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ATTACHMENT-4-8-3 COMPLETE BASELINE REPORT

Technical Report Prepared For
Amazon Data Services Ireland Limited

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EXECUTIVE SUMMARY

This soil and groundwater quality baseline report has been completed as part of the ADSIL IED licence application. The report has been prepared in compliance with *European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions*.

The only relevant bulk hazardous substances (substances stored or used onsite and which are classified as hazardous by the EPA under the Groundwater Regulations and contained in bulk storage) is diesel for emergency back-up generators. The diesel store is of sufficient volume to be identified as a hazard present at the site which has the potential to impact soil and groundwater if not adequately mitigated during storage and operation at the Installation.

A review of containment and mitigation measures at the facility confirms that the risk of a contamination event resulting in soil or ground water contamination is low. These measures include hard standing, adequate bunding, tank level alarms, double lined transfer lines, spill management procedures and hydrocarbon interceptors on all stormwater lines draining areas where there is a risk of surface water interacting with hydrocarbon sources.

The site is within an urban area situated in the Clonshaugh Business and Technology Park, Clonshaugh, Dublin 17.

A review of the site history confirmed the southern section of the site was formerly a warehouse operated by Donnelly Documentation Services. The middle section of the site was the former Cahill Printers building previously used as a printing press. The Northern section of the site is the former Acco/Rexel site which produced plastic extrusions. All three facilities comprised warehousing, offices and associated infrastructure.

The majority of the site is hard paved reducing the potential for vertical migration to ground during operation. In the unlikely event of a leakage outside of the storage bunds, the primary pathway would be through the stormwater drainage system which ultimately discharges to the business park storm sewer(s) following treatment through hydrocarbon interceptors. There is a stormwater flow control device located downstream of the attenuation storm cells to reduce to the maximum permissible flow rate.

A conceptual site model (CSM) has been presented for the site based on the assessment of available information and of site investigation data collected at neighbouring sites. The source pathway qualitative risk assessment concludes that the risk of an impact to soil or water is low.

Receptors include the underlying aquifer and Santry River located immediately to the south of the site which discharges to the east to the North Bull Island transitional water body, and ultimately the Dublin Bay. There is no potential for a source -pathway-receptor linkage with the underlying aquifer based on the presence of thick deposits of low permeability glacial clays beneath the site. There is an indirect linkage to Dublin Bay (> 5.5km from the site) through the stormwater system discharging to the Santry river. The design measures on site ensure maintenance of stormwater quality discharging from the facility.

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1.0 INTRODUCTION

AWN Consulting Limited (AWN) was appointed by ADSIL to complete a screening for a baseline report and a subsequent baseline report to accompany an application to the Environmental Protection Agency (EPA) for an Industrial Emissions (IE) Licence for the Installation.

ADSIL are applying to the Environmental Protection Agency (EPA) for an IE Licence in relation to Buildings W, X and Y on the Site. Building X and Y are connected via link corridor. As with the majority of the data storage facilities in Ireland, Buildings W, X and Y are equipped with diesel powered emergency back-up generators for the provision of emergency power supply.

This report relates to the site located Clonsaugh Business and Technology Park, Clonsaugh, Dublin 17 as described in the Operational Report Attachment 4-8-2.

It is necessary from the outset of a licence application that the operator of a facility has a record of the existing conditions of the site prior to development. This allows for a comparison of contamination at the beginning and end of a site's operational history.

1.1 DISCLAIMER

The conclusions presented in this report are professional opinions based solely on the tasks outlined herein and the information made available to AWN. They are intended for the purpose outlined herein and for the indicated site and project. Furthermore, this report is produced solely for the benefit of ADSIL to address the EPA requirement for a licence application.

This report may not be relied upon by any other party without explicit agreement from AWN. Opinions and recommendations presented herein apply to the site conditions existing at the time of the completed field work and subsequent assessment.

They cannot apply to changes at the site of which AWN is not aware and has not had the opportunity to evaluate. This report is intended for use in its entirety; no excerpt may be taken to be representative of this baseline assessment. All work carried out in preparing this report has utilised and is based on AWN professional knowledge and understanding of the current relevant Irish and European Community standards, codes, and legislation.

1.2 LEGISLATIVE CONTEXT AND GUIDANCE

Under the Industrial Emissions Directive¹ it necessary to prepare a Baseline Report in conjunction with an Industrial Emissions Licence Application, as stated in Article 22(2) Chapter 2 of the directive:

“Where the activity involves the use, production or release of relevant hazardous substances and having regard to the possibility of soil and

¹European Union. Directive 2010/75/EE of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control). EU: November 2010.

groundwater contamination at the site of the installation, the operator shall prepare and submit to the competent authority a baseline report before starting operation of an installation....”

Article 22(2) specifies that the Baseline Report should contain at least the following information:

- a) Information on the present use and, where available on past uses of the site;
- b) Where available, existing information on soil and groundwater measurements that reflect the state at the time the report is drawn up or, alternatively, new soil and groundwater measurements having regard to the possibility of soil and groundwater contamination by those hazardous substances to be used, produced or released by the installation concerned.

The Industrial Emissions Directive was transposed into Irish law under the European Union (Industrial Emissions) Regulations 2013². The Environmental Protection Agency Act 1992 was subsequently amended to include aspects of the conditions outlined in Article 22(2); this included the requirement for an applicant for a license to furnish to the Agency a baseline report. *The applicant in preparing the baseline report shall include any information prescribed in regulations under section 89 which includes:*

- a) The current use and, where available, the past use of the site,
- b) Any available information.
 - i. On soil or groundwater measurements that reflect the state of the site at the time that the baseline report is drawn up, or
 - ii. On new soil and groundwater measurements, having regard to the possibility of soil and groundwater contamination by the hazardous substances proposed to be used, produced or released by the installation concerned.

This report has been prepared to address the requirements of legislation and in accordance with the EU Guidance³ for baseline reports. The EU Guidance outlines a number of key tasks that should be undertaken to both determine whether a baseline report needs to be produced for a particular situation and in order to produce the baseline report itself. The EU Guidance sets out 8 individual Stages to be considered; this report addresses the elements in accordance with Stages 1 to 8.

- Stage 1: Identifying the potential hazardous substances that are currently used, produced, or released at the site
- Stage 2: Identifying the relevant hazardous substances i.e. those which have the potential to cause soil and groundwater contamination
- Stage 3: Assessment of the site-specific pollution risk
- Stage 4: Site History
- Stage 5: Environmental Setting
- Stage 6: Conceptual Site Model
- Stage 7: Site Investigation – Soil & Water Quality Assessment
- Stage 8: Production of the Baseline Report

²Ireland. European Union (Industrial Emissions) Regulations 2013 (S.I. No. 138 of 2013).

³European Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on Industrial Emissions. EU: 2014/C 136/03

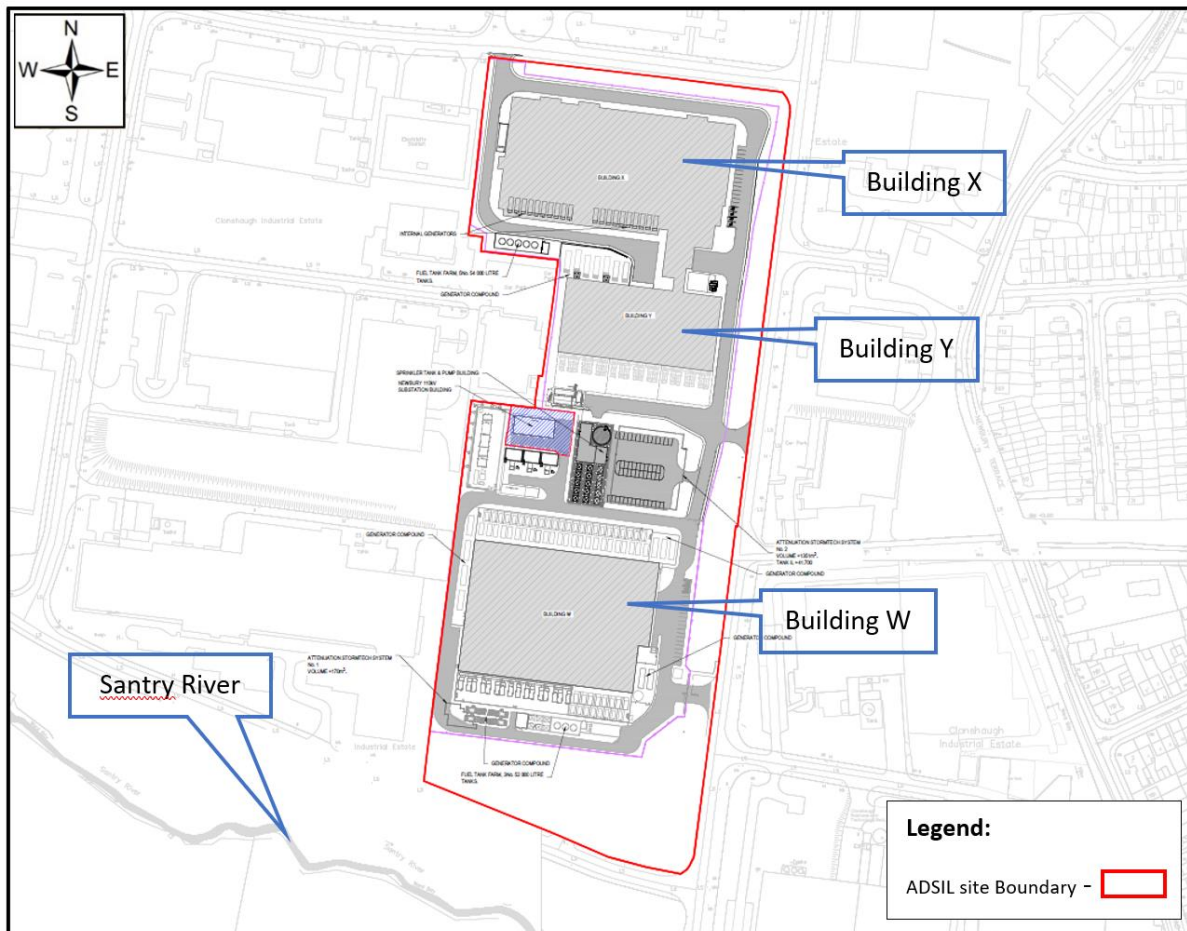
1.3 SITE LOCATION AND CONTEXT

This soil and groundwater baseline report relates to the entire site subject to the proposed IE licence. The site is c. 7.9 hectares in extent, 3 no. two storey data storage installation buildings with mezzanine floors at each level (Buildings W, X and Y) and ancillary elements. Building X and Y consists of a 2-storey building connected via link corridor. The ancillary elements include loading bays, maintenance and storage spaces, associated water tanks, sprinkler, tanks, pump house and electrical rooms, security and utility spaces, underground foul and stormwater drainage network, underground attenuation systems, internal roading network, and site landscaping. Building W occupies the southern section of the site. Building X occupies the northern section of the site and Building Y is located between Building W and X. The overall site includes the Newbury 110 kV GIS Substation.

The site boundary is presented in 21_123F-00-XX-DR-C-0002 Site Layout Plan of the licence application and Insert 1.1 (indicative) and 1.2 (extract from the CSEA Site Layout Plan) below.



Insert 1.1 Site Location (indicative red line site boundary)



Insert 1.2 Site Location (red line boundary illustrating as built site layout – extract from CSEA Site Layout Plan)

The Installation is located on a site of c. 7.9 hectares, located at the main entrance to the established Clonsaugh Business & Technology Park, approximately 200 m off Oscar Traynor Road. Developments within this business park are similar 'individual lot' type developments. The IDA managed Clonsaugh Business and Technology Park which lies approximately 6.5km north of Dublin's city centre and 3km south of Dublin Airport. To the south of the site is a sports grounds facility and to the East of the Business Park are residential estates. The M1 motorway runs parallel to the business park site boundary to the West the Site. Access to and from the park at present is from Oscar Traynor Road.

The IDA Clonsaugh Business and Technology accommodates a range of technology and industrial type uses and is bounded by the M50/M1 to the west, the Santry River to the south with Oscar Traynor Road beyond, residential areas to east and the R139 to the north.

The wider context of the site is defined primarily by commercial and industrial development. Large areas of the surrounding lands to the south and north within the Clonsaugh Business & Technology Park have been developed in the past 10-15 years and are occupied by industrial campuses including commercial and retail uses, including manufacturing, data centres and food manufacturing uses.

The closest occupied residential properties are located c. 200m east of the site boundary along the Clonshaugh Road. The surrounding 1 km of the site includes IE and IPC Licenced sites including:

- Forest Laboratories Ireland Limited (P0306-03), located to the immediate west of the site; and
- Wood-Printcraft Limited (P0143-01) located to the southeast in Coolock Industrial Estate
- Mondelez Ireland Production Limited (P0809-01) located to the southeast in Coolock Industrial Estate

Located approximately 1km to the north east of the site immediately north of the Junction of the R139 and Clonshaugh Road is a historic landfill containing; a mixture of commercial, municipal, industrial, and construction and demolition waste material; which was buried there in c. 1980s. Permission was granted by Fingal County Council (FCC) in 20 August 2019 (ref: F19A/0149) for the remediation by excavation and removal of circa 22,000 cubic metres of mixed waste material illegally deposited on lands at Belcamp. The project will involve site preparatory works, excavation and infill works, installation of a cut-off wall to the south and south west and restoration with grass and treeline where applicable.

The site location and wider context is presented in 21_123F-CSE-00-XX-DR-C-0001 Overall Site Location Plan included with this application.

1.4 SOURCES OF INFORMATION

Reference is made in this report to information from a number of existing data sources and reports including the following:

- Ordnance Survey Ireland - aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) – website mapping and database information;
- Dublin City Council - illegal landfill information; and
- Environmental Protection Agency (EPA) – www.epa.ie on-line mapping and database information;
- Environmental Protection Agency (EPA) – www.epa.ie on-line licence information
- Research papers referred to in the text.

Other relevant documentation consulted as part of this assessment included the following:

- Project C-Unit AF1, Clonshaugh Business and Technology Park, Dublin 17. Due Diligence Report, ADSIL 24th November 2010
- Site 1 Cahill Printers Facility Due Diligence Report ADSIL, 22nd February 2013.
- Site 2 Acco Rexel Facility Due Diligence Report, ADSIL, 22nd February 2013.
- Environmental Audit (Phase 1 – Historical Review and Site Walkover) for Clifton Scannell Emerson Associates by AWN ref TH/12/6520 7th February 2013
- Complete Baseline Report 2020 IED Licence Application, ADSIL, AWN Consulting ref JG/20/11534WR01

1.5 SCOPE OF WORK UNDERTAKEN

The scope of the work undertaken for this assessment included the following:

- A desktop review of regional and site geology and hydrogeology.
- Review of available soil and groundwater quality data where available.
- Review of bulk liquid storage at the site and assessment in terms of likely impact to receiving waters.

2.0 STAGE 1: IDENTIFYING THE POTENTIAL HAZARDOUS SUBSTANCES

This section of the report identifies a list of all hazardous substances dealt with inside the Installation boundary (either as raw materials, products, intermediaries, by-products, emissions or wastes).

This includes all hazardous substances associated with both the IED Annex I activities and directly associated activities which have a technical connection to the activities carried out and which could have an effect on soil or groundwater pollution.

Where hazardous substances are listed under trade names the chemical constituents have also been identified. For mixtures or compounds the relative proportion of the largest constituent chemicals are identified.

Table 2.1 Substances stored on site

Substance	Area Served/Purpose	Expected Volume of storage
Diesel Fuel Oil	Emergency Generator Fuel source	365 m ³
R410A	Refrigerant for cooling systems	590 (kg)
R32	Refrigerant for cooling systems	57.6 (kg)

There are no other raw materials held onsite other than domestic cleaning chemicals for cleaning of the staff facilities. These are managed by the cleaning company.

All oils, paints, adhesives or other materials required are brought onsite and removed from site by the relevant contractors.

Refrigerant is held within the VRF system for the offices. No refrigerants are stored onsite. R410A and R32 is held within this enclosed system on a continuous basis and would only be removed during decommissioning.

The small amounts of hazardous waste generated are stored in a designated storage area in each building. The waste is covered, and a mobile retention bund is in place to contain any liquid waste that requires storage, where required. The waste is collected from this area by an authorised waste contractor for recovery and / or disposal off-site.

Waste oil and filters and waste batteries are not stored onsite and are removed by the maintenance contractors during maintenance operations and change outs.

Waste sludge from the oil separators is removed directly from each separator by a specialised contractor by means of a vacuum tanker.

3.0 STAGE 2: IDENTIFYING THE RELEVANT HAZARDOUS SUBSTANCES

This section identifies which of the hazardous substances from Stage 1 are 'relevant hazardous substances' as defined by European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions.

'Relevant hazardous substances' are those substances or mixtures defined within Article 3 of Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP Regulation) which, as a result of their hazardousness, mobility, persistence and biodegradability (as well as other characteristics), are capable of contaminating soil or groundwater and are used, produced and/or released by the Installation.

Table 3.1 Hazard statements for substances on site

Substance	Hazard Statement(s)	Hazard Statement Description
Diesel Fuel Oil	H226, H304, H332, H315, H351, H373, H411	Very toxic to aquatic life, Toxic to aquatic life with long lasting effects

The table above summarise the Hazard Statement and description of the hazards for the identified chemicals identified, these statements identify the ability of these substances to contaminate soil or groundwater.

The only bulk liquids to be stored on site is diesel which is stored for emergency back-up operation of generators. Diesel fuel oil is considered to be capable of contaminating soil and/or groundwater.

4.0 STAGE 3 – ASSESSMENT OF SITE-SPECIFIC POLLUTION RISK

This section addresses the actual possibility in the context of the site for soil or groundwater contamination, including the probability of releases and their consequences. Taking particular account of:

- The quantity of each hazardous substance handled, produced or emitted in relation to its environmental effects.
- The location of each hazardous substance on the site e.g. where it is or will be delivered, stored, used, moved around the site, emitted etc., in particular in view of the characteristics of the soil and groundwater at that part of the site.
- The method of storage, handling and use of relevant hazardous substances and containment mechanisms to prevent emissions occurring; e.g. bunds, hard-standing, handling procedures.

As with every site there is the risk of accidents and incident due to tanker overturning on site roads; vessel rupturing; leaking tanks; seal breaking; accidental discharge; leaks from drain ruptures; or fire. As well as identified risks during routine operations such as spills during delivery or from pipe joints, small spills during decanting/transfer of product, leaks from blocked or broken drains, cracks in concrete hard-standing.

The only planned emissions from the site that hold a risk of including these relevant substances is the discharge to stormwater network. There are no planned discharges to land or ground water.

4.1 DIESEL FUEL OIL

Fuel (diesel) for the emergency back-up generators is stored in multiple locations across the Site; that includes bulk diesel tanks and day tanks located with each emergency back-up generator.

There is a total diesel storage capacity on site of 535,000 litres, 535 m³ or approximately 460 tonnes (assumed density of 0.86 l/kg). The tanks on site are filled to 80% capacity under normal conditions; therefore, the total diesel storage on site is 424,800 litres, 424.8 m³ or approximately 365 tonnes (assumed density of 0.86 l/kg).

There are 2 no. diesel unloading bays on site located at each of the bulk diesel tank farms.

Bulk Diesel Tank Farms

Bulk diesel is supplied to Building W generators from the 3 no. 52,000 L tanks located in the southeast of the Site; the bund has a capacity of 316.80 m³. The bund capacity exceeds the EPA guidance for 110% of the capacity of the largest tank or drum within the bunded area, or 25% of the total volume of the substance which could be stored within the bunded area.

Bulk diesel is supplied to Building X and Y generators from the 5 no. 54,000 L tanks located in the northeast of the Site; the bund has a capacity of 408 m³. The bund capacity exceeds the EPA guidance for 110% of the capacity of the largest tank or drum within the bunded area, or 25% of the total volume of the substance which could be stored within the bunded area.

The bund is constructed of suitable concrete and has undergone testing for integrity during the commissioning phase. All pipelines are integrity tested following installation by vendor. The bunds and delivery bays are equipped with hydrocarbon probes in the bund sump which detects diesel in the bund. This triggers closure of the sump discharge should hydrocarbon be detected in the sump and sends an alarm signal to the BMS to alert EOTs.

The bulk fuel tanks are fitted with automated level gauges and the online readings from these gauges are fed back into the facility's BMS/EPMS. The bulk tanks also have high/low level alarms (90% high, 30% low) and a high-level switch at 95% which alarm to the BMS/EPMS critical alarm.

Fuel delivery to the bulk storage tanks will take place within the designated fuel unloading areas under strict Standard Operating Procedures. Diesel will then be piped from the bulk storage tanks to the emergency backup generator. Diesel fuel pipelines above ground are Carbon Steel, and below ground are Close Fit PLX (dual-contained pipe system).

Buildings W

Bulk diesel is supplied to the emergency backup generator day tanks at Building W from the Bulk Tank Farm in the southeast of the site.

Each of the 13 no. emergency backup generators at Buildings A are accompanied by a double skinned day tank (2,500 litres each) for immediate supply to the generator.

These day tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

There are 2-no. diesel powered fire sprinkler pumps at the sprinkler house that have 3 no. double skinned tanks (1,000 litres each) for immediate supply to the fire sprinkler pump.

Buildings X and Y

Bulk diesel is supplied to the emergency backup generators day tanks at Building X and Y from the Bulk Tank Farm in the northeast of the site.

Each of the 20 no. emergency backup generators at Buildings X, and 7 no. emergency backup generators at Buildings Y, are accompanied by a double skinned day tank (2,500 litres each) for immediate supply to the generator. These day tanks are equipped with level gauges with high/low alerts which will also alarm to BMS/EPMS critical alarm.

There are 2-no. diesel powered fire sprinkler pumps at the sprinkler house that have 3 no. double skinned tanks (1,000 litres each) for immediate supply to the fire sprinkler pump.

4.2 SURFACE WATER DRAINAGE

Rainwater runoff from impermeable areas of the site will be collected via the onsite storm water drainage network in accordance with DCC Planning Ref. 2979/13, 2688/13 and 3534/11. This network will convey the stormwater via Hydrocarbon Interceptors to one of 2 no. stormwater basins (See Drawing 21_123F-CSE-00-XX-DR-C-1100). The attenuated stormwater discharges offsite at 2 no. Emission Points (SW1 and SW2).

There are 2 no. Attenuation Storm Cells located on site that are designed to attenuate storm waters:

- Attenuation Storm cell 1 (170 m³ capacity) is located to the south of the site and discharges directly to the existing business park storm sewer located to the south of the Site and subsequently to the Santry River.
- Attenuation Storm cell 2 (1,351 m³ capacity) is located to the south of Building Y, and discharges directly to the existing business park storm sewer located to the east of the Site and subsequently to the Santry River.

The stormwater from the site is discharged at the 2 no emission points SW1 discharges to a 450mm business park storm sewer, SW2 connects to a 900 mm diameter, business park storm sewer that is located to the east of the site that flows north to south. The stormwater passes through Hydrocarbon Interceptors on site to ensure that the quality of the stormwater discharge is controlled. This network is shown on Drawing 21_123F-00-XX-DR-C-1100 Surface Water Layout Plan.

The business park storm sewer(s) outfall into the Santry River that is located to the south of the Site; the Santry River flows 5.15 km east, to the North Bull Island transitional water body, and ultimately the Dublin Bay.

Evaporative Cooling Water

Evaporative cooling water from the AHUs discharges to the stormwater network. This is recirculated mains water that has been through the AHUs only. There is no addition of water treatment chemicals and therefore the water is of sufficient quality to be discharged to storm.

4.3 WASTEWATER DRAINAGE

Domestic effluent arising from occupation of the Site, including the transformer compound and control building will be discharged to the public foul sewer (at Emission Points SE1 through SE4). Refer to Drawing 21_123F-00-XX-DR-C-1200 for the foul drainage layout. The foul water connection to the public foul sewer is in accordance with the DCC Planning Ref. 2979/13, 2688/13 and 3534/11.

Domestic Effluent

A gravity piped foul drainage network comprising 225 mm uPVC pipes conveys effluent from internal sanitary locations and outfall into the external foul network. The outfall into the existing foul network will be at four locations, SE1, SE2, SE3 and SE4.

All internal foul drainage networks were designed in accordance with the relevant guidance including Irish Waters Code of Practice for Wastewater Infrastructure, National Building Regulations Technical Guidance Document H – Drainage & Waste Disposal.

The foul network ultimately conveys the wastewater for final treatment and disposal at Ringsend Wastewater Treatment Plant (WWTP) in Dublin.

Diesel Tank Farm(s)

Drainage of rainwater from the diesel tank farm and associated fuel unloading bays to the south of the Site (Building W) is directed to foul sewer and connects to the foul main at emission point SE2 and SE3. The drainage from the diesel tank farm and associated fuel unloading bays to the north of the Site (Building X and Y) is directed to foul sewer and connects to the foul main at emission point SE1.

The drainage sumps at the fuel unloading bays and in the bulk tank concrete bunds contain hydrocarbon detectors which automatically shut off drainage from these sumps if diesel is detected, preventing any contaminated stormwater from exiting the bund. These probes are also connected to the BMS/EPMS critical alarm.

Drainage from the bulk tank farms is equipped with hydrocarbon interceptor(s). The location of these are illustrated on 21_123F-00-XX-DR-C-1200. The hydrocarbon interceptors are equipped with an oil warning system which is connected to the BMS/EPMS critical alarm.

Transformer Compound

There is one transformer compound onsite located at the Newbury GIS Substation, the drainage from the transformer compound is directed to foul sewer, and connects to the foul main to discharge at emission point SE1.

Drainage from the GIS Substation transformer compound is equipped with hydrocarbon interceptors. The location of these are illustrated on Drawing 21_123F-

00-XX-DR-C-1200. The hydrocarbon interceptors are equipped with an oil warning system which is connected to the BMS/EPMS critical alarm.

5.0 CONCLUSION - STAGES 1 TO 3

Stages 1 to 3 of the Baseline Assessment concluded that there are relevant hazardous substances stored that are capable of contaminating soil or groundwater.

The potential pollution risk is low based on the likelihood of releases of such substances occurring. However, due to the volume of the diesel fuel oil, which is a relevant hazardous substance, 'used, stored and transported' to the site it is considered that a Complete Baseline Assessment is required.

6.0 STAGE 4 – SITE HISTORY

The purpose of this section is to determine which of the relevant hazardous substances identified by Stage 3 have the potential to be present on site in the soil and groundwater already as a result of activities to date and to determine whether they are coincident with potential future emission points.

The EU Commission guidance requires the following activity to be undertaken for Stage 4;

- Provide a site history. Consider available data and information:
- In relation to the present use of the site, and on emissions of hazardous substances which have occurred and which may give rise to pollution. In particular, consider accidents or incidents, drips or spills from routine operations, changes in operational practice, site surfacing, changes in the hazardous substances used.
- Previous uses of the site that may have resulted in the release of hazardous substances, be they the same as those used, produced or released by the existing installation, or different ones.
- Review of previous investigation reports may assist in compiling this data.

6.1 SUMMARY OF PRIOR USE

This section includes an evaluation of the likelihood of the presence of any historic contamination of soil/ groundwater at the site and an overview of the site history.

The historic mapping below indicates the prior use of the site from the earliest mapping available 1837-1842 through to present day.

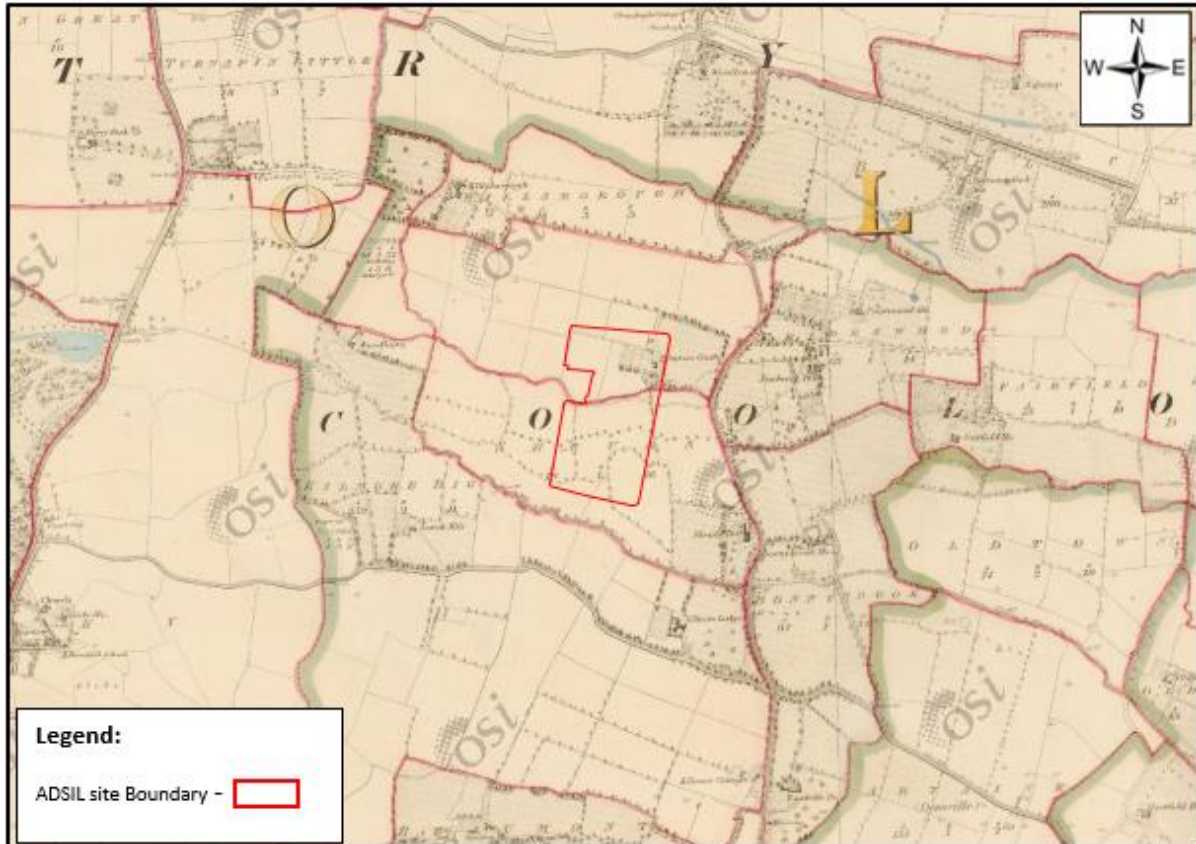
The site was historically agricultural lands of various plot sizes, a typical of the rural setting prior to the 1980's. By 1995, the Clonsaugh Business and Technology Park area was developed and surrounded by residential areas and the M50 motorway was under construction.

The current ADSIL site comprises three areas, the southern section (Building W) the mid-section (Building Y) and the northern section (Building X) of the site. All sections of the site were originally developed in the 1980's.

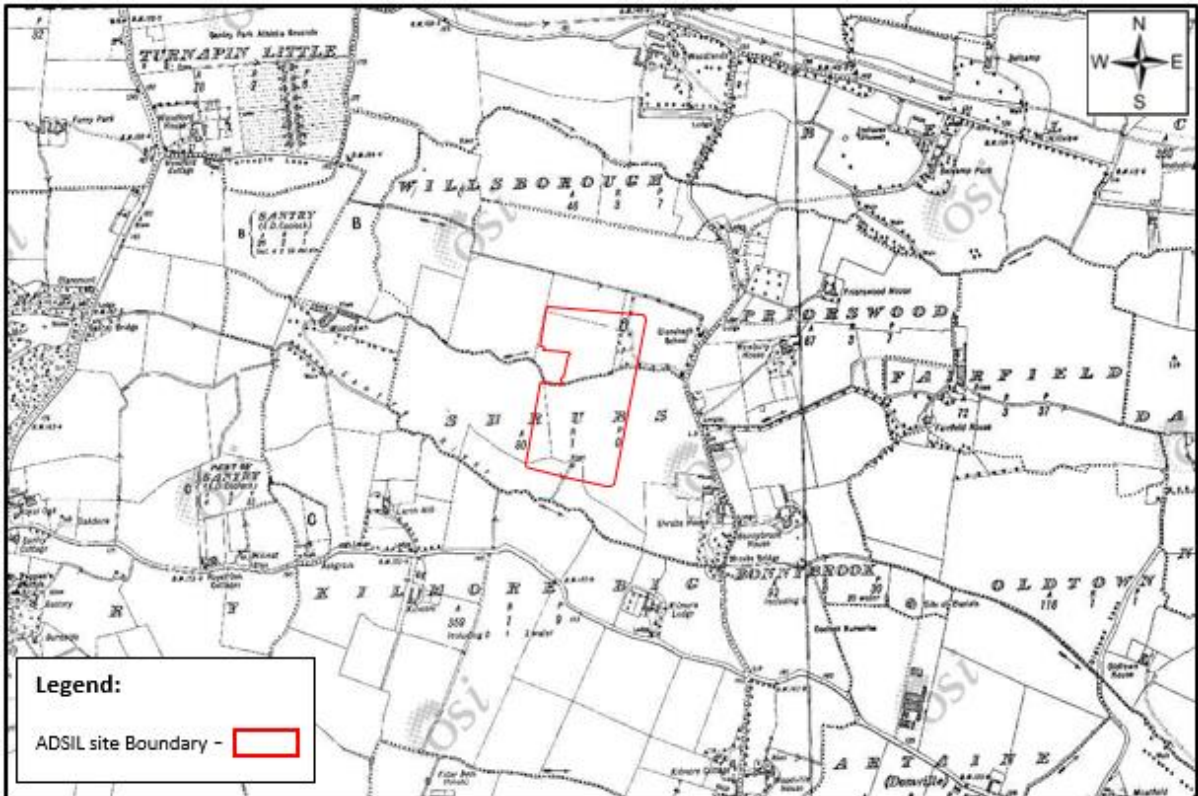
The southern section of the site was formerly a warehouse operated by Donnelly Documentation Services. The middle section of the site was the former Cahill Printers. building previously used as a printing press. The Northern section of the site is the former Acco/Rexel site which produced plastic extrusions. All three facilities comprised warehousing, offices and associated infrastructure.

6.2 HISTORIC MAPPING

Historical Ordnance Survey maps were examined for the purpose of this report to identify any historical sources of contamination. The available OSI mapping from the 1830s through to the 1913 (Insert 6.1 – 6.3) shows historic land use of agricultural nature. Insert 6.1 (1837-1842) shows two dwellings Willsborough House to the northwest of the site and Woodlands House to the north of the site.



Insert 6.1 Historic Map 6 inch Colour (c. 1837-1842) (source www.osi.ie): showing the approximate site location highlighted in red.

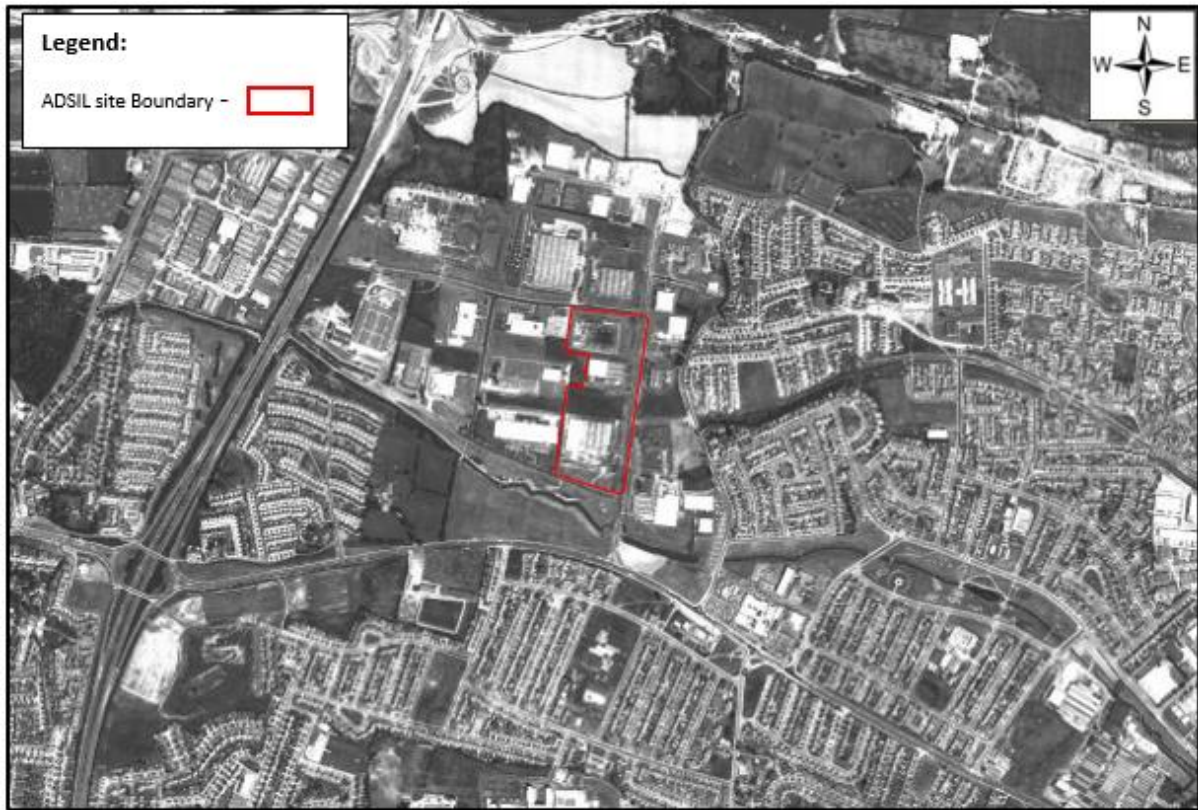


Insert 6.2 Historic Map 6 inch (c. 1837-1842) (source www.osi.ie): showing the approximate site location highlighted in red.



Insert 6.3 Historic Map 25 inch (c. 1888-1913) (source www.osi.ie): showing the approximate site location highlighted in red.

The most notable changes occur on the 1995 aerial imagery (Insert 6.4) with the construction of the M1 and M50 interchange motorway underway, along with the establishment of the Clonsaugh Business and Technology Park. One of the historic dwellings, Woodlands House is still located north of the site. In addition the 1995 aerial imagery illustrates extensive residential developments to the west, south and east of the Clonsaugh Business and Technology Park.



Insert 6.4 Aerial Image (1995) (source www.osi.ie): showing the approximate site location highlighted in red.

There is very little change in the immediate vicinity of the site and on the site between the 1995 image above and the 2000 (Insert 6.5) 2005-2012 image (Insert 6.6) below.



Insert 6.5 OSi Aerial Map (2000) (source www.osi.ie): showing the approximate site location highlighted in red.



Insert 6.6 OSi Aerial Map (2005-2012) (source www.osi.ie): showing the approximate site location highlighted in red.



Insert 6.7 OSi Aerial Map (2011-2013) (source www.osi.ie): showing the approximate site location highlighted in red.

The imagery dated 2011–2013 (Insert 6.7) shows surrounding area remains similar and ADSIL Building W in the southern part of the site has been completed within the similar footprint of the previous building at this location.



Insert 6.8 OSi Aerial Map (2013-2018) (source www.osi.ie): showing the approximate site location highlighted in red.

The 2013-2018 and 2018-2020 imagery (Insert 6.8 and 6.9) shows surrounding area remains similar and ADSIL Buildings X and Y have been completed in the northern and middle part of the site at the former Acco Rexel and Cahill Printers sites respectively.



Insert 6.9 Aerial Map 2018-2020 (source Google Maps): showing the approximate site location highlighted in red.

6.2.1 Planning History

The DCC Planning Department website was consulted in respect of planning applications and granted planning permissions for the site. Listed below are the main planning permissions relating to each of the buildings and phases of development at the site. In addition, table 6.1 below presents a list granted permissions relating the site development that fall outside the main activity at the site.

The Installation has received Final Grant of planning permission from Dublin County Council (DCC) under the separate applications listed below:

- Building X and Y; final grant of permission on 24th October 2013 (DCC Reg. Ref.: 2979/13).
- Building W; final grant of permission on 02 April 2012 (SDCC Reg. Ref.: 3534/11).

In addition to the relevant planning permissions for the Data Storage buildings and combustion of fuels (that relate to the IE application being made) the following additional permissions below relate to the history of the overall site.

Application Details	Description of Development
<p>Applicant: Amazon Data Services Ireland Ltd</p> <p>Reg. Ref.: 3400/19</p> <p>Final Grant Date: 07 Oct 2019</p>	<p>Planning permission for development on a site of c. 0.025 hectares at Clonsaugh Business and Technology Park, Dublin 17. The site is located to the south of an existing data storage facility at the former Cahill Printers building (Building B). The proposed development comprises of a container compound for the purposes of providing ancillary modular plant, electronic equipment and machinery space. The development comprises 4 no. prefabricated metal containers (stacked to form 2 no. storeys), associated access arrangements and staircases, a boundary fence enclosure around the proposed development with 3no. access points, and all ancillary works.</p>
<p>Applicant: Amazon Data Services Ireland Limited</p> <p>Reg. Ref.: 2244/17</p> <p>Final Grant Date: 22 May 2017</p>	<p>The development will consist of the upgrade of existing boundary railings and palisade fence by increasing the height of the existing fencing and railings by 0.7 meters to the overall site boundary</p>
<p>Applicant: ADSIL</p> <p>Reg. Ref.: 2979/13</p> <p>Final Grant Date: 24 Oct 2013</p>	<p>On a site at Clonsaugh Business and Technology Park, Clonsaugh, Dublin 17, specifically the former Cahill Printer and Acco Rexel Buildings and the site between the existing ADSIL building and the Cahill Printers building.</p> <p>The development will comprise (1) demolition of the former Acco Rexel Building (2) construction of a new two/three-storey building with a double vehicle loading bay, and including within the building, office and staff welfare facilities (3) alterations and additions to the former Cahill Printer building, consisting of demolition of the existing first floor offices and installation of ground level external air handling units with associated visual screening at south of the building; (4) construction of a new link building joining the two above buildings; (5) provision of a temporary accommodation comprising portacabins for staff offices, welfare and security for use during the phased construction of the development, (6) ancillary works comprise of the construction of a sprinkler tank, pump and water houses and adjoining water storage tanks and pumphouse: the construction of new site roadways and car parking for 69 cars as well as the upgrade of the existing boundary structures comprising new railings to the east and north of the enlarged site and fencing to the other boundaries and associated structures and landscaping works over the enlarged site. The facility is to house electrical rooms for electronic operations mechanical plant rooms, a loading bay workshops and a two-storey office and staff welfare facility. The works will include external roof top air handling units with associated visual screening. Total plan area of new building c. 21,750sq.m.</p>
<p>Applicant: ADSIL</p> <p>Reg. Ref.: 2688/13</p> <p>Final Grant Date: 19 Aug 2013</p>	<p>The development will comprise of alterations and additions to the two existing buildings and the provision of temporary accommodation. The alterations and additions at the former Acco Rexel building will comprise of (1) the partial demolition of the two-storey offices on its eastern facade (2) the demolition of an associated sprinkler tank, a pump house, fuel tanks, bunds and existing sheds on its western side; additions to the west and north side. At the former Cahill Printers building the works comprise (3) demolition of the existing first floor offices, (4) screening to external plant at south of the building; (5) a new double loading bay and link building joining the two above existing buildings; Ancillary works comprise (6) the construction of an auxiliary sprinkler tank, pump and water houses, and adjoining water storage tanks; (7) the construction of new site roadways and (8) car parking for 57 cars (9) the upgrade of the existing boundary structures comprising new railings to the east and north of the enlarged site and fencing to</p>

	<p>the other boundaries and (10) associated structures and landscaping works over the enlarged site. The temporary buildings comprise portacabins for staff offices, welfare and security for use during the phased construction of the development. The facility is to house electrical rooms for electronic operations, mechanical plant rooms, a loading bay, a workshop and a two storey office and staff welfare facility. The works will include external roof top air handling units with associated visual/acoustic screening and ground level external air handling units with associated visual acoustic screening.</p>
<p>Applicant: ADSIL Reg. Ref.: 2273/12 Final Grant Date: 21 Aug 2012</p>	<p>Permission to construct a new GIS (Gas Insulated Switchgear) 110kv electricity substation and to carry out ancillary site works.</p> <p>The proposed works will consist of the following: 1. All necessary site works for construction of a concrete compound area to the north of the existing ADSIL facility. 2. Construction of an ESB GIS substation control building within the compound area. 3. Construction of a client control building and a transformer bay to contain three number transformers within the compound area. 4. Construction of a 6m wide concrete access road within the perimeter of the site area. 5. Installation of all substation apparatus within the compound area and buildings.</p>
<p>Applicant: ADSIL Reg. Ref.: 3676/11 Final Grant Date: 23 Mar 2012</p>	<p>Upgrade of existing boundary fencing/railings, upgrade of existing site entrance, new security hut and upgrading of the site security system to include red-wall system, CCTV, public lighting poles and associated underground services to the site.</p>
<p>Applicant: ADSIL Reg. Ref.: 3534/11 Final Grant Date: 02 Apr 2012</p>	<p>RETENTION - Phase 1 refurbishment of the existing warehouse facility, to construct screening of mechanical plant, to carry out ancillary site works and construct ancillary site facilities to the site of DUB 10, Clonshaugh Business & Technology Park, Dublin 17.</p> <p>The works under Planning Retention will consist of the following: 1. The demolition of existing metal sheet roof and replacement with new roof cladding. 2. The demolition of lean-to buildings to the South & West elevations of the existing building to allow for a new internal access road and mechanical air handling equipment. 3. The demolition of a portion of the existing 2-storey office block for construction of a new loading bay to the east face of the building. 4. Demolition of existing sprinkler pumphouse & associated tanks, ESB substation and customer switchroom buildings to the south of the existing building. 5. Phase 1 internal works to the existing facility consist of 6 No. rooms for electrical and electronic operations, Loading Bay, Workshop, Offices and Staff Welfare area. 6. Construction of containerised electrical plant equipment to the North West corner of the site. 7. Phase 1 construction of new external wall cladding to a proportion of the north, east & south elevations of the building. 8. Screening to external mechanical air handling equipment and stand-by generator units to north, south and east elevations.</p> <p>PERMISSION- ADSIL is applying for Planning Permission for Phase 2 refurbishment of the existing warehouse facility, to construct screening of mechanical plant, to carry out ancillary site works and construct ancillary site facilities to the site of DUB 10, Clonshaugh Business & Technology Park, Dublin 17.</p> <p>The proposed works under Planning Permission will consist of the following: 1.Phase 2 construction to complete new cladding to remainder of the north, south and west elevations of the building. 2. Phase 2 construction of the palladine plant fencing to external Mechanical Air Handling Units. The fence line is to be constructed on the North and South elevations of the facility. 3. Phase 2 internal works to the existing facility will consist of 8No. rooms for electrical and electronic operations. 4. Auxiliary sprinkler and storage water tanks, pump house and provision for new oil storage tanks and associated bund.</p>

<p>Applicant: Bellpark Developments Ltd</p> <p>Reg. Ref.: 3679/08</p> <p>Final Grant Date: 09 Sep 2008</p>	<p>Development on a site of c0.325 hectares within Unit AF1, Clonsaugh Industrial Estate, Dublin 17. The application site will be located to the east of permitted Block no. 3 (per reg ref 1883/07) and will be located generally by the internal road network permitted under reg ref 1883/07. The development will consist of: A) 2 no. blocks as follows: - i) Block 1 (3 storey overall height 9.8m; GFA 2,343sqm) to comprise of 24no. own door office units (ranging in size from 72.0sqm to 138.5sqm). ii) Block 2 (single storey; overall height 8.1m; total GFA 1,146.1sqm) to comprise of 5 no. light industrial / workshop / enterprise units (ranging in size from 194.3sqm to 281.6sqm). The total GFA of the proposed blocks is 3,489.1sqm. B) 4 no. block indicator signs (each being 3m high with advertising space of c.2.8sqm each). C) All associated car parking, cycle parking, landscaping and site development works. D) Vehicular access and the internal road network to serve the proposed development will be per that permitted under reg ref 1883/07.</p>
<p>Applicant: Bellpark Developments Ltd</p> <p>Reg. Ref.: 5594/07</p> <p>Final Grant Date: 08 Jan 2008</p>	<p>Permission for development of light industrial/warehouse/enterprise units, area 6,857.6sqm, consisting of: Block 1 (area 3,363.6sqm) containing 14 no. units for use as light industrial/warehouse/enterprise units ranging from 132.5 to 323.6sqm on ground and part first floors; Block 2 (area 1,771.3sqm) containing 7 no. units for use as light industrial/ warehouse/ enterprise units ranging from 142.7 to 355.1sqm, on ground and part first floors; Block 3 (area 1,697.4sqm) containing 10 no. units for use as light industrial/ warehouse/ enterprise units ranging from 142.7 to 210.3sqm, on ground and first floors: ESB substation and switchroom (area 25.3sqm); new vehicular access; car parking & associated site works.</p>
<p>Applicant: Unknown</p> <p>Reg. Ref.: 2524/96</p> <p>Final Grant Date: May 1997</p>	<p>Retain and complete, compressor building at the rear of premises</p>
<p>Applicant: Acco Ireland Limited</p> <p>Reg. Ref.: 1248/96</p> <p>Grant Date: 11th September 1996</p>	<p>Elevation modifications, provision of internal factory toilets, lunch rooms, offices, external signs, palisade fencing to yard, lighting standards and extra parking</p>
<p>Applicant: Acco Ireland Limited</p> <p>Reg. Ref.: 2230/96</p> <p>Grant Date: 8th January 1997</p>	<p>Twenty car park spaces, landscaping and pedestrian access on the east side of the building</p>
<p>Applicant: Donnelley Documentation Services</p> <p>Reg. Ref.: 2382/92</p> <p>Grant Date: Feb 1993</p>	<p>Application for Planning Permission for a 'Two-Bay' Extension, New Entrance and Associated Site Works to the Donnelley Documentation Services Building at Clonsaugh Industrial Estate, Dublin 17.</p>
<p>Applicant: Mountcoal Investments Limited</p> <p>Reg. Ref.: 2512/90</p> <p>Grant Date: 1st March 1991</p>	<p>Construction of additional 2-storey offices, ESB substation and ancillary buildings to previously approved industrial unit and offices.</p>
<p>Applicant: Mountcoal Property Investments Limited</p> <p>Reg. Ref.: 1172/90</p> <p>Grant Date: 24th September 1990</p>	<p>Erect extension to existing general industrial unit.</p>
<p>Applicant: Acco Ireland Limited</p>	<p>Extension to Existing Factory</p>

Reg. Ref.: 1036/90 Grant Date: 24th September 1990	
Applicant: Irish Printers Limited Reg. Ref.: 736/90 Grant Date: June 1990	Modification to existing Entrances and Boundary Fence, Build new entrance and Car Park.
Applicant: Mountcoal Investments Limited Reg. Ref.: 2772/89 Grant Date: 20th April 1990	Erection of an Industrial Unit and Offices.
Applicant: Mountcoal Investments Limited Reg. Ref.: 2772/89 Grant Date: Feb 1990	Erection of an Industrial Unit and Offices
Applicant: Mountcoal Investments Limited Reg. Ref.: 1477/89 Grant Date: 11th October 1989	Change of use of Light Industrial Unit including Offices to General Industrial Unit and erection of ESB Substation
Applicant: Chisima (Ireland) limited Reg. Ref.: 2146/89 Grant Date: 23rd September 1989	Erection of Company Sign
Applicant: Unknown Reg. Ref.: 2321/88 Grant Date: Unknown	Original Planning Application cannot be found by DCC
Applicant: Acco Ireland Limited Reg. Ref.: 2219/852 Grant Date: 26th March 1985	Plant Room Extension to Factory

Table 6.1: Outlining the granted permissions relating development at the site that fall outside the main activity.

6.2.2 Prior Uses.

The current ADSIL site comprises three areas, the southern section (Building W) the mid-section (Building Y) and the northern section (Building X) of the site. All sections of the site were originally developed in the 1980's.

The southern section of the site where Building W is located was formerly a warehouse with associated offices built in 1989 which was modified and extended in the 1990. The planning file review indicates Donnelly Documentation Services was operating at the location in the 1990's.

The middle section of the site where Building Y is located was formerly Cahill Printers. This former Cahill printers building was partially demolished as part of the construction of Building Y. The building comprised warehousing and offices with associated infrastructure. The building was previously used as a printing press which is likely to have used a range of chemicals such as petroleum constituents, organic sulphur and organ nitrogen compounds, solvents and metals.

The Northern section of the site where Building X is located is the former Acco/Rexel site. It is understood that plastic extrusions were carried out on the site until 1996 when manufacturing ceased. From 1996 to c. 2010 the warehouse was been primarily used as a warehouse for finishing products. It is likely that there was organic solvents, inorganic pigments, organic pigment and dyes and organic binders in use at the facility. From 2010 only sales and marketing functions were undertaken at the site.

None of the former site uses were subject to an EPA licence, and, as a result there was no surrender of licence and no detailed site investigation completed at closure.

7.0 STAGE 5 - ENVIRONMENTAL SETTING

This section includes an assessment of the likely fate of any spill/leak event based on the topography, soil, and groundwater characteristics at the location. Based on the findings of Stages 1 to 4 above, the locations of hazardous substances storage have also been assessed with regard to confirming source-pathway-receptor linkages i.e. in the unlikely event of a leakage/spillage.

7.1 TOPOGRAPHY

The site topography is described as flat, with an elevation to ordinance datum (AOD Malin) ranging between 48m AOD and 44 m AOD across the site north to south and 46m AOD (west) to 44m AOD (east) indicating a shallow gradient to the southeast of the site. The regional topography gradient across the Clonshaugh Business Park falls from 56m AOD to 42m AOD in a south-easterly direction across a c. 1.5 km distance.

There are no water courses bounding or traversing the site. All existing surface water drainage discharges at the 2 no emission points SW1 and SW2 to the business park storm sewer that is located to the south (SW-1) and east (SW-2) of the site flow south towards the Santry River. The stormwater passes through Hydrocarbon Interceptors on site to ensure that the quality of the stormwater discharge is controlled.

The business park storm sewers outfalls into the Santry River that is located to the south of the Site; the Santry River flows 5.15 km east, to the North Bull Island transitional water body, and ultimately the North Dublin Bay SAC.

All foul drainage will outfall into the Industrial Estate foul drainage network at four locations, SE1 south of Building W, SE2, SE3 and SE4 east of Buildings X, Y and W which ultimately discharges to the municipal Waste Water Treatment Plant (WWTP) at Ringsend.

7.2 GEOLOGY & HYDROGEOLOGY

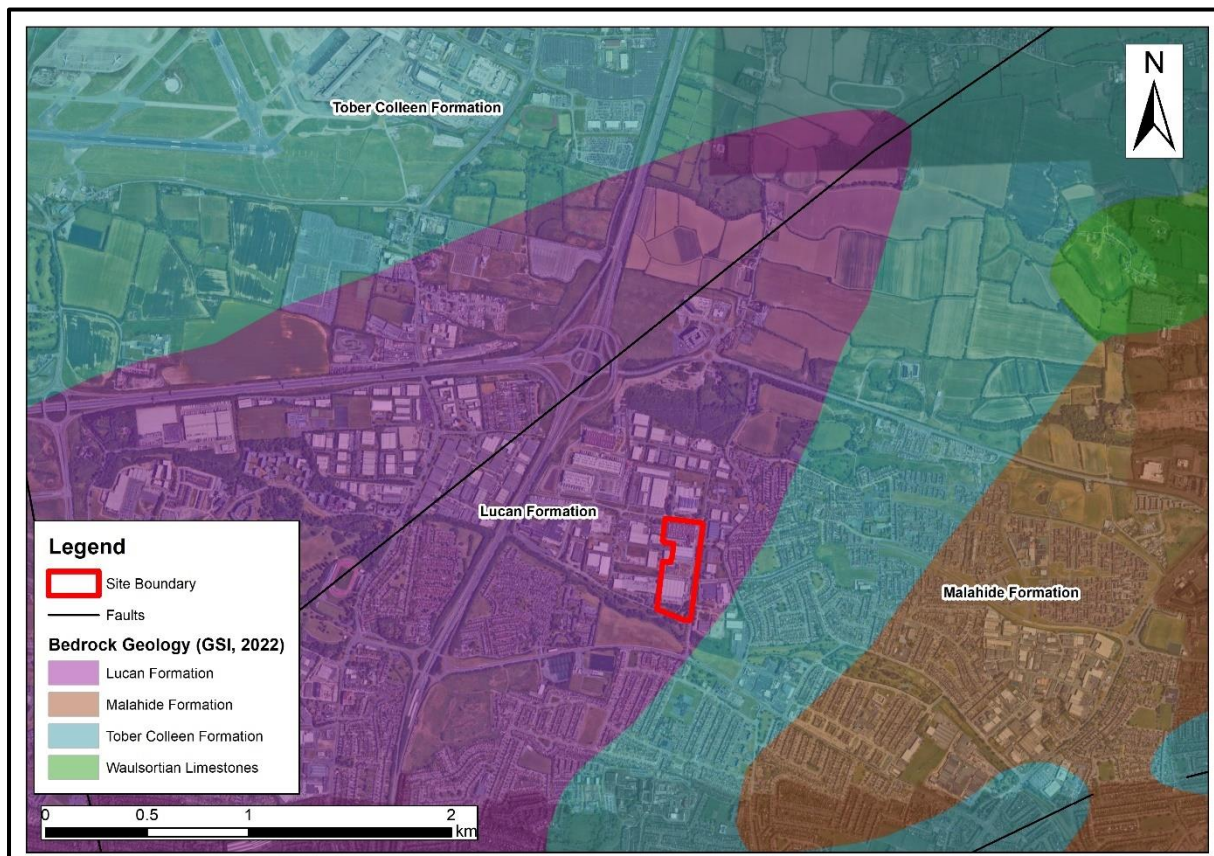
7.2.1 Regional Geology

The bedrock of the greater Dublin region consists of Dinantian Upper Impure Limestone which is part of the Lucan Formation. See Insert 7.1 below. The limestone is colloquially known as Calp and is estimated to be up to 800m thick. The homogeneous sequence consists of dark grey massive limestones, shaley limestones and massive mudstones. The average bed thickness is less than 1m, but these normally thin-bedded lithologies can reach thicknesses of 2m or more.

The Calp is almost completely obscured across central Dublin under the Dublin Boulder Clay. The depth to bedrock is mapped as >10m on the GSI GeoUrban viewer however local site-specific information available from sites within the Clonshaugh Business Park indicates bedrock is likely to be >20m below ground level.

No bedrock outcrop was identified on the sites. In terms of the structural relationship of the area, the GSI database (refer also to Insert 7.1) does not show any faults on the site or within the immediate vicinity of the sites. A synclinal axis line feature does

run from south west to north east beneath the Clonshaugh Roundabout to the northwest of the site.



Insert 7.1 Bedrock Geology Map (Source www.gsi.ie) showing indicative red line boundary

7.2.2 Regional Hydrogeology

7.2.2.1 Aquifer Classification

Aquifers are generally classified as rocks or other matrices that contain sufficient void spaces and which are permeable enough to allow water to flow through them in significant quantities. The GSI (2018) classifies the principal aquifer types in Ireland as:

Bedrock Aquifer

- Rkc – Regionally Important Aquifer – Karstified (conduit)
- Rkd – Regionally Important Aquifer – Karstified (diffuse)
- RK – Regionally Important Aquifer – Karstified
- Rf – Regionally Important Aquifer – Fissured bedrock
- Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive
- Lk – Locally Important Aquifer – Karstified
- LI – Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones
- PI – Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones

- PU – Poor Aquifer – Bedrock which is Generally Unproductive

Gravel Aquifer

- Lg - Locally Important Aquifer - Sand & Gravel
- Rg - Regionally Important Aquifer - Sand & Gravel

The bedrock aquifer underlying the site according to the GSI (www.gsi.ie/mapping) National Draft Bedrock Aquifer Map is classified as a Locally Important Aquifer (LI) which is described as *Bedrock which is Moderately Productive only in Local Zones*. Insert 7.2 presents the current bedrock aquifer map for the area surrounding the site. According to the GSI, the aquifer is not considered to have any primary porosity and flow will be primarily fracture controlled.



Insert 7.2 Aquifer Classification map (Source: www.gsi.ie) showing indicative red line boundary

7.2.2.2 Aquifer vulnerability

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures, the main feature that protects groundwater from contamination, and therefore the most important feature in protection of groundwater, is the subsoil (which can consist solely/ or of mixtures of peat, sand, gravel, glacial till, clays, or silts).

The GSI currently classifies the bedrock aquifer in the region of the site as having (L) - Low Vulnerability status across the site and the immediate area of the site (indicating >10 m of low permeability soil).



Insert 7.3 Aquifer vulnerability (Source: www.gsi.ie) showing indicative red line boundary

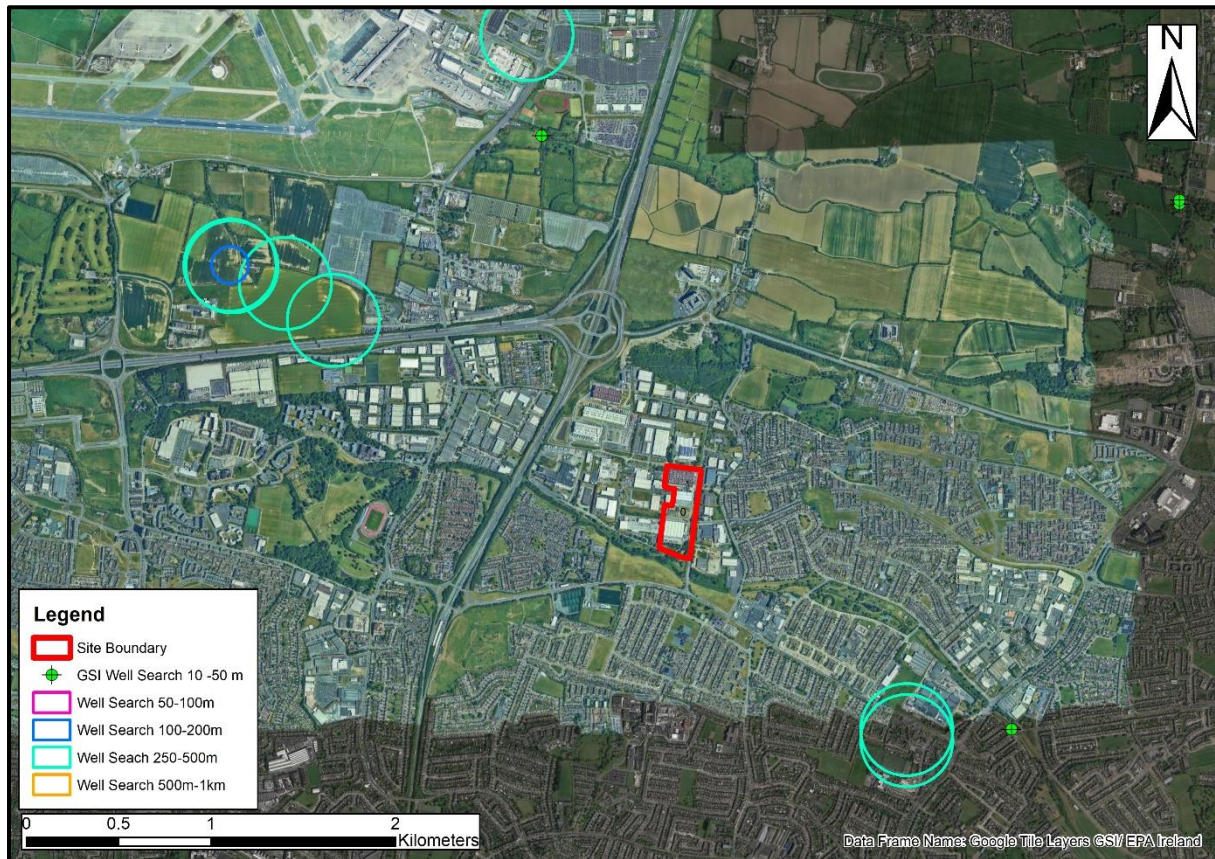
7.2.2.3 Groundwater Wells and Flow Direction

There are no source protection areas relating to group water schemes or public water supplies within 3km of the site, i.e. zones surrounding a groundwater abstraction area.

The GSI Well Card Index is a record of wells drilled in Ireland, water supply and site investigation boreholes. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland. This current index, however, shows a number of groundwater monitoring and abstraction wells within a 3 km radius of the site; the abstraction wells are used primarily for industrial use. The maximum borehole depth was 122m below ground level (bgl). Bedrock was encountered from between 10 – 23m bgl and water yields were recorded between 87 and 300 m³/day.

Local information confirmed a historical well on the former DIIO site and on the Butlers Chocolate Site to the north. The well on the DIIO site has since been decommissioned as part of the closure of the site. The well at the Butlers site was installed in the overburden and there is no abstraction undertaken. As the area is served by public mains, it is unlikely that there are any boreholes in the area used for potable water supply.

Insert 7.4 below presents the GSI well search for the area surrounding the site (Note this source does not include all wells) and Table 7.1 below summarises the details of some of the wells present within this search area.



Insert 7.4 GSI Well Search (GSI, 2020) showing indicative red line boundary

Groundwater flow locally is anticipated to flow in a south-easterly direction towards the Santry River and regionally to the east towards the Dublin Bay.

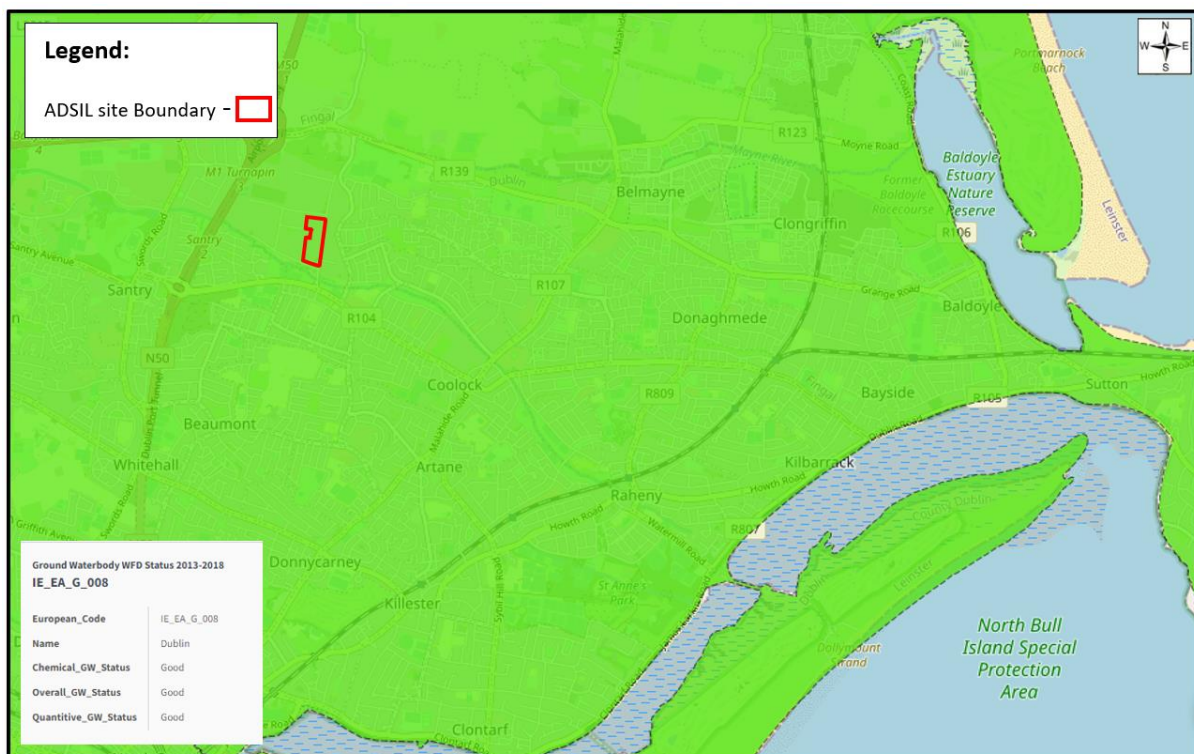
Table 7.1 GSI Well Index Table from well search (GSI, 2022)

GSI Name	Type	Depth (m)	Depth to Bedrock	Townland	County	Use	Yield Class	Yield m3/d
2923NEW042	Spring			TOBERBUNNY	Dublin			
3223NWW011	Spring			SAINTDOOLAGHS	Dublin			
3223NWW012	Spring			SAINTDOOLAGHS	Dublin			
3223SWW004	Spring			KILBARRACK UPPER	Dublin			
3223SWW005	Spring			BROOKVILLE	Dublin			
2923NEW015	Borehole	48.8		SANTRY	Dublin	Industrial use	Good	130
2923NEW016	Borehole	35.4		BALLYMUN	Dublin	Domestic use only	Good	109
2923NEW034	Borehole	13.7	11.6	CORBALLIS	Dublin	Industrial use	Good	300
2923NEW036	Borehole	91.4	20	BALLYMUN	Dublin	Industrial use	Moderate	87
2923NEW037	Borehole	122	22	BALLYMUN	Dublin	Industrial use		
2923SEW032	Borehole	15		COOLOCK	Dublin	Industrial use		
2923SEW033	Borehole	16.5		COOLOCK	Dublin	Industrial use		
2923NEW061	Borehole	91.4	20	BALLYMUN	Dublin	Industrial use	Moderate	87
2923NEW062	Borehole	122	23	BALLYMUN	Dublin	Industrial use	Good	200
3223SWW001	Borehole	52.7	10	BALGRIFFIN	Dublin	Industrial use	Good	196

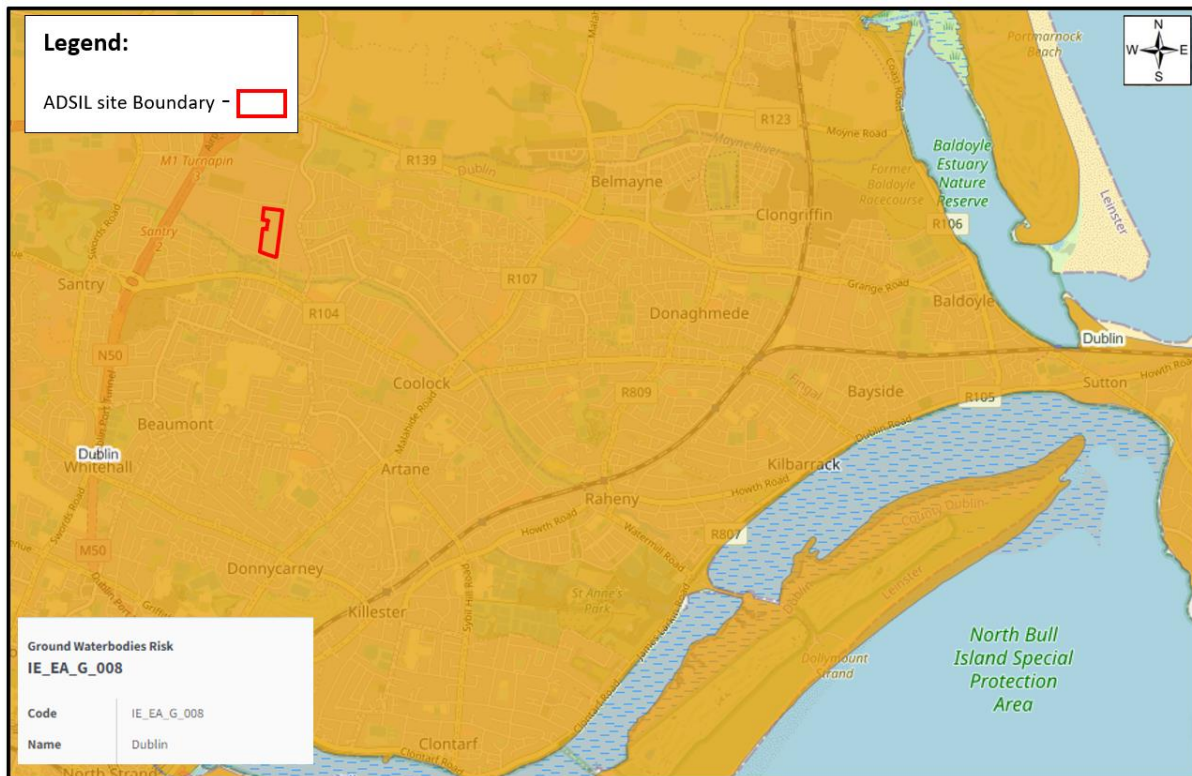
7.2.2.4 Groundwater Quality

The European Communities Directive 2000/60/EC established a framework for community action in the field of water policy (commonly known as the Water Framework Directive [WFD]). The WFD required 'Good Water Status' for all European water by 2015, to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'.

The Groundwater Body (GWB) underlying the site is the Dublin GWB (EU Groundwater Body Code: IE_EA_G_008). The current EPA data (2013-2018) classifies the Dublin GWB as having 'Good Status', with a WFD risk status 'under review'. Insert 7.5 and 7.6 below present the most recent data available from the EPA website.



Insert 7.5 GWB WFD Status (period 2013-2018). Green = Good Status. (indicative red line boundary)



Insert 7.6 GWB Risk 'groundwater body is 'under review' (indicative red line boundary)

There was no intrusive investigation or groundwater sampling undertaken at the site.

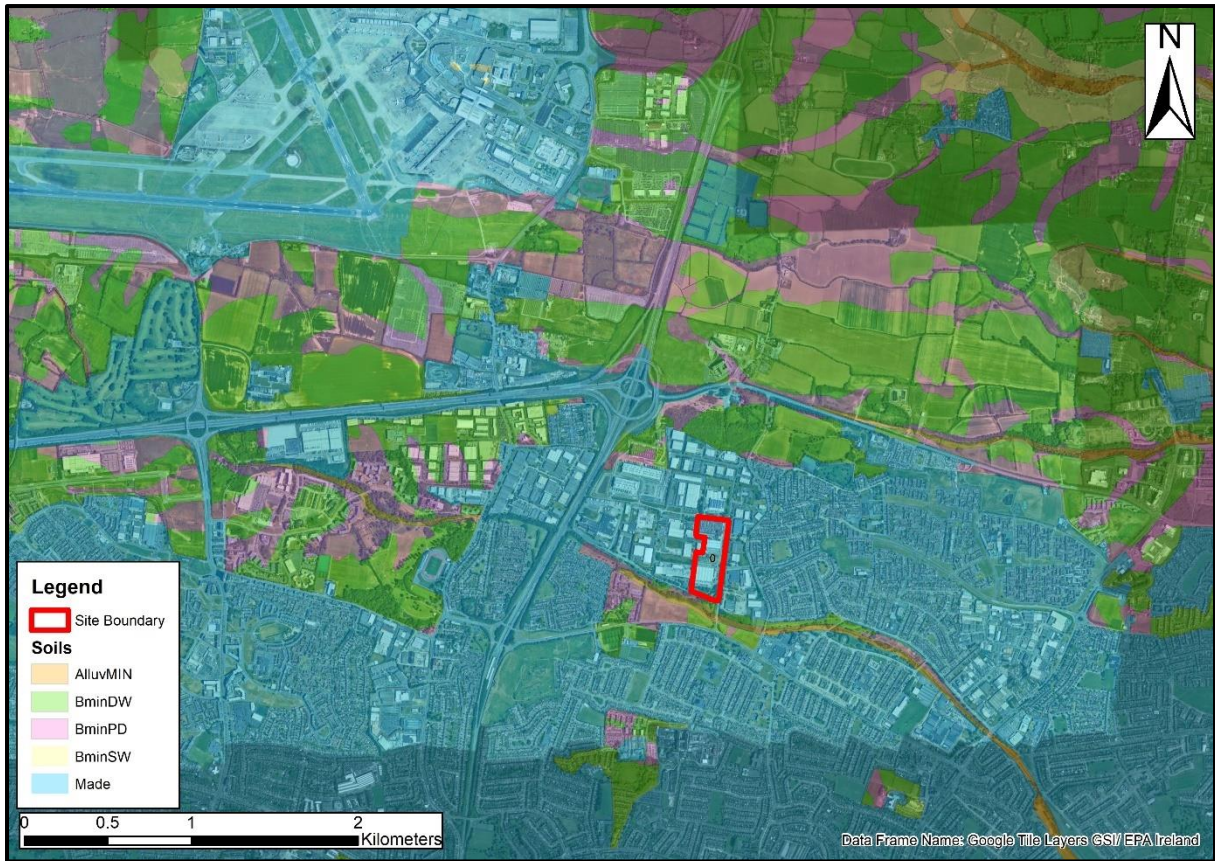
7.2.3 Regional Soils

The GSI geological web viewer shows the site is primarily underlain by made ground.

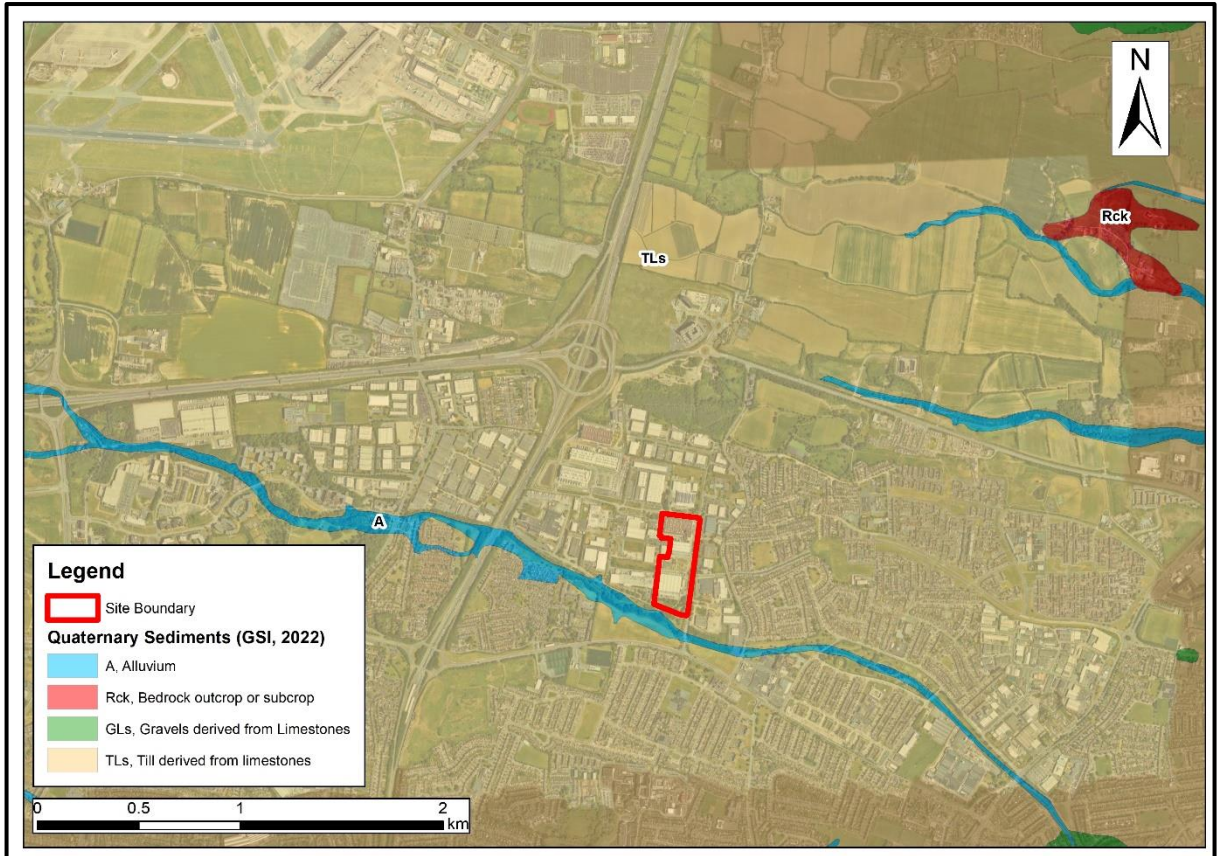
It is likely that the made ground designation relates to the hardstanding and buildings associated with the industrial estate as opposed to any historic made ground or infilling. Therefore, the made ground is underlain by the till which has been confirmed by AWN at neighbouring sites within the immediate vicinity of the Clonshaugh Business and Technology Park.

The subsoil has been classified as limestone till (Carboniferous). This is the dominant subsoil type in the region and is a glacial deposit which is known as Dublin Boulder Clay. There is alluvial deposits immediately south of the site at the River Santry. The soils and subsoils map for the site is illustrated in Insert 7.7 and 7.8.

The boulder clays generally exhibit very low permeability in the order of 1×10^{-7} to 1×10^{-9} m/s or lower. The glacial boulder clay will tend to act as an aquitard or aquiclude (a confining layer with low permeability) between the other more permeable formations including the limestone bedrock (fracture dominated flow).



Insert 7.7 Soils map (Source: www.gsi.ie) showing indicative red line boundary



Insert 7.8 Sub-Soils map (Source: www.gsi.ie) showing indicative red line boundary

7.3 HYDROLOGY

The area is drained by the Santry River which runs approx. 100m south of the site. Storm water drainage from the site currently discharges to the two attenuation basins on site prior to discharge to the existing storm water systems within the Clonshaugh Business Park via Class 1 hydrocarbon interceptors and flow control devices. This eventually discharges into the Santry River at two locations.

There are no streams on the site itself or along its boundaries.



Insert 7.9 Hydrological Environment, illustrating the River Mayne and the Santry River flowing in an easterly direction and showing indicative red line boundary

7.3.1 Surface Water Quality

The site is located within the Ireland River Basin District (formally the Eastern River Basin District (ERBD)), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD).

Surface water quality is monitored continuously by the EPA at various regional locations along principal and other smaller watercourses. Insert 7.10 below presents the EPA quality monitoring points in the context of the site and other regional drainage setting, together with hydrometric gauges along the respective stage of each river body shown.



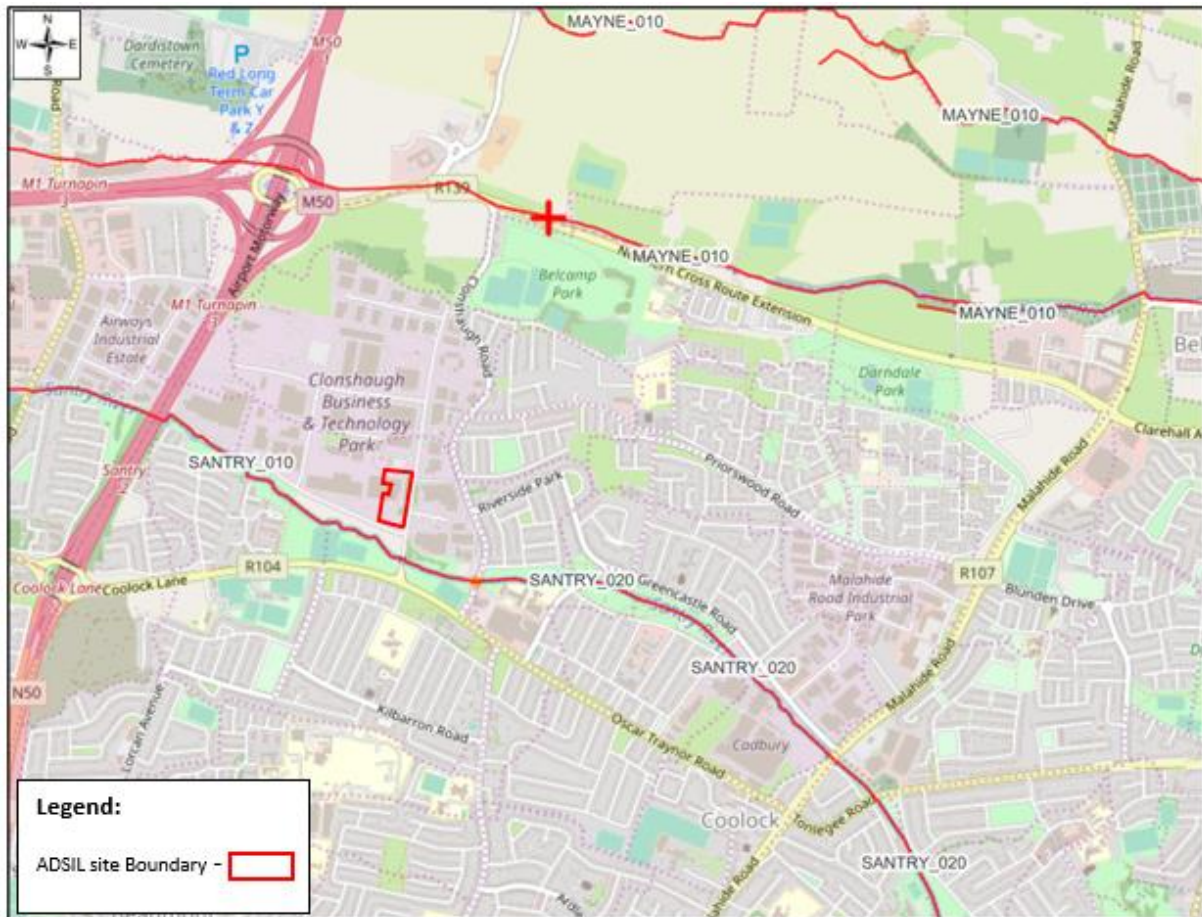
Insert 7.10 Surface Water Quality Monitoring Point (source: www.epa.envision) (Site location indicated with star with monitoring point locations shown with orange circles)

With reference to the site setting, the nearest downstream EPA monitoring station is situated along the Santry River to the south of the site.

The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

There is one water quality monitoring station located on the Santry River downstream of the proposed site which has quality ratings available within the last ten years. This monitoring location (Clonshaugh Road Bridge RS09S010300) obtained a Q rating of 2-3 - Poor Status (in 2019). There is also a station downstream on the River Mayne at the Hole-in-the-Wall Bridge. This also obtained a Q rating of 2-3 which also denotes a “poor” rating for the same period.

In accordance with the WFD, each river catchment within the former ERBD was assessed by the EPA and a water management plan detailing the programme of measures was put in place for each. Currently, the EPA classifies the WFD Ecological Status for the Mayne and Santry waterbodies as having ‘Poor Status’ (Cycle Status 2013-2018) with a current WFD River Waterbody risk score of 1a, ‘At risk of not achieving good status’. Insert 7.11 presents the river waterbody risk EPA map.



Insert 7.11 River Waterbody Risk - 'At risk of not achieving good status, WFD Ecological Status: Poor. and showing indicative site red line boundary

7.3.2 Flood Risk

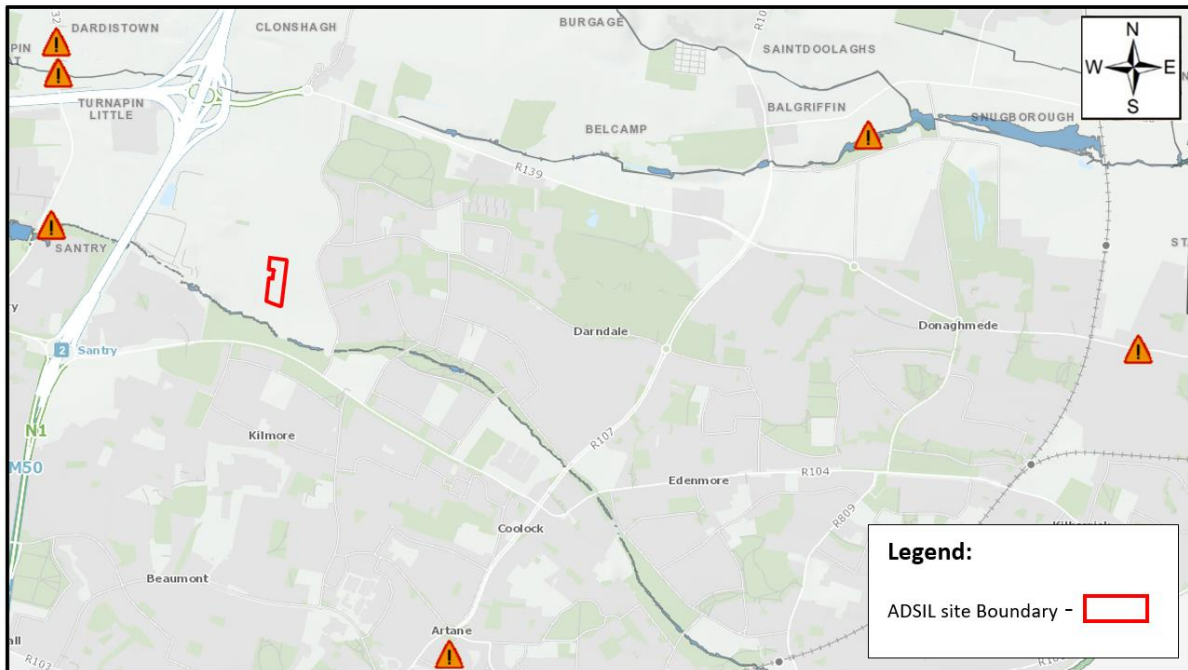
The potential risk of flooding on the subject site was also assessed through a review of the OPW CFRAM mapping for the area; shown in Insert 7.12, 7.13 and 7.14 below. The subject site is not located in an area that is at risk of flooding.

Insert 7.12 highlights the areas that have high probability flood events have approximately a 1-in-a-10 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 10%.

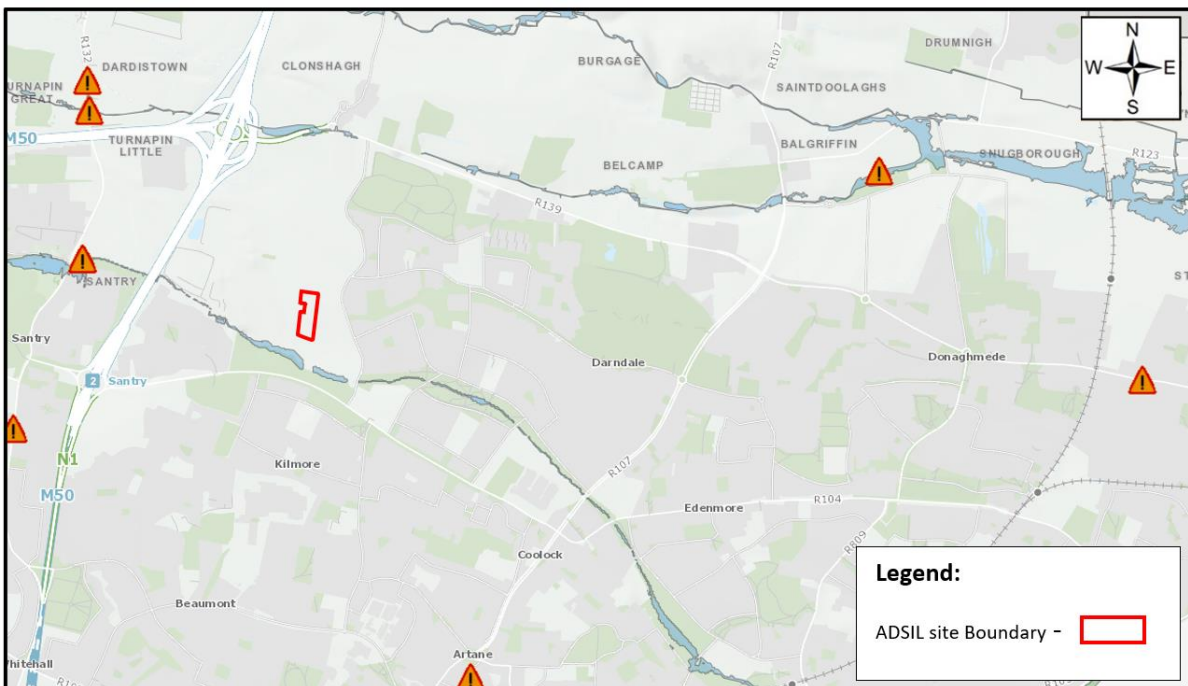
Insert 7.13 highlights the areas that have medium probability flood events have approximately a 1-in-a-100 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 1%.

Insert 7.14 highlights the areas that have low probability flood events have an indicative 1-in-a-1000 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 0.1%.

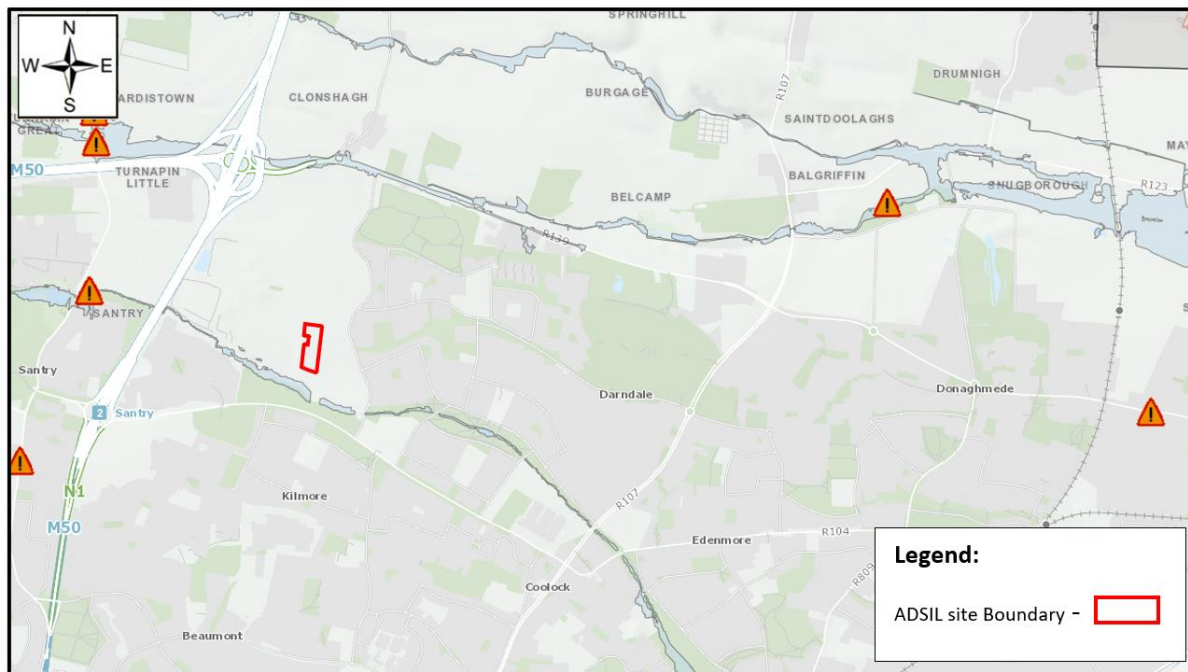
In addition, these maps highlight the locations where historic single flood events have occurred



Insert 7.12 Floodinfo.ie extract: The Site Location is Highlighted in Red (indicative red line boundary) – The map shows the modelled extent of land that might be flooded by rivers in a moderate flood event – A high probability of flooding. The warning signs illustrate the location of past 'single' flood events.



Insert 7.13 Floodinfo.ie extract: The Site Location is Highlighted in Red (indicative red line boundary) – The map shows the modelled extent of land that might be flooded by rivers in a severe flood event – A medium probability of flooding. The warning signs illustrate the location of past 'single' flood events.



Insert 7.14 Floodinfo.ie extract: The Site Location is Highlighted in Red (indicative red line boundary – The map shows the modelled extent of land that might be flooded by rivers in a very extreme flood event – Low probability of flooding. The warning signs illustrate the location of past 'single' flood events.

7.4 MAN-MADE PATHWAYS

As identified in Stages 1-4, bulk storage for hydrocarbons only is present at the facility. Due to the volumes stored and the hazard classifications of these substances they could pose a risk to receiving waters if a source-pathway-receptor linkage existed.

There are no historic mines on the site much of the site will be hard paved reducing the potential for vertical migration to ground during operation. In the unlikely event of a leakage outside of the storage bunds, the primary pathway would be through the stormwater drainage system. The only man-made pathway of concern is the site stormwater network, the stormwater network is described in Section 4.2 above.

As noted in Section 4.2 the fuel tanks are located on hardstanding, appropriately bunded, with leak detection alarm systems, furthermore, prior to discharge stormwater is passed through a Class 1 hydrocarbon interceptors to ensure that the quality of the stormwater discharge is controlled. In the event of a fire, run-off would be to the site attenuation systems where water would be held until tested and removed off site if required.

7.5 SURROUNDING LAND USE AND INTERDEPENDENCIES

The surrounding context of the site has been described in Section 1.3 above.

Located approximately 1 km upgradient of the site is an historic illegal landfill that is located on c.1.5 ha of lands to the north of Clonshaugh and R139 junction on Lands owned by the IDA. Permission has been granted by FCC (ref: F19A/0149) to remove and remediate part of the landfill site and this remedial work was undertaken in

2020/21. The application for planning permission was accompanied by an Environmental Impact Assessment report (EIAR). The exploratory site investigation undertaken to inform the EIAR in September/October 2018 included the installation of 23 No. Trial pits, 5 overburden leachate wells and 1 dual installation overburden/bedrock wells. (AWN 2018). The site investigation works noted that the waste body is dry, with no significant leaching or gaseous emissions, there was hydrocarbon staining and odours observed, Waste Acceptance Criteria testing confirmed that the waste body is primarily non-hazardous, with some localised areas considered to be hazardous due to the presence of hydrocarbon contaminated waste (AWN, 2018).

The waste is underlain by 14m of low permeability Dublin boulder clay, and monitoring confirmed that this protects the underlying aquifer should any leachate be generated within the waste body. Due to the low permeability of the subsoil of Dublin boulder clay, and the lack of gaseous emissions, and dry - leachate free waste. As such there is no source pathway linkage between the landfill and the subject site.

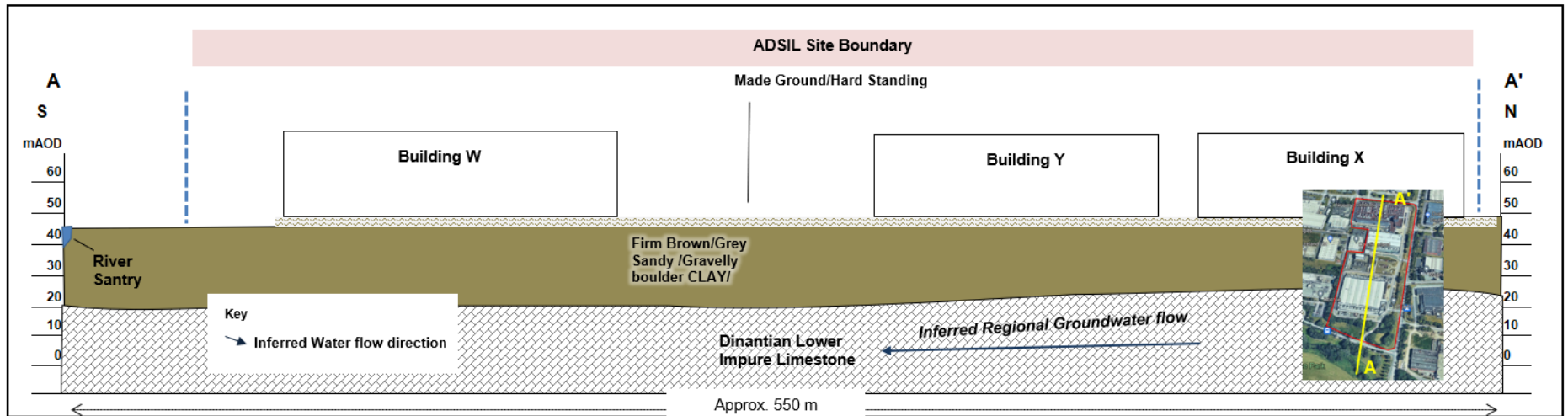
The only other site of interest in the surrounding area is the Forest Laboratories Ireland Limited site, this is located to the west of the site and cross gradient. Thus, the potential for any contamination from this site (if present) is unlikely to migrate onto the subject lands.

8.0 STAGE 6 – CONCEPTUAL SITE MODEL

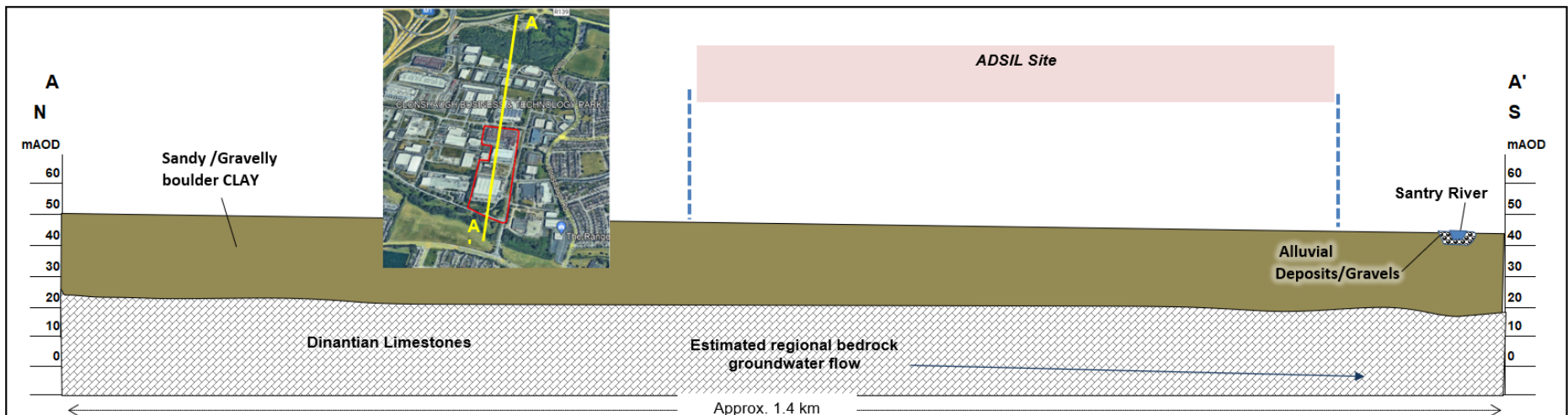
Based on the available information which includes some intrusive site specific data from neighbouring sites within the Clonshaugh Business and Technology Park (1.0km from the site) we have characterised the site below.

- The site topography is described as flat, with an elevation to ordinance datum (AOD Malin) ranging between 48m AOD and 44m AOD across the site north to south and 46m AOD (west) to 44m AOD (east) indicating a shallow gradient to the southeast of the site.
- The site is underlain by Dinantian Upper Impure Limestone which is part of the Lucan Formation, comprising dark shaley limestone known as Calp.
- The Bedrock Aquifer is Locally Important Aquifer (LI) which is described as *Bedrock which is Moderately Productive only in Local Zones*.
- The bedrock aquifer in the region of the site as having (L) - Low Vulnerability status (indicating >10 m of low permeability soil).
- Based in assessments on neighbouring sites within the Clonshaugh Business and Technology Park groundwater flows are in a south easterly direction towards Dublin Bay; however, the permeability of soils within the region are generally low as characterised by the Dublin GWB.
- Based on assessments on neighbouring sites within the Clonshaugh Business and Technology Park bedrock is greater than 20.0mbgl in the immediate vicinity of the site. As such there is a negligible pathway to the bedrock aquifer.
- The site is located within an extent of shallow Made Ground which reflects the industrial and business mix in terms of land use in the immediate area.
- Review of the geology and hydrogeology in the surrounding region indicates that there are no sensitive receptors such as groundwater-fed wetlands, significant public water supplies/ Group Water Schemes or geological heritage sites within the immediate vicinity which could be impacted by the Installation;

- Based on the Institute of Geologists of Ireland (IGI) the criteria for rating the importance of hydrogeological features, the importance of the hydrogeological features at this site is rated as **medium Importance**. This is based on the assessment that the attribute has a good quality significance or value on a local scale. The aquifer is a *moderately productive* bedrock aquifer, productive only in local zones and it is unlikely to be used for public water supply or widely used for potable use.
- In addition, the aquifer does not host any groundwater dependent ecosystems (SACs/NHAs).
- The storm water from site discharges in the business park storm sewer(s) drainage system which discharges into the Santry River approximately 100 meters south of the site flows 5.15 km east, to the North Bull Island transitional water body, and ultimately the Dublin Bay. The nearest SAC, the North Dublin Bay SAC is 5KM to the Southeast of the site.



Insert 8.1 A-A' Schematic local cross section showing the ADSIL site



Insert 8.2 A-A' Schematic regional cross section showing the ADSIL site

8.1 POLLUTANT LINKAGES

The pollutant linkages based on the primary sources of possible contaminants on site are summarised in Table 8.1.

Table 8.1 Pollutant Linkages

Source	Pathways	Receptor	Impact Assessment
Diesel Fuel Spill (not contained)	No source -pathway - receptor linkage based on thickness (>20 m) and low permeability nature of underlying soil. Lateral migration via drainage system	Locally Important Bedrock Aquifer with low vulnerability Stormwater system discharging to River Santry	Low – Tanks are bunded and double skinned and on hard stand areas with drainage to interceptors No source -pathway - receptor linkage based on thickness (>20 m) and low permeability nature of underlying soil. Low – Tanks contained (as above), gradient low and drainage to interceptors prior to discharge to storm sewer.

9.0 STAGE 7 – SITE INVESTIGATION

The due diligence reports completed by CSEA for all three sections of the site were reviewed. There was no intrusive investigations completed at the sites however the due diligence reports present details regarding the conditions of the building and the associated infrastructure at the facilities.

The southern section of the site where Building W is located was formerly occupied by Donnelly Documentation services. The warehouse and offices had two above ground storage tanks and out buildings that housed boilers and other mechanical infrastructure. The due diligence reports indicate the surfaces at the site were in good condition and does not report and known environmental incidents at the site.

The middle section of the site where Building Y is located was previously used as a printing press which is likely to have used a range of chemicals such as petroleum constituents, organic sulphur and organ nitrogen compounds, solvents and metals. The visual site assessment completed at the time of the due diligence did not identify any evidence of storage of chemicals. The AWN phase 1 walkover of the site completed 2013 recorded a boiler/generator room located to the rear of the building, the internal floor surface was in good condition and the external hardstanding was noted to be in moderate condition.

The Northern section of the site where Building X is located is the former Acco/Rexel site. It is understood that plastic extrusions were carried out on the site until 1996 when manufacturing ceased. From 1996 to c. 2010 the warehouse was been primarily used as a warehouse for finishing products. It is likely that there was organic solvents, inorganic pigments, organic pigment and dyes and organic binders in use at the facility. An above ground bundled heating oil tank and disused un-bundled above ground storage tanks (used for firewater retention and storage of dry granules) were identified during the AWN phase 1 walkover of the site completed in 2013. The external hardstanding areas were in poor condition.

Based on the AWN Phase 1 walkover of the former Cahill Printers and Acco/Rexel sites there was no underground storage tanks identified, there were above ground storage tank and infrastructure such as boilers and generators indicating the bulk storage and use of hydrocarbons on site. Based on the former uses it is likely there was chemicals stored at the site however there was no evidence of large bulk storage with the exception of two tanks which were reportedly used for storage dry polyethylene granules.

10.0 CONCLUSIONS

There no instructive site investigation information available for the ADSIL site. However based on extensive intrusive investigation works completed on other sites within the Clonsaugh Business and Technology Park there is detailed understanding of the local environmental conditions.

Based on the data available the following conclusions have been made:

- Bedrock is greater than 20.0 mbgl and is overlain by shallow fill and low permeability boulder clay greater than 20.0 meters. As such there is no source-pathway-receptor linkage to the underlying aquifer.
- The historic site uses have utilised chemicals as part of their manufacturing and printing processes these chemicals were likely to be stored in smaller containers and within the footprint of the building reducing the risk of potential historic contamination occurrences. The only bulk chemical likely to be present was fuel oil. There is no record of any spills at the site prior to redevelopment. However, based on the natural conditions present if any localised leaks or spills occurred, these would be contained within the clays on site and naturally degrade over time.
- There is only bulk diesel storage proposed for the facility. However, the risk prevention measures present at the facility significantly reduce the potential for an environmental impact to soil or water to occur. These measures include bunded or double contained vessels, dual-contained fuel pipe system (when underground), spill management procedures and incorporation of interceptors on stormwater lines.
- Source-pathway-receptor linkages were assessed for the bulk storage areas. It was concluded that there are no direct pathways to either the soil and groundwater environment. Interceptors are installed on the surface water drainage. A leakage from a bulk tank would be fully contained in the designated bund or the double skin lining of the tank, with leaks during delivery fully contained within the continuous hard stand delivery area. Any leakage outside of the delivery area would be treated through hydrocarbon interceptors within the drainage system prior to discharge from the site.
- There is an indirect connection through the stormwater drainage to the Santry river and ultimately Dublin Bay. Based on the assessment of the source-pathway-receptor linkages, there no potential for impact of any downgradient Natura site (> 5.5km from the facility).

11.0 REFERENCES

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