MOTT MACDONALD

IED Permit Application Site Condition Report

Eign Sludge Treatment Centre

December 2022

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Mott MacDonald
Floor 3
1 Whitehall Riverside
Leeds LS1 4BN
United Kingdom

T +44 (0)113 394 6700
mottmac.com

IED Permit Application Site Condition Report

Eign Sludge Treatment Centre

December 2022

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	25/11/22	J Boden	S Blackman	A Manns	First issue for client comment

Document reference: B16564-0AG964-ZZ-XX-DM-ZA-DH0031_SCR_EGN

Information class: Standard

Document Purpose:

A Site Condition Report (SCR) provides information regarding the condition of the land and groundwater at permitted sites at particular points in time throughout its permit history. It is an on-going record of the potential and known contamination risks before a permit is granted, whilst activities are carried out under a permit and at the time of surrounding the permit.

The SCR will be submitted as required for Form B2/C2, Question 5b and will be completed following the Environment Agency's Environmental permitting: H5 Site condition report guidance (2013)[1]. The template structure is directly from the Environment Agency's H5 Site Condition Report word template[2].

For all new permits sections 1 to 3 will be completed.

For sites that are currently permitted section 1 to 7 will be completed, updating sections from the previous Site Condition Report where available.

Section 8 to 10 are not to be edited; these address surrender of the permit at a later date.

1.0 SITE DETAILS

Name of the applicant	Dŵr Cymru Welsh Water (DCWW)
Activity address	Eign Sludge Treatment Centre Outfall Works Road Hereford HR1 1RY
National grid reference	SO 520 388

Document reference and dates for Site Condition Report at permit application and surrender	Site Condition Report: B16564-0AG964-ZZ-XX-DM-ZA-DH0031_SCR_EGN Date of Permit Application: 30 November 2022 Date of Surrender: -

Document references for site plans (including location and boundaries)	Location Plan: B16564-0AG964-ZZ-XX-DR-ZA-DH0010_LayoutEmissionDrainagePlan_EIG

2.0 Condition of the land at permit use	
Environmental setting including: • geology • hydrogeology • surface waters	**Land use** The site comprises Eign Sludge Treatment Centre (STC) that is situated within the wider Eign Wastewater Treatment Works (WwTW). The Works have occupied the land since approximately 1890, with upgrades in 1948 and 1978. The site is located approximately 800m south-south-east from Bartonsham, and approximately 1.5km south-east from Hereford. The site is bounded by a meander in the River Wye from north-east to the south-west. Past this bounding, there are residential areas to the north and south. To the west and east there are grasslands. **Geology** BGS GeoIndex (British Geological Survey, 2022) indicates made ground completely underlaying the site, of ~2.5m thickness. BGS mapping (British Geological Survey, 2000) indicates Alluvium underlaying the site. BGS borehole scans indicate that Alluvium was encountered between 1.38 – 5.61m below ground level (bgl), with a maximum thickness of 4.24m, described as soft, very silty to firm clay oxidising brown, containing fine to coarse gravel, fine to coarse grey to brown sand, stones, decaying wood fragments and some organics. Underlying the Alluvium, River Terrace Deposits are inferred to be mapped. They are described by the BGS GeoIndex as *"sand and gravel, locally with lenses of silt, clay, or peat."* The BGS mapping (British Geological Survey, 2000) also indicates the Raglan Mudstone Formation bedrock underlaying the site. This formation is defined by the BGS lexicon as "[interbedded] *red mudstones and silty mudstones with calcretes and*

sandstones". The lexicon also states that this stratum has the average thickness of 800m. No faults are recorded within 1km of the site.

BGS boreholes within 250m (SO53NW27, SO53NW28, SO53NW29, SO53NW30) confirm the presence of Raglan Mudstone, encountering it at 7.62 – 10.67m bgl, with the depth to base not proven in any borehole.

Historic Records

BGS boreholes within 250m (SO53NW11, SO53NW12, SO53NW13, SO53NW14, SO53NW27, SO53NW28, SO53NW29, SO53NW30) identify the following strata underneath the site (Table 1):

Table 1: Description of strata from BGS boreholes within 250m

Strata	Depth range (m bgl)	Description
Made ground	0 – 2.74	Silty, soft clay, containing ashes, concrete, fine to coarse grey to brown sand
Alluvium	1.38 – 5.61	Soft, very silty to firm clay oxidising brown, containing fine to coarse gravel, fine to coarse grey to brown sand, stones, decaying wood fragments and some organics.
Fluvioglacial deposits	4.42 – 9.46	Fine to coarse gravel with a little sand and traces of red clay
Raglan Mudstone Formation	7.62 – 10.67	Maroon to green grained micaceous sandstone, with firm to stiff red to green grey mottled clay

(source: British Geological Survey: Borehole Scans, accessed September 2022)

Hydrogeology

The superficial deposits of the Alluvium, River Terrace Deposits, and the bedrock geology of the Raglan Mudstone Formation, are designated as Secondary A aquifers, defined as *"permeable layers capable of supporting water supplies at a local rather than regional strategic scale, and in some cases forming an important source of base flow to rivers"* (Environment Agency, 2018).

The site is not located within 250m of a Source Protection Zone (SPZ).

Thirty-six discharge consents have been registered within 250m of the site. Each licence was registered to Dŵr Cymru Welsh Water, and the receiving water was the River Wye.

The entire site and locality lie in a drinking water protected area (surface water).

Hydrology and flooding

The River Wye is located 5m north-east of the site boundary (Envirocheck, 2022). The site is located within a flood zone 3 – an area

	with a high probability of surface water flooding. The site also lies in an area with the potential for groundwater flooding of property situated below ground level and at the surface. The WwTW has an internal drainage system which returns effluent to the head of the works prior to discharge into the River Wye. Under the Water Framework Directive (WFD), the River Wye is designated as "Moderate" for Ecological Quality, and "Fail" for Chemical. **Sensitive land use** There are two Nitrate Vulnerable Zones (NVZ) on-site, the Hereford area NVZ and the River Wye – Bredwardine Br to Hampton Bishop NVZ. The River Wye is designated as a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC), with the latter designation being given by both Natural England and Natural Resource Wales).
Pollution history including: • pollution incidents that may have affected land • historical land uses and associated contaminants • any visual/olfactory evidence of existing contamination • evidence of damage to pollution prevention methods	This section is informed by information taken from an Envirocheck Report (Envirocheck, 2022) commissioned in support of this project. **Pollution incidents to controlled waters** There have been four pollution incidents to controlled waters recorded within 250m of the site. Of these, three were designated as Category 3 (minor incident), with the fourth designated as Category 2 (significant incident). This significant incident occurred approximately 175m north of the site involving effluent/slurry on 16th March 1991 (incident reference 265). **Pollution Prevention and Control** The Envirocheck Report indicates that there are three integration pollution prevention and controls recorded within 250m of the site (Envirocheck, 2022). Two of these are recorded as 18m west of the site, dated to the 11th August 2009, with the same licence number, and recorded for combustion: "waste derived fuel greater of equal to 3Mw but less than 50Mw", however as no industry is located to the west of the site, these are considered likely to be on-site. The third record is 181m south of the site, dated 27th March 2013, and described as an "associated process" (Envirocheck, 2022). No further controls were identified within 250m of the site area. There are no recorded local authority integrated pollution prevention and controls recorded within 1km of the site area. There are no recorded local authority pollution prevention and controls within 250m of the site area. There have been no recorded prosecutions relating to authorised processes within 1km of the site area. There are no registered radioactive substances within 1km of the site area. **Nearby Industrial Land Uses** There are no active or inactive contemporary trade directories within 250m of the site area. There is one point of interest (public infrastructure) on-site (the sewage works). There are a further ten points of interest (public infrastructure) within 250m of the site, including four sewage works and

	six outfall. Of these points of interest, due to their locations and proximity, three sewage works and five outfalls are all believed to be associated with Eign WwTW. The remaining sewage works and outfall is believed to be associated with a nearby sewage works identified in the 1928-1929 historical mapping. In addition, there is one point of interest (manufacturing and production) within 250m, designated as an unspecified works or factories. **Landfill and waste sites** There are no BGS recorded, or local authority recorded, landfill sites within 1km of the site area. There is one registered landfill site 181m south of the site. The landfill licence is no longer active, and the holder was the Welsh Water Authority. The landfill was licenced to input 75,000 – 250,000 tonnes per year of waste in 1982 and received mostly excavated natural materials and hardcore and rubble. This is located on the wider Eign WwTW site. There is one registered waste treatment or disposal site on-site, licenced to Welsh Water Industrial Services Ltd in 1994 and is recorded as remaining operational as far as known. This site is licenced for 75,000 – 250,000 tonnes per year and authorised to accept 18 different types of waste (Envirocheck, 2022). **Mining sites and mineral extraction** The site is located in a non-coal mining area. There are no known mineral extraction sites within 500m of the site. **Chemical storage & use** Historically, any chemicals or fuels stored or used may potentially have leaked or been spilled. Such chemicals associated with activities on the WwTW may include aluminium sulphate, ferric chloride or sulphate, lime, insecticides and herbicides. Herbicides and pesticides may have been used to control vermin and weed growth across the site. However, there is no evidence of any spillages occurring within the proposed permit boundary. **Leaking or overflowing tanks** It is potentially possible that some of the tanks present on site have leaked in the past and it is possible that, especially in times of heavy rainfall that, the tanks have overflowed onto the surrounding land. However, there is no evidence of any leakages occurring within the proposed permit boundary. **Burial** Waste materials such as sludge or screenings may have been historically buried on or near the site. Burial of material is likely to have taken place in discrete 'hotspots'. It is unlikely that any burial areas were lined or capped. The nature of the material will determine leachate concentration and volume, whether its readily biodegradable and the potential for gas generation and accumulation. Other than the land reclamation, there is no evidence of burial of material within the proposed permit boundary. **Historical land use** **On-site history**

	The earliest available mapping is from 1886-1887. The site is undeveloped and denoted as being surrounded by floodplains. The site and surrounding works are first shown on the 1904 mapping where earthworks and drainage systems are shown associated with the wider 'Sewage Outfall Works'. The site shows further development on the 1967-1973 mapping where, sluices, settlement tanks and a storm water storage area are present. By 1983, new tanks have been constructed in the centre of the site and other tanks are no longer shown. The site then develops to present day. **Off-site history** Earliest mapping (1886-1887) notes the area surrounding the site is mostly marshland, bounded by the River Wye. The wider WwTW is first shown on the 1904 mapping. There is an outlet shown to the immediate east of the site into the River Wye. In the 1928-1929 mapping, the surrounding site has developed to gain four septic tanks, one sludge well, and four outfalls to the immediate west and south-west of the site area. In addition, another sewage disposal works is present approximately 250m to the south-east of the site. This works is not present on the 2000 mapping. The 1967-1973 mapping shows significant expansion: there is a pump house adjacent to the existing septic tanks, with further tanks identified approximately 50m south of the original tanks. There are settlement tanks, filter beds and fourteen sludge beds identified. The original outlet identified on the 1904 mapping is denoted as being "disused", with another active outfall 50m sou]th of the original. Three sludge beds are no longer present in the 1983 mapping. The site does not expand further until present day. The residential areas, particularly to the north and south, are continuously developed to present levels. **Contaminants of Concern** • The following contaminants are considered to be 'relevant hazardous substances', as defined in Article 3(18) of the IED and Article 3 of Regulation (EC) 1272/2008. heavy metals and inorganics; • pathogens; • ammoniacal nitrogen • total petroleum hydrocarbons (TPH); • polycyclic aromatic hydrocarbons (PAH); • volatile and semi-volatile organic compounds (VOC/SVOC); and • asbestos. There may also be ground gases present, likely comprising CO_2, CH_4, and H_2S. Although there is the potential for contamination of soils and groundwater as a result of the operation of the site, significant mitigation measures are already in place, including; bunding, maintenance of infrastructure, environmental management systems etc which reduce the risks of contamination occurring to very low. The Environmental Risk Assessment report includes the potential risk to receptors from the use, production and release of relevant harmful substances from operational activities at the WwTW. No further risk assessment for the release of

<table>
<tr><td></td><td>contaminants to the environment are therefore considered to be needed beyond the Environmental Risk Assessment for the application.</td></tr>
<tr><td>Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)</td><td><u>Site walkover</u>

A site walkover has not been undertaken for this site at this present moment.

<u>Planning applications</u>

A search of the Herefordshire Council planning portal was conducted on 26th September 2022.

No information relevant to contamination was found.</td></tr>
<tr><td>Baseline soil and groundwater reference data</td><td>A Geotechnics Ground Investigation Report is used to provide the prior reference data in this section (Geotechnics, 2022). In this investigation, three boreholes (BH01, BH02, BH03) were used to sample soil and groundwater. BH01 was in the south of the site area, with BH02 and BH03 approximately 100m south of the site area. Whilst not strictly on-site, BH02 and BH03 inform on possible ground conditions of the surrounding WwTW.

To evaluate the contamination data, values for borehole analyses were compared to relevant screening values.

For soil contamination, the 2015 Land Quality Management (LQM) Suitable 4 Use Levels (S4UL) for Commercial Use, 1% Soil Organic Matter (SOM) were used.

As the underlying Alluvium, River Terrace Deposits, and Raglan Mudstone Formation bedrock are classified as Secondary A aquifers, groundwater and leachate contamination values were compared to Drinking Water Standards (DWS). Due to the adjacent River Wye, values were also compared to Environmental Quality Standards (EQS).

For the EQS, the AA-EQS values were used as these represent the most protective values.

<u>Soil</u>

Soil pH is shown to be alkaline. Of these, the only potential contaminants above the values were chromium. Note that in analyses it is not clarified whether the determinand is chromium (III) or chromium (IV). If chromium (IV), there is contamination above the screening values, if it is chromium (III), contamination is below screening values. For clarity, this is summarised in Table 2.

Table 2: Comparison of chromium (III) and chromium (IV) soil values to GAC screening values
<table>
<tr><td>Determinand</td><td>GAC value (mg/kg)</td><td>BH01 (0.3m)</td><td>BH01 (2m)</td><td>BH02 (0.6m)</td><td>BH02 (2.5m)</td><td>BH03 (1.2m)</td><td>BH03 (3.2m)</td></tr>
<tr><td>pH</td><td>N/A</td><td>8.9</td><td>>12</td><td>7.7</td><td>8.6</td><td>11.5</td><td>11.6</td></tr>
<tr><td>Chromium (III) (mg/kg)</td><td>8600</td><td>61</td><td>88</td><td>330</td><td>39</td><td>280</td><td>39</td></tr>
<tr><td>Chromium (IV) (mg/kg)</td><td>33</td><td>61</td><td>88</td><td>330</td><td>39</td><td>280</td><td>39</td></tr>
</table></td></tr>
</table>

Whilst not above the GAC values, Total Petroleum Hydrocarbons (TPH) are shown to be >1000mg/kg at BH02 2.5m (7000mg/kg), and BH03 1.2m (2500mg/kg). In other areas, this would be classified as hazardous waste.

Leachate

Leachate was sampled at each borehole. Table 3 summarises their comparison to the DWS.

Table 3: Leachate data compared to the DWS

Determinand	DWS (µg/L)	BH01 (µg/L)	BH02 (µg/L)	BH02 (µg/L)	BH03 (µg/L)
		2m	0.6m	2.5m	1.2m
Arsenic	10	13		49	
Cadmium	5		6		
Chromium	50			95	
Nickel	20	350	470	2200	520
Lead	25		91		
Selenium	10		13		

Table 4 shows the comparison of leachate data to the EQS. In the EQS, where ranges are given, the lowest bound is used as the screening value in order to provide a conservative assessment of contamination.

Table 4: Leachate data compared to the EQS

Determinand	EQS (µg/L)	BH01 (µg/L)	BH02 (µg/L)	BH02 (µg/L)	BH03 (µg/L)
		2m	0.6m	2.5m	1.2m
Cadmium	5			6	
Chromium	**5** - 250	7.7	8.2	95	
Copper	**1** - 28	28	23	230	17
Nickel	**50** - 200	350	470	2200	520
Lead	**4** - 250	15		91	86
Zinc	**8** - 500	120	430	1400	

Groundwater

Borehole water samples at BH01 and BH03 indicate some contamination, although depths were not reported.

Note that values of water analyses at BH02 were not reported (Geotechnics, 2022), the reason for this is not stated. No values were above the DWS. According to the AA-EQS, dissolved nickel was above the AA-EQS value of 20mg/L in both boreholes (30 and 91mg/L respectively).

	It is not considered necessary to undertake additional geo-environmental samples to establish baseline conditions, as the site is underlain by artificial/reclaimed ground. Existing ground impacts are likely a result of the presence and operation of the WwTW and surrounding industrial land uses. Whilst the Environmental Risk Assessment has identified potential hazards to the environment from the identified contaminants of concern associated with the operation of the current site, existing contamination has been identified on-site which is likely to have resulted from the reclamation of land, upon which the WwTW is located, industrial land uses in the surrounding area, and from operational activities at the site itself.
Supporting information	Sources used in the production of this SCR: • UK Government. 2022. Flood Risk Information for this Location. Flood Map for Planning Service. Consulted September 2022; • Landmark (2022), Envirocheck report – Eign WwTW, ref:301645926 _1_1; • British Geological Survey, GeoIndex www.bgs.ac.uk consulted September 2022; • British Geological Survey, Borehole Scans www.bgs.ac.uk consulted September 2022; • Magic Map http://magic.gov.uk/ consulted September 2022; • Hereford Council planning application search. www.herefordshire.gov.uk (accessed September 2022); • Environment Agency. 2018. The Environment's Agency approach to groundwater protection. Consulted September 2022. • British Geological Survey, 2000. Geological Survey of England and Wales, Ross-on-Wye, sheet: 215.LQM/CIEH S4ULs for Human Health Risk Assessment, 2015 [Report Number 3142] • The Water Supply (Water Quality) Regulations 1989 • The River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010

3.0 Permitted activities	
Overview of site processes	Dŵr Cymru Welsh Water (DCWW) ('the Operator') are applying to vary Permit EPR/ UP3735GH V002 in order to satisfy the requirements of the Industrial Emissions Directive (IED) and Environmental Permitting Regulations (EPR) 2016. The primary permitted installation activity will be the AD treatment Site. The AD site will treat indigenously produced and imported sludges. Permitted Directly Associated Activities (DAAs) will be: • Physio-chemical treatment of indigenously produced and imported sludges. • Storage of indigenously produced sludges and the sludge cake from the AD Site.

	• Storage of biogas derived from the AD treatment of waste. • Combustion of biogas in an on-site CHP and boilers as per EPR/UP3735GH. Combustion of excess biogas via two on-site flare stack.
Permitted activities	The site currently has one Environmental Permit in operation. The existing Combined Heat and Power (CHP) plant is a non-hazardous waste activity which is currently carried out under a waste operation permit EPR/UP3735GH. The existing STC activities and infrastructure on site are not currently permitted and will be added as part of a variation. The waste activities at the site comprises of imports, physio-chemical and anaerobic digestion (AD) treatment, and the storage of waste, all for recovery purposes. The STC solely handles waste derived from the wastewater treatment process, either indigenously produced on-site or imported. The Site undertakes AD of sewage sludge from WwTW's only; it does not accept any liquid wastes or sludges from commercial or industrial operations. The site will continue this operation under a bespoke Industrial Emissions Directive (IED) Installation Environmental Permit.
Non-permitted activities undertaken	Waste activities comprising imports, physio-chemical and anaerobic digestion treatment and waste storage are currently non-permitted activities on site. Anaerobic digestion is to be permitted under the Industrial Emissions Directive under a Bespoke Installation Permit as Anaerobic Digestion is no longer operational under T21 exemptions. Permitted Directly Associated Activities include waste import, physio-chemical treatment of sludges and storage of indigenous and imported sludges.
Document references for: • plan showing activity layout; and • environmental risk assessment	

Note:

In Part B of the application form you must tell us about the activities that you will undertake at the site. You must also give us an environmental risk assessment. This risk assessment must be based on our guidance (*Environmental Risk Assessment - EPR H1*) or use an equivalent approach.

It is essential that you identify in your environmental risk assessment all the substances used and produced that could pollute the soil or groundwater if there were an accident, or if measures to protect land fail.

These include substances that would be classified as 'dangerous' under the Control of Major Accident Hazards (COMAH) regulations and also raw materials, fuels, intermediates, products, wastes and effluents.

If your submitted environmental risk assessment does not adequately address the risks to soil and groundwater we may need to request further information from you or even refuse your permit application.

4.0 Changes to the activity	
Have there been any changes to the activity boundary?	The site has not changed however the site permit boundary will be updated as part of this permit variation. See document reference B16564-0AG964-ZZ-XX-DR-ZA-DH0010_LayoutEmissionDrainagePlan_EIG
Have there been any changes to the permitted activities?	Permit updated to include digestion activities.
Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?	No prior site condition report is known to exist for the site. This SCR presents the condition of the site at the point of the amalgamation of the existing permits on site and the introduction of additional requirements relating to sludge processing, as required under the IED. 'Dangerous substances' that are used or produced at the site include: Although there is the potential for contamination of soils and groundwater as a result of the operation of the site, significant mitigation measures are already in place, including; bunding, maintenance of infrastructure, environmental management systems etc which reduce the risks of contamination occurring to very low. The Environmental Risk Assessment report includes the potential risk to receptors from the use, production and release of relevant harmful substances from operational activities at the STC. No further risk assessment for the release of contaminants to the environment are therefore considered to be needed beyond the Environmental Risk Assessment for the application.
Checklist of supporting information	B16564-0AG964-ZZ-XX-DR-ZA-DH0010_LayoutEmissionDrainagePlan_EIG

5.0 Measures taken to protect land	
Use records that you collected during the life of the permit to summarise whether pollution prevention measures worked. If you can't, you need to collect land and/or groundwater data to assess whether the land has deteriorated.	
Checklist of supporting information	• Inspection records and summary of findings of inspections for all pollution prevention measures • Records of maintenance, repair and replacement of pollution prevention measures

6.0 Pollution incidents that may have had an impact on land and their remediation
Summarise any pollution incidents that may have damaged the land. Describe how you investigated and remedied each one. If you can't, you need to collect land and /or groundwater reference data to assess whether the land has deteriorated while you've been there.

Checklist of supporting information	• Records of pollution incidents that may have impacted on land • Records of their investigation and remediation

7.0 Soil gas and water quality monitoring (where undertaken)	
Provide details of any soil gas and/or water monitoring you did. Include a summary of the findings. Say whether it shows that the land deteriorated as a result of the permitted activities. If it did, outline how you investigated and remedied this.	
Checklist of supporting information	• Description of soil gas and/or water monitoring undertaken • Monitoring results (including graphs)

8.0 Decommissioning and removal of pollution risk	
Describe how the site was decommissioned. Demonstrate that all sources of pollution risk have been removed. Describe whether the decommissioning had any impact on the land. Outline how you investigated and remedied this.	
Checklist of supporting information	• Site closure plan • List of potential sources of pollution risk • Investigation and remediation reports (where relevant

9.0 Reference data and remediation (where relevant)	
Say whether you had to collect land and/or groundwater data. Or say that you didn't need to because the information from sections 3, 4, 5 and 6 of the Surrender Site Condition Report shows that the land has not deteriorated. If you did collect land and/or groundwater reference data, summarise what this entailed, and what your data found. Say whether the data shows that the condition of the land has deteriorated, or whether the land at the site is in a "satisfactory state". If it isn't, summarise what you did to remedy this. Confirm that the land is now in a "satisfactory state" at surrender.	
Checklist of supporting information	• Land and/or groundwater data collected at application (if collected) • Land and/or groundwater data collected at surrender (where needed) • Assessment of satisfactory state • Remediation and verification reports (where undertaken)

10.0 Statement of site condition
Using the information from sections 3 to 7, give a statement about the condition of the land at the site. This should confirm that: • the permitting activities have stopped • decommissioning is complete, and the pollution risk has been removed • the land is in a satisfactory condition

A. Site Walkover

No site walkover was undertaken

B. Landmark Envirocheck Report

Available on request