

FORMER HAVERFORDWEST LIBRARY

**PHASE I PRELIMINARY RISK ASSESSMENT
& PHASE II GROUND INVESTIGATION
INTERPRETATIVE REPORT**

Report No. Q0912_DS.IR



FORMER HAVERFORDWEST LIBRARY

GROUND INVESTIGATION

Phase I & II: Preliminary Risk Assessment &

Ground Investigation Interpretative Report

Report No. Q0912/DS.IR

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0.0 FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

0.1 General

Recommendations made and opinions expressed in the report are based on desk-based information, including the study of historical Ordnance Survey maps of the area, GroundSure® reports, and geological maps where available.

Where other plan sources, and published data are considered, these are specifically referred to in the text.

We regret that no responsibility can be held for conditions, which have not been revealed by the plan sources referred to. Whilst the report may suggest the likely configuration of strata below the site, this is only indicative, and no liability can be accepted for its accuracy.

The report also provides recommendations and opinions are expressed in the report which are based on the strata observed in the excavations, together with the results of site and laboratory tests. No responsibility can be held for conditions which have not been revealed by the Exploratory Holes or which occur between Exploratory Holes. Whilst the report may suggest the likely configuration of strata, both between Exploratory Holes and below the maximum depth of investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

0.2 Investigation Procedures

Windowless Sample Borehole and Trial Pitting techniques for ground investigation have been employed within the project. All Exploratory Hole operations, sampling and logging of soils, rocks and in-situ testing complies with the recommendations of the British Code of Practice BS 5930: 2020 'Site Investigations', British Code of Practice BS 10175: A2:2017 'Investigation of Potentially Contaminated Sites' and BS 1377: 1990, 'Methods of Test for Soils for Engineering Purposes'.

0.3 Routine Sampling

Representative bulk disturbed and environmental samples of the different strata are taken following completion of logging. These samples are sealed and labelled in clear plastic bags and 2kg plastic tubs. Soil samples obtained for environmental testing are sampled and sealed in borosilicate amber jars or in specialist vessels where required. All samples are returned from site to QGL's laboratory for controlled storage within 24 hours of sampling to await test scheduling/requirements.

0.4 In-Situ Testing, Surveying & Instrumentation

In-situ testing comprised:

- Standard Penetration Testing within Boreholes (SPT)
- Groundwater and gas monitoring installations
- Soakaway Testing
- All exploratory hole locations to be surveyed for location and elevation.

0.5 Groundwater

Where possible, the depth of entry of any influx of groundwater is recorded during the course of excavation or boring operations. The rate of inflow into the excavation or borehole is monitored during the course of the excavation or during boring procedures. Upon encountering any water strikes, work is temporarily halted, and the water levels monitored for a standard twenty-minute period recording the change in water level at the end of the twenty minutes.

Groundwater conditions observed in the excavations are those appertaining to the period of investigation. It should be noted, however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions or other causes.

0.6 Retention of Samples

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded. Further to notifying the Engineer/ Client with one week's notice all soil and/or rock samples not tested will be discarded 28 days after submission of the approved final report.

1.0 INTRODUCTION

1.1 General

Upon the instructions of CB3, the Design Engineers, on behalf of Ateb Group, the Client, Quantum Geotechnic Limited (QGL) has been commissioned to undertake a Phase I desk-based preliminary risk assessment (PRA) study and a Phase II intrusive ground investigation at the site of the former Haverfordwest Library, Dew Street, Haverfordwest SA61 1ST.

The site comprises the old disused library building central to the site, the former (now demolished) leisure centre building in the north, a disused community hub building in the south and associated adjoining car parks. Development proposals are in the early stages but are understood to comprise a mix of housing and apartment blocks.

1.2 Purpose of Study

This report presents a two-stage assessment process; i) Desk-based Preliminary Risk Assessment (PRA) and, ii) Intrusive Ground Investigation.

i) The purpose of the desk study element of the works is to provide a preliminary assessment of the land quality and assess the site's suitability for development in terms of its geotechnical and geo-environmental setting.

This report aims to achieve this by providing the following:

- An early indication of possible land quality issues that could impact on the development proposals
- A conceptual model of the site detailing potential contamination source, pathways and receptors
- A geotechnical and geo-environmental appraisal of any issue highlighted and its significance
- The relevant information to allow the design of an appropriate intrusive (Phase II) ground investigation

Information to enable the PRA is obtained from a variety of sources, notably;

- Site specific database searches provided by Groundsure: GeoInsight and EnviroInsight, Radon,
- Historical and recent Ordnance Survey maps, geological maps and environmental information,
- Published Geological Map for the area: Sheet 228 'Haverfordwest',
- British Geological Survey Website,
- National Resources Wales.

ii) The subsequent intrusive ground investigation provides a site-specific geotechnical and geo-environmental assessment of existing ground conditions, to aid with the foundation design and contaminant risk assessment for the proposed residential development. The investigation comprised a series of shallow windowless sample boreholes across the site supplemented by trial pits to assess the ground, permit in-situ testing, to obtain soil and groundwater (where encountered) samples for geotechnical and geo-environmental laboratory analysis

and to establish the nature of the foundations of the existing retaining and boundary walls bordering the site. Groundwater and land gas monitoring standpipes are also to be installed within the boreholes to allow risk assessment of risks posed from any generated land gas and information on prevailing groundwater levels.

1.3 Report Structure

In this combined desk study and interpretative report, the findings of background and published datasets including site specific and adjacent property environmental and geotechnical information as well as historical land use mapping are reviewed initially to permit a preliminary risk assessment of the site. The findings of the preliminary risk assessment are then utilised to assist with the design of a suitable and targeted intrusive ground investigation to determine if any environmental or geotechnical risks identified from the Phase I desk-based literature review are realised on site.

The report also provides an account of the subsequent Phase II intrusive ground investigation fieldwork, with the strata encountered, including contamination and groundwater observations, detailed. Guidance and recommendations on geotechnical matters and contamination issues are provided along with details on any remedial or mitigative measures deemed necessary.

2.0 SITE DETAIL

2.1 Site Description

The area under review lies within the town of Haverfordwest, Pembrokeshire. It is understood that the new development will comprise several residential dwellings, apartment blocks and associated access roads and parking.

The site is located off Dew Street, Haverfordwest at approximate National Grid Reference SM 95082 15494. It is irregular in shape and covers an area of 1.33ha.

The site is bounded by the A487, Barn Street and residential houses to the west with Dew Street and residential houses to the east. Residential houses along Barn Court define the southern site boundary with the northern boundary defined by the Hotel Mariners and associated carpark. The site slopes gently from south to north, with several steps in the slope providing plateaux parking. Access is from Dew Street to the east where a tarmac down ramp enters around the former Library building. The site is mainly comprised of tarmac car parking in the central and southern areas, with a gravel car park in the north, dense woodland on a steep slope lies within the west of the site, with the south and east occupied by the former library building and education facility. Site boundaries comprise concrete walls and wooden fences backing onto residential gardens.

The surrounding area comprises mainly residential buildings and gardens with a school playing field further west. The site location and extent of the development is indicated on the site plan presented in Appendix I. An extract from present day on-line mapping is presented below.

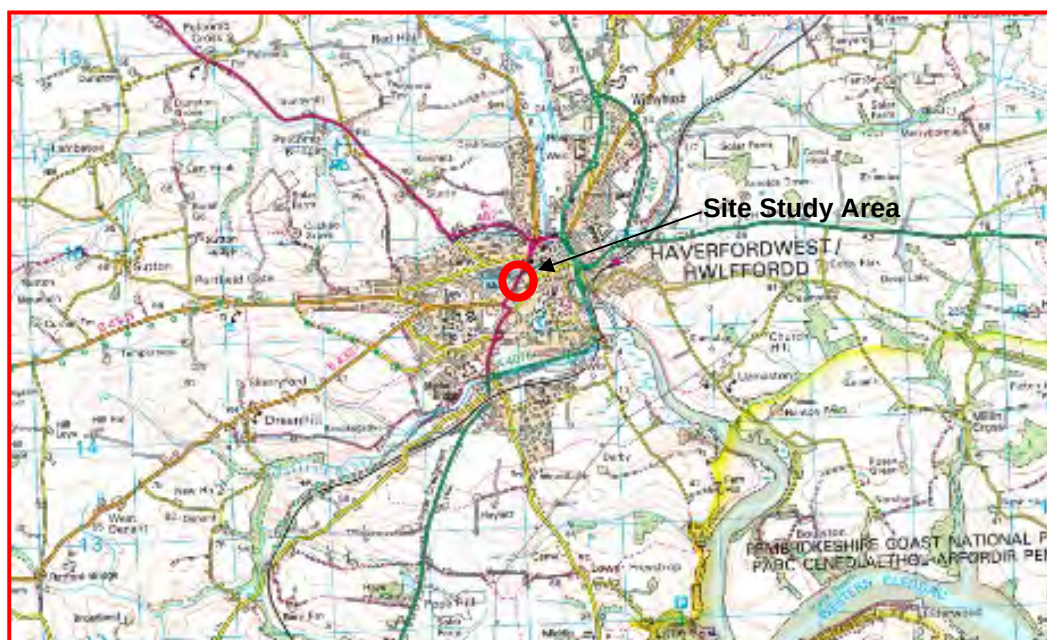


Figure 1: Site location shown ©OrdnanceSurvey

2.2 Topography & Elevation

The topography of the site is illustrated within Appendix I, Figure 1 and gently slopes from south to north towards the A487.

Additional aerial photographs of the site are included in the Groundsure reports presented in Appendix III.

2.3 Statutory Service Information

Service information was made available by the Design Engineers in preparation of any intrusive ground investigation work. During any future excavation works on site, utility plans should be requested from appropriate providers whilst also ensuring safe digging practices in accordance with to HS(G)47 are employed.

3.0 GEOLOGY, MINING AND SITE HISTORY REVIEW

3.1 Published Geology

Details of the geology of the site are provided by British Geological Survey (BGS) Sheet 228 'Haverfordwest', Drift edition at 1:50,000 scale, and BGS's online resource Geology of Britain Viewer. There is no mapped superficial geology on-site, with the geological mapping indicating the site to be underlain by strata from the Portfield & Haverfordwest Formation which is comprised of mudstone. The dip of the strata is in a southern direction of approximately 80 degrees. There are no faults located within 500m of the site, however it is observed to lie upon the northern limb of an east to west trending synform. Figure 2 below is an extract for BGS sheet 228 'Aberystwyth' highlighting the site study area.

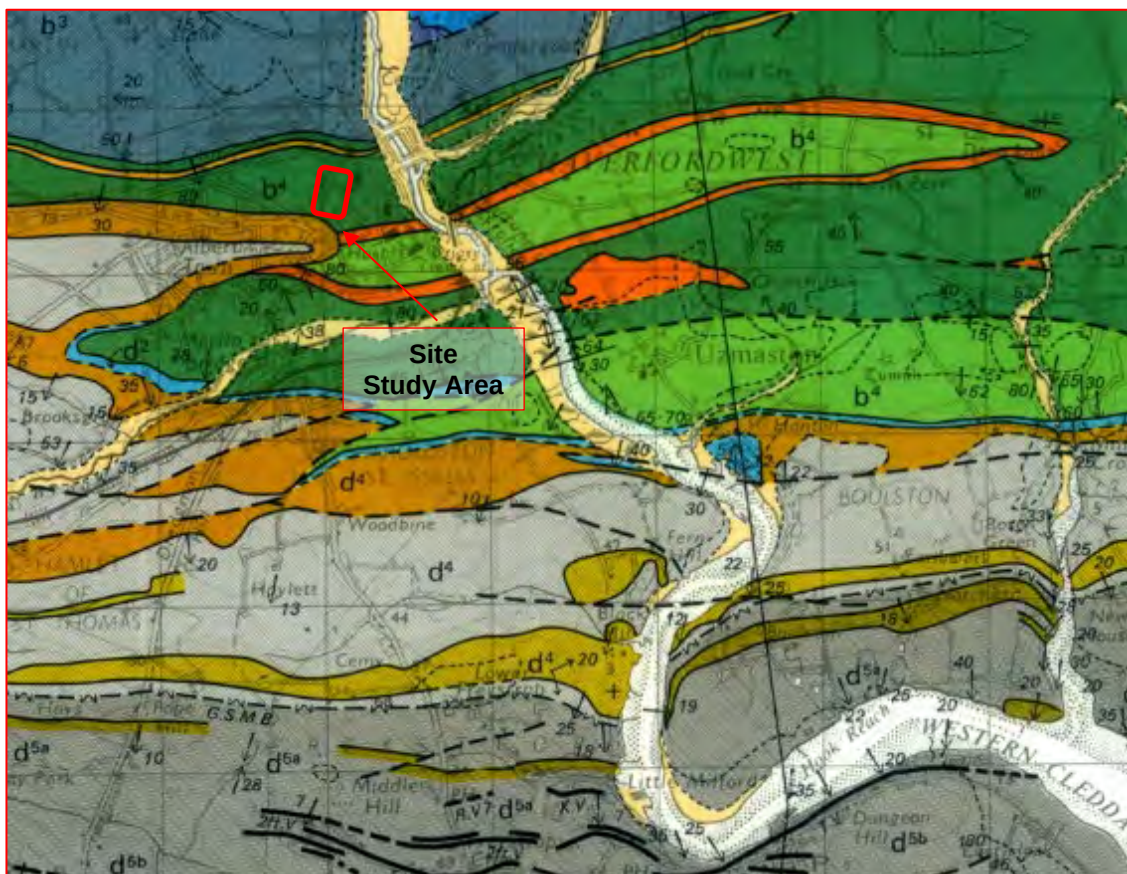


Figure 2: Site Study Area – Extract of Geological Sheet 228, Drift edition, 1:50 000 Scale (Not shown to scale).

©BritishGeologicalSurvey

3.3 Historical Mining Review

A review of available Ordnance Survey plans of the area as held by QGL have been undertaken to further determine if any unrecorded mine entries or workings may have taken place within the vicinity of the site other than what has been highlighted within the geological plans. The site lies within a non-coal mining area.

100m northeast of site. A benchmark of 86.7ftAOD (23.43mAOD) is recorded on Barn Street.

1906 to 1907 County Series at 1:2,500 and 1:10,560 scales

No notable significant changes within the site's boundary.

1937-1939 County Series at 1:2,500 and 1:10,560 scales

Few changes to the site, the most significant being a rectangular building structure towards the centre of site, its use is unknown. The School remains in place with associated outbuildings.

1948 County Series 1:10,560 scale

No obvious changes are observed across the site or indeed the immediate surrounding lands, that still comprise a mix of residential, schools, churches and retail.

1967-1968 National Grid at 1:2,500 scale

There have been significant changes to the site since 1948 edition mapping. The Grammar School building that fronted onto Dew Street, has been removed with majority of the site shown as open space. Kensington Gardens is no longer shown in detail and several of the outbuildings have also been removed in the north suggesting a change of land use with a dwelling and some isolated small unknown buildings appearing. The western area of site remains partially wooded green space.

1971 National Grid at 1:2,500 scale

By 1971, a library has been built in the eastern area of site, where the old grammar school once stood. A separate swimming pool/ leisure centre building has also been constructed in the northern area of site. Both buildings are accessed via a new roadway off Dew Street. The remainder of the site is still showing as garden and wooded areas.

1977 National Grid at 1:2,500 scale

The 1977 edition map shows a that a Technical College has been built in the southern third of the site, comprising two buildings within the site boundary.

1988-1994 Landline and National Grid 1:1,250 and 1:10,000 scale

Between 1977 and 1988 no notable changes occurred onsite. However, circa 1994, the Technical College building underwent development with one of the smaller buildings removed and the main college building extended, and re-used as an Education Centre.

2022 National Grid 1:10,000 scale

The most recent plan from 2022 shows that the swimming pool building in the northern area of site has been removed, with the library and education buildings still in place, but both unused and closed. The car park areas remain, as does the wooded area on the western boundary of the site leading up to Barn Street.

4.0 GROUNDSURE DATASET REVIEW

4.1 General

As part of the desk study element of this report, environmental and combined geological/ground stability reports have been obtained from GroundSure® which compile the results of online database searches using a range of national resources.

The combined GeoInsight® and EnviroInsight® report (Report Ref: HMD-213-9039024) provides details on the geology of the site as well as information relating to ground workings in the area of the site, mining, extraction, natural cavities and natural ground subsidence. It also provides details on site specific environmental issues including pollution incidents, discharge consents, flooding issues and any areas of significant contamination potential as well the risk to any existing or planned properties from the underlying ground conditions.

A summary and review of the data collected from within this report is detailed in the following sections. Full copies of the documents provided by GroundSure® are included in Appendix III.

4.2 Geology and Ground Stability - Data Review

4.2.1 Artificial Ground

The geology section of the combined geological/ground stability GroundSure® report has identified no presence of both Artificial Ground or Made Ground within the site study area.

4.2.2 Superficial Ground/ Drift Geology & Landslips

The Groundsure Report indicates no superficial deposits across site study area.

There are no records of any landslips within 500m of the site boundary.

4.2.3 Bedrock, Solid Geology & Faults

The report identifies the site to be underlain by the Portfield Formation and Haverford Mudstone Formation which concurs with Section 3.1 of this report.

There are no records of any geological faults within 500m of the site boundary.

4.2.4 Radon Data

The Groundsure Report indicates that between 1 and 3% of properties are estimated to be affected by Radon with a 75m accuracy radius. Therefore, no radon protective measures are required.

4.2.5 Mining, Ground Workings & Natural Cavities

There are four records of surface ground workings within 500m of the site study area. That being for the same cemetery 204m southwest from 1939 to 1974.

There are eight records of non-coal mining activity within 1000m of the site study area. The closest record is on site (unnamed) utilising a vein mineral commodity with a description of localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they not need be considered. All other records are more than range from 11m to 682m from the study area, relating to vein mineral extraction. There are no BritPits, underground workings, clay, tin, gypsum or any other mining or quarrying entries listed.

4.2.6 Natural Ground Subsidence

The Groundsure report identifies a range of 'Natural Ground Subsidence' datasets supplied by the British Geological Survey (BGS). Each hazard has a 'hazard rating' and corresponding description which are summarised in Table 1.

Table 1: Natural Ground Hazard Summary

Hazard	Hazard Rating	Details
Shrink - Swell Clays	Very Low (On-Site)	Ground conditions predominantly low plasticity
Landslides	Low (On-Site)	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.
Soluble Rocks	Negligible (On-Site)	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.
Collapsible ground	Very Low (On-Site)	Deposits with potential to collapse when loaded and saturated are unlikely to be present.
Compressible deposits	Negligible (On-Site)	Compressible strata are not thought to occur.
Running Sands	Negligible (On-Site)	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on land use due to running conditions.

4.2.7 Estimated Background Soil Chemistry

The report identifies three records of the estimated background soil chemistry either on site or within 250m of the site boundary. A summary of these records is presented in Table 2.

Table 2: Estimated Geometric Mean Soil Concentrations (all figures in mg/kg)

Location	Arsenic (As)	Bio accessible Arsenic	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)	Bio accessible Lead
On site	15-25 mg/kg	No Data	1.8 mg/kg	60-90 mg/kg	15-30 mg/kg	100 mg/kg	60 mg/kg

4.2.8 Railways and Tunnels

Section 21 of the Groundsure Report details current and historic railways, and railway related infrastructure such as embankments and tunnels. There are no current or historic railway and tunnelling records within 250m of the site study area.

4.3 Environmental Data Review

4.3.1 Historical Industrial Sites

The Groundsure combined report identifies 48 No. records of potentially contaminative past industrial land uses within 500m of the site boundary. These vary from police stations, cemeteries, smithy's, hospitals, unspecified works, unspecified depots, fire stations, burial grounds, terminus, unspecified ground workings, unspecified commercial/ industrial, railway sidings, sand pit, gravel pit, refuse heap, unspecified workhouse and carriage and wagon works dating back to 1906. The closest record is 202m northeast of the site relating to a police station. All entries are at such a distance they are not considered to pose a significant risk to the site or to have impacted upon the site historically.

There are 4 No. records relating to historical tanks within 500m of the site study area. The closest record being 94m southwest relating to an unspecified tank dated 1966.

There are 40 No. records in relation to historical energy features within 500m of the site study area. Two of which are electricity substations on site dated from 1992 and 1998. The nearest record off-site is 175m south identified as an electricity substation present from 1970.

There are no records of any historical military sites within 500m of the site boundary.

There are no records of any historical petrol stations within 500m of the site boundary.

There are 25 No. records of historical garages within 500m of the study area. The closest being 104m south of the site boundary present from 1966.

There are no records of historical landfills within 500m of the study area.

There are 8 No. recorded waste exemptions within 500m of the site boundary. The closest being 264m southeast for a pharmacy sorting and de-naturing of controlled drugs for disposal.

4.3.2 Current Industrial Sites

Section 4.1 of the Groundsure report lists 19 No. entries for recent industrial land uses within 250m of the site. These include an electricity substation located on site. All other entries are at such a distance they are not considered to pose a significant risk to the site or to have impacted upon the site.

There are two recorded current petrol station located 372m south and 389m southwest of the site study area.

There are no gas pipelines, no hazardous substance storage or usage sites, or indeed sites determined as Contaminated Land listed.

4.3.3 Environmental Permits, Incidents and Registers

Within this section of the Groundsure report, there are 36 No. entries against Licensed Discharges to controlled waters within 500m of the study area. Both records are on site relating to unspecified effluent into a highway ditch dated between 1901 and 1996.

There are no records of radioactive substance authorisations within 500m of the site.

There are no records of Integrated Pollution Control (IPC) within 500m of the site study area.

There are no records of both Licenced Industrial Activities (PartA(1)) within 500m of the site study area.

There are no records of Pollutant Release to Surface Waters (Red List) under the environmental protection regulations 1991.

There are no records for List 1 or List 2 Dangerous Substances in Compliance with European Directive E 2006/11/EC and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

There are 31 records of Substantiated Pollution Incidents (EA/NRW) within 500m of the site study area. The nearest is 171m north west of site for construction and demolition materials and wastes dated 2014. This had a minor impact on air and no impact of water or land.

No Pollution Inventory Waste Transfers/ Radioactive Waste data sets recorded within 500m of the site study area.

There are no records of Control of Major Accident Hazards (COMAH). This includes upper and lower tier sites and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS).

There are no records of National Grid High Voltage Underground Electricity Transmission Cables or High-Pressure Gas Transmission Pipeline within 500m of the site.

4.3.4 Hydrogeology and Hydrology

There are no superficial aquifers on the site study area, the closest being 261m east of the site for a Secondary A aquifer with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers. Whilst the underlying bedrock has a classification of Secondary B Aquifer, described as Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons, and weathering. These are generally the water-bearing parts of the former non-aquifers.

Groundwater vulnerability is based on an assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one-kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

The onsite characterisation of vulnerability to groundwater by a pollutant discharged at ground level is recorded in the Groundsure report as 'high'.

There is no soluble rock risk on or within 1km of the site study area.

There is one recorded groundwater abstraction licences within 2000m of the site located 1099m southeast of the site. There are 5 No. recorded surface water abstraction licences, the closest being 853m south of the site study area.

No potable water abstraction licenses are noted within 2000m of the site.

There are no designated source protection zones (SPZ) within the area.

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments. The site is classified as within a River Water Body catchment – Western Cleddau. Western Cleddau operational catchment and within the Cleddau and Pembrokeshire Coastal Rivers Management catchment.

4.3.5 Flooding

Information on surface water flooding, flood defences, flood storage and groundwater flooding are provided in this section with a radius of 250m of the site study area.

The site is listed as being at 'Negligible Risk' in relation to Risk of Flooding from Rivers and Sea (RoFRaS). The north-eastern corner of the site is at risk of a 1 in 30 year, 0.3m-1.0m surface water flooding. The site is at 'Negligible Risk' from Groundwater flooding.

4.3.6 Designated Environmentally Sensitive Sites

According to the Groundsure report there are three records of Designated Sites of Special Scientific Interest (SSSI) within 2000m of the site study area, the closest being 367m east of the site for the western Cleddau river.

There are two records of a Special Area of Conservation (SAC) within 2000m of the site, the closest being 367m east of the site for the Cleddau river.

13 No. areas of designated Ancient Woodland are recorded within 2000m of the site, the closest being 79m northwest of the site study area.

There are no other designated environmentally sensitive sites including National Nature Reserves (NNR) and Special Protection Areas (SPA) within 2000m of the site.

There are no Local Nature Reserves (LNR) within 2000m of the site.

There are no designated Biosphere Reserves within 2000m of the site.

There are no records of Forest Parks, Marine Conservation Reserves, Proposed Ramsar Sites, Potential Special Protection Areas (pSPA), Nitrate Sensitive Areas, Nitrate Vulnerable Zones and Green Belt Land within 2000m of the site study area.

4.4 Data Review Summary

Upon review of the geotechnical and geo-environmental data collected from all sources (including geology, site history and the Groundsure report), a limited number of features regarding historical/ current land use within the locality have been identified that may have the potential to influence the development. A summary of these features and potential contaminants associated with each are as follows:

- Historical mapping has shown that the majority of the site has been a mix of maintained garden and wooded lands with the exception of a grammar school located in the eastern area of site, fronting onto Dew Street. The site remained as such until circa 1968, when significant development took place. The grammar school was replaced by a Library, a Swimming Pool building was constructed in the northern area and a Technical

College in the southern area. New car parks were developed around these new buildings and a new access road off Dew Street. By 1994 the Technical College had been partially redeveloped and underwent a change of use to an Education Centre. By 2022, the swimming pool complex had been demolished, but the remaining library and education centre are now closed and partially derelict. The car parks remain functioning as council car parks.

- The central and southern areas of the site are listed as being at 'Negligible Risk' in relation to Risk of Flooding from Rivers and Sea (RoFRaS). The northern area of the site is at risk of a 1 in 30 year, 0.3m-1.0m surface water flooding. The site is at 'Negligible Risk' from Groundwater flooding.
- The Groundsure Report indicates that between 1 and 3% of properties are estimated to be affected by Radon. Therefore, no radon protective measures are required in accordance with the Building Research Establishment (BRE) guidance on radon protective measures for new dwellings (BR211 2015).
- The Groundsure Report did not identify any areas of concern regarding the underlying ground conditions in relation to geotechnical matters with no past mining, mineral extraction or groundworks processes having taken place on site or within a distance that may influence the site. No naturally occurring geo-hazards were identified;
 - Shrink Swell Clays – Very Low (On-Site)
 - Running Sands – Negligible to Very Low (On-Site)
 - Compressible Deposits – Negligible (On-Site)
 - Collapsible Deposits – Very Low (On-Site)
 - Landslides – Low (On-Site)
 - Ground Dissolution of Soluble Rocks – Negligible (On-Site)
- Past and current land use records from the Groundsure Report did not reveal any significant potential contaminative land uses with onsite or within a distance that may impact upon the site. However, the various phases of demolition and construction on parts of the site as shown in the historical review, does have the potential to give rise to land contamination through buried building waste materials. The extent of this is unknown at desk study stage.

5.0 CONCEPTUAL SITE MODEL (CSM) & PHASE II RECOMMENDATIONS

5.1 Legal Framework for Contaminated Land

Part 2A of the Environmental Protection Act 1990 created a regime for the identification and remediation of contaminated land. Contaminated land is defined by the potential to cause significant harm to human health and/or the environment. It establishes that responsibility for deciding when land is contaminated lies solely with local authorities.

Part 2A of the Environmental Protection Act 1990, Section 78A (2) defines “Contaminated Land” as:

“any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that -

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) pollution of controlled waters is being, or is likely to be, caused.”

The definition is subject to statutory guidance issued by the Secretary of State which defines significant harm and a significant possibility of such harm with respect to the definition of contaminated land. The statutory guidance sets the definition of contaminated land within the context of Government policy including the “suitable for use” approach.

In Wales, the governing guidance used within this study is that of the ‘2007 No.2 Environmental Protection, Wales, Part 2A Statutory Guidance on Contaminated Land (2006)’ and The Contaminated Land (Wales) Regulations 2006. This is further supplemented by the Welsh Local Government Association & Environment Agency Wales (*now Natural Resource Wales (NRW)*) document “Development of Land Affected by Contamination: A Guide for Developers” 2012.

Under the planning regime, land contamination is also a material consideration. A local authority has the duty to consider potential implications of contamination when it is considering applications for planning permission. A planning authority may require investigations to be undertaken where there is potential contamination or contamination is known to exist at a site before granting planning permission. Alternatively, planning permission may be conditional requiring appropriate investigation and, if necessary, remediation.

5.2 Conceptual Site Model

The Conceptual Site Model (CSM) is a representation of the current understanding of the site and its surrounding environment with regards to geology, groundwater, surface waters, and potential contamination on-site and adjacent off-site and any migration pathways.

The potential risks to the proposed development and adjacent land have been assessed by consideration of

the potential pollution linkages. For a risk to exist there must be a source of contamination, a receptor that may be harmed, and a pathway by which the receptor could be exposed to the contaminant. Only when all three factors are present (i.e. source, pathway, and receptor) can a pollution linkage, and consequently an unacceptable risk, exist. The CSM considers all three elements and the potential for pollution linkages that may exist. If no linkage is identified, then there is no or negligible risk.

The CSM has been developed for the proposed end use (Residential) and each factor has been assessed in terms of its relative position (on-site/off-site). A visual representation of the model is provided as Figure 4.

Sources

Potential sources or contamination (on-site) were identified by the data review with consideration to the site and surrounding land's past, present and potential future uses. Although considered low, the potential exists for Made Ground to be present on site associated with development of the site in relation to the three main structures that either once existed or those that remain i.e. the swimming pool complex (demolished), the library building (derelict) and the education centre (derelict). These buildings were all built at a time when Asbestos was also widely used in such buildings. The more central areas of the site have been used for car parking for several decades, with wooded areas remaining dominant along the western boundary.

Any Made Ground may contain Heavy Metals, Hydrocarbons and/or Asbestos.

Low risk off-site sources have been identified, associated with electricity sub-stations, ground workings with backfill material of an unknown nature and Made Ground potentially relating the development in the surrounding area.

The Groundsure Report indicates that between 1 and 3% of properties are estimated to be affected by Radon.

Receptors

Considering the proposed site end use (residential), a number of receptors have been identified at risk during and subsequent to the proposed development (on-site), and in the surrounding areas (off-site). These are summarised as follows:

On-site

- Future site users – residents, construction workers (during development)
- Controlled waters – groundwater (Secondary Aquifer B)
- Possible services

Off-site

- Local site users – residents, nearby site user
- Nearby controlled waters – groundwater (Secondary Aquifer B)
- Nearby buildings and services – primarily residential and small retail

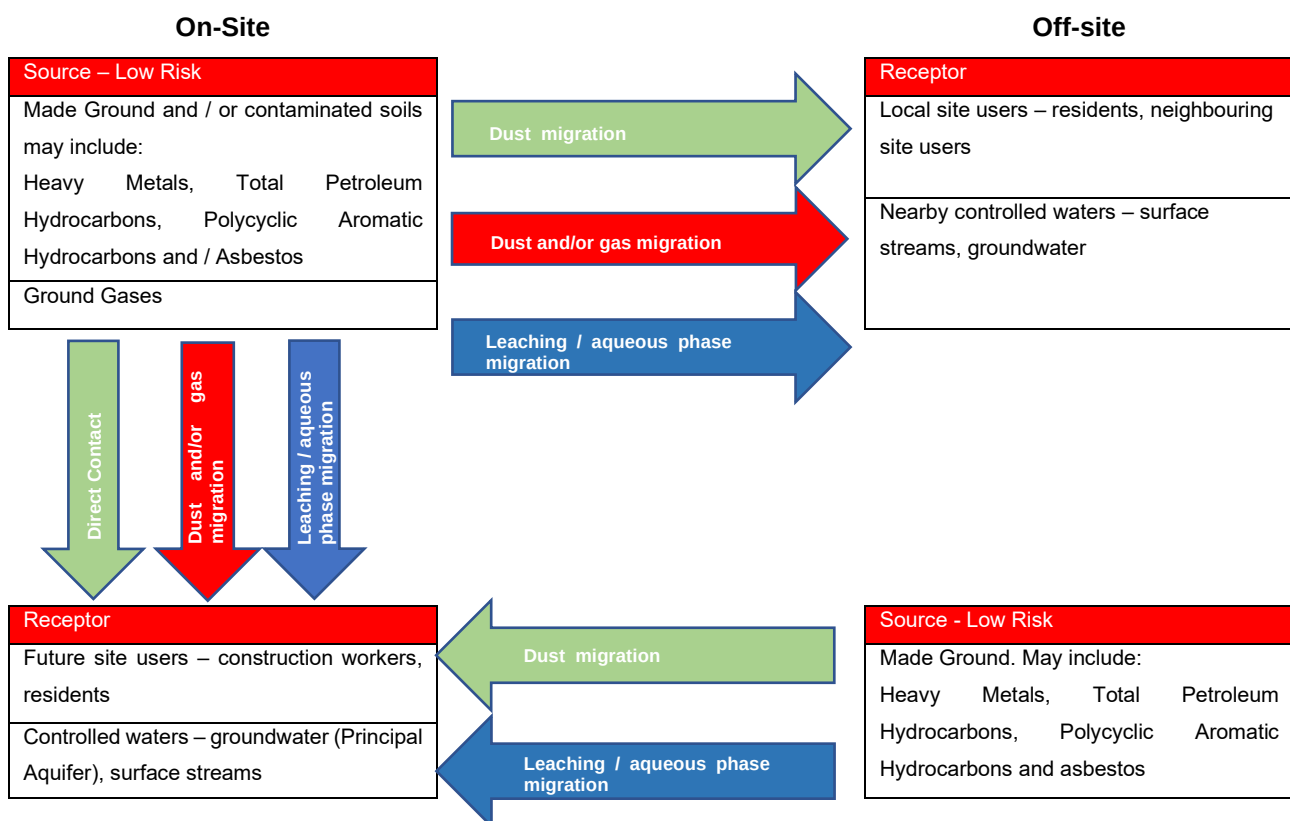
Pathways

Completing the pollutant linkage between source and receptor are pathways – the way in which they are connected. The type of sources identified have a range of ways of contaminating the receptors, and typically fall into the following categories:

- Direct contact – including dermal contact and ingestion
- Dust or land-gas migration through air (above or below ground level) and subsequent inhalation particularly during the construction phase when soils may be exposed.
- Leaching of contaminants into groundwater and aqueous phase migration into areas of direct contact. Considering the area's hydrogeology and suspected groundwater migration direction, the risk of potential off site to on-site and on-site to off-site aqueous and gaseous phase migration is considered medium.

Considering sources and receptors both on-site and off-site, pathways exist in three forms: on-site to on-site, on-site to off-site, and off-site to on-site. A visual representation of the complete model and each pollutant linkage is provided as Figure 4 below.

Figure 4: Conceptual Site Model: Pollution Linkages



5.3 Summary of Identified Potential Risks

A summary of all identified risks from the literature, plans, and dataset reviews is presented below;

Summary of Geotechnical Risks:

- The primary risk arises from the high potential for Made Ground to be present beneath some areas of site associated with past development including more recent demolition works associated with the former swimming pool complex. Made ground may not be suitable as a founding strata for any new builds and may also hold potential contaminants that could be chemically aggressive towards buried concrete and the degradation of buried new services.
- There is also a possibility of 'hard' and 'soft' spots locally around the site in relation to any buried concrete structures from past buildings and also any softer areas associated with the original land being wooded, soft landscaped and maintained garden areas.

Summary of Geo-Environmental Risks:

- Whilst the potential is perceived to be low from the initial desk study phase of this report, there is a risk of potentially contaminated Made Ground being present on-site associated with former buildings that once stood, their subsequent demolition and also the development of century of buildings.
- Made ground in the likely form of old building rubble which could contain buried Asbestos, likely to be Asbestos Containing Materials (ACM).
- Off-site sources of contamination include possibly Made Ground however, the risk to the site in question is regarded as very low.
- Low risk from ground gas emissions.
- There is a low possibility of leaching of contaminated soils into the groundwater (bedrock is a Secondary B aquifer). No soils are mapped as being onsite.
- No Radon protective measures are necessary.
- The Groundsure® report indicates the negligible risk of flooding for the site.

5.4 Recommendations for Phase II Ground Investigation

Based on the findings of the desk-based study element of the works, and the resultant Preliminary Risk Assessment (PRA) recommendations for the intrusive ground investigation are presented below to fully assess any potential geotechnical or geo-environmental hazards as well as obtaining all relevant information needed for the Client to progress to scheme's design and construction. The following is recommended.

- A series of intrusive exploratory holes (e.g., trial pits and boreholes) and in-situ testing to determine the underlying ground conditions and to obtain geo-environmental and geotechnical samples to characterise the underlying ground and groundwater conditions. The ground investigation should be competently designed and target the areas of geotechnical and geo-environmental issues identified in the Phase I Preliminary Risk Assessment.
- Installation of groundwater and ground gas monitoring wells together with a subsequent programme of sampling and monitoring.

- An assessment of ground stability risks to proposed development.
- A human health assessment to determine any elevated concentrations of contamination with respect to the proposed site end use.
- An assessment to determine pollution pathway linkages between sources and receptors on and off site including an assessment of risk to neighbouring controlled waters.
- An assessment of the ground and groundwater conditions.
- In-situ testing should also be undertaken to inform drainage design and pavement design whilst on site undertaking the geotechnical and geo-environmental investigation to provide cost saving.

6.0 PHASE II GROUND INVESTIGATION FIELDWORK

6.1 General

In September 2022, QGL undertook a Ground Investigation at the proposed development site in accordance with Section 5.4 above. Site supervision and attendance by an Engineering Geologist from QGL was undertaken on all aspects of the site works and subsequent reinstatement works of all exploratory hole locations. All service plans were held onsite as provided by the Client, with all Site Personnel inducted by QGL and briefed of the pertinent Risk Assessments and Method Statements relating to the tasks to be undertaken. No incidents or near misses were recorded during the fieldworks, with the works being incident free.

No deviations from the Standards and Procedures adopted for the works were recorded.

All exploratory hole locations were subject to the hand excavation of a 1.2m deep service/ utility inspection pit prior to any drilling. Also, each area of investigation was fully CAT ('Cable Avoidance Tool') scanned prior to breaking ground.

A summary of the fieldworks is outlined below;

- 5 No. Windowless Sample (WS) Boreholes to refusal
- 4 No. Machine Excavated Trial Pits (TP)
- 5 No. Super Heavy Dynamic Probes (DP)
- 2 No. In-situ TRL Dynamic Cone Penetrometer (DCP) tests
- In-situ Variable Head Permeability tests
- Installation of combined land gas and groundwater monitoring standpipes in 3 No. WS Boreholes
- Geotechnical and Environmental Soil Sampling
- Logging of all samples retrieved

6.2 Exploratory Hole Locations

The exploratory hole locations were set out by a QGL Engineering Geologist in general accordance with locations proposed by the Scheme Engineer, to obtain as best coverage of the site and where access could be gained with the investigation equipment. Each position was subsequently surveyed in to National Grid co-ordinates and levels recorded as Metres Above Ordnance Datum (mAOD). An Exploratory Hole Location Plan is presented in Appendix I.

6.3 Windowless Sample Boreholes

A total of 5 No. Windowless Sample Boreholes (WS01-WS05) were undertaken during the site works. Windowless Sampling techniques involve a sampler dynamically driven down to depth using sampling tubes, nominally 116mm in diameter and reducing as depth increases. This technique allows a relatively undisturbed sample of soil to be taken in a plastic liner, or alternatively sub sampled as a disturbed jar sample. Within

competent granular-cohesive soils the portable equipment used for Windowless Sampling is limited by the nature of the ground and robustness of the driving tool. The recovered sample liners were subsequently split and logged on site in accordance with BS5930: 2015+A1:2020; BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2005, by a Quantum Engineering Geologist. The sequence of deposits encountered during the investigation is detailed within the Engineering Geologist's logs presented within Appendix IV. The logs highlight the nature of the soils encountered and provide descriptions of the strata revealed at the site. Details of the Windowless Sample Boreholes, including final depths in metres below ground level (m.bgl) are provided below in Table 3:

Table 3: Windowless Sample Borehole Detail

Exploratory Hole ID	Terminated Depth (m.bgl)	Location Co-Ordinates			Reason for Termination
		Eastings	Northings	Elevation (mAOD)	
WS01	1.10	195037.988	215438.555	29.385	Terminated Upon Refusal
WS02	2.00	195041.36	215457.327	28.392	Terminated Upon Refusal
WS03	4.00	195071.765	215489.808	26.748	Terminated Upon Refusal
WS04	4.00	195112.248	215490.104	28.47	Terminated Upon Refusal
WS05	7.40	195080.976	215543.665	24.848	Terminated Upon Refusal

A set of Engineer's logs are presented within Appendix IV.

6.4 Machine Excavated Trial Pits

4 No. Trial Pits (TP01-TP04) were excavated using a 1.6-Ton tracked excavator to allow near surface sampling. This method of investigation allows direct sampling of the near surface deposits for identification purposes, as well as assessment of any salient features and Made Ground or disturbed ground. The trial pits were logged in accordance with BS5930:2015+A1:2020; BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004, and supervised at all times by an Engineering Geologist from QGL. All the trial pits were backfilled with compacted layers of arisings upon completion of soakaway testing with suitable surface reinstatement where required. Details of the Trial Pits including final depths in metres below ground level (m.bgl) are provided in Table 4.

Table 4: Trial Pit Detail

Exploratory Hole ID	Terminated Depth (m.bgl)	Location Co-Ordinates			Reason for Termination
		Eastings	Northings	Elevation (mAOD)	
TP01	2.00	195021.707	215439.424	30.366	Terminated Upon Refusal
TP02	2.00	195071.765	215478.442	27.492	Terminated Upon Refusal
TP03	2.00	195108.39	215531.939	24.993	Terminated Upon Refusal
TP04	2.00	195102.106	215565.422	24.527	Terminated Upon Refusal

A set of Engineer's logs and photographs are presented within Appendix V.

6.5 In-Situ Testing

6.5.1 Dynamic Probe Tests

5 No. Dynamic Probes (prefix DP) Super Heavy version – ‘DPSH’, were undertaken across the site, predominantly in the former footprint of the now demolished swimming pool building due to the dense gravel surface making it difficult for the windowless sample boreholes to penetrate.

Super Heavy Dynamic Probe testing involves recording the blow counts for every 100mm of driving (N100), using the automated 63.5kg drop hammer and 15cm² cone point with sacrificial cones. Dynamic probing determines the resistance of soils in-situ by the penetration of the 90° cone when driven dynamically in a standard manner, giving a continuous record of the relative density of the ground. The information is recorded as the number of blows to drive the cone each 100mm increment. The Dynamic Probe holes were backfilled with Bentonite pellets. Table 5 details the final depths achieved and reason for termination of each dynamic probe.

Table 5: Dynamic Probe details

Exploratory Hole ID	Terminated Depth (mbgl)	Location Co-Ordinates			Reason for Termination
		Eastings	Northings	Elevation (mAOD)	
DP01	5.90	195102.119	215565.153	24.462	Encountered refusal, dense strata– unable to progress
DP02	1.00	195102.755	215546.973	24.788	Encountered refusal, dense strata– unable to progress
DP03	0.40	195104.984	215529.112	24.945	Encountered refusal, dense strata– unable to progress
DP04	0.50	195108.251	215531.685	24.964	Encountered refusal, buried obstruction – unable to progress
DP05	3.30	195125.366	215548.951	24.771	Encountered refusal, dense strata– unable to progress

The Dynamic Probe logs are presented in Appendix VI.

6.5.2 Variable Head Permeability Tests

Following installations of groundwater and landgas monitoring wells in selected WS Boreholes, falling head permeability tests were undertaken to determine shallow ground permeability to assist with potential Sustainable Urban Drainage System (SuDs) solution for the proposed new development. Tests were performed in WS Boreholes WS02, WS03 and WS05.

Unfortunately, due to the extremely high outflow rate, it was not possible to obtain a head of water within the wells to permit a test to be undertaken. Water was pumped into the wells at a rate of 110litres per minute and still unable to achieve a head of water.

6.5.3 TRL Dynamic Cone Penetrometer Tests

A total of 2 No. TRL DCP tests were undertaken on site within accessible and permissible areas. DCP01 was adjacent TP01 and DCP02 was adjacent TP02 on grassed verge areas. The TRL approved dynamic cone

penetrometer test permits a calculation and derivation of a corresponding California Bearing Ratio (CBR) value to facilitate road pavement design. This method is often used where access to undertake conventional CBR testing is not available.

The DCP test involves the fall of a fixed weight over a fixed height to force a 20mm diameter, 60° cone into the near surface soils. The depth of penetration for varying numbers of blows is recorded and is then converted to a CBR value using well established empirical correlations (Highways Agency, 2008). In general, the tests were undertaken between the existing ground surface and 1.0m below ground level, thus providing a profile of correlated CBR values within the near-surface soils. No water was added to the soils prior to testing, so they were in their natural condition. The correlated CBR values are also shown on the test result sheets in Appendix VII.

6.6 Sampling - General

Geotechnical bulk and disturbed samples were taken where required within the superficial deposits for strata identification and laboratory testing purposes. In addition, environmental samples were taken for laboratory testing.

All environmental samples were sent to the laboratory within 24-36 hours of having been obtained, whilst geotechnical samples were returned from site to QGL's laboratory for controlled storage to await test scheduling/requirements. For specific details of laboratory testing see Section 7.0. Sample type and sample depth are recorded on the Engineering Geologist's Exploratory Hole Logs found within Appendices IV and V.

6.7 Landgas and Groundwater Monitoring

Three Windowless Sample boreholes were installed with 50mm Ø HDPE combined land gas and groundwater monitoring standpipes to permit post-fieldwork monitoring visits. Table 6 details the installations undertaken.

Table 6: Borehole Installation Detail

Exploratory Hole ID	Installation Standpipe Internal Diameter (mm)	Installation Depth (m.bgl)	Installation Response Zone (m.bgl)
WS02	50	2.00	1.00 - 2.00
WS03	50	4.00	2.00 – 4.00
WS05	50	3.00	2.00 – 3.00

Each post-fieldwork monitoring visit included the measurement of the following parameters:

- O₂ (% v/v)
- CH₄ (% v/v)
- H₂S (ppm)
- CO₂ (% v/v)
- Flow Rate (l/hr)
- Atmospheric Pressure (mb)
- Groundwater Level (m.bgl/ mAOD)
- CO (% v/v)

The works allowed for 3 No. post-fieldwork monitoring visits. The results of these visits are presented in Appendix VIII and discussed further in Section 10.7.

7.0 LABORATORY TESTING

7.1 General

The laboratory testing was scheduled by QGL and comprised a number of geotechnical and environmental tests on selected soil and groundwater samples obtained during the investigation.

7.2 Geotechnical Laboratory Testing

Only limited geotechnical testing was required for this scheme based on the ground conditions revealed during the investigation. Table 7 details the tests undertaken.

Table 7: Geotechnical Tests Undertaken

Type of Test	No of Tests
Moisture Content	5
Particle Size Distribution (Wet Sieve)	5
Atterberg Limits (4 Point)	4
BRE Suite D	7

A full set of geotechnical laboratory test certificates are provided within Appendix IX.

7.3 Geoenvironmental Laboratory Testing

Geoenvironmental testing was carried out on selected soil and soil leachate derived samples gained from the ground investigation. The purpose of the testing is to gain a holistic view of any raised levels of contaminants that may exist onsite. Table 8 below details Geoenvironmental tests undertaken on selected soil samples.

Table 8: Geo-environmental tests undertaken on soil and soil leachate samples

Heavy Metals			
• Arsenic	• Barium	• Beryllium	• Boron
• Cadmium	• Chromium (VI)	• Copper	• Lead
• Mercury	• Nickel	• Selenium	• Vanadium
• Zinc			
Inorganics			
• pH	• Total Sulphate	• Soluble Sulphate	• Sulphide
• Sulphur	• Organic Matter (soil only)	• Total Cyanide	• Complex Cyanide
• Free Cyanide	• Asbestos (soil only)		
Poly Aromatic Hydrocarbons			
• Naphthalene	• Acenaphthylene	• Acenaphthene	• Fluorene
• Phenanthrene	• Anthracene	• Fluoranthene	• Pyrene
• Benzo(a)anthracene	• Chrysene	• Benzo(b)fluoranthene	• Benzo(k)fluoranthene

• Benzo(a)pyrene	• Indeno(1,2,3-cd) pyrene	• Dibenz(a,h)anthracene	• Benzo(ghi)perylene
Total Petroleum Hydrocarbons			
<i>TPH-CWG Aliphatic Split:</i>			
• EC10 – EC12	• EC5 – EC6	• EC6 – EC8	• EC8 – EC10
	• EC12 – EC16	• EC16 – EC21	• EC21 – EC35
<i>TPH-CWG Aromatic Split:</i>			
• EC10 – EC12	• EC5 – EC7	• EC7 – EC8	• EC8 – EC10
	• EC12 – EC16	• EC16 – EC21	• EC21 – EC35
Aromatic, Monoaromatics & Oxygenates			
• Phenol	• Benzene	• Toluene	• Ethylbenzene
• p & m - xylene	• o - xylene	• MTBE	
Additional Tests for Soil Leachate			
• Hardness			

A full set of Geo-Environmental laboratory test certificates are provided within Appendix X.

8.0 GROUND CONDITIONS ENCOUNTERED

8.1 General

The sequence of deposits encountered during the investigation is detailed within the Engineering Geologist's logs presented within Appendices IV and V. The following sections summarise the findings of the exploratory holes.

8.2 Ground Conditions

8.2.1 Overview of Strata Encountered

The general ground conditions encountered across the site comprise a variable thickness and composition of Made Ground overlying a variable depth to completely weathered Bedrock. It is important to note that the overall site displays marked topographical variations with the eastern area being on an elevated setting (where the former library building resides) which then slopes down westwards to where the car parks reside in the central areas, before climbing back up along the western boundary where the wooded area exists.

Topsoil

Only Trial Pit TP01 encountered a layer of Topsoil. TP01 was located on a small grass verge area in the southwestern corner of the site. A thickness of 0.40m of silty Topsoil was recorded.

Made Ground

Each of the Trial Pits and Windowless Sample Boreholes encountered Made Ground across the site. The thickness and composition did vary. The Made Ground was recorded as predominately either as a sandy gravelly Clay, a sandy Gravel or a clayey gravelly Silt which reflects the process by which these were deposited onsite. Some of the material is recorded as a 'reworked ground'.

There was no obvious pattern of thinning or thickening in certain areas apart from the former swimming pool area where TP03, TP04 and WS05 were positioned. These proved the thickest of up to 4m whereby the windowless sampler equipment encountered refusal and unable to proceed. Therefore, super heavy Dynamic Probing was used to advance the borehole. The Made Ground material revealed in these three exploratory holes included much brick cobbles, coal, slate, concrete, porcelain and plastic fragments. Suspected Asbestos Containing Material (ACM) was recorded below 0.50m depth on TP04. WS05 was continued beyond 4.00m (still in Made Ground) using super heavy Dynamic Probe whereby beyond 3.00m depth broken ground was recovered.

Much of the Made Ground revealed in the northern area of site is likely to be associated with demolition waste from the felling and grubbing up of the former swimming pool building where much brick was identified and suspected ACM – please refer to Section 10.4.6 for Asbestos assessment findings.

Table 9 provides a summary of the range of depths to which Made Ground was revealed across the site.

Table 9: Made Ground Encountered Detail

Exploratory Hole ID	Made Ground Depth (mbgl)		Note
	Top	Base	
TP01	GL	0.90	
TP02	GL	1.50	
TP03	GL	1.40	
TP04	GL	Unknown	Unable to determine base of Made Ground – max. depth 2.00mbgl
WS01	GL	0.50	
WS02	GL	1.40	
WS03	GL	2.70	
WS04	GL	Unknown	Unable to determine base of Made Ground – borehole continued by dynamic probe methods to 4.0m
WS05	GL	Unknown	Unable to determine base of Made Ground – borehole sampled to 4.00m, but collapsing, continued by dynamic probe methods to 7.40m

G.L. = Ground Level * = Base of Strata Not Found

Bedrock

Directly underlying the Made Ground onsite, a completely weathered bedrock profile was encountered and recorded in the Engineer's logs. This typically comprised a bluish grey sandy gravelly Clay or a very dense clayey sandy Gravel of limestone. WS01, WS02 and WS03 terminated in the very dense Gravel whilst WS04 couldn't penetrate so was continued using dynamic probe methods which revealed very dense strata and refusing progress at 4.0m, considered to be the weathered bedrock. WS05 however, located in the northwestern corner of site revealed Made Ground to at least 4.0m whereby due to borehole collapsing was continued by dynamic probe methods, and achieved a final depth of 7.40m. The N100 blow counts recorded from 4.00m to 7.40m revealed a medium dense to dense granular strata with some irregular low N100 values which are likely to be consistent with the bedrock for the area whereby the initial shallow rock is highly fractured limestone recovered as gravel and cobbles with bands of highly weathered mudstone in the form of clay, which would account for the low N100 values. The dynamic probe came to a sharp refusal at 7.40m depth, suggesting competent bedrock. WS05 was the deepest exploratory hole recorded during the works.

Each of the 'standalone' dynamic probes ('DP') were sunk within or immediately adjacent the former footprint of the swimming pool building, through the gravel surfacing. All encountered refusal at fairly shallow depth with the exception of DP01. DP01 progressed to 5.90m before encountering refusal. Very low N100 blow count values were recorded indicating very soft ground until 5.40m depth. This was located alongside TP04.

DP04 failed to get beyond 0.40m depth due to buried obstruction. DP02, DP03 and DP05 refused between 0.40m and 3.30m depth.

Trial Pits TP01, TP02 and TP03 all terminated within the completely weathered bedrock similar to the windowless sample boreholes, however TP04 (located on the northern boundary, alongside the footprint of the former swimming pool building, now demolished, continued to a maximum dig depth of 2.0m still within the Made ground material and also revealed a buried stone wall feature.

Table 10: Bedrock Detail

Exploratory Hole ID	Depth to Completely Weathered Bedrock (mbgl)	Note
WS01	0.50	Proven down to 1.0m
WS02	1.40	Proven down to 2.0m
WS03	3.50	Poven down to 4.0m
WS04	4.00	Bedrock inferred from N100 blow count readings
WS05	-	Unable to determine rockhead depth, borehole progressed by dynamic probe methods due to collapse. Refusal encountered at 7.40m depth.
TP01	0.90	Proven down to 2.0m
TP02	1.50	Proven down to 2.0m
TP03	1.40	Proven down to 2.0m
TP04	0.20 – 2.00*	Bedrock not proven – terminated in Made Ground
DP01	5.90	Very soft/ loose ground before encountering inferred bedrock from N100 blow count readings
DP02	1.00	Bedrock inferred from N100 blow count readings
DP03	0.40	Bedrock inferred from N100 blow count readings
DP04	0.50	Bedrock not proven – terminated on buried obstruction
DP05	3.30	Bedrock inferred from N100 blow count readings

G.L. = Ground Level * = Base of Strata Not Found

8.2.2 Groundwater Conditions

No groundwater was encountered during the intrusive investigation.

Please note that due to the nature of Windowless Sample Borehole drilling and Dynamic Probing methods groundwater strikes can be difficult to record. The groundwater conditions observed in these exploratory holes are those appertaining to the period of the investigation. However, it should be noted that groundwater levels are subject to diurnal, seasonal and climatic conditions or may vary due to other causes.

8.2.3 Visual & Olfactory Evidence of Soil Contamination

Made Ground was identified across the site, typically remnant demolition rubble mixed with reworked natural soils in the northern area of site, with reworked soils in the southern area however, no olfactory or visual contamination was observed other than suspected Asbestos Containing Material (ACM) within TP04 between 0.50m and 2.00m depth.

8.2.4 Visual & Olfactory Evidence of Groundwater & Surface Water Contamination

No groundwater was observed during the investigative phase.

8.2.5 Buried Structures

TP04 revealed a buried stone wall which could possibly be associated with the unknown small rectangular structure first observed in the 1907 OS mapping due to its location. The base of the wall could not be reached during the works due to excavator limitations – see below for approximate location overlay:

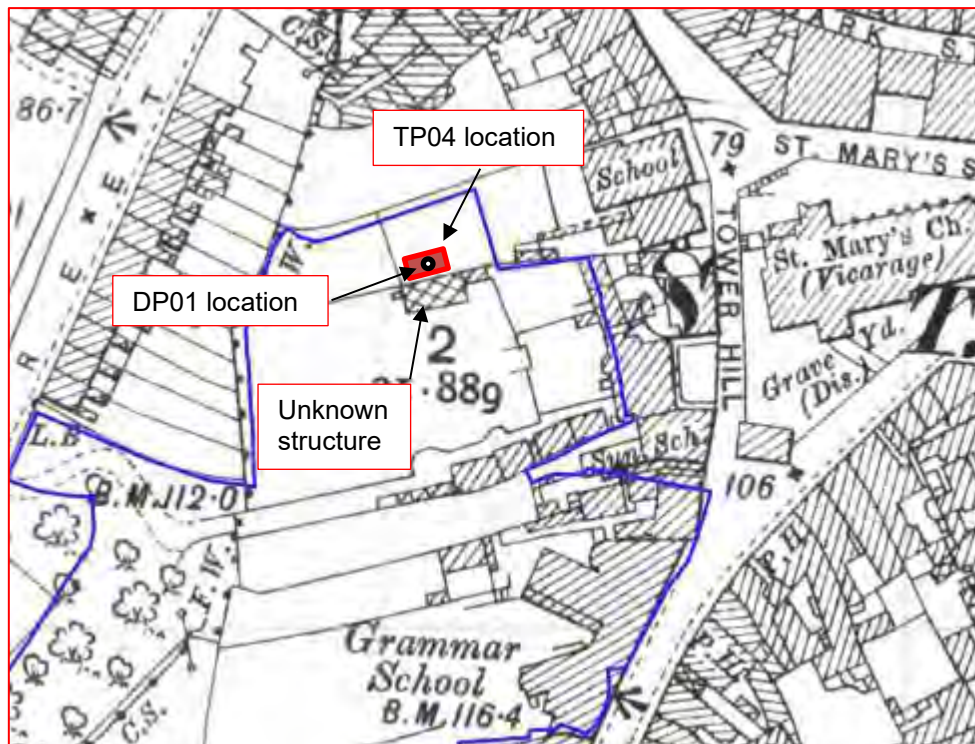


Figure 5: Extract of OS County Series: 1907 1:10,560 Scale with overlay of TP04 and DP01 showing (Not shown to scale) ©BritishGeologicalSurvey

9.0 GEOTECHNICAL ENGINEERING APPRAISAL

9.1 General

The purpose of this Ground Investigation and subsequent reporting is to determine and assess the existing ground conditions on site in preparation for the proposed residential development. The development and its proposed layout are at early stages at time of writing and as such the following assessment and recommendations are general in nature and may require further review as the scheme develops.

The main aims of the ground investigation are to provide an assessment of the ground conditions to inform initial design of the foundations and any contamination risk on site.

9.2 Engineering Properties of Strata

The soils on site generally comprised wide spread variable thickness of Made Ground (mix of demolition rubble, reworked natural soils) encountered to a maximum recorded depth of 4.00m in the north western area of the site, and generally becoming thinner towards the south. Topsoil was recorded in the southwestern corner of site on a grass verge (TP01). Underlying the Made Ground, a completely weathered bedrock profile was encountered. This comprised either a sandy clayey gravel, a gravelly clay or a localised clayey gravelly sand with high cobble content throughout and all gravel content being limestone i.e. onset of bedrock. Not all exploratory holes were able to determine bedrock with DP01, TP04 and WS05 either not bottoming out the made ground (DP01 & TP04), or unable to determine accurately where the weathered bedrock profile commenced (WS05). No groundwater was encountered during the investigation.

Selected geotechnical classification laboratory testing was undertaken on samples obtained from both the Made Ground material and the completely weathered bedrock material.

The results of particle size distribution testing are in conjunction with the engineer's initial log descriptions confirming that both the made ground soils and the underlying completely weathered bedrock profile are a heterogeneous mix of granular and semi-cohesive soils.

The Atterberg Limit Testing undertaken on two samples from the Made Ground (WS02 at 1.3m and WS05 at 2.6m depth) revealed and intermediate to high plasticity clay whilst the samples from the weathered bedrock profile (WS03 at 3.0m and TP03 at 1.5m) revealed a low to intermediate clay component. In general, the overall soil mass of both the revealed made ground and the natural weathered bedrock (recovered as a clayey gravel or gravelly clay predominantly) have a low to moderate susceptibility to shrinking and swelling processes due to moisture change within the soils.

9.3 Earthworks

9.3.1 Site Preparation

Earthworks shall be carried out in accordance with BS 6031: 2009 Code of Practice for Earthworks. Workmanship for excavation shall comply with BS 8000: Part 1, sections 3.1, 3.2 and 3.3.

Prior to commencing any earthworks / groundwork for the development, any live services on and in the vicinity of the site should be accurately located and protected, or if required diverted. Any services observed during excavations should be accurately traced/ surveyed to ensure that no structures will impinge on existing utilities.

Any exposed formations should be protected from the effects of the weather, site traffic, or water in order to prevent deterioration of this surface. It is recommended that any exposed formations be protected with a minimum thickness of up to 200mm of suitable granular material or a thin layer of blinding concrete, which should be placed immediately after excavation and exposure.

Depending on the foundation option adopted for the scheme, physical treatment in the form of proof rolling, excavating hard spots, re-engineering of the superficial deposits may be required. This however would need further discussion depending on the foundation opted for.

It is apparent that in the northern area of site, notably where the former swimming pool building once stood and also during the early 20th century where Kensington House and gardens once stood there are relic buried structures (as revealed in TP04 and DP01), and as such a land strip should be undertaken in this area prior to construction to identify any buried 'hard' structures that may require removal. In addition, WS05 which was also placed in the northern area but towards the western boundary also revealed very loose and considerable thickness of made ground comprising much brick and coal waste and collapsing ground to minimum of 4.0m.

9.3.2 Cutting and Filling

Due to the topography of the site, some cutting and filling is likely to be required. The eastern half of site is raised, where existing and past buildings once stood, and slopes westwards down to current car parking spaces before climbing westwards in a wooded area towards Barn Street (A487) . Limited geotechnical classification testing has been undertaken and as such no comment can be made regarding suitability of re-use of any of the site won material other than that the made ground material revealed across the site is unsuitable as an engineering fill in its current form due to inclusions of brick, concrete, plastic, metal and potentially ACM in the northern area (TP04).

Depending on the geo-environmental laboratory test results findings regarding Asbestos within the soils samples, further sampling and assessment of material onsite, particularly whether the made ground can be processed to a suitable fill material such as a Grade 2C in accordance with Series 600, Manual of Contract Documents for Highway Works. classification will need undertaking.

9.3.3 Excavation Plant

Based on the observations made during the exploratory investigation, it is considered that excavations within the shallow soils can be undertaken by conventional excavation plant. However, buried stone structures (TP04) and concrete structures (DP04), along with a weathered bedrock Limestone profile was encountered and therefore the use of breaking equipment to progress the excavations will be required. If the presence, competency and excavatability of the bedrock is to be established prior to construction, further intrusive ground investigation can be undertaken. Likewise, as detailed in Section 9.3.1 a land strip will be required perhaps as part of any planned demolition works of the remaining old library building and education centre to fully ensure all buried structures are suitably grubbed up.

9.3.4 Stability of Excavation Sides

Based on the intrusive investigation, the shallow ground, notably the made ground material, was unstable throughout, leading to collapse of pit walls and also collapse was recorded within WS05 location. Therefore, shoring and active support or battering back to a suitable safe angle will be required if excavations are to be left open even for a short period of time.

9.3.5 Control of Groundwater

No groundwater was encountered during the investigation. Based on the observations made during the ground investigation, significant quantities of groundwater are not expected to be encountered within shallow excavations. Sump pumping should control any groundwater/surface water ingress if it were to occur particularly as runoff from Dew Street along the site's eastern boundary and down onto the reduced level areas of site.

9.4 Structural Assessment

9.4.1 Foundation Recommendations

Details are not available as regards to construction detail of the new structure or the foundation loads that may be anticipated. For the purpose of a preliminary appraisal of potential foundation solutions, we would comment as follows;

The exploratory holes revealed the site has wide spread and variable thicknesses of Made Ground, overlying a heterogenous completely weathered limestone bedrock profile. This weathered bedrock was encountered at variable depths across the site. It is this strata that should be targeted as a suitable founding medium with founding on any made ground identified should be discarded.

The ground investigation has identified areas within the northern section of site to exhibit a considerable thickness of made ground and also buried structures, and indeed very soft/ loose ground notably in TP04, DP01 and WS05 locations.

All foundations should be at least founded upon the weathered bedrock profile which has occurred at varying

depths across the site. The site's topographic variation, in conjunction with the findings of this ground investigation in determining a variable depth weathered bedrock profile dictates the need for further assessment once a proposed development layout is realised.

This may result in the requirement for further ground investigation work, likely to be rotary drilled boreholes to prove suitable founding strata in targeted areas, and competent bedrock.

The logged completely weathered bedrock profile, depths detailed in Table 10 Section 8.2.1, would offer an allowable bearing capacity of at least 150-175kN/m². If more competent and less weathered bedrock was to be determined via recommended additional ground investigation works then if greater anticipated loadings are envisaged then increasingly competent bedrock should be targeted.

9.4.2 Foundation Concrete Class Designation

The Aggressive Chemical Environment for Concrete (ACEC) classification for the site has been assessed according to the guidelines within BRE Special Digest 1 (2005). For classification purposes, based on the BRE guidance, the groundwater must be classed as 'mobile' unless proven to be 'static' over a 24hr period. The pH values of the soil samples taken from across the site at shallow depth (made ground) ranged from 8.0 to 10.5. The levels of water-soluble sulphate (SO₄) content of the tested soil samples all recorded levels between 11 and 750 mg/l.

Based on the above, the Design Sulphate (DS) class for the site is DS-2, and the Aggressive Chemical Environment for Concrete (ACEC) site classification is AC-1, assuming mobile groundwater conditions.

9.5 Drainage Assessment

Three in-situ variable head permeability tests were performed within the borehole groundwater installations in WS02, WS03 and WS05.

Unfortunately, due to the extremely high outflow rate, it was not possible to obtain a head of water within the wells to permit a test to be undertaken. Water was pumped into the wells at a rate of 110litres per minute and still unable to achieve a head of water.

However, given the potential for the formation of solution features, this option should be considered carefully before being implemented due to the limestone bedrock.

10.0 GEO-ENVIRONMENTAL CONSIDERATIONS

10.1 General

The following Section assesses the findings of the geo-environmental laboratory test results from samples obtained during the ground investigation. The risks to human health and the environment are both considered herein. This Section sets out the preliminary Conceptual Site Model (CSM) for pollutant linkages and aims to review this CSM following assessment of the test result findings from the intrusive investigation.

10.2 Investigation Conceptual Site Model

Section 5.2 found potential sources of contamination present after investigation associated with Made Ground. Based on the intrusive investigation Made Ground was present across the study area, generally in the form of re-worked natural deposits. By way of performing the ground investigation and subsequent chemical testing on selected soil samples, a site-specific assessment can be undertaken to determine if any potential pollutant linkages and hence risks to either human health or the environment are realised.

10.3 Human Health Risk Assessment

10.3.1 Legislative Background

There have been several major changes in Contaminated Land non-statutory guidance over the past decade, in particular relating to Contaminated Land Regime (CLR) documentation and their derivatives i.e., Soil Guideline Values and Toxicological Reports. In 2006, DEFRA commenced work on their 'Way Forward' exercise which aimed to redefine the way contaminated land is assessed with the aid of devising revamped technical guidance and soil guideline values. A working group of various environmental consultancies/ establishments/ stakeholders set about determining how the non-statutory guidance of CLEA 2002 may be amended to be increasingly user friendly for assessors of contaminated land and ultimately to help in defining whether land qualifies as contaminated land under Part IIA Environmental Protection Act 1990. July 2008 saw the findings of this exercise published. Firstly, the document entitled '*Guidance on the Legal Definition of Contaminated Land*' was published followed closely by the publication of the fourteen measures derived to improve contaminated land non-statutory technical guidance i.e., CLR Publications.

In light of these improvements, the toxicology of various contaminants and therefore the generic soil guideline values, has been revised by EA and DEFRA. The revised paper published in August 2008 is entitled '*Human Health Toxicological Assessment of Contaminants in Soil*'. Based on the findings of this paper, EA are developing a new set of Toxicological Reports and subsequently a new, expanded set of SGV'. Upon publishing, these new SGV's may then be used in assessing risks to human health.

In parallel to much of these developments, in 2006/07 it was recognised that due to the limited number of revised SGVs being produced, the Chartered Institute of Environmental Health (CIEH) co-jointly with Land

Quality Management (LQM) researched and developed an additional or alternate set of Soil Guideline Values known as Generic Assessment Criteria (GAC) values, producing GACs for 31 contaminants for Residential, Allotment and Commercial End Land Uses. These new values complete with details of how they were derived and including toxicological datasets was published in a single document 'The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment'.

Following publication of the 'Way Forward' document in late 2006, LQM/CIEH looked to review their GAC and add to them. By 2009 a 2nd Edition of 'The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment' was published using updated methods and culminated in GAC for 82 substances.

In 2013, a cross-government steering group commenced the development of a new set of Generic Assessment Criteria as driven by DEFRA. The newly derived Guideline Values are termed C4SLs – Category 4 Screening Levels and are considered more pragmatic (but still precautionary) by DEFRA and were proposed as more suitable and sensible comparison values.

In November 2014, the LQM/CIEH produced its third set of Generic Assessment Criteria for 89 potential contaminants as knowledge of toxicity and interaction continued to progress, thus replacing the 2nd Edition with the new publication entitled 'The LQM/CIEH S4ULs for Human Health Risk Assessment'. This most recent set of GACs are referred to as 'S4ULs' – Suitable for Use Levels'

10.3.2 Human Health Risk Assessment Criteria

For the purposes of Quantum Geotechnic Ltd assessments, the most recent and applicable SGVs, GACs, SU4Ls and C4SLs are used based on site end use and development and overall suitability. These are all referenced within the text. SU4Ls take precedence in QGL assessments. Where these are not available or suitable, C4SLs are adopted.

By adopting the CLEA approach to human health risk assessment as defined in CLR11, a human health risk assessment has been undertaken for the proposed development adopting the most applicable model of Residential end use with plant uptake threshold values.

The assessment criteria used in this assessment is that presented by LQM/CIEH in their publication *The LQM/CIEH S4ULs for Human Health Risk Assessment (2015)*. The S4ULs (Suitable for Use Levels) used have been derived in accordance with UK legislation, national as well as Environment Agency policy and using a modified version of the Environment Agency CLEA software and available guidance provided to the contaminated land practitioner community for the purpose of deriving Generic Assessment Criteria (GAC).

The LQM/CIEH S4ULs are intended for use in assessing potential risks posed to human health by contaminants in soil and as transparently derived and cautious 'trigger values' above which further assessment or remedial action may be necessary. By using the LQM/CIEH S4AULs, Quantum Geotechnical acknowledges *Copyright Land Quality Management Ltd reproduced with permission; Publication Number S4AUL3409. All*

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10.4 Soil Sample Test Results Comparisons

The results of chemical laboratory testing on selected soil samples from the Made Ground shallow lying soils (up to a depth of 1.50mbgl) are presented and discussed within this Section.

10.4.1 Heavy Metal and Inorganic Compounds

The results of levels of potential contaminants have been compared to generic assessment criteria as described above, for a residential with plant uptake end use. The test certificates are included in Appendix X. The concentrations of heavy metal and inorganic compounds are summarised in the table below:

Table 11: Summary of Heavy Metals and Inorganic Soil Test Results

Determinant	Results Range (mg/kg)	LQM/CIEH (2015) GAC (mg/kg) Residential (with plant uptake) End Use ⁽¹⁾	Exceedances
Arsenic	3.6-12	37	0
Boron	<0.4-2.0	290	0
Cadmium	<0.1-0.13	11	0
Chromium	5-16	910	0
Copper	13-61	2,400	0
Lead	22-780	200	1 (TP03 at 1.0m)
Mercury	<0.05-0.59	40	0
Nickel	6.4-15	130	0
Zinc	37-97	3,700	0

Notes:

(1). GAC from LQM/CIEH S4ULs 2015. (2). GAC from LQM/CIEH 2009 & 2015. (3). GAC from DEFRA C4SL. (4). GAC from at Risk adopting most sensitive end use for acute risk.

10.4.2 Polycyclic Aromatic Hydrocarbons

The results of levels of potential polycyclic aromatic hydrocarbon contaminants have been compared to generic assessment criteria as described, for a residential end use and for a Soil Organic Matter (SOM) content of 1%, being the most conservative values. The concentrations of speciated Polycyclic Aromatic Hydrocarbon are summarised and compared in Table 12.

Table 12: Summary of Polycyclic Aromatic Hydrocarbon Soil Test Results

Determinant	Site Results Range (mg/kg)	LQM/CIEH (2015) GAC Residential (with plant uptake) End Use (mg/kg)	Exceedances
		1% SOM	
Soil Organic Matter (SOM)	2.7 – 19		
Acenaphthene	<0.1	210	0
Acenaphthylene	<0.1-0.87	170	0
Anthracene	<0.1-4.3	2,400	0

Determinant	Site Results Range (mg/kg)	LQM/CIEH (2015) GAC Residential (with plant uptake) End Use (mg/kg)	
		1% SOM	Exceedances
Benzo(a)anthracene	<0.1 – 20	7.2	2 (TP02 at 0.3m & WS03 at 1.5m)
Benzo(a)pyrene	<0.1 – 16	2.2	2 (TP02 at 0.3m & WS03 at 1.5m)
Benzo(b)fluoranthene	<0.1 – 26	2.6	2 (TP02 at 0.3m & WS03 at 1.5m)
Benzo(ghi)perylene	<0.1 – 9.3	320	0
Benzo(k)fluoranthene	<0.1 – 8.2	77	0
Chrysene	<0.1 – 19	15	1 (WS03 at 1.5m)
Dibenz(a,h)anthracene	<0.1-3.3	0.24	2 (TP02 at 0.3m & WS03 at 1.5m)
Fluoranthene	<0.1 – 40	280	0
Fluorene	<0.1-2.2	170	0
Indeno(1,2,3-cd)pyrene	<0.1-12	27	0
Naphthalene	<0.1-5.2	2.3	1 (TP02 at 0.3m)
Phenanthrene	<0.1 – 21	95	0
Pyrene	<0.1 – 26	620	0

Notes: (1). GAC from LQM/CIEH S4ULs 2015.

10.4.3 Total Petroleum Hydrocarbons

The results of levels of potential petroleum hydrocarbon contaminants have been compared to generic assessment criteria as described, for a residential end use with plant uptake for a Soil Organic Matter (SOM) content of 1%, being the most conservative values. The concentrations of speciated Petroleum Hydrocarbons are summarised and compared in Table 15.

Table 13: Summary of Petroleum Hydrocarbon Soil Test Results

Determinant	Site Results Range (mg/kg)	LQM/CIEH (2015) GAC ⁽¹⁾ Residential (with plant uptake) End Use (mg/kg)	
		1% SOM	Exceedances
TPH – Aliphatic EC5-6	<1.0	42	0
TPH – Aliphatic >EC6-8	<1.0	100	0
TPH – Aliphatic >EC8-10	<1.0	27	0
TPH – Aliphatic >EC10-12	<1.0	130	0
TPH – Aliphatic >EC12-16	<1.0	1,100	0
TPH – Aliphatic >EC16-21	<1.0	6,500	0
TPH – Aliphatic >EC21-35	<1.0	6,500	0
TPH – Aromatic >EC5-7	<1.0	70	0
TPH – Aromatic >EC7-8	<1.0	130	0
TPH – Aromatic >EC8-10	<1.0	34	0
TPH – Aromatic >EC10-12	<1.0	74	0
TPH – Aromatic >EC12-16	<1.0	140	0
TPH – Aromatic >EC16-21	<1.0	260	0
TPH – Aromatic >EC21-35	<1.0	1,100	0

Notes: (1). GAC from LQM/CIEH S4ULs 2015.

10.4.4 Total Phenols

Total Phenols (monohydric) recorded values below <0.10mg/kg.

10.4.6 Asbestos

6 No. soil samples were sent for routine Asbestos testing and identification. Asbestos was not detected in any samples. This included suspected Asbestos from TP04 and WS05, confirmed as 'No Asbestos Detected'.

10.5 Environmental Risk Assessment

The following section presents the findings of the groundwater test results and provides assessment in relation to risks to the environment, particularly controlled waters.

10.5.1 Test Criteria

The risk to controlled waters, i.e., nearby watercourses and groundwater, is defined by the potential for any contaminants present on site to leach from the soils beneath the site and into the groundwater body.

3 No. soil sample obtained from the Made Ground were tested using the leachate method to determine if any potential contaminants held within the soils are leachable. The result ranges are presented together with the threshold levels given by the United Kingdom Drinking Water Standards (UKDWS) as well as the relevant Environmental Quality Standards (EQS) guideline values.

10.5.2 Soil Leachate Test Results Comparisons

Table 14 presents the summarised findings of the soil leachate testing undertaken. The test certificates are included in Appendix X.

Table 14: Summary of Soil Leachate Chemical Analysis

Determinant	Units	Site Results Range (µg/l) Groundwater –	Environmental Quality Standards – Freshwater ¹	UK Drinking Water Standards ²	Exceedances
Arsenic	µg/l	3.0-6.7	50	10	0
Cadmium	µg/l	<0.11	5	5	0
Chromium (Hex)	µg/l	<0.5-6.9	150 ³	50	0
Copper	µg/l	1.7-4.0	22 ³	2000	0
Lead	µg/l	0.83-3.6	10 ³	10	0
Mercury	µg/l	<0.05	1	1	0
Nickel	µg/l	0.75-0.85	100 ³	20	0
Zinc	µg/l	<2.5	50 ³	5000	0
Naphthalene	µg/l	<0.1	10	Not Available	0
Acenaphthylene	µg/l	<0.1	Not Available	Not Available	
Acenaphthene	µg/l	<0.1	Not Available	Not Available	
Fluorene	µg/l	<0.1	Not Available	Not Available	
Phenanthrene	µg/l	<0.1	Not Available	Not Available	
Anthracene	µg/l	<0.1	Not Available	Not Available	
Fluoranthene	µg/l	<0.1	0.02	Not Available	0
Pyrene	µg/l	<0.1	Not Available	Not Available	

Determinant	Units	Site Results Range (µg/l) Groundwater –	Environmental Quality Standards – Freshwater ¹	UK Drinking Water Standards ²	Exceedances
Benzo(a)anthracene	µg/l	<0.1	Not Available	Not Available	
Chrysene	µg/l	<0.1	Not Available	Not Available	
Benzo(b)fluoranthene	µg/l	<0.1	Not Available	Not Available	
Benzo(k)fluoranthene	µg/l	<0.1	Not Available	Not Available	
Benzo(a)pyrene	µg/l	<0.1	0.03	0.001	0
Indeno(1,2,3-cd)pyrene	µg/l	<0.1	Not Available	Not Available	
Dibenz(a,h)anthracene	µg/l	<0.1	Not Available	Not Available	
Benzo(ghi)perylene	µg/l	<0.1	Not Available	Not Available	

¹Figures for Environmental Quality Standards (EQS) are Annual Average Concentrations derived from the Environment Agency ²UK Drinking Water Standards taken from; Water Supply (Water Quality) Regulations 1989 (SI 1989/1147) (as amended), and Water Supply (Water Quality) Regulations 2000 (SI 2000/3184) (as amended). ³Hardness Banding to be applied, mid hardness utilised of 100mgCaCO₃/l– using Table 2b: EGS for hardness related List 2 dangerous substances, EC Dangerous Substances Directive (76/464/EEC). NT – Not Tested. I/S – Insufficient Sample, NYS – Not Yet Specified

10.6 Recommendations on Contaminated Land

10.6.1 Human Health Risk of Site End Users

Following comparison of chemical test results from samples obtained from the made ground material onsite to the respective SGV or GAC assessment values for residential with plant uptake end use scenario, selected determinands exceeded the 'threshold' values as recorded in Table 15:

Table 15: Soil samples that exceeded threshold assessment values

Sample ID and Depth (mbgl)	Determinand	Site Results mg/kg	Assessment 'Thresholds' mg/kg
TP02 at 0.30m	Benzo(a)anthracene	13	7.2
	Benzo(a)pyrene	14	2.2
	Benzo(b)fluoranthene	21	2.6
	Dibenz(a,h)anthracene	2.6	0.24
	Naphthalene	5.2	2.3
TP03 at 1.00m	Lead	780	200
WS03 at 1.50m	Benzo(a)anthracene	13	7.2
	Benzo(a)pyrene	14	2.2
	Benzo(b)fluoranthene	21	2.6
	Chrysene	19	15
	Dibenz(a,h)anthracene	2.6	0.24

No Asbestos was detected in the testing.

Based on the above, a source of contamination which may pose a risk to human health is shown to exist within the made ground, predominantly in TP02 and WS03 in the central western area of site (back end of existing car park). Raised polycyclic aromatic hydrocarbons were recorded. TP03 in the former footprint of the now demolished swimming pool building recorded an isolated elevated lead value. As such a source-pathway-receptor is realised in relation to contaminants in the soil and end receptors in the area of the proposed residential development. Thus the made ground may be considered to pose a significant harm to the health of site end users.

In order to remove / reduce the risk to future site users, the potential contaminant source (Made Ground) in

the areas recording elevated contamination can be removed and disposed of off-site or, the potential contaminant pathway can be removed by installing a suitably designed capping layer above the potentially contaminated material or the soils in this area can be assessed further with consideration given to accessibility and a site-specific assessment undertaken to further assess the risk posed to future site users.

10.6.2 Human Health Risks during Construction

The ground investigation and subsequent testing has identified the presence of localised potentially significantly elevated concentrations of contaminants and as with all construction schemes involving earthworks in Made Ground, precautions should be undertaken where Made Ground or potentially contaminated land be encountered.

Operatives working with, or likely to come into contact with Made Ground with the potential to harness raised concentrations of contaminants, should observe particular precautions concerning personal hygiene. They should be issued with the appropriate personal protective equipment and should be instructed in safe working methods.

Instructions should be issued in the recognition of potentially hazardous materials including oily and odorous soil and water and also any discoloured or fibrous substances for example. Operatives should be warned to avoid contact between hands and mouth before washing. The consumption of food must be confined to designated clean areas with suitable welfare including washing facilities should be provided.

10.6.3 Risk to the Environment and Controlled Waters

The risk to controlled waters, i.e., nearby water courses, is defined by the potential for any contaminants present on site to either leach from the soils beneath the site onto controlled waterways or indeed historic trapped contaminated waters within the shallow soils migrate to controlled waterways.

In terms of risk to aquatic life, all potential contaminants concentrations were below the relevant assessment criteria and as such, no potential risk was identified.

Based on the above it is considered there is a negligible risk to surface and groundwater-controlled waters from any potential contaminants that may be present in the shallow soils.

10.7 Ground Gas Monitoring Results

3 No. post-fieldwork monitoring ground gas visits have been undertaken to allow a preliminary assessment to be undertaken. Appendix VIII presents the monitoring records with the results discussed below.

The results show maximum CH₄ concentrations of 0.1%v/v and CO₂ concentrations of 5.6%v/v. Maximum measured flow rate was recorded as 0.1l/hr whilst O₂ levels ranged between 6.3 and 21.2%v/v. No H₂S or CO was recorded.

The potential risks posed by any recorded presence of potentially harmful gases can be assessed on a semi-quantitative basis by reference to the guidance in documents CIRIA 665 and BS8485. The assessment comprises multiplying the maximum measured steady gas flow rate (expressed as litres per hour) by the maximum steady gas concentration (expressed as percentage-by-volume; divided by 100) to derive a Gas Screening Value (GSV). The GSV can then be used to determine a risk classification and a Characteristic Situation for the site as defined in Table 16.

Table 16: Gas Screening Value and Characteristic Situation Classification

Characteristic Situation	Risk Classification	Gas Screening Value (l/hr) - GSV
1	Very low	<0.07
2	Low	>0.07, <0.7
3	Moderate	>0.7, <3.5
4	Moderate to High	>3.5, <15
5	High	>15, <70
6	Very High	>70

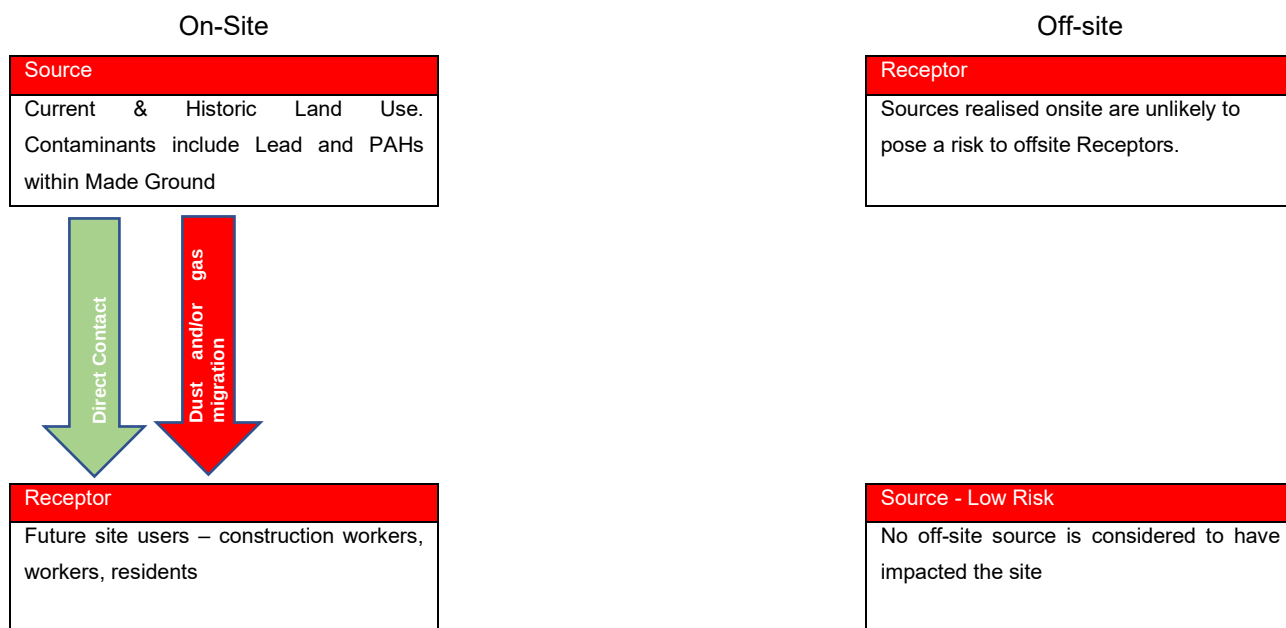
Based on the ground gas monitoring findings to date, the site is classified as Characteristic Situation 1, Very Low risk, with no special precautions against ground gas required. Additionally, no radon protective measures are required.

10.8 Review of Conceptual Site Model (CSM) - Summary

The onsite investigation and subsequent laboratory testing has identified elevated Lead within the Made Ground in the area of TP03, and also elevated PAH compounds within TP02 and WS03, which could pose a potential risk to human health. Either further site-specific assessment to further assess the risk should be undertaken, or remedial measures implemented to remove the contamination source or pathway, as discussed within 10.6.1, and therefore break the source-pathway-receptor linkage

A revised Conceptual Site Model is presented over page.

Figure 6: Haverfordwest Library – Revised Conceptual Site Model: Pollution Linkages



Other potential pollutant linkages have been dismissed through the soil testing process, i.e., chemical attack of building materials. The site-derived chemical dataset did not highlight any potentially deleterious chemicals/contaminants within the soil matrix onsite to be at concentrations, which may lead to chemical attack and corrosion of building materials, in particular, concrete and mortar, as well as buried services and utilities.

11.0 RECOMMENDATIONS - FURTHER WORKS

11.1 Further Assessment Recommendations

This ground investigation should be viewed as a preliminary assessment of the existing site conditions.

The scheme is in its early development stages and as such further assessment in the form of targeted ground investigation, notably rotary drilled deep boreholes to prove competent ground for foundation design, and also deeper trenching exercises to uncover any buried structures are recommended.

This investigation has recorded buried structures, soft spots and also a variable thickness of made ground across the site. It has also identified elevated contaminants within the shallow made ground soils. It is therefore recommended that additional targeted ground investigation works are undertaken, to provide added information on the geotechnical setting as well as further contamination assessment, with particular reference to BS10175: 2011+A2:2017 'Investigation of Potentially Contaminated Sites'. It would be beneficial if such a secondary ground investigation was undertaken following an outlined development proposal layout was undertaken to ensure a targeted approach.

12.0 REFERENCES

British Geological Survey:

- British Geological Survey (BGS) Sheet 228 'Haverfordwest' solid and drift edition at 1:63,360 scale
- BGS Lexicon of Named Rock Units (www.bgs.ac.uk/lexicon)
- BGS Geology of Britain Viewer (www.bgs.ac.uk)

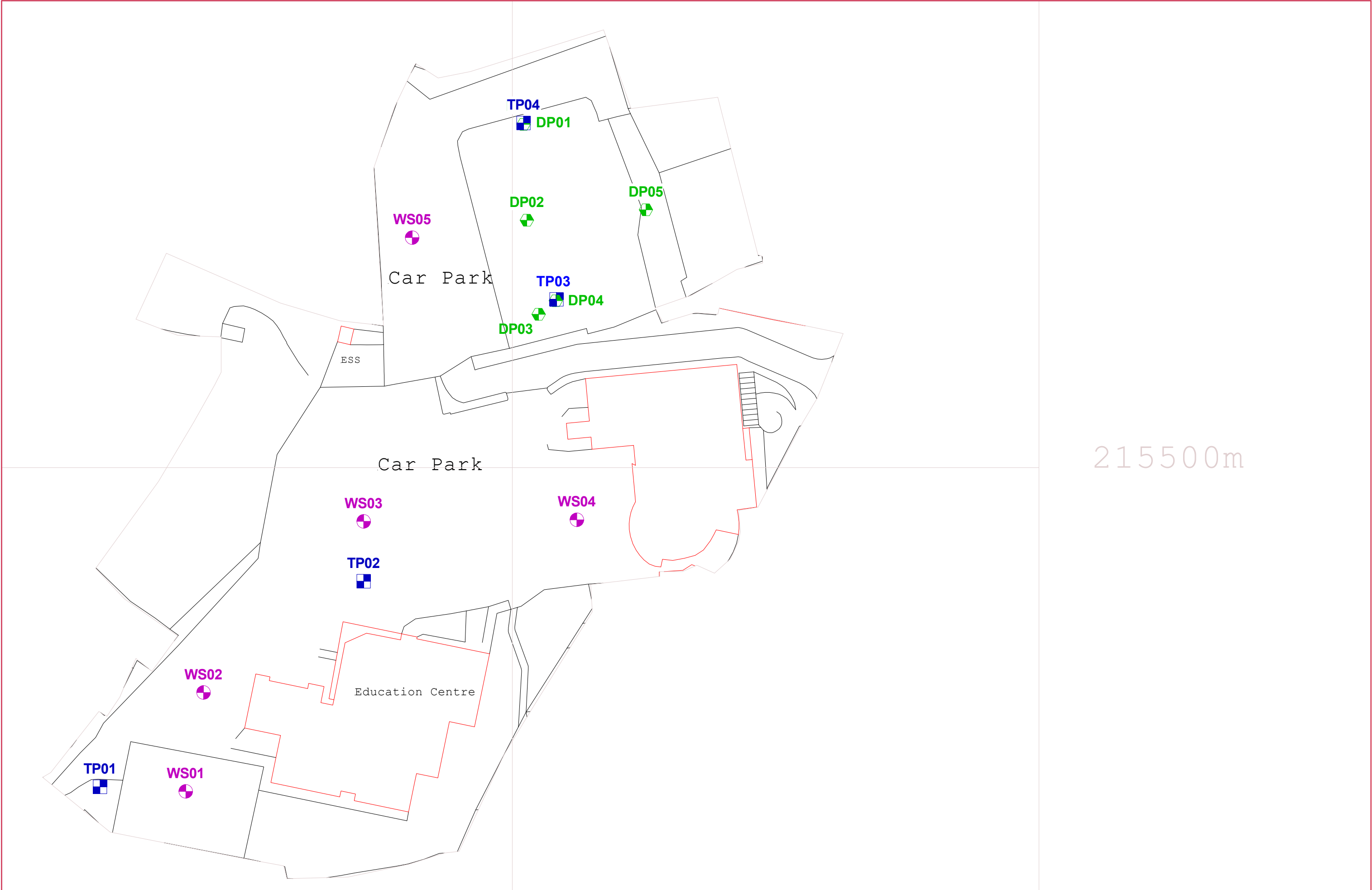
Groundsure:

- Combined Groundsure Geo and Enviro Insight Report, Ref; HMD-213-9039024, Dated: 8th September 2022
- Groundsure Mapping Dataset, Ref; HMD-213-9039023, Large and Small Scale, Dated: 8th September 2022

Specialist Publications: -

- British Code of Practice BS 5930:2015+A1:2020 '*Code of Practice for Site Investigations*'
- British Code of Practice BS 1377:1990 '*Methods of test for soils for civil engineering purposes*'.
- British Code of Practice BS 10175:2011 '*Code of Practice for Investigation of Potentially Contaminated Sites*'
- British Code of Practice BS EN ISO 14688-1:2002+A2:2013 Geotechnical investigation and testing. Identification and classification of soil. Identification and description
- British Code of Practice BS EN ISO 14688-2:2004+A2:2013 Geotechnical investigation and testing. Identification and classification of soil. Principles for a classification.
- British Code of Practice BS EN ISO 14689-1:2003 Ground Investigation and Testing – Identification and classification of rock
- Health and Safety Executive Guidance Note EH40/90
- BRE (2005) Special Digest 1:2005, 3rd Edition, Concrete in aggressive ground. BRE, Garston.
- BS 6031: 2009 Code of Practice for Earthworks.
- ICE UK Specification for Ground Investigation Second Edition.
- Specification for Highways Works Series 600 Earthworks
- Environment Agency Science Report SC050021/[various] (2009) *Soil Guideline Values*
- LQM/CIEH Publication S4UL3409 (2015) '*Generic Assessment Criteria for Human Health Risk Assessment*'
- World Health Organisation (2011) '*Guidelines for drinking-water quality, 4th edition*'
- Statutory Instruments (UK Legislation) 2016 No. 614 '*The Water Supply (Water Quality) Regulations*' retrieved from www.legislation.gov.uk/2016/614
- Statutory Instruments (UK Legislation) 2015 No. 1623 '*The Water Framework Directive (Standards and Classification) Directions (England and Wales)*'

APPENDIX I – SITE PLANS AND FIGURES



APPENDIX II – GROUNDSURE HISTORICAL MAP SET

Site Details:

2, DEW STREET,
HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: County Series Town Plan

Map date: 1889

Scale: 1:500

Printed at: 1:1,000



Surveyed 1889
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1889
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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Map legend available at:
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215600

195200

215600

215400

195200

195000

195000



0 50m

Site Details:

2, DEW STREET,
HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_- Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: County Series

Map date: 1889-1890

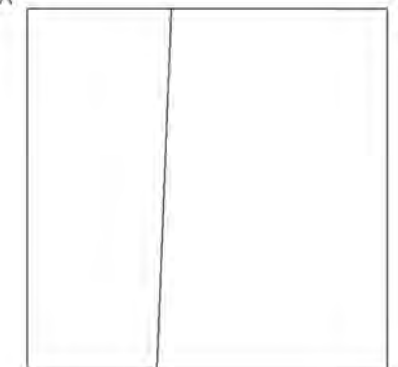
Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1889
Revised 1889
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1890
Revised 1890
Edition N/A
Copyright N/A
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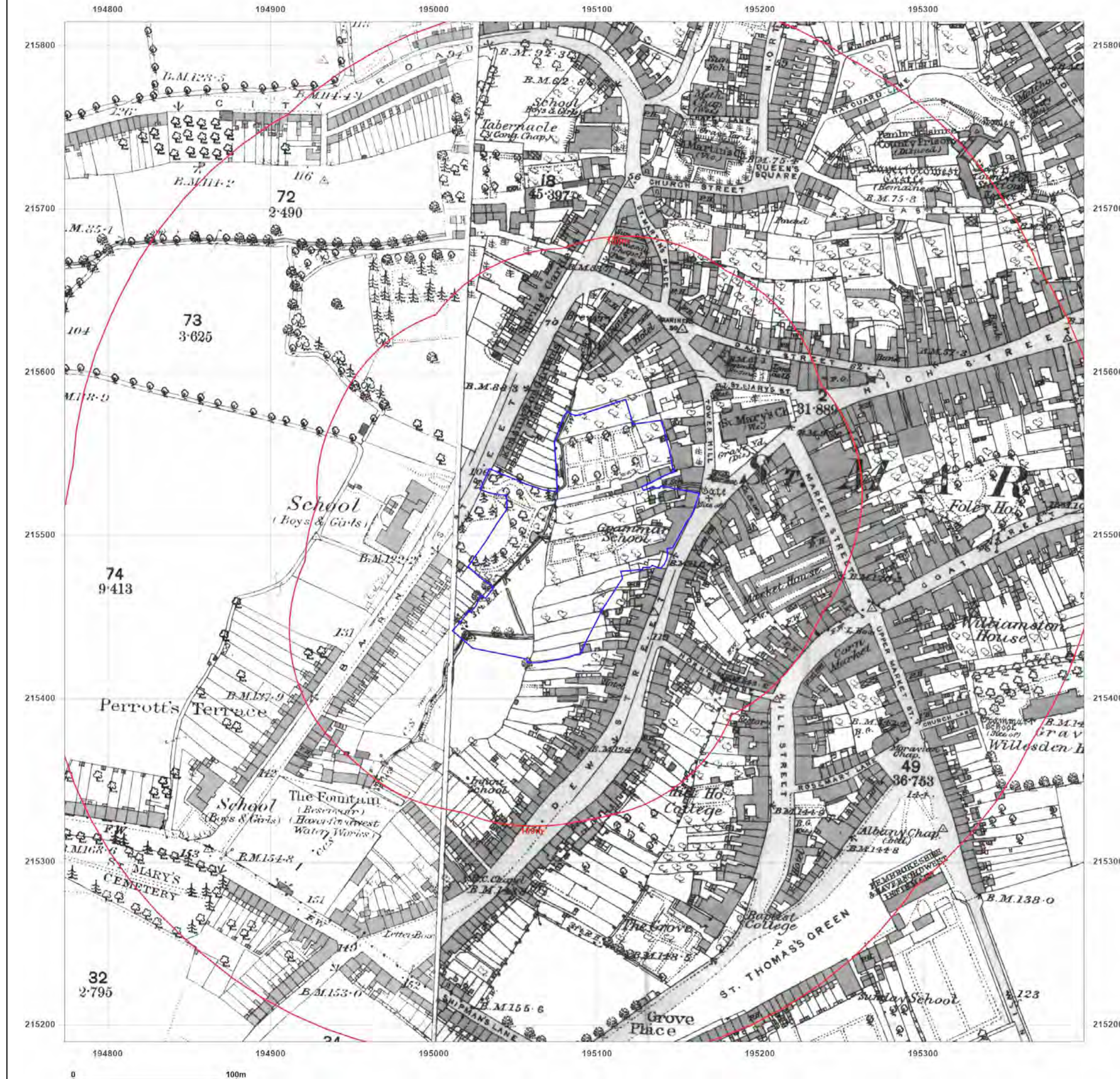


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Site Details:

2, DEW STREET,
HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: County Series

Map date: 1907

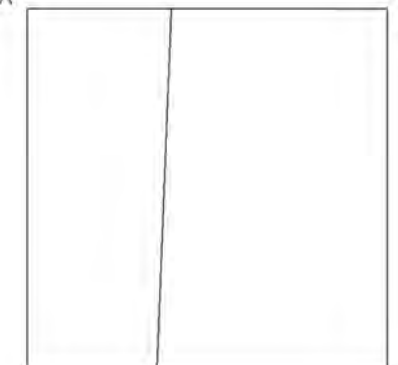
Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1907
Revised 1907
Edition N/A
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Levelled N/A

Surveyed 1907
Revised 1907
Edition N/A
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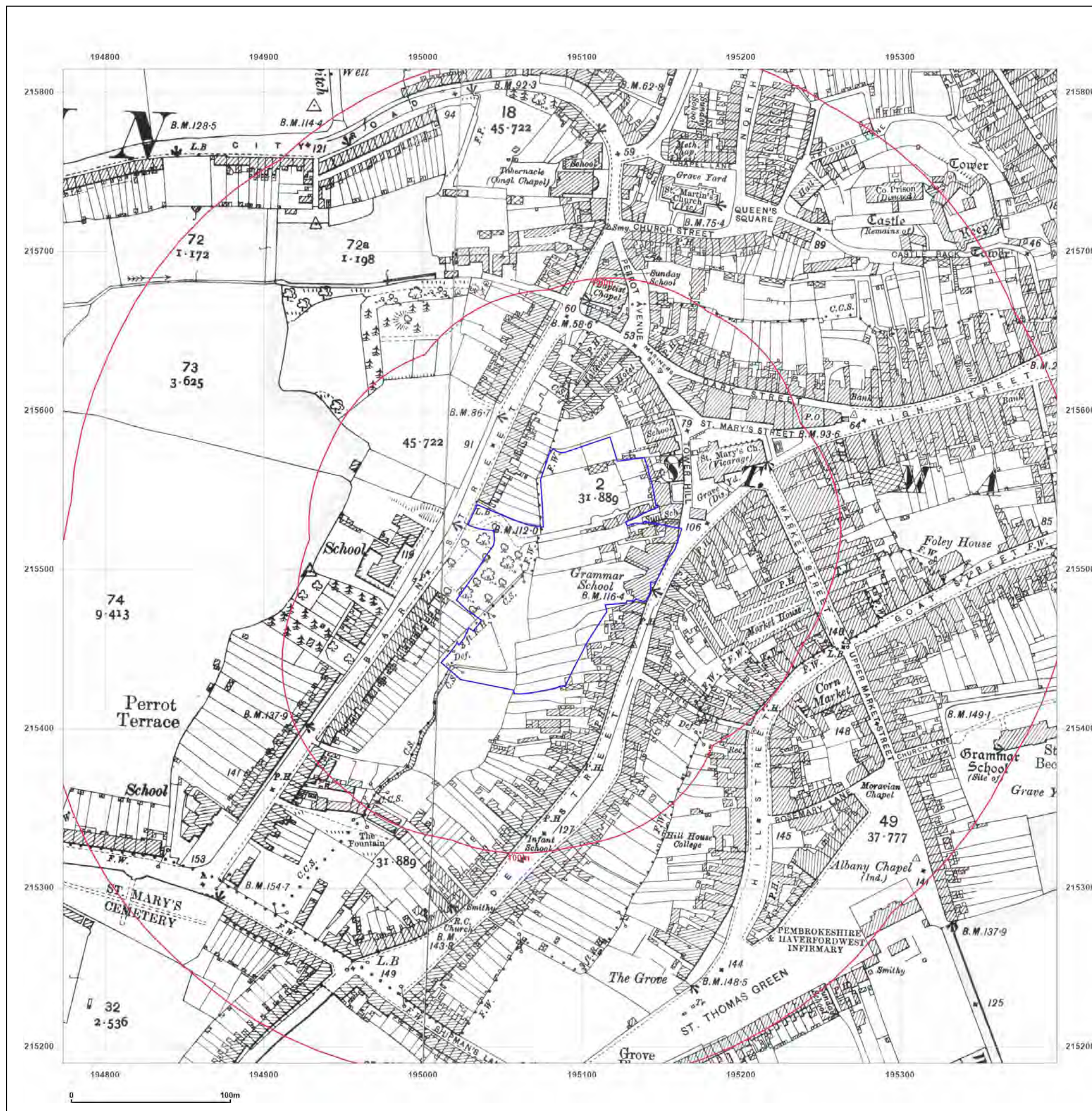


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Site Details:

2, DEW STREET,
HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: County Series

Map date: 1937

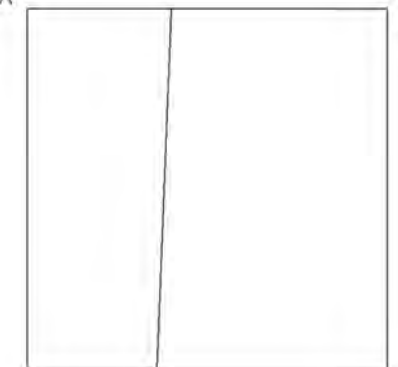
Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1937
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Edition N/A
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Surveyed 1937
Revised 1937
Edition N/A
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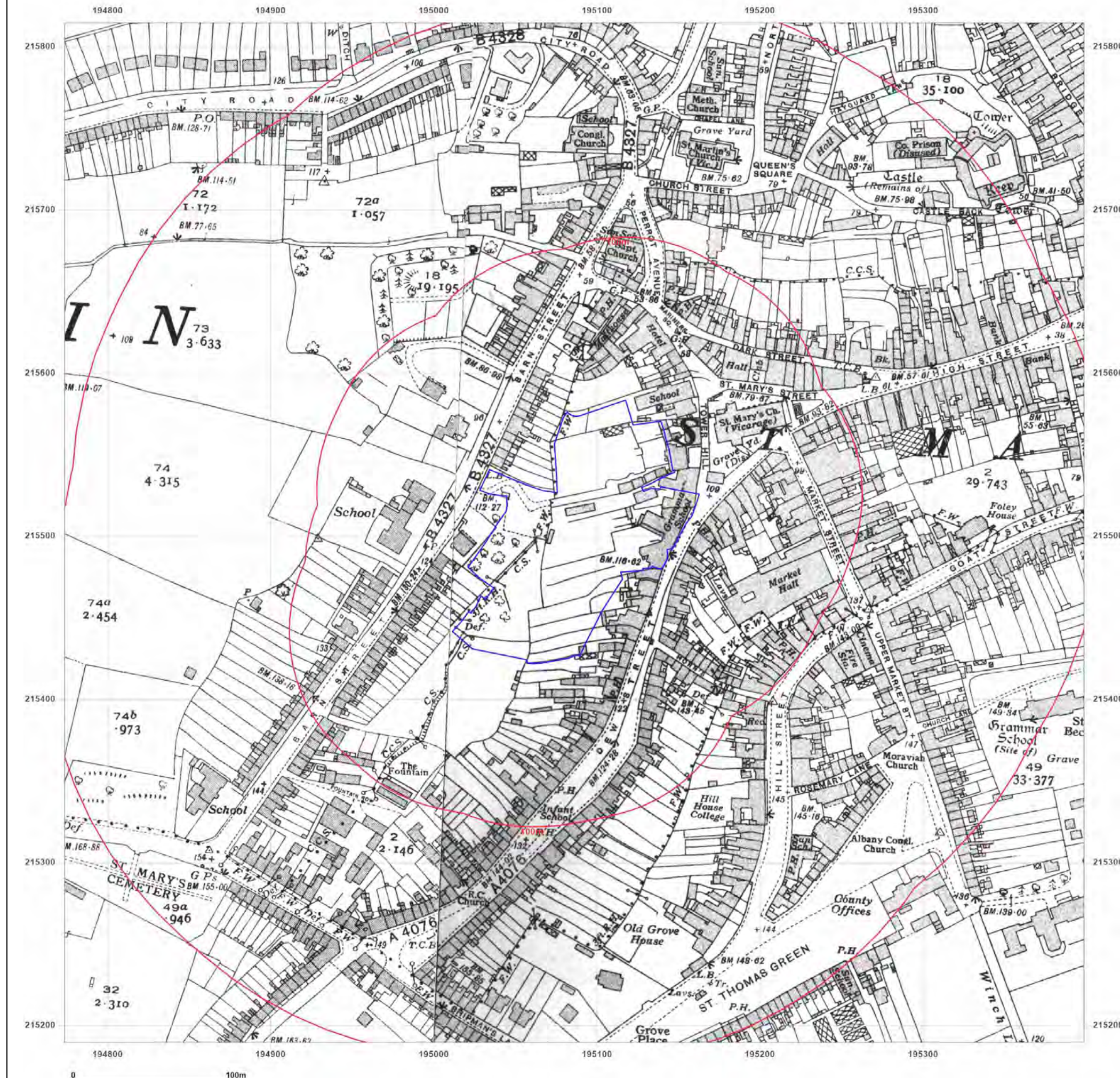


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Site Details:

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HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_- Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 1967

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1966
Revised 1966
Edition N/A
Copyright 1967
Levelled 1962



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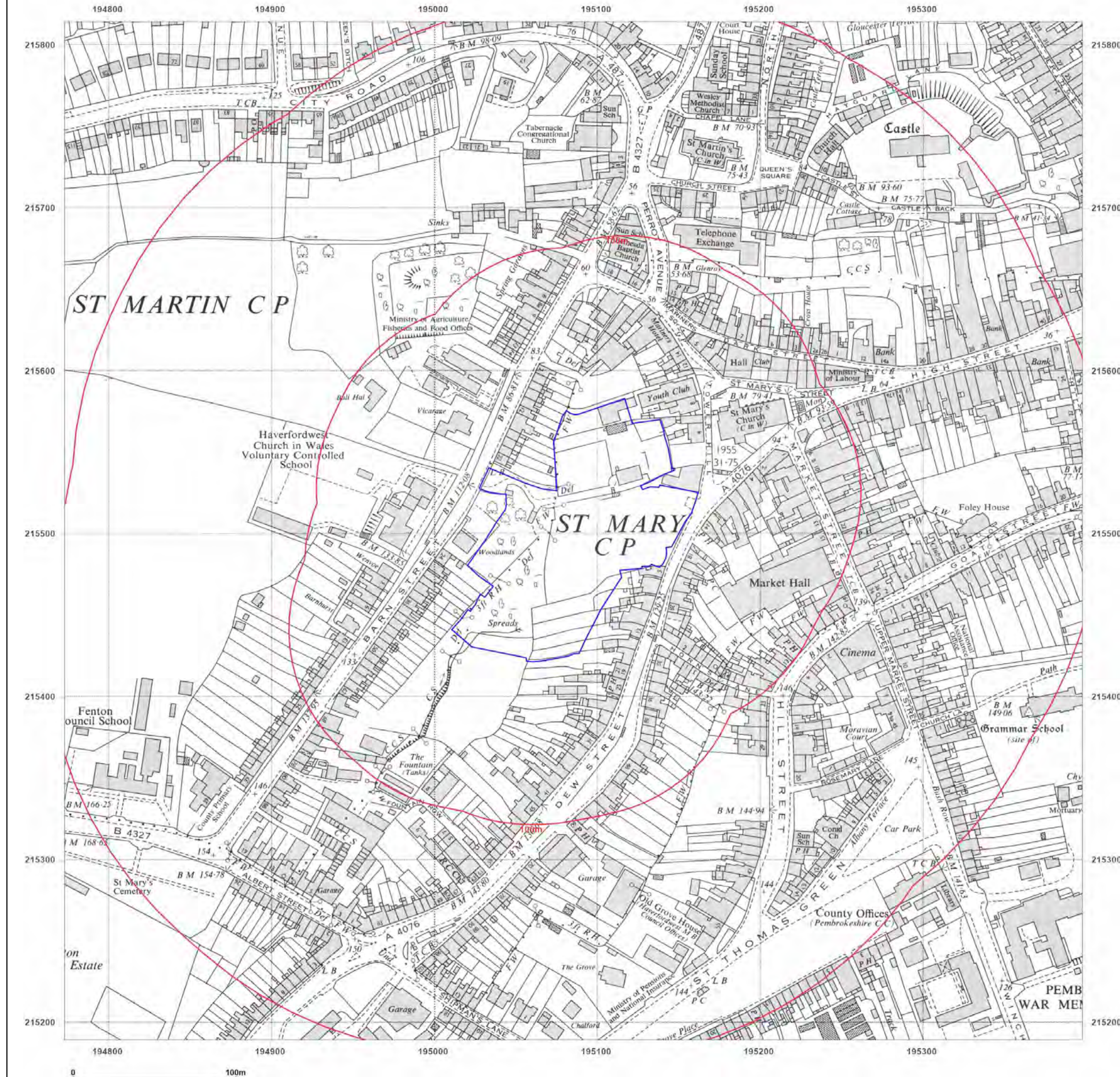


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Site Details:

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HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_- Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 1971

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1970
Revised 1970
Edition N/A
Copyright 1971
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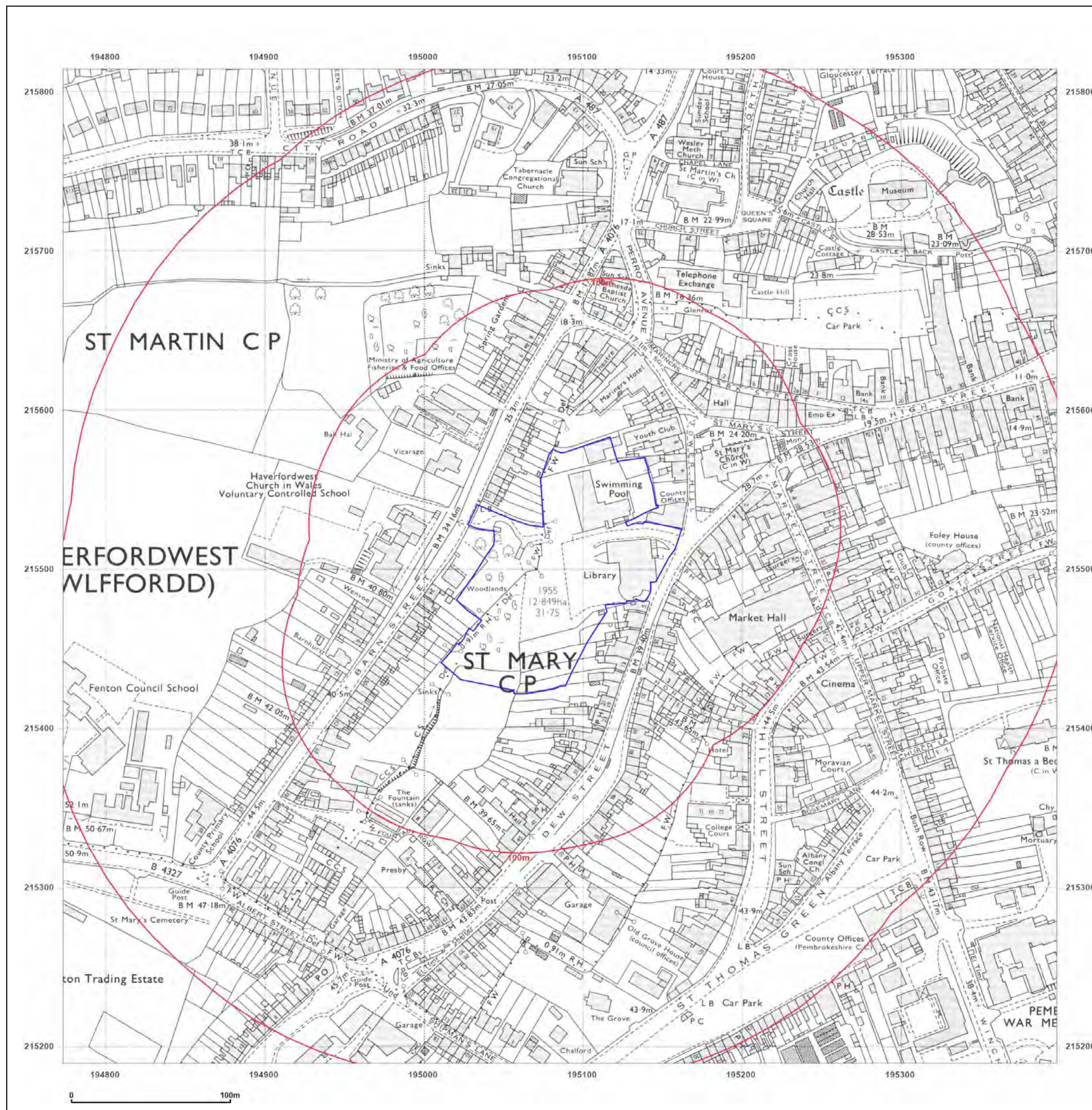


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Site Details:

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Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 1971

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1971
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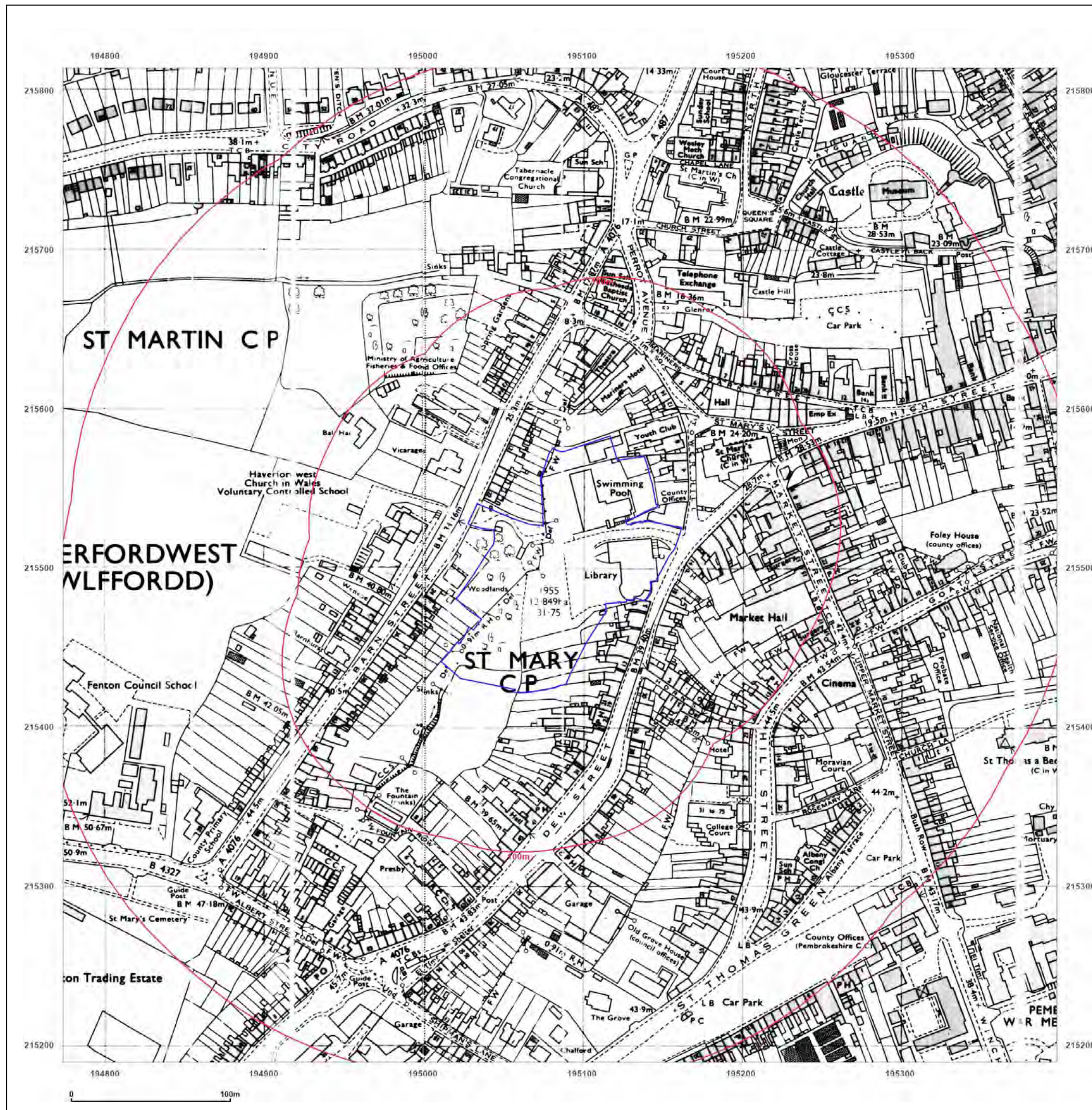


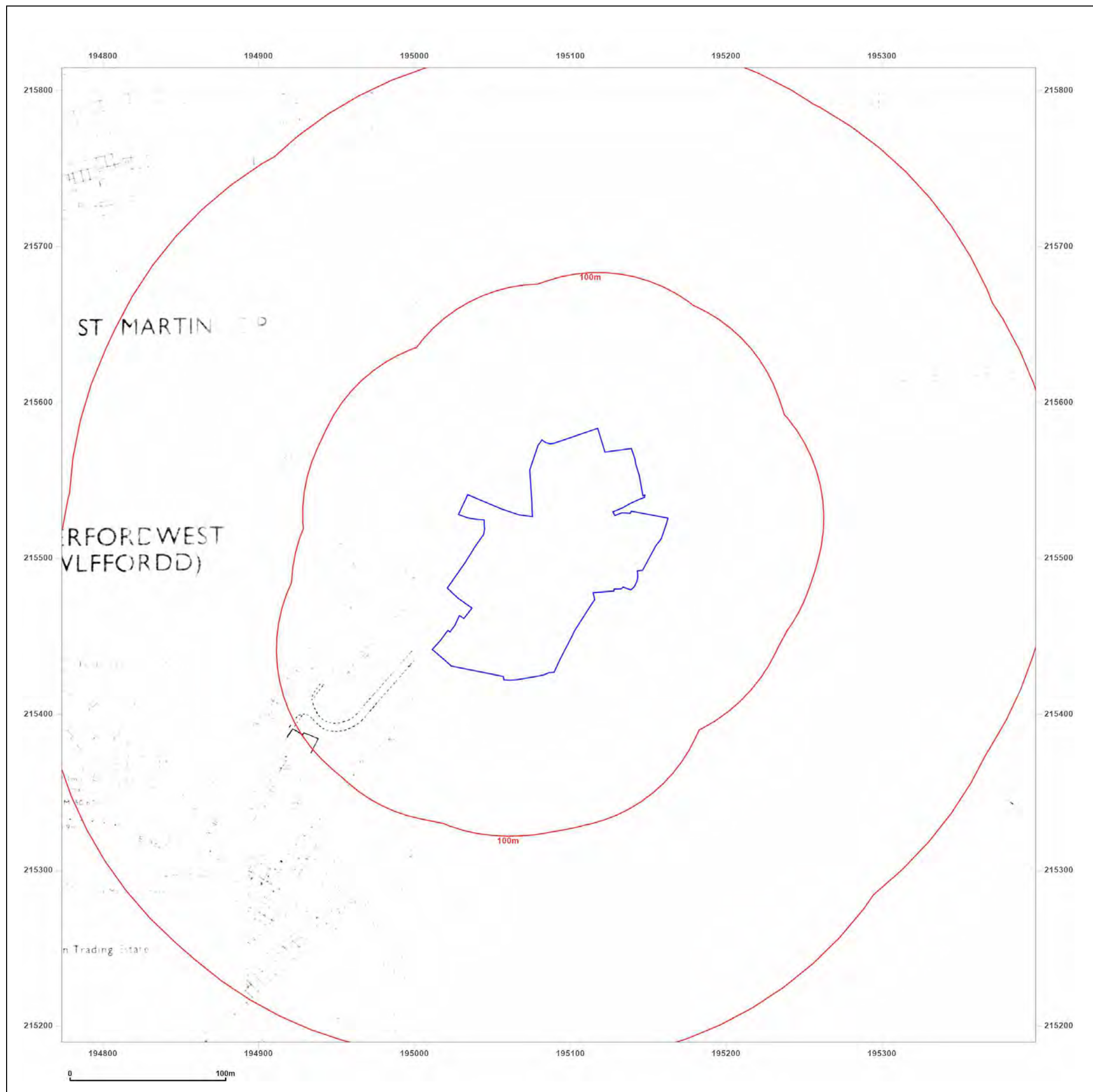
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Site Details:

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HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_- Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 1973-1974

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
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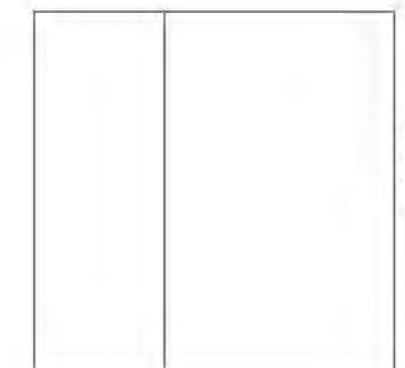
Client Ref: Q0912_- Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 1977

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1977
Levelled N/A



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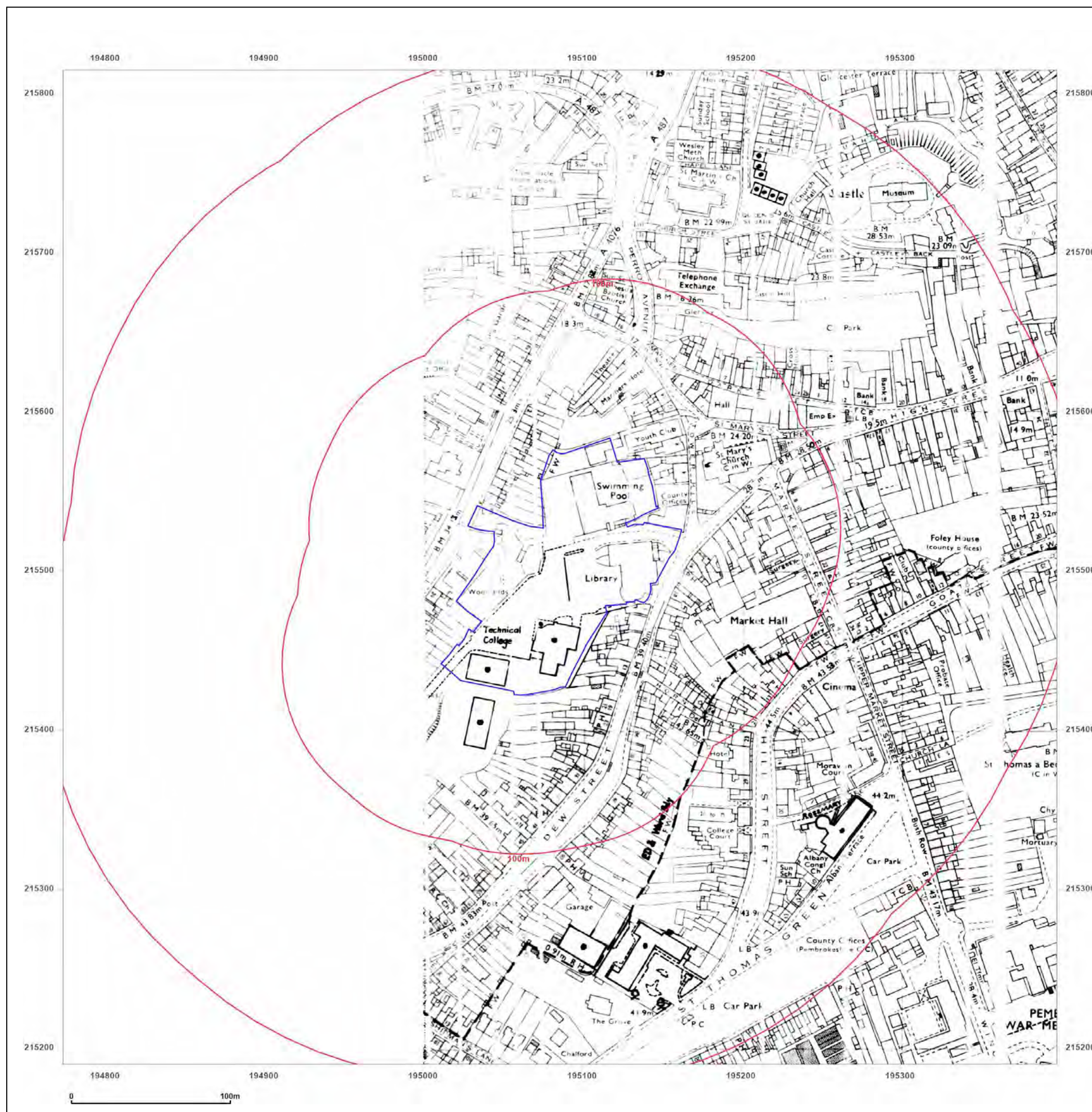


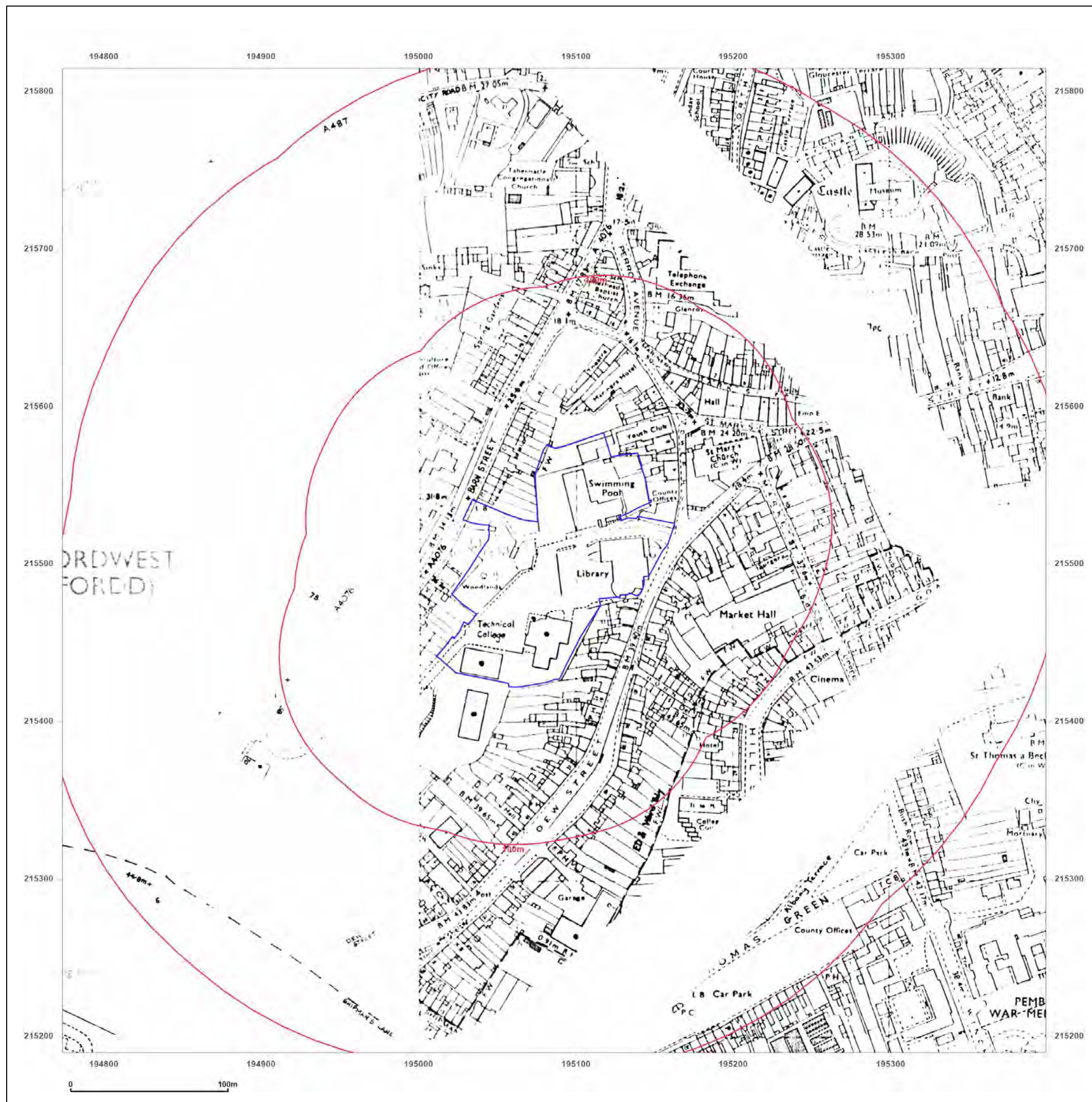
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Site Details:

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Client Ref: Q0912_- Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 1987

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1987
Revised 1987
Edition N/A
Copyright 1987
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Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 1988-1990

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1966
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Edition N/A
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Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1988
Levelled 1971



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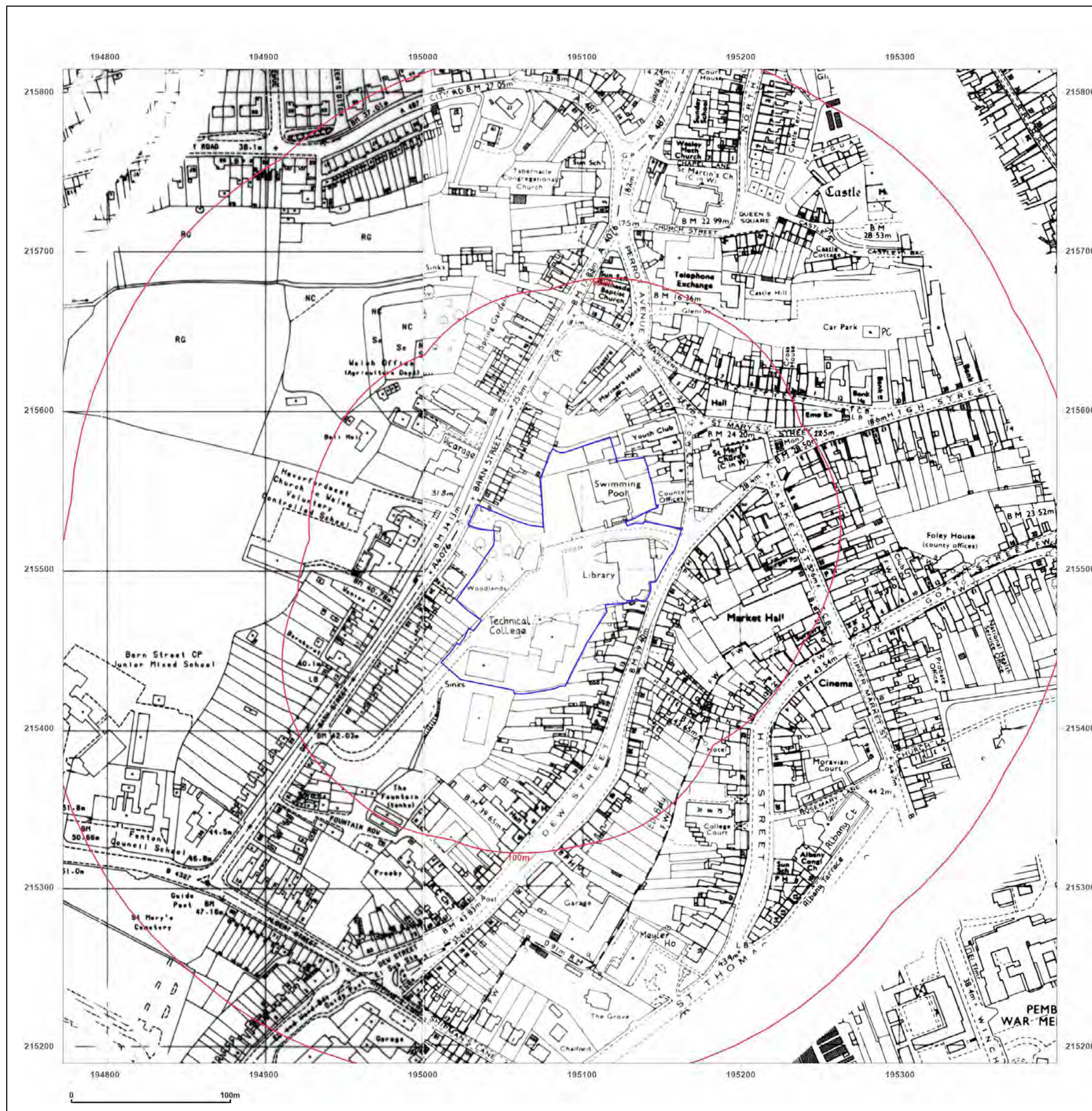


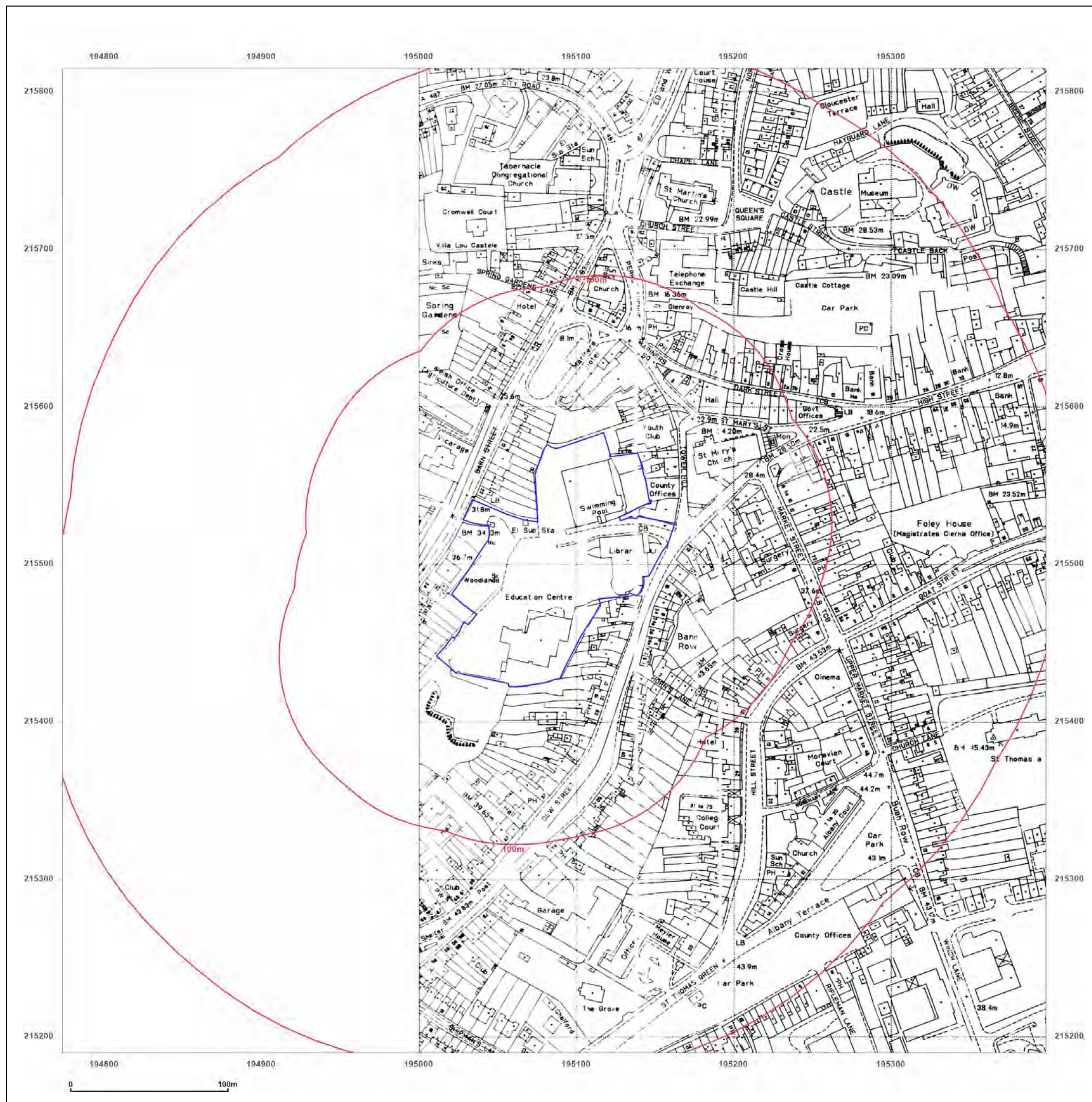
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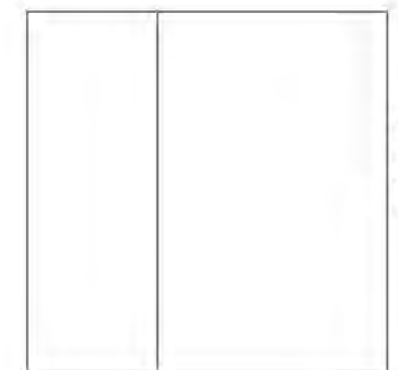
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Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 1994

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
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Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 1992-1995

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
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Surveyed 1966
Revised 1990
Edition N/A
Copyright 1992
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Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



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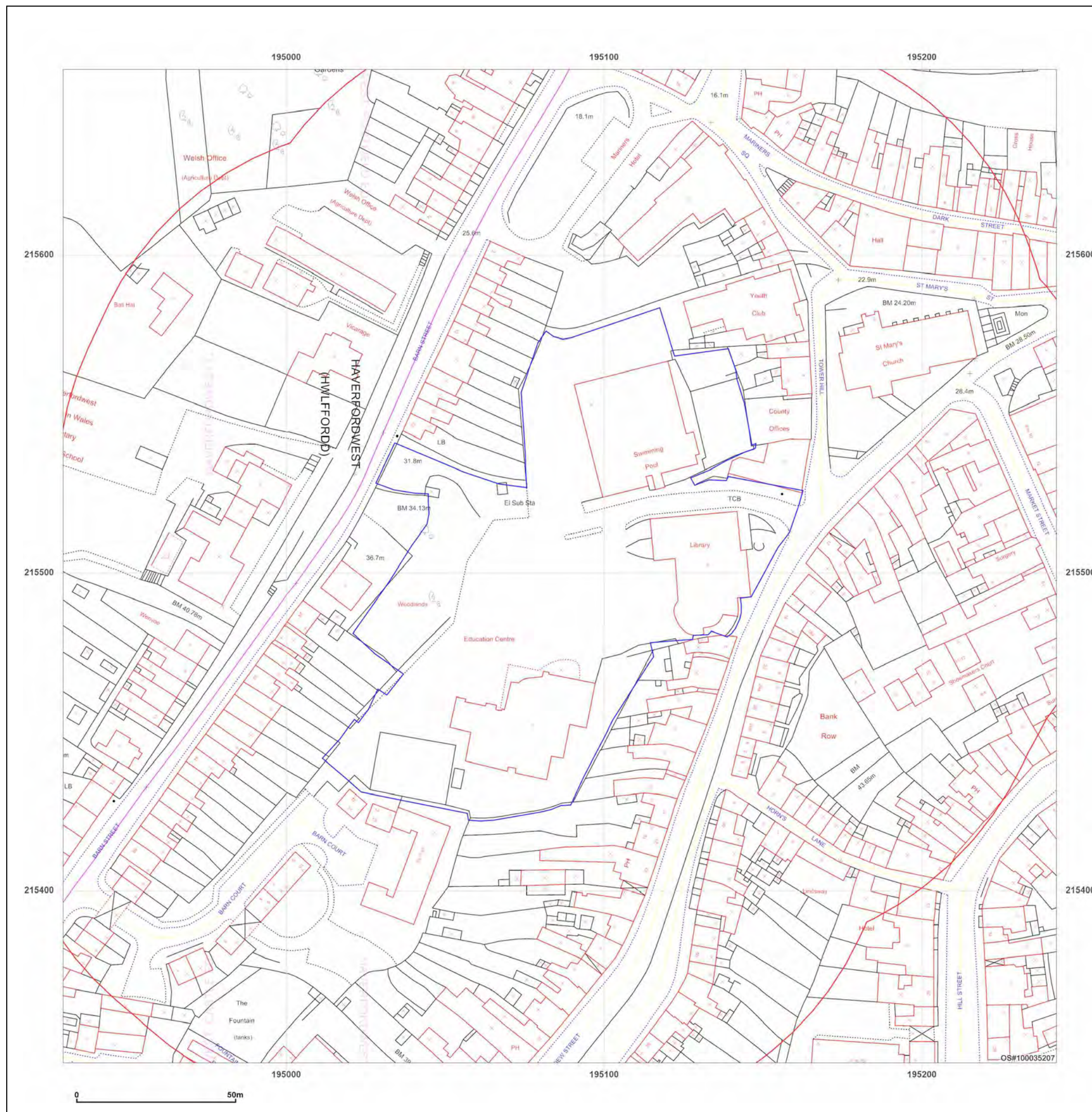


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Site Details:

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HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: County Series

Map date: 1887-1888

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1887
Revised 1887
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
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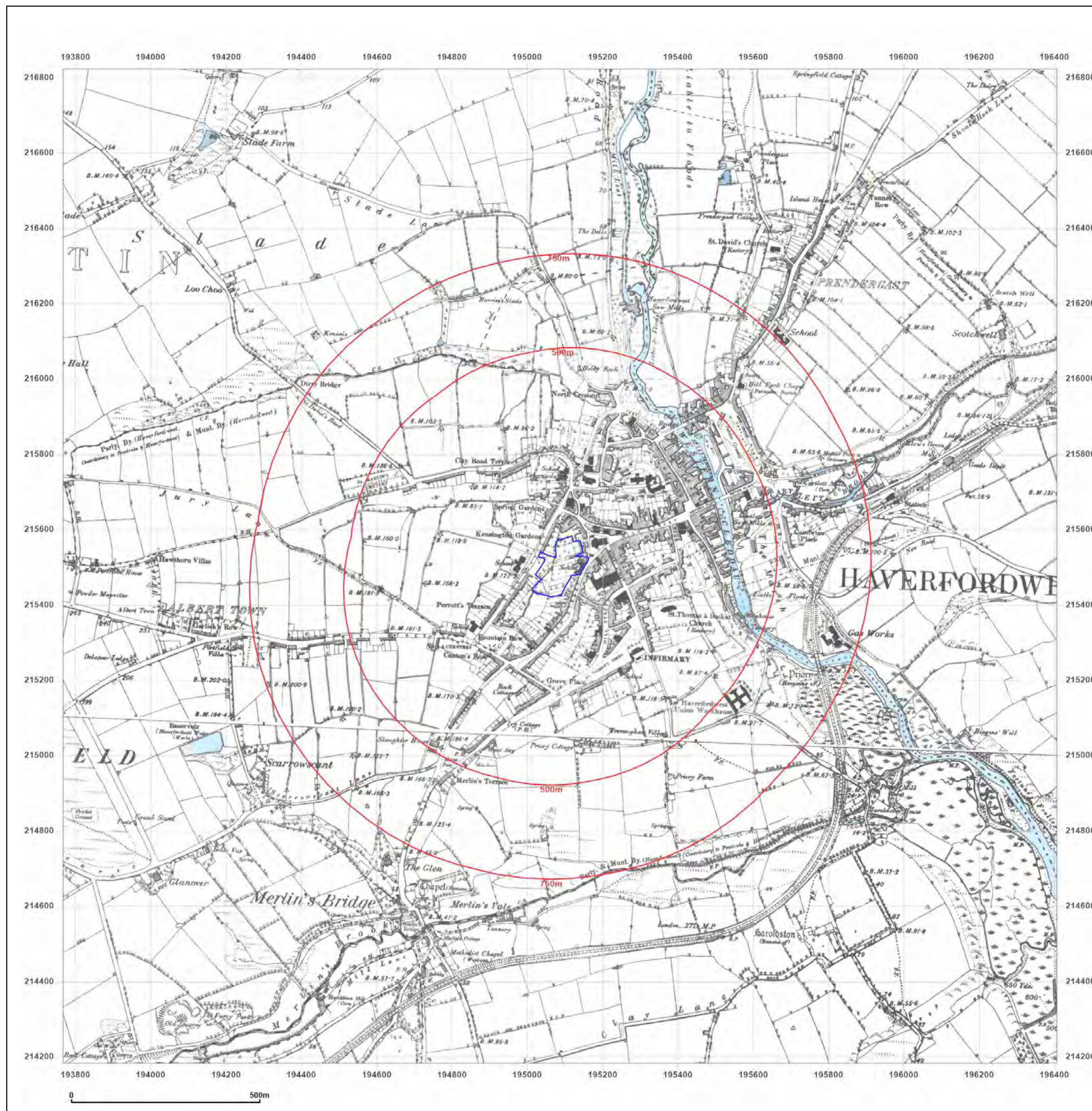


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HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: County Series

Map date: 1906

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1887
Revised 1906
Edition N/A
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Levelled N/A

Surveyed 1888
Revised 1906
Edition N/A
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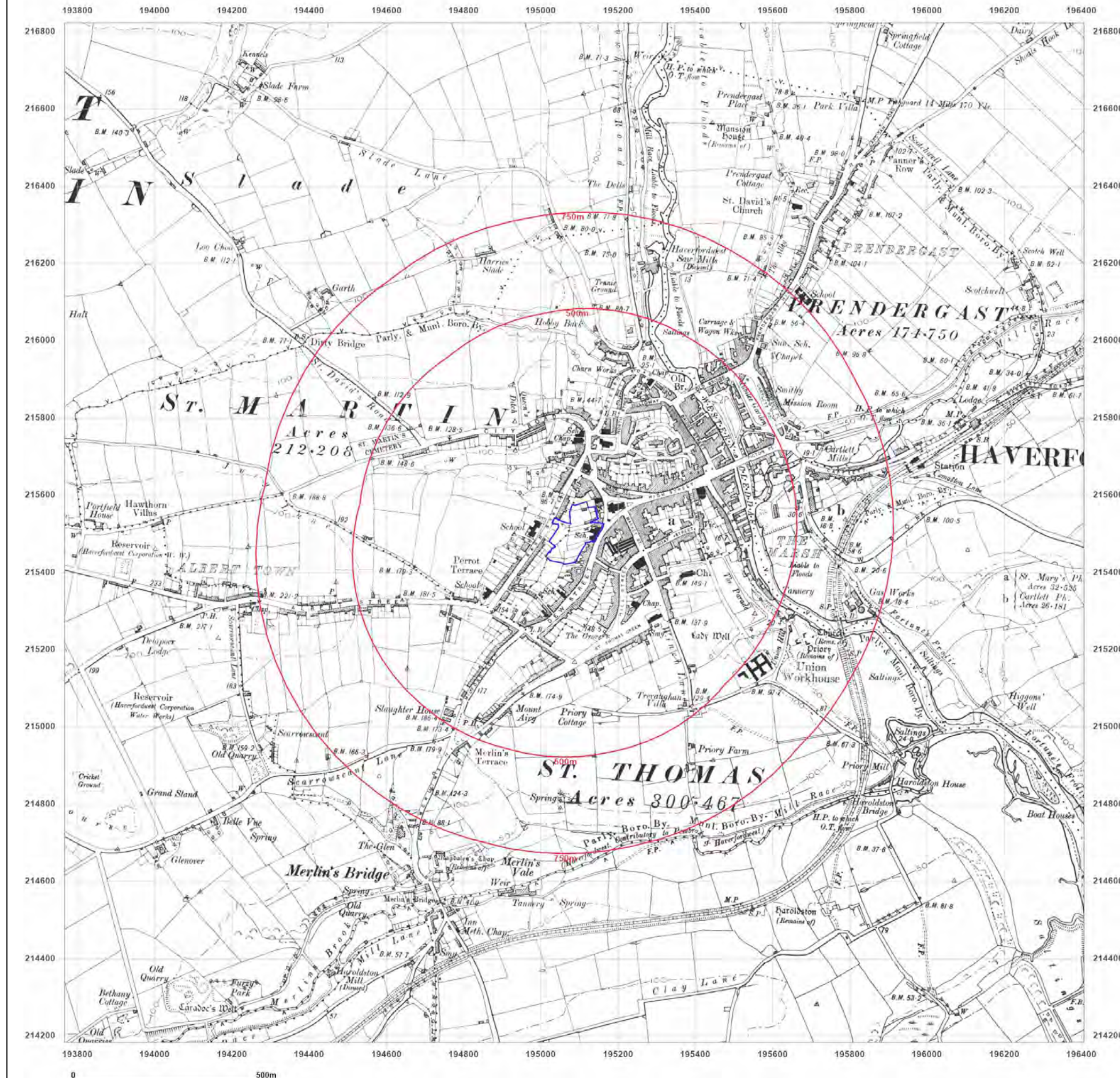


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HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: County Series

Map date: 1938-1939

Scale: 1:10,560

Printed at: 1:10,560



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Edition 1939
Copyright N/A
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Surveyed 1888
Revised 1938
Edition 1938
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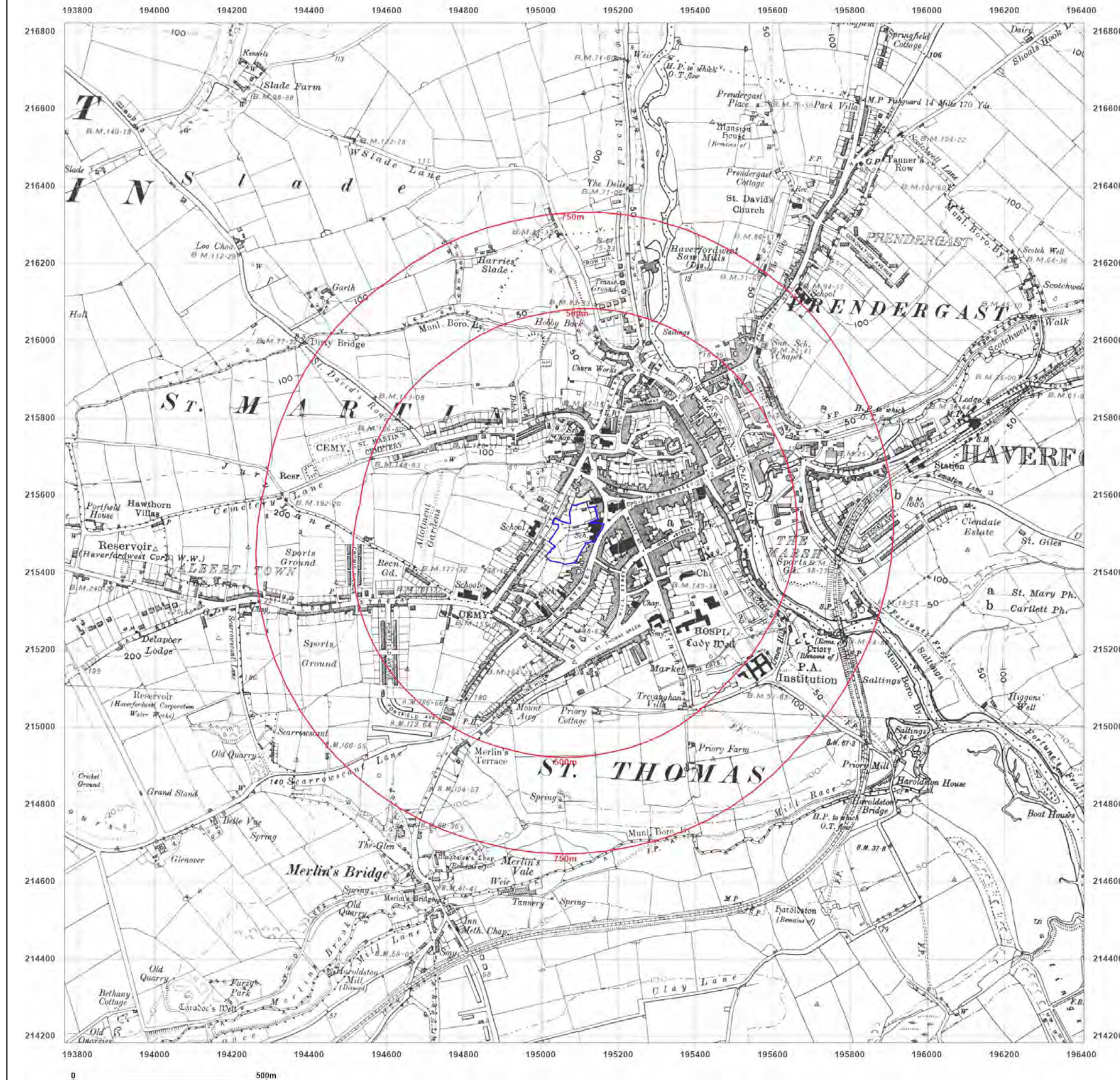


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Client Ref: Q0912_- Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: County Series

Map date: 1948

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1887
Revised 1948
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Surveyed 1888
Revised 1948
Edition N/A
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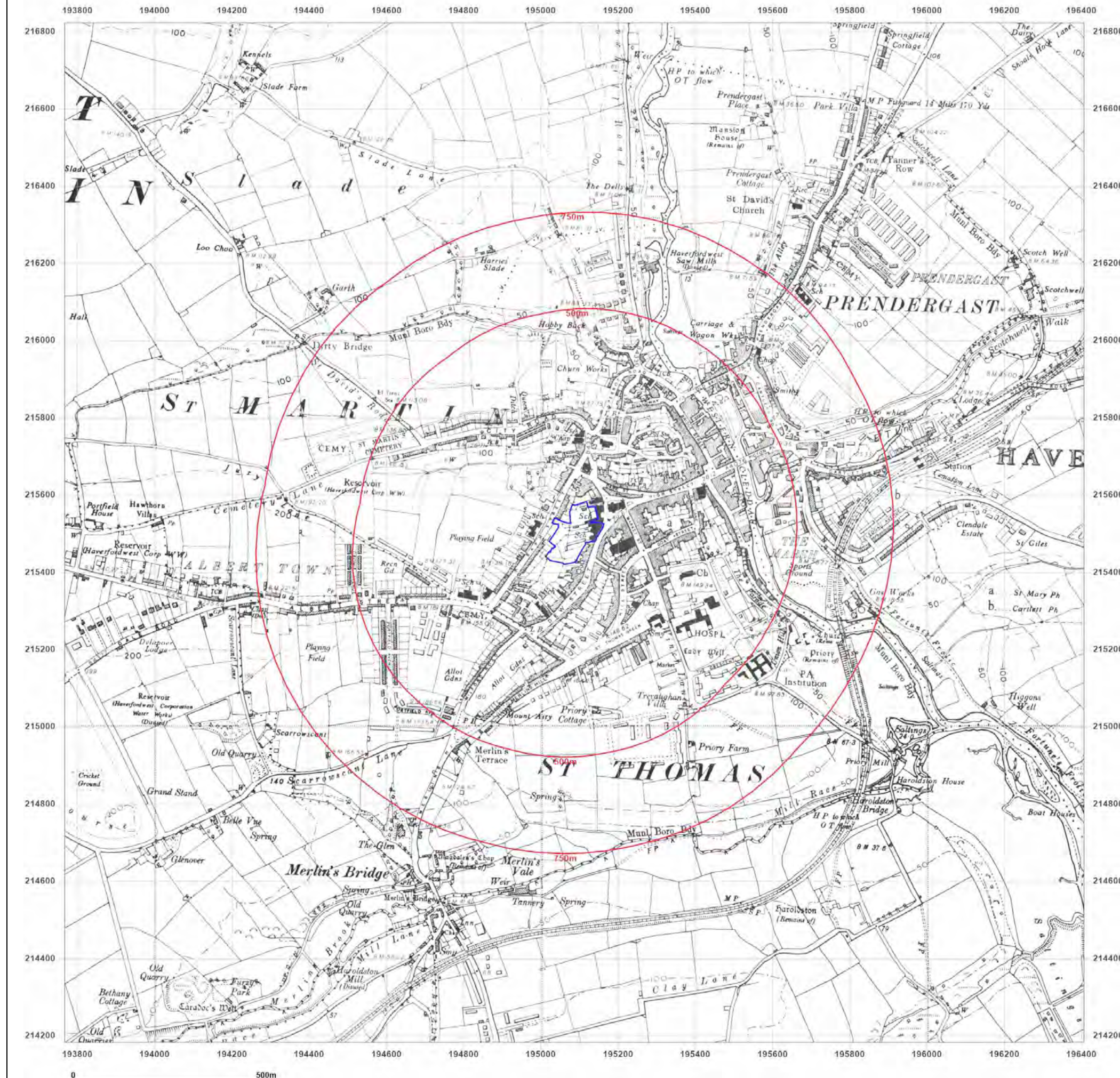


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Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: Provisional

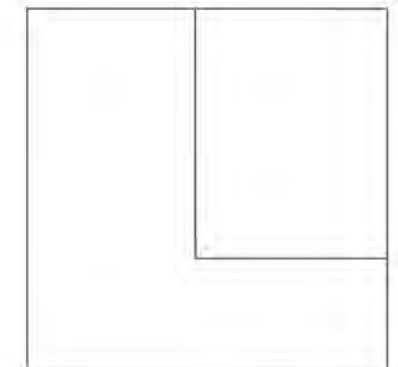
Map date: 1963

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1948
Revised 1963
Edition N/A
Copyright N/A
Levelled N/A



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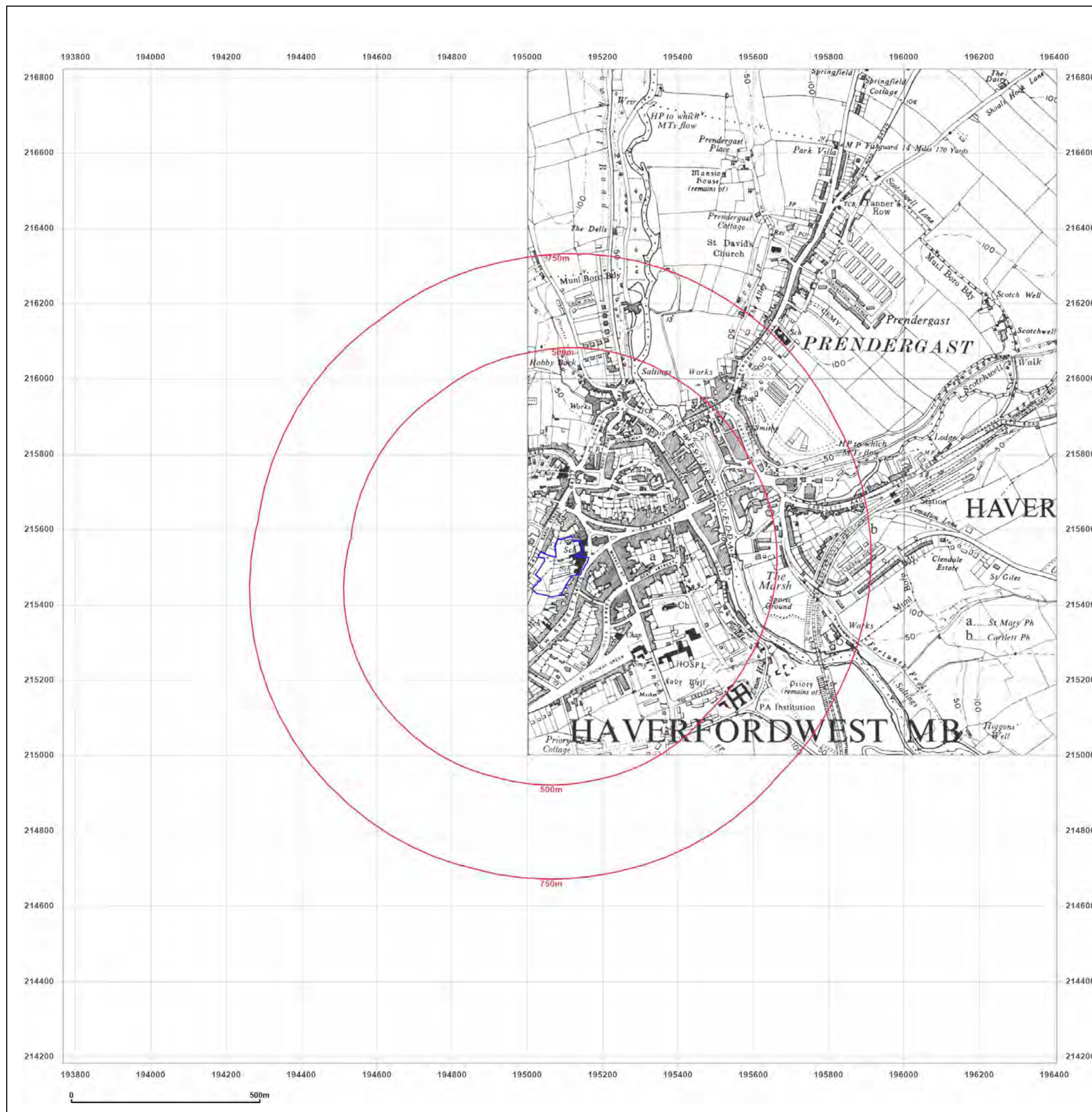


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Site Details:

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Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: Provisional

Map date: 1963-1968

Scale: 1:10,560

Printed at: 1:10,560



Surveyed N/A
Revised 1963
Edition 1964
Copyright 1964
Levelled N/A

Surveyed 1968
Revised 1968
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1930
Revised 1948
Edition N/A
Copyright 1964
Levelled N/A

Surveyed 1948
Revised 1948
Edition N/A
Copyright 1964
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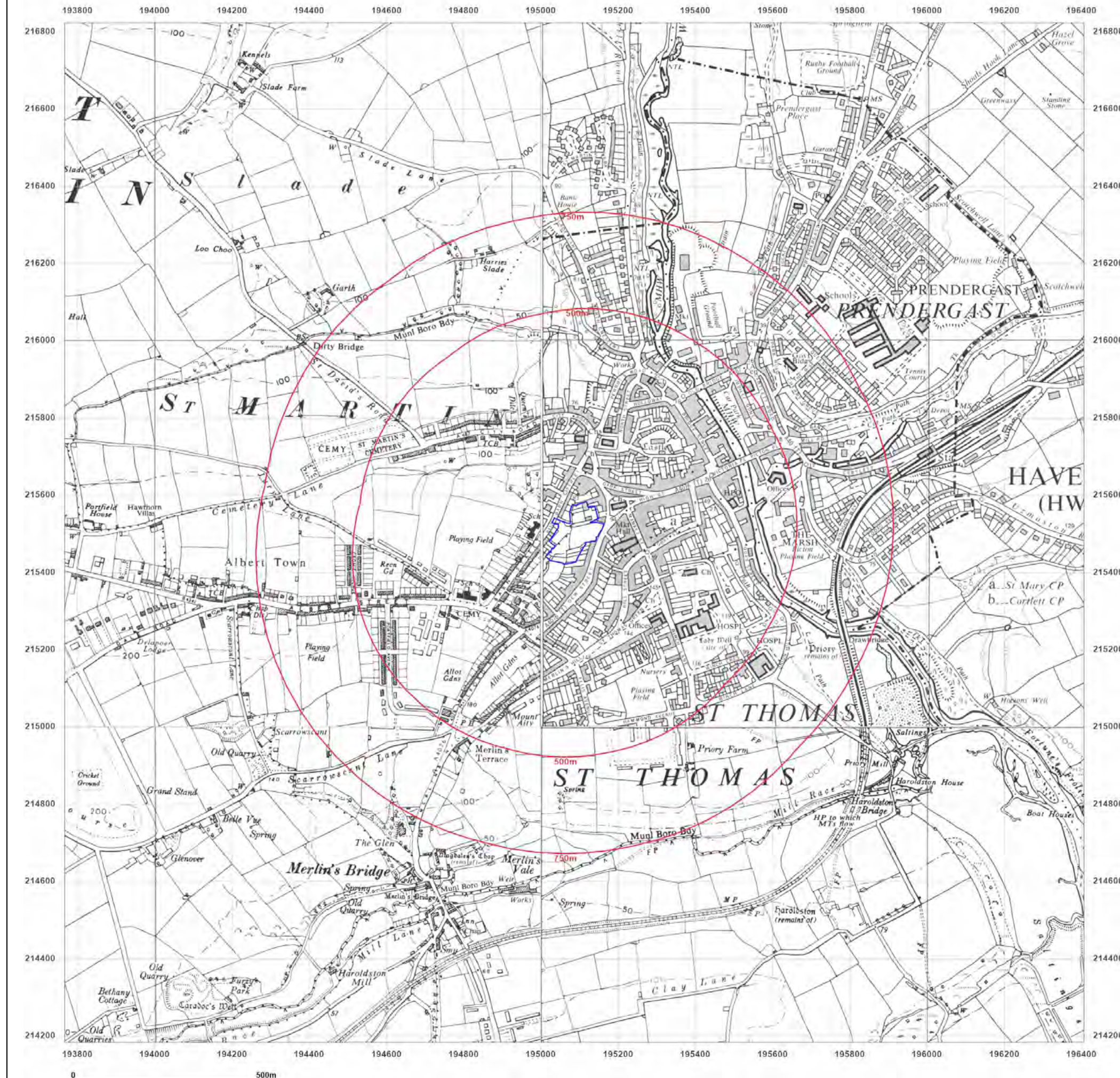


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Site Details:

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HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

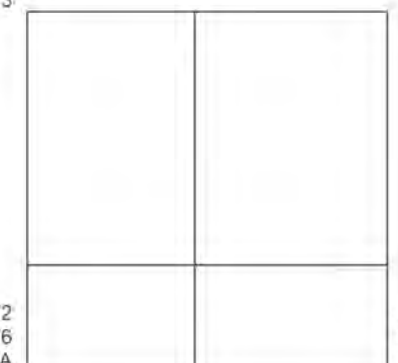
Map date: 1975-1976

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1972
Revised 1975
Edition N/A
Copyright 1975
Levelled 1973



Surveyed 1972
Revised 1976
Edition N/A
Copyright 1976
Levelled 1973

Surveyed 1972
Revised 1975
Edition N/A
Copyright 1975
Levelled 1973



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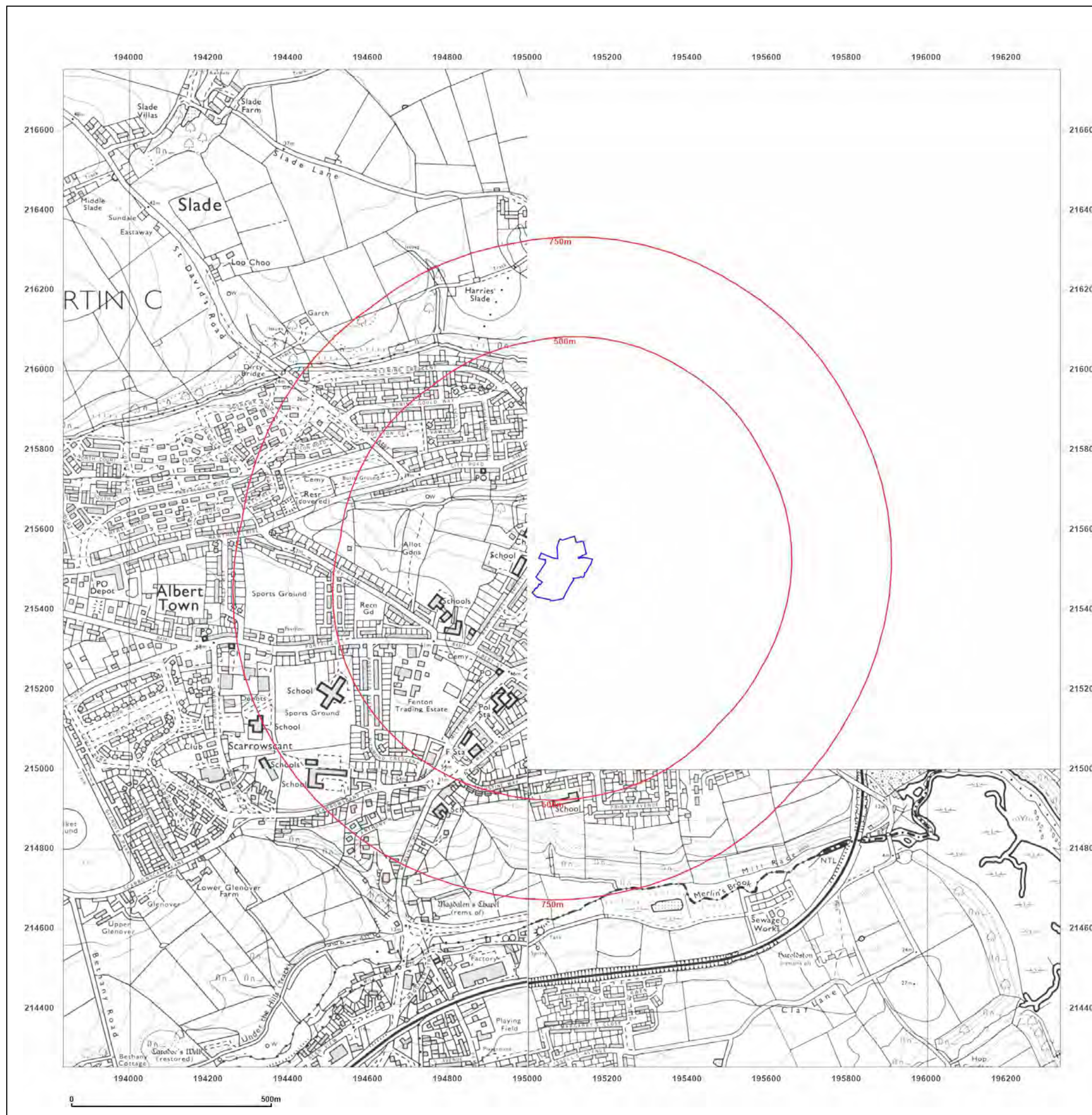


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Site Details:

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Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

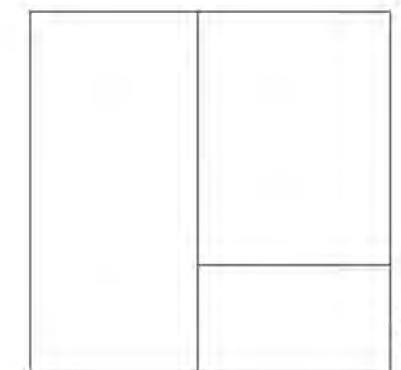
Map date: 1983

Scale: 1:10,000

Printed at: 1:10,000



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Edition N/A
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Levelled N/A



Surveyed 1972
Revised 1983
Edition N/A
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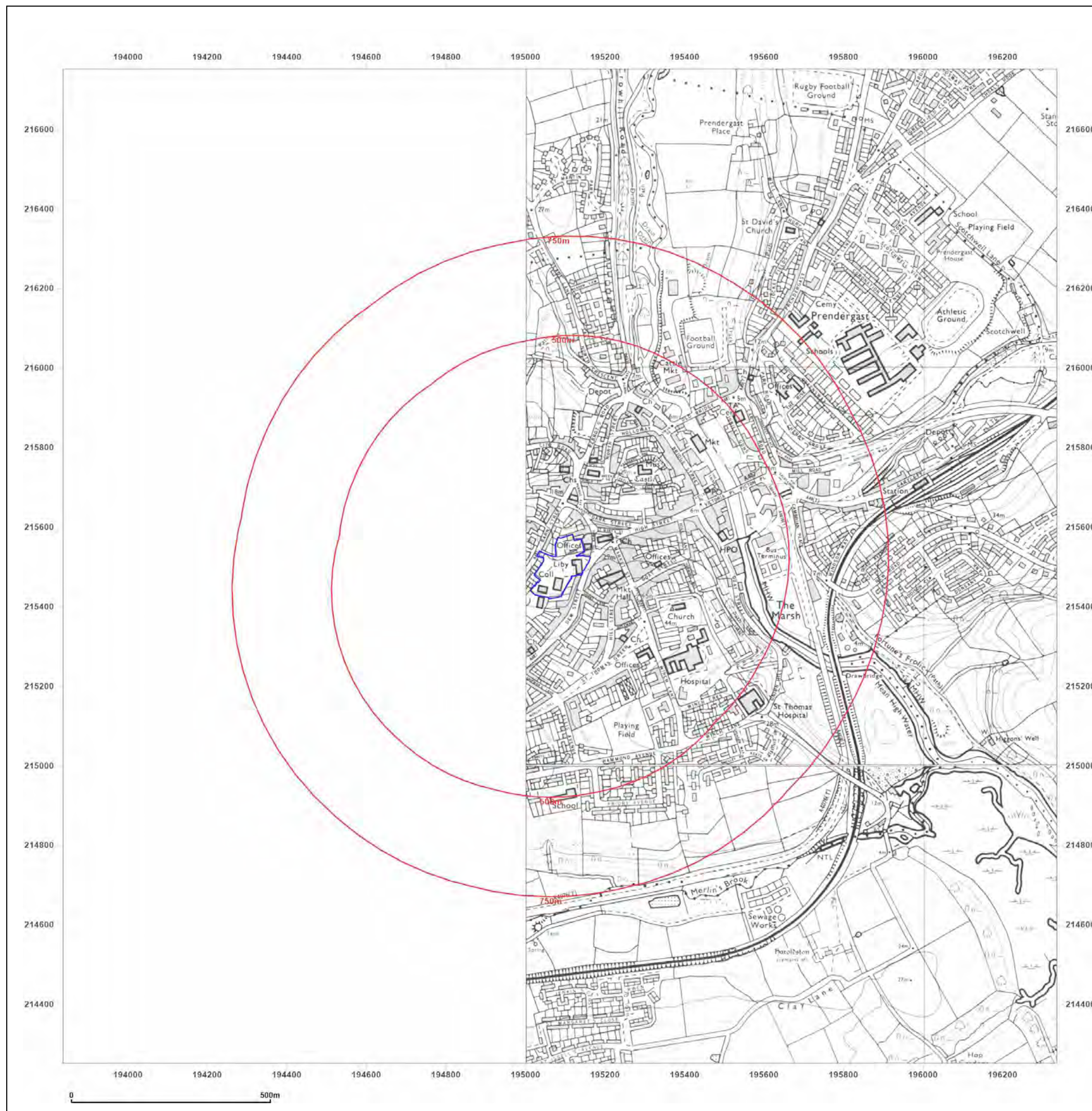


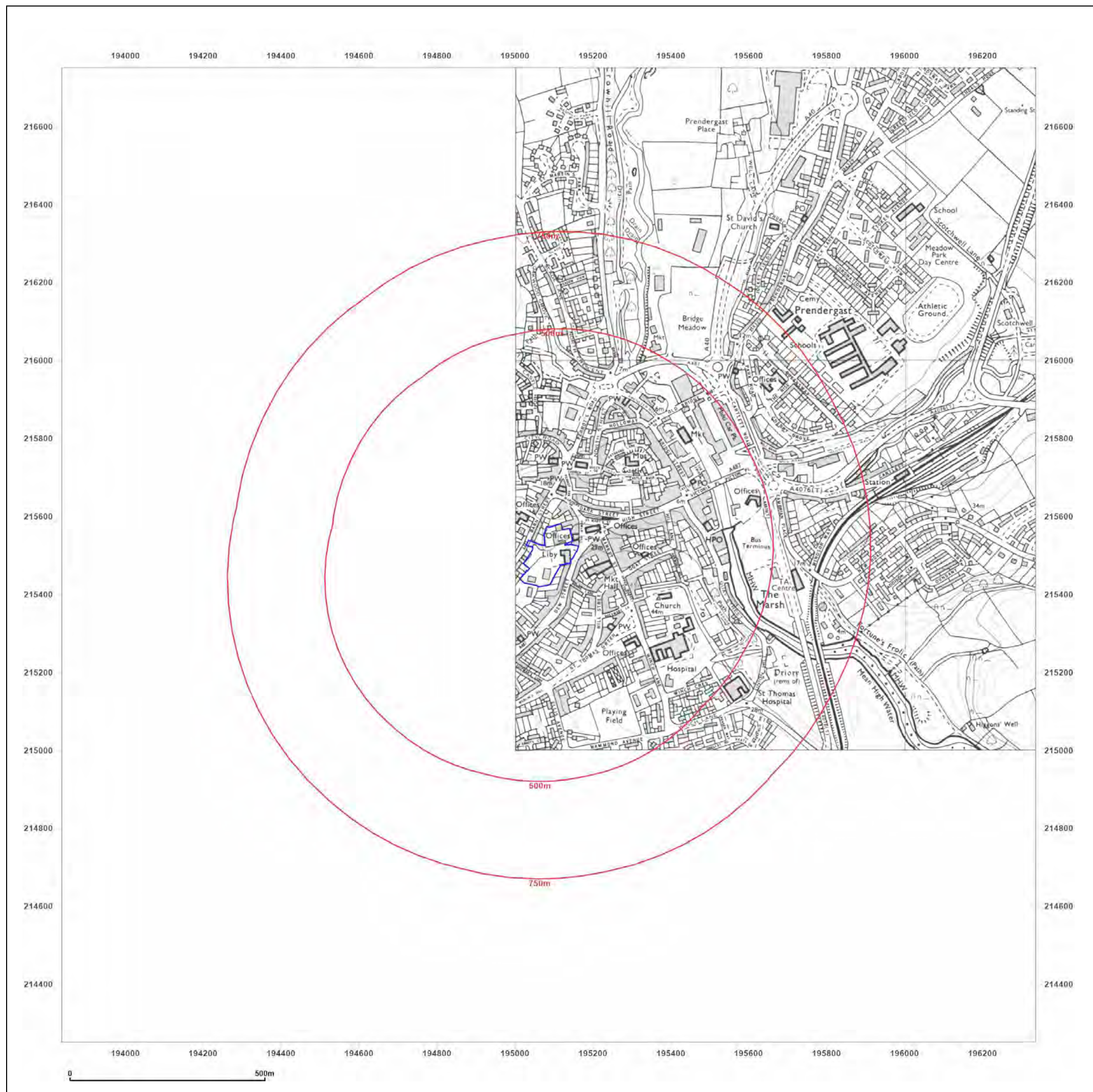
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Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

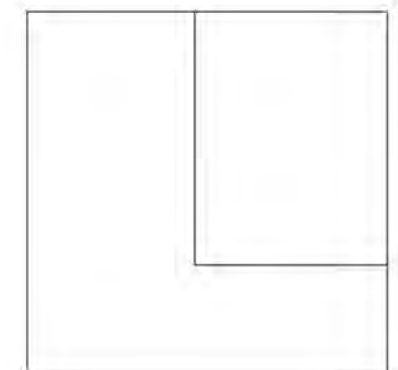
Map date: 1992

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1991
Revised 1992
Edition N/A
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Site Details:

2, DEW STREET,
HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_-_Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000



Produced by
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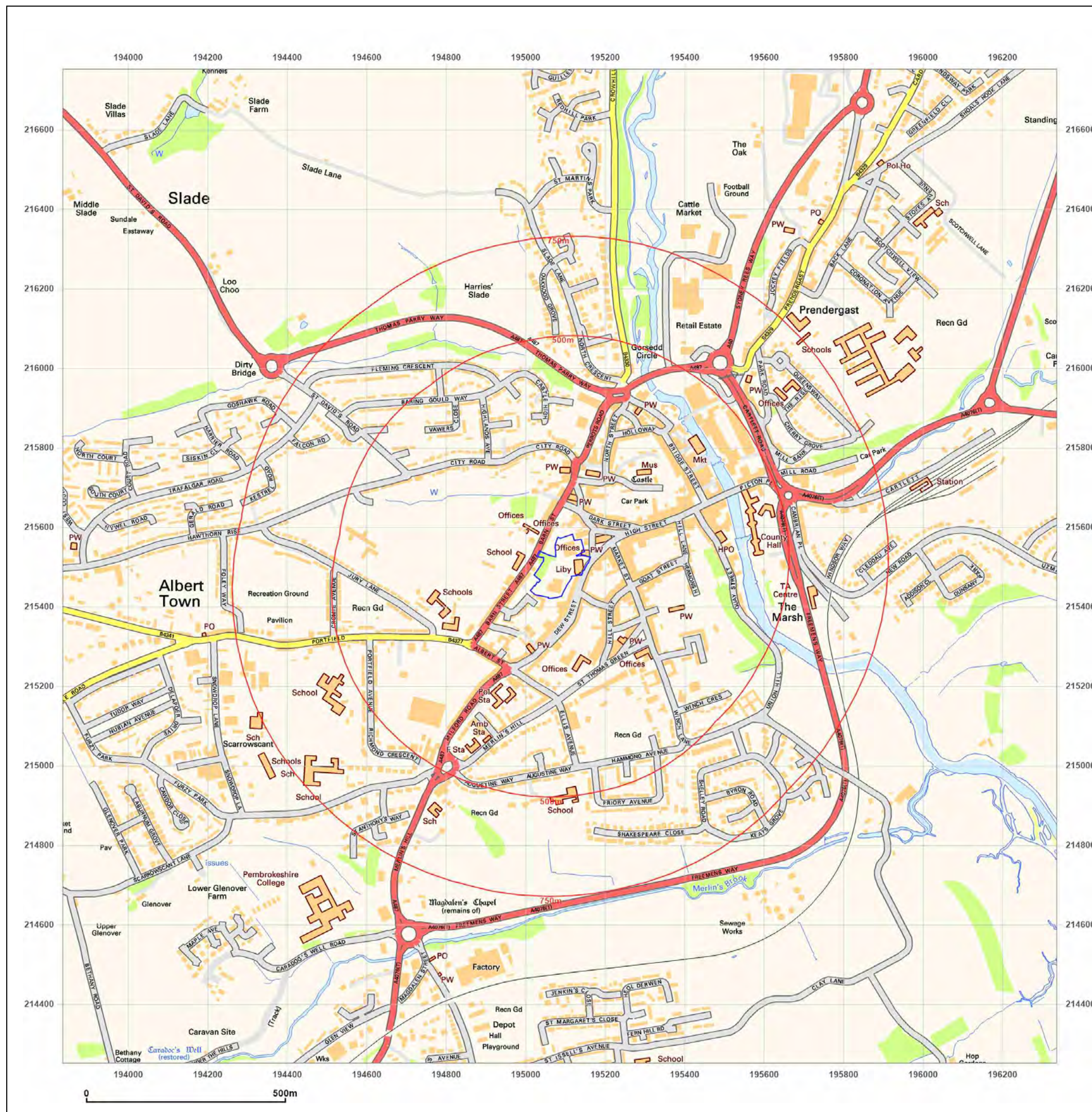


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Production date: 08 September 2022

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Site Details:

2, DEW STREET,
HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_- Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



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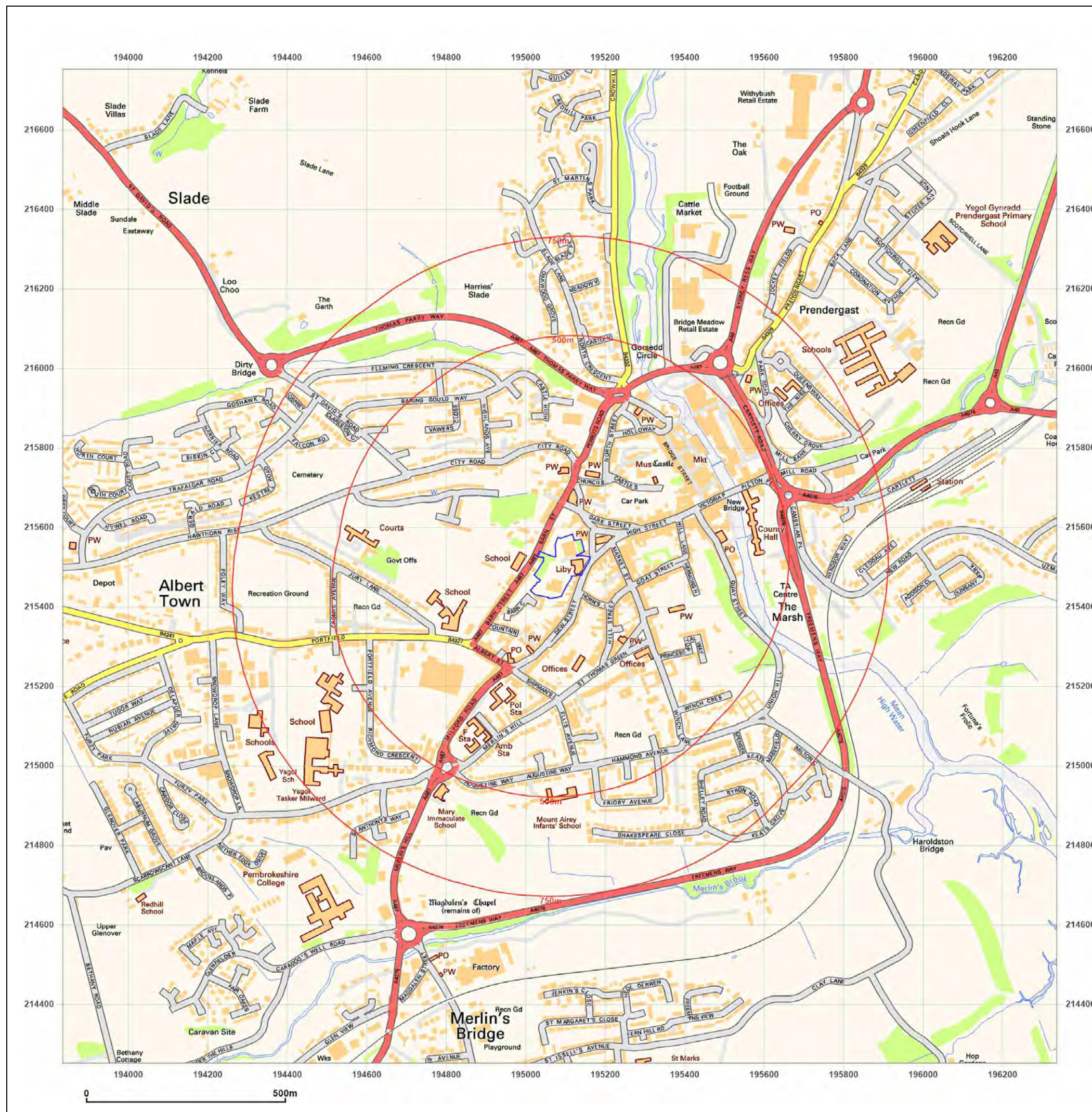


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Site Details:

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HAVERFORDWEST, SA61 1NJ

Client Ref: Q0912_- Haverfordwest_Library
Report Ref: HMD-213-9039023
Grid Ref: 195086, 215502

Map Name: National Grid

Map date: 2022

Scale: 1:10,000

Printed at: 1:10,000



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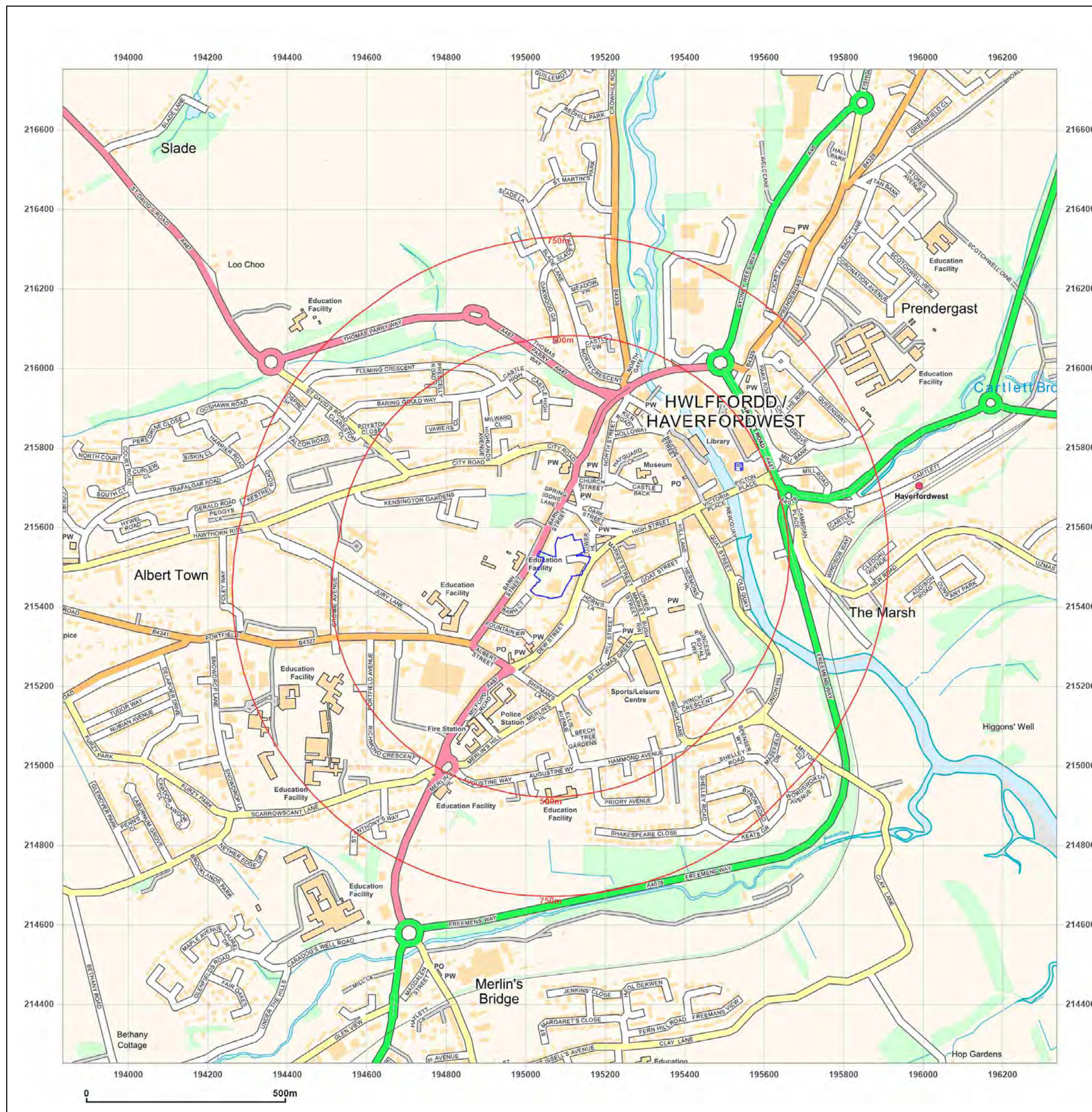


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INSIGHTS

HISTORICAL MAP PACK LEGEND

COUNTY SERIES & NATIONAL GRID 1:10,560 & 1:10,000

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COUNTY SERIES 1:10,560

VEGETATION



Fir Wood



Mixed Wood



Orchard



Rough Pasture



Marsh



Deciduous Wood



Brushwood



Reeds

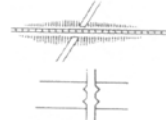


Furze

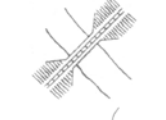


Osiers

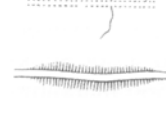
ROADS



Railway over Road



Road over River or Canal



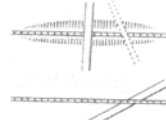
Railway over River



Road over Stream



Raised Road



Road over Railway



Level Crossing



Road over Stream



Sunken Road

RAILWAYS



Double Lines of Railway



Single Lines of Railway and Tramway

GENERAL FEATURES



Gravel Pit



Quarry



Other Pits



Sand Pit



Shingle



Antiquities, Site of

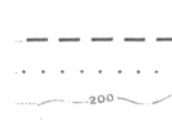


Arrow, showing direction of flow of water



Trigonometrical Station

BOUNDARIES



County Boundary



Parish Boundary



Contours



Parliamentary Division Boundary



Union Boundary



Rural District Boundary

NATIONAL GRID 1:10,000 & 1:10,560

HEIGHTS (METRES)

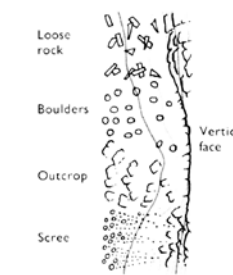
Values are given in metres above mean sea level at Newlyn.

Surface heights determined by ground survey 163m

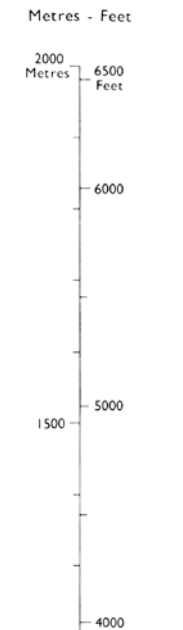
Bench marks and their values are shown on large scale maps, and bench mark lists containing fuller and possibly later levelling information are obtainable from the Director General, Ordnance Survey.

Contours are at 5 metres vertical interval.

ROCK FEATURES



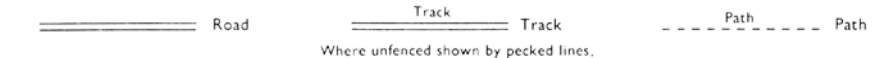
CONVERSION SCALE



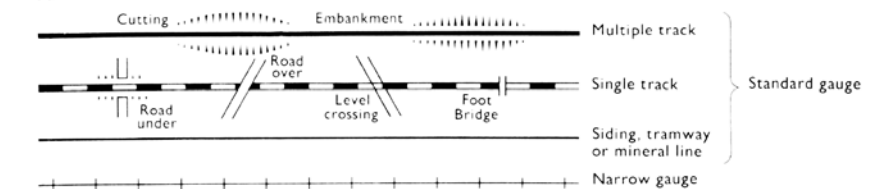
ABBREVIATIONS

BP,BS	Boundary Post or Stone	PO	Post Office
Ch	Church	PC	Public Convenience
CH	Club House	PH	Public House
F Sta	Fire Station	S	Stone
FB	Foot Bridge	Spr	Spring
Fn	Fountain	TCB	Telephone Call Box
GP	Guide Post	TCP	Telephone Call Post
MP,MS	Mile Post or Stone	TH	Town Hall
P	Pole or Post	W	Well
Pol Sta	Police Station	Y	Youth hostel

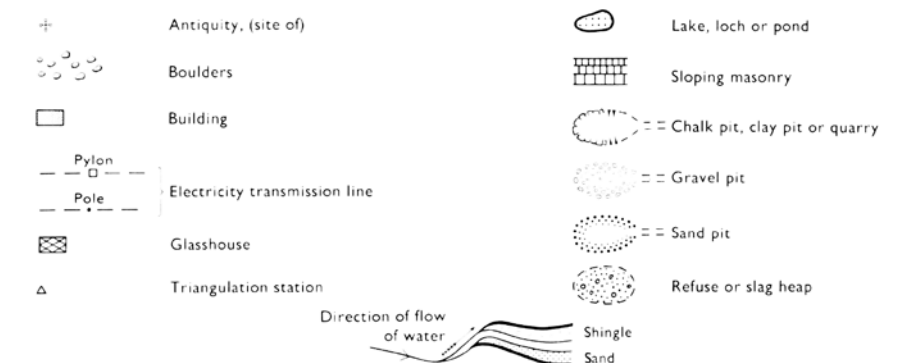
ROADS



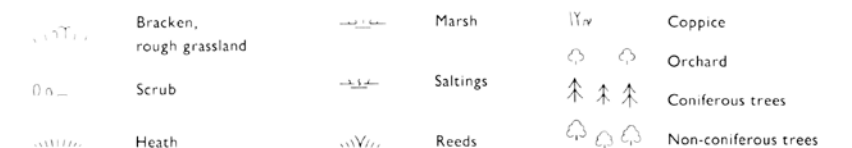
RAILWAYS



GENERAL FEATURES



VEGETATION



In some areas bracken () and rough grassland () are shown separately.



Groundsure
INSIGHTS

HISTORICAL MAP PACK LEGEND

COUNTY SERIES
1:1,2500
NATIONAL GRID
1:1,250 & 1:2,500

Information present on these legends is sourced
from the same Ordnance Survey mapping
as the maps used in this product.

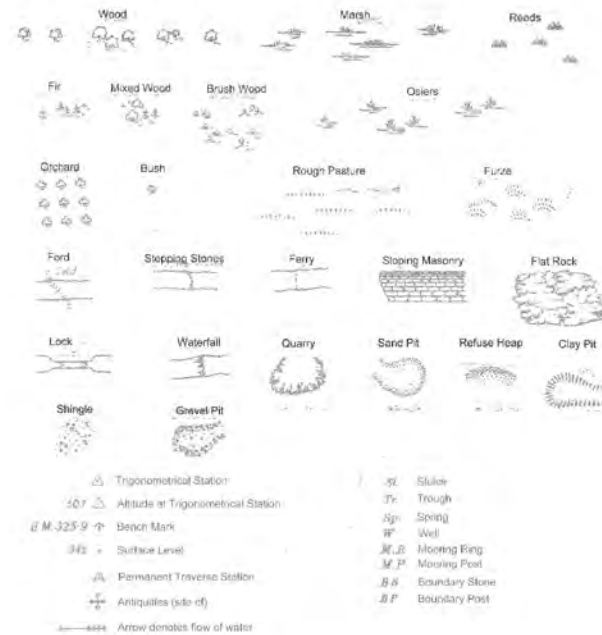
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COUNTY SERIES 1:2,500

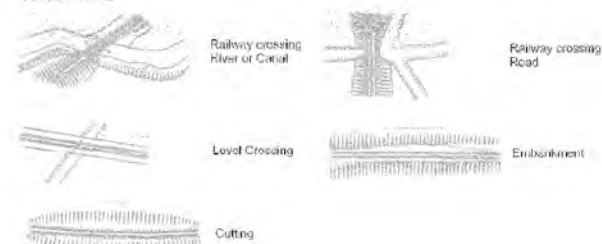
GENERAL FEATURES



ROADS



RAILWAYS

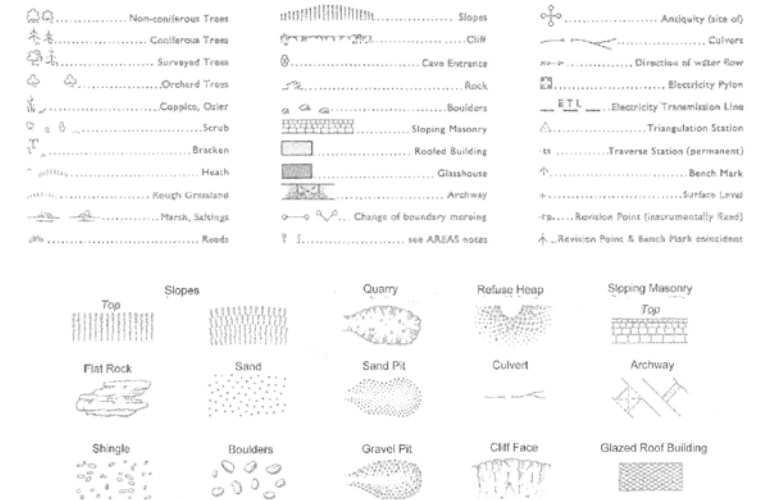


ABBREVIATIONS

Trigonometrical Station	Sluice
Altitude at Trigonometrical Station	Trough
Bench Mark	Spring
Surface Level	Well
Permanent Traverse Station	Mooring Ring
Antiquities (site of)	Mooring Post
Arrow denotes flow of water	Boundary Stone
	Boundary Post

NATIONAL GRID 1:2,500 & 1:1,250

GENERAL FEATURES



BOUNDARIES

England & Wales	
County Boundary (geographical)	
County & Civil Parish Boundary coterminous	
Admin County or County Borough Boundary	
London Borough Boundary	
County District Boundaries based on civil parish	
England, Wales & Scotland	
Civil Parish Boundary	
Boro (or Burgh) Const & Ward Bdy	Parly & Ward Boundaries based on civil parish
Co Const Bdy	
Boro (or Burgh) Const & Ward Bdy	Parly & Ward Boundaries not based on civil parish
Co Const Bdy	
Scotland	
County Boundary (geographical)	
County Council Boundary	
County of the City Boundary	
Burgh Boundary	
District Council Boundary	
Not with parish	Coincident with parish

ABBREVIATIONS

B.H.	Beer House	M.P.U.	Mail Pick-up
B.M.	Bench Mark	M.S.	Mile Stone
B.P.	Boundary Post	N.T.	National Trust
B.S.	Boundary Stone	N.T.L.	Normal Tidal Limit
C.	Crane	N.T.S.	National Trust for Scotland
C.H.	Club House	P.	Pillar, Pole or Post
Chy.	Chimney	P.C.	Public Convenience
Ca.	Capstan	P.C.B.	Police Call Box
D.Fn.	Drinking Fountain	P.H.	Public House
Dk.	Dock	P.O.	Post Office
E.P.	Electricity Pillar or Pole	Pp.	Police Telephone Pillar
E.T.L.	Electricity Transmission Line	P.T.P.	Police Telephone Pillar
F.A.	Fire Alarm	Rear.	Rear View
F.A.P.	Fire Alarm Pillar	R.H.	Road House
F.B.	Filter Bed, Foot Bridge	rp.	Revision Point
F.B.M.	Fundamental Bench Mark	S.	Stone
F.S.	Flacstaff	S.B.	Signal Box
F.Sta.	Fire Station	S.L.	Signal Light
G.P.	Guide Post	Sl.	Sluice
G.V.C.	Gas Valve Compound	S.P.	Signal Post
H.	Hydrant or Hydraulic	Spr.	Spring
ha.	Heath	S.Sta.	Signal Station
L.B.	Litter Box	T.C.B.	Telephone Call Box
L.B.Sta.	Litter Box Station	T.C.P.	Telephone Call Post
L.C.	Level Crossing	Tk.	Tank or Track
L.G.	Loading Gauge	Tr.	Trough
L.H.	Lighthouse	ts.	Traverse Station
L.Twr.	Lighting Tower	W.	Well
m.	Metres	W.B.	Weighbridge
M.H.W.	Mean High Water	Wd.P.	Wind Pump
M.H.W.S.	Mean High Water Springs	Wks.	Works
M.L.W.	Mean Low Water	Wv.P.	Water Point
M.L.W.S.	Mean Low Water Springs	Wv.T.	Water Tap
M.P.	Mile or Mooring Post		

APPENDIX III – GROUNDSURE ENVIRO & GEO INSIGHT REPORT DATASET

2, DEW STREET, HAVERFORDWEST, SA61 1NJ

Order Details

Date: 08/09/2022
Your ref: Q0912_-_Haverfordwest_Library
Our Ref: HMD-213-9039024

Site Details

Location: 195074 215487
Area: 1.33 ha
Authority: [Sir Benfro - Pembrokeshire County Council](#)



Summary of findings

p. 2 **Aerial image**

p. 8

OS MasterMap site plan

p.13 groundsure.com/insightuserguide

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
14	1.1	<u>Historical industrial land uses</u>	0	0	9	39	-
16	1.2	<u>Historical tanks</u>	0	0	2	2	-
17	1.3	<u>Historical energy features</u>	2	0	5	33	-
19	1.4	Historical petrol stations	0	0	0	0	-
19	1.5	<u>Historical garages</u>	0	0	8	17	-
20	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
21	2.1	<u>Historical industrial land uses</u>	0	0	10	47	-
24	2.2	<u>Historical tanks</u>	0	0	5	3	-
24	2.3	<u>Historical energy features</u>	2	0	6	50	-
27	2.4	Historical petrol stations	0	0	0	0	-
27	2.5	<u>Historical garages</u>	0	0	15	32	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
30	3.1	Active or recent landfill	0	0	0	0	-
30	3.2	Historical landfill (BGS records)	0	0	0	0	-
31	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
31	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
31	3.5	Historical waste sites	0	0	0	0	-
31	3.6	Licensed waste sites	0	0	0	0	-
31	3.7	<u>Waste exemptions</u>	0	0	0	8	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
33	4.1	<u>Recent industrial land uses</u>	1	1	17	-	-
35	4.2	<u>Current or recent petrol stations</u>	0	0	0	2	-
35	4.3	Electricity cables	0	0	0	0	-
35	4.4	Gas pipelines	0	0	0	0	-
35	4.5	Sites determined as Contaminated Land	0	0	0	0	-



35	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
36	4.7	Regulated explosive sites	0	0	0	0	-
36	4.8	Hazardous substance storage/usage	0	0	0	0	-
36	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
36	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
36	4.11	<u>Licensed pollutant release (Part A(2)/B)</u>	0	0	0	1	-
37	4.12	Radioactive Substance Authorisations	0	0	0	0	-
37	4.13	<u>Licensed Discharges to controlled waters</u>	0	0	3	33	-
42	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
43	4.15	Pollutant release to public sewer	0	0	0	0	-
43	4.16	List 1 Dangerous Substances	0	0	0	0	-
43	4.17	List 2 Dangerous Substances	0	0	0	0	-
43	4.18	<u>Pollution Incidents (EA/NRW)</u>	0	0	4	27	-
47	4.19	Pollution inventory substances	0	0	0	0	-
47	4.20	Pollution inventory waste transfers	0	0	0	0	-
47	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
48	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
50	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
52	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
53	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
53	5.5	Groundwater vulnerability- local information	None (within 0m)				
54	5.6	<u>Groundwater abstractions</u>	0	0	0	0	1
55	5.7	<u>Surface water abstractions</u>	0	0	0	0	5
56	5.8	<u>Potable abstractions</u>	0	0	0	0	3
57	5.9	Source Protection Zones	0	0	0	0	-
57	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
58	6.1	<u>Water Network (OS MasterMap)</u>	0	0	2	-	-



59	6.2	<u>Surface water features</u>	0	0	2	-	-
59	6.3	<u>WFD Surface water body catchments</u>	1	-	-	-	-
59	6.4	<u>WFD Surface water bodies</u>	0	0	0	-	-
60	6.5	<u>WFD Groundwater bodies</u>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
61	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
61	7.2	Historical Flood Events	0	0	0	-	-
61	7.3	Flood Defences	0	0	0	-	-
62	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
62	7.5	Flood Storage Areas	0	0	0	-	-
63	7.6	Flood Zone 2	None (within 50m)				
63	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
64	8.1	<u>Surface water flooding</u>	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	Groundwater flooding					
66	9.1	<u>Groundwater flooding</u>	Negligible (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
67	10.1	<u>Sites of Special Scientific Interest (SSSI)</u>	0	0	0	1	2
68	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
68	10.3	<u>Special Areas of Conservation (SAC)</u>	0	0	0	1	1
69	10.4	Special Protection Areas (SPA)	0	0	0	0	0
69	10.5	National Nature Reserves (NNR)	0	0	0	0	0
69	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
70	10.7	<u>Designated Ancient Woodland</u>	0	0	1	2	10
70	10.8	Biosphere Reserves	0	0	0	0	0
71	10.9	Forest Parks	0	0	0	0	0
71	10.10	Marine Conservation Zones	0	0	0	0	0
71	10.11	Green Belt	0	0	0	0	0
71	10.12	Proposed Ramsar sites	0	0	0	0	0



71	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
72	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
72	10.15	Nitrate Sensitive Areas	0	0	0	0	0
72	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
73	10.17	SSSI Impact Risk Zones	0	-	-	-	-
73	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
74	11.1	World Heritage Sites	0	0	0	-	-
75	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
75	11.3	National Parks	0	0	0	-	-
75	11.4	Listed Buildings	0	9	203	-	-
88	11.5	Conservation Areas	1	0	0	-	-
89	11.6	Scheduled Ancient Monuments	0	0	1	-	-
89	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
90	12.1	Agricultural Land Classification	None (within 250m)				
90	12.2	Open Access Land	0	0	0	-	-
90	12.3	Tree Felling Licences	0	0	0	-	-
90	12.4	Environmental Stewardship Schemes	0	0	0	-	-
91	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
92	13.1	Priority Habitat Inventory	0	0	0	-	-
92	13.2	Habitat Networks	0	0	0	-	-
92	13.3	Open Mosaic Habitat	0	0	0	-	-
92	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
93	14.1	10k Availability	Identified (within 500m)				
94	14.2	Artificial and made ground (10k)	0	0	0	0	-
95	14.3	Superficial geology (10k)	0	0	0	0	-

95	14.4	Landslip (10k)	0	0	0	0	-
96	14.5	Bedrock geology (10k)	0	0	0	0	-
96	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
97	15.1	<u>50k Availability</u>	Identified (within 500m)				
98	15.2	Artificial and made ground (50k)	0	0	0	0	-
98	15.3	Artificial ground permeability (50k)	0	0	-	-	-
99	15.4	<u>Superficial geology (50k)</u>	0	0	0	2	-
100	15.5	Superficial permeability (50k)	None (within 50m)				
100	15.6	Landslip (50k)	0	0	0	0	-
100	15.7	Landslip permeability (50k)	None (within 50m)				
101	15.8	<u>Bedrock geology (50k)</u>	1	0	6	1	-
102	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
102	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
103	16.1	<u>BGS Boreholes</u>	0	0	11	-	-
Page	Section	Natural ground subsidence					
105	17.1	<u>Shrink swell clays</u>	Very low (within 50m)				
106	17.2	<u>Running sands</u>	Negligible (within 50m)				
108	17.3	<u>Compressible deposits</u>	Negligible (within 50m)				
109	17.4	<u>Collapsible deposits</u>	Very low (within 50m)				
110	17.5	<u>Landslides</u>	Low (within 50m)				
112	17.6	<u>Ground dissolution of soluble rocks</u>	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
114	18.1	Natural cavities	0	0	0	0	-
115	18.2	BritPits	0	0	0	0	-
115	18.3	<u>Surface ground workings</u>	0	0	4	-	-
115	18.4	Underground workings	0	0	0	0	0
115	18.5	Historical Mineral Planning Areas	0	0	0	0	-



116	18.6	<u>Non-coal mining</u>	1	1	2	3	1
117	18.7	Mining cavities	0	0	0	0	0
117	18.8	JPB mining areas	None (within 0m)				
117	18.9	Coal mining	None (within 0m)				
117	18.10	Brine areas	None (within 0m)				
117	18.11	Gypsum areas	None (within 0m)				
118	18.12	Tin mining	None (within 0m)				
118	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
119	19.1	<u>Radon</u>	Between 1% and 3% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
120	20.1	<u>BGS Estimated Background Soil Chemistry</u>	2	2	-	-	-
120	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
120	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
121	21.1	Underground railways (London)	0	0	0	-	-
121	21.2	Underground railways (Non-London)	0	0	0	-	-
121	21.3	Railway tunnels	0	0	0	-	-
121	21.4	Historical railway and tunnel features	0	0	0	-	-
121	21.5	Royal Mail tunnels	0	0	0	-	-
122	21.6	Historical railways	0	0	0	-	-
122	21.7	Railways	0	0	0	-	-
122	21.8	Crossrail 1	0	0	0	0	-
122	21.9	Crossrail 2	0	0	0	0	-
122	21.10	HS2	0	0	0	0	-



Recent aerial photograph



Capture Date: 14/05/2020

Site Area: 1.33ha



Recent site history - 2017 aerial photograph



Capture Date: 08/05/2017

Site Area: 1.33ha



Recent site history - 2013 aerial photograph



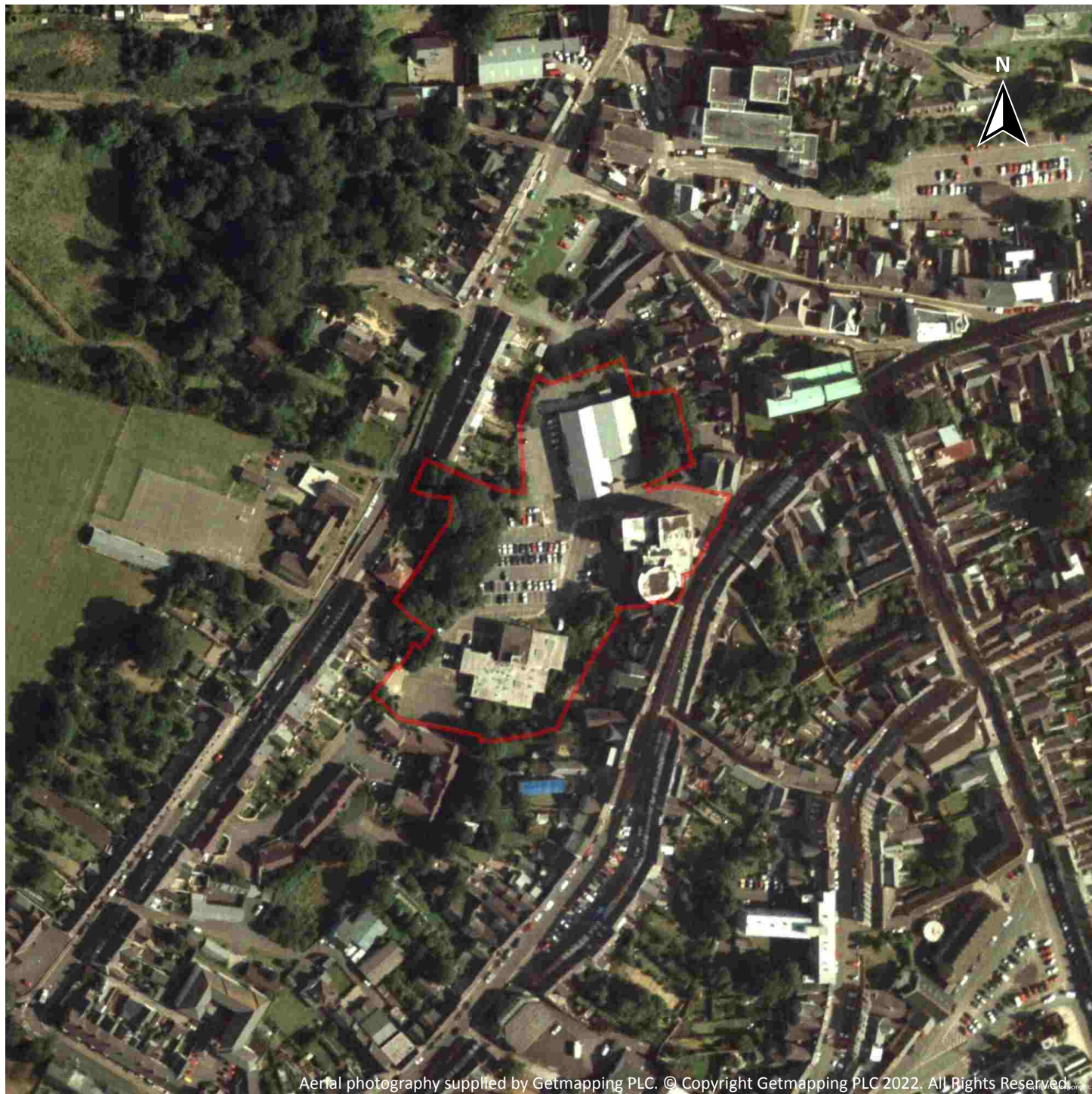
Aerial photography supplied by Getmapping PLC, © Copyright Getmapping PLC 2022. All Rights Reserved.

Capture Date: 04/06/2013

Site Area: 1.33ha



Recent site history - 2003 aerial photograph

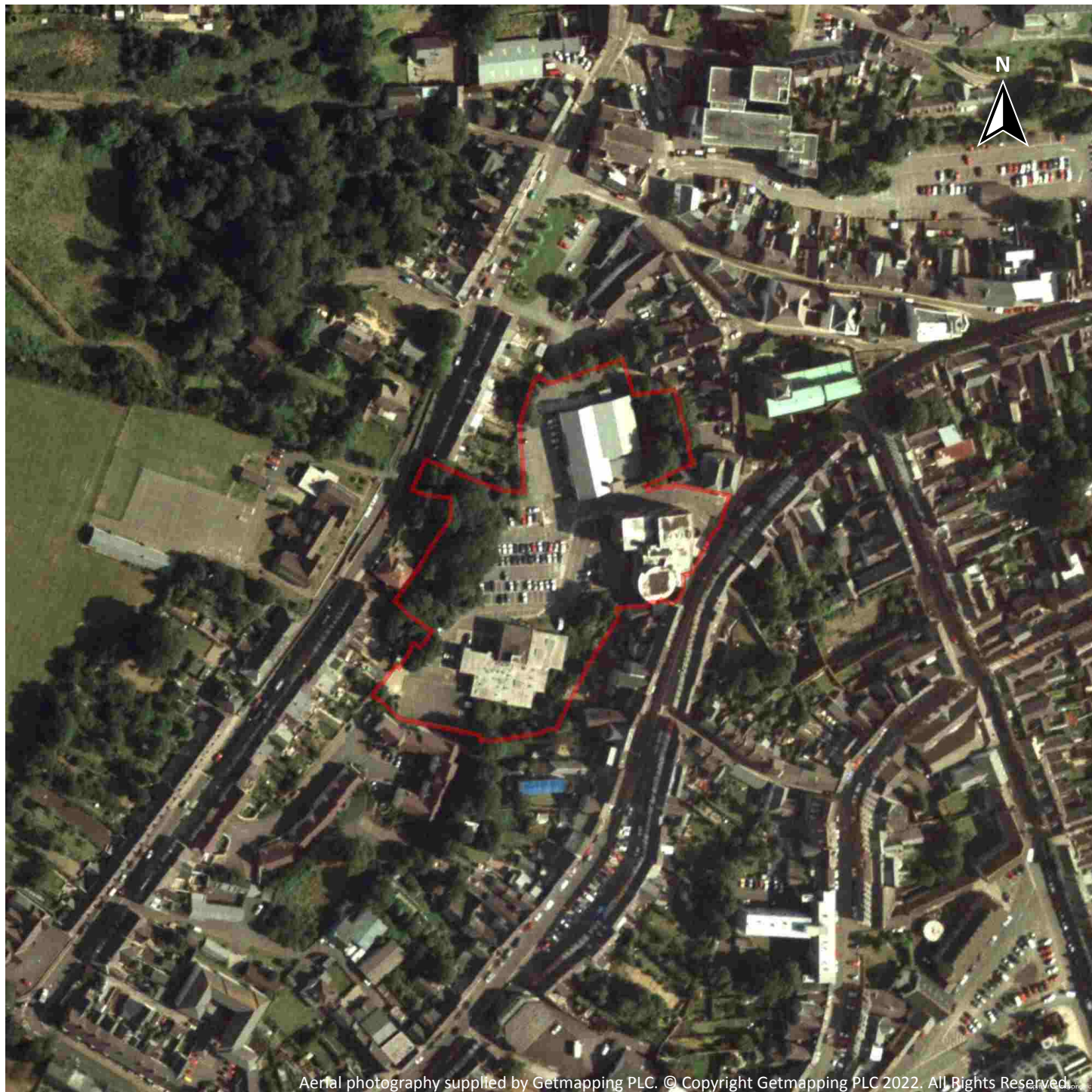


Capture Date: 14/09/2003

Site Area: 1.33ha



Recent site history - 2000 aerial photograph



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Capture Date: 20/07/2000

Site Area: 1.33ha



OS MasterMap site plan



Site Area: 1.33ha



1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

1.1 Historical industrial land uses

Records within 500m

48

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
4	202m NE	Police Station	1948 - 1963	15156



ID	Location	Land use	Dates present	Group ID
E	204m SW	Cemetery	1939	16256
E	205m SW	Cemetery	1948	14925
E	206m SW	Cemetery	1963	16416
E	206m SW	Cemetery	1974	16556
5	233m S	Police Station	1974	12507
F	249m SE	Smithy	1939	16266
F	249m SE	Smithy	1906	14021
F	249m SE	Smithy	1948	16173
F	254m SE	Smithy	1963	17452
G	254m SE	Hospital	1948	15576
7	266m SE	Nursery	1968	13159
I	274m N	Unspecified Works	1948	14297
I	274m N	Unspecified Works	1906	16069
G	274m SE	Hospital	1963 - 1992	15541
G	276m SE	Hospital	1939	17513
I	298m N	Unspecified Works	1963	16569
I	301m N	Unspecified Works	1939	14754
I	332m N	Unspecified Depot	1983	13735
10	369m SW	Fire Station	1974	12239
M	376m NE	Unspecified Works	1968	17390
P	393m NW	Burial Ground	1974	13522
P	393m NW	Cemetery	1963	17430
Q	394m NW	Cemeteries	1948	13177
P	394m NW	Cemetery	1906	14099
R	395m E	Terminus	1992	13864
Q	395m NW	Cemetery	1939	16149
R	396m E	Unspecified Ground Workings	1906	12845
11	401m N	Unspecified Ground Workings	1939	14247



ID	Location	Land use	Dates present	Group ID
13	420m E	Tannery	1906	13780
R	424m E	Terminus	1983	15154
T	425m E	Unspecified Commercial/Industrial	1948	13933
T	425m E	Unspecified Commercial/Industrial	1906	17192
T	445m E	Railway Sidings	1906	11328
Q	445m NW	Cemetery	1963	16853
Q	445m NW	Cemetery	1974	16855
X	466m E	Sand Pit	1963	11829
X	467m E	Gravel Pit	1939	13439
X	470m E	Refuse Heap	1948	13020
X	481m E	Unspecified Ground Workings	1968	12844
15	488m N	Unspecified Ground Workings	1939	16285
Y	488m SE	Hospital	1968 - 1992	15845
Z	489m NE	Smithy	1906	15984
Z	489m NE	Smithy	1948	17538
AA	492m NE	Unspecified Works	1963	12624
Y	493m SE	Unspecified Workhouse	1906	12533
AA	494m NE	Carriage and Wagon Works	1906	15051
AA	494m NE	Carriage and Wagon Works	1948	15476

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m

4

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**



ID	Location	Land use	Dates present	Group ID
1	94m SW	Tanks	1966 - 1992	2767
2	122m N	Unspecified Tank	1890	1719
9	339m SW	Unspecified Tank	1966 - 1970	2897
12	418m SE	Unspecified Tank	1937	1718

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	40
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Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
A	On site	Electricity Substation	1998	646
A	On site	Electricity Substation	1992	690
C	175m S	Electricity Transformer	1970	848
C	176m S	Electricity Transformer	1987	691
C	177m S	Electricity Substation	1990 - 1992	716
D	178m N	Electricity Substation	1998	478
D	194m N	Electricity Substation	1992	479
H	275m S	Electricity Substation	1992	476
H	275m S	Electricity Transformer	1987	539
H	283m S	Electricity Substation	1998	480
8	294m NW	Electricity Substation	1990 - 1995	701
G	296m SE	Electricity Substation	1992	477
G	296m SE	Electricity Transformer	1987 - 1988	836
J	298m E	Electricity Substation	1998	500



ID	Location	Land use	Dates present	Group ID
G	299m SE	Electricity Transformer	1970	757
J	311m E	Electricity Transformer	1987	849
J	312m E	Electricity Substation	1992	501
J	312m E	Electricity Transformer	1988	638
J	313m E	Electricity Transformer	1970	792
K	342m NE	Electricity Transformer	1970	543
K	344m NE	Electricity Substation	1998	688
L	345m NE	Electricity Transformer	1987 - 1988	622
K	346m NE	Electricity Substation	1992	854
L	347m NE	Electricity Substation	1992 - 1998	822
L	350m NE	Electricity Transformer	1970	818
O	377m NE	Electricity Transformer	1987 - 1988	698
O	379m NE	Electricity Transformer	1970	860
O	393m NE	Electricity Substation	1998	485
O	395m NE	Electricity Substation	1992	487
S	405m SW	Electricity Substation	1995	481
S	412m SW	Electricity Substation	1990 - 1992	692
U	431m E	Electricity Substation	1992 - 1998	798
R	431m E	Electricity Transformer	1970	546
U	431m E	Electricity Transformer	1987	545
O	434m NE	Electricity Transformer	1987 - 1988	617
V	437m S	Electricity Substation	1995 - 1997	607
V	437m S	Electricity Substation	1987 - 1992	771
O	437m NE	Electricity Transformer	1970	863
V	454m S	Electricity Substation	1972	754
16	500m NW	Electricity Substation	1990 - 1992	869

This data is sourced from Ordnance Survey / Groundsure.



1.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m

25

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14**

ID	Location	Land use	Dates present	Group ID
B	104m S	Garage	1966 - 1970	303
B	109m S	Garage	1992	207
B	109m S	Garage	1998	212
B	110m S	Garage	1987 - 1988	295
3	135m SW	Garage	1966 - 1970	268
C	203m S	Garage	1990 - 1992	243
C	207m S	Garage	1966 - 1970	244
6	237m N	Garage	1992 - 1998	278
H	263m S	Garage	1966 - 1970	240
H	265m S	Garage	1987 - 1998	256
I	303m N	Garage	1992	210
I	304m N	Garage	1998	185
M	371m NE	Garage	1992 - 1998	283
M	372m NE	Garage	1966 - 1970	249



ID	Location	Land use	Dates present	Group ID
N	375m E	Garage	1987 - 1988	236
M	376m NE	Garage	1987	177
M	377m NE	Garage	1988	229
N	377m E	Garage	1966	175
N	377m E	Garage	1970	199
W	442m NE	Garage	1987 - 1988	230
W	444m NE	Garage	1966 - 1970	265
W	467m NE	Garage	1987 - 1988	260
W	470m NE	Garage	1966 - 1970	279
14	486m N	Garage	1965	151
AA	499m NE	Garage	1987	219

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

Records within 500m

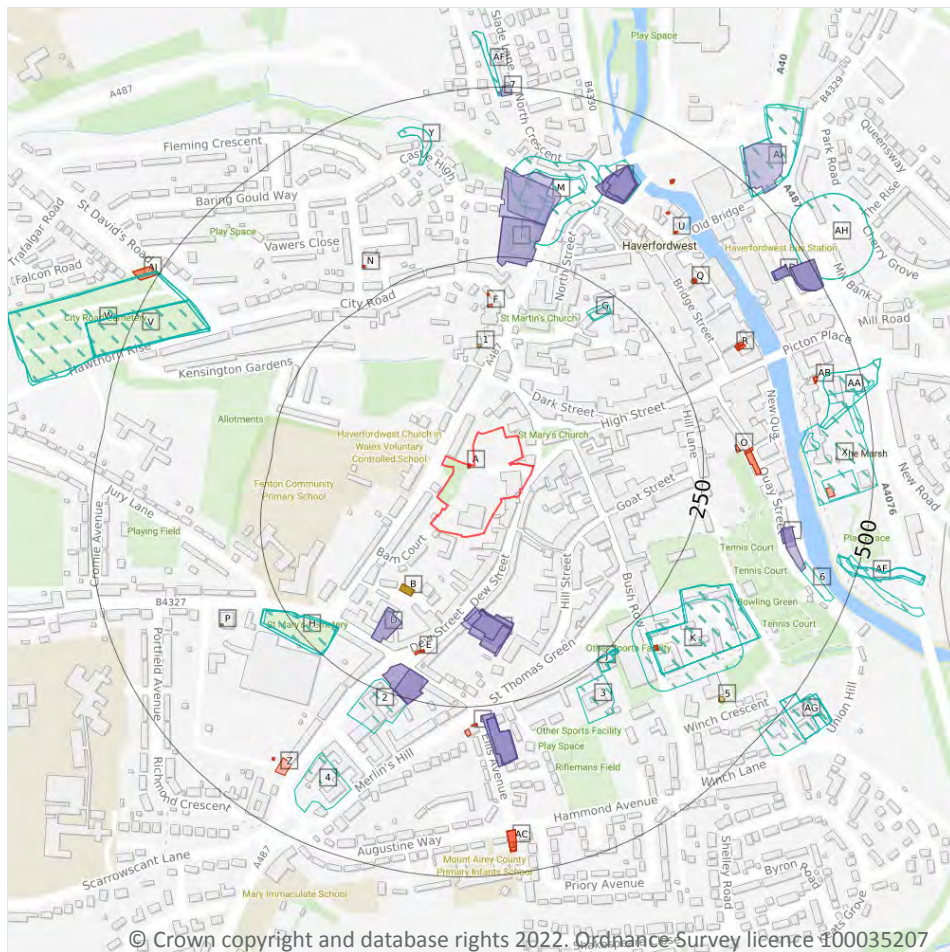
0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.



2 Past land use - un-grouped



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

2.1 Historical industrial land uses

Records within 500m

57

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 21**

ID	Location	Land Use	Date	Group ID
G	202m NE	Police Station	1963	15156
H	204m SW	Cemetery	1939	16256
G	204m NE	Police Station	1948	15156



ID	Location	Land Use	Date	Group ID
H	205m SW	Cemetery	1948	14925
H	206m SW	Cemetery	1974	16556
H	206m SW	Cemetery	1963	16416
2	233m S	Police Station	1974	12507
J	249m SE	Smithy	1939	16266
J	249m SE	Smithy	1948	16173
J	249m SE	Smithy	1906	14021
J	254m SE	Smithy	1963	17452
K	254m SE	Hospital	1948	15576
3	266m SE	Nursery	1968	13159
M	274m N	Unspecified Works	1948	14297
M	274m N	Unspecified Works	1906	16069
K	274m SE	Hospital	1983	15541
K	274m SE	Hospital	1968	15541
K	274m SE	Hospital	1992	15541
K	274m SE	Hospital	1963	15541
K	276m SE	Hospital	1939	17513
M	298m N	Unspecified Works	1963	16569
M	301m N	Unspecified Works	1939	14754
M	332m N	Unspecified Depot	1983	13735
4	369m SW	Fire Station	1974	12239
S	376m NE	Unspecified Works	1968	17390
V	393m NW	Burial Ground	1974	13522
V	393m NW	Cemetery	1963	17430
W	394m NW	Cemeteries	1948	13177
V	394m NW	Cemetery	1906	14099
X	395m E	Terminus	1992	13864
V	395m NW	Cemetery	1939	16149



ID	Location	Land Use	Date	Group ID
X	396m E	Unspecified Ground Workings	1906	12845
Y	401m N	Unspecified Ground Workings	1939	14247
Y	401m N	Unspecified Ground Workings	1939	14247
6	420m E	Tannery	1906	13780
X	424m E	Terminus	1983	15154
AA	425m E	Unspecified Commercial/Industrial	1948	13933
AA	425m E	Unspecified Commercial/Industrial	1906	17192
W	442m NW	Cemetery	1939	16149
AA	445m E	Railway Sidings	1906	11328
W	445m NW	Cemetery	1974	16855
W	445m NW	Cemetery	1963	16853
AE	466m E	Sand Pit	1963	11829
AE	467m E	Gravel Pit	1939	13439
AE	470m E	Refuse Heap	1948	13020
AE	481m E	Unspecified Ground Workings	1968	12844
AF	488m N	Unspecified Ground Workings	1939	16285
AF	488m N	Unspecified Ground Workings	1939	16285
AG	488m SE	Hospital	1983	15845
AG	488m SE	Hospital	1968	15845
AG	488m SE	Hospital	1992	15845
AH	489m NE	Smithy	1948	17538
AH	489m NE	Smithy	1906	15984
AI	492m NE	Unspecified Works	1963	12624
AG	493m SE	Unspecified Workhouse	1906	12533
AI	494m NE	Carriage and Wagon Works	1948	15476
AI	494m NE	Carriage and Wagon Works	1906	15051

This data is sourced from Ordnance Survey / Groundsure.



2.2 Historical tanks

Records within 500m

8

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 21**

ID	Location	Land Use	Date	Group ID
B	94m SW	Tanks	1970	2767
B	94m SW	Tanks	1966	2767
B	94m SW	Tanks	1990	2767
B	94m SW	Tanks	1992	2767
1	122m N	Unspecified Tank	1890	1719
P	339m SW	Unspecified Tank	1966	2897
P	339m SW	Unspecified Tank	1970	2897
5	418m SE	Unspecified Tank	1937	1718

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m

58

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 21**

ID	Location	Land Use	Date	Group ID
A	On site	Electricity Substation	1992	690
A	On site	Electricity Substation	1998	646
E	175m S	Electricity Transformer	1970	848
E	176m S	Electricity Transformer	1987	691
E	177m S	Electricity Substation	1990	716
E	177m S	Electricity Substation	1992	716



ID	Location	Land Use	Date	Group ID
F	178m N	Electricity Substation	1998	478
F	194m N	Electricity Substation	1992	479
L	275m S	Electricity Transformer	1987	539
L	275m S	Electricity Substation	1992	476
L	283m S	Electricity Substation	1998	480
N	294m NW	Electricity Substation	1990	701
N	294m NW	Electricity Substation	1992	701
N	294m NW	Electricity Substation	1995	701
K	296m SE	Electricity Transformer	1987	836
K	296m SE	Electricity Transformer	1988	836
K	296m SE	Electricity Transformer	1988	836
K	296m SE	Electricity Substation	1992	477
O	298m E	Electricity Substation	1998	500
K	299m SE	Electricity Transformer	1970	757
O	311m E	Electricity Transformer	1987	849
O	312m E	Electricity Transformer	1988	638
O	312m E	Electricity Substation	1992	501
O	313m E	Electricity Transformer	1970	792
Q	342m NE	Electricity Transformer	1970	543
Q	344m NE	Electricity Substation	1998	688
R	345m NE	Electricity Transformer	1987	622
R	345m NE	Electricity Transformer	1988	622
R	345m NE	Electricity Transformer	1988	622
Q	346m NE	Electricity Substation	1992	854
R	347m NE	Electricity Substation	1998	822
R	349m NE	Electricity Substation	1992	822
R	350m NE	Electricity Transformer	1970	818
U	377m NE	Electricity Transformer	1987	698



ID	Location	Land Use	Date	Group ID
U	377m NE	Electricity Transformer	1988	698
U	377m NE	Electricity Transformer	1988	698
U	379m NE	Electricity Transformer	1970	860
U	393m NE	Electricity Substation	1998	485
U	395m NE	Electricity Substation	1992	487
Z	405m SW	Electricity Substation	1995	481
Z	412m SW	Electricity Substation	1990	692
Z	412m SW	Electricity Substation	1992	692
AB	431m E	Electricity Substation	1998	798
X	431m E	Electricity Transformer	1970	546
AB	431m E	Electricity Transformer	1987	545
AB	431m E	Electricity Substation	1992	798
U	434m NE	Electricity Transformer	1987	617
U	434m NE	Electricity Transformer	1988	617
U	434m NE	Electricity Transformer	1988	617
AC	437m S	Electricity Substation	1997	607
AC	437m S	Electricity Substation	1995	607
AC	437m S	Electricity Substation	1987	771
AC	437m S	Electricity Substation	1987	771
AC	437m S	Electricity Substation	1992	771
U	437m NE	Electricity Transformer	1970	863
AC	454m S	Electricity Substation	1972	754
AJ	500m NW	Electricity Substation	1990	869
AJ	500m NW	Electricity Substation	1992	869

This data is sourced from Ordnance Survey / Groundsure.



2.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m

47

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 21**

ID	Location	Land Use	Date	Group ID
C	104m S	Garage	1970	303
C	104m S	Garage	1966	303
C	109m S	Garage	1992	207
C	109m S	Garage	1998	212
C	110m S	Garage	1987	295
C	110m S	Garage	1988	295
C	110m S	Garage	1988	295
D	135m SW	Garage	1970	268
D	135m SW	Garage	1966	268
E	203m S	Garage	1990	243
E	203m S	Garage	1992	243
E	207m S	Garage	1970	244
E	207m S	Garage	1966	244
I	237m N	Garage	1998	278
I	237m N	Garage	1992	278
L	263m S	Garage	1970	240



ID	Location	Land Use	Date	Group ID
L	263m S	Garage	1966	240
L	265m S	Garage	1987	256
L	265m S	Garage	1988	256
L	265m S	Garage	1992	256
L	268m S	Garage	1998	256
M	303m N	Garage	1992	210
M	304m N	Garage	1998	185
S	371m NE	Garage	1998	283
S	372m NE	Garage	1970	249
S	372m NE	Garage	1966	249
S	373m NE	Garage	1992	283
T	375m E	Garage	1987	236
T	375m E	Garage	1988	236
T	375m E	Garage	1988	236
S	376m NE	Garage	1987	177
S	377m NE	Garage	1988	229
S	377m NE	Garage	1988	229
T	377m E	Garage	1970	199
T	377m E	Garage	1966	175
AD	442m NE	Garage	1987	230
AD	442m NE	Garage	1988	230
AD	442m NE	Garage	1988	230
AD	444m NE	Garage	1970	265
AD	444m NE	Garage	1966	265
AD	467m NE	Garage	1987	260
AD	467m NE	Garage	1988	260
AD	467m NE	Garage	1988	260
AD	470m NE	Garage	1970	279



ID	Location	Land Use	Date	Group ID
AD	470m NE	Garage	1966	279
7	486m N	Garage	1965	151
AI	499m NE	Garage	1987	219

This data is sourced from Ordnance Survey / Groundsure.



3 Waste and landfill



- Site Outline
- Search buffers in metres (m)
- Waste exemptions

3.1 Active or recent landfill

Records within 500m

0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m

0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.



3.3 Historical landfill (LA/mapping records)

Records within 500m**0**

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m**0**

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m**0**

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m**0**

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m**8**

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

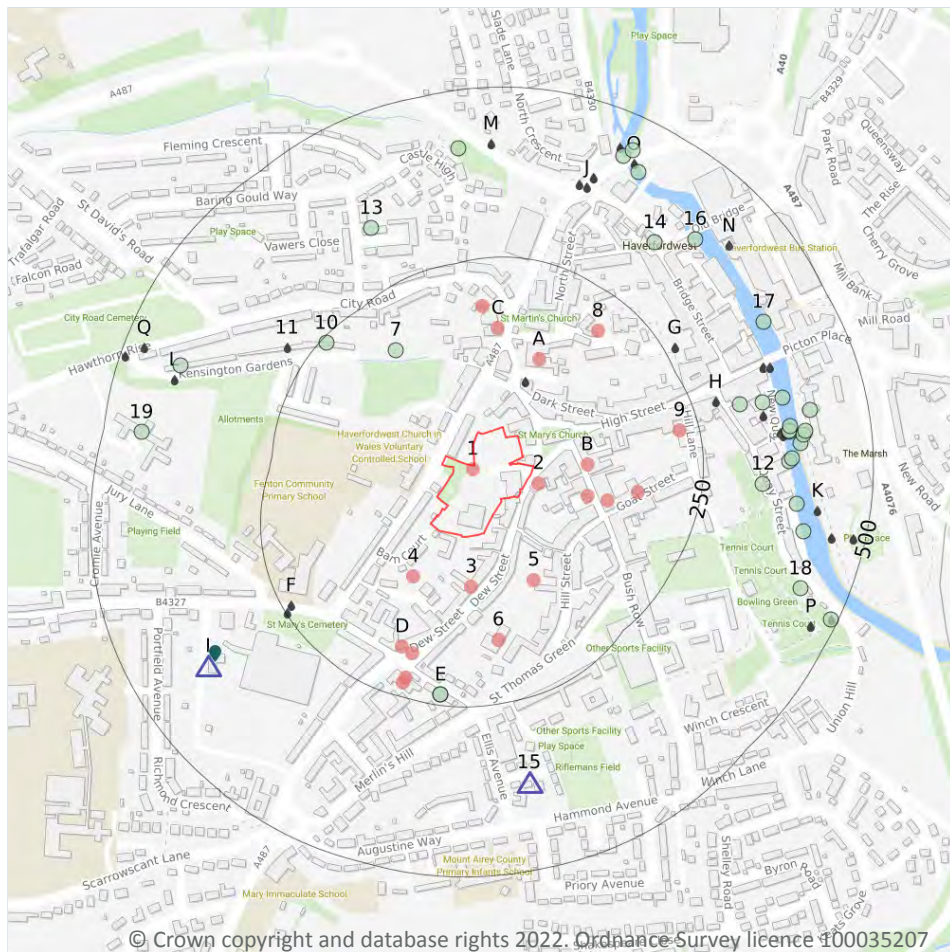
Features are displayed on the Waste and landfill map on **page 30**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	264m SE	N-Pharma Ltd, Nootts Pharmacy, 3 St. Thomas Green, Haverfordwest, Pembrokeshire, SA61 1QX	NRW-WME049305	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
A	264m SE	N-Pharma Ltd, Nootts Pharmacy, 3 St. Thomas Green, Haverfordwest, Pembrokeshire, SA611QX	NRW-WME021624	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
A	264m SE	St Thomas Surgery, St. Thomas Surgery, St. Thomas Green, Haverfordwest, Sir Benfro, SA611QX	NRW-WME035636	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
B	305m S	HCRG Medical Services Limited, Dyfed Powys Police, Haverfordwest Police Station, Merlins Hill, Haverfordwest, Sir Benfro, SA61 1PE	NRW-WME069257	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
B	305m S	Health Care Resourcing Group Ltd T/A CRG Recruitment Group, po box 31, Haverfordwest Police Custody, Haverfordwest, sa611pe	NRW-WME032137	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
1	345m SW	Tesco Stores Limited, Tesco Pharmacy, Fenton Trading Estate, Portfield, Haverfordwest, Dyfed, SA61 1BU	NRW-WME041967	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
2	373m W	Fenton Veterinary Practice Ltd., 21 Portfield, Haverfordwest, Haverfordwest, Pembrokeshire, SA61 1BN	NRW-WME048502	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
3	404m SE	Winch Lane GP Surgery, Winch Lane Surgery, Winch Lane, Hwlfordd, Sir Benfro, SA611RN	NRW-WME019590	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal

This data is sourced from the Environment Agency and Natural Resources Wales.



4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- △ Current or recent petrol stations
- Licensed pollutant release (Part A(2)/B)
- Licensed Discharges to controlled waters
- Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m

19

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 33**

ID	Location	Company	Address	Activity	Category
1	On site	Electricity Sub Station	Dyfed, SA61	Electrical Features	Infrastructure and Facilities
2	17m SE	Tree House Antiques	14, Dew Street, Haverfordwest, Dyfed, SA61 1NJ	Clearance and Salvage Dealers	Recycling Services
3	73m S	Beds Today	39, Dew Street, Haverfordwest, Dyfed, SA61 1ST	Beds and Bedding	Consumer Products



ID	Location	Company	Address	Activity	Category
4	77m SW	Tank	Dyfed, SA61	Tanks (Generic)	Industrial Features
B	79m E	The Bed Shop	14, Market Street, Haverfordwest, Dyfed, SA61 1NH	Beds and Bedding	Consumer Products
B	89m E	Electricity Sub Station	Dyfed, SA61	Electrical Features	Infrastructure and Facilities
5	100m SE	Electricity Sub Station	Dyfed, SA61	Electrical Features	Infrastructure and Facilities
A	113m NE	Telephone Exchange	Dyfed, SA61	Telecommunications Features	Infrastructure and Facilities
B	120m E	Gadget Geeks	32, Market Street, Haverfordwest, Dyfed, SA61 1NH	Electrical Equipment Repair and Servicing	Repair and Servicing
C	146m N	Haverfordwest Coin Machines	Cromwell House 1-3, City Road, Haverfordwest, Dyfed, SA61 2EH	Hobby, Sports and Pastime Products	Consumer Products
6	157m S	Runway Autos	Runway Autos 62-70, Dew Street, Haverfordwest, Dyfed, SA61 1NR	Vehicle Repair, Testing and Servicing	Repair and Servicing
B	159m E	P M R Ltd	12, Goat Street, Haverfordwest, Dyfed, SA61 1PX	Agricultural Machinery and Goods	Industrial Products
D	178m S	Sound & Vision Services	83, Dew Street, Haverfordwest, Dyfed, SA61 1SY	Electrical Equipment Repair and Servicing	Repair and Servicing
C	180m N	Electricity Sub Station	Dyfed, SA61	Electrical Features	Infrastructure and Facilities
D	184m S	Electricity Sub Station	Dyfed, SA61	Electrical Features	Infrastructure and Facilities
8	194m NE	Electricity Sub Station	Dyfed, SA61	Electrical Features	Infrastructure and Facilities
9	221m E	Electricity Sub Station	Dyfed, SA61	Electrical Features	Infrastructure and Facilities
D	222m S	Motec Vehicle Hire	Shipmans Lane, Haverfordwest, Dyfed, SA61 1NS	Vehicle Hire and Rental	Hire Services
D	229m S	Motec	Shipmans Lane, Haverfordwest, Dyfed, SA61 1NS	Vehicle Repair, Testing and Servicing	Repair and Servicing

This data is sourced from Ordnance Survey.



4.2 Current or recent petrol stations

Records within 500m**2**

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 33**

ID	Location	Company	Address	LPG	Status
15	372m S	OBSOLETE	Shipmans Lane, Haverfordwest, Pembrokeshire, SA61 1NS	Not Applicable	Obsolete
I	389m SW	TESCO EXTRA	Fenton Trading Estate, Portfield, Haverfordwest, Pembrokeshire, SA61 1BU	No	Open

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m**0**

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m**0**

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m**0**

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m**0**

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.



This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m

0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m

0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m

0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m

0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m

1

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 33**



ID	Location	Address	Details	
I	370m SW	Tesco Filling Station, Fenton Trading Estate, Portfield, Haverfordwest, Pembrokeshire, SA61 1BU	Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m

0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m

36

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 33**

ID	Location	Address	Details	
A	74m NE	SOC.NO3 BARN ST.H'WEST PO	Effluent Type: UNSPECIFIED Permit Number: BH0069901 Permit Version: 1 Receiving Water: ST. MARTINS STREAM	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 31/01/1967 Effective Date: 31/01/1967 Revocation Date: 30/11/2000
F	238m SW	Combined Sewer Overflow No. 6, Nr 1 Portfield, Haverfordwest, SA61 1TF	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: BP0295801 Permit Version: 2 Receiving Water: Western Cleddau	Status: Effective Issue date: 11/10/2019 Effective Date: 11/10/2019 Revocation Date: -
F	248m SW	SOC.NO6 PORTFIELD DRAIN DRAI	Effluent Type: UNSPECIFIED Permit Number: BH0070401 Permit Version: 1 Receiving Water: CULVERTED MARINERS STREAM	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 31/01/1967 Effective Date: 31/01/1967 Revocation Date: 30/11/2000



ID	Location	Address	Details	
G	264m NE	S.O.C. NO.4 CASTLE LAKE DRAINAGE	Effluent Type: UNSPECIFIED Permit Number: BH0070201 Permit Version: 2 Receiving Water: ST.MARTINS STREAM	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 19/10/1989 Effective Date: 19/10/1989 Revocation Date: 30/11/2000
G	264m NE	S.O.C. NO.4 CASTLE LAKE DRAINAGE	Effluent Type: UNSPECIFIED Permit Number: BH0070201 Permit Version: 1 Receiving Water: ST.MARTINS STREAM	Status: REVOKED - UNSPECIFIED Issue date: 31/01/1967 Effective Date: 31/01/1967 Revocation Date: 18/10/1989
11	283m NW	HAVERFORDWEST CSO SCHEME, VARIOUS LOCATIONS, HAVERFORDWEST, PEMBROKESHIRE, SA61 2RS	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: BP027670101 Permit Version: 1 Receiving Water: ST MARTINS STRM & WEST CLEDDAU	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 11/08/1999 Effective Date: 11/08/1999 Revocation Date: 20/06/2008
H	283m E	S.O.C. NO.5 HIGH ST. DRAINAGE	Effluent Type: UNSPECIFIED Permit Number: BH0070301 Permit Version: 1 Receiving Water: ST. MARTINS STREAM	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 31/01/1967 Effective Date: 31/01/1967 Revocation Date: 30/11/2000
H	345m E	HAVERFORDWEST CSO SCHEME, VARIOUS LOCATIONS, HAVERFORDWEST, PEMBROKESHIRE, SA61 2RS	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: BP027670101 Permit Version: 1 Receiving Water: ST MARTINS STRM & WEST CLEDDAU	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 11/08/1999 Effective Date: 11/08/1999 Revocation Date: 20/06/2008
H	345m E	HAVERFORDWEST CSO SCHEME, VARIOUS LOCATIONS, HAVERFORDWEST, PEMBROKESHIRE, SA61 2RS	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: BP027670101 Permit Version: 1 Receiving Water: ST MARTINS STRM & WEST CLEDDAU	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 11/08/1999 Effective Date: 11/08/1999 Revocation Date: 20/06/2008
H	365m E	New Quay CSO New Quay Haverfordwest, Rear of 12 Quay St, NEW QUAY, Haverfordwest, SA61 1BG	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BP0282701 Permit Version: 2 Receiving Water: Tidal Waters of the Western Cleddau	Status: Effective Issue date: 21/10/2019 Effective Date: 21/10/2019 Revocation Date: -



ID	Location	Address	Details	
H	367m NE	NEWBRIDGE CSO HAVERFORDWEST, NEWBRIDGE CSO, NEWBRIDGE, HAVERFORDWEST, PEMBROKESHIRE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BP0290201 Permit Version: 1 Receiving Water: WESTERN CLEDDAU	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY Issue date: 12/04/2001 Effective Date: 12/04/2001 Revocation Date: 11/12/2001
H	367m NE	NEWBRIDGE CSO HAVERFORDWEST, NEWBRIDGE CSO, NEWBRIDGE, HAVERFORDWEST, PEMBROKESHIRE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BP0290201 Permit Version: 2 Receiving Water: WESTERN CLEDDAU	Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 11/12/2001 Effective Date: 12/12/2001 Revocation Date: 31/03/2002
H	370m E	NEW QUAY CSO NEW QUAY HAVERFORDWEST, NEW QUAY CSO, NEW QUAY, HAVERFORDWEST	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BP0282701 Permit Version: 1 Receiving Water: TIDAL WTRS OF WESTERN CLEDDAU	Status: Effective Issue date: 30/03/2000 Effective Date: 30/03/2000 Revocation Date: -
J	372m N	NORTHGATE/FRED REES CSO HVRFORDWEST, Nr Fred Rees Garages, Haverfordwest, SA61 2HD	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BH0070601 Permit Version: 4 Receiving Water: Western Cleddau	Status: Effective Issue date: 17/12/2019 Effective Date: 17/12/2019 Revocation Date: -
J	373m N	NORTHGATE/FRED REES CSO HVRFORDWEST, NORTHGATE/FRED REES CSO, TRAFFIC ISLAND, NORTHGATE, Haverfordwest	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BH0070601 Permit Version: 3 Receiving Water: WESTERN CLEDDAU	Status: Effective Issue date: 30/03/2000 Effective Date: 01/04/2000 Revocation Date: -
H	376m NE	CASTLE BANK HAVERFORDWEST, HAVERFORDWEST, SA61 2JX	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BP0208901 Permit Version: 2 Receiving Water: WESTERN CLEDDAU	Status: Surrendered Issue date: 08/09/2010 Effective Date: 08/09/2010 Revocation Date: -



ID	Location	Address	Details	
H	376m NE	CASTLE SQUARE HAVERFORDWEST, HAVERFORDWEST, SA61 2JX	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BP0209001 Permit Version: 2 Receiving Water: WESTERN CLEDDAU	Status: Surrendered Issue date: 08/09/2010 Effective Date: 08/09/2010 Revocation Date: -
H	376m NE	FENTON HAVERFORDWEST, FENTON H'WEST. SWO, H'WEST. SWO	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BP0209101 Permit Version: 2 Receiving Water: WESTERN CLEDDAU	Status: Surrendered Issue date: 08/09/2010 Effective Date: 08/09/2010 Revocation Date: -
J	389m N	NORTH GATE	Effluent Type: UNSPECIFIED Permit Number: BH0070601 Permit Version: 1 Receiving Water: SLADE BROOK	Status: REVOKED - UNSPECIFIED Issue date: 20/09/1991 Effective Date: 20/09/1991 Revocation Date: 15/10/1991
J	389m N	NORTH GATE	Effluent Type: UNSPECIFIED Permit Number: BH0070601 Permit Version: 2 Receiving Water: SLADE BROOK	Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 88) Issue date: 16/10/1991 Effective Date: 16/10/1991 Revocation Date: 31/03/2000
L	413m W	COMBINED SEWER OVERFLOW NO 10, STM MARTINS BROOK, HAVERFORDWEST, PEMBROKESHIRE	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BP0295901 Permit Version: 1 Receiving Water: ST MARTINS BROOK	Status: Effective Issue date: 25/03/2002 Effective Date: 25/03/2002 Revocation Date: -
M	416m N	H/WEST TOWN DRAINAGE SLADE BROOK ST, H/WEST TOWN DRAINAGE SLADE BROOK, SLADE BROOK STORM & CRUDE EFFLUE, STORM & CRUDE EFFLUENT ., ., .	Effluent Type: UNSPECIFIED Permit Number: BH0070701 Permit Version: 1 Receiving Water: SLADE BROOK	Status: REVOKED (WRA 91, S88 & SCHD 10 AS AMENDED BY ENV Issue date: 31/01/1967 Effective Date: 31/01/1967 Revocation Date: 31/03/2006
N	418m NE	SOC.NO2 PRENDEGAST AND PROSPEC	Effluent Type: UNSPECIFIED Permit Number: BH0070702 Permit Version: 1 Receiving Water: WESTERN CLEDDAU	Status: REVOKED - UNSPECIFIED Issue date: 31/01/1967 Effective Date: 31/01/1967 Revocation Date: 18/10/1989
N	418m NE	SOC.NO2 PRENDEGAST AND PROSPEC	Effluent Type: UNSPECIFIED Permit Number: BH0070702 Permit Version: 2 Receiving Water: WESTERN CLEDDAU	Status: REVOKED (WRA 91, S88 & SCHD 10 AS AMENDED BY ENV Issue date: 19/10/1989 Effective Date: 19/10/1989 Revocation Date: 22/10/2001



ID	Location	Address	Details	
K	422m E	PICTON PS	Effluent Type: UNSPECIFIED Permit Number: BP0111501 Permit Version: 1 Receiving Water: R. WESTERN CLEDDAU	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 13/12/1991 Effective Date: 13/12/1991 Revocation Date: 15/08/2002
O	431m NE	NORTH GATE H'WEST SWO, H'WEST SWO	Effluent Type: UNSPECIFIED Permit Number: BP0208801 Permit Version: 1 Receiving Water: WESTERN CLEDDAU	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY Issue date: 19/10/1989 Effective Date: 19/10/1989 Revocation Date: 20/09/1991
O	445m NE	COMBINED SEWER OVERFLOW NO 6, FENTON SCHOOL, HAVERFORDWEST, PEMBROKESHIRE	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: BP0295801 Permit Version: 1 Receiving Water: WESTERN CLEDDAU	Status: Effective Issue date: 25/03/2002 Effective Date: 25/03/2002 Revocation Date: -
K	450m E	SOC.NO8 & PS.OVERFLOW DRA	Effluent Type: UNSPECIFIED Permit Number: BH0070101 Permit Version: 1 Receiving Water: WESTERN CLEDDAU	Status: REVOKED - UNSPECIFIED Issue date: 31/01/1967 Effective Date: 31/01/1967 Revocation Date: 18/10/1989
K	450m E	SOC.NO8 & PS.OVERFLOW DRA	Effluent Type: UNSPECIFIED Permit Number: BH0070101 Permit Version: 2 Receiving Water: WESTERN CLEDDAU	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 19/10/1989 Effective Date: 19/10/1989 Revocation Date: 30/11/2000
P	468m SE	PICTON PS & PICTON FIELDS CSO, FREEMENS WAY, HAVERFORDWEST	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: BP0282301 Permit Version: 1 Receiving Water: WESTERN CLEDDAU (TIDAL WTRS)	Status: Effective Issue date: 30/03/2000 Effective Date: 30/03/2000 Revocation Date: -
P	468m SE	PICTON PS & PICTON FIELDS CSO, FREEMENS WAY, HAVERFORDWEST	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: BP0282301 Permit Version: 1 Receiving Water: WESTERN CLEDDAU (TIDAL WTRS)	Status: Effective Issue date: 30/03/2000 Effective Date: 30/03/2000 Revocation Date: -



ID	Location	Address	Details	
Q	470m W	SSO.AT ST.MARTINS CEM CEMAT	Effluent Type: UNSPECIFIED Permit Number: BH0070501 Permit Version: 1 Receiving Water: ST. MARTINS STREAM	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 31/01/1967 Effective Date: 31/01/1967 Revocation Date: 30/11/2000
K	482m E	Picton PS & Picton Fields CSO, Community Centre, Freemans Way, Haverfordwest, SA61 1UG	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: BP0282301 Permit Version: 2 Receiving Water: Tidal Waters of the Western Cleddau	Status: Effective Issue date: 25/09/2020 Effective Date: 25/09/2020 Revocation Date: -
K	482m E	Picton PS & Picton Fields CSO, Community Centre, Freemans Way, Haverfordwest, SA61 1UG	Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY Permit Number: BP0282301 Permit Version: 2 Receiving Water: Tidal Waters of the Western Cleddau	Status: Effective Issue date: 25/09/2020 Effective Date: 25/09/2020 Revocation Date: -
P	490m SE	HAVERFORDWEST CSO SCHEME, VARIOUS LOCATIONS, HAVERFORDWEST, PEMBROKESHIRE, SA61 2RS	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: BP027670101 Permit Version: 1 Receiving Water: ST MARTINS STRM & WEST CLEDDAU	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 11/08/1999 Effective Date: 11/08/1999 Revocation Date: 20/06/2008
Q	492m W	Haverfordwest Hawthorn Rise CSO, Hawthorn Rise, Haverfordwest, SA61 1BY	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: BP0295901 Permit Version: 2 Receiving Water: ST MARTINS BROOK	Status: Effective Issue date: 18/09/2019 Effective Date: 18/09/2019 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m

0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.



4.15 Pollutant release to public sewer

Records within 500m

0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m

31

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 33**

ID	Location	Details	
7	171m NW	Incident Date: 09/07/2014 Incident Identification: 1254161 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: - Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
E	234m S	Incident Date: 04/07/2001 Incident Identification: 13484 Pollutant: Sewage Materials Pollutant Description: Storm Sewage	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

ID	Location	Details	
E	234m S	Incident Date: 04/07/2001 Incident Identification: 13484 Pollutant: Sewage Materials Pollutant Description: Storm Sewage	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
10	242m NW	Incident Date: 03/06/2014 Incident Identification: 1241638 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: - Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
H	316m E	Incident Date: 29/09/2014 Incident Identification: 1282096 Pollutant: Inert Materials and Wastes Pollutant Description: Mineral Materials and Wastes	Water Impact: - Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
12	338m E	Incident Date: 19/06/2001 Incident Identification: 10247 Pollutant: Sewage Materials Pollutant Description: Grey Water	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
13	338m NW	Incident Date: 17/09/2003 Incident Identification: 190536 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
14	348m NE	Incident Date: 15/01/2003 Incident Identification: 131215 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other Animal Matter	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
H	350m E	Incident Date: 29/10/2002 Incident Identification: 117334 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
H	376m E	Incident Date: 15/06/2001 Incident Identification: 9523 Pollutant: Sewage Materials Pollutant Description: Storm Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
H	379m E	Incident Date: 30/07/2014 Incident Identification: 1262592 Pollutant: - Pollutant Description: -	Water Impact: - Land Impact: - Air Impact: -
H	379m E	Incident Date: 11/02/2017 Incident Identification: 1700715 Pollutant: - Pollutant Description: -	Water Impact: Category 4 (No Impact) Land Impact: Other Air Impact: Other



ID	Location	Details	
H	379m E	Incident Date: 22/10/2003 Incident Identification: 197652 Pollutant: Oils and Fuel Pollutant Description: Petrol	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
H	379m E	Incident Date: 21/10/2003 Incident Identification: 197459 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
H	382m E	Incident Date: 15/07/2002 Incident Identification: 91645 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
16	389m NE	Incident Date: 03/09/2002 Incident Identification: 104971 Pollutant: Specific Waste Materials Pollutant Description: Metal Wastes	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
K	391m E	Incident Date: 06/09/2002 Incident Identification: 105918 Pollutant: Sewage Materials Pollutant Description: Storm Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
H	394m E	Incident Date: 18/03/2002 Incident Identification: 64650 Pollutant: Oils and Fuel Pollutant Description: Diesel	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
17	398m NE	Incident Date: 25/09/2003 Incident Identification: 192512 Pollutant: Oils and Fuel Pollutant Description: Unidentified Oil	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
H	400m E	Incident Date: 11/03/2015 Incident Identification: 1319897 Pollutant: Inert Materials and Wastes Pollutant Description: Soils and Clay	Water Impact: - Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
H	402m E	Incident Date: 11/06/2018 Incident Identification: 1803255 Pollutant: Inert Materials and Waste Pollutant Description: Soils and Clay	Water Impact: Category 2 (Significant) Land Impact: No Details Air Impact: No Details
K	408m E	Incident Date: 06/09/2002 Incident Identification: 106037 Pollutant: Sewage Materials Pollutant Description: Storm Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)



ID	Location	Details	
L	410m W	Incident Date: 24/04/2002 Incident Identification: 74435 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Vegetable Cuttings and Deposits	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
H	414m E	Incident Date: 16/05/2003 Incident Identification: 158796 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
M	415m N	Incident Date: 07/06/2001 Incident Identification: 7963 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
O	424m NE	Incident Date: 04/04/2003 Incident Identification: 148625 Pollutant: Specific Waste Materials Pollutant Description: Other Specific Waste Material	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
18	430m SE	Incident Date: 07/02/2003 Incident Identification: 138769 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
O	436m NE	Incident Date: 23/10/2003 Incident Identification: 197751 Pollutant: Contaminated Water Pollutant Description: Suspended Solids	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
19	444m W	Incident Date: 04/10/2013 Incident Identification: 1164839 Pollutant: Inert Materials and Wastes Pollutant Description: Other Inert Material or Waste	Water Impact: - Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
O	449m NE	Incident Date: 08/08/2002 Incident Identification: 98633 Pollutant: Specific Waste Materials Pollutant Description: Containers	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
P	490m SE	Incident Date: 31/12/2002 Incident Identification: 128449 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.



4.19 Pollution inventory substances

Records within 500m**0**

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m**0**

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

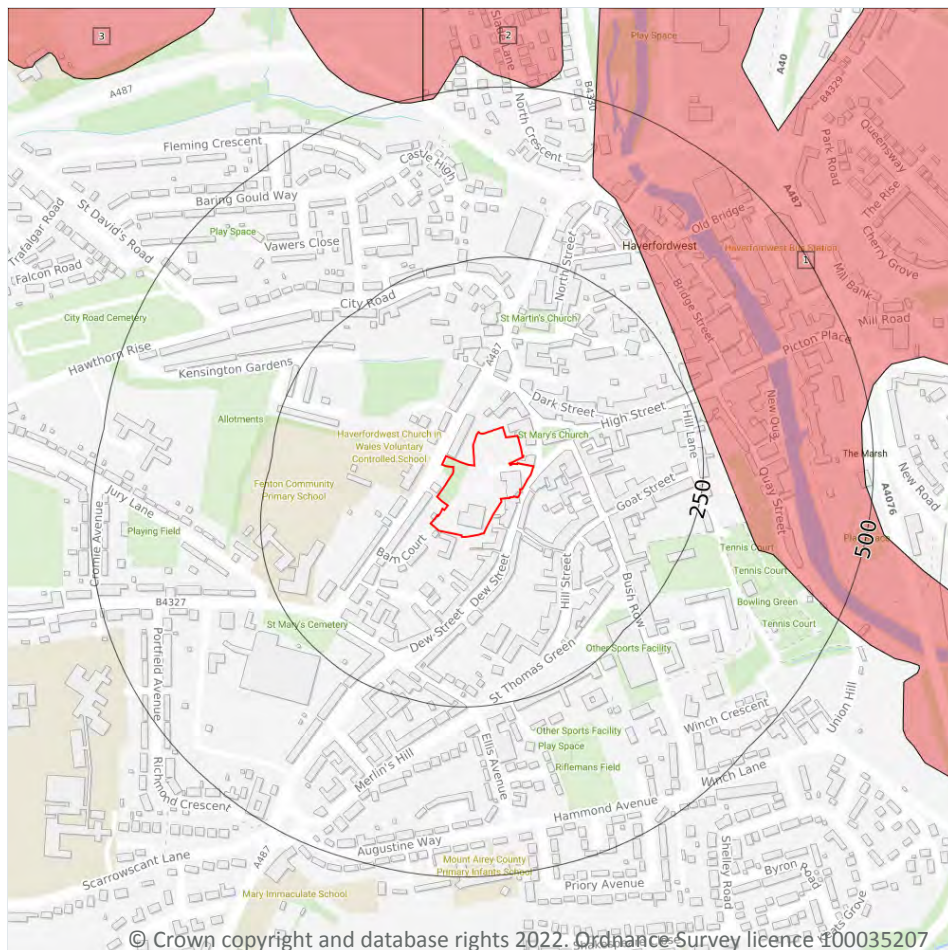
4.21 Pollution inventory radioactive waste

Records within 500m**0**

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



- Site Outline**
- Search buffers in metres (m)**
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive
 - Unknown

5.1 Superficial aquifer

Records within 500m

3

Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 48**

ID	Location	Designation	Description
1	261m E	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	493m N	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

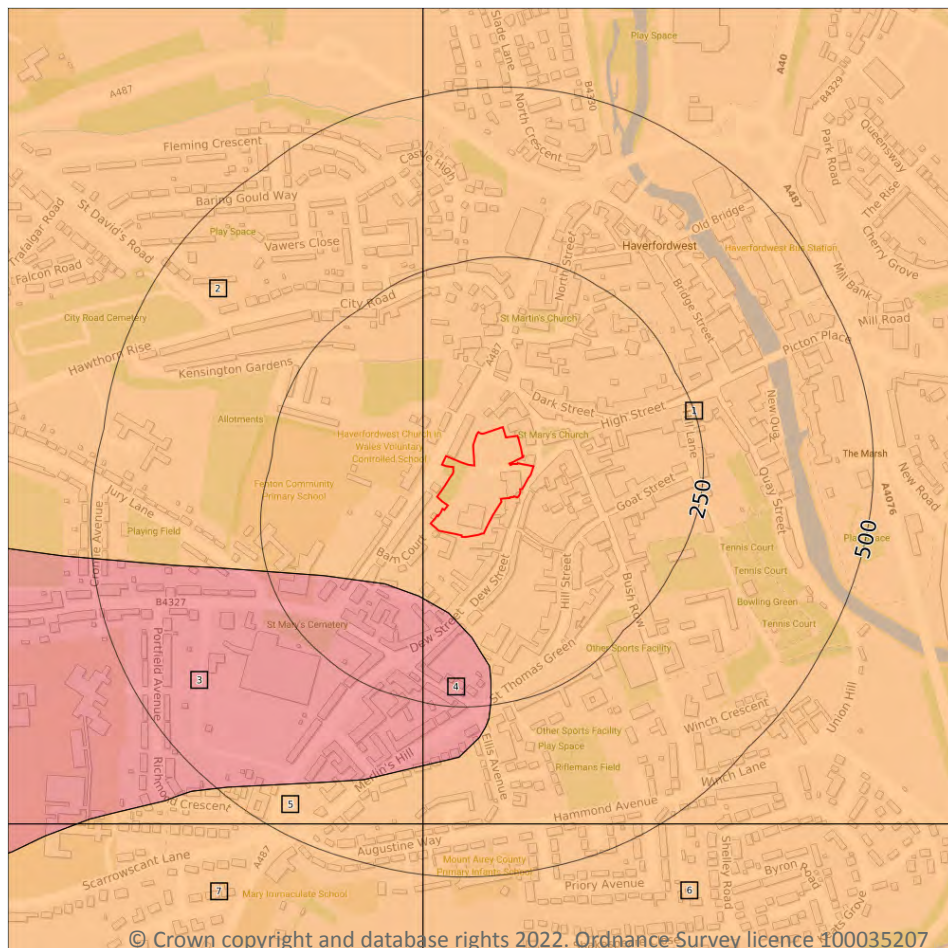


ID	Location	Designation	Description
3	494m N	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Bedrock aquifer



- Site Outline
- Search buffers in metres (m)
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive

5.2 Bedrock aquifer

Records within 500m

7

Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 50**

ID	Location	Designation	Description
1	On site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers
2	11m W	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers

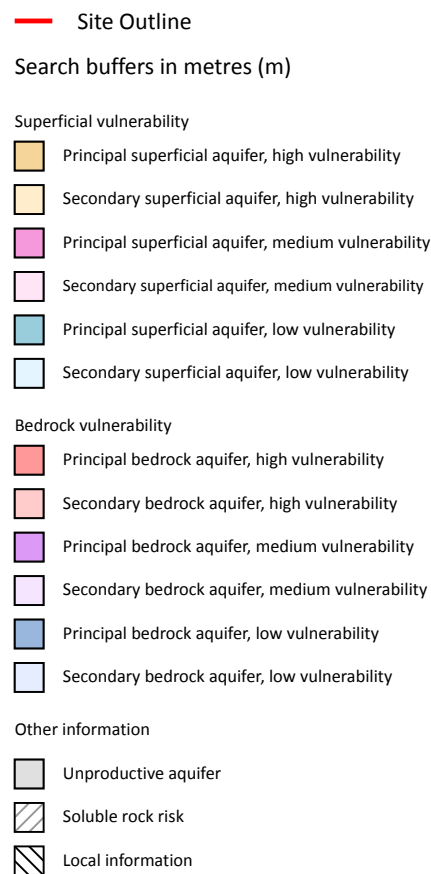
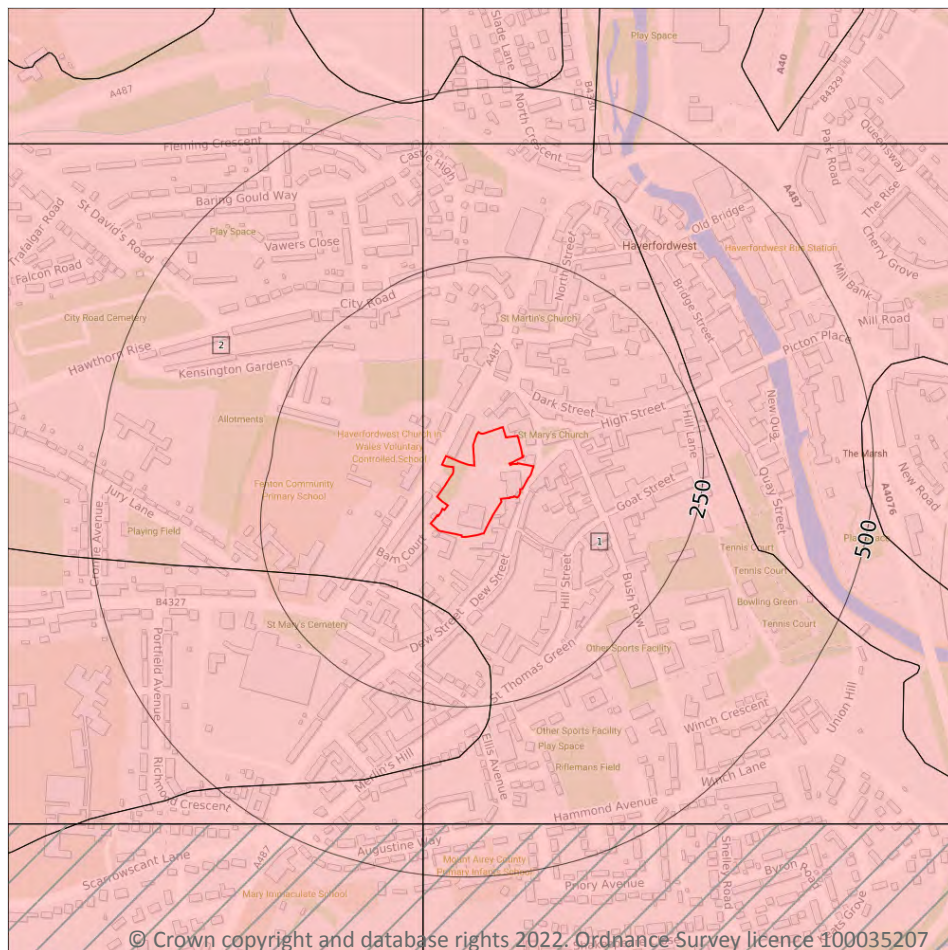


ID	Location	Designation	Description
3	100m S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	102m S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	342m S	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers
6	422m S	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers
7	426m S	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 52**



ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer	Leaching class: High Infiltration value: 40-70% Dilution value: >550mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: High Aquifer type: Secondary Flow mechanism: Well connected fractures
2	11m W	Summary Classification: Secondary bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer	Leaching class: High Infiltration value: 40-70% Dilution value: >550mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: High Aquifer type: Secondary Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site

0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

Records on site

0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.



The map displays the Haverfordwest area, with a red outline highlighting a specific site. Key features include:

- Streets:** St David's Road, City Road, North Street, Bridge Street, High Street, Goal Street, Hill Street, Dew Street, Barn Court, St Thomas Green, Elm Avenue, Augustine Way, Scarrow Lane, Portfield Avenue, Richmond Crescent, and Union Hill.
- Landmarks:** Haverfordwest Church, St Martin's Church, St Mary's Church, St Mary's Cemetery, Penson Community Primary School, and Haverfordwest Bus Station.
- Green Spaces:** Allotments, Playing Field, and various parks.
- Water Features:** River Miln.
- Other Features:** A red outline highlights a specific area in the center, likely the site of the proposed development. The map also shows the River Miln and surrounding green spaces.

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- ### Site Outline
- Search buffers in metres (m)
-  Source Protection Zone 1
Inner catchment
 -  Source Protection Zone 2
Outer catchment
 -  Source Protection Zone 3
Total catchment
 -  Source Protection Zone 4
Zone of Special Interest
 -  Source Protection Zone 1c
Inner catchment - confined aquifer
 -  Source Protection Zone 2c
Outer catchment - confined aquifer
 -  Source Protection Zone 3c
Total catchment - confined aquifer
 -  Drinking water abstraction licences
 -  Drinking water abstraction licences
Polygon features
 -  Drinking water abstraction licences
Linear features
 -  Groundwater abstraction licence (point)
 -  Groundwater abstraction licence (area)
 -  Groundwater abstraction licence (linear)
 -  Surface Water Abstractions (point)
 -  Surface Water Abstractions (area)
 -  Surface Water Abstractions (linear)

54

ID	Location	Details	
-	1099m SE	Status: Historical Licence No: 22/61/3/0035 Details: Water Bottling Direct Source: EAW Groundwater Point: SPRING KNOWN AS HIGGONS WELL FOR ALDERWICKS SOFT DRINK Data Type: Point Name: O'Dare Easting: 196160 Northing: 215060	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 01/01/2003 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	5
-----------------------------	----------

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 54**

ID	Location	Details	
-	853m S	Status: Historical Licence No: 22/61/3/0039 Details: Process water Direct Source: EAW Surface Water Point: MERLINS BROOK Data Type: Point Name: Haverfordwest Cheese Ltd Easting: 194920 Northing: 214580	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 101 Version Start Date: 01/04/2002 Version End Date: -
-	1304m N	Status: Historical Licence No: 22/61/3/0001 Details: Potable Water Supply - Direct Direct Source: EAW Surface Water Point: WESTERN CLEDDAU AT CROWHILL Data Type: Point Name: Dwr Cymru Cyfyngedig Easting: 195330 Northing: 216870	Annual Volume (m ³): 7,728,200 Max Daily Volume (m ³): 27276 Original Application No: - Original Start Date: 31/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/01/1966 Version End Date: -



ID	Location	Details	
-	1329m N	Status: Active Licence No: 22/61/3/0001 Details: Potable Water Supply - Direct - Medium Direct Source: Western Cleddau Point: - Data Type: Point Name: - Easting: 195300 Northing: 216900	Annual Volume (m ³): 7,728,200 Max Daily Volume (m ³): - Original Application No: - Original Start Date: Dec 22 2015 12:00AM Expiry Date: - Issue No: - Version Start Date: - Version End Date: -
-	1485m SW	Status: Historical Licence No: 22/61/3/0031 Details: Spray Irrigation - Direct Direct Source: EAW Surface Water Point: MERLINS BROOK AT PALMERSTON FARM, DALE ROAD Data Type: Point Name: R K Lucas & Son Easting: 194150 Northing: 214230	Annual Volume (m ³): 2400 Max Daily Volume (m ³): 255 Original Application No: - Original Start Date: 10/11/1977 Expiry Date: - Issue No: 100 Version Start Date: 27/03/2008 Version End Date: -
-	1617m E	Status: Active Licence No: 22/61/3/0048 Details: Unknown (Impounding) - Direct Source: - Point: - Data Type: Point Name: - Easting: 196780 Northing: 215550	Annual Volume (m ³): 0 Max Daily Volume (m ³): - Original Application No: - Original Start Date: May 20 1992 12:00AM Expiry Date: - Issue No: - Version Start Date: - Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m

3

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 54**



ID	Location	Details	
-	1099m SE	Status: Historical Licence No: 22/61/3/0035 Details: Water Bottling Direct Source: EAW Groundwater Point: SPRING KNOWN AS HIGGONS WELL FOR ALDERWICKS SOFT DRINK Data Type: Point Name: O'Dare Easting: 196160 Northing: 215060	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 01/01/2003 Version End Date: -
-	1304m N	Status: Historical Licence No: 22/61/3/0001 Details: Potable Water Supply - Direct Direct Source: EAW Surface Water Point: WESTERN CLEDDAU AT CROWHILL Data Type: Point Name: Dwr Cymru Cyfyngedig Easting: 195330 Northing: 216870	Annual Volume (m ³): 7,728,200 Max Daily Volume (m ³): 27276 Original Application No: - Original Start Date: 31/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/01/1966 Version End Date: -
-	1329m N	Status: Active Licence No: 22/61/3/0001 Details: Potable Water Supply - Direct - Medium Direct Source: Western Cleddau Point: - Data Type: Point Name: - Easting: 195300 Northing: 216900	Annual Volume (m ³): 7,728,200 Max Daily Volume (m ³): - Original Application No: - Original Start Date: Dec 22 2015 12:00AM Expiry Date: - Issue No: - Version Start Date: - Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0
----------------------------	----------

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

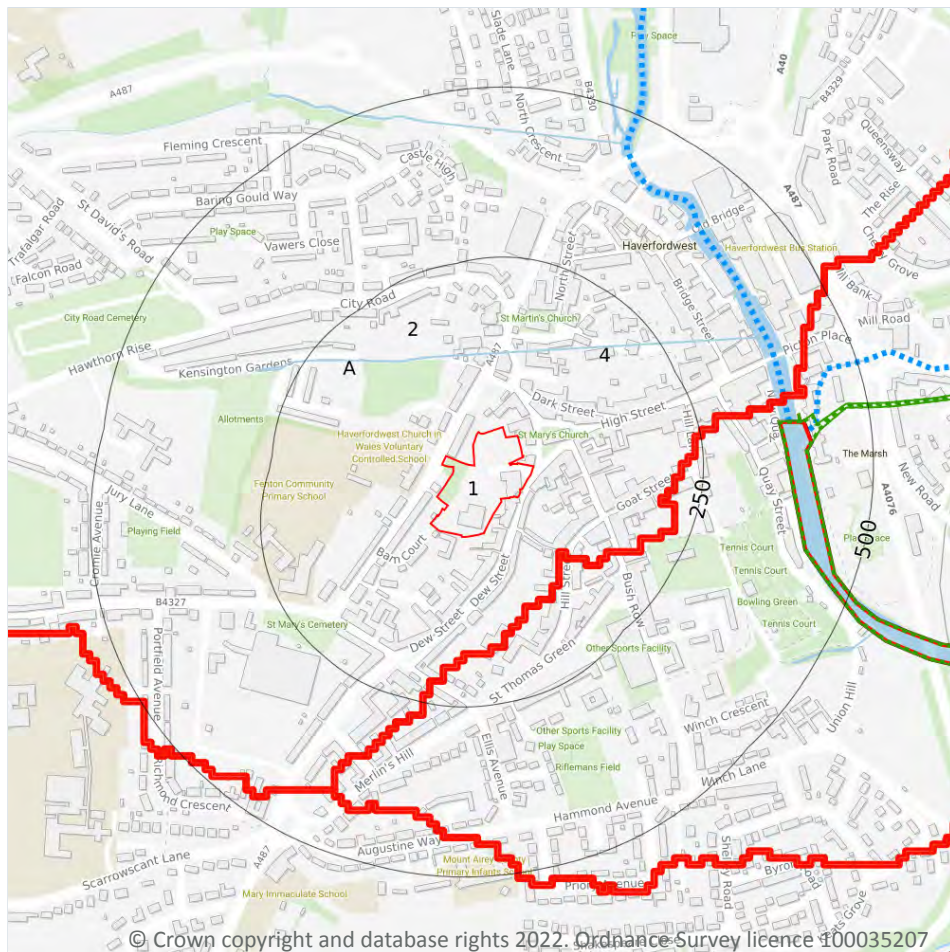
Records within 500m	0
----------------------------	----------

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.



6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- ⋯ WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m

2

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 58**

ID	Location	Type of water feature	Ground level	Permanence	Name
4	109m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
A	133m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	2
----------------------------	----------

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 58**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1
------------------------	----------

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 58**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
2	On site	River WB catchment	W Cleddau - Anghof conf to Cartlett Brook conf	GB110061031340	Western Cleddau	Cleddau and Pembrokeshire Coastal Rivers

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1
---------------------------	----------

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site.



Features are displayed on the Hydrology map on **page 58**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
7	382m E	River	W Cleddau - Anghof conf to Cartlett Brook conf	GB110061031340	Moderate	Good	Moderate	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1
------------------------	----------

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place.

Features are displayed on the Hydrology map on **page 58**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	On site	Cleddau and Pembrokeshire	GB41002G200400	Poor	Poor	Good	2017

This data is sourced from the Environment Agency and Natural Resources Wales.



7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m

0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m

0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m

0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m

0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m

0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.



River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m

0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m

0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.



8 Surface water flooding



— Site Outline

Search buffers in metres (m)

1 in 1000 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site

1 in 30 year, 0.1m - 0.3m

Highest risk within 50m

1 in 30 year, 0.3m - 1.0m

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 64**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

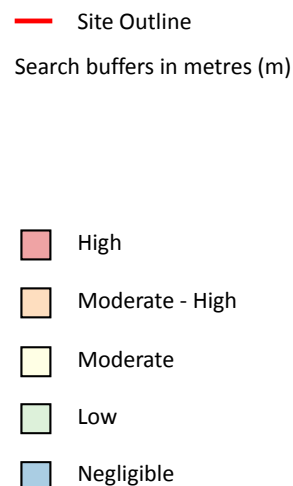
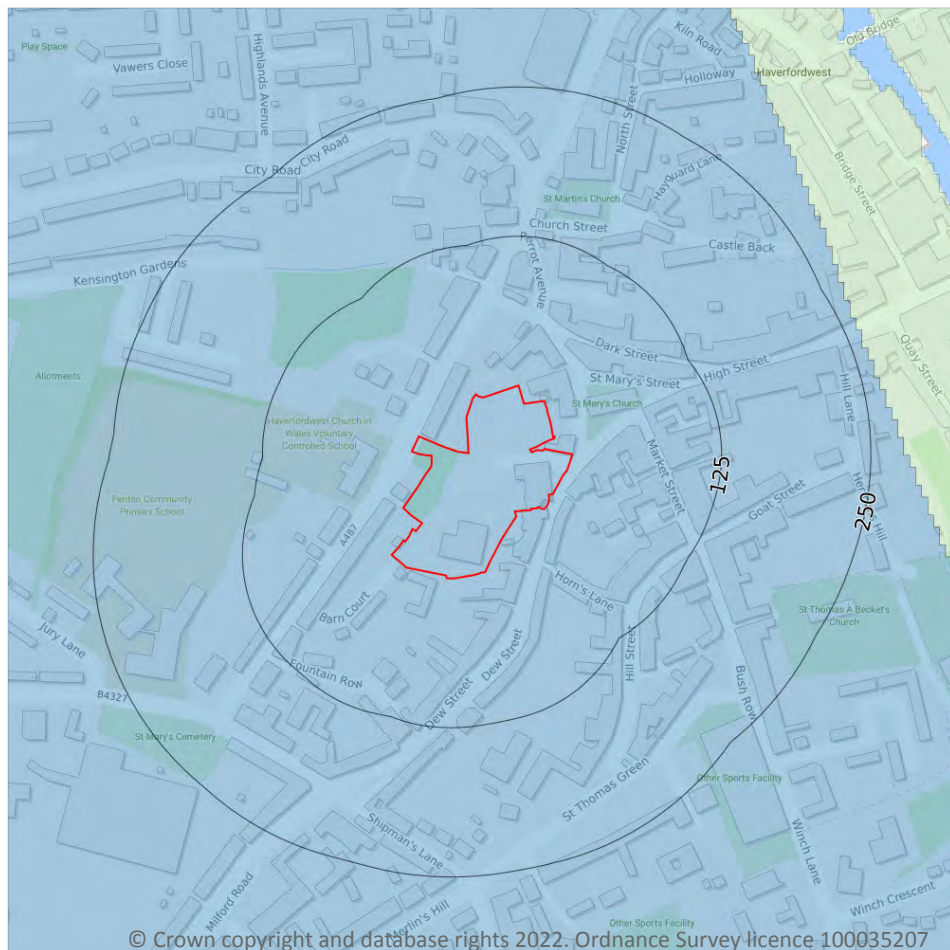
The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.3m and 1.0m
1 in 250 year	Between 0.3m and 1.0m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Between 0.1m and 0.3m

This data is sourced from Ambiantal Risk Analytics.



9 Groundwater flooding



9.1 Groundwater flooding

Highest risk on site

Negligible

Highest risk within 50m

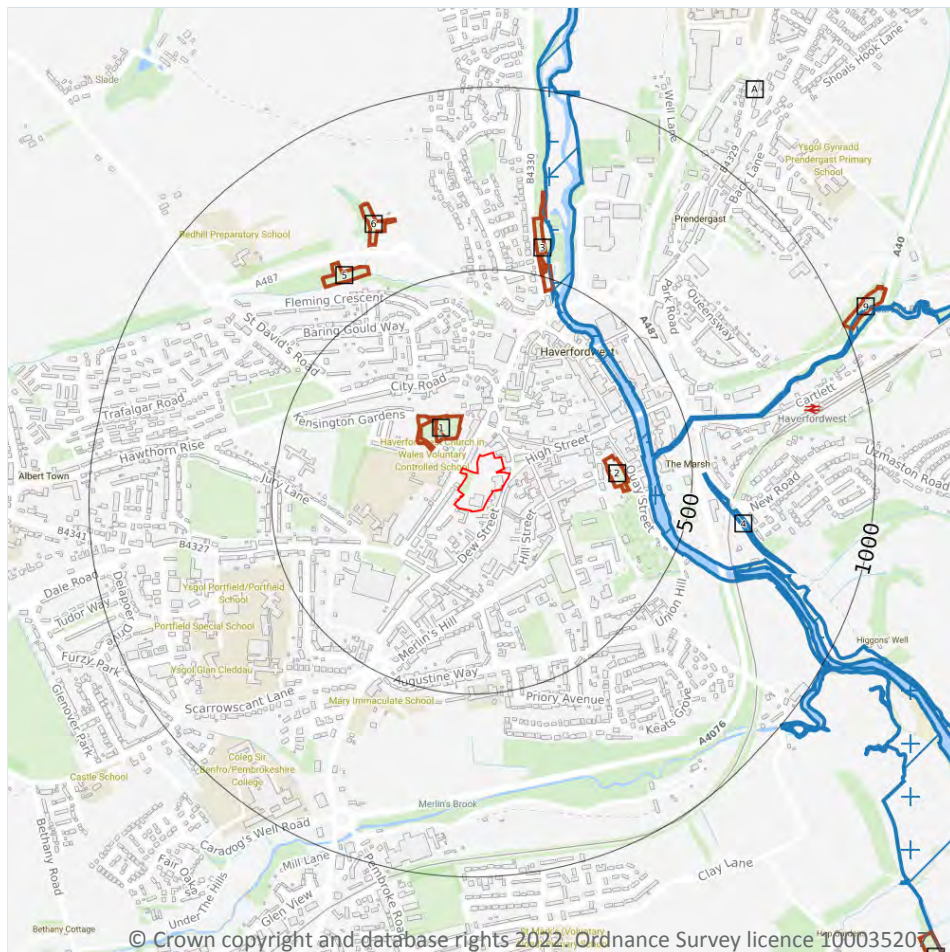
Negligible

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 66**

This data is sourced from Ambiantal Risk Analytics.

10 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Sites of Special Scientific Interest (SSSI)
- + Special Areas of Conservation (SAC)
- ▨ Designated Ancient Woodland

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

3

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 67**

ID	Location	Name	Data source
A	367m E	AFON CLEDDAU GORLLEWINOL/WESTERN CLEDDAU RIVER	Natural Resources Wales



ID	Location	Name	Data source
4	532m E	GAS WORKS LANE SECTION (HAVERFORDWEST)	Natural Resources Wales
8	666m E	MILFORD HAVEN WATERWAY	Natural Resources Wales

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m

2

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

Features are displayed on the Environmental designations map on **page 67**

ID	Location	Name	Features of interest	Habitat description	Data source
A	367m E	Afonydd Cleddau / Cleddau Rivers	Rivers with floating vegetation often dominated by water-crowfoot; Active raised bogs; Degraded raised bog; Alder woodland on floodplains; Sea lamprey; Brook lamprey; River lamprey; Allis shad; Atlantic salmon; Bullhead; Otter.	Broad-leaved deciduous woodland; Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites); Inland water bodies (Standing water, Running water); Improved grassland; Bogs, Marshes, Water fringed vegetation, Fens; Heath, Scrub, Maquis and Garrigue, Phygrana; Coniferous woodland; Other arable land; Mixed woodland; Dry grassland, Steppes	Natural Resources Wales

ID	Location	Name	Features of interest	Habitat description	Data source
7	666m E	Pembrokeshire Marine / Sir Benfro Forol	Subtidal sandbanks; Estuaries; Intertidal mudflats and sandflats; Lagoons; Shallow inlets and bays; Reefs; Atlantic salt meadows; Sea caves; Sea lamprey; River lamprey; Allis shad; Twaite shad; Bottlenose dolphin; Harbour porpoise; Otter; Grey seal; Shore dock.	Salt marshes, Salt pastures, Salt steppes; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Marine areas, Sea inlets	Natural Resources Wales

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m

0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m

0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m

0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.



10.7 Designated Ancient Woodland

Records within 2000m

13

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 67**

ID	Location	Name	Woodland Type
1	79m NW	Unknown	Restored Ancient Woodland Site
2	261m E	Unknown	Ancient Semi Natural Woodland
3	464m N	Unknown	Ancient Semi Natural Woodland
5	581m NW	Unknown	Restored Ancient Woodland Site
6	643m NW	Unknown	Restored Ancient Woodland Site
9	1001m NE	Unknown	Ancient Semi Natural Woodland
-	1268m S	Unknown	Restored Ancient Woodland Site
-	1381m NE	Unknown	Restored Ancient Woodland Site
-	1642m N	Unknown	Restored Ancient Woodland Site
13	1674m SE	Unknown	Restored Ancient Woodland Site
-	1685m N	Unknown	Restored Ancient Woodland Site
-	1934m NE	Unknown	Restored Ancient Woodland Site
-	1993m N	Unknown	Restored Ancient Woodland Site

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m

0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.



10.9 Forest Parks

Records within 2000m

0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m

0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m

0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m

0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m

0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.



10.14 Potential Special Protection Areas (pSPA)

Records within 2000m

0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m

0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m

0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.



SSSI Impact Zones and Units

10.17 SSSI Impact Risk Zones

Records on site	0
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Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

This data is sourced from Natural England.

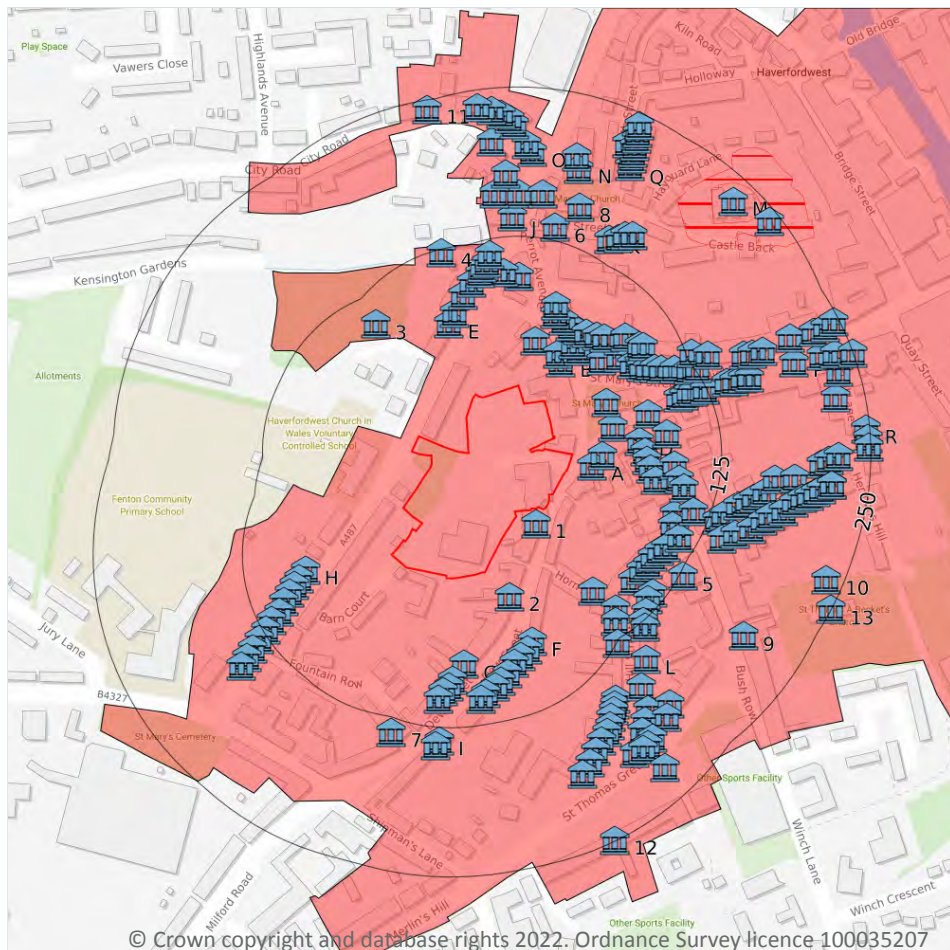
10.18 SSSI Units

Records within 2000m	0
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Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations



- Site Outline
- Search buffers in metres (m)
- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.



11.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m

212

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 74**

ID	Location	Name	Grade	Reference Number	Listed date
1	12m S	NOS.7 & 7A DEW STREET (PREMISES OF A & S EVANS, DRAPERS), DYFED, Situated in terraced row, the second house above the County Library.	II	12063	01/07/1974
A	19m E	10,Dew Street,Haverfordwest,SA61 1NJ, Situated in terraced row at lower end of street, opposite the top of Tower Hill.	II	87057	30/11/2005
A	26m E	6-8,Dew Street,Haverfordwest,SA61 1NJ, Situated at lower end of street, opposite St Mary's churchyard.	II	87056	30/11/2005

ID	Location	Name	Grade	Reference Number	Listed date
2	29m SE	The Kings Arms, Situated in terraced row some 100m SW of the County Library.	II	12064	01/07/1974
B	35m NE	12,Tower Hill,Haverfordwest,SA61 1SR, Situated just below former Tasker's School.	II	87071	30/11/2005
B	40m N	Hotel Mariners, Situated overlooking the small irregular square just E of Barn Street.	II	12165	01/07/1974
C	41m NE	Churchyard walls, gates, gatepiers and railings at Church of Saint Mary, Situated encircling churchyard of St Mary's Church except at upper S end.	II	12227	01/07/1974
B	41m N	14,Tower Hill,Haverfordwest,SA61 1SR, Situated just above Mariners Hotel.	II	87072	30/11/2005
C	50m E	Church of Saint Mary, Situated at the head of the High Street.	I	12226	12/10/1951
B	51m NE	NO.3 TOWER HILL, DYFED, Situated in stepped terraced row.	II	12237	01/07/1974
B	53m NE	NO.5 TOWER HILL, DYFED, Situated at end of terrace, the end-wall overlooking Mariners Square.	II	12238	01/07/1974
D	58m E	5 Market Street, Situated at N end of street, opposite former Commerce House.	II	12166	01/07/1974
B	59m NE	The Assembly Rooms, Situated at corner of Tower Hill.	II	12229	01/07/1974
D	61m E	7 & 7a Market Street, Situated in stepped terraced row, opposite former Commerce House.	II	12167	01/07/1974
D	63m E	9 Market Street, Situated in stepped terraced row, much taller than adjoining No 7.	II	12168	01/07/1974
E	63m N	No 9 Spring Gardens, including area railings, Situated at the SW end of stepped terrace SW of Bethesda Chapel.	II	87022	01/07/1974
B	66m NE	NO.11 DARK STREET, DYFED, Situated towards the W end of Dark Street, just before Mariners Square.	II	12059	01/07/1974
B	66m NE	NOS.12 & 13 DARK STREET (THE GLOSTER ARMS INN), DYFED, Situated in terraced row, overlooking Mariners Square.	II	12060	01/07/1974
B	66m NE	13,Dark Street,Haverfordwest,SA61 2DS, Situated in terraced row, overlooking Mariners Square.	II	87054	01/07/1974
B	66m NE	Nos 9 & 10 Dark Street, Situated in terraced row, a low two-storey house between the three-storey Nos 8 and 11.	II	87053	30/11/2005
D	67m E	11 Market Street, Situated in terraced row on W side of Market Street.	II	87089	30/11/2005
B	67m NE	NOS.14 & 14A DARK STREET, DYFED, Situated on the corner of Dark Street and Perrots Avenue, overlooking Mariners Square.	II	12061	01/07/1974



ID	Location	Name	Grade	Reference Number	Listed date
B	70m NE	Somerset House, Situated the second house in terraced row 7-14 Dark Street.	II	87052	01/07/1974
E	70m N	Nos 8 and 8A Spring Gardens, including area railings, Situated in stepped terrace SW of Bethesda Chapel.	II	87021	01/07/1974
F	70m SE	NO.44 DEW STREET, DYFED, Situated in terraced row Nos 44-60 (even) on raised pavement mid-way down street.	II	12070	01/07/1974
B	72m NE	The Liberal Chambers, Situated recessed with forecourt between the former assembly rooms and former Temperance Hall.	II	87064	30/11/2005
D	72m NE	The Crypt, Situated on the corner of Market Street and High St, opposite St Mary's Church.	II*	12172	12/10/1951
B	73m NE	Summerville House, Situated at end of terraced row Nos 7-14 Dark Street.	II	12058	01/07/1974
G	73m S	Haverfordwest Tavern, Situated in terraced row about half away up street, two doors before former Infants School.	II	12065	01/07/1974
D	73m E	Kent House and railings, Situated in stepped terraced row on W side of Market Street.	II	12169	01/07/1974
H	73m W	No 15 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 15 and 17 the lowest pair of the almshouse group.	II	12024	01/07/1974
B	74m NE	The Greyhound Inn, Facing W to Mariners Square.	II	12194	01/07/1974
F	74m SE	NO.46 DEW STREET, DYFED, Situated in terraced row Nos 44-60 (even) on raised pavement mid-way down street.	II	12071	01/07/1974
F	76m SE	NOS. 48 & 50 DEW STREET, DYFED, Situated in terraced row Nos 44-60 (even) on raised pavement mid-way down street.	II	12072	01/07/1974
B	79m NE	Former Temperance Hall, Situated prominently opposite N side of St Mary's churchyard.	II	12228	01/07/1974
H	80m W	No 17 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 15 and 17 the lowest pair of the almshouse group.	II	87023	01/07/1974
F	80m S	50,Dew Street,SA61 1NR, Situated in terraced row Nos 44-60 (even) on raised pavement mid-way down street.	II	87058	01/07/1974
D	80m SE	Hillborough House and area railings, Some 30m S of the junction of Hill Street and Horn's Lane.	II*	12152	01/07/1974
D	81m E	Nos 6, 8, 10, 12 including the wing to rear of No 6, Near Corner with High Street	II	12173	01/07/1974
E	84m N	Pembroke House Hotel including area railings, Situated in stepped terrace SW of Bethesda Chapel.	II	87020	01/07/1974



ID	Location	Name	Grade	Reference Number	Listed date
G	85m S	No. 43 Dew Street (formerly the Dew Street Infants School), Situated in terraced row about mid-way along street.	II	12066	01/07/1974
H	85m W	No 19 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 19 and 21 the second lowest pair of the almshouse group.	II	87024	01/07/1974
B	86m E	Former Town Council offices, Situated between the former Temperance Hall and No 2 High Street.	II	87066	30/11/2005
D	86m E	18 Market Street, Situated stepped in the line of street frontages towards the lower end of street.	II	14540	11/05/1994
B	87m NE	Former Stables attached to No 6 Dark Street, At right angles to No 6 Dark Street	II	87525	01/07/1974
F	87m S	NOS.52 & 54 DEW STREET, DYFED, Situated in terraced row Nos 44-60 (even) on raised pavement mid-way down street.	II	12073	01/07/1974
G	91m S	NOS.45 & 47 DEW STREET, DYFED, Next to the former Dew Street Infants School and some 120m NE of the junction of Dew Street and Shipman's Lane.	II	12067	01/07/1974
H	91m W	No 21 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 19 and 21 the second lowest pair of the almshouse group.	II	87025	01/07/1974
B	91m E	NO.2 HIGH STREET (PREMISES OCCUPIED BY SWALE MUSIC CENTRE), DYFED, Situated at upper end of High Street facing Boer War memorial.	II	12113	01/07/1974
E	92m N	Bethesda Baptist Church including vestry block attached to left, Situated near the centre of Haverfordwest, on the E side of Barn Street near its junction with City Road and Perrots Road.	II*	22762	14/05/1975
F	92m S	54,Dew Street,Haverfordwest,SA61 1NR, Situated in terraced row Nos 44-60 (even) on raised pavement mid-way down street.	II	87059	01/07/1974
D	92m E	22 Market Street, Situated in stepped row in line of street frontages, to left of The George's inn.	II	12174	01/07/1974
B	93m NE	4,Dark Street,Haverfordwest,SA61 2DS, Situated in terraced row, paired with No 3, opposite rear of former Town Council offices.	II	87048	30/11/2005
E	93m N	No 5 Spring Gardens including area railings, Situated at the NE end of stepped terrace SW of Bethesda Chapel.	II	12023	01/07/1974
B	95m NE	NOS.3-6 DARK STREET (PREMISES OCCUPIED BY SECOND HAND SHOP) (FORMERLY A STABLE), DYFED, Situated in terraced row, paired with No 4, opposite former Town Council offices.	II	12057	30/11/2005



ID	Location	Name	Grade	Reference Number	Listed date
D	95m SE	Nos 13 and 15, Situated immediately left of the Pembrokeshire Yeoman inn on the NW side of the street.	II	87100	01/07/1974
D	95m SE	The Pembrokeshire Yeoman, On the NW side of Hill Street some 50m from its junction with Market Street.	II	12133	01/07/1974
G	95m S	47,Dew Street,Haverfordwest,SA61 1ST, Situated in terraced row two doors up from former Infants School.	II	87055	01/07/1974
E	95m N	Gates and railings at Bethesda Baptist Church, Situated near the centre of Haverfordwest, on the E side of Barn Street near its junction with City Road and Perrots Road.	II	22767	06/12/1999
F	96m S	NO.56 DEW STREET, DYFED, Situated in terraced row Nos 44-60 (even) on raised pavement mid-way down street.	II	12074	01/07/1974
B	96m E	NO.4 HIGH STREET, DYFED, Situated in terraced row Nos 2-10 High Street, facing Boer War memorial.	II	12114	01/07/1974
D	97m E	Telephone Call-box outside Shoemakers Court (01437 762413), Situated towards upper end of Market Street, outside modern development on site of the Market Hall.	II	13047	15/07/1988
D	98m E	The George's Inn, Situated in stepped terraced row, about half way up street.	II	12175	01/07/1974
D	98m SE	9,Hill Street,Haverfordwest,SA61 1QQ, Situated immediately right of Pembrokeshire Yeoman inn, on the NW side of the street.	II	87099	01/07/1974
H	98m SW	No 23 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 23 and 25, the third pair from the lower end of the almshouse group.	II	87026	01/07/1974
D	98m SE	NOS.7 & 9 HILL STREET, DYFED, On the NW side of Hill Street some 40m from its junction with Market Street.	II	12132	01/07/1974
E	99m N	No 4 Spring Gardens, In a terrace at the N end of Barn Street opposite Bethesda Baptist Church.	II	87019	01/07/1974
F	99m S	NO.58 DEW STREET, DYFED, Situated in long terraced row Nos 44-60 on raised pavement mid-way down street.	II	12075	01/07/1974
D	99m SE	No. 17 and area railings, On the W side of Market Street just N of its junction with Hill Street.	II	12170	01/07/1974
B	100m NE	NO.7 HIGH STREET,7,High Street,Haverfordwest,DYFED,SA61 2BW, On the S side of the High Street facing its junction with St. Mary's Street.	II	12101	01/07/1974
3	101m N	Summer house to rear of Nos 5-9 Spring Gardens, Situated in an overgrown woodland garden behind gardens of Spring Gardens Terrace, on the W edge of Haverfordwest; reached from Spring Gardens Lane.	II	14534	08/03/1994



ID	Location	Name	Grade	Reference Number	Listed date
D	101m SE	5,Hill Street,Haverfordwest,SA61 1QQ, Near the junction with Market Street, situated in terraced row, a three-storey pair with No 3.	II	87098	01/07/1974
B	101m E	NO.6 HIGH STREET (PREMISES OCCUPIED BY S.D. PUGH & SON), DYFED, Situated at upper end of the street, opposite the Boer War Memorial.	II	12115	01/07/1974
G	101m S	NO.49 DEW STREET, DYFED, Situated in terraced row three doors up from former Infants School.	II	12068	01/07/1974
E	103m N	No 3 Spring Gardens, In a terrace at the N end of Barn Street opposite Bethesda Baptist Church.	II	87018	01/07/1974
F	103m S	NO.60 DEW STREET (THE LAMB INN P.H.), DYFED, Situated at right end of long terraced row Nos 44-60 on raised pavement mid-way down street.	II	12076	01/07/1974
D	103m SE	No 23 Hill Street and railings, Situated on corner of Horns Lane and Hill Street.	II	12134	01/07/1974
D	105m SE	NOS.3 & 5 HILL STREET, DYFED, Near the junction with Market Street, situated in terraced row, a three-storey pair with No 5.	II	12131	01/07/1974
B	106m NE	Nos 9&11 HIGH STREET,9&11,High Street,Haverfordwest,DYFED,SA61 2BW, On the S side of the High Street facing its junction with St. Mary's Street.	II	12102	14/01/1965
H	106m SW	No 25 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 23 and 25, the third pair from the lower end of the almshouse group.	II	87027	01/07/1974
E	106m N	No 2 Spring Gardens, In a terrace at the N end of Barn Street opposite Bethesda Baptist Church.	II	87017	01/07/1974
D	110m SE	19 Market Street, On the W side of Market Street at its junction with Hill Street.	II	12171	01/07/1974
B	111m NE	11,High Street,Haverfordwest,SA61 2BW, On the S side of the High Street some 20m W of its junction with Dark Street.	II	87095	01/07/1974
B	111m NE	8,High Street,Haverfordwest,SA61 2DA, On the N side of the High Street some 40m E of the Church of Saint Mary.	II	87070	30/11/2005
D	111m E	30 Market Street, Situated in stepped row towards upper end of street.	II	12176	01/07/1974
D	112m SE	Nos 25 and 27 Hill Street, Situated in terraced row to W of Horns Lane.	II	12135	12/10/1951
E	112m N	No 1 Spring Gardens, In a terrace at the N end of Barn Street opposite Bethesda Baptist Church.	II	12022	01/07/1974



ID	Location	Name	Grade	Reference Number	Listed date
B	114m NE	NO.13 HIGH STREET, DYFED, On the S side of the High Street some 15m W of its junction with Dark Street.	II	12103	01/07/1974
H	114m SW	No 27 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 27 and 29 are the fourth pair from the lower end of the almshouse group.	II	87028	01/07/1974
D	115m SE	4 Hill Street, Situated just right of garages attached to right of former Corn Market.	II	12149	01/07/1974
D	115m SE	6,Hill Street,Haverfordwest,SA61 1QF, Nearly opposite the junction of Hill Street and Horn's Lane.	II	87105	01/07/1974
B	120m NE	Borough House, Terraced house at corner of High Street and Dark Street.	II	87090	30/11/2005
D	121m SE	Nos 8 and 10 and area railings, Just opposite the junction of Hill Street and Horn's Lane.	II	12150	01/07/1974
4	122m N	Former Stables, Situated down lane between Nos 4 and 5 Spring Gardens, Barn Street.	II	87068	30/11/2005
H	123m SW	No 29 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 27 and 29 are the fourth pair from the lower end of the almshouse group.	II	87029	01/07/1974
B	123m NE	NO.15 HIGH STREET (PREMISES OCCUPIED BY W.H. SMITH & SON), DYFED, On the S side of the High Street opposite its junction with Dark Street.	II*	12104	12/10/1951
D	125m SE	NO.29 HILL STREET, DYFED, Situated in terraced row against right end of C20 College Court development.	II*	12137	12/10/1951
D	126m SE	Ashleigh House, Some 15m S of the junction of Hill Street and Horn's Lane.	II	12151	01/07/1974
B	127m NE	Nichol memorial adjoining No 10 High Street, Situated on triangle of pavement between High Street and Dark Street.	II	87091	30/11/2005
5	128m SE	Palace Cinema and No. 2 Hill Street, Situated on corner of Upper Market Street with facades to both streets.	II*	12148	01/07/1974
B	130m E	NO.12 HIGH STREET, DYFED,12116, Situated attached to No 1 Dark Street, at junction of High Street and Dark Street.	II*	12116	01/07/1974
D	130m SE	14,Hill Street,Haverfordwest,SA61 1QH, Some 20m S of the junction of Hill Street and Horn's Lane.	II	87106	01/07/1974
H	132m SW	No 31 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 31-37 are a row of four with similar eaves height.	II	87030	01/07/1974
D	133m E	Walden House, Situated at upper W end of the street, projecting forward from No 6 to right	II	12088	01/07/1974



ID	Location	Name	Grade	Reference Number	Listed date
D	136m E	Nos 6 and 6a Goat Street, Situated towards W end of the street, attached but set back from No 4.	II	12089	12/10/1951
6	136m N	Churchyard walls and gates to Saint Martin's Church, Situated enclosing churchyard of St Martin's Church: to Church St, Chapel Lane, Queen's Square and to garden of No 2 Chapel Lane.	II	12042	01/07/1974
I	136m S	Plymouth House, Situated towards the upper end of the street, the only three-storey house.	II	12077	01/07/1974
7	137m S	Roman Catholic Church of Saint David and Saint Patrick, Situated towards upper end of street, set back between Nos 63 and 67.	II	12069	01/07/1974
H	140m SW	No 33 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 31-37 are a row of four with similar eaves height.	II	87031	01/07/1974
I	141m S	NO.76 DEW STREET, DYFED, Situated towards the upper end of Dew Street, attached to the three-storey No 74.	II	12078	01/07/1974
B	141m NE	NO.14 HIGH STREET, DYFED, Situated attached to No 12 at junction of High Street with Dark Street.	II	12117	01/07/1974
J	142m N	Cromwell House, Nos. 1 and 3 City Road, Situated on SW corner of City Road, facing end of Church Street.	II	12043	01/07/1974
D	142m SE	Nelson House, On the S side of Goat Street just E of its junction with Market Street.	II	12079	01/07/1974
B	143m NE	17, High Street, Haverfordwest, SA61 2BW, On the S side of the High Street opposite its junction with Dark Street.	II	87096	01/07/1974
K	144m NE	NO.24 QUEEN'S SQUARE, DYFED, Situated at lower end of terraced row of four, at top end of Church Street. Much restored c. 2000.	II	12224	01/07/1974
D	145m E	NOS.8 & 10 GOAT STREET AND GARAGES, DYFED, Situated in terraced row, attached to similar No 10 to right, and with a gap to left before No 6.	II*	12090	12/10/1951
H	148m SW	No 35 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 31-37 are a row of four with similar eaves height.	II	87033	01/07/1974
B	149m NE	NO.19 HIGH STREET (PREMISES OF TRUSTEE SAVINGS BANK), DYFED, On the S side of the High Street just E of its junction with Dark Street.	II	12105	01/07/1974
K	149m NE	NO.23 QUEEN'S SQUARE, DYFED, Situated in terraced row of four, at top end of Church Street. Much restored c. 2000.	II	12223	01/07/1974
D	151m E	More House, Situated at upper end of terraced row, projecting forward from No 7 to left.	II	12080	01/07/1974



ID	Location	Name	Grade	Reference Number	Listed date
D	152m E	10,Goat Street,Haverfordwest,SA61 1PX, Situated in terraced row, attached to similar No 8.	II*	87060	01/07/1974
L	152m SE	Nos. 18 and 20 Hill Street, Situated in terraced row, on corner of Rosemary Lane.	II	12153	01/07/1974
L	153m SE	NOS.77,79 & 81 HILL STREET (FORMERLY 37,39,41), DYFED, Situated in terraced row immediately left of C20 College Court development.	II	12138	01/07/1974
K	154m NE	NO.22 QUEEN'S SQUARE, DYFED, Situated in terraced row of four, at top end of Church Street. Much restored c. 2000.	II	12222	01/07/1974
L	155m SE	79,Hill Street,Haverfordwest,SA61 1QL, Situated second house in row to left of C20 College Court development.	II	87101	01/07/1974
B	156m NE	NOS.21 & 23 HIGH STREET, DYFED, On the S side of the High Street some 20m E of its junction with Dark Street.	II	12106	01/07/1974
H	157m SW	No 37 Perrot's Terrace, Situated at the upper end of Barn Street, Nos 31-37 are a row of four with similar eaves height.	II	87035	01/07/1974
D	157m E	The Studio, Situated between No 10 and building attached to left of Foley House.	II	87061	01/07/1974
K	157m NE	NO.21 QUEEN'S SQUARE, DYFED, Situated in terraced row of four, at top end of Church Street. Much restored c. 2000.	II	12221	01/07/1974
8	158m N	Church of Saint Martin of Tours, Situated in churchyard raised above Church Street and Chapel Lane.	II*	12041	12/10/1951
L	158m SE	81,Hill Street,Haverfordwest,SA61 1QL, Situated the third house in row to left of C20 College Court development.	II	87102	01/07/1974
J	161m N	Forecourt dwarf wall and railings to Tabernacle Church and to Tabernacle Church School, Situated across the E fronts of the chapel and school, overlooking junction with Perrots Road.	II*	12046	01/07/1974
L	161m SE	NOS.83,85 & 87 HILL STREET (FORMERLY 43,45,49), DYFED, The fourth house in row to left of C20 College Court development.	II	12139	01/07/1974
D	162m E	Williamston House including area railings, On the S side of Goat Street some 45m E of its junction with Market Street.	II*	12081	01/07/1974
B	162m NE	23,High Street,Haverfordwest,SA61 2BW, On the S side of the High Street some 25m E of its junction with Dark Street.	II	87097	01/07/1974
J	162m N	Tabernacle Congregational Church, Situated on SW corner of City Road, facing across main road to St Martin's Church.	II*	12044	01/07/1974
J	162m N	Wall enclosing garden behind No. 4 on W side, Situated on E side of main road, either City Road or Perrot's Road at this point, opposite Tabernacle Chapel.	II	12037	01/07/1974



ID	Location	Name	Grade	Reference Number	Listed date
L	162m SE	Forecourt walls, railings and gates to the Albany Church, Situated surrounding the W and N sides of the chapel forecourt.	II	12155	01/07/1974
D	164m E	Building to W of Foley House, Situated immediately left of Foley House, on street line.	II	12091	01/07/1974
L	165m SE	85,Hill Street,Haverfordwest,SA61 1QL, The fifth house in row to left of C20 College Court development.	II	87103	01/07/1974
B	166m NE	NO.22 HIGH STREET, DYFED, Situated two doors down from set-back for C20 National Westminster Bank.	II*	12118	01/07/1974
D	169m E	Clive House including area railings, Situated in terraced row, between the taller Nos 7 and 11, projecting forward of No 7 to right.	II	12082	01/07/1974
L	169m SE	87,Hill Street,Haverfordwest,SA61 1QL, The sixth house in row to left of C20 College Court development.	II	87104	01/07/1974
D	171m E	Foley House, Situated in own grounds on sloping site half way down street, set back in terraced forecourt.	II*	12092	12/10/1951
L	172m SE	Grove End and railings, Situated in railed front garden towards the SW end of the street.	II	12140	12/10/1951
B	172m NE	NOS.24 & 26 HIGH STREET, DYFED, On the N side of the High Street some 45m E of its junction with Dark Street.	II	12119	01/07/1974
D	173m E	Cleeve House including area railings, Situated in terraced row between lower No 9 and projecting warehouse opposite Foley House.	II	87062	01/07/1974
L	176m SE	Ashgrove and railings, At the SW end of Hill Street near its junction with St. Thomas Green.	II	12142	12/10/1951
J	178m N	Tabernacle Church School, Situated adjoining Tabernacle Church to N, overlooking junction of City Road and Perrots Road.	II*	12045	01/07/1974
L	179m SE	Schoolroom to Albany Chapel, Situated on S side of forecourt to the Albany Church.	II	87107	30/11/2005
B	181m NE	26,High Street,Haverfordwest,SA61 2DA, On the N side of the High Street some 50m E of its junction with Dark Street.	II	87092	01/07/1974
L	182m SE	College House and railings, At the SW end of Hill Street near its junction with St. Thomas Green.	II	12144	12/10/1951
L	182m SE	Dragon House, On the E side of Hill Street just S of the Albany Church.	II	12156	01/07/1974



ID	Location	Name	Grade	Reference Number	Listed date
D	183m E	Two warehouses between Nos. 11 and 13 Goat Street, Situated framing narrow courtyard at right angles to street, the right warehouse projecting to left of No 11.	II	12083	01/07/1974
L	187m SE	DRAGON HOUSE,HILL STREET, DYFED, On the E side of Hill Street just S of the Albany Church.	II	12157	01/07/1974
D	188m E	Boundary wall to Foley House, Situated immediately below Foley House along street line to garage attached to No 14.	II	12093	01/07/1974
L	188m SE	NO.55 HILL STREET, DYFED, Situated at the SW end of Hill Street facing St. Thomas Green..	II	12146	01/07/1974
N	189m N	Former Wesleyan Methodist Chapel, Situated on corner of Perrot Road and Chapel Lane.	II	12198	01/07/1974
L	190m SE	Albany United Reformed Church, Situated set back in railed forecourt, just S of Rosemary Lane.	II	12154	01/07/1974
D	190m E	NO.13 GOAT STREET, DYFED, Situated in terraced row, tall house between warehouse pair and much lower No 15, opposite Foley House.	II	12084	01/07/1974
L	195m SE	Bulmer House and railings, Situated attached to rear left side of Albany Chapel, facing St Thomas' Green.	II	12230	01/07/1974
O	196m N	NOS.12 & 14 CITY ROAD, DYFED, Situated at the foot of City Road, attached to No 14 to right.	II	12048	01/07/1974
D	196m E	NOS.15 & 17 GOAT STREET, DYFED, Situated in terraced row, one of two two-storey houses between Nos 13 and 19.	II	12085	01/07/1974
L	196m SE	15,Albany Terrace,Haverfordwest, Situated at left end of terraced row, around small courtyard.	II	87016	01/07/1974
9	197m SE	Willesden House and railings, Situated on corner of Church Lane at NE corner of St Thomas's Green.	II	12232	14/12/1971
N	198m N	Former Wesleyan Methodist Sunday School, Situated to left of former Wesleyan chapel on raised terrace over Perrot Road.	II	12199	01/07/1974
L	198m SE	NO.12 (DRAGON HOTEL) NO.13,NO.14 (GERALD OLIVER ANTIQUES) INCLUDING OUTBUILDINGS FACING ONTO HILL ST, DYFED, Situated in row of three low houses on street line facing St Thomas' Green.	II	12231	01/07/1974
L	199m SE	13,Albany Terrace,Haverfordwest, Situated in centre of row of three low houses on street line facing St Thomas' Green.	II	87014	01/07/1974
L	199m SE	No 14 Albany Terrace and outbuilding to rear, Situated at left of row of three low houses on street line facing St Thomas' Green.	II	87015	01/07/1974



ID	Location	Name	Grade	Reference Number	Listed date
P	201m NE	NO.35 HIGH STREET, DYFED,12107, On the S side of the High Street some 70m E of its junction with Dark Street.	II	12107	01/07/1974
D	202m E	17,Goat Street,Haverfordwest,SA61 1PX, Situated as one of two two-storey houses between taller Nos 13 and 19.	II	87063	01/07/1974
O	202m N	14,City Road,Haverfordwest,SA61 2ST, Situated at the foot of City Road attached to No 12 to left.	II	87046	01/07/1974
O	206m N	Elm Cottage and front railings, On the SW side of City Road some 40m from its junction with Barn Street.	II	12047	01/07/1974
D	206m E	Orielton House, Situated towards the lower end of street, a pair with No 21.	II	12086	01/07/1974
Q	206m NE	No. 7 Castle Terrace, Situated in terraced row on the E side of North Street, just N of Queen's Square.	II	87088	01/07/1974
P	207m NE	Barclay's Bank, On the N side of the High Street some 75m E of its junction with Dark Street.	II	12120	01/07/1974
D	209m E	No. 16 Goat Street and garage to left, Situated below Foley House in steeply sloping terrace.	II	12094	01/07/1974
D	211m E	Egerton House, Situated towards the lower end of street, a pair with No 19.	II	87065	01/07/1974
Q	212m NE	No. 6 Castle Terrace, Situated in terraced row on the E side of North Street, just N of Queen's Square.	II	87087	01/07/1974
D	215m E	Hillside, Situated in steeply sloping terrace, next to the three-storey No 16.	II	12095	01/07/1974
Q	217m NE	No. 5 Castle Terrace, Situated in terraced row on the E side of North Street, just N of Queen's Square.	II	87086	01/07/1974
O	219m N	NO.20 CITY ROAD, DYFED, Situated at right end of terrace Nos 20-30 City Road, some 40m from junction with Perrots Road.	II	12049	01/07/1974
D	219m E	NO.23 GOAT STREET, DYFED, Situated at lower end of street paired with No 23A to left, and stepped down from Nos 19-21 to right.	II	12087	01/07/1974
D	219m E	23a,Goat Street,Haverfordwest,SA61 1PX, Situated at lower end of street paired with No 23.	II	87067	01/07/1974
L	222m SE	Telephone Call-box adjoining Dyfed County Council Offices	II	13045	15/07/1988
Q	222m NE	Retaining wall, railings and pavement before Nos, 1-7 Castle Terrace, Situated in front of terraced row on the E side of North Street, just N of Queen's Square.	II	12179	01/07/1974
D	223m E	NO.20 GOAT STREET, DYFED, Situated at lower end of steeply sloping terrace below Foley House.	II	12096	01/07/1974



ID	Location	Name	Grade	Reference Number	Listed date
Q	223m NE	No. 4 Castle Terrace, Situated in terraced row on the E side of North Street, just N of Queen's Square.	II	87085	01/07/1974
O	224m N	NO.22 CITY ROAD, DYFED, Situated in terraced row Nos 20-30 City Road, set back behind front garden.	II	12050	01/07/1974
P	224m E	HSBC Bank, Towards the bottom of the High Street, close to the corner with Hill Lane.	II	15672	18/01/1995
P	226m E	No. 22 and archway to left with railings, On the W side of Hill Lane some 50m S of its junction with the High Street.	II	12129	01/07/1974
P	227m NE	Nos. 36 and 38 High Street, On the N side of the High Street some 60m W of its junction with Quay Street.	II*	12122	12/10/1951
O	228m N	NO.24 CITY ROAD, DYFED, Situated in terraced row Nos 20-30 City Road, set back behind front garden.	II	12051	01/07/1974
Q	229m NE	No. 3 Castle Terrace, Situated in terraced row on the E side of North Street, just N of Queen's Square.	II	87084	01/07/1974
M	230m NE	Former County Gaol, Situated to W of the castle ruins on the site of the outer ward.	II	12033	01/07/1974
O	232m N	NO.26 CITY ROAD, DYFED, Situated in terraced row Nos 20-30 City Road, set back behind front garden.	II	12052	01/07/1974
P	233m E	NO.24 HILL LANE, DYFED, Situated just uphill of rear of 43 High Street.	II	12130	01/07/1974
Q	234m NE	No. 2 Castle Terrace, Situated in terraced row on the E side of North Street, just N of Queen's Square.	II	87083	01/07/1974
O	235m N	NO.28 CITY ROAD, DYFED, Situated in terraced row Nos 20-30 City Road, set back behind front garden.	II	12053	01/07/1974
P	235m E	NO.43 HIGH STREET (PREMISES OCCUPIED BY MONTS), DYFED, On the S side of the High Street some 20m W of its junction with Quay Street.	II	12108	01/07/1974
10	235m SE	Churchyard gates and railings, Church of Saint Thomas a Becket, Mainly to the N and E of the churchyard, the gates on the W side to Church Lane.	II	87045	30/11/2005
P	237m NE	NOS.40 & 42 HIGH STREET, DYFED, On the N side of the High Street some 50m W of its junction with Quay Street.	II*	12123	12/10/1951
Q	240m NE	No. 1 Castle Terrace, Situated in terraced row on the E side of North Street, just N of Queen's Square.	II	12178	01/07/1974
M	241m NE	The Governor's House, In a prominent position just E of Haverfordwest Castle.	II	12032	01/07/1974



ID	Location	Name	Grade	Reference Number	Listed date
11	242m N	34, City Road, Haverfordwest, SA61 2ST, Situated at E end of terrace Nos 34-40 City Road some 100 m NW of junction with Perrots Road.	II	87047	30/11/2005
P	245m NE	42, High Street, Haverfordwest, SA61 2DA, On the N side of the High Street some 45m W of its junction with Quay Street.	II	87093	01/07/1974
R	246m E	NO.33 HILL LANE, DYFED, Situated at left end of terraced row Nos 27-31.	II	12127	01/07/1974
R	248m E	Emlyn House, Situated in terraced row Nos 27-33 Hill Lane.	II	12126	01/07/1974
R	249m E	Hilltop, Situated in terraced row Nos 27-33 Hill Lane.	II	12125	01/07/1974
12	249m SE	The Oak Inn P.H, On S side of St. Thomas Green opposite Hill Street.	II	12235	01/07/1974
P	250m E	NO.45 HIGH STREET, DYFED, Situated on the corner of Hill Lane, next to the Shire Hall.	II	12109	01/07/1974
13	250m SE	Church of Saint Thomas a Becket, Situated at end of short lane running E from St Thomas' Green.	II	12038	12/10/1951

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m

1

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

Features are displayed on the Visual and cultural designations map on **page 74**

ID	Location	Name	District	Date of designation
A	On site	Haverfordwest	PEMBROKESHIRE	1975-11-15

This data is sourced from Historic England, Cadw and Historic Environment Scotland.



11.6 Scheduled Ancient Monuments

Records within 250m

1

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

Features are displayed on the Visual and cultural designations map on **page 74**

ID	Location	Ancient monument name	Reference number
M	183m NE	Haverfordwest Castle	2714

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m

0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.



12 Agricultural designations

12.1 Agricultural Land Classification

Records within 250m

0

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

This data is sourced from Natural Resources Wales.

12.2 Open Access Land

Records within 250m

0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m

0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m

0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.



12.5 Countryside Stewardship Schemes

Records within 250m

0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.



13 Habitat designations

13.1 Priority Habitat Inventory

Records within 250m

0

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m

0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m

0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.



14 Geology 1:10,000 scale - Availability



— Site Outline
Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m

1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 93**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	No coverage	No coverage	No coverage	NoCov

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Artificial and made ground

14.2 Artificial and made ground (10k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Superficial

14.3 Superficial geology (10k)

Records within 500m

0

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m

0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Bedrock

14.5 Bedrock geology (10k)

Records within 500m

0

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.



15 Geology 1:50,000 scale - Availability



— Site Outline

Search buffers in metres (m)

□ Geological map tile

15.1 50k Availability

Records within 500m

1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme. Where 50k data is not available, this area has been filled in with 625k scale data.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 97**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	EW228_haverfordwest_v4

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

Records within 50m

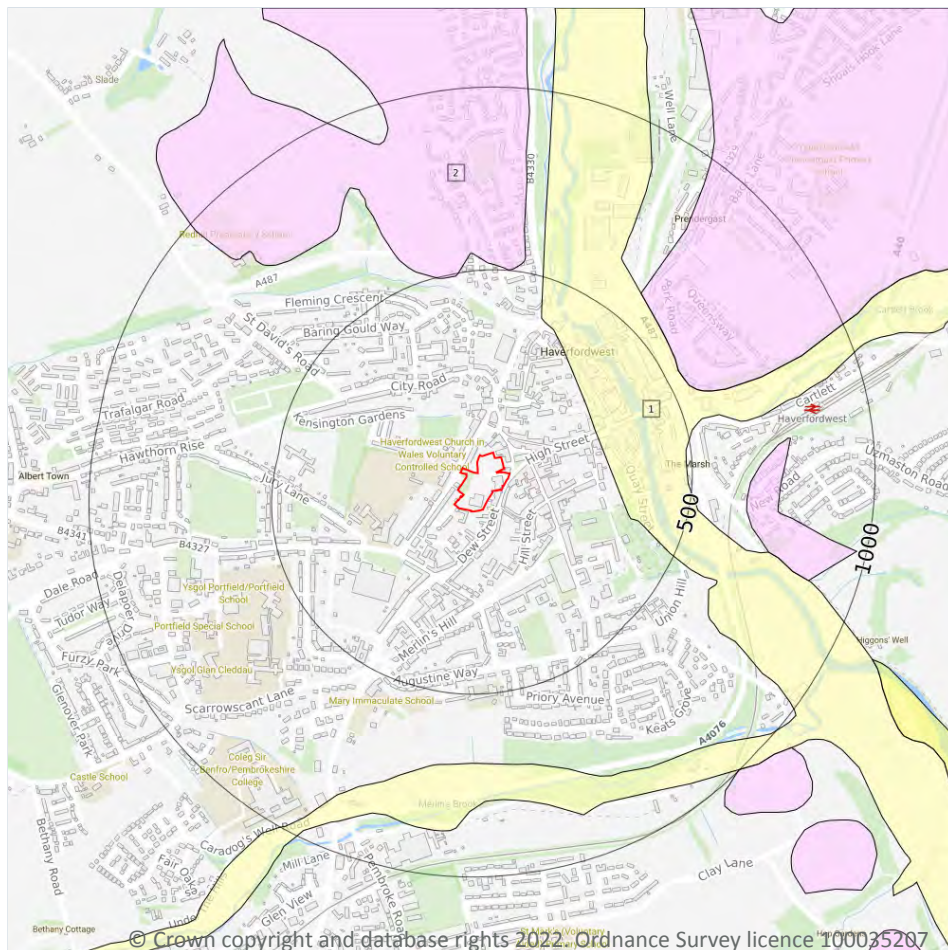
0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m

2

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 99**

ID	Location	LEX Code	Description	Rock description
1	261m E	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
2	493m N	GFDMP-XSV	GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE	SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m

0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m

0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

Records within 50m

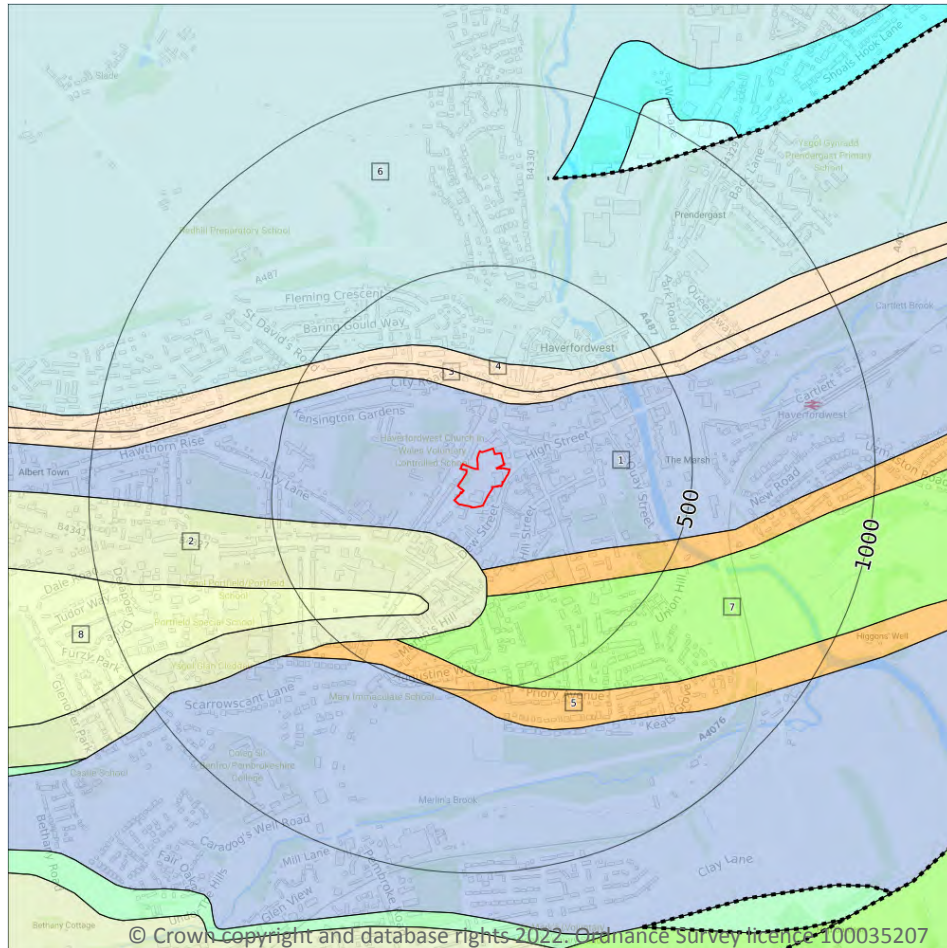
0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

..... Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

8

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 101**

ID	Location	LEX Code	Description	Rock age
1	On site	PFHD-MDST	PORTFIELD FORMATION AND HAVERFORD MUDSTONE FORMATION (UNDIFFERENTIATED) - MUDSTONE	-
2	100m S	TWR-SCON	TWRCH SANDSTONE FORMATION - SANDSTONE AND CONGLOMERATE, INTERBEDDED	NAMURIAN
3	129m N	CETS-SDST	CETHINGS SANDSTONE MEMBER - SANDSTONE	HIRNANTIAN



ID	Location	LEX Code	Description	Rock age
4	172m N	PFLD-MDST	PORTFIELD FORMATION - MUDSTONE	HIRNANTIAN
5	172m S	GWST-SDST	GASWORKS SANDSTONE FORMATION - SANDSTONE	AERONIAN
6	235m N	SLR-MDST	SLADE AND REDHILL FORMATION - MUDSTONE	-
7	246m S	MMN-MDST	MILLIN MUDSTONE FORMATION - MUDSTONE	TELYCHIAN
8	273m SW	BISHM-MDSS	BISHOPSTON MUDSTONE FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	NAMURIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	2
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Low	Low
11m W	Fracture	Low	Low

This data is sourced from the British Geological Survey.

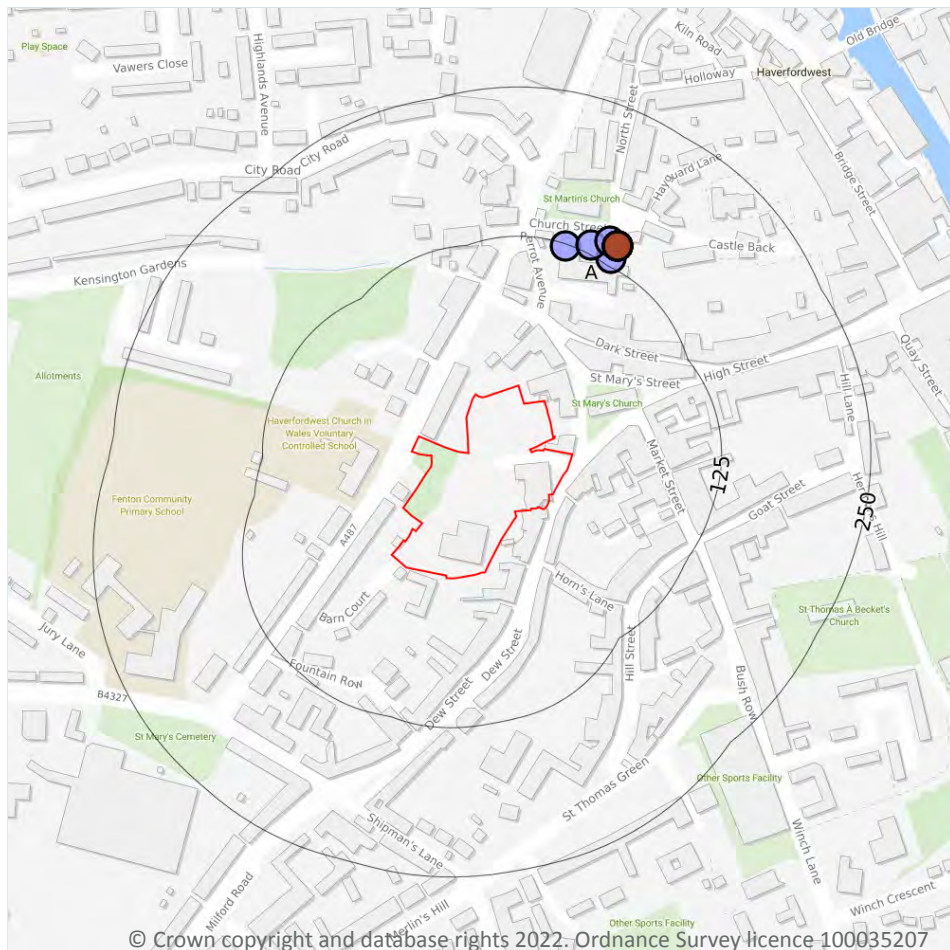
15.10 Bedrock faults and other linear features (50k)

Records within 500m	0
----------------------------	----------

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



— Site Outline
Search buffers in metres (m)

- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

16.1 BGS Boreholes

Records within 250m

11

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

Features are displayed on the Boreholes map on **page 103**

ID	Location	Grid reference	Name	Length	Confidential	Web link
A	123m N	195157 215700	HAVERFORD ATE 4	5.06	N	252559
A	132m NE	195195 215690	HAVERFORD ATE 1	7.5	N	252556
A	132m NE	195178 215701	HAVERFORD ATE 3	1.05	N	252558

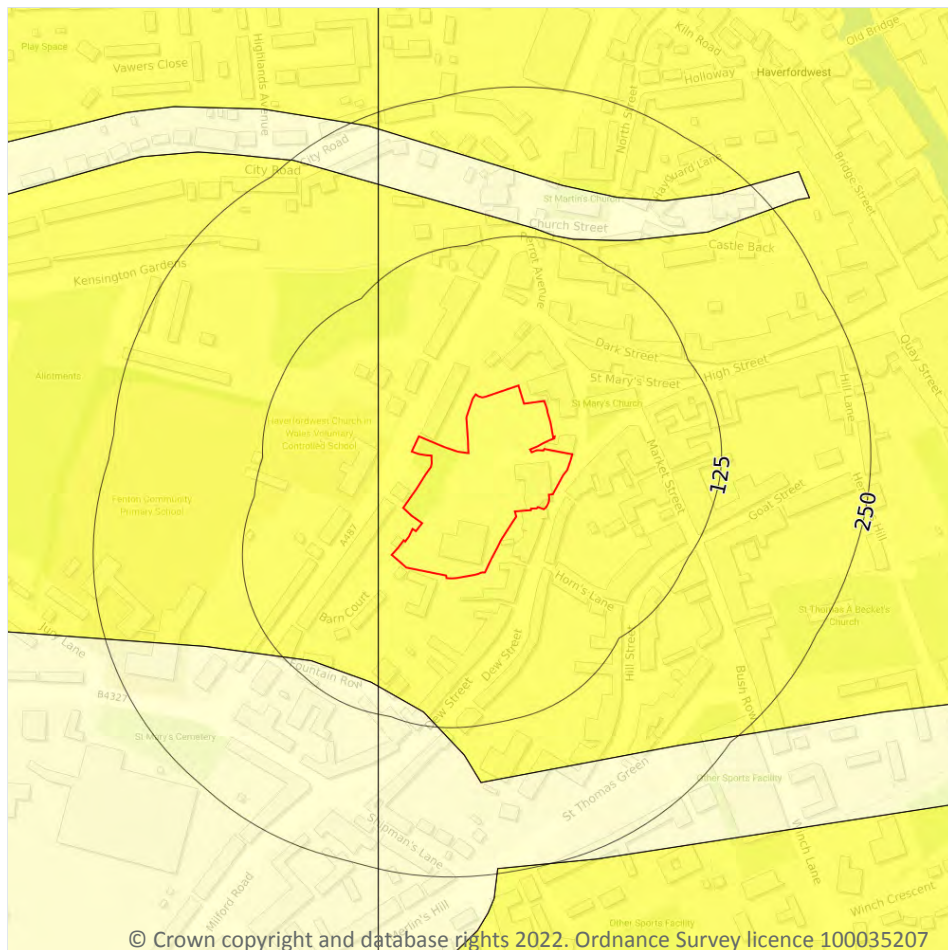


ID	Location	Grid reference	Name	Length	Confidential	Web link
A	143m NE	195194 215704	HAVERFORD ATE 2	1.05	N	252557
A	143m NE	195200 215700	HAVERFORDWEST, A.T.E. 1-5, (2ND SERIES)	5.03	N	252553
A	143m NE	195200 215700	HAVERFORDWEST TE/TRS 5	-1.0	N	252623
A	143m NE	195200 215700	HAVERFORDWEST TE/TRS 2	-1.0	N	252625
A	143m NE	195200 215700	HAVERFORDWEST, A.T.E. 1-4, R1-R3	8.4	N	252552
A	143m NE	195200 215700	HAVERFORDWEST TE/TRS 3	-1.0	N	252626
A	143m NE	195200 215700	HAVERFORDWEST TE/TRS 4	-1.0	N	252627
A	143m NE	195200 215700	HAVERFORDWEST TE/TRS 1	-1.0	N	252624

This data is sourced from the British Geological Survey.



17 Natural ground subsidence - Shrink swell clays



- Site Outline**
- Search buffers in metres (m)**
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.1 Shrink swell clays

Records within 50m

2

The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

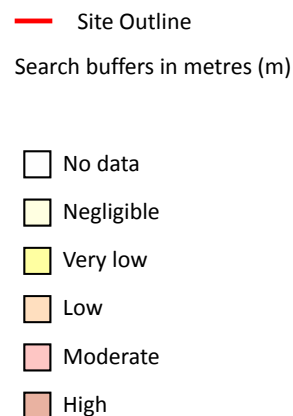
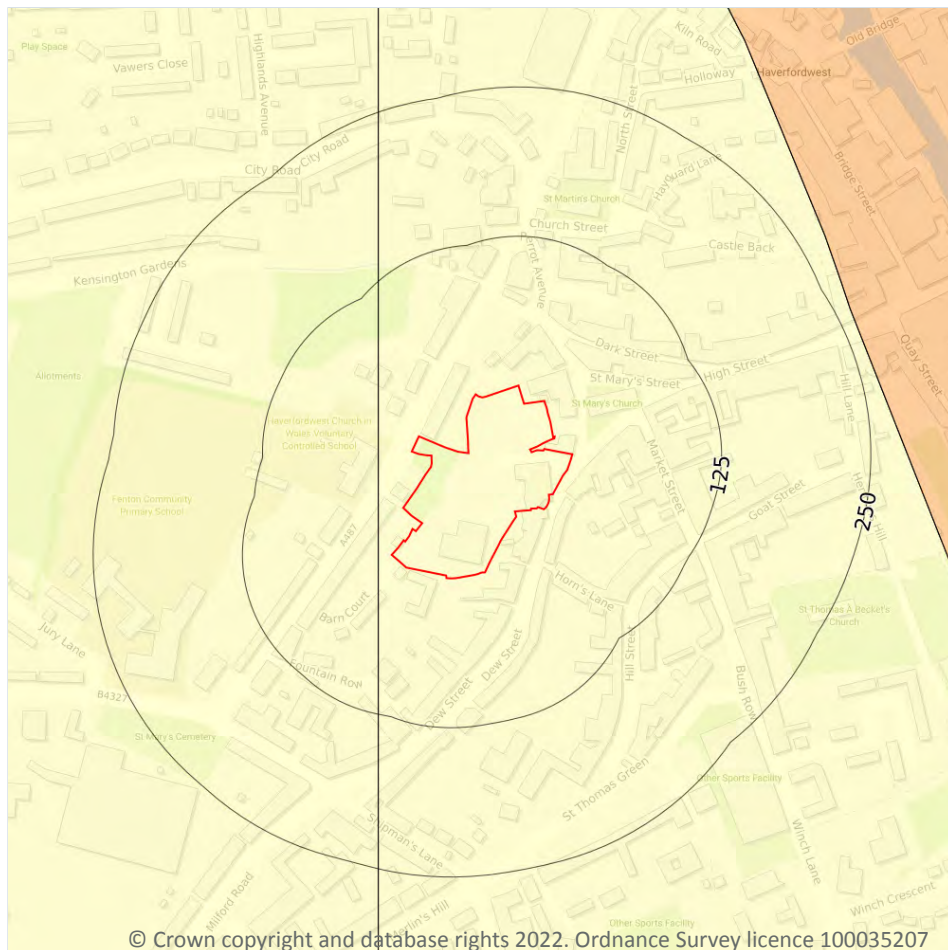
Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 105**

Location	Hazard rating	Details
On site	Very low	Ground conditions predominantly low plasticity.
11m W	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Running sands



17.2 Running sands

Records within 50m

2

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 106**

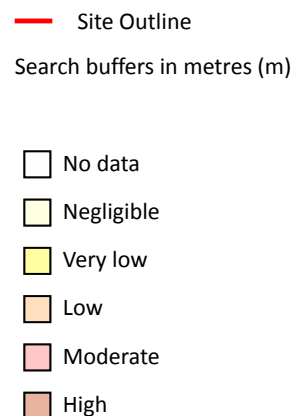
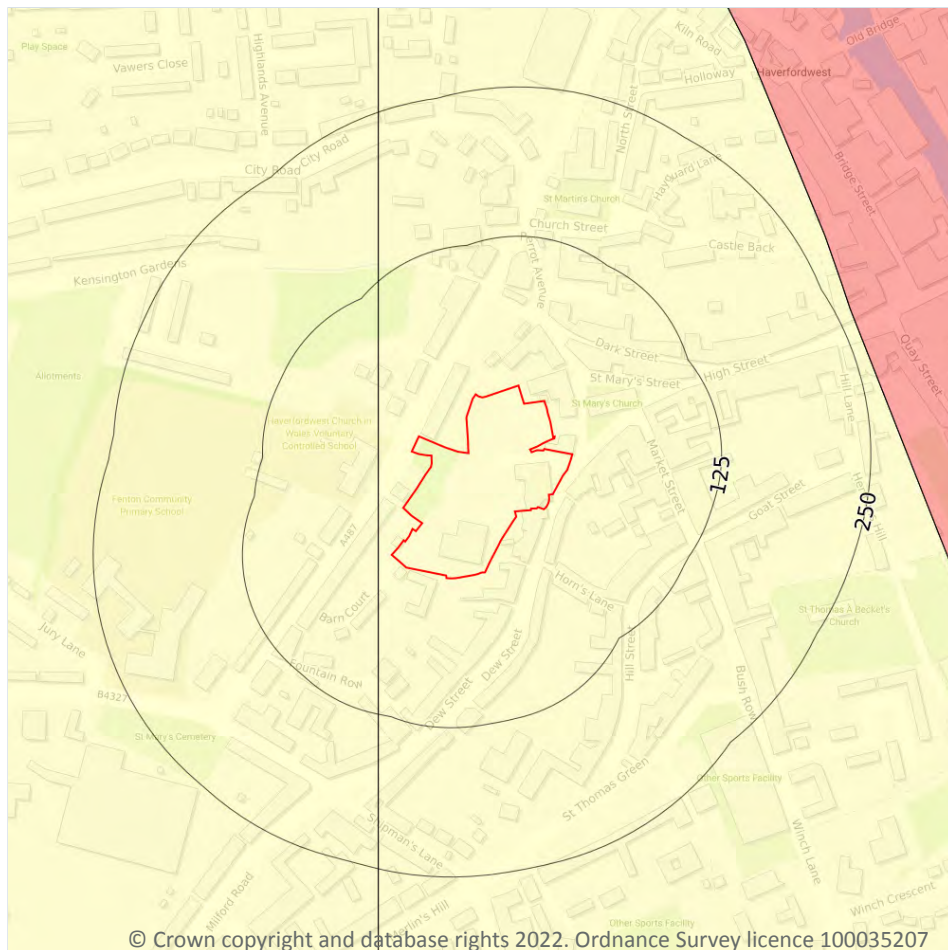
Location	Hazard rating	Details
On site	Negligible	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.

Location	Hazard rating	Details
11m W	Negligible	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Compressible deposits



17.3 Compressible deposits

Records within 50m

2

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

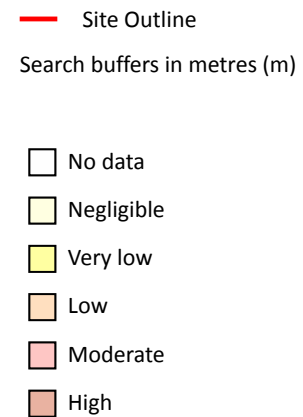
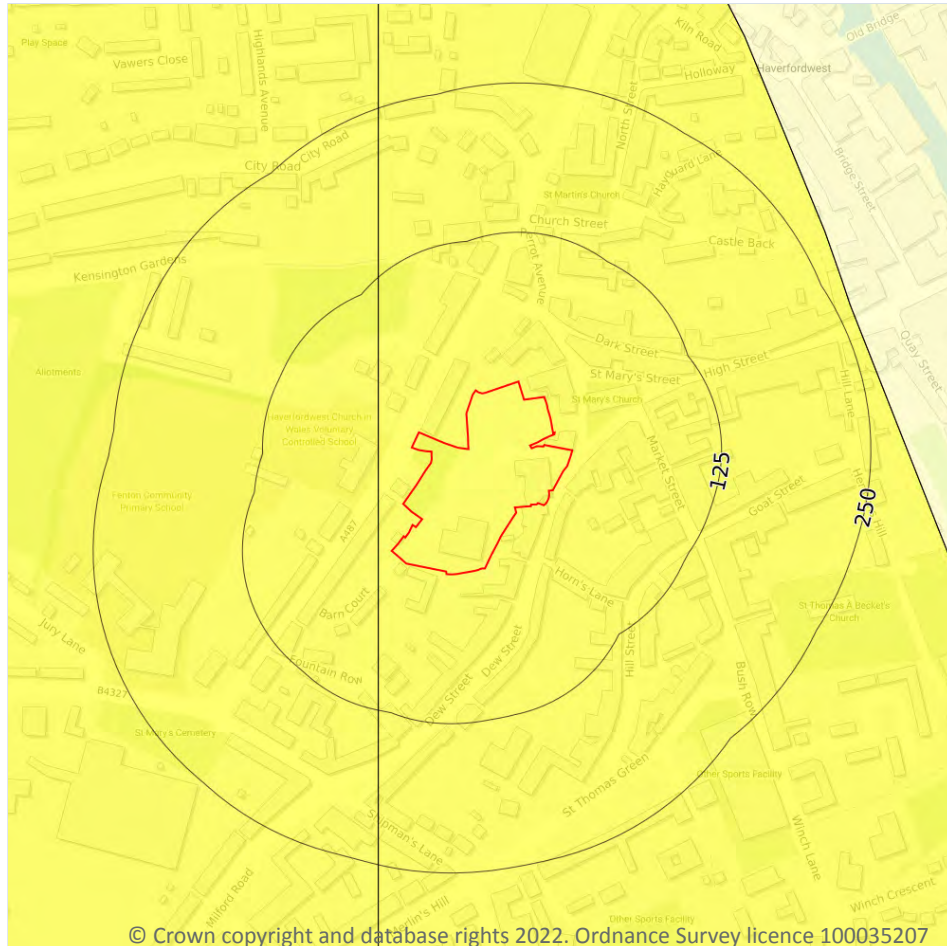
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 108**

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.
11m W	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Collapsible deposits



17.4 Collapsible deposits

Records within 50m

2

The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

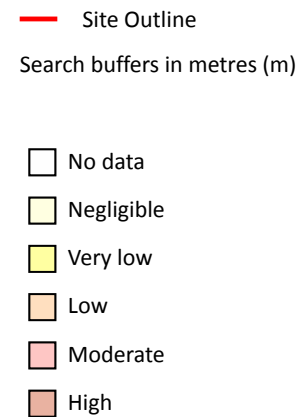
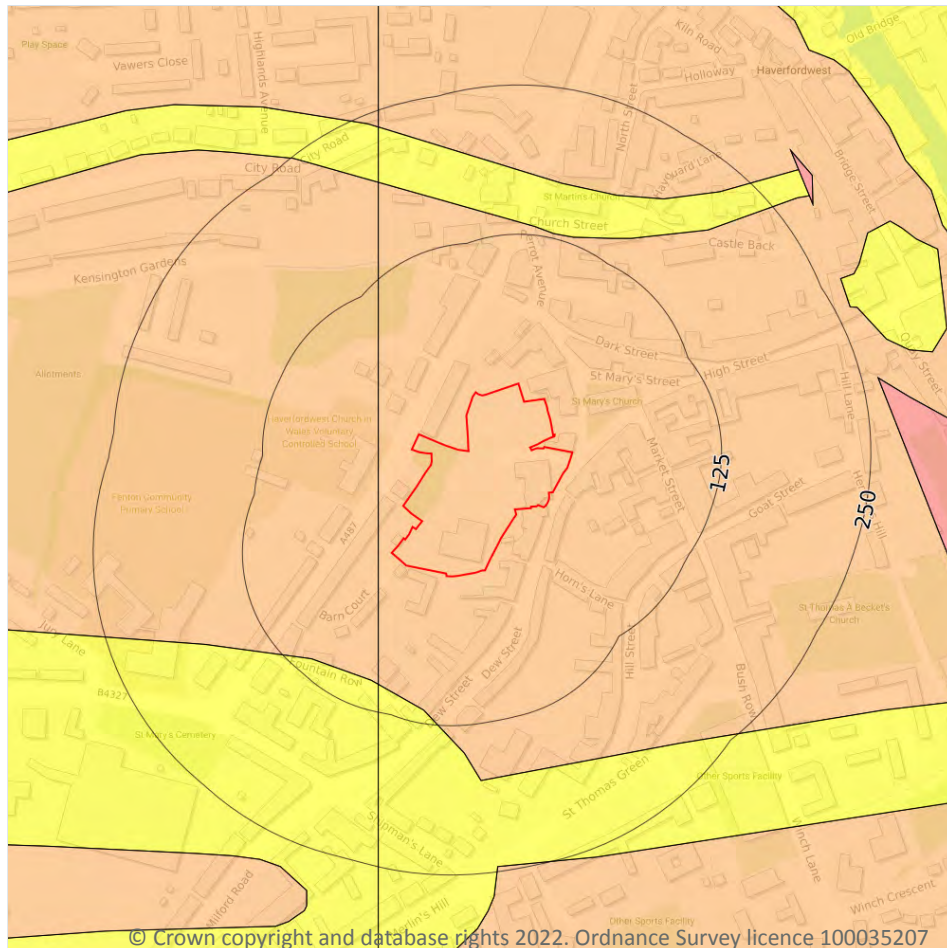
Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 109**

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.
11m W	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Landslides



17.5 Landslides

Records within 50m

2

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 110**

Location	Hazard rating	Details
On site	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.

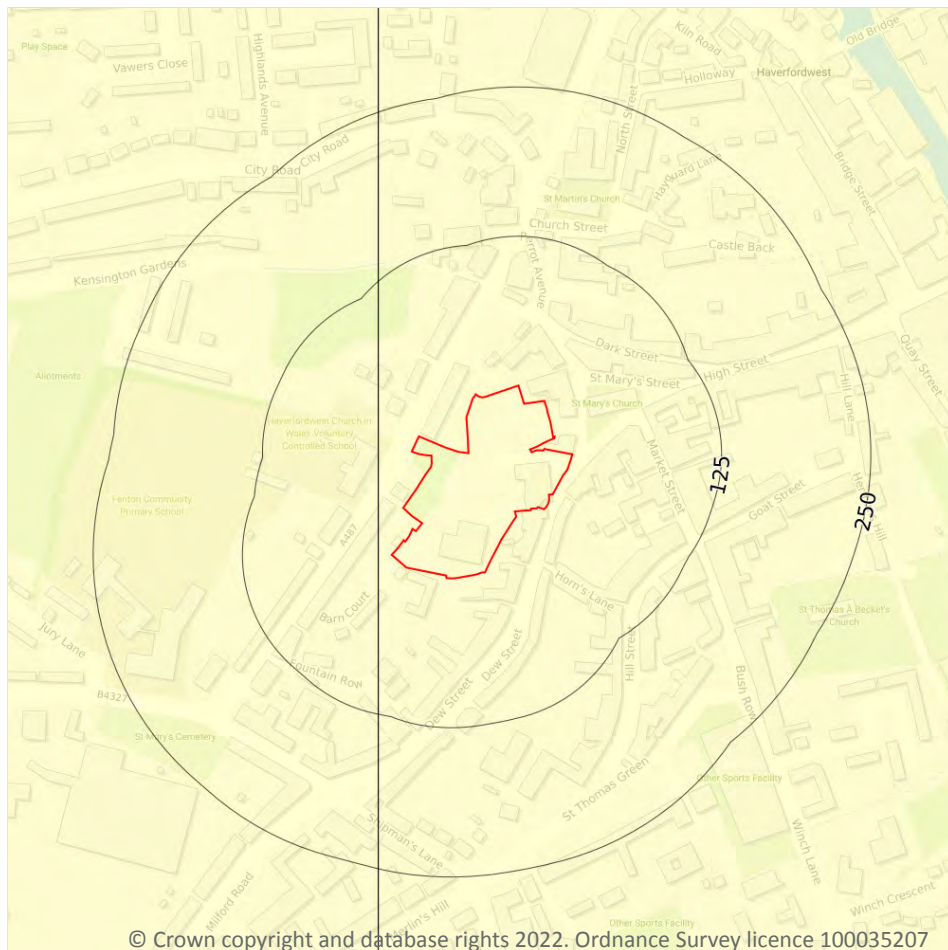


Location	Hazard rating	Details
11m W	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Ground dissolution of soluble rocks



- Site Outline**
- Search buffers in metres (m)**
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.6 Ground dissolution of soluble rocks

Records within 50m

2

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 112**

Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

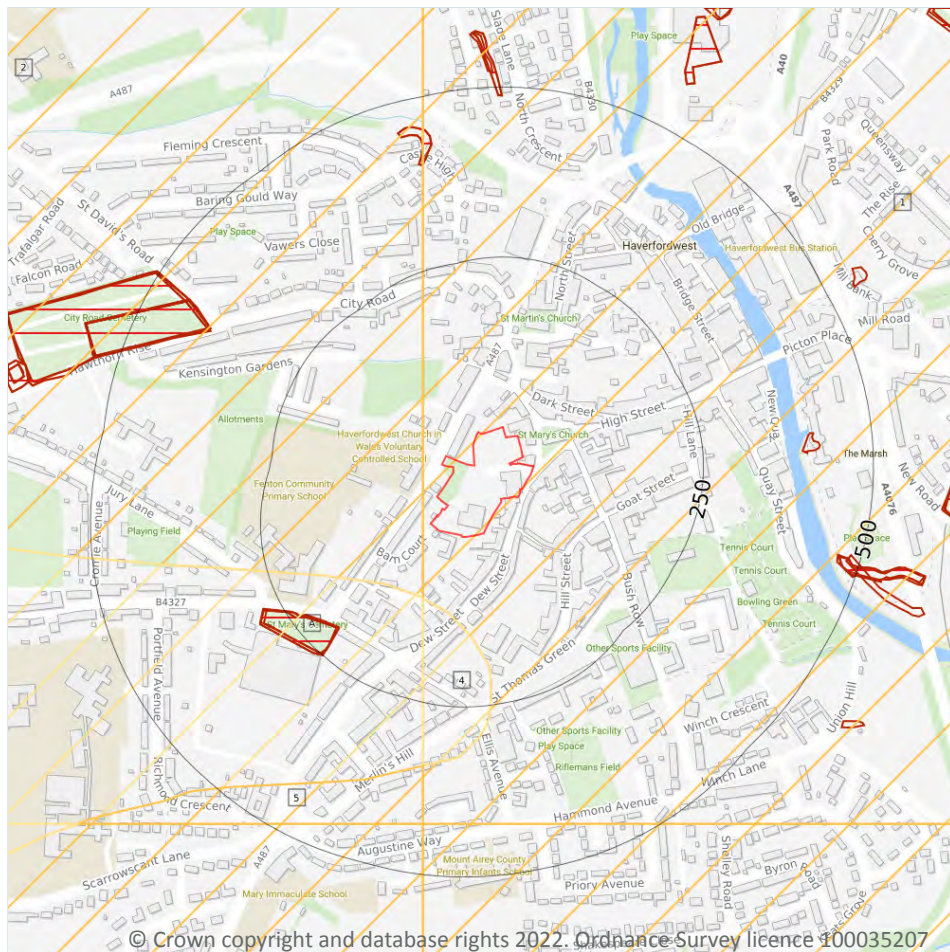


Location	Hazard rating	Details
11m W	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

This data is sourced from the British Geological Survey.



18 Mining, ground workings and natural cavities



- Site Outline
- Search buffers in metres (m)
- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities
- Non Coal Mining
- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m

0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m**0**

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m**4**

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 114**

ID	Location	Land Use	Year of mapping	Mapping scale
A	204m SW	Cemetery	1939	1:10560
A	205m SW	Cemetery	1948	1:10560
A	206m SW	Cemetery	1974	1:10000
A	206m SW	Cemetery	1963	1:10560

This data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m**0**

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m**0**

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.



18.6 Non-coal mining

Records within 1000m

8

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on **page 114**

ID	Location	Name	Commodity	Class	Likelihood
1	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
2	11m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
3	100m S	Not available	Vein Mineral	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered
4	102m S	Not available	Vein Mineral	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered
5	342m S	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
7	422m S	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
8	426m S	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
11	682m SW	Not available	Vein Mineral	A	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

This data is sourced from the British Geological Survey.



18.7 Mining cavities

Records within 1000m

0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site

0

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site

0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site

0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site

0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0
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Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

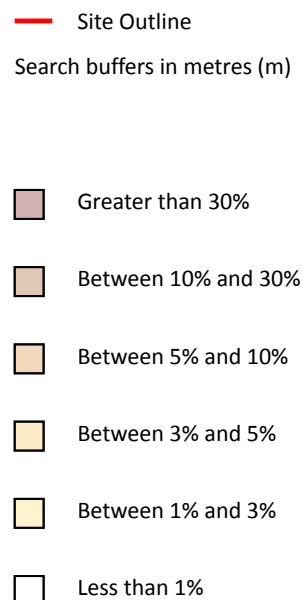
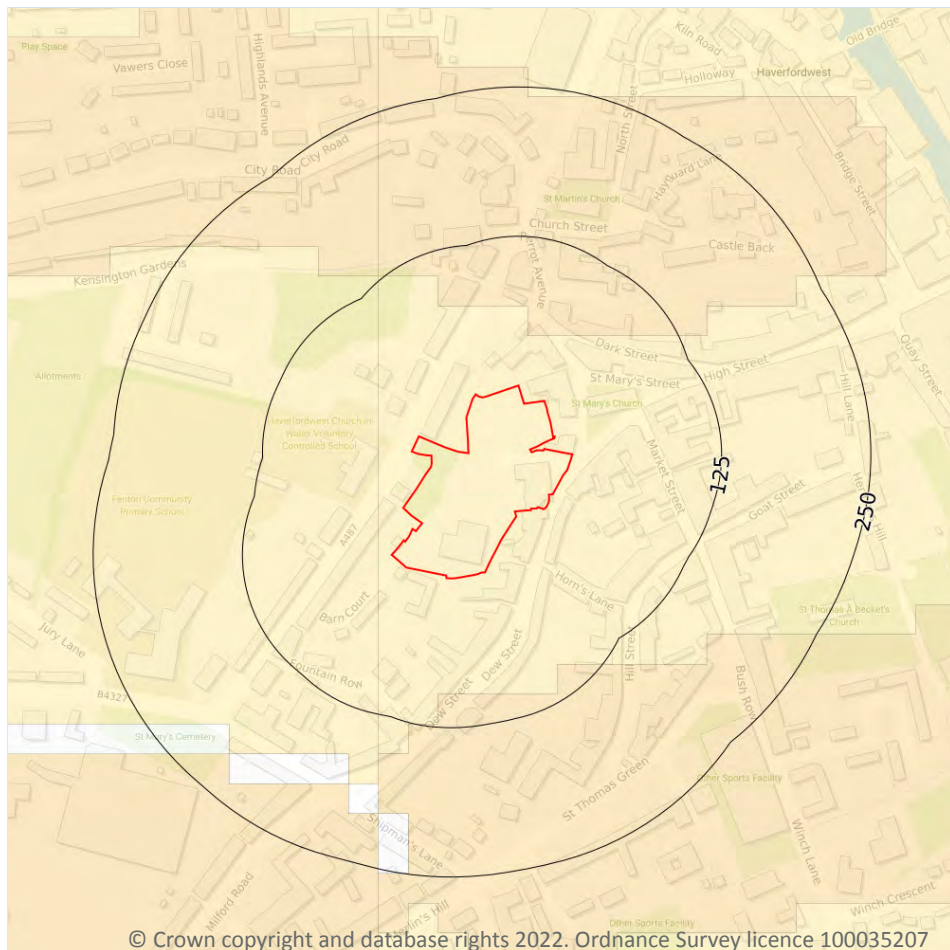
18.13 Clay mining

Records on site	0
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Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



19.1 Radon

Records on site

1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 119**

Location	Estimated properties affected	Radon Protection Measures required
On site	Between 1% and 3%	None

This data is sourced from the British Geological Survey and Public Health England.



20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

4

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
11m W	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
28m W	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m

0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.



21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m**0**

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m**0**

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m**0**

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m**0**

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m**0**

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.



This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m

0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m

0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m

0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m

0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m

0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 Ltd.



Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see <https://www.groundsure.com/sources-reference>.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: <https://www.groundsure.com/terms-and-conditions-jan-2020/>.



APPENDIX IV – ENGINEER’S WINDOWLES SAMPLE LOGS

Contract : Haverfordwest Library Client : Ateb Group								Window Sample No. WS01		
Dates : 13/9/22 - 13/9/22 Location : Tarmac Car Park				Job Number : Q0912 Engineer : CB3 Consult		Ground Level : 29.39 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 195037.99 E 215438.56 N <i>Co-ordinates to National Grid</i>				
Samples		Sample Run		Tests		STRATA				
Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thickness)	DESCRIPTION	Legend	Red. Level A.O.D.	Water
0.50 - 1.00	B 1			0.60	SPT (C) 32 (3-4-4-8-10-10)	(0.10)	Tarmac.		29.29	
						0.10	Dense greyish brown sandy angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND - SUB-BASE)			
						(0.40)				
						0.50				
				1.10	SPT (C) 50/211mm (10-12-16-22-12/61mm-)	(0.50)	Very dense bluish grey slightly clayey slightly sandy angular GRAVEL of siltstone. (COMPLETELY WEATHERED BEDROCK)		28.89	
						1.00			28.39	

Equipment used: Dando Terrier
Remarks: 1.) Hand pit dug to 0.50m,
 2.) CPT refusal at 1.10m,
 3.) No groundwater encountered.

Quantum Geotech Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator: RM/AW	Logged By: T.Goodrick	Sheet No. 1 Of 1	m Per Page 8	All measurements in metres unless otherwise stated	
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Contract : Haverfordwest Library

Client : Ateb Group

Borehole No.

WS01

Dates : 13/9/22 -

Job Number : Q0912

Ground Level : 29.39 m A.O.D.
Level to Ordnance Datum

Location : Tarmac Car Park

Engineer : CB3 Consult

Coordinates: 195037.99 E
215438.56 N
Co-ordinates to National Grid



Plas Newydd, Llanedi, Pontarddulais, Swansea
SA4 0FQ
Tel: 01554 744880
email: enquiries@quantumgeotech.co.uk

Operator:
RM/AW

Logged By:
T.Goodrick

Sheet No.
1 Of 1

m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Haverfordwest Library Client : Ateb Group										Window Sample No. WS02						
Dates : 13/9/22 - 13/9/22 Location : Tarmac Car Park					Job Number : Q0912 Engineer : CB3 Consult			Ground Level : 28.39 m A.O.D. <i>Level to Ordinance Datum</i> Coordinates: 195041.36 E 215457.33 N <i>Co-ordinates to National Grid</i>								
Samples		Sample Run		Tests		STRATA										
Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thickness)	DESCRIPTION	Legend	Red. Level . A.O.D.	Water	Install/ Backfill					
1	1.00 1.00	B 1 D 1		1.00	SPT (C) 10 (1-2-2-3-3-2)	(0.10)	Tarmac.		28.29							
						0.10	Dense greyish brown sandy angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND - SUB-BASE)									
2	1.00 1.00	B 1 D 1		1.00	SPT (C) 10 (1-2-2-3-3-2)	(0.70)										
						0.80	Soft orangish brown slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of limestone. (REWORKED GROUND)		27.59							
	1.00 1.00	B 1 D 1		2.00	SPT (C) 50/237mm (7-10-12-15-20-3/12mm)	(0.60)										
						1.40	Very dense bluish grey slightly clayey slightly sandy angular GRAVEL of siltstone. (COMPLETELY WEATHERED BEDROCK)		26.99							
						2.00			26.39							
Equipment used: Dando terrier Remarks: 1.) Hand pit dug to 0.50m, 2.) CPT refusal at 2.00m, 3.) Installed standpipe at 2.00m, 4.) No groundwater encountered.																
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Contract : Haverfordwest Library

Client : Ateb Group

Borehole No.

WS02

Dates : 13/9/22 -

Job Number : Q0912

Ground Level : 28.39 m A.O.D.
Level to Ordnance Datum

Location : Tarmac Car Park

Engineer : CB3 Consult

Coordinates: 195041.36 E
215457.33 N
Co-ordinates to National Grid



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Contract : Haverfordwest Library Client : Ateb Group										Window Sample No. WS03						
Dates : 14/9/22 - 14/9/22 Location : Tarmac Car Park					Job Number : Q0912 Engineer : CB3 Consult			Ground Level : 26.75 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 195071.77 E 215489.81 N <i>Co-ordinates to National Grid</i>								
Samples		Sample Run		Tests		STRATA										
Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thickness)	DESCRIPTION	Legend	Red. Level A.O.D.	Water	Install/ Backfill					
						(0.10)	Tarmac.		26.65							
0.30 - 0.80	B 1					0.10	Dense grey gravelly fine to coarse SAND with a high cobble content of angular brick and limestone. Gravel is angular to subangular fine to coarse of brick, limestone and shell fragments. (MADE GROUND)									
0.50	ES 1					(0.70)										
						0.80	Medium dense black sandy angular to subangular GRAVEL of coal. (MADE GROUND)		25.95							
1.00 - 2.50	B 2			1.00	SPT (C) 2 (1-0-0-1-0-1)	0.90			25.85							
						(0.10)	Firm orangish brown gravelly sandy CLAY. Gravel is angular to subangular fine to coarse of limestone. (REWORKED GROUND)		25.75							
1.50	ES 2					1.00										
						(1.70)	Soft dark brown slightly clayey gravelly SILT. Gravel is angular to subangular fine to coarse of sandstone, coal, limestone and porcelain. (MADE GROUND)									
				2.00	SPT (C) 1 (0-0-0-1-0-0)											
						2.70	Soft bluish grey sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of limestone. (COMPLETELY WEATHERED BEDROCK)		24.05							
3.00	D 1			3.00	SPT (C) 6 (1-1-1-1-2-2)	(0.80)										
						3.50	Dense bluish grey to orangish brown clayey sandy angular to subangular fine to coarse GRAVEL of limestone. (COMPLETELY WEATHERED BEDROCK)		23.25							
3.70	D 2					(0.50)										
				4.00	SPT (C) 50/28mm (14-11/16mm-50/28mm--)	4.00			22.75							
Equipment used: Dando Terrier Remarks: 1.) Hand pit dug to 1.00m, 2.) CPT refusal at 4.00m, 3.) Installed standpipe from 4.00m, 4.) No groundwater encountered.																
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Contract : Haverfordwest Library

Client : Ateb Group

Borehole No.

WS03

Dates : 14/9/22 -

Job Number : Q0912

Ground Level : 26.75 m A.O.D.
Level to Ordnance Datum

Location : Tarmac Car Park

Engineer : CB3 Consult

Coordinates: 195071.77 E
215489.81 N
Co-ordinates to National Grid



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Contract : Haverfordwest Library Client : Ateb Group								Window Sample No. WS04		
Dates : 14/9/22 - 14/9/22 Location : Tarmac Car Park				Job Number : Q0912 Engineer : CB3 Consult		Ground Level : 28.47 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 195112.25 E 215490.10 N <i>Co-ordinates to National Grid</i>				
Samples		Sample Run		Tests		STRATA				
Depth	Type No.	Diam. (mm)	Recovery (%)	Depth	SPT & Hand Vane Results	Depth (Thickness)	DESCRIPTION	Legend	Red. Level A.O.D.	Water
0.10	B.5					(0.10)	Tarmac.		28.37	
						0.10 (0.40)	Loose brown angular to subangular fine to coarse GRAVEL of sandstone. (MADE GROUND)			
						0.50	Borehole continued with dynamic probe to 4.00m		27.97	
1										
2						(3.50)				
3										
4						4.00			24.47	
Equipment used: Dando Terrier Remarks: 1.) Hand dug pit to 0.40m, 2.) Dynamic probe from 0.40m to refusal at 5.00m, 3.) No groundwater encountered.										
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Contract : Haverfordwest Library Client : Ateb Group										Dynamic Probe WS04	
Dates : 14/9/22 - Location : Tarmac Car Park					Job Number : Q0912 Engineer : CB3 Consult					Ground Level : 28.47 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 195112.25 E 215490.10 N <i>Co-ordinates to National Grid</i>	

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
0.5	5	1	0	3	4												
1.0	2	0	0	0	0												
1.5	0	0	0	0	0												
2.0	1	2	2	1	1												
2.5	1	1	1	0	1												
3.0	1	4	1	1	3												
3.5	2	2	4	5	6												
4.0	30																
4.5																	
5.0																	
5.5																	
6.0																	
6.5																	
7.0																	
7.5																	
8.0																	
8.5																	
9.0																	
9.5																	

Equipment: Dando Terrier Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2					Comments:				
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Contract : Haverfordwest Library

Client : Ateb Group

Borehole No.

WS05

Dates : 14/9/22 -

Job Number : Q0912

Ground Level : 24.85 m A.O.D.
Level to Ordnance Datum

Location : Tarmac Car Park

Engineer : CB3 Consult

Coordinates: 195080.98 E
215543.67 N
Co-ordinates to National Grid



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Contract : Haverfordwest Library Client : Ateb Group										Dynamic Probe WS05							
Dates : 14/9/22 - Location : Tarmac Car Park					Job Number : Q0912 Engineer : CB3 Consult					Ground Level : 24.85 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 195080.98 E 215543.67 N <i>Co-ordinates to National Grid</i>							
Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
0.5																	
1.0																	
1.5																	
2.0																	
2.5																	
3.0																	
3.5																	
4.0																	
4.5																	
5.0																	
5.5																	
6.0	2	1															
			5														
				5													
6.5	9	7															
			8														
				9													
7.0	12	15															
			3														
				15													
7.5	25				25												
8.0																	
8.5																	
9.0																	
9.5																	
Equipment: Dando Terrier										Comments:							
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2																	
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APPENDIX V – ENGINEER’S TRIAL PIT LOGS

Contract : Haverfordwest Library Client : Ateb Group							Trial Pit No. TP01	
Dates : 13/9/22 - 13/9/22 Location : Grass Siding			Job Number : Q0912 Engineer : CB3 Consult		Ground Level : 30.37 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 195021.71 E 215439.42 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	
1	0.30 -	ES1			0.40	Grass over medium dense brown sandy SILT with rootlets. (TOPSOIL)			
	0.50 - 1.00	B1 B2			0.40 0.10	Medium dense orangish brown clayey gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of limestone. (REWORKED GROUND)		29.97	
					0.50	Firm dark brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of brick. (MADE GROUND)		29.87	
	0.70 -	ES2			0.40				
	1.50 - 2.00	ES3			0.90	Dense greenish grey very sandy gravelly CLAY with a high cobble and low boulder content of subangular limestone. Gravel is angular to subangular fine to coarse of limestone. (COMPLETELY WEATHERED BEDROCK)		29.47	
				1.10					
2					2.00			28.37	

PLAN 		Groundwater: Stability: Stable Shoring: None		Remarks: 1.) Difficulty excavating from 1.50m, 2.) Pit terminated at 2.00m, 3.) No groundwater encountered.	
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Equipment Used: Takeuchi 1.6t					
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Contract : Haverfordwest Library

Client : Ateb Group

Trial Pit No.

TP01

Dates : 13/9/22 - 13/9/22

Job Number : Q0912

Ground Level : 30.37 m A.O.D.
Level to Ordnance Datum

Location : Grass Siding

Engineer : CB3 Consult

Coordinates: 195021.71 E
215439.42 N
Co-ordinates to National Grid



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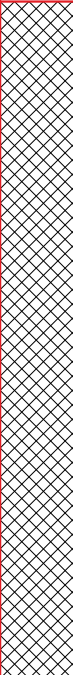
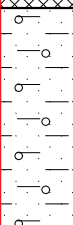
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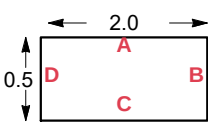
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Contract : Haverfordwest Library Client : Ateb Group							Trial Pit No. TP02	
Dates : 13/9/22 - 13/9/22 Location : Grass Siding			Job Number : Q0912 Engineer : CB3 Consult		Ground Level : 27.49 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 195071.77 E 215478.44 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	
1	0.30 -	ES1				Scrub over dark brown sandy gravelly SILT. Gravel is angular to subangular fine to coarse of brick, metal, glass, plastic. (MADE GROUND)			
	0.50 - 1.00	B1							
	0.70 -	ES2							
	1.00 - 1.50	B2							
	1.00 -	ES3							
2	1.50 - 2.00	B3			1.50	Dense clayey gravelly fine to coarse SAND with a high cobble and low boulder content of subangular limestone. Gravel is angular to subangular fine to coarse of limestone. (COMPLETELY WEATHERED BEDROCK)		25.99	
					0.50				
	2.00 -	ES4			2.00			25.49	

PLAN



Groundwater: Slow groundwater seepage.

Stability: Stable

Shoring: None

Remarks: 1.) Difficulty excavating from 1.50m,
 2.) Pit terminated at 2.00m,
 3.) Groundwater seepage at 1.50m.

Equipment Used: Takeuchi 1.6t

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Contract : Haverfordwest Library

Client : Ateb Group

Trial Pit No.

TP02

Dates : 13/9/22 - 13/9/22

Job Number : Q0912

Ground Level : 27.49 m A.O.D.
Level to Ordnance Datum

Location : Grass Siding

Engineer : CB3 Consult

Coordinates: 195071.77 E
215478.44 N
Co-ordinates to National Grid



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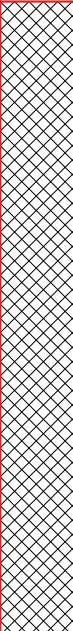
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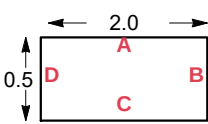
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Contract : Haverfordwest Library Client : Ateb Group							Trial Pit No. TP03	
Dates : 13/9/22 - 13/9/22 Location : Gravel Car Park			Job Number : Q0912 Engineer : CB3 Consult		Ground Level : 24.99 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 195108.39 E 215531.94 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	
1	0.50 - 1.00 0.50 -	B1 ES1			1.40	Dense brown slightly sandy angular to subangular fine to coarse GRAVEL of sandstone, brick, concrete and plastic with a high cobble content of subangular brick and concrete. (MADE GROUND)			
	1.00 -	ES2							
2	1.50 - 2.00 1.50 -	B2 ES3			0.60	Firm to stiff brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of limestone. (COMPLETELY WEATHERED BEDROCK)		23.59	
					2.00				
								22.99	

PLAN 		Groundwater: Stability: Unstable from 0.50m Shoring: None		Remarks: 1.) Difficulty excavating from 1.50m, 2.) Pit terminated at 2.00m, 3.) No groundwater encountered.	
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Equipment Used: Takeuchi 1.6t					
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Contract : Haverfordwest Library

Client : Ateb Group

Trial Pit No.

TP03

Dates : 13/9/22 - 13/9/22

Job Number : Q0912

Ground Level : 24.99 m A.O.D.
Level to Ordnance Datum

Location : Gravel Car Park

Engineer : CB3 Consult

Coordinates: 195108.39 E
215531.94 N
Co-ordinates to National Grid



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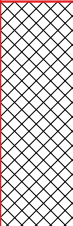
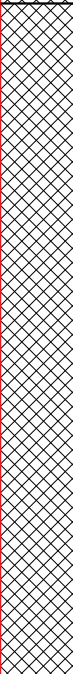
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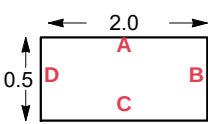
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Contract : Haverfordwest Library Client : Ateb Group							Trial Pit No. TP04	
Dates : 13/9/22 - 13/9/22 Location : Gravel Car Park			Job Number : Q0912 Engineer : CB3 Consult		Ground Level : 24.53 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 195102.11 E 215565.42 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	
1	0.10 - 0.50	B1				Very dense brown slightly sandy angular to subangular fine to coarse GRAVEL of sandstone, brick and concrete with a high cobble content of subangular brick and concrete. (MADE GROUND)			
	0.30 -	ES1			0.50				
	0.70 -	ES2			0.50	Loose to medium dense sandy angular to subangular fine to coarse GRAVEL of sandstone, plastic, metal and suspected asbestos (ACM) with a high cobble content of subangular sandstone. (MADE GROUND)		24.03	
	1.00 - 1.50 1.00 -	B2 ES3			1.50				
2					2.00			22.53	

PLAN 		Groundwater: Stability: Unstable from 0.50m Shoring: None		Remarks: 1.) Difficulty excavating from 1.50m, 2.) Old stone wall observed running, 3.) Pit terminated at 2.00m, 4.) No groundwater encountered.	
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Equipment Used: Takeuchi 1.6t					
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Contract : Haverfordwest Library

Client : Ateb Group

Trial Pit No.

TP04

Dates : 13/9/22 - 13/9/22

Job Number : Q0912

Ground Level : 24.53 m A.O.D.
Level to Ordnance Datum

Location : Gravel Car Park

Engineer : CB3 Consult

Coordinates: 195102.11 E
215565.42 N
Co-ordinates to National Grid



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Contract : Haverfordwest Library

Client : Ateb Group

Trial Pit No.

TP04

Dates : 13/9/22 - 13/9/22

Job Number : Q0912

Ground Level : 24.53 m A.O.D.
Level to Ordnance Datum

Location : Gravel Car Park

Engineer : CB3 Consult

Coordinates: 195102.11 E
215565.42 N
Co-ordinates to National Grid



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APPENDIX VI – DYNAMIC PROBE RECORDS

Contract : Haverfordwest Library										Dynamic Probe							
Client : Ateb Group										DP01							
Dates : 14/9/22 - 14/9/22					Job Number : Q0912					Ground Level : 24.46 m A.O.D. <i>Level to Ordnance Datum</i>							
Location : Gravel Car Park					Engineer : CB3 Consult					Coordinates: 195102.12 E 215565.15 N <i>Co-ordinates to National Grid</i>							
Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
0.5	2	2															
			1														
				0													
	0				1												
		0															
			0														
1.0				0													
	0				1												
		0															
			0														
1.5				1													
	0				1												
		1															
			0														
2.0				1													
	1				0												
		2															
			1														
2.5				2													
	1				1												
		1															
			3														
3.0				2													
	2				2												
		2															
			1														
3.5				1													
	1				1												
		2															
			1														
4.0				2													
	3				1												
		0															
			0														
4.5				1													
	1				1												
		1															
			1														
5.0				1													
	0				1												
		1															
			1														
5.5				0													
	4				21												
		10															
			15														
6.0				50													
6.5																	
7.0																	
7.5																	
8.0																	
8.5																	
9.0																	
9.5																	
Equipment:										Comments:							
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2																	
 Quantum Geotech Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk					Operator:		Logged By:		Sheet No. 1 Of 1		m Per Page 10		All measurements in metres unless otherwise stated				

Form Name: DYNAMIC PROBE. Version 2.10.000, 29/04/13 Output By: Tyler Goodrick. Library File: C:\USERS\TYLER GOODRICK\QUANTUM GEOTECHNIC LTD\QUANTUM GEOTECHNICAL - COMPANY\GINT\QUANTUM

Contract : Haverfordwest Library Client : Ateb Group										Dynamic Probe DP02	
Dates : 14/9/22 - 14/9/22 Location : Gravel Car Park					Job Number : Q0912 Engineer : CB3 Consult					Ground Level : 24.79 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 195102.76 E 215546.97 N <i>Co-ordinates to National Grid</i>	

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
0.0	6	0															
0.1			1														
0.2				0													
0.3	13				4												
0.4		20															
0.5			16														
0.6				28													
0.7					50												
0.8																	
0.9																	
1.0																	
1.1																	
1.2																	
1.3																	
1.4																	
1.5																	
1.6																	
1.7																	
1.8																	
1.9																	
2.0																	
2.1																	
2.2																	
2.3																	
2.4																	
2.5																	
2.6																	
2.7																	
2.8																	
2.9																	
3.0																	
3.1																	
3.2																	
3.3																	
3.4																	
3.5																	
3.6																	
3.7																	
3.8																	
3.9																	
4.0																	
4.1																	
4.2																	
4.3																	
4.4																	
4.5																	
4.6																	
4.7																	
4.8																	
4.9																	
5.0																	
5.1																	
5.2																	
5.3																	
5.4																	
5.5																	
5.6																	
5.7																	
5.8																	
5.9																	
6.0																	
6.1																	
6.2																	
6.3																	
6.4																	
6.5																	
6.6																	
6.7																	
6.8																	
6.9																	
7.0																	
7.1																	
7.2																	
7.3																	
7.4																	
7.5																	
7.6																	
7.7																	
7.8																	
7.9																	
8.0																	
8.1																	
8.2																	
8.3																	
8.4																	
8.5																	
8.6																	
8.7																	
8.8																	
8.9																	
9.0																	
9.1																	
9.2																	
9.3																	
9.4																	
9.5																	

Equipment: Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2					Comments:				
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 Quantum Geotech Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator:	Logged By:	Sheet No. 1 Of 1	m Per Page 10	All measurements in metres unless otherwise stated	 AGS
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Form Name: DYNAMIC PROBE. Version 2.10.000, 29/04/13 Output By: Tyler Goodrick. Library File: C:\USERS\TYLER GOODRICK\QUANTUM GEOTECHNIC LTD\QUANTUM GEOTECHNICAL - COMPANY\GINT\QUANTUM

Contract : Haverfordwest Library										Dynamic Probe DP03							
Client : Ateb Group																	
Dates : 14/9/22 - 14/9/22					Job Number : Q0912					Ground Level : 24.95 m A.O.D. <i>Level to Ordnance Datum</i>							
Location : Gravel Car Park					Engineer : CB3 Consult					Coordinates: 195104.98 E 215529.11 N <i>Co-ordinates to National Grid</i>							
Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
	30	19															
			21														
0.5				60												>>	
1.0																	
1.5																	
2.0																	
2.5																	
3.0																	
3.5																	
4.0																	
4.5																	
5.0																	
5.5																	
6.0																	
6.5																	
7.0																	
7.5																	
8.0																	
8.5																	
9.0																	
9.5																	
Equipment:										Comments:							
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2																	
 Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk					Operator:		Logged By:		Sheet No. 1 Of 1		m Per Page 10		All measurements in metres unless otherwise stated				

Contract : Haverfordwest Library										Dynamic Probe DP05							
Client : Ateb Group																	
Dates : 14/9/22 - 14/9/22					Job Number : Q0912					Ground Level : 24.77 m A.O.D. <i>Level to Ordnance Datum</i>							
Location : Gravel Car Park					Engineer : CB3 Consult					Coordinates: 195125.37 E 215548.95 N <i>Co-ordinates to National Grid</i>							
Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
	12																
		11															
			7														
				0													
0.5	1				0												
		0															
			1														
				0													
1.0	1				1												
		0															
			0														
1.5				0													
	0				0												
		0															
			0														
2.0	1				0												
		2															
			2														
				5													
2.5					6												
	6																
		6															
			7														
				12													
3.0					16												
	10																
		28															
			62														
3.5																	
4.0																	
4.5																	
5.0																	
5.5																	
6.0																	
6.5																	
7.0																	
7.5																	
8.0																	
8.5																	
9.0																	
9.5																	
Equipment:										Comments:							
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2																	
 Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk					Operator:		Logged By:		Sheet No. 1 Of 1		m Per Page 10		All measurements in metres unless otherwise stated				

APPENDIX VII – TRL DCP-CBR RECORDS

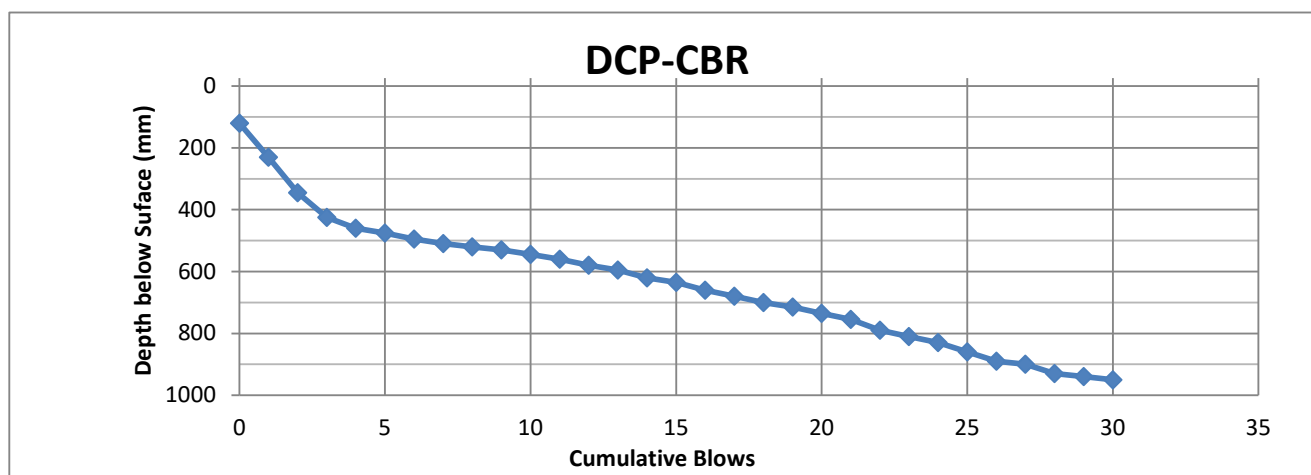
Determination of Equivalent CBR using TRL Dynamic Cone Penetrometer DCP

CBR

Relationship based on Kleyn & Van Heerden (60° Cone) - TRL, DMRB HD 29/08 & TP 12

Client Name:	ATEB C/O CB3 CONSULT LTD			
Contract Name:	Former Haverfordwest Library	Contract No.:		Q0912

Site Reference:	TRL DCP01	Lab. Reference:	n/a	Date Tested:	13/09/2022
Sample Location:	DCP01_CBR01			Date Received:	13/09/2022
Supplier:	In-Situ	Source:	n/a		
Depth Start of Test (mm)	120	Tested By:	TG		



CBR Relationship - TRL Equation $\log_{10}(\text{CBR}) = 2.48 - 1.057 * \log_{10}(\text{Penetration Rate})$

Layer No.	Number of Blows		Penetration (mm)		Rate of Penetration (mm/blow)	Equivalent CBR (%)	Remarks
	Start	Finish	Start	Finish			
1	0	5	120	475	71.00	3	
2	5	30	475	950	19.00	13	

Signed: T Goodrick

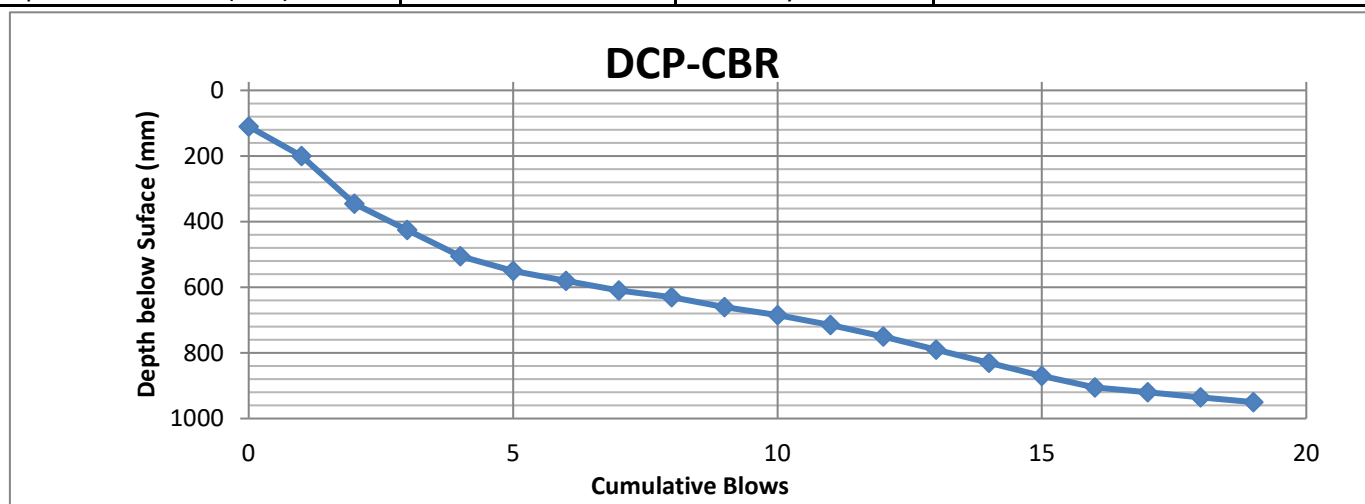
Position: Engineering Geologist

Dated: 13 September 2022

**Determination of Equivalent CBR using TRL Dynamic Cone Penetrometer DCP
CBR Relationship based on Kleyn & Van Heerden (60° Cone) - TRL, DMRB HD 29/08 & TP 12**

Client Name:	ATEB C/O CB3 CONSULT LTD		
Contract Name:	Former Haverfordwest Library	Contract No.:	Q0912

Site Reference:	TRL DCP02	Lab. Reference:	n/a	Date Tested:	13/09/2022
Sample Location:	DCP02_CBR02			Date Received:	13/09/2022
Supplier:	In-Situ	Source:	n/a		
Depth Start of Test (mm)	110	Tested By:	TG		



CBR Relationship - TRL Equation $\log_{10}(\text{CBR}) = 2.48 - 1.057 \cdot \log_{10}(\text{Penetration Rate})$

Layer No.	Number of Blows		Penetration (mm)		Rate of Penetration (mm/blow)	Equivalent CBR (%)	Remarks
	Start	Finish	Start	Finish			
1	0	5	110	550	88.00	3	
2	5	19	550	950	28.57	9	

Signed: T Goodrick
Position: Engineering Geologist
Dated: 13 September 2022

APPENDIX VIII – POST-FIELDWORK LANDGAS & GROUNDWATER MONITORING RECORDS

Page 1 of 1

Installation Date:			13/09/2022	
GL (mAOD)	Pipe	Type	Installation Depth (mbgl)	Response Zone (mbgl)
28.392	A	50mm diameter	2.00	1.0-2.0

[illegible]

Page 1 of 1

Project Name:	Haverfordwest Library
Project No.:	Q0912
BH/TP No.:	WS03
Instruments Used:	Water Dip Meter Probe, GA2000 Gas Analyser

Installation Date:			14/09/2022	
GL (mAOD)	Pipe	Type	Installation Depth (mbgl)	Response Zone (mbgl)
26.748	A	50mm diameter	4.00	2.0-4.0

[illegible]

Page 1 of 1

Installation Date:			14/09/2022	
GL (mAOD)	Pipe	Type	Installation Depth (mbgl)	Response Zone (mbgl)
24.848	A	50mm diameter	3.00	2.0-3.0

[illegible]

APPENDIX IX – GEOTECHNICAL LABORATORY TEST RESULTS



Laboratory Report



Contract Number: 61484

Client Ref: **Q0912**

Client PO:

Date Received: **22-09-2022**

Date Completed: **13-10-2022**

Report Date: **13-10-2022**

Client: **Quantum Geotechnic Ltd**

Plas Newydd

Llanedi

Pontarddulais

Swansea

SA4 0FQ

This report has been checked and approved by:

Brendan Evans

Office Administrator

Contract Title: **Q0912 - Haverfordwest Library**

For the attention of: **Tyler Goodrick**

Test Description	Qty
Samples Received - @ Non Accredited Test	10
Moisture Content of Soil BS1377 : Part 2 : Clause 3.2 : 1990 - * UKAS	5
4 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.3 & 5.3 - * UKAS	4
PSD Wet & Dry Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	5
BRE Full Suite includes pH, water & acid soluble sulphate, total sulphur, magnesium, chloride and nitrate Sub-contracted Test	7
Disposal of samples for job	1

Notes: **Observations and Interpretations are outside the UKAS Accreditation**

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

Approved Signatories:

Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)

Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)

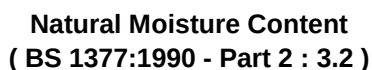
Wayne Honey (Human Resources/ Health and Safety Coordinator)

GEO Site & Testing Services Ltd

Units 3-4, Heol Aur, Dafen, Llanelli, Carmarthenshire, Wales SA14 8QN

Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

[illegible]

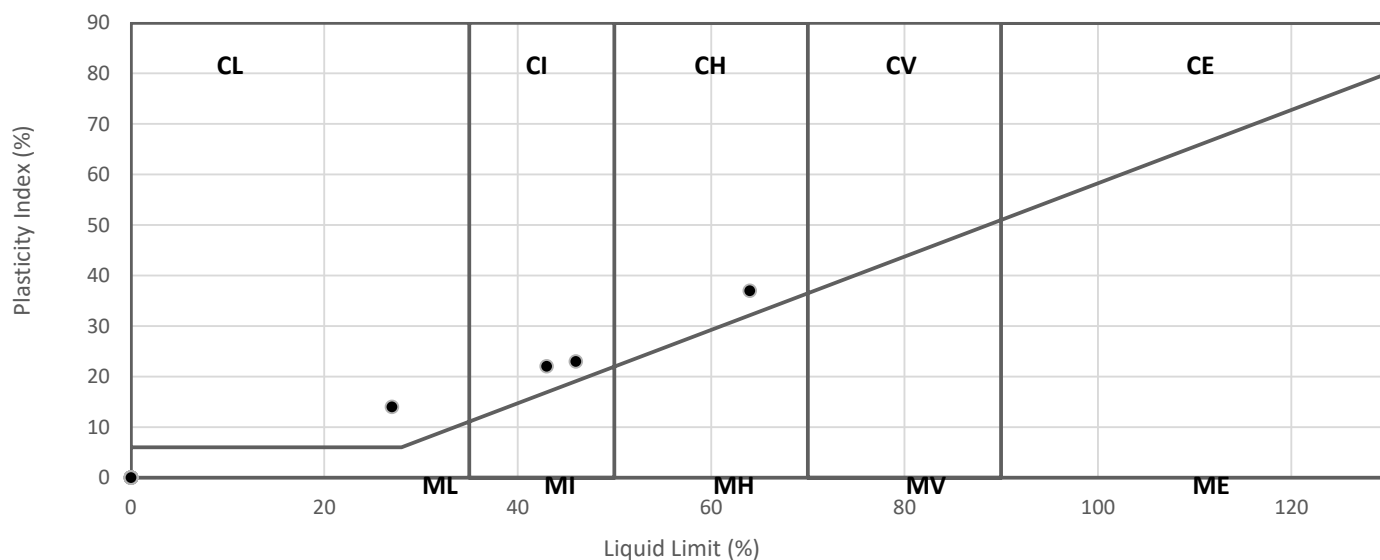


Contract Number	61484	
Project Name	Q0912 - Haverfordwest Library	
Date Tested	04/10/2022	

[illegible]

Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION BS 5930:1999+A2:2010



Operator
Darcy Etheridge

PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number 61484

Borehole/Pit No. TP01

Project Name Q0912 - Haverfordwest Library

Sample No. 2

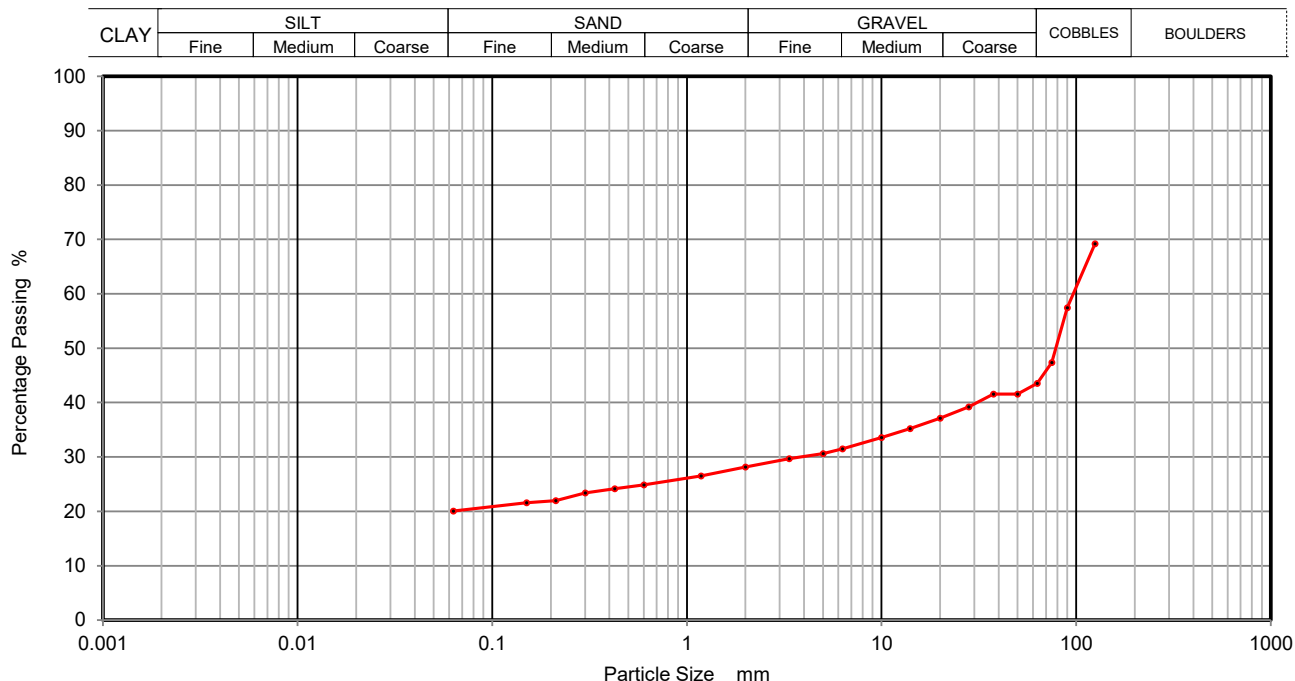
Soil Description Dark grey fine to coarse sandy fine to coarse gravelly SILT/CLAY (with cobbles)

Depth Top 1.50

Depth Base

Date Tested 05/10/2022

Sample Type B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	69		
90	57		
75	47		
63	44		
50	42		
37.5	42		
28	39		
20	37		
14	35		
10	34		
6.3	31		
5	31		
3.35	30		
2	28		
1.18	27		
0.6	25		
0.425	24		
0.3	23		
0.212	22		
0.15	22		
0.063	20		

Sample Proportions	% dry mass
Cobbles	56
Gravel	16
Sand	8
Silt and Clay	20

Remarks
Preparation and testing in accordance with BS1377 unless noted below

Operator

David Edwards

**PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2**

Contract Number 61484

Borehole/Pit No. WS01

Project Name Q0912 - Haverfordwest Library

Sample No. 1

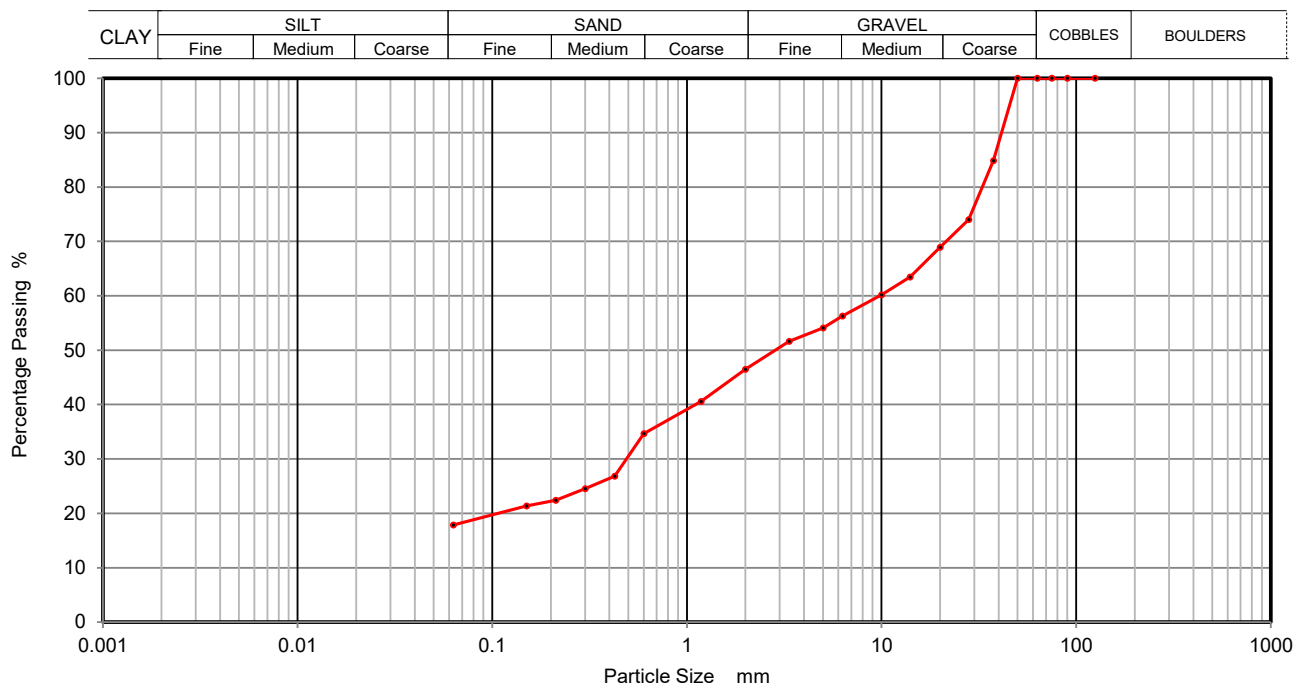
Soil Description Brown silty/clayey fine to coarse sandy fine to coarse GRAVEL

Depth Top 0.50

Depth Base

Date Tested 05/10/2022

Sample Type B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	85		
28	74		
20	69		
14	63		
10	60		
6.3	56		
5	54		
3.35	52		
2	47		
1.18	41		
0.6	35		
0.425	27		
0.3	25		
0.212	22		
0.15	21		
0.063	18		

Sample Proportions	% dry mass
Cobbles	0
Gravel	53
Sand	29
Silt and Clay	18

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator

David Edwards

**PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2**

Contract Number 61484

Borehole/Pit No. WS02

Project Name Q0912 - Haverfordwest Library

Sample No. 1

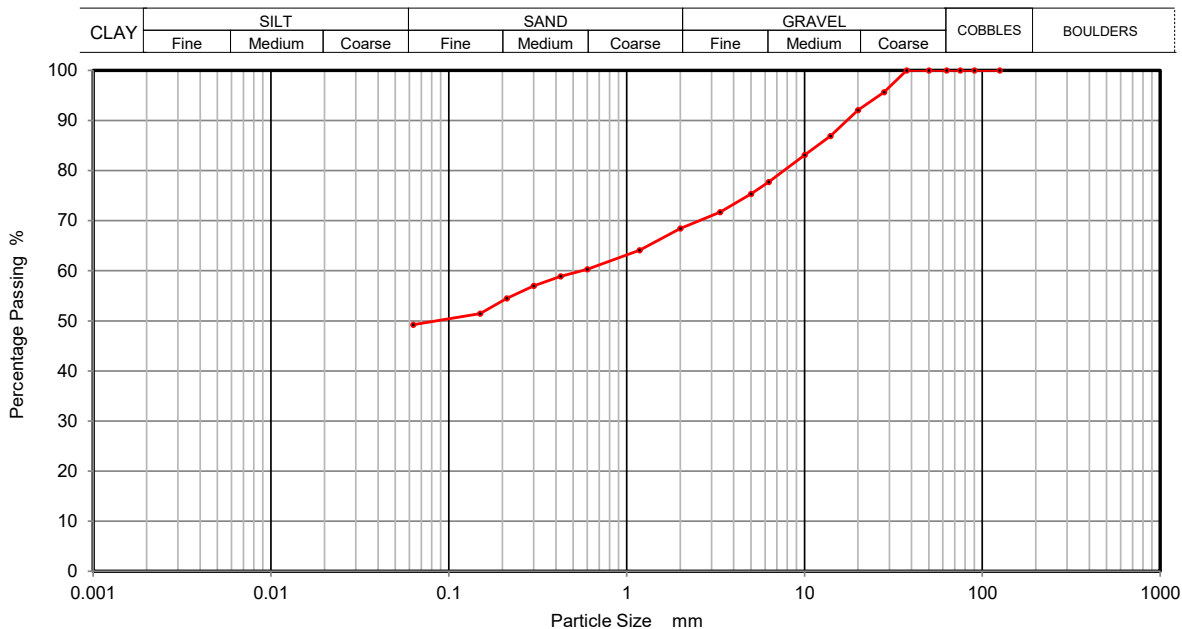
Soil Description Grey fine to coarse sandy fine to coarse gravelly SILT/CLAY

Depth Top 1.30

Depth Base

Date Tested 05/10/2022

Sample Type D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	96		
20	92		
14	87		
10	83		
6.3	78		
5	75		
3.35	72		
2	68		
1.18	64		
0.6	60		
0.425	59		
0.3	57		
0.212	54		
0.15	51		
0.063	49		

Sample Proportions	% dry mass
Cobbles	0
Gravel	32
Sand	19
Silt and Clay	49

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator
David Edwards

PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2

Contract Number 61484

Borehole/Pit No. WS03

Project Name Q0912 - Haverfordwest Library

Sample No. 2

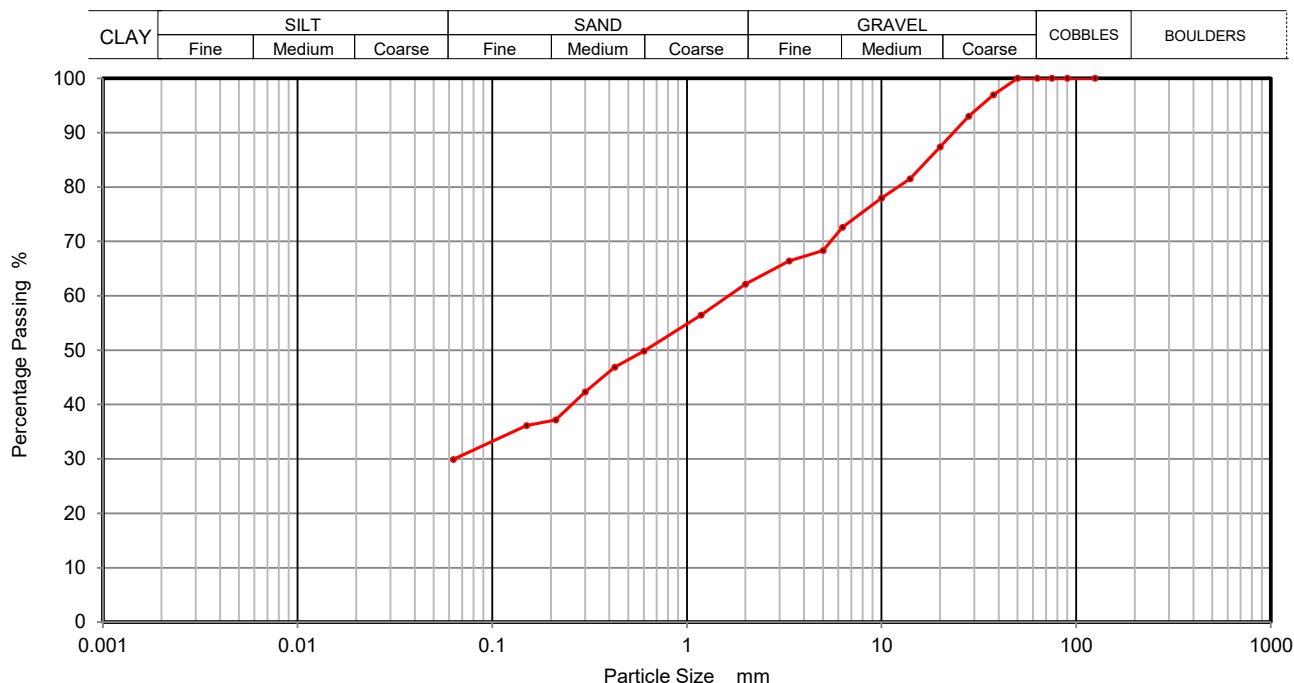
Soil Description Dark grey silty/clayey fine to coarse sandy fine to coarse GRAVEL

Depth Top 1.00

Depth Base 2.50

Date Tested 05/10/2022

Sample Type B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	97		
28	93		
20	87		
14	82		
10	78		
6.3	73		
5	68		
3.35	66		
2	62		
1.18	56		
0.6	50		
0.425	47		
0.3	42		
0.212	37		
0.15	36		
0.063	30		

Sample Proportions	% dry mass
Cobbles	0
Gravel	38
Sand	32
Silt and Clay	30

Remarks
Preparation and testing in accordance with BS1377 unless noted below

Operator

David Edwards

**PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve, Clause 9.2**

Contract Number 61484

Borehole/Pit No. WS05

Project Name Q0912 - Haverfordwest Library

Sample No. 3

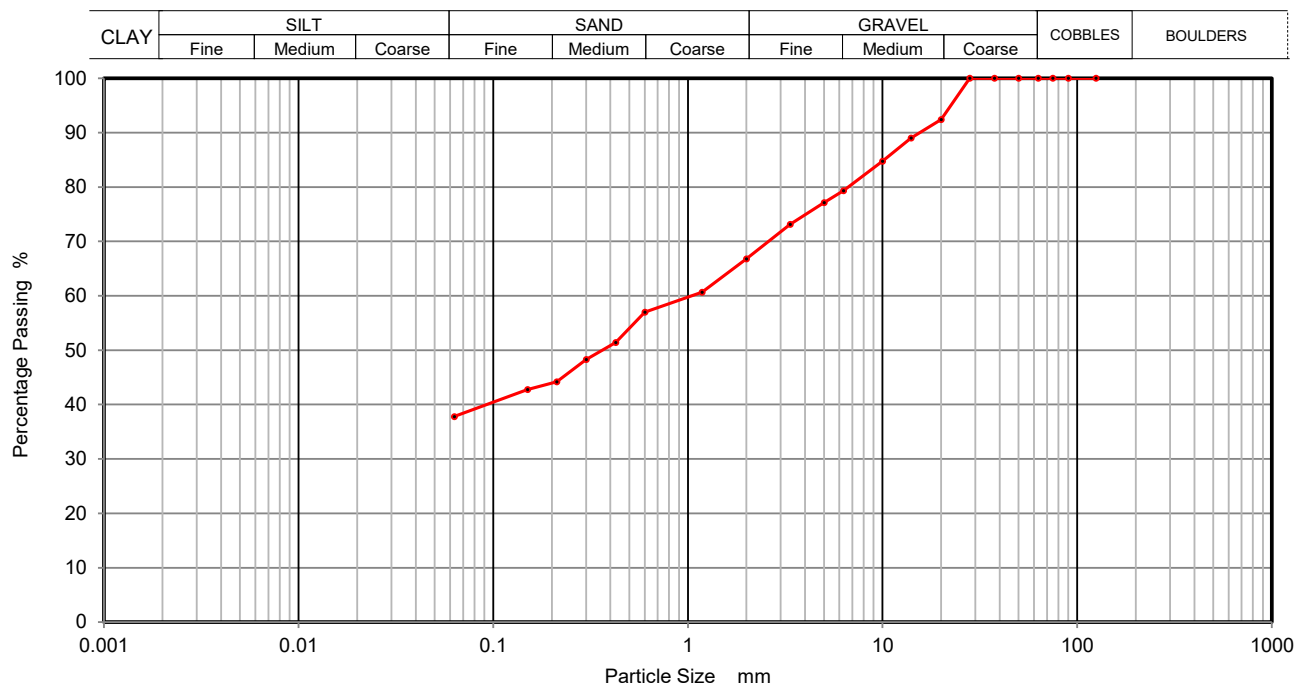
Soil Description Dark grey fine to coarse sandy fine to coarse gravelly SILT/CLAY

Depth Top 3.00

Depth Base

Date Tested 05/10/2022

Sample Type B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	92		
14	89		
10	85		
6.3	79		
5	77		
3.35	73		
2	67		
1.18	61		
0.6	57		
0.425	51		
0.3	48		
0.212	44		
0.15	43		
0.063	38		

Sample Proportions	% dry mass
Cobbles	0
Gravel	33
Sand	29
Silt and Clay	38

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator

David Edwards



ANALYTICAL TEST REPORT

Contract no: 114072

Contract name: Haverfordwest Library

Client reference: Q0912

Clients name: Geo Site and Testing Services

Clients address: Unit 3 and 4 Heol Aur
Dafen Industrial Estate, Dafen
Llanelli, Carmarthenshire
SA14 8QN

Samples received: 28 September 2022

Analysis started: 28 September 2022

Analysis completed: 05 October 2022

Report issued: 05 October 2022

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing

Approved by:

Rachael Burton

Reporting Manager

Chemtech Environmental Limited

SOILS

Lab number			114072-1	114072-2	114072-3	114072-4	114072-5	114072-6
Sample id			TP02	TP03	WS01	WS02	WS03	WS03
Depth (m)			1.50-2.00	1.50-2.00	0.50-1.00	1.50-2.00	1.00-2.00	3.00
Sample Type			B3	B2	B1	B1	B2	D1
Date sampled			-	-	-	-	-	-
Test	Method	Units						
pH	CE004 ^U	units	8.0	8.4	8.1	8.1	7.9	8.0
Magnesium (2:1 water soluble)	CE061	mg/l Mg	4.4	1.4	4.4	2.6	3.9	4.3
Chloride (2:1 water soluble)	CE049 ^U	mg/l Cl	29	4.7	1.3	36	9.0	2.7
Nitrate (2:1 water soluble)	CE049 ^U	mg/l NO ₃	<1	11	1.8	46	3.1	<1
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	118	71	30	<10	35	12
Sulphate (total)	CE062 ^U	mg/kg SO ₄	377	410	<100	<100	446	<100
Sulphate (total)	CE062 ^U	% w/w SO ₄	0.04	0.04	<0.01	<0.01	0.04	<0.01
Sulphur (total)	CE062	mg/kg S	126	137	<33	<33	149	<33
Sulphur (total)	CE062	% w/w S	0.01	0.01	<0.003	<0.003	0.01	<0.003

Chemtech Environmental Limited

SOILS

Lab number			114072-7
Sample id			WS05
Depth (m)			3.00-4.00
Sample Type			B3
Date sampled			-
Test	Method	Units	
pH	CE004 ^U	units	7.6
Magnesium (2:1 water soluble)	CE061	mg/l Mg	4.5
Chloride (2:1 water soluble)	CE049 ^U	mg/l Cl	4.0
Nitrate (2:1 water soluble)	CE049 ^U	mg/l NO ₃	<1
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	208
Sulphate (total)	CE062 ^U	mg/kg SO ₄	1212
Sulphate (total)	CE062 ^U	% w/w SO ₄	0.12
Sulphur (total)	CE062	mg/kg S	404
Sulphur (total)	CE062	% w/w S	0.04

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Magnesium (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		1	mg/l Mg
CE049	Chloride (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l Cl
CE049	Nitrate (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l NO ₃
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE062	Sulphate (total)	HCl extract, analysed by ICP-OES	Dry	U	100	mg/kg SO ₄
CE062	Sulphate (total)	HCl extract, analysed by ICP-OES	Dry	U	0.01	% w/w SO ₄
CE062	Sulphur (total)	HCl extract, analysed by ICP-OES	Dry		33	mg/kg S
CE062	Sulphur (total)	HCl extract, analysed by ICP-OES	Dry		0.003	% w/w S

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
114072-1	TP02	1.50-2.00	Y	All (NSD)
114072-2	TP03	1.50-2.00	Y	All (NSD)
114072-3	WS01	0.50-1.00	Y	All (NSD)
114072-4	WS02	1.50-2.00	Y	All (NSD)
114072-5	WS03	1.00-2.00	Y	All (NSD)
114072-6	WS03	3.00	Y	All (NSD)
114072-7	WS05	3.00-4.00	Y	All (NSD)

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones, where applicable.

APPENDIX X – GEOTECHNICAL LABORATORY TEST RESULTS



2183

Final Report

Report No.:	22-35480-1		
Initial Date of Issue:	02-Oct-2022		
Client	Quantum Geotechnic Ltd		
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ		
Contact(s):	Phil Darby		
Project	Q0912 Haverfordwest Library		
Quotation No.:	Q22-27358	Date Received:	16-Sep-2022
Order No.:		Date Instructed:	23-Sep-2022
No. of Samples:	5		
Turnaround (Wkdays):	5	Results Due:	29-Sep-2022
Date Approved:	02-Oct-2022		
Approved By:			



Details: Stuart Henderson, Technical Manager

Results - Leachate

Project: Q0912 Haverfordwest Library

Client: Quantum Geotechnic Ltd	Chemtest Job No.: 22-35480				
Quotation No.: Q22-27358	Chemtest Sample ID.: 1507693				
	Client Sample ID.: ES1				
	Sample Location: TP03				
	Sample Type: SOIL				
	Top Depth (m): 0.50				
	Date Sampled: 13-Sep-2022				
Determinand	Accred.	SOP	Type	Units	LOD
pH	U	1010	10:1		N/A 8.5
Sulphate	U	1220	10:1	mg/l	1.0 28
Cyanide (Total)	U	1300	10:1	mg/l	0.050 < 0.050
Hardness	U	1415	10:1	mg/l	15 45
Arsenic (Dissolved)	U	1455	10:1	µg/l	0.20 6.7
Boron (Dissolved)	U	1455	10:1	µg/l	10.0 35
Cadmium (Dissolved)	U	1455	10:1	µg/l	0.11 < 0.11
Chromium (Dissolved)	U	1455	10:1	µg/l	0.50 6.9
Copper (Dissolved)	U	1455	10:1	µg/l	0.50 1.7
Mercury (Dissolved)	U	1455	10:1	µg/l	0.05 < 0.05
Nickel (Dissolved)	U	1455	10:1	µg/l	0.50 0.80
Lead (Dissolved)	U	1455	10:1	µg/l	0.50 3.6
Zinc (Dissolved)	U	1455	10:1	µg/l	2.5 < 2.5
Total TPH >C6-C40	U	1670	10:1	mg/l	0.010 < 0.010
Naphthalene	U	1800	10:1	µg/l	0.10 < 0.10
Acenaphthylene	U	1800	10:1	µg/l	0.10 < 0.10
Acenaphthene	U	1800	10:1	µg/l	0.10 < 0.10
Fluorene	U	1800	10:1	µg/l	0.10 < 0.10
Phenanthrene	U	1800	10:1	µg/l	0.10 < 0.10
Anthracene	U	1800	10:1	µg/l	0.10 < 0.10
Fluoranthene	U	1800	10:1	µg/l	0.10 < 0.10
Pyrene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[a]anthracene	U	1800	10:1	µg/l	0.10 < 0.10
Chrysene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[b]fluoranthene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[k]fluoranthene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[a]pyrene	U	1800	10:1	µg/l	0.10 < 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	10:1	µg/l	0.10 < 0.10
Dibenz(a,h)Anthracene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[g,h,i]perylene	U	1800	10:1	µg/l	0.10 < 0.10
Total Of 16 PAH's	U	1800	10:1	µg/l	2.0 < 2.0
Total Phenols	U	1920	10:1	mg/l	0.030 < 0.030

Results - Soil

Project: Q0912 Haverfordwest Library

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				22-35480	22-35480	22-35480	22-35480
Quotation No.: Q22-27358	Chemtest Sample ID.:				1507691	1507694	1507696	1507698
	Client Sample ID.:				ES2	ES2	ES1	ES3
	Sample Location:				TP01	TP03	TP04	TP04
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.70	1.00	0.30	1.00
	Date Sampled:				13-Sep-2022	13-Sep-2022	13-Sep-2022	13-Sep-2022
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	13	11	5.3	11
pH	U	2010		4.0	8.3	9.9	10.5	9.0
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	1.2	0.65	0.77
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.011	0.75	0.21	0.014
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	U	2455	mg/kg	0.5	6.4	6.5	5.5	12
Cadmium	U	2455	mg/kg	0.10	< 0.10	0.13	< 0.10	0.13
Chromium	U	2455	mg/kg	0.5	16	11	10	16
Copper	U	2455	mg/kg	0.50	14	16	13	25
Mercury	U	2455	mg/kg	0.05	< 0.05	0.27	0.13	0.21
Nickel	U	2455	mg/kg	0.50	13	8.4	8.1	15
Lead	U	2455	mg/kg	0.50	24	780	22	98
Zinc	U	2455	mg/kg	0.50	57	50	37	97
Organic Matter	U	2625	%	0.40	4.4	2.7	2.7	9.7
Total TPH >C6-C40	U	2670	mg/kg	10	< 10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Naphthalene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: Q0912 Haverfordwest Library

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				22-35480	22-35480	22-35480	22-35480
Quotation No.: Q22-27358	Chemtest Sample ID.:				1507691	1507694	1507696	1507698
	Client Sample ID.:				ES2	ES2	ES1	ES3
	Sample Location:				TP01	TP03	TP04	TP04
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.70	1.00	0.30	1.00
	Date Sampled:				13-Sep-2022	13-Sep-2022	13-Sep-2022	13-Sep-2022
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD				
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	0.29	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	0.12	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	0.61	0.20	0.38
Pyrene	U	2800	mg/kg	0.10	< 0.10	0.66	0.17	0.38
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

Test Methods

SOP	Title	Parameters included	Method summary
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Final Report

Report No.:	22-35483-1		
Initial Date of Issue:	03-Oct-2022		
Client	Quantum Geotechnic Ltd		
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ		
Contact(s):	Phil Darby		
Project	Q0912 Haverfordwest Library		
Quotation No.:	Q22-27358	Date Received:	16-Sep-2022
Order No.:		Date Instructed:	23-Sep-2022
No. of Samples:	2		
Turnaround (Wkdays):	5	Results Due:	29-Sep-2022
Date Approved:	03-Oct-2022		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Leachate

Project: Q0912 Haverfordwest Library

Client: Quantum Geotechnic Ltd	Chemtest Job No.: 22-35483				
Quotation No.: Q22-27358	Chemtest Sample ID.: 1507702				
	Client Sample ID.: ES2				
	Sample Location: TP02				
	Sample Type: SOIL				
	Top Depth (m): 0.70				
	Date Sampled: 13-Sep-2022				
Determinand	Accred.	SOP	Type	Units	LOD
pH	U	1010	10:1		N/A 9.1
Sulphate	U	1220	10:1	mg/l	1.0 1.8
Cyanide (Total)	U	1300	10:1	mg/l	0.050 < 0.050
Hardness	U	1415	10:1	mg/l	15 43
Arsenic (Dissolved)	U	1455	10:1	µg/l	0.20 3.0
Boron (Dissolved)	U	1455	10:1	µg/l	10.0 < 10
Cadmium (Dissolved)	U	1455	10:1	µg/l	0.11 < 0.11
Chromium (Dissolved)	U	1455	10:1	µg/l	0.50 < 0.50
Copper (Dissolved)	U	1455	10:1	µg/l	0.50 4.0
Mercury (Dissolved)	U	1455	10:1	µg/l	0.05 < 0.05
Nickel (Dissolved)	U	1455	10:1	µg/l	0.50 0.85
Lead (Dissolved)	U	1455	10:1	µg/l	0.50 2.3
Zinc (Dissolved)	U	1455	10:1	µg/l	2.5 < 2.5
Total TPH >C6-C40	U	1670	10:1	mg/l	0.010 < 0.010
Naphthalene	U	1800	10:1	µg/l	0.10 < 0.10
Acenaphthylene	U	1800	10:1	µg/l	0.10 < 0.10
Acenaphthene	U	1800	10:1	µg/l	0.10 < 0.10
Fluorene	U	1800	10:1	µg/l	0.10 < 0.10
Phenanthrene	U	1800	10:1	µg/l	0.10 < 0.10
Anthracene	U	1800	10:1	µg/l	0.10 < 0.10
Fluoranthene	U	1800	10:1	µg/l	0.10 < 0.10
Pyrene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[a]anthracene	U	1800	10:1	µg/l	0.10 < 0.10
Chrysene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[b]fluoranthene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[k]fluoranthene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[a]pyrene	U	1800	10:1	µg/l	0.10 < 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	10:1	µg/l	0.10 < 0.10
Dibenz(a,h)Anthracene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[g,h,i]perylene	U	1800	10:1	µg/l	0.10 < 0.10
Total Of 16 PAH's	U	1800	10:1	µg/l	2.0 < 2.0
Total Phenols	U	1920	10:1	mg/l	0.030 < 0.030

Results - Soil

Project: Q0912 Haverfordwest Library

Client: Quantum Geotechnic Ltd	Chemtest Job No.:		22-35483		
Quotation No.: Q22-27358	Chemtest Sample ID.:		1507701		
	Client Sample ID.:		ES1		
	Sample Location:		TP02		
	Sample Type:		SOIL		
	Top Depth (m):		0.30		
	Date Sampled:		13-Sep-2022		
	Asbestos Lab:		DURHAM		
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
Moisture	N	2030	%	0.020	18
pH	U	2010		4.0	8.0
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	2.0
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.029
Cyanide (Total)	U	2300	mg/kg	0.50	0.50
Arsenic	U	2455	mg/kg	0.5	3.6
Cadmium	U	2455	mg/kg	0.10	< 0.10
Chromium	U	2455	mg/kg	0.5	5.0
Copper	U	2455	mg/kg	0.50	61
Mercury	U	2455	mg/kg	0.05	0.70
Nickel	U	2455	mg/kg	0.50	6.4
Lead	U	2455	mg/kg	0.50	57
Zinc	U	2455	mg/kg	0.50	94
Organic Matter	U	2625	%	0.40	19
Total TPH >C6-C40	U	2670	mg/kg	10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10
Naphthalene	U	2800	mg/kg	0.10	5.2

Results - Soil

Project: Q0912 Haverfordwest Library

Client: Quantum Geotechnic Ltd	Chemtest Job No.:		22-35483		
Quotation No.: Q22-27358	Chemtest Sample ID.:		1507701		
	Client Sample ID.:		ES1		
	Sample Location:		TP02		
	Sample Type:		SOIL		
	Top Depth (m):		0.30		
	Date Sampled:		13-Sep-2022		
	Asbestos Lab:		DURHAM		
Determinand	Accred.	SOP	Units	LOD	
Acenaphthylene	N	2800	mg/kg	0.10	0.87
Acenaphthene	U	2800	mg/kg	0.10	2.5
Fluorene	U	2800	mg/kg	0.10	2.2
Phenanthrene	U	2800	mg/kg	0.10	14
Anthracene	U	2800	mg/kg	0.10	2.8
Fluoranthene	U	2800	mg/kg	0.10	26
Pyrene	U	2800	mg/kg	0.10	19
Benzo[a]anthracene	U	2800	mg/kg	0.10	13
Chrysene	U	2800	mg/kg	0.10	13
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	21
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	7.4
Benzo[a]pyrene	U	2800	mg/kg	0.10	14
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	11
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	2.6
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	9.3
Total Of 16 PAH's	N	2800	mg/kg	2.0	160
Total Phenols	U	2920	mg/kg	0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

Test Methods

SOP	Title	Parameters included	Method summary
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Final Report

Report No.:	22-35488-1		
Initial Date of Issue:	03-Oct-2022		
Client	Quantum Geotechnic Ltd		
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ		
Contact(s):	Phil Darby		
Project	Q0912 Haverfordwest Library		
Quotation No.:	Q22-27358	Date Received:	16-Sep-2022
Order No.:		Date Instructed:	23-Sep-2022
No. of Samples:	2		
Turnaround (Wkdays):	5	Results Due:	29-Sep-2022
Date Approved:	03-Oct-2022		
Approved By:			



Details: Stuart Henderson, Technical Manager

Results - Leachate

Project: Q0912 Haverfordwest Library

Client: Quantum Geotechnic Ltd	Chemtest Job No.: 22-35488				
Quotation No.: Q22-27358	Chemtest Sample ID.: 1507721				
	Client Sample ID.: ES1				
	Sample Location: WS05				
	Sample Type: SOIL				
	Top Depth (m): 1.50				
	Date Sampled: 14-Sep-2022				
Determinand	Accred.	SOP	Type	Units	LOD
pH	U	1010	10:1		N/A 8.5
Sulphate	U	1220	10:1	mg/l	1.0 35
Cyanide (Total)	U	1300	10:1	mg/l	0.050 < 0.050
Hardness	U	1415	10:1	mg/l	15 59
Arsenic (Dissolved)	U	1455	10:1	µg/l	0.20 6.0
Boron (Dissolved)	U	1455	10:1	µg/l	10.0 27
Cadmium (Dissolved)	U	1455	10:1	µg/l	0.11 < 0.11
Chromium (Dissolved)	U	1455	10:1	µg/l	0.50 4.2
Copper (Dissolved)	U	1455	10:1	µg/l	0.50 1.8
Mercury (Dissolved)	U	1455	10:1	µg/l	0.05 < 0.05
Nickel (Dissolved)	U	1455	10:1	µg/l	0.50 0.75
Lead (Dissolved)	U	1455	10:1	µg/l	0.50 0.83
Zinc (Dissolved)	U	1455	10:1	µg/l	2.5 < 2.5
Total TPH >C6-C40	U	1670	10:1	mg/l	0.010 < 0.010
Naphthalene	U	1800	10:1	µg/l	0.10 < 0.10
Acenaphthylene	U	1800	10:1	µg/l	0.10 < 0.10
Acenaphthene	U	1800	10:1	µg/l	0.10 < 0.10
Fluorene	U	1800	10:1	µg/l	0.10 < 0.10
Phenanthrene	U	1800	10:1	µg/l	0.10 < 0.10
Anthracene	U	1800	10:1	µg/l	0.10 < 0.10
Fluoranthene	U	1800	10:1	µg/l	0.10 < 0.10
Pyrene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[a]anthracene	U	1800	10:1	µg/l	0.10 < 0.10
Chrysene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[b]fluoranthene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[k]fluoranthene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[a]pyrene	U	1800	10:1	µg/l	0.10 < 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	10:1	µg/l	0.10 < 0.10
Dibenz(a,h)Anthracene	U	1800	10:1	µg/l	0.10 < 0.10
Benzo[g,h,i]perylene	U	1800	10:1	µg/l	0.10 < 0.10
Total Of 16 PAH's	U	1800	10:1	µg/l	2.0 < 2.0
Total Phenols	U	1920	10:1	mg/l	0.030 < 0.030

Results - Soil

Project: Q0912 Haverfordwest Library

Client: Quantum Geotechnic Ltd	Chemtest Job No.:		22-35488		
Quotation No.: Q22-27358	Chemtest Sample ID.:		1507720		
	Client Sample ID.:		ES2		
	Sample Location:		WS03		
	Sample Type:		SOIL		
	Top Depth (m):		1.50		
	Date Sampled:		14-Sep-2022		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
Moisture	N	2030	%	0.020	24
pH	U	2010		4.0	8.4
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	1.5
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.23
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50
Arsenic	U	2455	mg/kg	0.5	8.3
Cadmium	U	2455	mg/kg	0.10	< 0.10
Chromium	U	2455	mg/kg	0.5	7.4
Copper	U	2455	mg/kg	0.50	21
Mercury	U	2455	mg/kg	0.05	0.59
Nickel	U	2455	mg/kg	0.50	9.3
Lead	U	2455	mg/kg	0.50	120
Zinc	U	2455	mg/kg	0.50	91
Organic Matter	U	2625	%	0.40	11
Total TPH >C6-C40	U	2670	mg/kg	10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10
Naphthalene	U	2800	mg/kg	0.10	< 0.10

Results - Soil

Project: Q0912 Haverfordwest Library

Client: Quantum Geotechnic Ltd	Chemtest Job No.:		22-35488		
Quotation No.: Q22-27358	Chemtest Sample ID.:		1507720		
	Client Sample ID.:		ES2		
	Sample Location:		WS03		
	Sample Type:		SOIL		
	Top Depth (m):		1.50		
	Date Sampled:		14-Sep-2022		
	Asbestos Lab:		COVENTRY		
Determinand	Accred.	SOP	Units	LOD	
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	21
Anthracene	U	2800	mg/kg	0.10	4.3
Fluoranthene	U	2800	mg/kg	0.10	40
Pyrene	U	2800	mg/kg	0.10	26
Benzo[a]anthracene	U	2800	mg/kg	0.10	20
Chrysene	U	2800	mg/kg	0.10	19
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	26
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	8.2
Benzo[a]pyrene	U	2800	mg/kg	0.10	16
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	12
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	3.3
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	8.1
Total Of 16 PAH's	N	2800	mg/kg	2.0	200
Total Phenols	U	2920	mg/kg	0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1415	Cations in Waters by ICP-MS	Sodium; Potassium; Calcium; Magnesium	Direct determination by inductively coupled plasma - mass spectrometry (ICP-MS).
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

Test Methods

SOP	Title	Parameters included	Method summary
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and Trimethylphenols Note: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	Compliance Test for Leaching of Granular Waste Material and Sludge

Report Information

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>	"greater than"
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Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

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customerservices@chemtest.com



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W: <http://www.quantumgeotech.co.uk>