MOTT MACDONALD

NW IED Site Condition Report: Howdon Sludge Treatment Centre

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	10/02/2022	A Bagdadi	S Blackman	A Manns	First issue (v1)
B	24/03/2022	A Bagdadi	S Blackman	A Manns	Final (v1)
C	31/01/2023	A Bagdadi	S Blackman	A Manns	Update site plan (v2)
D	24/02/2023	A Bagdadi	S Blackman	A Manns	Resubmission following return of application, dated 13/02/2023 (v3)

Document reference: 100105164_MSD_SCR_HOW |

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[1].

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.

Key:

Guidance on SCR is found here https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report

[1] https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report

1.0 SITE DETAILS	
Name of the applicant	Northumbrian Water Limited
Activity address	Howdon Sewage Treatment Works, Northumberland Dock Road, Wallsend, Newcastle, Tyne and Wear, NE28 0QD.
National grid reference	433513, 566350
Permit reference	EPR/KP3394ZE
Document reference and dates for Site Condition Report at permit application and surrender	Site Condition Report: 100105164_MSD_SCR_HOW Date of Permit Application: TBC Date of Surrender: TBC
Document references for site plans (including location and boundaries)	See Appendix A for relevant plans and figures.

2.0 Condition of the land at permit issue	
Environmental setting including: • geology • hydrogeology • surface waters	**NB: Definition of the site, when mentioned in this document, refers to the area of land within the green line boundary as presented in the site layout plan in Appendix A.2** **Land use:** The site, Howdon Sewage Treatment Works (STW) and Sludge Treatment Centre (STC), is located in an industrialised area along Northumberland Dock Road, north of the River Tyne. Howdon STW serves local authorities including North Tyneside, Newcastle, Gateshead, South Tyneside and parts of Northumberland. The land located directly to the east of the site is occupied by the 'Chemson Ltd' chemical works. To the southeast of this site is a disused wharf (Northumberland Dock). To the north of the primary treatment works is a region of derelict ground that comprises a national cycle route formed from a dismantled mineral railway. To the south are a series of staithes (wharves) and a haulage platform, whilst the northwest area comprises a mixture of residential dwellings and allotment gardens. The residential area is the A19 road and Tyne Tunnel transport link. **Geology:** Artificial Geology Mapped artificial geology in the west of the site comprises Made Ground deposits, indicating that the deposits are at least 2.5m thick in the area. Made Ground of

	less than 2.5m in thickness can also be expected in the east of the site due to previous development on site. Historical mapping also indicates that the south and east of the site were previously part of Northumberland Dock, which was partially infilled to form the artificially constructed area of disused land, on which the site is located. Extensive earthworks have also been undertaken in the site, suggesting that the ground will be significantly reworked. The site is bounded on the upper eastern edge of the site by an artificially raised embankment. <u>Superficial Geology</u> Superficial geology in the east of the site consists of Tidal River or Creek Deposits comprising clay, silt and sand Holocene in age. Tidal River or Creek Deposits also run along the south of the site associated with River Tyne. Areas of Pelaw Clay Member are mapped immediately to the north of the site and Till, Devensian in age, lies approximately 700m to the northeast of the site consisting of Diamicton. <u>Bedrock</u> Solid geology at the site comprises of Pennine Middle Coal Measures (PMCM) formation which consists of interbedded sequences of mudstone, siltstone and sandstone together with coal seams, Westphalian in age. The Envirocheck geological maps indicate some faulting of this bedrock running from the north-west to south-east on the western and eastern boundaries of the site.
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 measures	**<u>Hydrogeology:</u>** The superficial deposits underlying the site are classified as a combination of Unproductive Strata, Secondary Undifferentiated aquifers and unknown (lakes and landslip), indicating that they are not of significant value. The bedrock (PMCM) consists of siltstone, mudstones and sandstones of varying permeability. The PMCM formation is classed as a Secondary A superficial aquifer with low vulnerability. There are no SPZs (of any level) within at least a 5km buffer of the site. There are no boreholes used for drinking water supply within 1km of the site. However, there are two abstraction points one located approximately 400m south of the site used for mineral washing and the second approximately 1km west of the Installation which is used for industrial water used for dust suppression. **<u>Hydrology and flooding:</u>** The site is located on the northern banks of the River Tyne, approximately 75m inland. The remaining part of the historical Northumberland Dock lies approximately 50m to the east. The site is located in an Environment Agency zone 1 flood risk area. Areas within zone 1 have 1 in a 1,000 chance of river or sea related flooding. However, the area approximately 50m to the east and 80m to the south of the site is located within a zone 3 flooding risk area due to the proximity of the River Tyne. Areas

	within flood zone 3 have been shown to be at a 1% or greater probability of flooding from rivers or 0.5% or greater probability of flooding from rivers/ the sea. **Sensitive land use:** No sensitive land use located within 1km of the site.
Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)	**Recorded landfill and Historical landfill:** One BGS recorded landfill site, and one local authority landfill site are located on site, both along Northumberland Dock. Two historical landfill sites are also recorded as being present on-site. Historical landfill reference EAHLD06809 was operational between 1960 and 1972 but the type of waste disposal has not been specified. No information is known about the landfill reference EAHLD03526. **Registered Waste Treatment or Disposal Sites** Three on-site licenced waste management facilities are reported in the Envirocheck. Two of these are operated by Northumbrian Water Limited one for sewage sludge treatment and the other for biological waste treatment. The other on-site waste management facility, operated by Suez Recycling And Recovery North East Ltd, comprises a household, commercial and industrial transfer station. No other facilities are reported within 250m of the site. **Radon** The site is in a low probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Hence, no radon preventative measures are required. **Nearby industrial land uses** Five active contemporary trade directives located within 250m of the site including Northumberia Water Scientific Services, chemical manufacturers, Breedon Aggregates and a plumbing store. Additionally, two inactive contemporary trade directives are located within 250m of the site comprising scientific apparatus and chemical manufacturers. A Control of Major Accident Hazard (COMAH) site is reported 150m east of the site, associated with Chemson Limited (Heyhole Works). This site also has four planning hazardous substance consents. **Discharge consents:** The following discharge consents are recorded within 250m of the site: • Seven discharge consents are recorded on-site, although only one is currently active - operated by Northumbrian Water Limited enabling sewage and storm water discharge to be released into River Tyne saline estuary.

	• 33 discharge consents are also recorded 120m southeast of the site and 170m southwest, operated by Northumbrian Water Limited, although the only consents currently active relate to final/treated effluent discharge, and pumping station and storm water discharge to be released into River Tyne saline estuary. • 76m from site – discharge consent for trade discharge and processing water into the River Tyne saline estuary from a cement works. Licence revoked in 2016. • 152m from site – operated by Amec Process and Energy Limited enabling the release of other matter effluent discharge to be released into the River Tyne saline estuary. No details are provided as to whether this consent is still active. • Two discharge consents 224m from site – discharge consents for trade discharge and processing water into the River Tyne saline estuary. Both consents were revoked in 2005. **Pollution incidents to controlled waters:** Five pollution incidents to controlled waters were recorded within 250m of the site, these include: • Two pollution incidents to controlled waters recorded on-site relating to works at Howdon STW. On both occasions in March 1996, a category 2 - significant incident was recorded in the lower Tyne saline estuary where sewage treatment effluent pollution was found however no fish were killed. • 77m from the site - a category 3 minor incident was recorded in 1996 where chemicals from paints and dyes were responsible for pollution to be found in the lower Tyne saline estuary. • 138m from the site – a category 2 significant incident was recorded in 1990 from miscellaneous premises in east Howdon, the cause of the incident or its receiving body remain unknown. • 139m from the site – a category 3 minor incident took place in 1992. The cause of the incident related to oil being released from miscellaneous premises located between North Shields & Willington impacting a freshwater river/stream tributary of the River Tyne. • 149m from the site – a category 3 - minor incident took place in 1993. The cause of the incident related to sewage works effluent from Howdon STW polluting a freshwater river/stream tributary of the River Tyne. **Integrated pollution and prevention controls:** There are four integrated pollution and prevention control registered sites located within 250m of the site. • One for Howdon Biogas Combustion Installation on-site at the STW, for waste combustion (permit YP3331HQ which was varied in 2019). • Two for Hayhole Works, 150m east of the site for the use of inorganic chemicals (reference BV4606IL which has been superseded by variation, and permit WP3633LF which is effective from 2005). **Local authority pollution and prevention controls:**

	Three local authority pollution and prevention controls exist within 250m of the site; two for the blending, packing, loading and use of bulk cement 60m southwest (one revoked), and one for coating manufacture 65m to the northeast. **Mining and quarrying:** The Coal Authority indicates that the Installation is within the likely zone of influence from workings of one coal seam of 220 – 260m depth, which was last worked in 1947. There is no current or future intention for mining of underground coal reserves within the vicinity of the Installation. The Coal Authority has no recorded incidents of subsidence recorded since 1984, and no preventative works are proposed under the Coal mining Subsidence Act 1991. The Coal Authority has no record of any mine gas emission issues requiring Coal Authority intervention. No abandoned shafts are located within the site boundary. **Historical land use:** • Earliest mapping of the site in 1861 (Envirocheck 2022) indicates that a railway terminus and associated buildings were located within the western region of the site. Seatonburn Colliery was located 150m to the east of the site and other surface mines and pits are evident in the wider area. Additionally, land berths associated with railway lines and colliery were present on-site entering Northumberland Dock, which exists on-site in the southern and eastern site extents. Residential properties were located 100m west of the site in East Howdon. • By 1897 there was no change of land use on the site however surrounding the site, Northumberland shipyard is located on the western boundary of the site and an iron foundry 80m to the northwest. Hayhole Lead Works now occupies the Seatonburn Colliery site. • In 1916 further changes of land use surrounding the site include the removal of unknown industrial/commercial buildings and the iron foundry located west of the site. Additionally, terraced houses have been developed approximately 100m to the west of the site. • In 1938 the railway line now terminates 50m to the north of the site. A well is also located on the western section of the site. Surrounding the site, further housing development has taken place to the west and northwest of the site as well as an allotment gardens 75m northwest. Additionally, Northumberland Dock Road is located along the northern site boundary as well as cutting through the north-western extent of the site. • In 1954 the well on site is no longer marked and therefore has likely been infilled. The Northumberland shipyard is no longer marked and has likely been infilled. No other notable changes have occurred on-site and in the surrounding area. • In 1964 two piggeries were located in the west of the site. Additionally, a transmission line was established to the east of the site and a scrap depot located approximately 50m to the west of the site. The lead works is now labelled only as ‘works’ and the Northumberland shipyard has been replaced with a light engineering works. The Northumberland Dock has reduced in length from the east and an entry to the dock, from the River Tyne, now exists 40m from the site.

	• By 1977, mapping shows that the area of Northumberland Dock to the south of the site has been infilled and therefore the site is fully on-land. By 1982, the first indication of a sewage works located on site are seen, including settling tanks, pumps and an electrical substation. At this time, the railway to the north has also been dismantled and is now marked as 'disused workings'. • Since as far back as 1985 (Google Earth Pro, 2022) Breedon Aggregates, a concrete, sand and gravel supplier, has been located directly south of the site, Chemson Limited a plastic fabrication company has been located within 50m east of the site and N.W.G scientific services has been located within 100m west of the site. • On-site development of Howdon STW infrastructure is noted up until 2018, when the current site layout is seen. **Soil chemistry:** The Envirocheck report indicates background baseline soil concentrations in the area of: • <15mg/kg of arsenic, • <1.8mg/kg cadmium, • 60-90mg/kg chromium, • <100mg/kg of lead and • 15-30mg/kg nickel. **Contaminants of concern:** The following contaminants are of concern regarding the industrial activities stated above, in addition to the current use of the site: • total petroleum hydrocarbons (TPH); • polycyclic aromatic hydrocarbons (PAH); • heavy metals and inorganics; • pathogens; • asbestos; • polychlorinated biphenyls (PCBs); • chlorinated solvents and phenols; and • volatile and semi-volatile organic compounds (VOC/SVOC). There may also be ground gases present, likely comprising CO_2 and CH_4.
Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)	**Site walkover** A site walkover by a waste consultant from Mott MacDonald was undertaken on 22nd September 2021. A summary of the findings are as follows: • The site consists of three advanced anaerobic digesters, three composite boilers, four strategic storage tanks, one screened sludge mixing tank, cake import facilities, a post digestion tank, a biomethane upgrade plant, and a THP plant which includes two raw cake THP buffer tanks.

	• Cake facilities include one large 500t silo with storage space for the maximum of two silos. Cake is not moved around site and emptied straight from the hopper chute into the truck. • The site has one back-up generator on-site (560kW) which is used in emergencies. • The site has three dual fuel Combined Heat and Power (CHP) gas engines and one natural gas engine with flare for excess. • For waste generated on site, there are separate skips for waste electricals, redundant equipment, general waste with cardboard/paper/plastic segregation. • The site currently accepts 40,000 TDS/year which is equivalent to 110TDS/day however has the capacity to accept more. • The site accepts indigenous, liquid imports, cake imports and recycled waste. This site does not accept hazardous waste. • Site runs using dual fuel however natural gas or biogas can be used in emergencies. Diesel is stored in tanks. • The hardstanding was noted to be in good condition. Surfaces were free from cake and reported to be cleaned daily. **Planning applications** A search of the North Tyneside Council planning portal on the 7th January 2022 identified little of relevance to this site condition report (SCR), other than a statement of compliance with planning conditions for permission 10/1823/FUL (the on-site Advanced Digestion activities). This statement provides evidence that: • Gas membranes have been installed in the MCC kiosks, high-voltage switchgear kiosk, dewatering building, cake reception building, laboratory, boiler water treatment kiosk, final effluent booster set kiosk and THP buffer tanks area. • Areas of hardstanding drain to the foul water sewer, other than where spillages are likely to occur where instead the drains are diverted to the liquors return pump station. • All oils and chemical tanks will be stored in bunds with 110% capacity or double skinned tanks on impervious ground, and all pipework will be double contained. Oil storage tanks have lockable drains in tanks and bunds. All tank fittings, including the chemical dosing pumps are located within the tank bunds. The tank bunds have level detection to notify the SCADA operating system. – Fuel oil storage tank = 45m^3 self-bunded – Lubricating oil tank = 2000L self-bunded – Sodium hydroxide (caustic soda) = 500L storage tank – Polyphosphates (anti-foam agent) = 500L storage tank – Sodium bisulphite = 500L storage tank – Salt (brine solution) = 500L storage tank

Baseline soil and groundwater reference data	A previous ground investigation is known to have been undertaken at the site by Allied Exploration and Geotechnics Ltd (AEG) in 2009, and is referenced to in the previous SCR for permit YP3331HQ, however the investigation report has not been located to be reviewed as part of this SCR. The investigation is reported to have found Made Ground present across the site in significant thicknesses, encountered from ground level to depths ranging between 8.60 mbgl and 15.30 mbgl. Borehole logs indicated that the Made Ground layer predominantly comprises firm grey brown sandy gravely clay with gravel and cobbles of coal, flint/chert, brick, mudstone, limestone and sandstone. A layer of sandy gravel was present at greater depths across the south-western section of the site and was found to contain ash and fragments of steel during the AEG investigation. AEG borehole logs also indicated the presence of a thin vegetated topsoil layer overlying the Made Ground across the western and southern sections of the site. A layer of geotextile matting was encountered at 2.70 mbgl in one location. Information on the 2009 AEG investigation indicates the localised presence of a thin layer of interlaminated sandy clay and silt, likely to represent alluvial deposits. Underlying the alluvium, glacial till deposits comprising the Pelaw Clay Member with interbedded layers of sand, gravel and silt were encountered in a layer up to approximately 23 m in thickness. Borehole logs also indicated that mudstone of the PMCM predominates beneath the site area, with layers of sandstone at greater depths and a coal seam at approximately 52 mbgl. No visual or olfactory evidence of direct contamination of the soils encountered in the boreholes was reported by AEG. The previous SCR reports a further investigation was undertaken by AEG in 2011 to gather information on the site condition prior to the operation of the permit. This is reported to have identified: • In general, there are currently negligible levels of contamination within site soils, with soil pHs identified within the normal range and relatively low soil organic matter contents. When compared against threshold criteria for a commercial land use (relevant in 2011; data has not been able to be reviewed against current standards), a very minor and isolated soil concentration of lead was identified within the deeper layers of Made Ground in the northwest corner of the site. Near surface materials in the same location were identified as being significantly alkaline. • Groundwater was encountered at a majority of exploratory boreholes within the Made Ground stratum and is likely to be in continuity with the River Tyne, which is tidal in the site vicinity. The proximity of the site to the coast and elevated chloride concentrations within groundwater samples recovered from the site indicate that groundwaters underlying the site are slightly saline/brackish. • When compared to estuarine environmental quality standards (EQS, relevant in 2011), groundwater samples exhibited elevated concentrations of selenium, zinc, sulphate and extractable petroleum hydrocarbons. These concentrations are likely to originate to groundwater interaction with potentially contaminated

Made Ground on-site, organic rich superficial deposits and bedrock strata and the industrial history of the surrounding area.

- Monitoring for landfill and mine gases found that there were slightly elevated concentrations of carbon dioxide at all locations, methane concentrations were below detectable limits at all but one location and negligible levels of hydrogen sulphide were measured. Overall, the site has been classified by the geotechnical investigation as having 'low' hazard potential in accordance with BS 8485:2007 Code of Practice for the characterisation and remediation from ground gas in affected developments.

The table below presents a summary of the baseline concentrations of parameters analysed as part of the 2011 investigation. Note that the data from this investigation has not been identified for review.

Parameter	Units	Media	Baseline concentration range
Soil organic matter	%	Soil	1.8 – 2.8
Chloride	mg/l	Groundwater	6000 – 8200
Sulphate	mg/l	Soil	56 – 890
pH	pH units	Soil	8.0 – 8.5 (11.6)
	pH units	Groundwater	7.6 – 8.4
Total PAH	mg/kg	Soil	0.8 – 1.6
	µg/l	Groundwater	0.1 – 0.52
Total TPH	mg/kg	Soil	10 – 88
	µg/l	Groundwater	31 - 82

The bracketed pH value indicates an isolated alkaline pH and is not included in the baseline concentration range.

Supporting information

- British Geological Survey, GeoIndex www.bgs.ac.uk consulted January 2022;
- Magic Map http://magic.gov.uk/ consulted January 2022;
- Landmark (2022), Envirocheck Report – Howdon STW.
- Mott MacDonald (2011) Site Condition Report: YP3331HQ.

3.0 Permitted activities

Overview of site processes

Howdon Sewage Treatment Works consists of Preliminary, Primary and Secondary Treatment, with Tertiary Treatment in the form of UV. Treatment of the incoming sewage comprises:

- Municipal treatment (non-permitted area)
  - 6mm screening using fine screens
  - Grit removal using travelling bridge and air blower system
  - Primary settlement in mechanically scraped rectangular tanks
  - Secondary aeration utilising the conventional activated sludge process plus Settlement tanks
  - Final settlement tanks

	– UV tertiary treatment of final effluent – Primary sludge storage – Surplus activated sludge (SAS) Storage – Primary and SAS thickening drums – Thickened sludge storage • Sludge processing (permitted area) – Transfer pumps and pipelines – Sludge dewatering – Advanced anaerobic digestion (AAD) plant – Final dewatering cake silo for digested sludge cake storage – Final dewatering sludge cake loading bay The primary settlement tanks accept municipal wastewaters pumped to the works from South of the Tyne and from the North interceptor. Return liquors from the sludge treatment process are also transferred to the primary tank distribution chamber. The primary settlement and secondary settlement tanks are automatically desludged and this sludge is treated by drum thickening before transfer to the thickened sludge day tanks, where it is combined with imported sludge from other sewage works. The combined sludge is then transferred to the strategic storage tanks each holding 10,500m^3. This feed may be from a single tank or in any combination of the four as circumstances dictate. The key requirement of the AAD process is a feed of screened sludge at 17-18% dry solids. To enable this to be achieved it is necessary to screen and dewater the existing sludge prior to it being delivered to the THP. This is achieved by forwarding the existing sludge stored on site to a pre-dewatering and screening facility where it passes through 6 No. strain presses. It is then temporarily stored in the screened sludge buffer tank prior to being passed through 2 No. centrifuges. The dewatered and screened sludge is then pumped as raw sludge cake to the AAD process. The raw sludge cake produced on site is pumped and occasionally sludge in cake form will be imported from elsewhere and will enter the system downstream of the centrifuges. The combined cake will then be transferred to cake buffer tanks and will undergo a blending / dilution process prior to subsequent pumping to the THP buffer tanks. From here the sludge will then be pumped into the THP system. Two operational THP streams will operate, each consisting of: • Sludge heating in the pulper / pre-heater; • Thermal hydrolysis in one of four batch reactors; and • Pressure let down in the flash tank. In the pulper the sludge is pre-heated by the injection of recycled steam from the reactors and flash tank. This will ensure that the sludge reaches the optimum temperature in the reactors. In the reactors, steam from the boilers and CHP plant is injected until the appropriate operating temperature of approximately 165°C to 180°C and pressure of 6 bar is reached.

	Following the thermal hydrolysis reactors, the sludge is transferred to the flash tank where the excess steam is recycled to the pulper. The resultant hydrolysed sludge is then further diluted as it is pumped forward to 3 No. AADs where the blended sludge is pasteurised in a THP then digested to maximise gas production. The sludge is of too high a temperature to enter the digesters directly and is blended with sludge recirculating through the digesters mixing system and a proportion is passed through water/sludge coolers before entering the digesters. The temperature of this sludge at the outlet of the coolers is such that the overall digester temperature is maintained at a fixed temperature. This continuous process displaces sludge from the digesters which passes under gravity to the digested sludge holding tank where it is maintained in an aerobic condition to suppress any further gas production caused by continuing digestion and strip any residual methane to create an un-zoned area for downstream processes. The optimum temperature for the digesters to work is around 40°C and a re-circulation system linked to adiabatic coolers will maintain the sludge at this temperature. Sludge resides in the digesters for approximately 18 days. Digested sludge is stored in 1 No. post digestion sludge storage tank (4,600m^3) before being dewatered by 2 No. centrifuges to approximately 27% dry solids (DS) in the dewatering treatment plant centrifuges, and transferred by screw conveyor to a sludge cake silo. The final product is then transferred via the screw conveyor to bulk tippers for transport off-site for storage prior to being recycled to agricultural land under the Sludge (Use Agriculture) Regulations 1990. Biogas produced from the 3 No. digesters will be transported to 2 No. spherical gas holders. The biogas produced gas will then be burnt in the 3 No. dual fuel CHP engines to produce electricity, with electricity exported to the grid from the Site's generator. The Site also comprises one natural gas engine and three composite steam boilers (two for normal use and one for standby operation). The CHPs and boilers are configured to operate either on biogas or natural gas depending on the mode of operation. The standard mode is for the biogas to go to the grid so natural gas is burned. However, in times of very low demand the biogas can be burned in the CHP units preferentially. The fourth engine reduces electricity demand from the national electricity network. The biogas is stored on site in two double skinned tanks. A flare stack is provided as an emergency disposal route should the gas engines and boilers be unavailable. The operational procedures have been designed to minimise this event and therefore flaring is only expected to occur as an emergency condition. The biomethane plant cleans the biogas of contaminants deemed harmful to the natural gas grid and reduces carbon dioxide content, thereby increasing the calorific value (CV) of the gas so that it can be designated as biomethane. The biogas (~ 61% methane, 37% carbon dioxide and 2% of other gases (nitrogen and oxygen)) entering the biogas upgrade plant is compressed prior to entering the scrubbing tower. In the scrubbing tower, the scrubbing liquid (water) is sprayed and the carbon dioxide is absorbed by the water. Two product streams leave this tower: the methane stream designated as product gas - formed mainly by methane (97%) with

	a very small amount of carbon dioxide and other gases (3%) and the waste process water stream. The product gas is then dried prior to entering the final polishing filter. A Supervisory Control and Data Acquisition (SCADA) system is utilised to provide management, control and monitoring of the various treatment processes. A telemetry system is employed to provide monitoring of the various treatment processes on the site, which provides alarm identification. The site is manned 24hrs per day and 24hr EMI support is provided.
Permitted activities	• YP3331HQ – R1 burning of waste as a fuel • KP3394ZE – D15 storage, R13 storage of waste, D9 physico-chemical treatment, R3 recycling of organic substances • CB3235DQ – A1 Sch 23 part 2 keeping or use of radioactive material in sealed sources The original YP3331HQ permit issued in 2011 regulated the Howdon Biogas Combustion Installation which is located within the Howdon STC. The Installation consists of three spark ignition CHP engines that run on biogas produced by anaerobic digestion (AD) of sewage sludge at the STW. Each engine is rated at 4.8MWth and there are also three steam boilers, each rated at 2.2MWth. The boilers primarily run on natural gas, although use biogas when available and gas oil if the gases are not available. The boilers are required to provide heat to the AD process, which in turn produces the biogas required by the CHP engines. The CHP engines also supply heat to the AD process. The activity was varied in 2013 to account for changes required by the Industrial Emissions Directive (IED) which changed the biogas combustion to a waste operation, and again in 2019 to consolidate the permit and allow the operator to operate: • A waste operation for the combustion of biogas from the sewage works and associated natural gas fuelled steam boilers (these can also be fuelled by biogas and gas-oil). • One new medium combustion plant (MCP) rated between 1 and <50MWth but aggregated to <50MWth, which was put in operation on or after 20/12/2018 at a specified location; and/or • Tranche A and Tranche B Specified Generators (SG) aggregated to <50MWth at a specified location.
Non-permitted activities undertaken	WEX165484 U6 – using sludge to re-seed a wastewater plant 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 IED 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	• EA (2016), Permit with introductory note – EPR/YP3331HQ • EA (2010), Notice of variation with introductory note - EPR/YP3331HQ

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?	Yes. Permit EPR/KP3394ZE site boundary was varied in 2014, as a Standard Rules permit SR2008No19.
Have there been any changes to the permitted activities?	Due to impending changes in the way the Waste Management industry is regulated by the Environment Agency and Natural Resources Wales, STCs are obliged to apply for Fixed Installation Permits under the IED and comply with new permit conditions by August 2022. Fixed Installation Permits will amalgamate and supersede all current permits and exemptions under which waste is treated on the STC sites (including Environmental Permitting Regime (EPR), Medium Combustion Plant Directive (MCPD), old style Waste Management Licenses, and T21 exemptions). Activities at Howdon STC will continue, as prior to the introduction of the updated and amalgamated permit, although under any new requirements imposed by the permit.
Have any 'dangerous substances' not identified in the	Dangerous substances' that are used or produced at the site include: • Polyelectrolyte (liquid and powder): 40 bags (0.75t per bag) and 20 IBCs • Poly tank (raw): 24m^3

Application Site Condition Report been used or produced as a result of the permitted activities?	• Final poly tanks (20m^3 mix tank and 20m^3 day tank) • Diesel: 60L • Lubrication oil for gas engines: 1m^3 • Test/calibration gases for grid entry unit: 0.09m^3 • Sodium hydroxide: 15m^3 • Sodium hypochlorite: 50m^3 • Sulphuric acid (for ammonia polishing in OS 12): 5m^3 • Anti-foam: 5 tonnes • Coolant – 5m^3 • Carbon filters used in the odour control units • Propane used to enrich biomethane in the biomethane plant • Odorant to odorise enriched biomethane in the grid entry unit • Sodium bicarbonate for pH control in the biomethane plant: 0.4 tonnes • Sodium bisulphate for water conditioning in boilers: 0.5m^3 • Methane (produced from the digestors and stored in the on-site double membrane gas holder). • Effluent screenings (rag and grit from screening process at inlet works).
Checklist of supporting information	

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

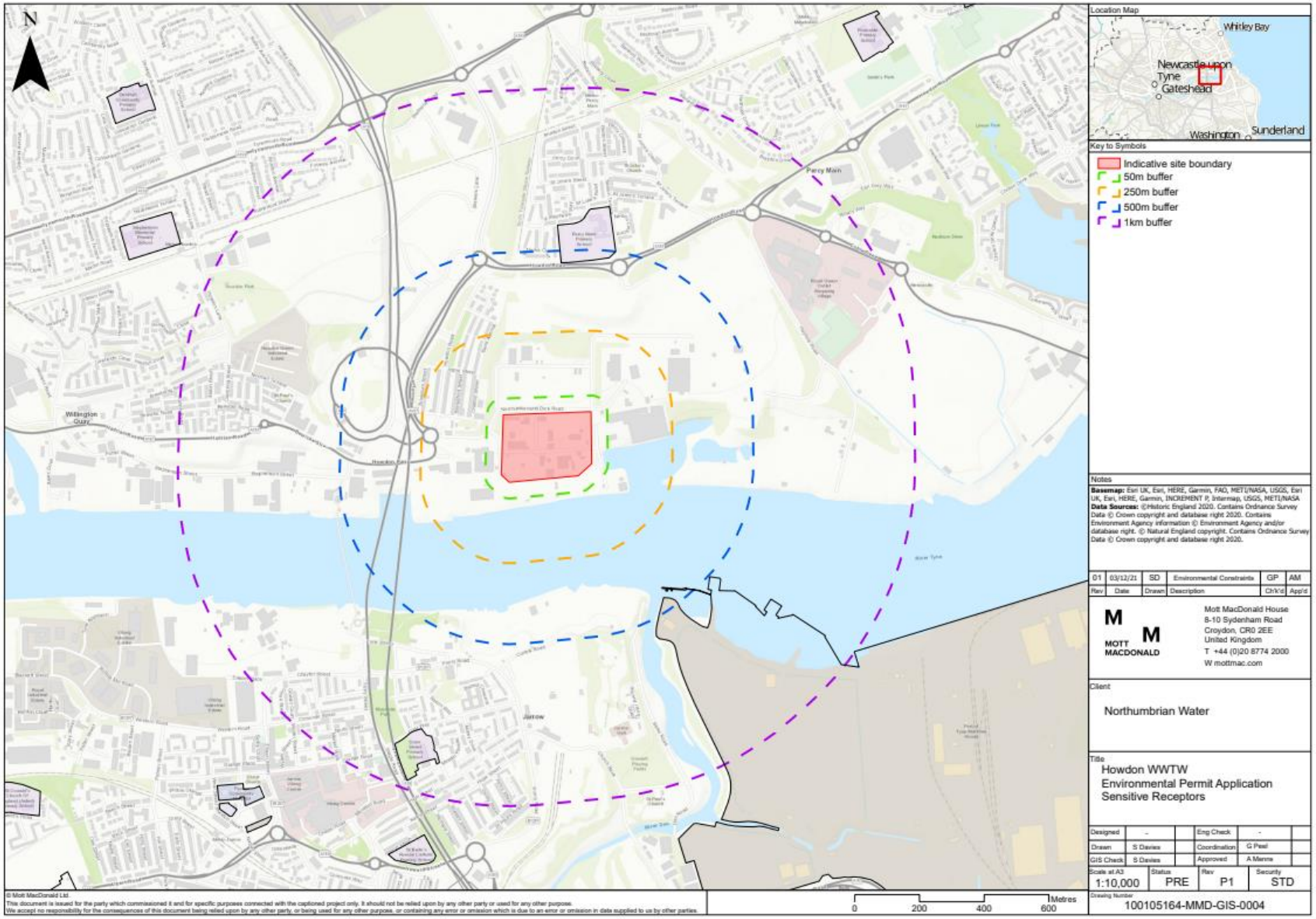
Using the information from sections 3 to 7, give a statement about the condition of the land at the site. This should confirm that:

- the permitted activities have stopped
- decommissioning is complete, and the pollution risk has been removed
- the land is in a satisfactory condition.

Appendices

A. Plans and figures

A.1 Location plan



A.2 Site process locations

Emissions Ref	Emissions Points	Asset Ref	Asset	X	Y
A1	Advanced anaerobic digester 1: Whessoe valve	1	Advanced anaerobic digester 1	433580	566390
A2	Advanced anaerobic digester 2: Whessoe valve	2	Advanced anaerobic digester 2	433604	566390
A3	Advanced anaerobic digester 3: Whessoe valve	3	Advanced anaerobic digester 3	433629	566390
A4	CHP and boiler stack	4	CHP and boiler stack	433663	566338
A5	CHP engine 1 - Bursting disc (exhaust gas)	5	CHP engine 1	433629	566320
A6	CHP engine 2 - Bursting disc (exhaust gas)	6	CHP engine 2	433637	566320
A7	CHP engine 3 - Bursting disc (exhaust gas)	7	CHP engine 3	433647	566320
A8	Natural gas engine	8	Natural gas engine	433663	566321
A9	Composite boiler 1 - Boiler safety valve, Economiser safety valve and Safety valve	9	Composite boiler 1	433619	566342
A10	Composite boiler 2 - Boiler safety valve, Economiser safety valve and Safety valve	10	Composite boiler 2	433631	566342
A11	Composite boiler 3 - Boiler safety valve, Economiser safety valve and Safety valve	11	Composite boiler 3	433641	566342
A12	Flare stack	12	Flare	433648	566360
A13	Gas bag holder 1	13	Gas bag holder 1	433610	566360
A14	Gas bag holder 2	14	Gas bag holder 2	433631	566359
A15	AD biofilter	15	Biofilter	433583	566331
A16	Odour control unit 1	16	Odour control unit 1	433413	566273
A17	Odour control unit 2	17	Odour control unit 2	433588	566335
A18	Odour control unit 3	18	Odour control unit 3	433570	566256
AA	Inlet works			433670	566540
AB	Effluent discharge			433467	566519
		19	Biomethane upgrade plant	433582	566283
		20	Cake reception building	433553	566354
		21	Cake Silo	433613	566250
		22	Cake loading area	433622	566251
		23	Screened sludge buffer tank	433535	566308
		24	THP reactors	433578	566351
		25	THP flash tanks	433579	566366
		26	THP pulper	433578	566342
		27	THP buffer tanks (feed silos) 1	433556	566332
		28	THP buffer tanks (feed silos) 2	433548	566332
		29	Post digestion storage tank	433590	566315
		30	Dewatering building and Centrifuges (x2)	433550	566311
		31	Final stage dewatering building and Centrifuges (x2)	433588	566259
		32	Back-up generator	433598	566366
		33	Fuel oil storage tank	433621	566309
		34	Gas engine lubricant/ Waste oil tank	433618	566307
		35	Strategic sludge storage tank 1	433435	566266
		36	Strategic sludge storage tank 2	433478	566267
		37	Strategic sludge storage tank 3	433436	566223
		38	Strategic sludge storage tank 4	433477	566222
		39	Water treatment plant (boilers)	433602	566344
		40	Imported sludge reception building	433523	566262
		41	General waste bins (x2)	433599	566290
		42	Screening skip 1	433548	566307
		43	Screening skip 2	433558	566307
		44	Drum thickeners	433428	566309
		45	Thickened sludge day tanks (x2)	433413	566309
		46	Grid entry unit	433681	566406

A.3 Process flow-chart

See 100105164_MSD_Schematics_HOW

B. Site walkover notes

RFI Ref	Site operations	
	Operational contact details for the application forms	Ed Higgins (Compliance Team) Ed.higgins@nwl.co.uk 07794201311 John Robinson (Howdon site expert) John.robinson2@nwl.co.uk 07970316623
	No of site staff (day and shift operators etc)	18 shift operators 6 day shift opertors 1 process tech
I15	During what hours is the site staffed Monday – Friday and at weekends?	24/7
	What hours can waste enter the site (planning)	24/7
I16	What hazardous waste treatment capacity (tonnes per day) is available on site?	STC does not accept hazardous waste
I17	What non- hazardous waste treatment capacity (tonnes per day) is available on site? This should also include Commercial Waste where appropriate.	40,000 TDS/year = 110TDS/day Want 50,000 TDS for the permit capacity due to potential to accept more from Yorkshire Water in the future.
I18	What is the total waste storage capacity (tonnes) at the site? Note: Cake, digestors, other tanks relating to STC)	3 digesters = 6,000m^3 each (18,000m^3 total) 4 strategic tanks = 10,000m^3 each (40,000m^3 total) Screened sludge buffer tank = 600m^3 Cake bunker/silo = 500t (usually fill to 400t) Gas bag 1 - 2250m^3 Gas bag 2 = 1150m^3 Post digestion tank = 4600m^3 2 x raw THP silo – 320m^3 each
I19	What is the annual waste throughput (tonnes each year) at the site? (TDS volume for the STC)	2020-21 Indigenous 22,494TDS Liquid imports 13,353TDS Cake imports 964TDS Recycled 12,381 TDS
I20	For the waste types authorised to be accepted at the site (EWC codes) – List the types of waste required to be listed on each permit.	19 08 05 19 02 06 19 08 01 10 08 02 20 03 04

		20 03 06 16 10 02
121	How many years is each permit expected to be required for? List details of each permit separately	More than 50 years
GEN07	Please describe the aspects of the site that generate litter, mud and debris within and outside the site boundary.	Truck/tanker movements. All access roads to the tanker offloading area, inlet to the works and sludge treatment facility are of concrete or tarmac finish. They are cleaned by an external roadsweeper when required. Maintenance activities have the greatest potential to generate litter. Work is permitted/supervised. Redundant items are removed in skips along with general waste and WEEE. Cake spillage at offloading points is contained/frequently cleaned.
GEN08	Describe the site cleaning procedures on site. Including any infrastructure cleaning, wheel wash etc	Trucks and tankers are washed down every night. An external street cleaning wagon would be brought in to clear up any carryover or in the event of an incident.
GEN09	Please describe the site security measures in place at site. Can you elaborate on the type of fencing e.g. palisade, chain link, barbed wire, and mix of? How high, do they go all around the perimeter? Do they have barbed wire on top? Type of gate, what are the gates made of, height etc? Gate control, CCTV, how many cameras etc	The site is surrounded by a 2m high steel palisade fence. Northumberland Dock Road runs through the site to a former industrial plant. The main site, which comprises the tanker offloading facility, laboratories, garages and sludge handling/treatment process units is accessed by a 24hr manned security barriered entrance and monitored by CCTV cameras. There is another barriered entrance adjacent to Chemson site.
	Site Plans	
GEN13	Please provide a copy of the Site Plan showing the proposed permitting boundary in green. This can be overlaid the Site Layout Plan. The Site Plan will be placed in the permit and needs to show a north arrow, identifiable location indicators (such as roads).	To be provided
	Visual impacts	
GEN10	Please describe the visual impacts of each site.	Lost in the industrial background of the local area.
	Site condition report	
SCR02	Please provide a list of permitted activities per site.	YP3331HQ – R1 burning of waste as a fuel KP3394ZE – D15 storage, R13 storage of waste, D9 physico-chemical treatment, R3 recycling of organic substances CB3235DQ – A1 Sch 23 part 2 keeping or use of radioactive material in sealed sources
SCR03	Please provide a list of non-permitted activities per site. Including exemptions	WEX165484 U6 – using sludge to re-seed a wastewater plant
SCR05	Please provide any environmental risk assessments for site.	Need a new one, risk assessment is currently spread across multiple docs
SCR06	Site overview	TBC
	Emergency procedures	

GEN17	Provide a description of the emergency procedures for each site	NW have a documented site wide emergency plan which includes checklists to follow in the event of an emergency and check lists, contacts etc.
	Sludge import	
SV01	Does the site accept trade waste (commercial tankers)?	Septic/cess imported to head of the works under Controlled Waste Regs. None imported directly into STC other than what is routed in from WSTW
SV01/02	How many tankers arrive at the site per day? Where are the tankers unloaded? Is an odour control hose used during unloading?	6 tankers 24/7 60-70 movements per day Sludge reception area – day tank, through drum thickness into strategic storage tanks. Cambi is fed from there. No odour extraction but no discharge to atmosphere.
SV03	Where is sludge imported from? Sludge imported from other satellite sites? How many?	Liquid sludge imported from potentially 415 sites. Cake from 6 sites (1 only frequently) – most cake is sent to Bran Sands when feasible.
I22	Air Emissions	
	Please provide the following information for all point source emissions (CHP, boilers, flare, pressure valves/vents, odour abatement, emission points) to air from each site:	
	Source 1	Indicate individual sources on site layout plan
	National Grid Reference	NZ 33629 66317
	Source type	A1, A2, A3 3x4.8MWth spark ignitions CHPs are dual fuel
	Parameter (e.g. oxides of nitrogen)	NOx 500mg/m3, VOC 1000mg/m3, CO 1400mg/m3
	Quantity (with its unit)	
	Stack height	
	Source 2	Indicate individual sources on site layout plan
	National Grid Reference	NZ 33657 66317
	Source type	A201x4.5MWth natural gas engine, New MCP
	Parameter (e.g. oxides of nitrogen)	NOx 95mg/m3, CO no limit
	Quantity (with its unit)	
	Stack height	
	Source 3	Indicate individual sources on site layout plan
	National Grid Reference	NZ33640 66329
	Source Type	A4, A5, A6 3x2.2MWth steam boilers
	Parameter (e.g. oxides of nitrogen)	NOx no limit, VOC no limit. CO no limit
	Quantity (with its unit)	
	Source 4	Indicate individual sources on site layout plan
	National Grid Reference	NZ 33648 66362
	Source Type	Waste gas burner flare stack
	Parameter (e.g. oxides of nitrogen)	Combustion gases no limit set
	Quantity (with its unit)	
	Source 5	Indicate individual sources on site layout plan
	National Grid Reference	TBC

	Source Type	Exhaust gas bursing discs
	Parameter (e.g. oxides of nitrogen)	
	Quantity (with its unit)	
	Source 6	Indicate individual sources on site layout plan
	National Grid Reference	TBC
	Source Type	Whessoe value (bull horn design with two emission points) on Digestor 1
	Parameter (e.g. oxides of nitrogen)	
	Quantity (with its unit)	
	Source 7	Indicate individual sources on site layout plan
	National Grid Reference	TBC
	Source Type	Whessoe value (bull horn design with two emission points) on Digestor 2
	Parameter (e.g. oxides of nitrogen)	
	Quantity (with its unit)	
	Source 8	Indicate individual sources on site layout plan
	National Grid Reference	TBC
	Source Type	Whessoe value (bull horn design with two emission points) on Digestor 3
	Parameter (e.g. oxides of nitrogen)	
	Quantity (with its unit)	
	Source 9	Indicate individual sources on site layout plan
	National Grid Reference	TBC
	Source Type	Odour control unit (OS 8 and 9)
	Parameter (e.g. oxides of nitrogen)	
	Quantity (with its unit)	
	Source 10	Indicate individual sources on site layout plan
	National Grid Reference	TBC
	Source Type	Odour control unit (OS10, 11 and 12)
	Parameter (e.g. oxides of nitrogen)	
	Quantity (with its unit)	
	Source 11	Indicate individual sources on site layout plan
	National Grid Reference	TBC
	Source Type	AD Biofilter
	Parameter (e.g. oxides of nitrogen)	
	Quantity (with its unit)	
	Please provide the emission/maintenance report(s) for the flare(s). Are there any maintenance reports?	

	Please clarify whether safety zoning of areas is undertaken under DSEAR/PEXA at site.		
	Air Emissions from plant		
		Plant 1, 2 etc	Plant 1,2 etc
I27	What date did the combustion plant become operational?	November 2011	
I28	What type of SG/MCP is at each plant? E.g. diesel engine, gas turbine, other engine or MCP Take photos of all relevant tanks/equipment and processes	3 x Edina MWM 1 x TGC2020 V20 3 x CHP	
I29	What is the MWth input of each plant? Take photos of any plates	3 x 4.761 MWth 1 x 4.5 MWth 3 x 2.179 MWth	
I30	What are the guaranteed emission limits for the plant?		
I31	What are the total operating hours for the year?	2019-20 Engines 20,139 Boilers 10,487	
I33	What fuel is used? Natural gas, biogas, diesel) Dual or co- fired? What total volume of fuel is used? What total volume is stored at any one time?	All dual fuel Natural gas and biogas in an emergency	
	Provide manufacturer's specifications for all combustion plant where possible.		
	Emissions		
	Emissions to land		
GEN20	Please describe where all condensate pipes discharges (typically CHP exhaust , gas bag and digester), including the exact location of the emission and the quantity/rate of discharge. Include NGR is discharges to ground. Include location of inlet works if condensate goes to site drainage. If container used to collect condensate, where and how often, does it get emptied?	Condensate is recirculated in the process/returned to head of the works.	
	Exemptions		
	What exemptions are used on site? Typically SW have T21, D5 and S1.	U6 – using sludge for re-seeding other works	
	Cake storage		
SV04	Is any cake imported? If so, how is it unloaded from trucks and where is it unloaded?	Raw cake from Morpeth and ad hoc from other satellite sites when Bran Sands is down. Tipper trucks – cake reception area is	

		enclosed (vehicle drives in and shutter door is closed behind before unloading), and has odour extraction.
SV05	Where is cake stored? How is cake stored? E.g. Cake bays, silos, directly into skips etc	Cake silo
	How many cake bays/silos/other are there on site? How long does it take to fill a bay e.g. 4-6weeks?	
	What is the total surface area of the cake bays? Or total volume that can be stored if known? E.g. L x H x W. What is the total capacity (if in a silo)?	One large 500t silo (usually fill to 400t). Two wagons out of Howdon daily. Storage space for 1-2 only.
SV06	How is cake moved to the cake bays (enclosed truck etc)? How frequently is cake moved around the site?	Biosolids straight from the hopper chute into the truck (which is covered after loading). It is not usually stored. Cake is not moved around site.
SV07	Is the cake treated further after the centrifuge e.g. liming of cake within cake bays?	THP
SV08	When cake is within the bay, is the cake turned/disturbed at all? How often? Why?	N/A
SV09	How is cake removed from the site? How often? Over what timeframe? e.g. 2weeks constantly	Covered tipper trucks Most removal is carried out Monday-Friday, also removed on weekends but less frequently. Extra trucks from Bran Sands may arrive during busy period or plant downtime.
SV10	What is the condition of the cake bays? Eg condition of base, height of walls? Does this sufficiently contain the cake? Are there any known issues?	Good condition No known issues
	Water usage	
SV11	What sources of water does the site use? E.g. potable, secondary washwater, other process water etc What proportion/% of the site's water usage is from this source?? E.g. 2% potable water for polymer make-up and drinking, 98% primary or secondary wash water for other i.e. cleaning etc? What is it used for e.g. poly make-up, washing down etc? Is specifically potable water required for any of the site processes? (e.g. poly make-up)	Final effluent post UV used in dilution water Poly make up uses potable water Drinking water is potable water Potable water for wheel wash down 80/20 potable to final effluent Use approx. 270m3 of potable water per day
SV12	Does the site get water from other sources? Abstraction from river etc? How much is permitted to be abstracted/day/hr etc? What is it used for e.g. poly make-up, washing down etc?	No
	Generators	

SV13 - 19	Are there any generators on site? How many and what size (MW)? What are they used for e.g. primary/secondary. Site running, exporting power to grid? Do they export to grid or import from grid to run the site? Is operation of the CHPs temperature sensitive? If yes, what is their optimum temperature range? Is there a temperature above/below which they will not operate? What are their fuel sources? E.g. diesel, biogas, other source How many hours per year do they operate? Any monitoring undertaken? If so, what for and what are the standards used?	Standby generator – 1175 kVA standby, 930kVA continuous Only used during testing No export as the site demand is too great Not known Red diesel 6 hours a year approximately/infrequently
	CHP engines/boilers	
		Take photos of any plates
SV18 SV17 GRA01 MIL01	How many CHPs/boilers on site? What size (MW)? What are they used for e.g. primary/secondary. Site running, exporting power to grid? Are there any flares? If so how often is the flare used? E.g. during emergency or maintenance of the engines or all the time? Are the CHP's/boilers/ generators adequate for the amount of gas produced by the site? Any monitoring undertaken? If so, what for and what are the standards used? Is operation of the CHPs temperature sensitive? If yes, what is their optimum temperature range? Is there a temperature above/below which they will not operate? What is the annual load of CHP (given as %)	3 CHP engines (1.75MWth) 1 gas engine (2MWth) Yes – in an emergency less than 10% of total running time Yes, export biomethane to grid Yes – BS/ISO standard test method is used. Method as stated or as otherwise indicated by MCERTS and Environment Agency M2 monitoring guidance. Not known
	Noise	
I64	Please describe any noise mitigation measures on site.	Plant/equipment/generators/engines are inside building where possible. Appropriate design and equipment selection.
	Other abatement?	
	Have any noise assessments been undertaken on the site?	Yes in 2010, in 2017 one was completed for the blowers and 2014 for the G2G
	Have there been any noise complaints?	No historic records of noise complaints
SV19	Any monitoring undertaken? If so, what standards are used?	N/A
	Odour	
SV20	Please describe any odour mitigation measures on site e.g. processing of imported sludge immediately,	Current OMP reference OMP rev14 (last reviewed Dec 2020 and is done annually)

	odour control hoses for tankers, water suppression sprays, enclosed processes, doors to buildings kept closed, buildings under negative pressure?	OC 8 and 9 extract from strategic tanks. OC 10, 11 (dewatering scrubber) and 12 (polisher to remove ammonia) AD biofilter extracts from raw centrifuge, PDST and cake import (wet scrubber with rock media) G2G has a carbon filter for emergency/secondary abatement Cake import facility has extraction, in addition to the vehicles pulling in, and the door closing behind before unloading. No odour suppression units Imported sludge is processed immediately SCADA tracks wind direction/wind speed
SV21	What is the odour control system used – specific to locations on site? Bio-scrubbers/carbon filter etc? What is the media used? Which processes are odour controlled? How and when is the odour control maintained/inspected to ensure they remain effective? Please provide full maintenance schedules for each site	Obtain as much information as possible on system used and take photos. See above
SV24	Is odour monitored? If so how?	TBC
	Is there a site specific odour management plan?	OMP revision 14, Dec 2020
	Any odour complaints?	Yes, TBC
	Other abatement?	Wind direction and speed monitoring on SCADA. Key processes are enclosed.
GEN16	Describe the maintenance programmes that are undertaken to ensure odour and bioaerosol control measures are maintained	See above
OMP02	Please identify the most common sources of odour complaints (i.e. during movement of cake, etc)	TBC
OMP01	Dry solids range (%), sludge type, sludge pH, and storage time at average throughput for different tanks / processes.	The plant was originally designed to accept liquid sludges between 3 & 8% DS. Thinner sludges do arrive. Thicker sludges are difficult to discharge and have been diverted offsite for “adjustment”. Cake %DS varies but typically 25%. Sludge pH can vary from 5.5. to 8 but typically around 7. Buffering varies through the plant. Imported cake loads are processed immediately – no more than two loads in each stream (one on conveyor and other in silo). Digestion process is designed for optimum 18 days retention.
OMP04	For each asset on-site, please provide: • Potential odour source • Odour controls in place (see SV21) • Potential for odour emissions • Action to be taken in case of failure	Tanker import: Sludge leaks/spillage; washdown/clean up; localised odour potential; operational clean up; Team Leader. Cake Import: Spillage; clean up; localised odour potential; periodic operational clean up; Team Leader. Sludge tanks: Pipe blockage/tank cleaning; clean up; localised odour potential; periodic operational clean up; Team Leader.

	• Person responsible	Sludge cake dilution; Pipe/pump blockage/tank cleaning; clean up; localised odour potential; periodic operational clean up; Team Leader. Raw Sludge Dewatering: Sludge blockage/spillage; odour extraction/wash down facilities; minor odour potential; clean up; Team Leader. THP; Foul gas skid maintenance; stream shutdown; strong odour potential; pre inspection flushing/immediate clean up; Team Leader. Digesters: "Burp"; process throughput reduced or stopped; minor odour potential; process control and sampling to avoid upset; sludge spillage removal/washdown/clean up; Team Leader. Biogas Gas Bags: gas leak from inner to outer bag; CH4 monitoring/internal gas bag inspections; localised odour potential; CH4 monitoring/gas replacement; Maintenance Team leader. Digestate Dewatering: Spillage/blockage; clean up; minimal odour potential; regular maintenance; Ops & Maintenance Team Leader. Biofilters: Failure to treat odours; media replacement/capex for process improvements; temporary mitigation e.g carbon filters; regular maintenance; Maintenance and Site Managers. G2G: Offgas discharge from stack; carbon filter and monitoring (H2S CEM and sampling); low odour potential; carbon filter change; Team Leader G2G: Odorant spillage; selected equipment; spillage control/clean up procedures; strong odour potential; regular maintenance; Northern Gas Networks (NGN).
	Bioaerosols	
GEN15	Describe the processes and bioaerosol control measures (e.g. odour abatement systems, enclosed tanks, filters) associated with:	All STC processes are enclosed See above for odour abatement
	• Sludge reception/transfer of sludge between the vehicles and the facility (including: frequency of deliveries and collections, and types of vehicles used to transport waste; proportion of water within the sludge cake delivered to site etc)	Vehicles carrying cake drive in and the shutter door is closed behind before tipping to prevent emissions. The cake reception facility is also connected to odour extraction. Vehicles transporting cake/sludge are covered.
	• Handling and storage of sludge/digestate throughout AD process	See previous questions.
	• Disposal of biogas (combustion)	Combustion in boilers/gas engines/by flare and export after Gas to Grid plant.
	• Any other relevant procedures onsite which could generate bioaerosols	See previous answers.
	If using odour suppression sprays are they used to just mask the smell or to catch and drop the odour?	No
	Is sludge arriving on site processed immediately? If not how long is it until it is fed into the system?	Sludge/cake is processed immediately
	Pests	
SV25 &	Does the site experience pests and if so what are they (birds, vermin etc)?	Site doesn't experience many problems with pests. Some presence of rats.

GEN12	What measures are in place to prevent/control pests? What measures are in place to remove pest issues? What's the frequency of visits by a pest control contractor?	The pest control is not regular, and an external contractor is brought onto site when an issue with rats has been flagged. Site ensures good housekeeping at all times to discourage presence of pests. Doors are kept closed when not in use
	Raw materials – Write here or refer to table at the bottom	
135	Will operations require raw materials? What raw materials are used on site? List all including diesel, poly, lime etc Try to get the proper chemical name as well as what it is referred to.	Polyelectrolyte (liquid and powder) – 15-20 bags (0.75t per bag) and 15-20 IBCs Poly tank (raw) 24m3 Final poly tanks (20m3 mix tank and 20m3 day tank) Diesel – 300l Lubrication oil for gas engines – TBC Test/calibration gases for grid entry unit – TBC Sodium hypochlorite – 15,000l Sulphuric acid (for ammonia polishing in OS 12) - 5,000l Anti foam – 5t Gas bag - TBC
I36	How much is stored on site of each at any one time (maximum tonnage)?	TBC
	What is each material used for?	For Raw Water & High Quality Process Water see SV11. Polyelectrolyte is used as a coagulant to thicken sludge. Diesel is a fuel. Lubrication for engines. Compulsory requirement for natural gas in the gas network. Calibration test gases also compulsory requirement.
SV26	How and where are they stored? Bunded, stored undercover etc? Are they in IBC's, bags, tanks etc?	Poly is stored in buildings in bags or IBCs Diesel is stored in tanks Sulphuric acid is stored in chemical tank Sodium hypochlorite is stored is stored in chemical tank
SV27	What is the storage capacity of tanks, IBC's etc, how many on site?	See above
	How often are they replaced?	TBC
I38	Describe the basic measures for improving energy efficiency of the activities carried out on site	Energy Plan reviewed. Various options under investigation, feasibility, installation, commissioning and operation e.g. Variable Speed Drive (VSD) used on digester mixing, RO, warm Pulper dilution, steam accumulator, heat recovery, steam use reduction, increased energy generation (ETC), organic ranking cycle (ORC), warm combustion air, load adjustment for centrifuges, gas chiller, sludge cooler control/digester temperature, digester feed control, LED lighting, Solar panels (250kW peak) and various other ongoing investigations/potential trials (gas recovery from digestate, UV treatment of odour, Algae treatment of digested liquors, Digester DNA profiling).

	Resource efficiency	
I41	Explain and justify the raw and other materials, other substances and water that SW use at site	See SV26
SV28	Describe waste avoidance and waste recovery measures (for the whole site operations, including staff generated waste). Describe how waste is disposed, by whom. This relates to all wastes generated by SWS operations on site – e.g. wash water, screenings etc	AAD/RSTC destroys 50% of sludge solids converting them into renewable energy. The process sterilises the sludge (12 bar 165C) killing all viruses/salmonella and produces an excellent solid conditioner/fertiliser. Washings/dewatering liquors are treated in the adjacent WSTW. Dewatering process is closely controlled to minimise waste. The RAG is removed from the process and currently goes to landfill after compaction. NWL are actively looking at alternate routes for this waste – preferably re-use. NWL has a campaign ongoing to "Bin the Wipe" that has reduced RAG levels in targeted areas. Scrap steel from redundant equipment removal/plant improvements is separately collected for recycling. Separate skips for WEEE, redundant equipment, general waste with cardboard/paper/plastic segregation. NWL has have 'zero avoidable waste by 2025' policy, which includes producing a waste accounting workbook to track waste being generated.
	Any water saving measures?	Several of the energy efficiencies will reduce steam use therefore water use. Use of final effluent for dilution
	Combustion	
I43	Does the site have an aggregated net thermal input of combustion plant/s more than 20MW?	No
	Site Plans and Processes	
I50	Please obtain a site layout plan for the site to show the location of all equipment, key aspects of the site infrastructure and operations and emission points	To be provided
I52	Please explain the waste treatment processes carried out on site, the associated environmental risks and how these are managed/mitigated for each site	To be detailed in the new ERA. AAD/RSTC accepts and treats municipal sludge (from STW) using a combination of straining, raw dewatering, sludge cake reception, blending, thermal hydrolysis, anaerobic digestion, digestate dewatering and digested cake export. The biogas produced is either utilised on site for electricity and heat generation or upgraded and exported to gas network after propane addition. A combination of design, equipment/process selection and operational procedures manage identified environmental risks for the site.
	Risk Assessment	
I55	Please provide any existing environmental risk assessments relating to the operations of the site	No existing ERA doc, risk assessments are spread across multiple docs so new one will need to be produced.
I57	Please confirm whether the site sources all water or a proportion of water through surface water or ground water abstraction.	No groundwater abstraction

I61	Please provide details of the tanks on each site, their contents, how they are maintained, capacity and specification (e.g bunding features) What are the age/condition of tanks?	Tank schedule can be provided if required.
I62	Please provide details of all environmental incidents that have occurred within, or near the site, including any fires and spills. Please explain how these were handled and any environmental impacts identified following the incident.	No history of fires.
I63	Please describe any noise mitigation measures on site	As previously stated, plant/infrastructure/generators are in enclosed buildings
GEN03	Please provide historical flood records for all sites Are these events recorded anywhere e.g. site diary/log How often are flooding occurrences – e.g. monthly, during heavy rainfall?	No historical issues with flooding, so events have not been logged/recorded. There are plans to increase flow by 15% to meet the population growth within the catchment area.
GEN04	Please provide copies of any additional assessments undertaken at the site e.g. air dispersion modelling, habitats regulations, protected species surveys, preliminary ecological, MCZ screening, noise impact, flood risk, heritage, bioaerosols risk assessments etc	Noise impact assessment last completed in 2014 Air dispersion modelling has also been completed recently
	Health and Safety	
GEN05	Please provide a description of the health and safety procedures that are in place to deal with accidents/incidents on site. Please confirm any accreditation achieved for H&S.	Used to be certified to 18001 however this certification lapsed in 2021, due to NWL cost saving measures. Company health & safety handbook, system of tool box talks, weekly safety meeting/learning calls, deviation/change control, work permit system along with site specific safe, standard operational procedures (SSOPs), site safety groups and requisite training.
	Is SCADA used on site? What processes are covered by SCADA?	Howdon has a site wide SCADA which covers all processes.
	Digesters	
	How many digesters on the site?	3, a bull horn whessoe value on each (two emission points)
	Digester capacity	18,000m3 total, 6,000m3 each
SV29	Any Wesso valves? How many? Any temperature sensitivity observed in the Whesso valves? (previously we have heard of Whesso valves freezing below -5oC)	See above. No known issues
SV30	Any monitoring of tanks/gas? Is there an alarm system attached to the Wesso valves (inform SCADA when operational)?	Alarms above 32.4 millibar (lower alarm kevel that Bran Sands) All tanks have level monitoring (radar, ultrasonic, float, hydraulic, contact, radioisotope (Registration under IRR17 and separate permit under EPR 2016). Pressure monitoring of biogas from digesters alarms before Whessoe valve would operate. Various levels of protection e.g. two separate technologies to measure level in digesters, pressure measurement, water locks and Whessoe valv

	What is the ground like surrounding the tanks? E.g. permeable gravel, concrete etc	A reinforced concrete apron
SV31	Underground pipework? Known condition?	Mix of underground and overground pipework
	Is biogas generation managed by reducing the digester feed in the event that the flare stack and/or CHP engine failed and caused the Whessoe valves to release biogas?.	Biogas generation is managed by reducing feed. No known biogas release from the Whessoe valves.
	Drainage	
	Where do the drains go? E.g. Head of the works	Surface water drains to the Tyne. Apron drains (most operational area) recirculate back to the head of the works
	Is site adjacent to a river or stream?	Yes, River Tyne
	Is the whole site bunded	No
	Are there any cracks in the pavement	Nothing significant
SV31	In the condition of the underground pipework known?	No
GEN21	Please describe whether all drainage (surface or foul water) will be captured by the onsite drainage systems.	See above
GEN21	Please describe the drainage surrounding the cake storage bays and whether run off from there is also captured by the drainage system.	Apron drains recirculated to the head of the works
SV32	Are there any isolation valves, penstock etc operational that can isolate flows? If so where and in what circumstances are these used?	No
	Abnormal conditions – extreme high temperature, flooding (Climate Change RA)	
SV36	How large is the site's stormwater storage capacity? OR how much retention time do the storm storage tanks allow? Have there been any issues in the past with direct discharge to the watercourse when stormwater storage capacity has been exceeded, occurring repeatedly?	STC and AD have no stormwater capacity N/A No
CC01	Has the site previously experienced any flooding incidents? If yes, is there information on these? When, how frequent, how severe has flooding been. Has the flooding led to untreated wastewater being discharged to the watercourses due to high volume of water exceeding the storm storage capacity?	No see SV34 N/A
CC07	Is the access route to the site (main road access) at risk of flooding? Has it flooded previously? Are there alternative access routes?"	Main access route and an entrance at the north east corner
CC03	What wastewater flow is the site rated at? What is the pass-forward' flow?	TBC

CC04	How large is the site's stormwater storage capacity, OR how much retention time do the storm storage tanks allow?	N/A
CC06	Does the site require potable water for any of its processes?	Drinking water, poly make up and vehicle wash down
CC05	Does the site operate any temperature-sensitive processes? E.g. do any of the biological treatment processes have optimal operating temperature ranges? What are they? Does the AD plant or anything else have optimum temperature range for operation?	unknown
SV38 & CC02	Has the site experienced any issues related to high temperatures in the past – e.g. any odour control issues? Or Potable water availability issues during drought?	No No
CC08	Does the site already have a generator installed / provision for a plug-in generator at the site?	Yes, a standby generator
	Waste generation	
	What wastes are generated by the site?	General, recyclable, grit, screenings, plastic, glass, metals and some haz wastes from the lab
	How is it stored?	Mainly in biffa skips, within buildings
	Other	
SV39	Has any ground investigation/monitoring been undertaken on the site eg for planning permissions? Are there any available monitoring boreholes?	Envirocheck report in April 2011 AEG ground investigation report in March 2010
	Planned AMP7 schemes for the site that may impact the permit application?	Plans to increase flow by 15% to handle the additional throughput from the catchment areas population growth.
	What is the general site infrastructure like? Any areas of concern?	Good condition
	Any positive interventions witnessed on site?	No
	Age of site?	1970 and has been continually developed since

C. Envirocheck report

To be provided upon request