given in **Table A-1**.

Table A-1 Planning policy issues relevant to geoenvironmental impacts and surface water quality

Policy reference	Policy relevance
National planning policies	
Planning Policy Wales, Edition 12[1] (2024)	Section 6 (Distinctive and Natural Places) covers the environmental and cultural components of planning and states: "*Problems should be prevented from occurring or getting worse. Biodiversity loss should be reversed, pollution reduced, environmental risks addressed and overall resilience of ecosystems improved. When appropriate development is proposed, it must be taken forward in an integrated way, woven into its place/context alongside nature to ensure common issues are considered and accommodated in the early stages of plan-making or individual proposal and multiple benefits, such as green infrastructure are secured*". 6.7.16 (Location of Commercial, Industrial and other Potentially Polluting Development) states: "*Relevant considerations in making planning decisions for potentially polluting development are likely to include* [excerpt from full list only] • *effect of pollution on the natural and built environment and the enjoyment of areas of landscape and historic and cultural value;* • *impact on groundwater and surface water quality;* • *effect on biodiversity and ecosystem resilience, including where there may be cumulative impacts on air or water quality which may have adverse consequences for biodiversity and ecosystem resilience".* 6.9.18 (Land contamination) states "*Planning authorities should take into account the nature, scale and extent of land contamination which may pose risks to health and the environment so as to ensure the site is capable of effective*

[1] Welsh Government (2024). Planning Policy Wales, Edition 12. [online] Available at: https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf [Accessed 25 July 2024].

	remediation and is suitable for its intended use. In doing so, development management decisions need to take into account: *• the potential hazard that contamination presents to the development itself, its occupants and the local environment; and* *• the results of a specialist investigation and assessment by the developer to determine the contamination of the ground and to identify any remedial measures required to deal with any contamination".*

There are no local planning policies which are relevant to the scope of the geoenvironmental and surface water quality assessment.

Legislation

Table A-2 presents the relevant legislation for the assessment of the potential effects on geoenvironmental and surface water quality receptors.

Table A-2 Legislation relevant to the geoenvironmental impacts and surface water quality assessment

Legislation	Relevance
European Union (EU) Water Framework Directive (WFD) (2000/60/EC) 2000[2] **EU Groundwater Directive (GWD) (2006/118/EC) 2006[3]**	The aim of the GWD (also known as the 'groundwater daughter directive' to the WFD) is to protect groundwater against pollution caused by dangerous substances. The potential for the Proposed Development to have an effect on groundwater bodies through the introduction of hazardous substances and/or non-hazardous pollutants during demolition requires assessment. The objectives of the WFD and the GWD are implemented in Wales through The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[4], and elements of the Environmental Permitting (England and Wales) Regulations 2016[5]. Any activity with the potential to cause input of pollutants to groundwater, whether directly or via percolation through the soil, is a groundwater activity. Operators carrying out a groundwater activity must have an environmental permit or an exemption.

[2] European Commission (2000). Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy. [online] Available at: https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32000L0060 [Accessed 25 July 2024].
[3] European Commission (2006). Directive 2006/118/EC on the protection of groundwater against pollution and deterioration (Groundwater Directive). [online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0118 [Accessed 25 July 2024].
[4] UK Government (2017). The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. [online] Available at: https://www.legislation.gov.uk/uksi/2017/407/contents [Accessed 25 July 2024].

Environmental Permitting Regulations 2016 (EPR)[5]	The EPR enforces the requirements of the GWD to prevent the entry of hazardous substances into groundwater and to limit entry of non-hazardous pollutants. Any activity that results in, or might result in, the input of a pollutant directly or indirectly to groundwater is a groundwater activity and requires a permit under these regulations. It is an offence to cause or knowingly permit a groundwater activity unless authorised by a permit or registered as exempt.
Water Resources Act 1991[6] as amended by the Water Act 2003[7]	The Water Resources Act 1991[6] states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. The 1991 Act[6] was revised by the Water Act 2003[7], which provides the definition of, and regulatory controls for, the protection of water resources, including the quality standards expected for controlled waters. The 2003 Act[7] sets out the definition of controlled waters which has been used to define the scope of receptors for the assessment.
The Environmental Protection Act 1990[8]	Part 2 of the Act makes provision for the improved control of pollution arising from certain industrial and other processes. Part 2A of the Act provides the regulatory basis for the identification, designation, and remediation of Contaminated Land. Land potentially affected by historical contamination that is proposed for development requires assessment to ensure the land is suitable for the proposed land-use and that, where necessary, remediation is carried out to ensure the land cannot be determined as contaminated land under the Act[8].
The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009[9]	The Environmental Damage Regulations implement the EU directive[10] on environmental liability setting out the principles for prevention and remedy of environmental damage. Where the Proposed Development has the potential to cause pollution, the regulations place emphasis on businesses to proactively implement pollution prevention measures so that damage to the environment does not arise.

[5] UK Government (2016). The Environmental Permitting (England and Wales) Regulations 2016. [online] Available at: https://www.legislation.gov.uk/uksi/2016/1154/contents [Accessed 25 July 2024].
[6] UK Government (1991). Water Resources Act 1991. [online] Available at: https://www.legislation.gov.uk/ukpga/1991/57/contents [Accessed 25 July 2024].
[7] UK Government (2003). Water Act 2003. [online] Available at: https://www.legislation.gov.uk/ukpga/2003/37/contents [Accessed 25 July 2024].
[8] UK Government (1990). Environmental Protection Act 1990. [online] Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents [Accessed 25 July 2024].
[9] UK Government (2009). The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009. [online] Available at: https://www.legislation.gov.uk/wsi/2009/995/contents [Accessed 25 July 2024].
[10] European Commission (2004). *Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage*. [online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32004L0035 [Accessed 25 July 2024]

The Construction Design and Management (CDM) Regulations 2015[11]	Place specific duties on clients, designers, and contractors, so that health and safety is considered throughout the life of a construction project from its inception to its subsequent final demolition and removal. They include the requirement to appoint a Principal Designer and Principal Contractor to co-ordinate health and safety aspects during construction. Under CDM 2015[11], designers must avoid foreseeable risks so far as reasonably practicable by: eliminating hazards from the construction, cleaning, maintenance, and proposed use and demolition of a structure; reducing risks from any remaining hazard; and giving collective safety measures priority over individual measures. The Proposed Development will fall under the requirements of CDM[11], requiring consideration of health and safety to be incorporated into the design and at the planning stage for demolition.
The Health and Safety at Work Act 1974[12]	The Health and Safety at Work Act[12] and regulations made under the Act (notably The Management of Health and Safety at Work Regulations 1999[13]) place responsibilities upon employers to carry out a risk assessment for every work activity and to document it. Besides carrying out a risk assessment, employers also need to: make arrangements for implementing the health and safety measures identified as necessary by the risk assessment; appoint competent people to help them implement the arrangements; set up emergency procedures; provide clear information and training to employees; and work together with other employers sharing the same workplace. Land contamination may pose a hazard to groundworkers and potentially others in proximity to the demolition and infilling work. Appropriate risk assessments must be carried out and arrangements made to protect the health and safety of workers directly involved in groundworks for the Proposed Development, and other human receptors who could be affected.
The Control of Asbestos Regulations 2012[14]	Require employers to prevent the exposure to asbestos of any employee so far as is reasonably practicable. Where it is not reasonably practicable to prevent exposure, the employer must take the measures necessary to reduce exposure of any such employee to the lowest level reasonably practicable, using measures other than the use of respiratory protective equipment. To comply, in respect of asbestos-contaminated soil and construction and demolition materials, employers must consider people other than their own employees in the risk assessment

[11] UK Government (2015). The Construction (Design and Management) Regulations 2015. [online] Available at: https://www.legislation.gov.uk/uksi/2015/51/contents [Accessed 25 July 2024].
[12] UK Government (1974). Health and Safety at Work etc. Act 1974. [online] Available at: https://www.legislation.gov.uk/ukpga/1974/37/contents [Accessed 25 July 2024].
[13] UK Government (1999). The Management of Health and Safety at Work Regulations 1999. [online] Available at: https://www.legislation.gov.uk/uksi/1999/3242/contents/made [Accessed 25 July 2024].
[14] UK Government (2012). The Control of Asbestos Regulations 2012. [online] Available at: https://www.legislation.gov.uk/uksi/2012/632/contents [Accessed 25 July 2024].

	required by Regulation 6, and in the action taken to prevent or control exposure required by Regulation 11. The other key regulation relevant to the Proposed Development is the requirement under Regulation 16 to prevent or reduce the spread of asbestos. Every employer must prevent or, where this is not reasonably practicable, reduce to the lowest level reasonably practicable, the spread of asbestos from any place where work under the employer's control is carried out.
Well-being of Future Generations (Wales) Act 2015[15]	The Well-being of Future Generations Act[15] makes provision requiring public bodies to support the pursuit of economic, social, environmental and cultural well-being of Wales through sustainable development. A separate technical document[16] provides technical descriptors for the fifty national indicators set forth to support the legislation. Indicator No.45 is described as: '*Percentage of surface water bodies and groundwater bodies achieving good or high overall status'* and relates back to good water status as presented in the WFD.

Technical guidance

A summary of the relevant technical guidance with respect to geoenvironmental impacts and surface water quality assessment is given in **Table A-3**.

Table A-3 Technical guidance relevant to geoenvironmental impacts and surface water quality

Guidance	Relevance
The Environmental Protection Act 1990: Contaminated Land Statutory Guidance for Wales (2012)[17] **and Radioactive Contaminated Land Statutory Guidance for Wales (2012)**[18]	Sets out how local authorities should implement the Part 2A regime, including how they should approach deciding whether land is contaminated land as referred to in the EPA 1990[8]. It also elaborates on the remediation provisions of Part 2A, such as the goals of

[15] UK Government (2015). Well-being of Future Generations (Wales) Act 2015. [online] Available at: https://www.futuregenerations.wales/about-us/future-generations-act/#:~:text=The%20Well%2Dbeing%20of%20Future%20Generations%20Act%20requires%20public%20bodies,health%20inequalities%20and%20climate%20change [Accessed 25 July 2024].

[16] Welsh Government (2021). Well-being of Wales: national indicator technical descriptions and data links. [online] Available at: https://gov.wales/well-being-wales-national-indicator-technical-descriptions-and-data-links. [Accessed 25 July 2024].

[17] Welsh Government (2012). Contaminated Land Statutory Guidance – 2012. [online] Available at: https://gov.wales/sites/default/files/publications/2019-08/contaminated-land-statutory-guidance-2012.pdf [Accessed 25 July 2024].

[18] Welsh Government (2012). Radioactive Contaminated Land Statutory Guidance for Wales – 2012 (2013-6) [online] Available at: https://gov.wales/sites/default/files/publications/2019-07/rclguidance0613.pdf [Accessed 25 July 2024].

	remediation, and how regulators should ensure that remediation requirements are reasonable.
Land Contamination Risk Management (LCRM) (2020)[19]	Provides the technical framework for applying a risk management process when dealing with land affected by contamination.
CIRIA Report C692: Environmental Good Practice on Site (2010)[20]	Provides practical advice about managing construction works on site to minimise environmental impacts.
BS6031: 2009 Code of practice for earthworks (2009)[21]	Provides recommendations and guidance for unreinforced earthworks forming part of general civil engineering construction, except for dams. This standard also gives recommendations and guidance for temporary excavations such as trenches and pits.
Approach to Groundwater Protection (2018)[22]	This guidance has been adopted by Natural Resources Wales (NRW) and outlines the Environment Agency's approach to groundwater protection, updating its previous groundwater protection principles and practice GP3[23].
Land contamination groundwater compliance points: quantitative risk assessments (2017)[24]	This guidance has been adopted by NRW and outlines the Environment Agency's guide on to how to select compliance points for the assessment of risks to groundwater from land contamination. It requires the 'prevent and limit' requirements of the WFD[4] and the GWD to be met and states:

[19] Environment Agency (2021). Land contamination risk management (LCRM). [online] Available at: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm,[Accessed 25 July 2024].
[20] CIRIA (2010). Report C692: Environmental Good Practice on Site. CIRIA; London, UK.
[21] British Standards Institute (2009). BS6031: 2009 Code of practice for earthworks. BSI; London, UK.
[22] Environment Agency (2018). The Environment Agency's approach to groundwater protection, February 2018 Version 1.2. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692989/Envirnment-Agency-approach-to-groundwater-protection.pdf [Accessed 25 July 2024].
[23] Environment Agency (2013). Groundwater protection: principles and practice GP3. [online] Available at: https://www.gov.uk/government/publications/groundwater-protection-principles-and-practice-gp3 [Accessed 25 July 2024].
[24] Environment Agency (2017). Land contamination groundwater compliance points: quantitative risk assessments. [online] Available at: https://www.gov.uk/guidance/land-contamination-groundwater-compliance-points-quantitative-risk-assessments [Accessed 25 July 2024].

	"Where pollutants are in the soil and haven't entered groundwater, you must take all necessary and reasonable measures to: *• prevent the input of hazardous substances into groundwater* *• limit the entry of non-hazardous pollutants into groundwater to avoid pollution, deterioration in the status of groundwater bodies and to prevent sustained and upward trends in pollutant concentrations in groundwater".*
UK Government Groundwater protection technical guidance (2017)[25]	Guidance relevant to planners and applicants for environmental permits, and landowners concerned with the quality and quantity of groundwater in relation to activities (including construction) that could lead to the input of substances to ground which could affect the quality or quantity of groundwater.
UK Government guidance on the requirement for an Environmental Permit (2020)[26]	In relation to construction/ demolition work, the guidance provides a link to the list of exclusions and exemptions, if planned work does not fit into these categories then an environmental permit is needed if the following activities are to be carried out: *"a stand-alone water discharge activity that involves releasing polluting liquids to surface water such as rivers or streams; and a stand-alone groundwater activity that involves releasing polluting liquids directly or indirectly to water underground."*
Industry Guidance, Qualitative Risk Assessment for Land Contamination, including Radioactive Contamination (2012)[27]	Guidance for practitioners in the nuclear sector on the methodology for qualitative risk assessment (QLRA) of land

[25] Environment Agency (2017). Groundwater protection technical guidance. [online] Available at: https://www.gov.uk/government/publications/groundwater-protection-technical-guidance [Accessed 25 July 2024].
[26] Environment Agency and Department for Environment, Food & Rural Affairs (DEFRA) (2020). Guidance Check if you need an environmental permit. [online] Available at: https://www.gov.uk/guidance/check-if-you-need-an-environmental-permit [Accessed 25 July 2024].
[27] Nuclear Industry Group for Land Quality (2012). Qualitative Risk Assessment for Land Contamination, including Radioactive Contamination Available at: http://www.safegrounds.com/pdfs/NIGLQ%20QLRA%20Guide_V1_1_13_06_12.pdf [Accessed 25 July 2024].

	contamination. It covers both non-radioactive and radioactive contamination.
Management of radioactive waste from decommissioning of nuclear sites: Guidance on Requirements for Release from Radioactive Substances Regulation (RSR) (2018)[28]	Guidance on the process of decommissioning and release of the site from RSR. The document highlights that after revocation, any residual contamination of land once covered by the environmental permit subsequently would become subject to the contaminated land regulatory regime. The management of radioactive contamination and radiological issues over the long-term are primarily addressed in Chapter 9: Long-term Radiological and Non-radiological Impacts.
Radioactive Substance Regulation (RSR) guidance for nuclear sites undergoing decommissioning (2024)[29]	Guidance for the operators of nuclear sites in England and Wales undertaking decommissioning work under radioactive substances activity environmental permit. The guidance focusses on decommissioning activities and sets out requirements for operators before and during decommissioning.
Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction. V1.1 (2014)[30]	Guidance for developers, their consultants and environmental health practitioners on how to undertake a construction impact assessment (including demolition and earthworks as appropriate). Emphasis is on identifying mitigation measures appropriate to the risk.

[28] Joint Regulators (2018), Management of radioactive waste from decommissioning of nuclear sites: Guidance on Requirements for Release from Radioactive Substances Regulation. Available at: https://www.sepa.org.uk/media/365893/2018-07-17-grr-publication-v1-0.pdf. [Accessed 25 July 2024].

[29] Environment Agency and Natural Resources Wales, (2024). *RSR guidance for nuclear sites undergoing decommissioning*. [Online] Available at: [Accessed 25 July 2024].

[30] Institute of Air Quality Management (2014). Guidance on the assessment of dust from demolition and construction. V1.1. [online] Available at: https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf [Accessed 25 July 2024].

Appendix 7B.1 Hydrogeology

7.13.2 BGS information[17] shows that the Rhinog Sandstone and Mudstone Formation (Rhinog Grits) is classed as a secondary A aquifer. There are no superficial deposits within the Application Area , and groundwater in the made ground is not classified as an aquifer.

7.13.3 The Trawsfynydd site lies within the Llyn and Eryi groundwater body, which was classified by NRW as having overall 'poor' quality in 2021[14]. However, relating to chemistry, the quantitative status was good. This is applicable to the entire catchment, which extends beyond the Study Area, and does not reflect the Trawsfynydd site-specific groundwater quality.

7.13.4 There are no groundwater abstractions for potable use within the Application Site boundary or in the Study Area. There is a groundwater abstraction system external to the south wall of Reactor 1. This was commissioned in 2021 to minimise the ingress of water to the reactor basement. Water is pumped from five boreholes and discharged to a holding tank, then flows through a plated interceptor. The plated interceptor discharges through a settlement tank and then under gravity to surface water manhole MH142, located at the southeast corner of Reactor 1. Once in the surface water drainage it is conveyed to MH103 and then to Llyn Trawsfynydd via an oil interceptor and the diversion culvert.

7.13.5 The ponds complex and reactors are located on a platform constructed by excavation into the lower slopes of Craig Gyfynys. In such a setting, groundwater flow can, in general, be expected to be from the bedrock up into the overlying made ground. Given the relative transmissivities of the bedrock and made ground, the upward flow of groundwater can be expected to be small compared with the flow in the made ground recharged by infiltrating water from the surface.

7.13.6 Groundwater is not expected to flow from bedrock into the made ground everywhere. Where the rock-head is high, such as in locations where it was not excavated during construction, groundwater cannot discharge to the overlying made ground because it is unsaturated but flows horizontally in the bedrock until it reaches locations where the rock-head is below the water table in the made ground. Likewise, where the groundwater head in made ground is locally higher than in the underlying bedrock, groundwater is prevented from flowing from the bedrock into the made ground. Conversely, where the water table in the made ground is lower than the head of groundwater in the underlying bedrock, groundwater flows from the bedrock to the made ground.

7.13.7 The rock fill is comprised of a range of material from large boulders to clay. Based on previous investigations and the 2023 Hydrogeological Conceptual Model[5], the made ground can be generally described as permeable.

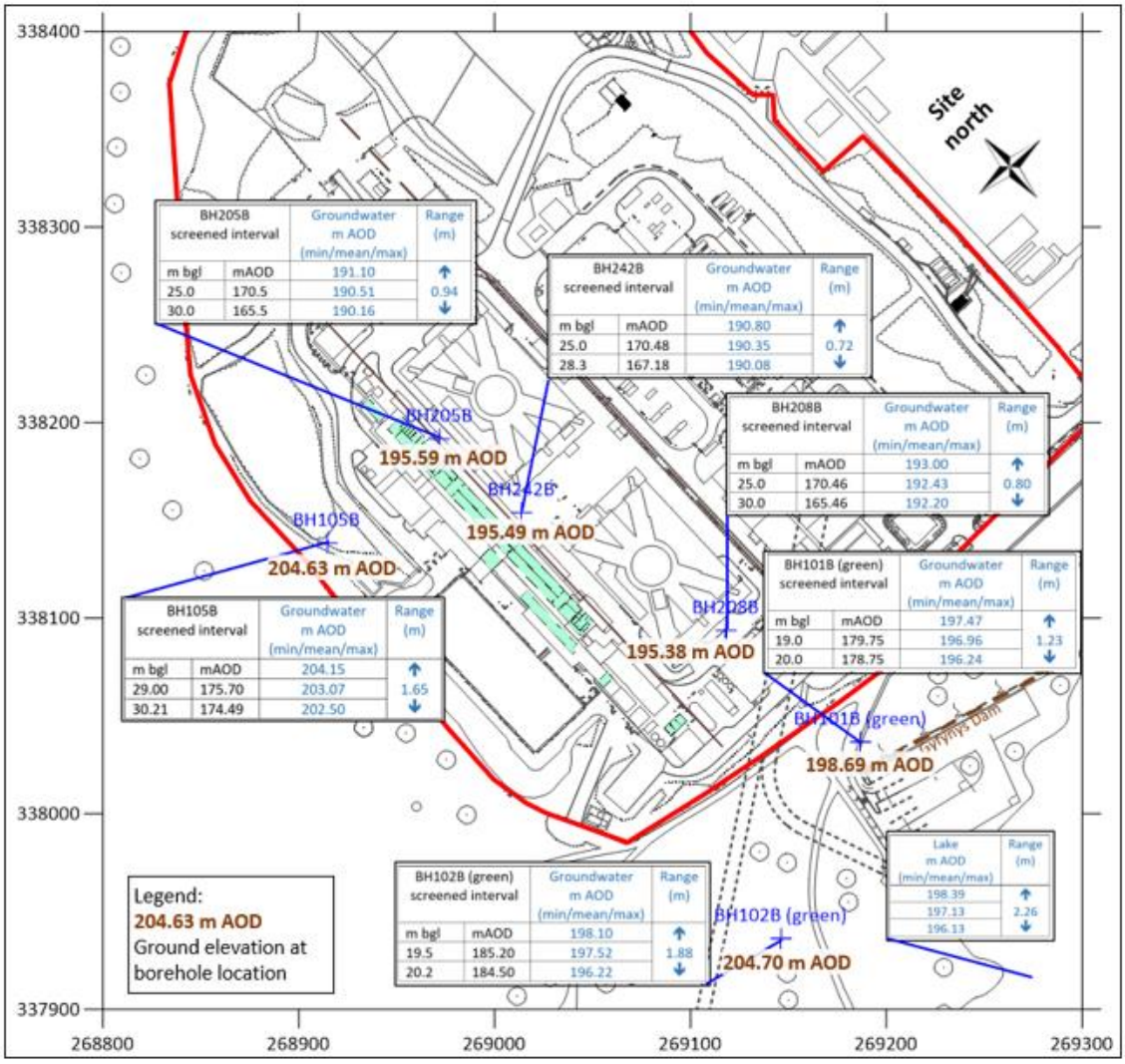
[17] British Geological Society (BGS), (n.d.). Aquifer Designation Date. [online] Available at: https://www.bgs.ac.uk/datasets/aquifer-designation-data/ [Accessed 10 November 2023].

7.13.8 The bedrock is typically low permeability and allows groundwater flow only where fractures are present. Fractures are typically more frequent closer to the bedrock surface and less frequent at depth.

7.13.9 Groundwater level (**Graphic 7.4**) in the near surface bedrock near Llyn Trawsfynydd is determined by the lake level, except downstream of the dams where the dams are almost completely successful in preventing the level being transmitted to the ground. The lake is the dominant control on the groundwater elevation in the bedrock immediately south of the Trawfynydd site (as observed in BH102B, shown on **Graphic 7.4**, and to a lesser extent BH101B). Near groundwater drains that are below the water table (such as that leading to MH6) and in drained made ground (e.g., below Reactor 1) groundwater levels are nearly constant over time. Variations in groundwater level are likewise prevented close to the springs on Roadway 5. Elsewhere made ground groundwater levels respond clearly and quickly to rainfall. South of Reactor 1 the response appears to be accentuated by leakage from surface water drains.

7.13.10 The main flows of water into ground on the Trawsfynydd site are infiltration into unpaved ground and near surface flow (in drift) from Craig Gyfynys. Of secondary importance is the upward flow from deep bedrock (of water that has recharged on Craig Gyfynys) and leakage from surface water drains. Most groundwater discharges into groundwater drains although the magnitude of this flow is uncertain since the only currently available estimate is based on a short campaign of measurement in 1997. Of secondary importance is the discharge to ground at, and flow in, the ground across the eastern Site boundary.

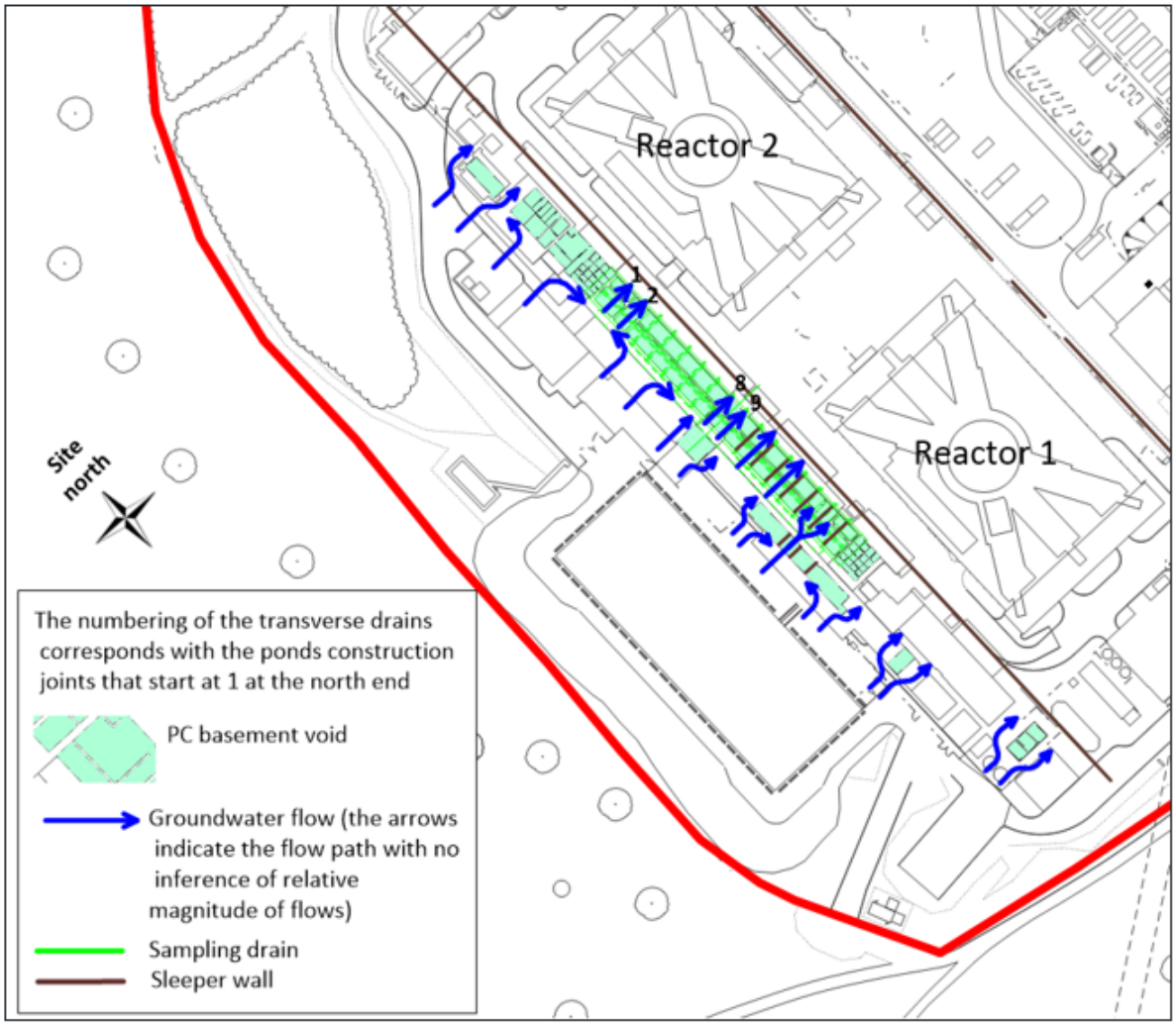
Graphic 7.2 Summary of Groundwater Levels in Bedrock at Approximately 20 m bgl to 30 m bgl



7.13.11 A series of packer tests has shown that the bedrock at the Trawsfynydd site decreases in permeability with depth, that the hydrogeological unit is controlled by fractures, and that the hydraulic conductivity is typically low but highly variable and heterogeneous. For example, a hydraulic conductivity range was recorded in borehole BH104 of $1.2x10^{-6}$ to $9.9x10^{-7}$ between 12.9 to 20.3m bgl followed by results too low to analyse at the base of the borehole at 30.4m. BH104 is located south of the ponds complex as shown on **Figure 7.3**.

7.13.12 Groundwater flows (see **Graphic 7.5**) onto the Trawsfynydd site from the south-west and from the west of the Gyfynys Dam. Shallow groundwater flow is influenced by sub-surface structures including the reactor building foundations and cooling water culverts. Spring lines are noted on the north-west boundary of the Trawsfynydd site as well as close to the reservoir outfall on the south side of the Trawsfynydd site.

Graphic 7.3 Flow of Groundwater where Concrete Structures Provide a Flow Barrier



Groundwater occurrence and flow from the ponds complex to other controlled waters receptors

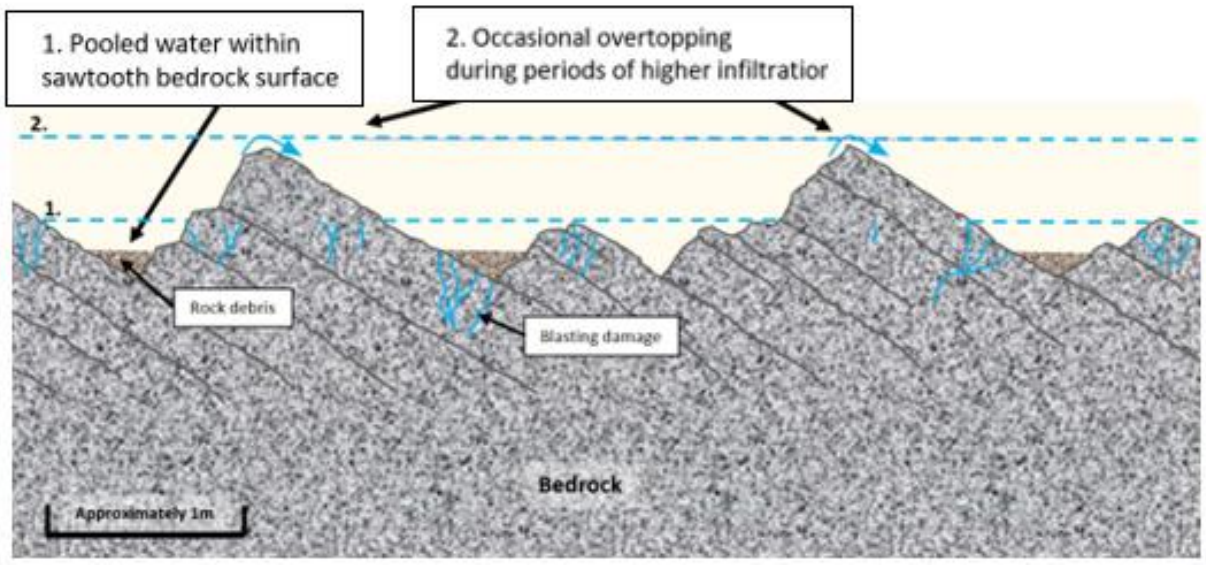
7.13.13 The following **paragraphs (7.13.14 to 7.13.23)** describe groundwater occurrence and flow downgradient of the ponds complex under current conditions. The summaries are based on the 2023 Conceptual Site Model[5] and are intended to illustrate the potential migration pathways for contaminants in groundwater at the Proposed Development to migrate to other controlled waters receptors within the study area.

Groundwater Occurrence and Flow Immediately East of the Northern ponds complex Structures

7.13.14 Mobile groundwater occurs in made ground in pools on the rock-head topography in an approximately 3m wide zone between the east side of the ponds complex and the western Goliath track wall. Where rock-head in this zone is high, the water table is in bedrock and groundwater is relatively immobile. The western Goliath track wall has the potential to be a barrier to groundwater flow in made ground but apertures, perhaps including purpose-built drainage pipes, may explain how groundwater is able to pass through it.

7.13.15 The water table does not fall steadily from north to south along the west side of the Goliath Track south of the north FED vaults. It is interpreted that groundwater pools on the rock-head sawtooth topography. Following rainfall, water is inferred to fill the pools and cascade from one small topographic depression in the rock-head to another in the transmissive made ground (see **Graphic 7.6**).

Graphic 7.4 Groundwater interaction with rock-head at the Goliath track



7.13.16 There is currently no groundwater level information immediately east of the ponds complex structures from the north FED vaults to the Active Waste Vaults, but groundwater flow is expected to also follow the fall of the rock-head and this is inferred from pre-construction borehole information to be to the north.

Groundwater Occurrence and Flow Between Reactor 2 and Reactor 1

7.13.17 Groundwater that passes through the parts of the western Goliath track wall north of the south ponds lanes flows in made ground close to rock-head into a groundwater drain flowing north to south between Reactor 2 and Reactor 1 into the groundwater drains around Reactor 1.

Groundwater Occurrence and Flow Beneath Reactor 2

7.13.18 Reactor 2 is founded on bedrock and its external walls are expected to be a barrier to groundwater flow in the made ground. Bedrock groundwater discharges into the unlined Reactor 2 west sub-floor void when bedrock groundwater levels are higher than the local rock-head. The low transmissivity of the bedrock means that little lateral flow of groundwater is expected in the footprint of Reactor 2.

Groundwater Occurrence and Flow Around the South Side of Reactor 1

7.13.19 Groundwater around the Final Delay Tanks and south of Reactor 1 flows over rock-head and in the absence of the current dewatering system would pool against the south wall of Reactor 1. Whilst the current groundwater pumping arrangements are in place, the made ground adjoining the Reactor 1 south basement is kept dry and groundwater is transferred to the surface water drainage system. When not pumped, the groundwater probably flows

out of this pooled area along the southern part of the groundwater drain along the west side of Reactor 1 (and thence into made ground beneath the northern part of the Reactor building) and/or to made ground to the north and east, possibly being diverted by the solid part of the eastern Goliath track wall and/or the cooling water culverts towards the drain leading to MH6.

Groundwater Occurrence and Flow East of the Southern Ponds Complex Structures, Beneath Reactor 1

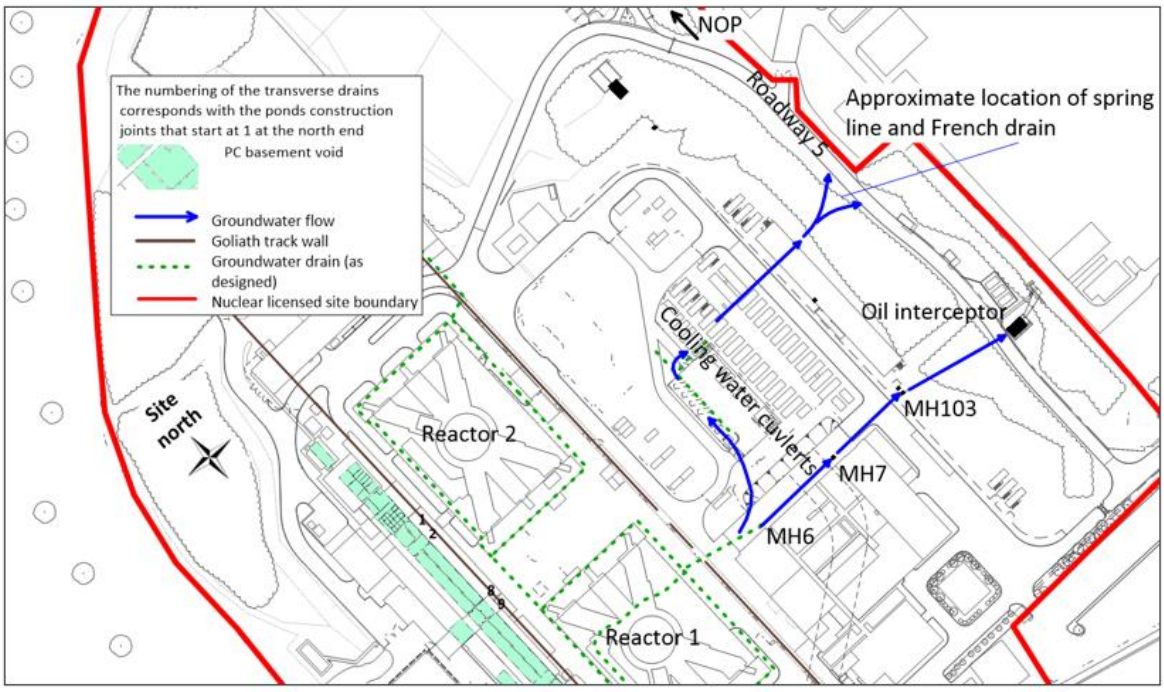
7.13.20 Groundwater on the west side of Reactor 1, and north of a rock-head high close to the southwest corner of Reactor 1, is expected to flow northwards in made ground into a made ground filled rock-head trough that extends beneath the AETP basement, south ponds lanes and Reactor 1, guided by the rock-head topography and western Goliath track wall.

7.13.21 Groundwater flow in the trough is from west to east in made ground and drains. As is interpreted to be the case east of the northern ponds complex structures, flow is interpretated to take place through undocumented purpose-built drainage holes in the western Goliath track wall and, at least locally, beneath it in bedrock.

Groundwater Flow to MH6 and to Surface Water

7.13.22 Most of the groundwater passing through the made ground filled rock-head trough and around the east side of Reactor 1 is captured by the pipe leading from the groundwater drain on the east side of Reactor 1 into the main storm drain at MH6 (see **Graphic 7.5**). The flow rate has been measured in a short campaign in 1997 and found to be between 1.3 and 1.7 l/s. From MH6, the intercepted groundwater drains by gravity through solid pipes to MH7 and on into MH103. The storm drain then runs from MH103 to the Diversion Culvert via the Main Drains Oil Interceptor and the Diversion Culvert Pump Sumps. From there, water is currently pumped via Diversion Culverts No. 3 and No. 4 and is discharged via pipes to Llyn Trawsfynydd.

Graphic 7.5 Flow of Groundwater from MH6



Groundwater Flow Beneath the former Turbine Hall to the Spring Line on Roadway 5

7.13.23 Groundwater not intercepted by groundwater drains feeding into MH6 is inferred to flow eastwards via a ‘saddle’ in the rock-head topography under the west side of the Turbine Hall. Beyond the ‘saddle’ in rock-head, groundwater flow is inferred to follow the rock-head topography until it reaches the cooling water culverts. Here, it is probably collected by a drainage pipe that runs along the west side of the cooling water culverts within the former Turbine Hall footprint before passing through a west-east pipe beneath the northern part of the culverts. It then flows over the falling rock-head towards a spring line located at the foot of the bank on the west side of Roadway 5 (see **Graphic 7.5**). The groundwater seepage is captured by road gulley drains and a French drain installed at the spring line and flows in surface water drains to the Northern Outlet Pipe where it discharges to the unnamed stream running off Craig Gyfynys.

Appendix 7B.2
Extant Contaminated Land: Risk Estimation and Risk Evaluation

Baseline Contaminated Land

Land contamination has been identified within the Proposed Development boundary, predominantly caesium-137, strontium-90 and tritium originating from storing irradiated fuel in the cooling ponds, which were subject to leakage to ground. Contamination of the ponds structure, the underlying sampling drains and the made ground (rock fill) adjoining and beneath the ponds has occurred. Ongoing groundwater monitoring records radiological contamination in groundwater, which has been shown to decrease over time.

Radiological contamination from leakage at the cooling pond, first identified in 1983, migrated northwards and southwards, including beneath sub-surface structures, towards the Reactor Building 1 and Reactor Building 2 groundwater drains, which discharge along with the main site storm drain system via the Main Drains Oil Interceptor and the Diversion Culvert pumping sump to Llyn Trawsfynydd. Radiologically contaminated water was also identified at the spring line within the down-gradient part of the Trawsfynydd site, which is captured by a pumping sump (formerly known as 'Pwmp Dail') which loops the water back to the storm drain system at the Main Drains Oil Interceptor[1] and thence via the Diversion Culvert to Llyn Trawsfynydd.

Non-radiological contaminants of potential concern may also be present within the Proposed Development boundary associated with the following activities/areas:

- Resin and sludge vaults, water treatment bays and laundry pump room (potential for hydrocarbons including oils or fuels); and
- Workshop, mask wash cleaning facility (potential for solvent contamination).

Though not considered to be "contaminated land" as such, NRW data[2] shows a historical licensed landfill is located within the north of the Proposed Development boundary (shown on **Figure 7.4**). The NRW data indicates the following waste categories apply: inert, industrial, household, special and liquid/sludge, and that the landfill was licensed to the Central Electricity Generating Board. Information held by the Application details that this landfill dates from the early 1960s and was licensed in the 1970s and 1980s; it is identified in the land contamination inventory for the Trawsfynydd site as a non-radiological source. It is also identified as including asbestos disposal cells[3]. This feature is shown on NRW's DataMapWales website[2] as partially within the north of the Proposed Development boundary. The Applicant holds records of an asbestos burial area in the vicinity of the NRW landfill area. The ground in this area is partly surfaced with hardstanding and partly unpaved.

The current risk levels to human health for members of the public (outside of the Trawsfynydd site - excluding radiological contaminants in relation to human health*) and

[1] History and geometry of leakage form cooling pond Section 4 of Golder, 2021. Interpretation of radioactive contamination of ground and groundwater. 1780044.623/A1.
[2] Welsh Government (2022). Data map Wales. https://datamap.gov.wales/ [Accessed 20 October 2022].
[3] Mott Macdonald (2022) Trawsfynydd Decommissioning Site Ponds Complex - Detailed SuDS Drainage Design Proposal (Rev P01).

controlled waters from land contamination have been assessed by Golder[4] as set out below. This applies the 'short-term' risk defined by Golder4. These risks are considered to reflect the baseline risk levels to human health and environmental receptors from known or potential land contamination at the Trawsfynydd site, based on identified potential (contaminant) source – pathway – receptor linkages.

* Risks to human health (including offsite receptors) from radiological contaminants were defined as outside the scope of the 2020 QLRA[4] due to having been addressed separately by Magnox via the safety case under Licence Condition 14 of Magnox, 2018, Care and Maintenance Safety Case: Stage Submission 4, Land Quality, Reference NP/SC 5226 Rev1 Add2 Rev1, December 2018. However, in Chapter 7 of the Environmental Statement radiological contaminants have been included for completeness in relation to the assessment of potential human health effects due to temporary activities which will be undertaken during the Proposed Development Works Phase and have potential to interact with legacy ground contamination.

Risk Estimation and Risk Evaluation

A summary of the Golder, 2020[4] risk estimation and risk evaluation is given in Table B-1.

The 2020 QLRA[4] identifies Areas of Potential Concern (APCs) and assigns relevant potential contaminants for each APC by contaminant type, comprising of: organic contaminants (e.g., hydrocarbons), inorganic contaminants (e.g., metals), radiological contaminants, and asbestos containing materials (ACMs). For some APCs only one contaminant type is applicable, and for others a combination of these contaminant types is relevant. Golder also notes in the QLRA that the receptors are sufficiently distant from the sources that linking pathways overlap and relevant pollutant linkages cannot be geographically separated e.g., contaminants migrating from various sources migrating in the same groundwater body. The assessment of risk to each receptor considers each potential pollutant linkage and assumes that the pathway exists for all relevant APCs. In taking this approach, the cumulative risk to each receptor from all relevant APCs (and associated contaminant types) is assessed in the 2020 QLRA. As noted above, asbestos is only considered in relation to human health impacts via the inhalation pathway, and radiological contaminants were excluded from the scope of the 2020 QLRA in relation to human health.

[4] Golder (2020) Trawsfynydd Site: 2020 Update of the Land Quality Qualitative Risk Assessment (Ref. 19123725.605/A.1, September 2020).

Table B-1 Summary of Risk Estimation and Risk Evaluation (summarised from Golder, 2020[4])

Receptor Group	Source	Pathway	Severity of consequence	Likelihood of a contaminant linkage	Risk (short term)	Comment on confidence
Human health – members of the public (outside the Trawsfynydd site)	Asbestos present in dust derived from ground with incomplete hardstanding cover, or as redistributed by burrowing animals or surface run-off	Inhalation of asbestos fibres	Moderate	Extremely unlikely	Very low	Current conditions well understood
	Non-radiological contaminants present in dust derived from ground with incomplete hardstanding cover, or as redistributed by burrowing animals or surface run-off	Inhalation, ingestion or direct contact	Mild	Very unlikely	Very low	Current conditions well understood
	Contaminants adhered to or taken up by fruit or vegetables, or through the food chain (via contaminant migration in windblown dust)	Ingestion	Mild	Very unlikely	Very low	Current conditions well understood
	Contaminants adhered to or taken up by fruit or vegetables, or through the food chain (via	Ingestion	Negligible	Unlikely	Very low	Current conditions well understood

	contaminant migration in surface water)					
	Contaminants present in surface water	Ingestion or direct contact	Negligible	Unlikely	Very low	Current conditions well understood
Controlled waters: groundwater	Contaminants on the Trawsfynydd site migrating vertically and / or horizontally to groundwater	Infiltration Leaching	Mild	Unlikely	Low	Further targeted groundwater sampling and assessment may result in decreased risk
	Non aqueous phase liquid (NAPL)	Migration	Moderate	Extremely unlikely	Very low	Current conditions well understood
	Contaminants entering drainage system and associated non-permitted outfalls	Migration in drainage infrastructure, then surface water	Negligible	Likely	Very low	Current conditions well understood

Appendix 7C
Risk Estimation and Risk Evaluation

1.1.1 The potential geoenvironmental and surface water quality receptors that require assessment for potentially significant effects as a result of the Proposed Development are identified below in **Table C-1**.

1.1.2 The geoenvironmental and surface water quality receptors that are unlikely to be significantly affected by the Proposed Development and are therefore scoped out of further assessment are summarised below in **Table C-2.**

Table C-1 Receptors requiring assessment

Receptor group	Receptors included within group	Justification for inclusion
Human health	Members of the public (outside of the Trawsfynydd site).	As almost all groundwater and run off in the ponds area, and all run off in the northern part of the Application Site, is directed to Llyn Trawsfynydd as a permitted discharge, any impacts during the Works Phase on members of the public are limited to being negligible (through compliance with permit conditions and dilution in Llyn Trawsfynydd).
Controlled waters	Shallow groundwater – Superficial deposits including rock fill Rhinog Grits – Low permeability bedrock Surface water –Llyn Trawsfynydd, Gwylan stream and Afon Tafarn-helyg.	Potential impacts on groundwater and surface water quality (radiological and non-radiological), e.g. from rainfall contacting demolition material stockpiles, spills, or removal of hard cover potentially mobilising existing ground contamination.
Ecology	Biota using the lake and downstream water courses	Potential impacts via groundwater and surface water. However, as almost all groundwater and run off in the ponds area, and all run off in the northern part of the Application Site, is directed to Llyn Trawsfynydd as a permitted discharge, any impacts during the Works Phase on local watercourse ecology are limited to being negligible (through compliance with

		permit conditions and dilution in Llyn Trawsfynydd).

Table C-2 Receptors not requiring assessment

Receptor group	Receptors within group	Justification for exclusion
Hydrogeology	Water Groundwater resources (quantity and flow of groundwater).	Though the works will include temporary removal of hard cover for the installation of the new drainage arrangements associated with the capping slab as well as grouting of under ponds drains numbered 3 to 6 and 10 to 11, effects on groundwater flow quantity and direction impacting on groundwater as a resource for abstraction or provision of base flow to surface watercourses are scoped out on the basis that there will be no significant change. No de-watering (other than of any small volumes of water accumulating in the ponds voids) is proposed, and the high hydraulic conductivity/transmissivity of the made ground means that any temporary removal of ground cover would have spatially and temporally limited effects.
Geology, soil and geodiversity	Soils / geology / geodiversity.	There are no designated geological sites within the Study Area. Even if there were to be temporary increased mobilisation of existing radioactively contaminated land due to removal of hard cover, this will not increase the area of land affected by contamination.
Land contamination: Property	On-site properties. Off-site properties.	On-site properties will be protected through works management, e.g. barriers, controlled vehicle and plant routes etc. Ground gas migration: no significant change in below ground conditions resulting from the Proposed Development. No putrescible or organic materials being introduced into the sub-surface environment. No other geology, hydrogeology or contaminated land mechanisms for harm to property are present connecting the Proposed

		Development to off-site properties located within the Study Area.

Appendix 7D
Classification of Consequences

Classification of Consequences

The classification of consequences is presented in **Table D-1**. This uses the definitions of consequences in Table 5 of the Nuclear Industry Group for Land Quality (NIGLQ)[1].

[1]NIGLQ, (2012). Qualitative Risk Assessment for Land Contamination, including radioactive contamination. V1.1. [online] Available at http://www.safegrounds.com/pdfs/NIGLQ%20QLRA%20Guide_V1_1_13_06_12.pdf [Accessed 10 November 2023].

Table D-1 Classification of consequence (impacts)[a]

Classification	Human health (radiological)[a]	Human health (non-radiological)	Controlled waters (aka "the water environment", including abstractions)	Flora and fauna (ecological systems)
Negligible	**The public** Less than of order 0.01 mSv y^{-1}, were exposure to occur. This level corresponds to a risk of death of 10^{-6} y^{-1}, as defined by the Radioactive Substances (Basic Safety Standards Direction) (England and Wales) Direction 2000 and is not subject to any regulatory controls. May be demonstrated by presence of exposed soils with no or only localised exceedence of generic radionuclide assessment criteria (GRAC) for scenarios applicable to site use for 0.01 mSv y^{-1}.	**All humans** People being exposed to contaminants in soil or other media at levels that represent negligible/minimal risk to human health. No perceptible nuisance. If quantitative data were available, this could be demonstrated by non-exceedance of background/normal levels, or GACs[2] for threshold substances.	"Negligible" pollution is what a regulator would typically regard as a potentially discernible but inconsequential effect, such as: • Contaminants of concern detectable in a water environment receptor at levels indistinguishable from local background levels. • Contaminants of concern detectable in groundwater in unproductive strata, but below applicable water quality standards.	Any ecological system or living organism forming part of such a system being exposed to contaminants in soil or other media at levels that could not lead to "significant harm" to an ecological system as defined for the Environmental Protection Act EPA90, Part 2A[3]
Mild	**The public** Of order 0.01 – 0.1 mSv y^{-1}, were exposure to occur. May be demonstrated by presence of exposed soils with no or only localised exceedence of GRAC for scenarios applicable to site use for 0.1 mSv y^{-1}.	**All humans** People being exposed to contaminants in soil or other media at levels with acceptably low likelihood of leading to "significant harm" to human health as defined for the EPA90, Part 2A16 ["Acceptably low likelihood" of significant harm being in the situation of people actually being exposed].	"Mild" pollution is what a regulator would typically regard as a discernible but "minimal" effect, such as: • A borderline Category 3/4 incident affecting surface water, as defined in the Environment Agency's (EA's) CICS. • Contaminants of concern detectable in groundwater in aquifer strata, but below applicable water quality standards. • A borderline Category 3/4 incident affecting a potable abstraction, as defined in the EA's Common Incident Classification Scheme (CICS)[4].	Any ecological system or living organism forming part of such a system being exposed to contaminants in soil or other media at levels with acceptably low likelihood of leading to "significant harm" to an ecological system as defined for the EPA90, Part 2A ["Acceptably low likelihood" of significant harm being in the situation of an ecological system actually being exposed].
Moderate	**The public** Of order 0.1 - 1 mSv y^{-1}, were exposure to occur. The upper level corresponds to the legal limit for effective dose in a calendar year for any member of the public from sources of ionising radiation originating from a nuclear licensed site.	**All humans** People being exposed to contaminants in soil or other media at levels giving rise to reasonable concern about the possibility of "significant harm" to human health as defined for the EPA90, Part	"Moderate" pollution is what a regulator would typically regard as a borderline "minimal"/"significant" effect, such as: • A Category 3 incident affecting surface water, as defined in the EA's CICS. • Contaminants of concern detectable in groundwater above applicable water quality standards in groundwater in	Any ecological system or living organism forming part of such a system being exposed to contaminants in soil or other media at levels giving rise to reasonable concern about the possibility of "significant harm" to an ecological system as defined for the EPA90, Part 2A, but not indicative of SPOSH.

[2] GAC sources include current EA SGVs, LQM/CIEH GACs (Nathanial et al. 2009), EIC/CL:AIRE GACs.

[3] i.e. "For any protected location: harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location or harm which affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location", as described in Defra (2006) Environmental Protection Act 1990: Part 2A Contaminated Land. Defra Circular 01/2006, Department for Environment Food and Rural Affairs, London.

[4] Environment Agency (2011) Incidents and their classification: the Common Incident Classification Scheme (CICS). Operational Instruction 04_01 (September 2011).

	This range is of a similar order to the dose constraint of 0.3 mSv y^{-1} in EA Briefing Note 3 (2006) and recommended by HPA (NRPB, 1998) for development of land under Planning legislation. May be demonstrated by presence of exposed soils with no or only localised exceedence of GRAC for scenarios applicable to site use for 1 mSv y^{-1}.	2A, but not indicative of SPOSH[5]. ["Reasonable concern" about the possibility of significant harm being in the situation of people actually being exposed]. If quantitative data were available, this could be indicated by widespread substantial exceedances of GACs.	aquifer strata, but not reaching a relevant assessment point.[6] • A Category 3 incident affecting a potable abstraction, as defined in the EA's CICS.	["Reasonable concern" about the possibility of significant harm being in the situation of an ecological system actually being exposed].
Severe	**The public** Of order > 1 mSv y^{-1}, were exposure to occur. This level of dose exceeds the legal limit for effective dose in a calendar year for members of the public from sources of ionising radiation originating from a nuclear licensed site. This is of a similar order to the 3 mSv y^{-1} criterion for determination of "radioactive contaminated land" not on a nuclear licensed site under EPA90 Part 2A. May be demonstrated using the EPA90 Part 2A criteria for "radioactive contaminated land" or by presence of exposed soils with extensive exceedence of GRAC for scenarios applicable to site use for 1 mSv y^{-1}.	**All humans** People being exposed to contaminants in soil or other media at levels that could reasonably be construed as indicative of SPOSH (significant possibility of significant harm) to human health as defined for the EPA90, Part 2A. [SPOSH being in the situation of people actually being exposed]. If quantitative data were available, this could be indicated by widespread gross exceedances of GACs.	"Severe" pollution is what a regulator would typically term a "significant" or "major" effect on a water environment receptor, such as: • A Category 1 or 2 incident affecting surface water, as defined in the EA's CICS. • Significant pollution of groundwater, as might be determined under Part 2A of EPA90.[7] A Category 1 or 2 incident affecting a potable abstraction, as defined in the EA's CICS. A Category 2 incident is defined as "Significant effect on a potable abstraction point".	Any ecological system or living organism forming part of such a system being exposed to contaminants in soil or other media at levels that could reasonably be construed as indicative of SPOSH to an ecological system as defined for the EPA90, Part 2A. [SPOSH being in the situation of an ecological system actually being exposed].

[a] This table is an edited version of the equivalent table in the NIGLQ (2012) guidance for the purposes of the assessment in Chapter 7 Geoenvironmental Impacts and Surface Water Quality. It does not include property receptors on or offsite, as no potential for significant effects on these receptors has been identified, and it does not include workers on the Trawsfynydd site (including site operatives or site visitors), as the Applicant has well established procedures to protect the health of these receptors, as well as there being extensive legislation that must be complied with (see **Chapter 4: Regulatory Context** chapter).

[5] SPOSH = "significant possibility of significant harm" as defined in Part 2A of the Environmental Protection Act and relevant statutory guidance in England, Scotland and Wales.

[6] Guidance on assessment points and criteria are found for England and Wales in Environment Agency (2017) Groundwater protection technical guidance. Available at: https://www.gov.uk/government/publications/groundwater-protection-technical-guidance. [Accessed 25 July 2024].