SUEZ Recycling and Recovery UK Ltd

SUEZ Anaerobic Digestion Plant Darwen, Lancashire

Phase 1 Environmental Desk Study

WSP Environment & Infrastructure Solutions UK Limited – October 2022

Report for

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Document revisions

No.	Details	Date
P01.1	Draft for Client Comment	July 2022
P02.1	Final	August 2022
P02.2	Minor revision following client comment	October 2022

Executive summary

Background	WSP Environment & Infrastructure Solutions UK Limited (WSP) was commissioned by SUEZ Recycling and Recovery UK Ltd to prepare a Phase 1 Environmental Desk Study for the proposed anaerobic digestion (AD) facility, at SUEZ Recycling and Recovery Ltd (SUEZ) Lower Eccleshill Road, Darwen, Lancashire. The proposed development is located within an existing waste facility and will replace the existing waste handling, processing and transfer facilities at the site.
Purpose of the report	The purpose of the report is to support the forthcoming planning application for the Proposed Development by assessing the risks from land contamination in line with the Environment Agency's guidance, Land Contamination Risk Management (LCRM). This report presents the Phase 1 Desk Study stage of LCRM.
Site description	The site is located at Lower Eccleshill, near Darwen, Lancashire. The proposed development is located within an existing waste facility and will replace the existing waste handling and transfer facilities at the site.
Site history	The site was developed from greenfield in the late 19th century as an iron smelting works and continued in this usage till the mid-20th century. Infrastructure included blast furnaces, chimneys, rail sidings etc. By 1950 all above-ground structures had been removed. The site was then redeveloped with new infrastructure as the Wolstenholme Bronze Powder works, producing bronze and aluminium paints and inks for the coating and printing industry. This was discontinued around 2010, since when the site has been acquired and adapted by SUEZ to its present use as a waste transfer and recovery facility, occupying some of the former bronze works buildings. Other buildings have been demolished.
Environmental Setting	The site is underlain by made ground of variable composition and thickness. The presence of slag from the former iron smelting works has been confirmed in various parts of the site by intrusive ground investigation. Natural strata beneath the site are shown on geological mapping to comprise superficial deposits of diamicton (glacial clay, sand and gravel) to depths from 5 m to >10 m, overlying sandstone and mudstone bedrock of the Pennine Lower Coal Measures. The superficial deposits are classified as a secondary undifferentiated aquifer and the bedrock as a secondary A aquifer. The site does not lie within a source protection zone and there are no currently licensed potable groundwater abstractions within or close to the site. Insufficient data is available to predict the groundwater depth or flow direction beneath the site. There are no ecological designations (e.g. SSSI) on site or nearby.
Initial Conceptual Site Model and Environmental Risk Assessment	Moderate risks to future site users (assuming no mitigation) have been identified arising from exposure to contaminants potentially present in made ground across the site. Moderate risks to nearby surface water receptors have been identified arising from potential contaminants in surface water discharge from the site. Moderate to low risks to the same receptors have been identified via shallow groundwater migration from the site and from the off-site landfill, the latter assumed to be up-gradient of both the site and surface water receptors. The landfill also represents a moderate to low risk to future site users via migration of landfill gas and leachate. The other identified contaminant linkages have been assessed as low risk.

Recommendations	Given the absence of reliable current ground investigation data with respect to potential contamination, it is recommended that a ground investigation is undertaken including sampling of the pond on site and nearby surface water streams (where practicable). A site-wide investigation is recommended given the multiple sources of potential contaminants present both on and surrounding the site. Following completion of the ground investigation, remediation may be required to ensure the site is suitable for the proposed redevelopment as an AD plant in line with LCRM. The requirement for completion of a Phase 2 ground investigation and, if required, remediation could be secured through appropriately worded planning conditions as part of the Proposed Development.

Contents

1. Introduction

Background	WSP Environment & Infrastructure Solutions UK Limited (WSP) was commissioned by SUEZ Recycling and Recovery UK Ltd (SUEZ) to prepare a Phase 1 Environmental Desk Study for the proposed anaerobic digestion (AD) facility, at SUEZ Recycling and Recovery Ltd (SUEZ) Lower Eccleshill Road, Darwen in Lancashire. The proposals also include the relocation of the existing waste facilities. The proposed development is located within an existing waste facility and will replace the existing waste handling, processing and transfer facilities at the site.
Proposed Development	The Proposed Development comprises the construction of an anaerobic digestion (AD) facility at the site. This will entail demolition of most of the existing infrastructure, with the exception of the modern office building in the northwest, and extensive remodelling. The AD vessels will be located in the east of the site, with the remainder hosting the relocated Waste Transfer Station and Materials Recycling Facility. The proposed development plan is included in Appendix A.
Purpose of the Report	The purpose of the report is to support the planning application for the Proposed Development by assessing the risks from land contamination in line with the Environment Agency guidance on Land Contamination Risk Management (LCRM)[1]. LCRM comprises an iterative risk-based approach starting with Phase 1, a Desk Study and followed by Phase 2, comprising Ground Investigation (including quantitative risk assessment), where considered necessary, to assess the risks to the environment and users of the land posed by contamination that may be present. This report presents the Phase 1 Desk Study stage of LCRM.
Scope of work	The scope of work comprises the following: ● Review local geological, hydrogeological, and hydrological information. ● Review previous ground investigations and geo-environmental reports relating to the site and adjacent land. ● Reviewing a range of contemporary environmental data including historical land use and environmental setting information presented in an environmental dataset obtained by Groundsure. ● Complete a walkover survey to visually assess the current condition of the site. ● Development of a Conceptual Site Model (CSM) and preliminary Environmental Risk Assessment, in line with LCRM to provide an assessment of the site's potential contamination status and identify the presence of potentially significant contaminant linkages (source, pathways and receptors) that require further consideration.
Regulatory Context	**Planning Regime** Development of the site is controlled under the Planning Regime. Planning guidance relating to the development of land potentially affected by contamination is detailed in the National Planning Policy Framework (NPPF) February 2021 and constitutes

[1] Environment Agency, (2020). Land contamination risk management (LCRM). (online) Available at: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm (Accessed April 2022).

guidance for Local Planning Authorities (LPA). In this case the LPA is Blackburn with Darwen Borough Council (BDBD).

The NPPF sets out the Government's planning policies for England and how these should be applied. The NPPF states that:

> *Give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land.*

Therefore, planning policies and decision should ensure that:

a) *A site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation).*

b) *After remediation, as a minimum, land should be capable of not being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and*

c) *Adequate site investigation information, prepared by a competent person, is available to inform these assessments.*

The statutory definition of contaminated land is given under Part 2A of the Environmental Protection Act (EPA) 1990 (Part 2A). This does not include land that is already regulated through other means, such as Waste Management Legislation or the Environmental Permitting Regulations 2010.

In addition, the NPPF states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

Information Sources

The following sources of information have been used in the preparation of this report:

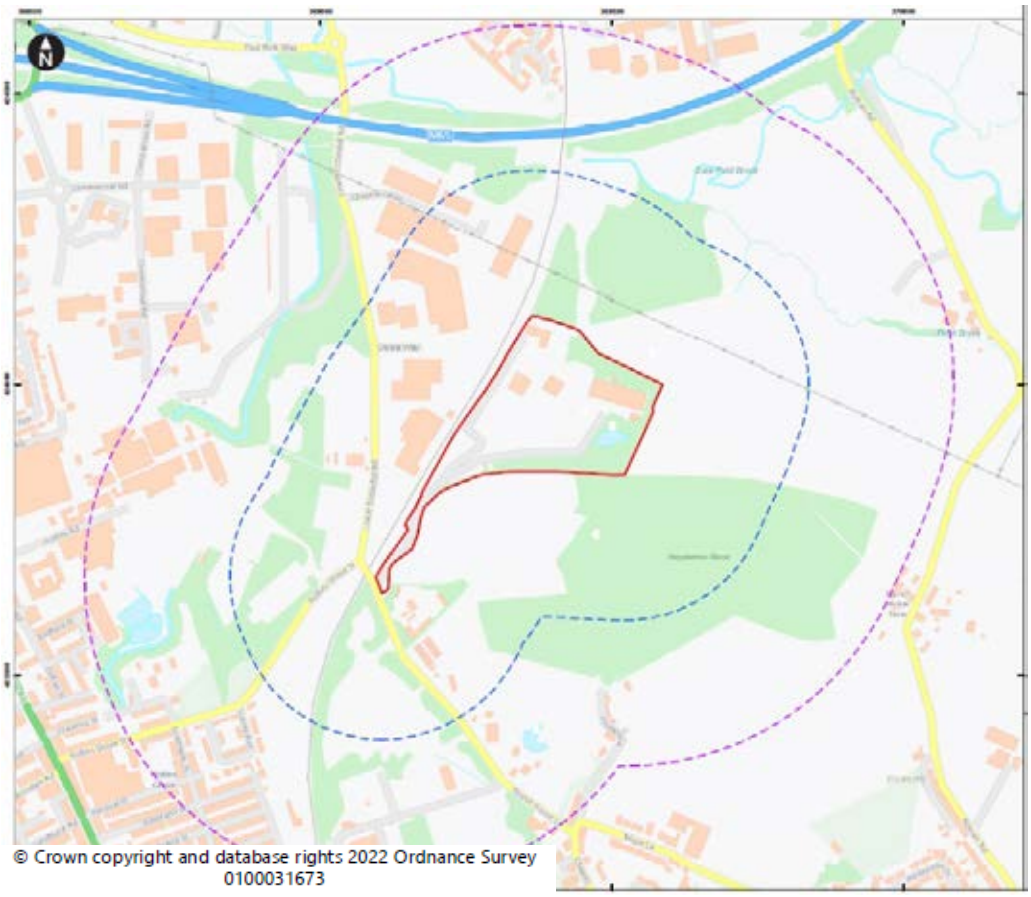
- British Geological Survey GeoIndex website, https://mapapps2.bgs.ac.uk/geoindex/home.html, accessed in July 2022;
- British Geological Survey, 2008, Rochdale, Sheet 76, Bedrock, 1:50,000 view on the BGS maps portal, accessed in July 2022;
- Environment Agency Catchment Data Explorer, https://environment.data.gov.uk/catchment-planning, accessed in July 2022;
- DEFRA, MAGIC map website, https://magic.defra.gov.uk/magicmap.aspx, accessed in July 2022;
- RPS, Darwen Energy Recovery Centre (ERC), Phase 1: Geo-Environmental Risk Assessment For SUEZ, April 2019, reference RCEI68589-002 R;
- RPS, Darwen Energy Recovery Centre (ERC), Coal Mining Risk Assessment For SUEZ, April 2019, reference RCEI68589-003 R
- An updated Groundsure report (Ref: GS-8685614 dated 21 April 2022) (Appendix B)
- An updated CON29M Coal Mining Report (Ref: GS-8685613 dated 21 April 2022)

	• Site walkover completed by a Wood engineer on 11 May 2022 The report has been produced in general accordance with the following UK guidance on the assessment of land condition: • LCRM, the Environment Agency (2020) which provides the technical framework for applying a risk management process when dealing with land affected by contamination. • Guidance for the Safe Development of Housing on Land Affected by Contamination, NHBC et al. (2008) which provides guidance on defining the likelihood definitions used when assessing risks from land contamination. The risk assessment approach used in this report is presented in Appendix D.
Limitations	The conclusions reached and advice given in this report are based in part upon information and/or documents that have been prepared by third parties. In view of this, we accept no responsibility or liability of any kind in relation to such third-party information and no representation, warranty or undertaking of any kind, express or implied, is made with respect to the completeness, accuracy, or adequacy of such third-party information. In preparing this report we have assumed that all information provided by the Client is complete, accurate and not misleading.

2. Site Description & Setting

Site Location	**The site is located approximately 1.8km north of Darwen town centre and 960m southeast of the M65 motorway junction 4.** **The site location is shown on Figure 2.1.**

Figure 2.1 Site Location



Key:

Site Address	SUEZ Recycling and Recovery UK, Lower Eccleshill Road, Darwen BB3 0RP
Grid Reference	369340E, 423884N
Site Description	A site walkover was conducted by a Wood site engineer on the 11th May 2022. Photographic images from the walkover can be found in Appendix D. The main part of the site is roughly rectangular in shape, with a long spur to the southwest comprising the site access road from Goose House Lane. The site covers an area of

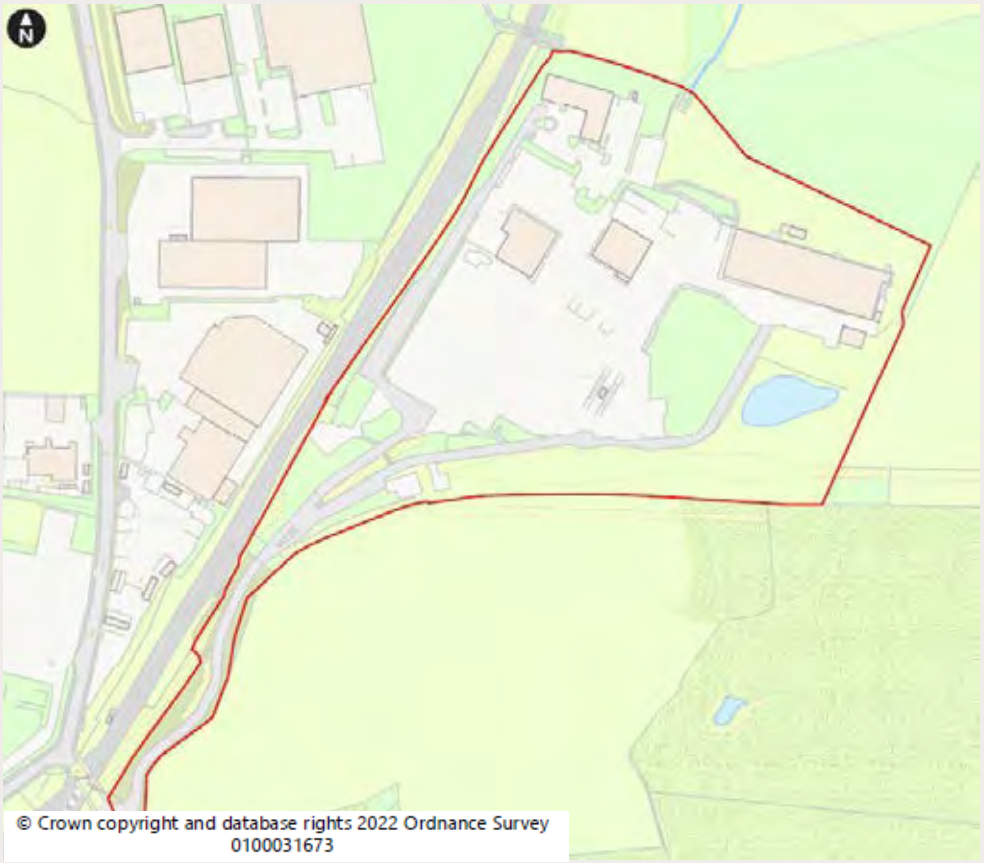
approximately 7.33ha. The site is generally flat at an elevation of approximately 150m above Ordnance Datum (AOD) with a steep wooded slope in the south rising southwards an adjacent capped landfill. In the north of the site the topography falls gently towards the north. The site is largely hard surfaced although the surface concrete is generally in poor condition.

A pond is located in the east side of the site with a small stream issuing from it flowing northwards (Plates 1 to 3 in Appendix D). Another small stream flows north from an interceptor on the site boundary. Both streams feed into Davy Field Brook (Plate 6 in Appendix D). Immediately downstream of the confluence, Davy Field Brook is culverted under the motorway.

The site is currently operated as a waste segregation and transfer station that receives mixed wastes that are sorted, with recyclable materials being baled up for further processing elsewhere and non-recyclables consigned for disposal offsite. The waste handling processes are carried out either in the existing repurposed industrial buildings or in the open. In addition, a modern two-storey office building is located in the northwest corner of the site. A fire-water pond has recently been created in the east of the site, in response to difficulty in accessing sufficient fire-fighting water (Plate 11 in Appendix D). It comprises an unlined 25x25m square stepped pit approximately 6m deep which, at the time of the walkover, did not contain much water. The sides of the pit were observed to be composed of brown sandy clay.

The current site layout is presented in Figure 2.2 below.

Figure 2.2 Site Layout



Key:

site boundary

Boundaries (land uses and relevant features)

In the immediate surroundings the land to the north comprises a historic slag heap from the former ironworks that is now covered with regenerating woodland and scrub (Plate 9 in Appendix D). To the south is a closed landfill currently licensed to Infinis, possibly for power generation from landfill gas. To the west is an active railway line beyond which are various commercial premises and land to the east is open agricultural land.

Direction	Adjacent	Beyond
North	Wooded land	M65 Motorway
East	Fields	More fields
South	Wooded slope up	Closed landfill
West	Railway (Bolton to Blackburn)	Industrial estate

Current site activities

Waste segregation and transfer station including sorting, baling and transfer of miscellaneous wastes.

Services

The site is served by mains water, gas, electricity, telecoms and drainage. Surface water drains flow to an interceptor in the north of the site, whilst foul drainage is discharged to sewer. It is unclear whether or not the interceptor discharge is currently consented, although it is subject to annual sampling and analysis by SUEZ.

Up-to-date service plans have not been made available for review; however a previous report (Entec 2010) contains detailed service and topographical information.

3. Site History

A summary of the historical development of the site, based on historical OS maps and aerial imagery provided in the Groundsure report (Appendix B), is presented below.

1850's

Figure 3.1: 1849 map extract

Onsite: The site is shown as open agricultural land, with field boundaries/hedgerows. The Blackburn Railway line is shown immediately adjacent to the west of the site.

Offsite: The site surroundings are dominated by open agricultural land. The Blackburn Railway line is identified immediately adjacent to the west and a sandstone quarry is shown approximately 150m south. In addition, coal pits and old coal pits are identified between approximately 300m and 450m south of the site. The Hollins Paper Works is identified approximately 400m west and a possible reservoir is identified approximately 200m southwest.

1890's

Figure 3.2: 1891-92 map extract

Onsite: The site is shown to be occupied by the Darwen and Mostyn Iron Works that is shown in 1:2,500 mapping to include railway lines, reservoirs, earthworkings and circular structures (possibly tanks). In addition, the central west of the site along the site access a clay pit and embankments are shown. The Hoddlesden Branch is shown along the southern boundary and in the far southwest of the site.

Offsite: There has been little significant change to the land uses to the south, southeast and northeast of the site. A refuse tip associated with the onsite iron works is identified immediately to the north of the site. The Hollings Brick Works is identidied immediately adjacent to the west of the site and further development of the Hollins Paper Works is identified including additional ponds and reservoirs. A sewage works is identified approximately 450m southwest of the site. Mills (unspecified) are identified approximately 500m southwest of the site.

1900's

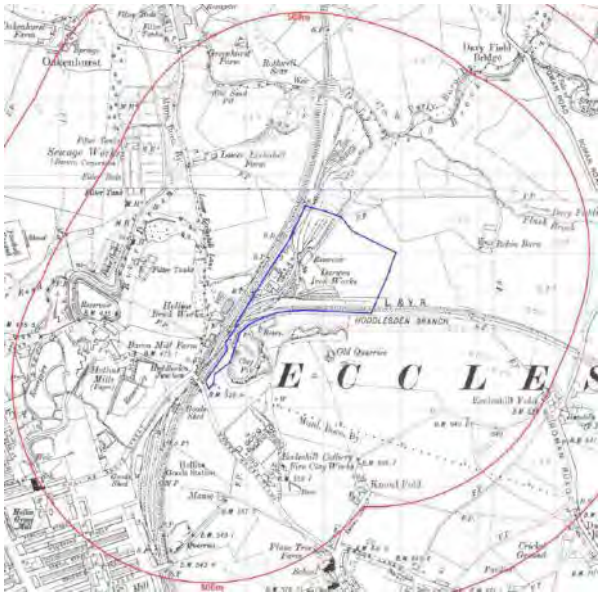


Figure 3.3: 1909-10 map extract

Onsite: The Darwen and Mostyn Iron Works is shown to have expanded towards the east with the addition of a marshalling yard in the southeast and north of the site. The clay pit in the southwest of the site is shown to have expended offsite to the south. In the 1911 1:2,500 map a tunnel is shown to pass beneath access route in thre south of the site. The tunnel is shown to pass from the southeast to northwest between the clay pit adjacent to the south and the Hollins Brick Works adjacent to the west.

Offsite: Immediately adajcent to the south of the site a clay pit and refuse heaps, including a reservior and tank are shown. An old quarry is also shown approximately 100m south. Further expansion of the Hollins Paper Works is shown to the west and further refuse heaps are shown approximately 200m from the site beyond Hollins Brick Works to the west. To the south of the site the Eccleshill Colliery and Fire Clay Works (possibly a brick works) are shown approximately 250m south of the site. The Hollins Good Station is shown approximately 250m south-southwest of the site. The Darwen Sewage Works including filter beds and sludge beds are identified approximately 350m northwest of the site.

1920's

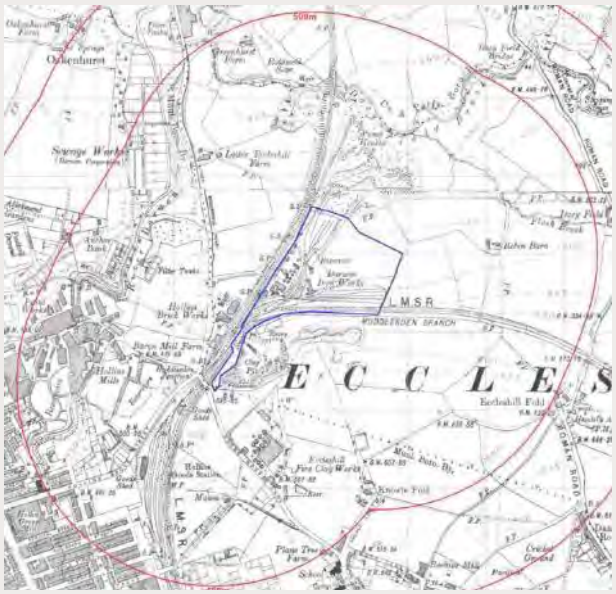


Figure 3.4: 1928 map extract

Onsite: There has been no obvious significant change to the land use of the site.

Offsite: There has been no obvious significant change to the land use of the site surroundings.

1930's

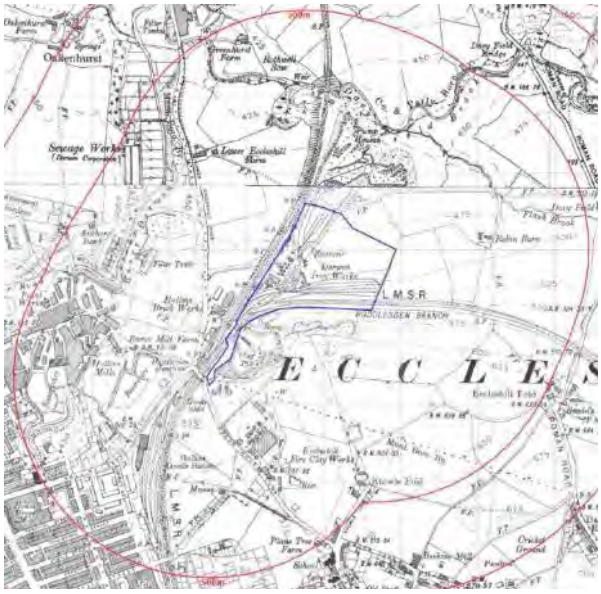


Figure 3.5: 1938 map extract

Onsite: There has been no obvious significant change to the land use of the site.

Offsite: There has been no obvious significant change to the land use of the site surroundings. The quarry adjacent to the south of the site is identified as the Eccleshall Quarry (shale) in 1:2,500 scale mapping.

1950's

Figure 3.6: 1950-51 map extract

Onsite: The Darwen and Mostyn Iron Works is no longer shown within the site. The only part of the former works remaining is a reservoir located within the centre of the site. In the southern and north-western portions of the site earthworks are shown.

Offsite: There has been no obvious significant change to the land use of the site surroundings.

1960's

Figure 3.7: 1967 map extract

Onsite: In 1969 1:2,500 scale mapping the tunnel in the south of the site is no longer shown and the site is occupied by earthworkings and embankments. The railway line in the south of the site is shown to have been dismantled.

Offsite: The Hollins Paper Works to the west and the Eccleshill Colliery and Fire Clay Works to the south have been reannoted a Works (unspecified). To the west of the site the Hollins Brick Works is reannotated a electricity works in 1:2,500 scale mapping from 1969. Three large circular tanks and a cooling tank are identified approximately 150m west of the site. The Hollins Brick Works to the west is shown as disused.

1970's

Figure 3.8: 1970-75 map extract

Onsite: The works (unspecified) is shown to have expanded towards the southeast and an additional building is shown in the north of the site

Offsite: To the immediate south of the site a refuse tip is shown along the southern boundary

1980's

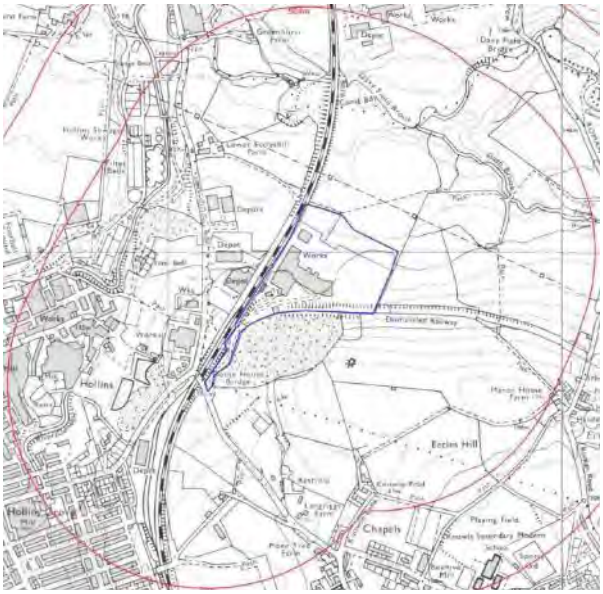


Figure 3.9: 1983 map extract

Onsite: The onsite works has expanded to the southeast and the earthworks are no longer shown.

Offsite: A refuse trip is identified immediately to the south of the site and approximately 250m west and southwest of the site. Depots and work (unspecified) are identified between approximately 50m and 200m west of the site and approximately 400m to the north.

1990's

Onsite: The site is annotated a works (unspecified). The southern boundary of the site is shown to be occupied by an embankment and in the central north of the site a stream is shown to issue onsite and flow offsite to the north.

Offsite: There has been no obvious significant change to the land use within the immediate site surroundings.

2000's

Figure 3.10: 2000 map extract

Onsite: Further expansion of the works (unspecified) is identified by the addition of further buildings in the north and centre of the site.

Offsite: The refuse tip to the immediate south of the site is no longer shown. There has been no significant change to the land use within the site surroundings.

2010's

Figure 3.10: 2000 map extract

Onsite: An additional long retangular building is identified in the east of the site. There has been no other obvious land use change since the previous mapping

Offsite: Additional possible industrial development is identidied approximately 250m north of the site. There has been no significant change to the land use within the site surroundings.

4. Environmental Setting

Geology	**British Geological Survey (BGS) mapping indicates that the site is almost entirely underlain by artificial deposits likely to be associated with the historical development of the site. The BGS mapping identifies areas of infilled made ground immediately adjacent to the north and south of the site as well as made ground to the west as shown in Figure 4.1 below.**

Figure 4.1 Infilled laid ground adjacent to site

Contains British Geological Survey materials © UKRI 2022. Contains OS data © Crown copyright [and database right] 2022.

= Infilled ground

= Made ground (undivided)

BGS mapping indicate that superficial deposits comprise Glacial Till (diamicton) with an area of thin or absent deposits also shown along the southern boundary of the site. In the wider area Alluvium deposits are identified approximately 230m north and Glaciofluvial Deposits are identified approximately 245m northwest of the site. An area of thin or absent deposits is identified immediately adjacent to the south and southeast of the site

BGS mapping records the underling bedrock as the Pennine Lower Coal Measures Formation (Coal Measures) comprising cyclical sequences of sandstone, mudstone, siltstone and coal. In the northern half of the site the Old Lawrence Rock comprising sandstone is identified with the remainder of the southern half of the site shown to be underlain by Coal Measures. The Old Lawrence Rock is a significant sandstone bed which forms part of the Coal Measures formation that is recorded to be between 5m and 25m in thickness. BGS geological mapping indicates that the upper boundary between the Old Lawrence Rock and the Coal Measures is denoted by the Dib Hole Coal seam.

BGS mapping indicates that the site is underlain by the Dib Hole Coal seam in the southeast corner of the site. In addition, a geological fault is identified in the far south of the site adjacent to the site entrance striking generally north-northwest. The downthrow side of the fault is to the west, the downthrow distance is not given.

Mining	A Groundsure CON29M report (reference GS-8685613) has been obtained for the site which reveals that the site is not underlain by recorded underground coal workings. However, the report

	indicates that a coal outcrop (the Dib Hole Seam identified above) is present underlying the site and as such there is the possibility of unrecorded mining features within the site. The CON29M report indicates that a shaft is present within the central west of the site. The available records indicate that a search for the shaft was conducted by Terraconsult Limited in July 2014 but that their investigations (method not detailed) did not locate the shaft. No information is provided on whether the shaft has been treated in the past. The report indicates that the Coal Authority are not monitoring any mine gas emissions sites within the site boundary. The RPS Coal Mining Risk Assessment concluded that assuming no buildings are positioned over the mine shaft, the potential risks associated with mine gas were considered to be low.
Unexploded Ordnance (UXO)	Zetica UXO risk maps classifies the site and surrounding area as low bomb risk. There are no reported UXO discoveries or bomb strikes within the area.
Previous Investigation	The RPS 2019 desk study includes a summary of previous intrusive investigations undertaken at the site as follows: ● GKN Reinforcements Ltd Report No. S.M.956 Lower Eccleshill Site Investigation Darwen, dated July 1963; ● Northern Foundations Report No S.I.6911 Investigations at Wolstenholme International Ltd, Darwen dated April 1997; In addition to the above reports the RPS 2019 desk study references the following report which has been reviewed by Wood: ● Fairhurst Geo-Environmental Ground Investigation Report, Darwen Ink Works Redevelopment, report reference D/I/D/92064/04 dated January 2012. A summary the review is provided below. Previous investigations of the site have comprised a total of fifteen boreholes, eight trail pits and two hand pits. However, of these only eleven boreholes, five trial pits and two hand pits have a known location within the site, the remaining locations were not shown on an exploratory hole location plan therefore their locations are unknown. In general the ground conditions encounter in the previous investigation were described as follows: ● **Concrete** floor slabs and hard standings were internally and externally to the buildings; ● **Topsoil** was encountered to depths of between 0.1 and 0.2m bgl; ● **Made ground** extended to depths of between 0.6m and 6.6m bgl and comprised sandy gravel and gravelly sand subbase as well as sand, ash, gravel, brick and iron slag. In one location slag was encountered to a depth of 6.0m bgl;. ● **Glacial Till** was encountered to proven to depths of 10.0m bgl and comprised firm to stiff slightly, locally laminated, sandy to sandy, slightly gravelly to gravelly silty clay, locally a sandy slightly gravelly clayey silt was encountered. In one location silt and clays where encountered to 4.6m bgl and underlain by sands and gravels to the base of the borehole at 10.0m bgl. ● **Coal Measures** bedrock was not encountered in any exploratory location. The Fairhurst report reveals that groundwater strikes were encountered within three exploratory boreholes at depths of between 3.9m and 8.20m bgl. The post works monitoring undertaken by Fairhurst recorded static water levels between 0.52m and 5.0m bgl (within the made ground). It is noted that a limited number of soil and groundwater samples have been obtained and assessed in previous investigations of the site. The Fairhurst investigation obtained a limited number of samples and based on the assessment of the results concluded the site did not pose a

	risk to site users. However, Fairhurst did conclude that surface waters and groundwater were considered to be potentially at risk of contamination by ammonia and sulphates. RPS noted that Fairhurst only screened one sample of made ground for the presence of asbestos containing materials, within which no asbestos was detected. Also of note the ERM report dated 2003 provides full details of the processes in use at that time by the Wolstenholme Bronze Powder works, including various solvents used in those processes. No additional information/reports have been identified by Wood as being available since the RPS report in 2019.
Hydrogeology	Groundsure report indicates that the superficial deposits are classified as a Secondary Undifferentiated Aquifer with a medium vulnerability. These are aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the deposits that offer some groundwater protection. The Coal Measures bedrock is classified as a Secondary A Aquifer with a medium vulnerability. These are bedrocks with 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. A medium vulnerability is defined as having a vulnerability between high and low vulnerability. The site does not lie within a source protection zone and there are no currently licensed potable groundwater abstractions within the site. The nearest recorded groundwater abstraction is located approximately 295m west of the site and relates to the Eccleshill Mineshaft overflow at the intake to Hollins Papermill. The abstraction is operated by St Regis Paper Company Limited for general use. There is insufficient data available to estimate the groundwater flow direction beneath the site. Although, the groundwater flow direction is likely to be complicated by the presence of variable made ground and historical quarrying and infilling in the near vicinity of the site the shallow groundwater flow is likely to be towards the north following the general surface topography. The aquifer underlying the site is part of the Douglas, Darwen and Calder Carboniferous Aquifers Water Framework Directive body that was classified by the Environment Agency as having an overall status of Poor in 2019. The Groundsure report indicates that the site is within an area that is at a low risk of groundwater flooding.
Hydrogeological sensitivity	The hydrogeological sensitivity of the site is low due to the presence medium vulnerability and lower sensitivity of the aquifer in Coal Measures.
Hydrology	The site walkover identified a pond (a former reservoir) within the east of the site that has a small stream issuing towards the north for a short distance before crossing the site boundary. Beyond the site boundary the stream flows across fields and is likely to drain north-eastwards to Davy Field Brook approximately 285m north of the site. In addition, the walkover identified an interceptor structure on the site's northern boundary which accepts surface water drainage from the site. The outflow from the interceptor flows through a wooded area to join with Davy Field Brook. The Davy Field Brook flows east to west roughly parallel with the M65 motorway and enters a culvert just downstream of the confluence with the site interceptor outflow. The Davy Field Brook is a tributary of the River Darwen that have a confluence approximately 670m northwest of the site. The Davy Field Brook is a Water Framework Directive waterbody that was classified by the Environment Agency as having an overall status of Moderate, chemical rating of Fail and an ecological rating of Moderate in 2019.
Hydrological sensitivity	The hydrological sensitivity of the site is medium due to the presence of water features within 300m which accept drainage from the site.

Sensitive land uses (ecology)	There are no statutory designated ecological sites on or in the vicinity of the site. No Sites of Special Scientific Interest (SSSIs) or other sensitive land uses are present on site or in the surrounding area.
Ecological sensitivity	The ecological sensitivity of the site is low, although ecological monitoring of the pond on site is currently on going.
Radon sensitivity	The site and surrounding area are shown to be at low risk from radon. The Public Health England (PHE) information in included in the Groundsure report estimates less than 1% of properties exceed radon action level.

5. Regulatory Information

Activity	On-Site	0-500m	Details
Waste sites	**2**	**14**	The Groundsure report identifies the following historical waste site: • Ground workings and refuse heap that extends on to the central north of the site that is dated 1930. • An onsite planning application for an Energy From Waste facility in 2019 (assumed to be a previous application). • Ground workings and refuse heap within 5m south and approximately 20m northwest of the site boundary and approximately 355m west and 460m northwest. • Ground workings and refuse heaps within 85m to 100m northwest and west of the site. • Scrap/breakers yards approximately 105m and 165m southeast, 315m west and 415m southwest. The Groundsure report identifies the following licenced or recently closed waste sites: • Darwen Materials Recycling Facility onsite operated by Sita UK Limited (now SUEZ) from 2012 and transferred to SUEZ in 2015. • Darwen Resource Recovery Centre onsite that is recorded as a special wastes transfer station operated by SUEZ from 2014. • Broadbent Autos ELV Facility (scrap yard) located approximately 180m and 275m south of the site. • Blackburn Borough Council Davyfield waste transfer station located approximately 310m north of the site that is licenced to store and transfer household, commercial and industrial wastes. • A B Spares/Berry Auto Salvage vehicle dismantlers/depollution facility located approximately 330m west of the site. • Blackburn Borough Council Davyfield Depot waste transfer station located approximately 400m north of the site that is licenced to store and transfer household, commercial and industrial wastes. • Clarence Street Car Breakers approximately 430m west of the site.
Current Industrial Land Use/Features of significance	**4**	**30**	The Groundsure report identifies the following onsite current/recent industrial land uses: • SUEZ UK Limited recycling, reclamation and disposal in the northwest of the site (possibly the address point); • Electricity sub-station in the northeast of the site; • Works (unspecified) in the central east and northwest of the site. In the near vicinity masts, tanks, electrical sub-stations, scrap yards and a garage have been identified within 100m of the site.
Historical Industrial Land Use/Features of significance	**30**	**165**	The Groundsure report identifies onsite historical industrial land uses including refuse heaps, heaps (unspecified), tanks, railway sidings, iron works, pits, cuttings, quarries and clay pits. In the wider area historical industrial land uses have included refuse heaps, heaps (unspecified), brick works, railway sidings, railway buildings, depots (unspecified), works (unspecified), tanks, pits, fire clay works, quarries, good sheds, ground

Activity	On-Site	0-500m	Details
			workings, good station, cuttings, mills (unspecified) and old coal pits with 250m of the site.
Landfill	**1**	**6**	The Groundsure report identifies the following landfills: • Wolstenholme Bronze Powders landfill was located in the central north of the site and was permitted to accept inert, commercial and industrial wastes from December 1977. The landfill was operated under the Environmental Permitting Regulations. • Goosehouse Quarry closed landfill operated by Inifinis (Re-Gen) Limited located immediately adjacent to the south of the site received household, commercial and industrial wastes. The landfill was operated under the Environmental Permitting Regulations. • Hollins Paper Mill historical landfill site located approximately 100m west of the site received inert, industrial and commercial wastes between 1947 and 1991. • Anchor Road historical landfill located approximately 345m west of the site received unknown wastes and the operating dates are not given. Lower Darwen Paper Mill historical landfill located approximately 480m northwest of the site was licenced to receive inert, industrial and liquid wastes.
Hazardous or Explosive Substances (inc. COMAH or NIHHS) planning hazardous consents	**0**	**1**	The Groundsure report identifies the nearest hazardous site is approximately 425m west of the site but the record relates to a withdrawn application.

6. Generic Risk Assessment

6.1 Conceptual Site Model

The Conceptual Site Model (CSM) and plausible contaminant linkages are defined below based on the desk study review of available information collated in the previous sections. The CSM is based on the proposed industrial land use. The CSM provides an assessment of the site's potential contamination status and identifies the presence of potentially significant contaminant linkages that require further consideration.

6.2 Potential Contamination (Sources)

A review of the site's history and environmental setting has identified several potential contaminant sources on the site and the surrounding area, as summarised below in Table 6.1.

Table 6.1 Current and historical containment sources

No.	Source	Potential Contaminants	Location	Source to be considered further?
S1	Waste processing, storage and transfer	Fatty acids, COD, BOD, TOC, ammoniacal-N, phosphates, chloride and metals.	Onsite	Yes
S2	Made ground (associated with the former iron works, clay pit and general infill containing slag, ash and demolition rubble)	Asbestos, metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs, asbestos and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Onsite	Yes
S3	Bronze Powder Works	Metals, hydrocarbons (PAH and TPH), solvents and VOC	Onsite	Yes
S4	Landfill	Landfill gas (CO_2 and CH_4), leachate (ammonia, metals and other contaminants)	Offsite adjacent to the south	Yes
S5	Slag heaps/refuse tips	Metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Offsite adjacent to the north	Yes
S6	Mine Gas from coal seam below site.	Mine gas (e.g., methane, carbon dioxide)	On site	Yes

No.	Source	Potential Contaminants	Location	Source to be considered further?
S7	Depots and works (unspecified)	Metals, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH	Offsite approximately 50m west	No The only possible pathway to onsite receptors is via direct contact with groundwater. However, given the surface cover and under normal forms of commercial/industrial land use contact is considered unlikely
S8	Railway land	Metals, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Offsite adjacent to the west	Yes

6.3 Potential receptors and exposure pathways

The potential receptors and associated pathways that have been identified are shown in Table 6.2.

Table 6.2 Pathways and Receptors

Receptors	Potential pathways
R1 **Future site users: industrial**	P1: Dermal contact, ingestion (including of contaminated potable water) and inhalation of dusts and fibres P2: Inhalation of vapours and accumulated gases
R2 **Future buildings and services**	P4: Direct contact, ingress and accumulation of gases
R3 **Controlled Waters: Davy Field Brook**	P3: Dust migration P5: Surface water run-off P6: Leaching, lateral migration
R4 **Offsite workers**	P1: Dermal contact, ingestion (including of contaminated potable water) and inhalation of dusts and fibres P2: Inhalation of vapours and accumulated gases
R5 **Controlled Waters: Secondary A Aquifer**	P6: Leaching, vertical migration

6.4 Exclusions from risk assessment

Current site users

The site is currently owned by SUEZ Recycling and Recovery Ltd. As this desk study relates to a planning application for the proposed redevelopment of the site, operational risks to existing site users (SUEZ staff, visitors and adjacent site workers) are not included in this risk assessment. Existing operational procedures and precautions are assumed be in place in respect to the health and safety of current site users.

Redevelopment workers

The CSM does not consider risks to construction or site maintenance workers on the basis that risks to such workers will be dealt with under the Health and Safety at Work Act (1974) and regulations made under the Act. Site-specific contamination data obtained from all site investigations should be included in the pre-construction information for the proposed works (a requirement of Construction Design and management Regulations 2015), to enable any contractors to address potential risk from contamination as necessary in their risk assessments and method statements. Moreover, as the exact details of the proposed construction methods are not currently known, it is not considered appropriate to provide a wide ranging and speculative risk assessment for redevelopment workers.

Invasive species

Invasive species (such as Japanese knotweed and giant hogweed) are not considered within the risk assessment for contamination. Invasive species are considered to be a constraint to redevelopment rather than a contaminated land risk issue and would be anticipated to be assessed and addressed further in appropriate documentation relating to enabling works ahead of redevelopment.

Unexploded ordnance (UXO)

UXO are not considered within the risk assessment for contamination as they are also considered to be a constraint to redevelopment rather than a contaminated land risk issue and would be anticipated to be managed as part of safe working practices by a developer.

Wood notes that a preliminary UXO assessment was undertaken by RPS using publicly available UXO risk maps provided by Zetica UXO. The site and surrounding area were classified as low risk.

6.5 Preliminary risk assessment

In order for land contamination risk to be realised, a ‘contaminant linkage’ must exist. A contaminant linkage requires the presence of a:

- source of contamination;
- receptor capable of being harmed; and
- pathway capable of exposing a receptor to the contaminant.

A preliminary risk assessment has been undertaken for these potential contaminant linkages to identify potentially unacceptable risks on a qualitative basis. Risk is therefore based on a consideration of both:

- The likelihood of an event (probability – considers both the presence of the hazard and receptor and the integrity of the pathway); and
- The severity of the potential consequence (considers both the potential severity of the hazard and the sensitivity of the receptor).

Further information on the risk assessment methodology used is given in Appendix D. The method of dealing with identified risks and the level of significance of those risks will be a function of site use.

The risk assessment is based on the future proposed land use and assumes no control measures to manage the risk (e.g., source removal or capping) have been incorporated in the development. In practice, it is likely that hard surface cover provided by the new development will mitigate most risks by interrupting exposure pathways.

Table 6.3 Preliminary Risk Assessment – Risks to future site users and environment from current/historic sources

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk/ Significance
Waste processing, storage and transfer (S1)	Fatty acids, COD, BOD, TOC, ammoniacal-N, phosphates, chloride and metals.	R1 Future site users: industrial	P1: Dermal contact, ingestion (including of contaminated potable water) and inhalation of dusts and fibres P2: Inhalation of vapours and accumulated gases	Health Hazard [Medium]	Unlikely The waste processing facility is regulated under the Environmental Permitting Regulations therefore it is considered unlikely that significant contamination has been caused by the facility during its operational life.	**Low**
	Fatty acids, COD, BOD, TOC, ammoniacal-N, phosphates, chloride and metals.	R2 Future buildings and services	P4: Direct contact, ingress and accumulation of gases	Damage to Property [Mild]	Low likelihood	**Low**
	Fatty acids, COD, BOD, TOC, ammoniacal-N, phosphates, chloride and metals.	R3 Controlled Waters: Davy Field Brook	P5: Surface water run-off P6: Leaching, lateral migration	Pollution of Controlled waters [Medium]	Unlikely The waste processing facility is regulated under the Environmental Permitting Regulations therefore it is considered unlikely that significant contamination has been caused by the facility during its operational life.	**Low**
	Fatty acids, COD, BOD, TOC, ammoniacal-N, phosphates, chloride and metals.	R4 Neighbouring Industrial Workers	P2: Inhalation of vapours and accumulated gases P3: Dust migration	Health Hazard [Medium]	Unlikely Nearest industrial users to the west. The only possible pathway is via contact with contaminated groundwater therefore under	**Low**

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk/ Significance
					normal forms of use contact is considered unlikely	
	Fatty acids, COD, BOD, TOC, ammoniacal-N, phosphates, chloride and metals.	R5 Controlled Waters: Secondary A Aquifer	P6: Leaching, vertical migration	Pollution of Secondary A Aquifer [Medium]	Unlikely Overlying glacial deposits likely to provide some protection	**Low**
Made ground containing slag, ash, demolition rubble, chemicals, etc (S2)	Asbestos, metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs, and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Future site users: industrial (R1)	P1: Dermal contact, ingestion (including of contaminated potable water) and inhalation of dusts and fibres P2: Inhalation of vapours and accumulated gases	Health Hazard [Medium]	Likely (assuming no mitigation) Extent of made ground and its constituents are not known. The nature, depth and extent of the made ground are currently unknown, therefore ground gas cannot be discounted on the site. There is potential for asbestos to be present in the made ground.	**Moderate**
	Asbestos, metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs, and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Future buildings and services (R2)	P4: Direct contact, ingress and accumulation of gases	Damage to Property [High]	Likely The presence of significant thicknesses of iron slag in the made ground could pose a risk to building foundations. The nature, depth and extent of the made ground are currently unknown, therefore ground gas cannot be discounted on the site.	**High**

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk/ Significance
					There is potential for asbestos to be present in the made ground.	
	Asbestos, metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs, and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	R3 Controlled Waters: Davy Field Brook and other streams to N and E	P3: Dust migration P6: Leaching, lateral migration	Pollution of Controlled waters [Medium]	Likely Possible contamination of adjacent watercourses via lateral groundwater migration	**Moderate**
	Asbestos, metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs, and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC	R4 Neighbouring Industrial Workers	P2: Inhalation of vapours and accumulated gases P3: Dust migration	Health Hazard [Medium]	Unlikely Nearest industrial users to the west are unlikely to be significantly affected via these pathways.	**Low**

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk/ Significance
	Asbestos, metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs, and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC	R5 Pennie Lower Coal Measure formation. (Secondary A Aquifer)	P6: Leaching, vertical migration	Pollution of Secondary A Aquifer [Medium]	Likely Overlying glacial deposits likely to provide some protection.	**Moderate**
Legacy contaminants from Bronze Powder works (S3)	Metals, hydrocarbons (PAH and TPH), solvents and VOC	Future site users: industrial (R1)	P1: Dermal contact, ingestion (including of contaminated potable water) and inhalation of dusts and fibres P2: Inhalation of vapours and accumulated gases	Health Hazard [Medium]	Likely Contact with contamination possible without mitigation.	**Moderate**
	Metals, hydrocarbons (PAH and TPH), solvents and VOC	Future buildings and services (R2)	P4: Direct contact, ingress and accumulation of gases	Damage to Property [Mild]	Unlikely Degradation of materials or services is unlikely.	**Low**
	Metals, hydrocarbons (PAH and TPH), solvents and VOC	R3 Controlled Waters: Davy Field Brook and other streams to N and E	P5: Surface water run-off P6: Leaching, lateral migration	Pollution of Controlled waters [Medium]	Low likelihood Possible contamination of adjacent watercourses via lateral groundwater migration.	**Moderate /Low**

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk/ Significance
	Metals, hydrocarbons (PAH and TPH), solvents and VOC	R4 Neighbouring Industrial Workers	P2: Inhalation of vapours and accumulated gases P3: Dust migration	Health Hazard [Medium]	Unlikely Nearest industrial users to the west are unlikely to be significantly affected via these pathways.	**Low**
	Metals, hydrocarbons (PAH and TPH), solvents and VOC	R5 Pennie Lower Coal Measure formation. (Secondary A Aquifer)	P6: Leaching, migration	Pollution of Secondary A Aquifer [Medium]	Likely Overlying glacial deposits likely to provide some protection	**Moderate**
Gas and leachate from landfill (S4)	Landfill gas (CO_2 and CH_4), leachate (ammonia, metals and other contaminants)	Future site users: industrial (R1)	P1: Dermal contact, ingestion (including of contaminated potable water) P2: Inhalation of vapours and accumulated gases	Health Hazard [Medium]	Likely There is some potential for contaminants including landfill gas to migrate onto the site in shallow soils, there is potential for migration through shallow groundwater.	**Moderate**
	Landfill gas (CO_2 and CH_4), leachate (ammonia, metals and other contaminants)	Future buildings and services (R2)	P4: Direct contact, ingress and accumulation of gases	Damage to Property [Medium]	Likely Degradation of materials or services is possible. Concentrations could be high enough to cause accumulation of gases.	**Moderate**

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk/ Significance
	Landfill gas (CO_2 and CH_4), leachate (ammonia, metals and other contaminants)	R4 Neighbouring Industrial Workers	P1: Dermal contact, ingestion (including of contaminated potable water) and inhalation of dusts and fibres P2: Inhalation of vapours and accumulated gases	Health Hazard [Medium]	Unlikely There is some potential for contaminants including landfill gas to migrate however off-site workers are at a significant distance.	
	Leachate (ammonia, metals and other contaminants)	Controlled Waters: Davy Field Brook and other streams to N and E (R3)	P6: Leaching, migration	Pollution of Controlled waters [Medium]	Likely Possible contamination of adjacent watercourses via migration of lateral groundwater contaminated with leachate.	**Moderate**
	Leachate (ammonia, metals and other contaminants)	Pennie Lower Coal Measure formation. (Secondary A Aquifer) (R5)	P6: Leaching, migration	Pollution of Secondary A Aquifer [Medium]	Low likelihood Possible contamination of Secondary A aquifer via vertical migration of leachate directly from landfill.	**Moderate**
Slag heaps/refuse tips (S5)	Metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Future site users: industrial (R1)	P1: Dermal contact, ingestion (including of contaminated potable water) P2: Inhalation of vapours and accumulated gases	Health Hazard [Medium]	Unlikely Limited migration of contaminants in groundwater and ground gas. Site users unlikely to be significantly affected via this pathway.	**Low**

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk/ Significance
	Metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Future buildings and services (R2)	P4: Direct contact, ingress and accumulation of gases	Damage to Property [Medium]	Unlikely There is some potential for contaminants including ground gas to migrate onto the site in shallow soils, there is potential for migration through shallow groundwater.	**Low**
	Metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Controlled Waters: Davy Field Brook and other streams to N and E (R3)	P3: Dust migration P5: Surface water run-off. P6: Leaching, migration	Pollution of Controlled waters [Medium]	Likely Possible contamination of adjacent watercourses via surface water run-off and lateral groundwater migration.	**Moderate/Low**
	Metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Pennie Lower Coal Measure formation. (Secondary A Aquifer) (R5)	P6: Leaching, migration	Pollution of Secondary A Aquifer [Medium]	Unlikely Overlying glacial deposits likely to provide some protection.	**Low**
Mine Gas from coal seam below site (S6)	Mine gas (e.g., methane, carbon dioxide)	Future site users: industrial (R1)	P2: Inhalation of vapours and accumulated gases	Health Hazard [Medium]	Low likelihood The coal seam below site and possible mine entry could produce	**Moderate/Low**

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk/ Significance
					mine gas, however hardstanding and industrial use of site mitigate exposure.	
	Mine gas (e.g., methane, carbon dioxide)	Future buildings and services (R2)	P4: Direct contact, ingress and accumulation of gases	Damage to Property [Medium]	Low likelihood. There is potential for the coal seam below site and possible mine entry could produce mine gas which could migrate into on site buildings.	**Moderate/Low**
	Mine gas (e.g., methane, carbon dioxide)	Offsite workers (R4)	P2: Inhalation of vapours and accumulated gases	Health Hazard [Medium]	Unlikely Mine gas could migrate off-site via shallow ground, however off-site workers are unlikely to be significantly affected.	**Low**
Railway land (S8)	Metals, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Future site users: industrial (R1)	P1: Dermal contact, ingestion (including of contaminated potable water) P2: Inhalation of vapours and accumulated gases P3: Dust migration	Health Hazard [Medium]	Low likelihood There is some potential for contaminants including ground gas to migrate onto the site in shallow soils, there is potential for migration through shallow groundwater.	**Low**

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk/ Significance
	Metals, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Future buildings and services (R2)	P4: Direct contact, ingress and accumulation of gases	Damage to Property [Medium]	Low likelihood Degradation of materials or services is unlikely. Concentrations unlikely to be high enough to cause accumulation of gases.	**Low**
	Metals, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	(R3) Controlled Waters: Davy Field Brook and other streams to N and E	P5: Surface water run-off P6: Leaching, lateral migration P3: Dust migration	Pollution of Controlled waters [Medium]	Low likelihood Possible contamination of adjacent watercourses via migration of lateral groundwater contaminated with leachate.	**Low**
	Metals, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Offsite Workers (R4)	P1: Dermal contact, ingestion (including of contaminated potable water) and inhalation of dusts and fibres P3: Dust migration	Health Hazard [Medium]	Low likelihood There is some potential for contaminants including ground gas to migrate onto the site in shallow soils, there is potential for migration through shallow groundwater.	**Low**

Potential Source	Potential Pollutant	Potential Receptors	Potential Pathways to Receptors	Associated Hazard [severity]	Likelihood of Occurrence	Risk/ Significance
	Metals, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	(R5) Controlled Waters: Secondary A Aquifer	P5: Surface water run-off P6: Leaching, lateral migration	Pollution of Controlled waters [Medium]	Low likelihood Possible contamination of Secondary A aquifer via vertical migration of leachate directly from railway land.	**Low**

Table 6.4 PRA Summary Table

Potential Source with associated contaminants:	Waste leachate from waste processing (S1)	Made ground (S2)	Legacy contaminants from Bronze Powder works (S3)	Gas and leachate from landfill (S4)	Slag heaps/refuse tips (S5)	Mine Gas (S6)	Railway Land (S8)
Potential Pollutants:	Fatty acids, COD, BOD, TOC, ammoniacal-N, phosphates, chloride and metals.	Asbestos, metals, hydrocarbons including PAH, pH Ground gas (e.g., methane, carbon dioxide)	Hydrocarbons, VOC	Landfill gas (CO_2 and CH_4), leachate (ammonia, metals and other contaminants)	Metals, cyanide, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)	Mine gas (e.g., methane, carbon dioxide)	Metals, sulphur, hydrocarbons (PAH and TPH), VOCs and abnormal pH Ground gas (e.g., methane, carbon dioxide, VOC)
R1 **Future site users: industrial**	**Low**	**Moderate**	**Moderate**	**Moderate**	**Low**	**Moderate/Low**	**Low**
R2 **Future buildings and services**	**Low**	**High**	**Low**	**Moderate**	**Low**	**Moderate/Low**	**Low**
R3 **Controlled Waters: Davy Field Brook and other streams to N and E**	**Low**	**Moderate**	**Moderate/Low**	**Moderate**	**Moderate/Low**	**N/A**	**Low**
R4 **Neighbouring Industrial Workers**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

Potential Source with associated contaminants:	Waste leachate from waste processing (S1)	Made ground (S2)	Legacy contaminants from Bronze Powder works (S3)	Gas and leachate from landfill (S4)	Slag heaps/refuse tips (S5)	Mine Gas (S6)	Railway Land (S8)
R5 **Pennie Lower Coal Measure formation.** **(Secondary A Aquifer)**	**Low**	**Moderate**	**Moderate**	**Moderate**	**Low**	**N/A**	**Low**

7. Conclusions & Recommendations

An updated Phase 1 land contamination desk study has been undertaken to support the planning application for the Proposed Development in line with LCRM. The findings of this report are broadly in line with those of the previous RPS 2019 Phase 1 report.

Contaminated Land

The site has a long history of industrial development which has left a legacy of various waste materials within the made ground beneath the site. These materials are likely to include potentially large amounts of ironworks slag as well as other combustion residues such as ash, clinker etc. The more recent metallic powder and ink works may have contaminated the ground with hydrocarbons such as oils, solvents, VOCs etc. In addition, the site may contain residues from the handling and processing of miscellaneous wastes from recent and current site use. All of these have the potential to cause harm to human health by direct exposure and to controlled waters by migration off-site either directly or by permeation through the ground. A historical landfill in the northern section of site may be a source of landfill gas and leachate.

A significant potential off-site source of contamination is the landfill adjoining the southern boundary of the site. This has the potential to be a source of gas and leachate migration onto the site.

Accurate quantification of the risks is not possible at this stage due to an absence of reliable ground investigation data including analysis of contaminants in soil and groundwater samples. Therefore the risk assessment has been carried out on the basis of a worst-case scenario, in which future site users are potentially exposed to contaminants on site without mitigation.

Five potential contaminant linkages of concern have been identified. These are:

- Moderate risks to future site users from potential contamination in the made ground.
- High risk to future site infrastructure from significant depths (6m) of made ground and iron works slag.
- Moderate risks to future site infrastructure from gas and leachate migration from the off-site landfill
- Moderate risks to controlled waters (Davy Field Brook) from surface water runoff
- Moderate risks to future site infrastructure from landfill gas and leachate migration from the adjacent landfill.
- Moderate to Low risks to controlled waters (Davy Field Brook) from potentially contaminated groundwater migration from both the site and off-site landfill

The other identified contaminant linkages have been assessed as low risk.

Recommendations

Given the absence of reliable current ground investigation data with respect to potential contamination, it is recommended that a ground investigation is undertaken including sampling of the pond on site and nearby surface water streams (where practicable). A site-wide investigation

is recommended given the multiple sources of potential contaminants present both on and surrounding the site.

Following completion of the ground investigation, remediation may be required to ensure the site is suitable for the proposed redevelopment as an AD plant in line with LCRM.

The requirement for completion of a Phase 2 ground investigation and, if required, remediation could be secured through appropriately worded planning conditions as part of the Proposed Development.

Appendix A
Proposed Development Plan

NOTE

1. THIS DRAWING IS COPYRIGHT GSDA LTD.
2. THE CONTRACTOR MUST NOT SCALE FROM THE DRAWING ALL DIMENSIONS TO BE TAKEN FROM DIMENSION STRINGS.
3. WHERE ANY DISCREPANCIES ARE FOUND BETWEEN DIMENSIONS THESE MUST BE BROUGHT TO THE ATTENTION OF THE ARCHITECTS FOR RESOLUTION.
4. WHERE DISCREPANCIES EXIST BETWEEN REFERENCE OR ASSEMBLY DRAWINGS & DETAIL DRAWINGS, THE LATTER TAKE PREFERENCE.

KEY

- Ownership Boundary
- Fence Line
- Buildings
- Concrete and tarmac hardstanding and maintenance areas
- Demarcated pedestrian route area on hardstanding
- Permeable block paving
- Area of proposed landscaping
- Existing trees retained

N

0 5 10 25m

PROJECT: Darwen AD

DRAWING: Proposed Site Plan

FOR PLANNING

1:500@A1 SCALE	22/08/16 DATE	-	22/08/10	Issued for planning							
1446_PL101 DWG. NO.	B REVISION	A	22/08/12	Issued for planning							
		B	22/08/16	Issued for planning, bin store amended							

GSDA
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Appendix B
Groundsure Report

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_1
Grid Ref: 369090, 423634

Map Name: National Grid

Map date: **1954**

Scale: 1:1,250

Printed at: 1:2,000

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Production date: 21 April 2022

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_1
Grid Ref: 369090, 423634

Map Name: National Grid
Map date: **1955**
Scale: 1:1,250
Printed at: 1:2,000

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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 N/A Levelled N/A
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 N/A Levelled N/A

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Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_1
Grid Ref: 369090, 423634

Map Name: National Grid
Map date: **1962**
Scale: 1:1,250
Printed at: 1:2,000

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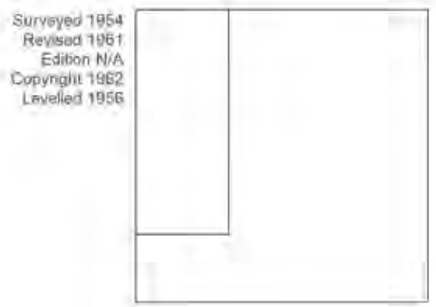

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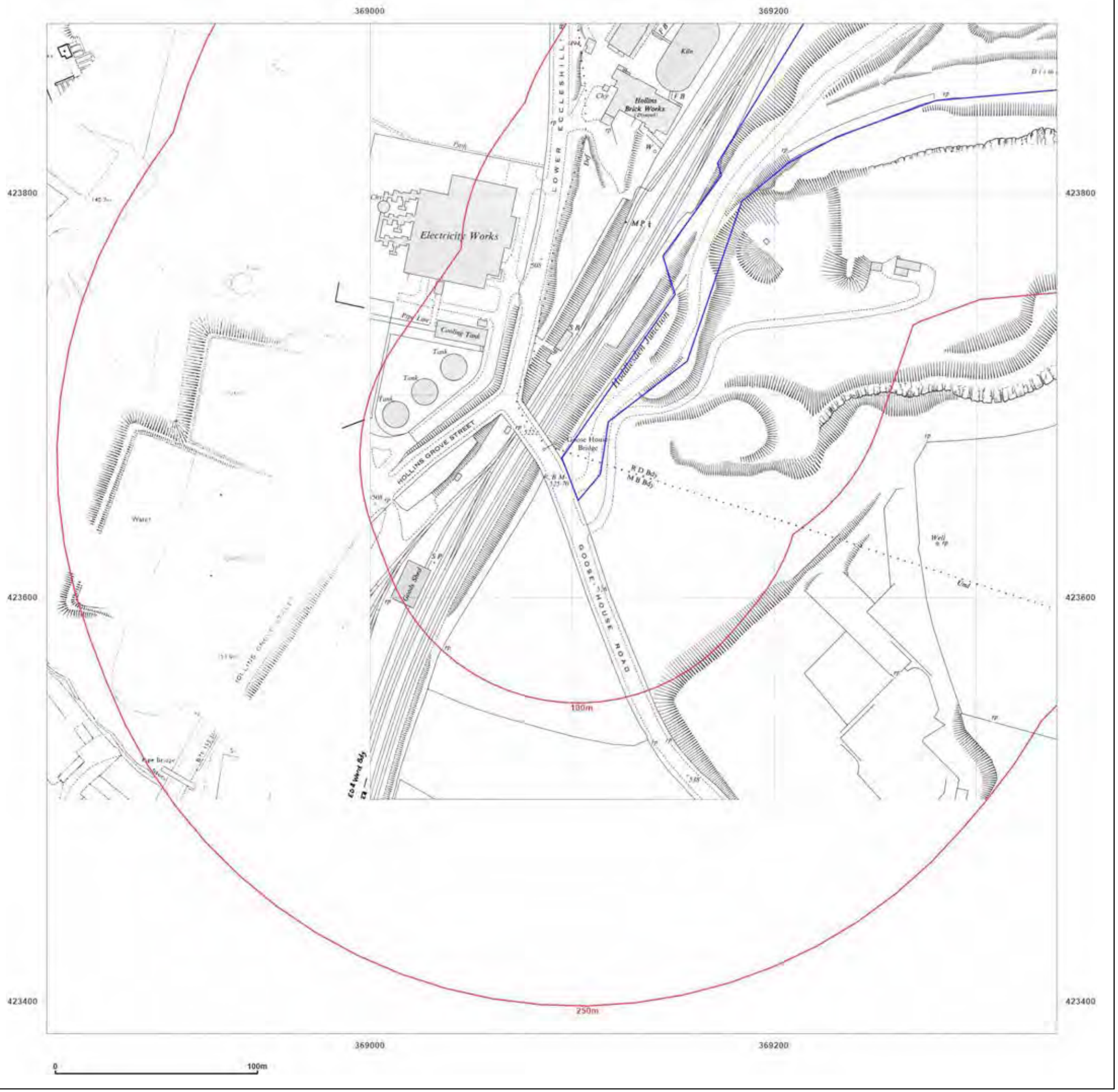

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_1
Grid Ref: 369090, 423634

Map Name: National Grid
Map date: **1961-1966**
Scale: 1:1,250
Printed at: 1:2,000

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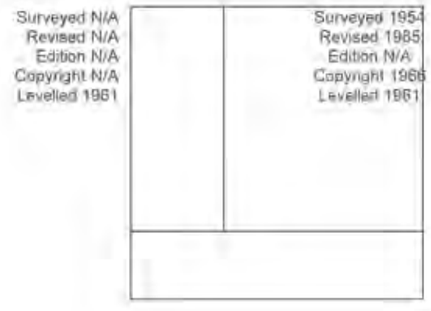

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Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_1
Grid Ref: 369090, 423634

Map Name: National Grid
Map date: **1971-1975**
Scale: 1:1,250
Printed at: 1:2,000

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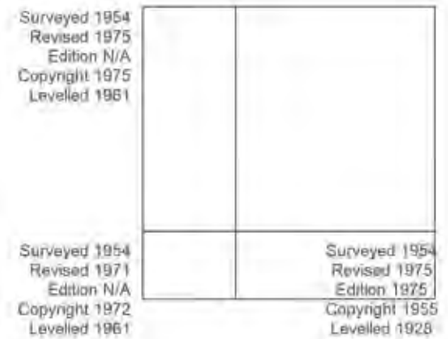

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Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_1
Grid Ref: 369090, 423634

Map Name: National Grid
Map date: **1980-1986**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed 1961 Revised 1986 Edition N/A Copyright 1986 Levelled 1961	Surveyed 1961 Revised 1980 Edition N/A Copyright 1980 Levelled 1961
	Surveyed N/A Revised N/A Edition N/A Copyright 1982 Levelled 1961

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Production date: 21 April 2022

Map legend available at:
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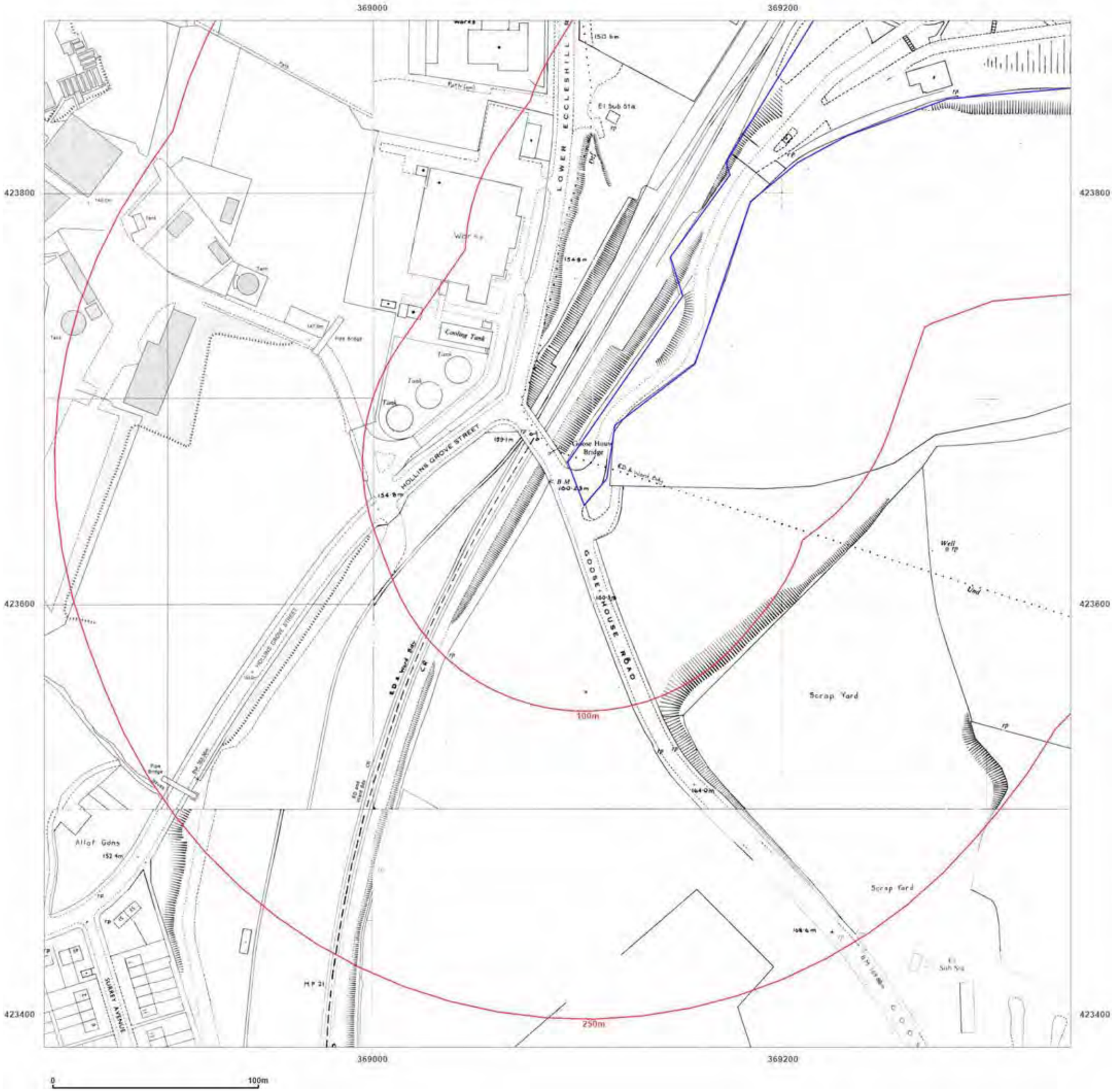

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_1
Grid Ref: 369090, 423634

Map Name: National Grid
Map date: **1989-1991**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed 1954 Revised 1989 Edition N/A Copyright 1989 Levelled N/A	Surveyed 1961 Revised 1990 Edition N/A Copyright 1990 Levelled 1961
Surveyed 1961 Revised 1990 Edition N/A Copyright 1990 Levelled 1961	Surveyed N/A Revised N/A Edition N/A Copyright 1991 Levelled 1961

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Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_1
Grid Ref: 369090, 423634

Map Name: National Grid
Map date: **1991-1993**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed 1993 Revised 1993 Edition N/A Copyright N/A Levelled N/A	Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A
Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A	Surveyed 1961 Revised 1991 Edition N/A Copyright 1991 Levelled 1961

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Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_2
Grid Ref: 369090, 424134

Map Name: National Grid
Map date: **1954-1955**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed 1954 Revised 1954 Edition N/A Copyright N/A Levelled 1928	Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A
Surveyed 1954 Revised 1954 Edition N/A Copyright N/A Levelled 1928	Surveyed 1954 Revised 1954 Edition N/A Copyright N/A Levelled 1928

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Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_2
Grid Ref: 369090, 424134

Map Name: National Grid
Map date: **1955**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A		Surveyed 1954 Revised N/A Edition 1955 Copyright N/A Levelled 1928
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Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_2
Grid Ref: 369090, 424134

Map Name: National Grid
Map date: **1961-1966**
Scale: 1:1,250
Printed at: 1:2,000

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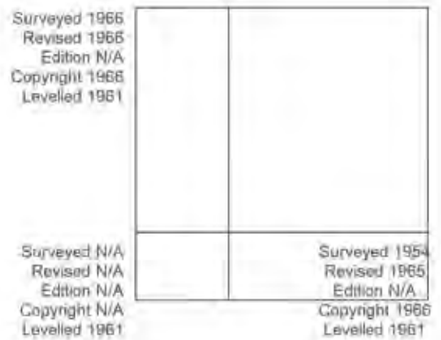

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Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_2
Grid Ref: 369090, 424134

Map Name: National Grid
Map date: **1975-1980**
Scale: 1:1,250
Printed at: 1:2,000

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	Surveyed 1954 Revised 1976 Edition 1977 Copyright 1955 Levelled 1928
Surveyed 1954 Revised 1975 Edition N/A Copyright 1975 Levelled 1961	Surveyed 1961 Revised 1980 Edition N/A Copyright 1980 Levelled 1961

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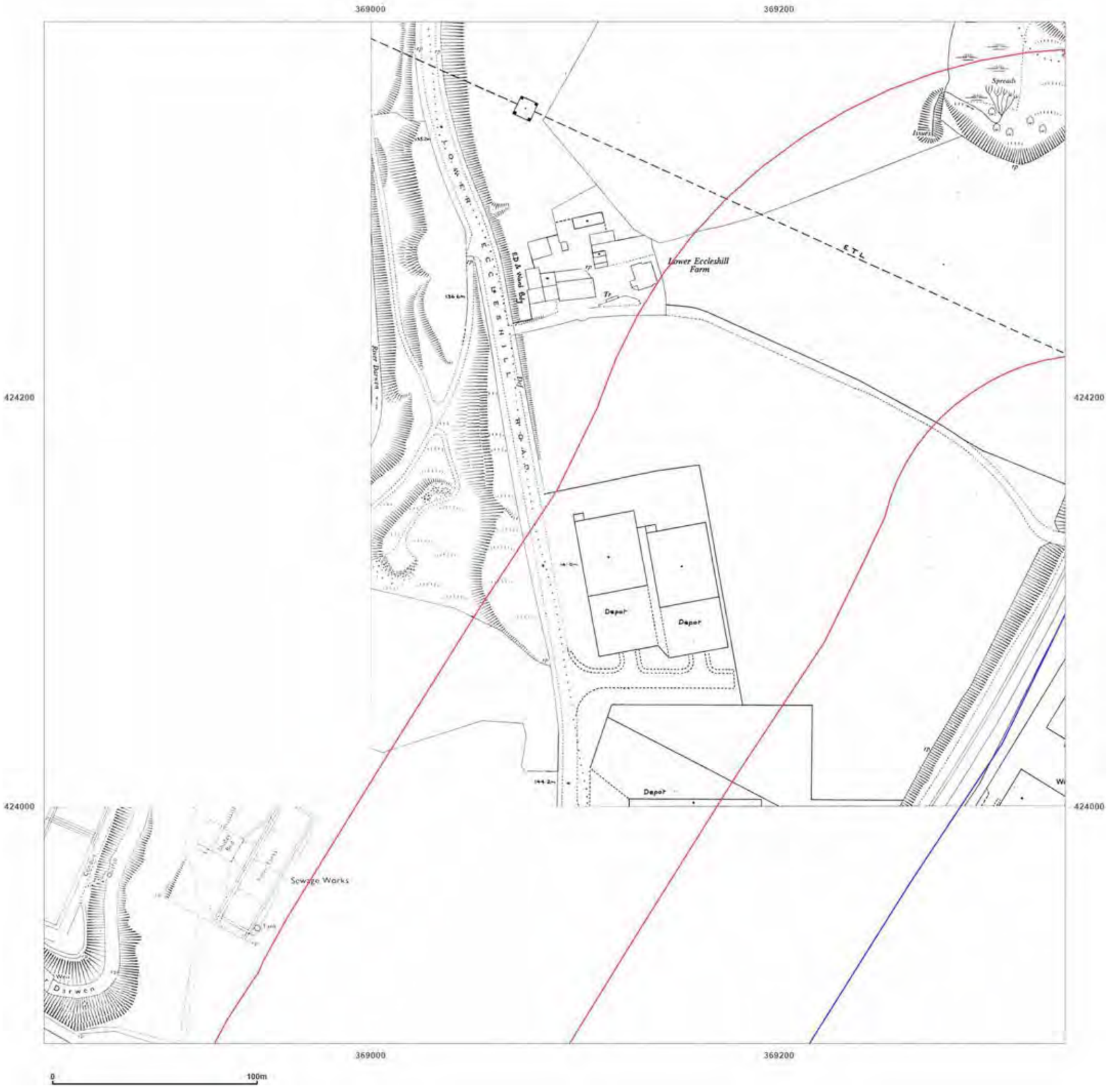

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Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_2
Grid Ref: 369090, 424134

Map Name: National Grid
Map date: **1981-1986**
Scale: 1:1,250
Printed at: 1:2,000

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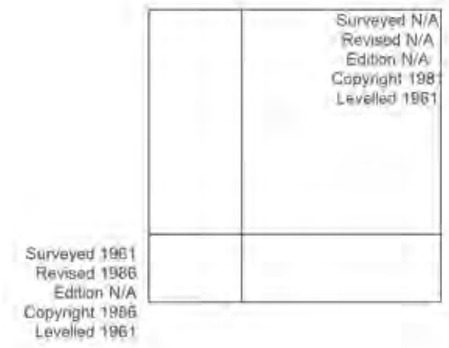

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Site Details:

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Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_1_2
Grid Ref: 369090, 424134

Map Name: National Grid
Map date: **1989-1993**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A		Surveyed 1981 Revised 1990 Edition N/A Copyright 1990 Levelled 1961
Surveyed 1954 Revised 1989 Edition N/A Copyright 1989 Levelled N/A		Surveyed 1961 Revised 1990 Edition N/A Copyright 1990 Levelled 1961

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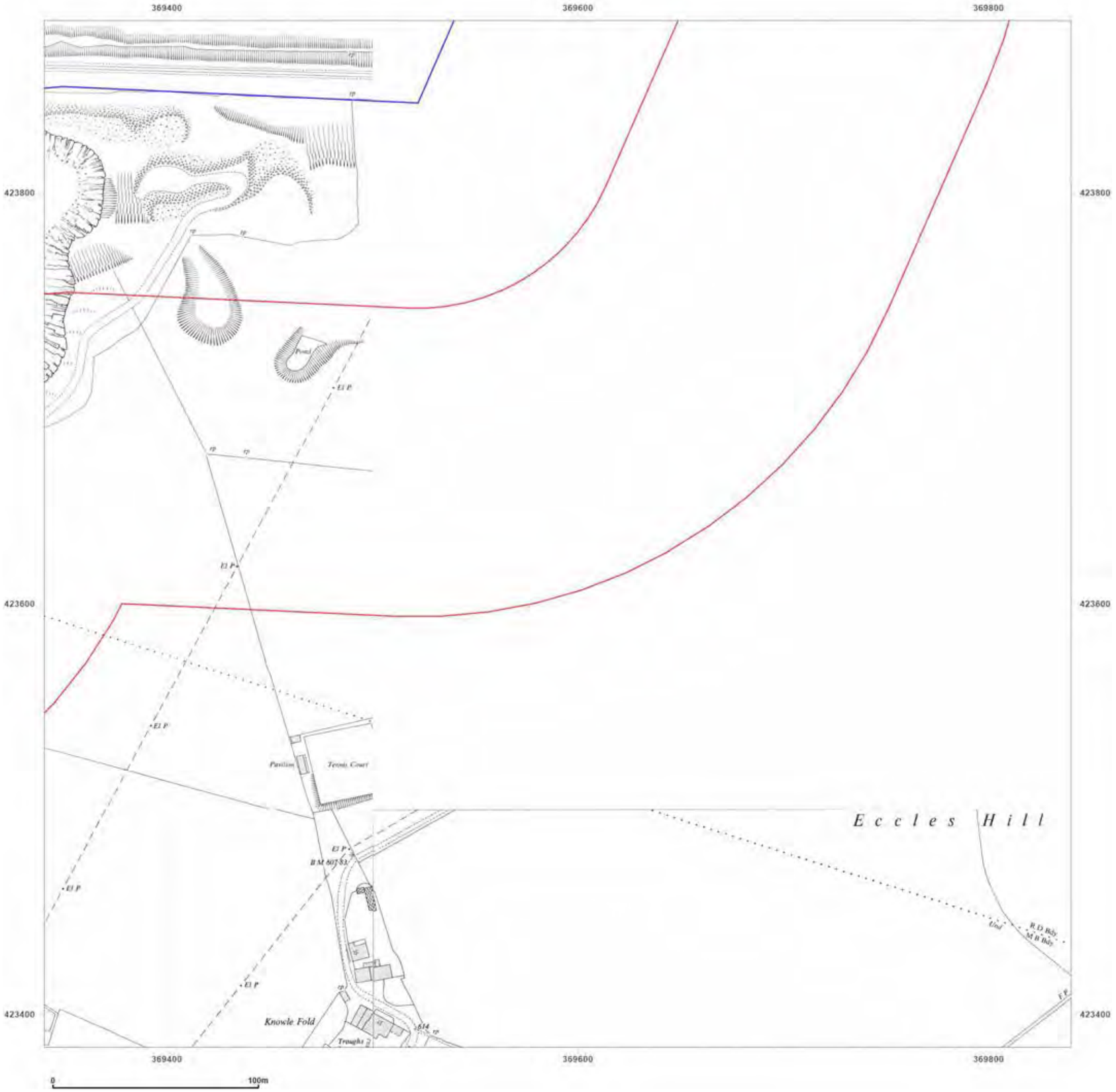

Groundsure INSIGHTS

Site Details:

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Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_1
Grid Ref: 369590, 423634

Map Name: National Grid
Map date: **1954**
Scale: 1:1,250
Printed at: 1:2,000

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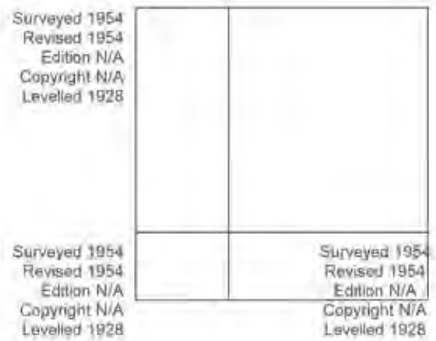

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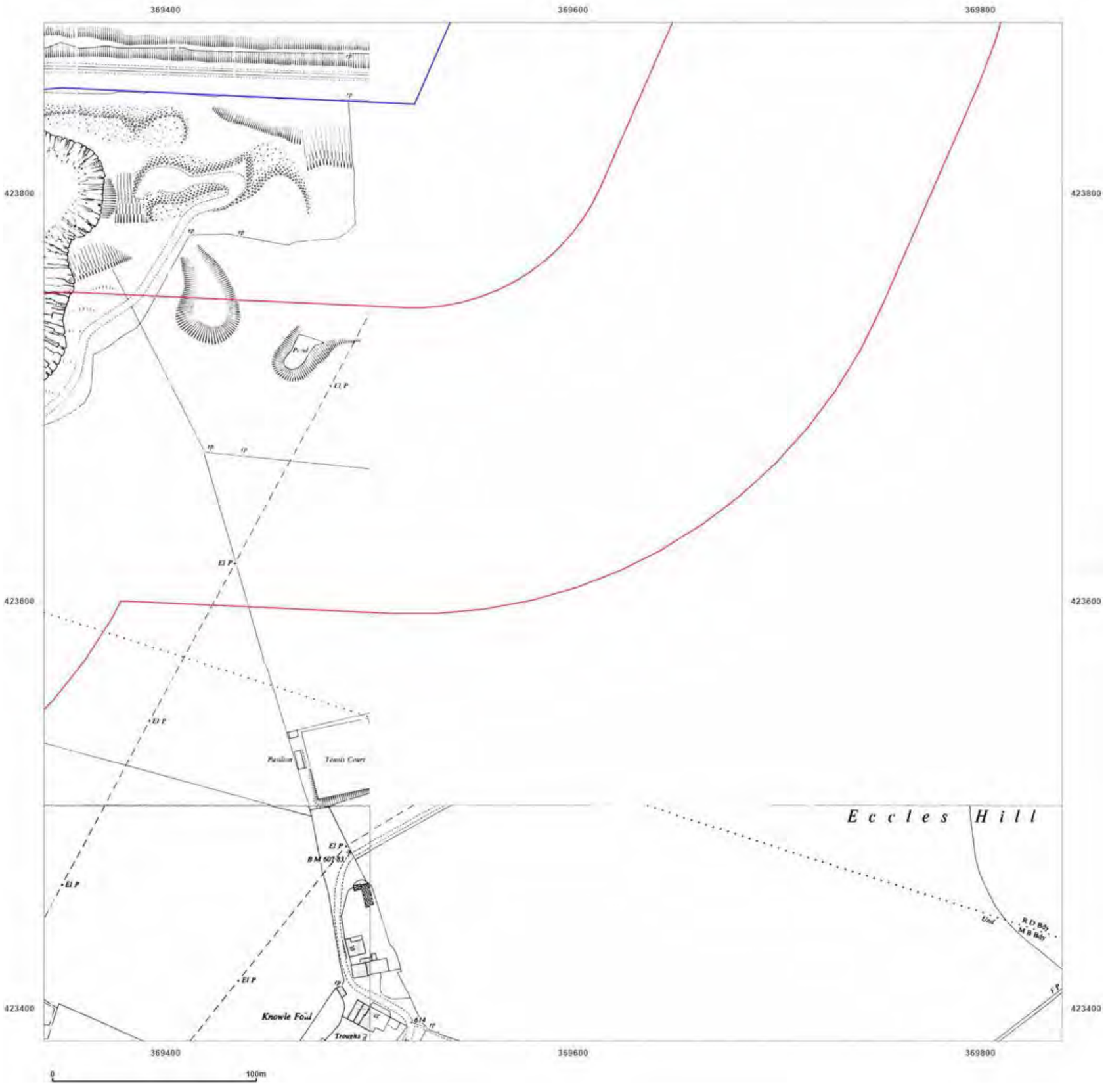

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_1
Grid Ref: 369590, 423634

Map Name: National Grid
Map date: **1955**
Scale: 1:1,250
Printed at: 1:2,000

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Edition N/A
Copyright N/A
Levelled N/A

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Levelled N/A

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Revised N/A
Edition N/A
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Levelled N/A

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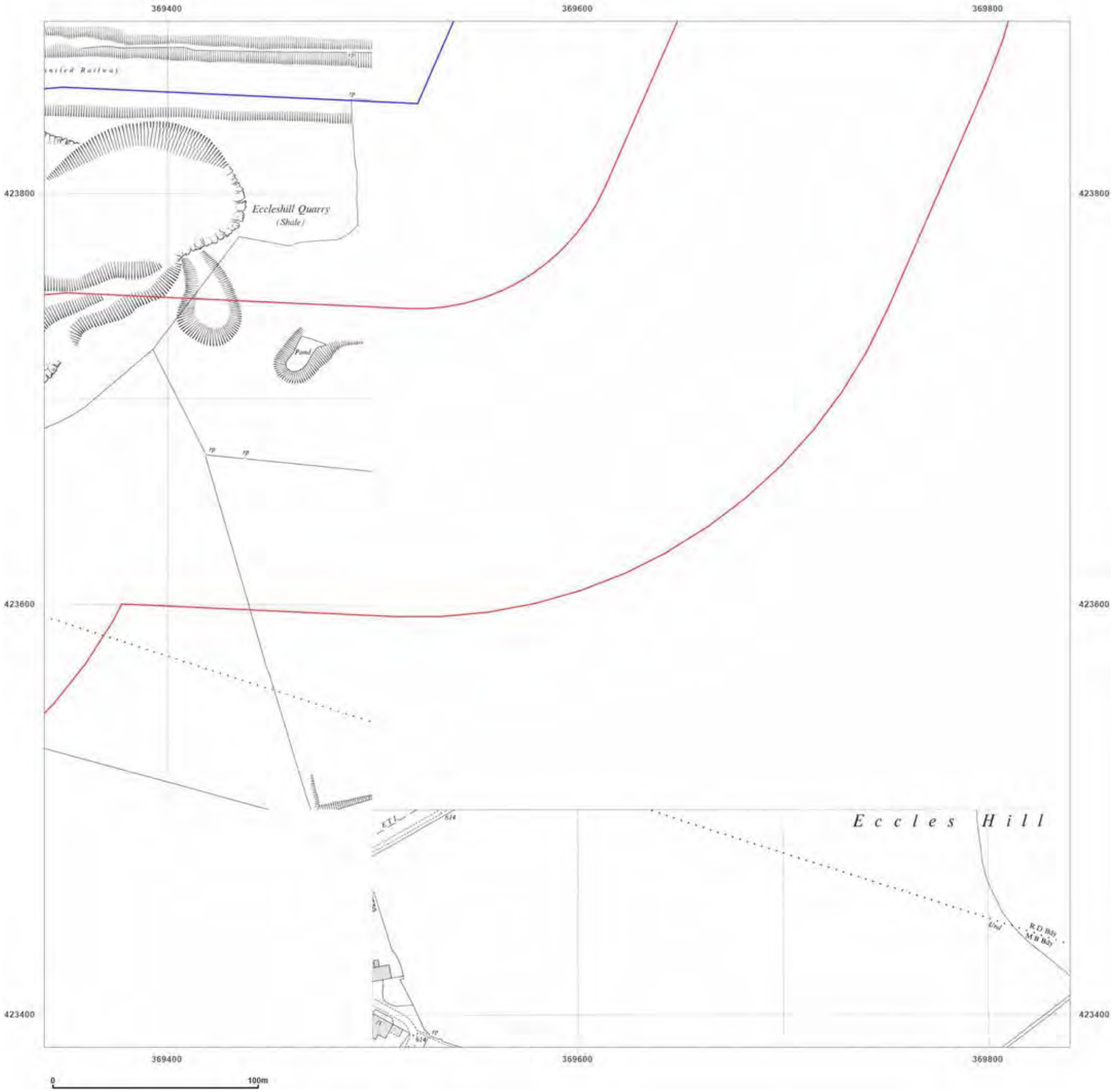

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_1
Grid Ref: 369590, 423634

Map Name: National Grid
Map date: **1966-1967**
Scale: 1:1,250
Printed at: 1:2,000

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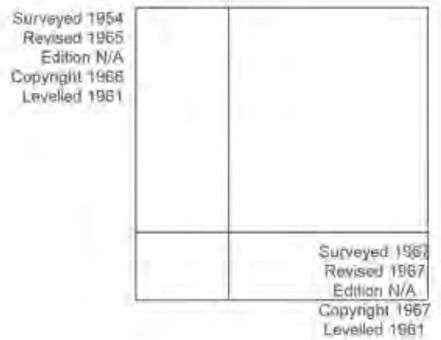

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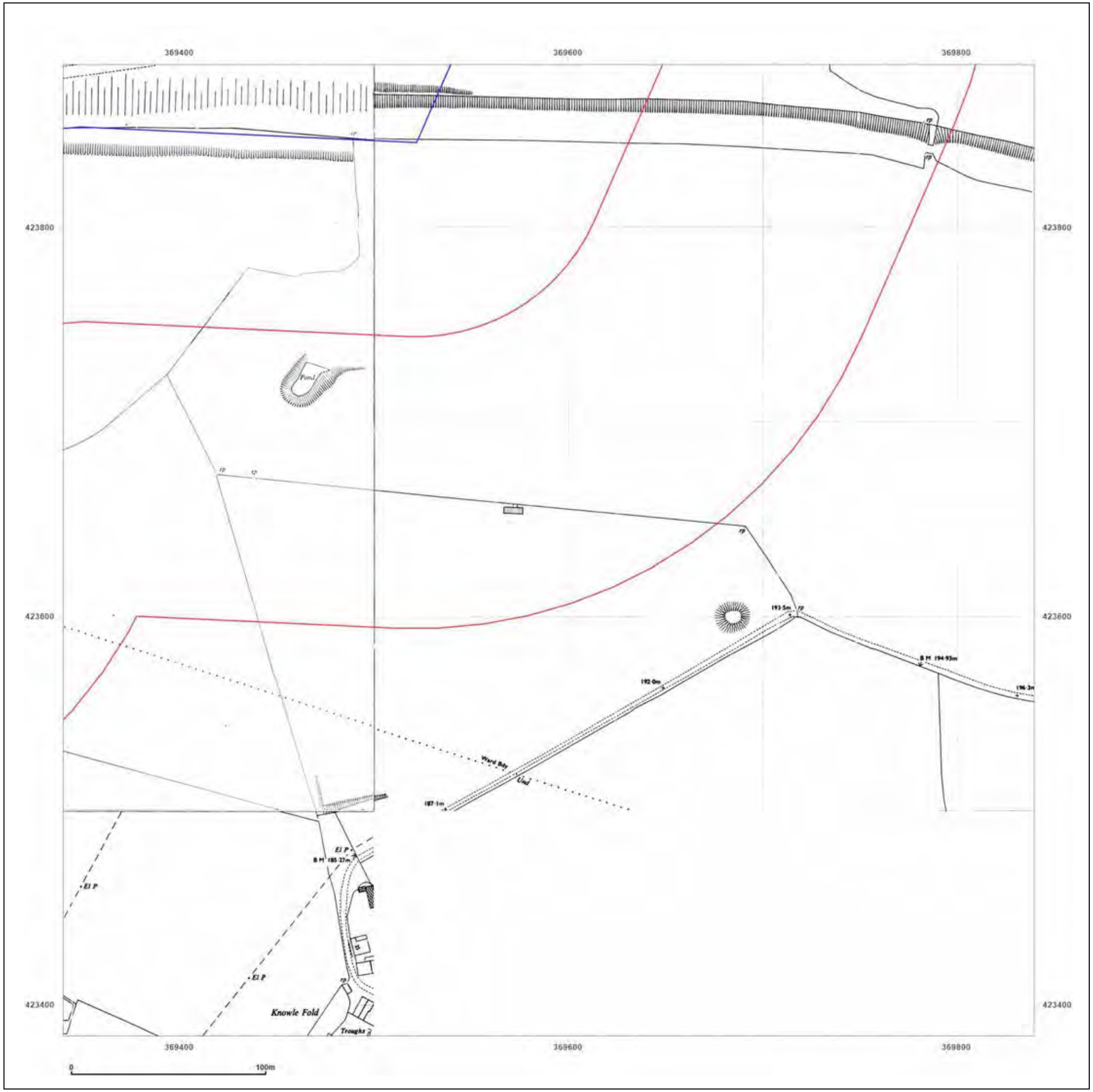

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_1
Grid Ref: 369590, 423634

Map Name: National Grid
Map date: **1975-1980**
Scale: 1:1,250
Printed at: 1:2,000

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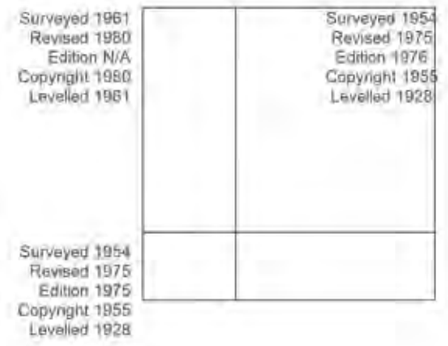

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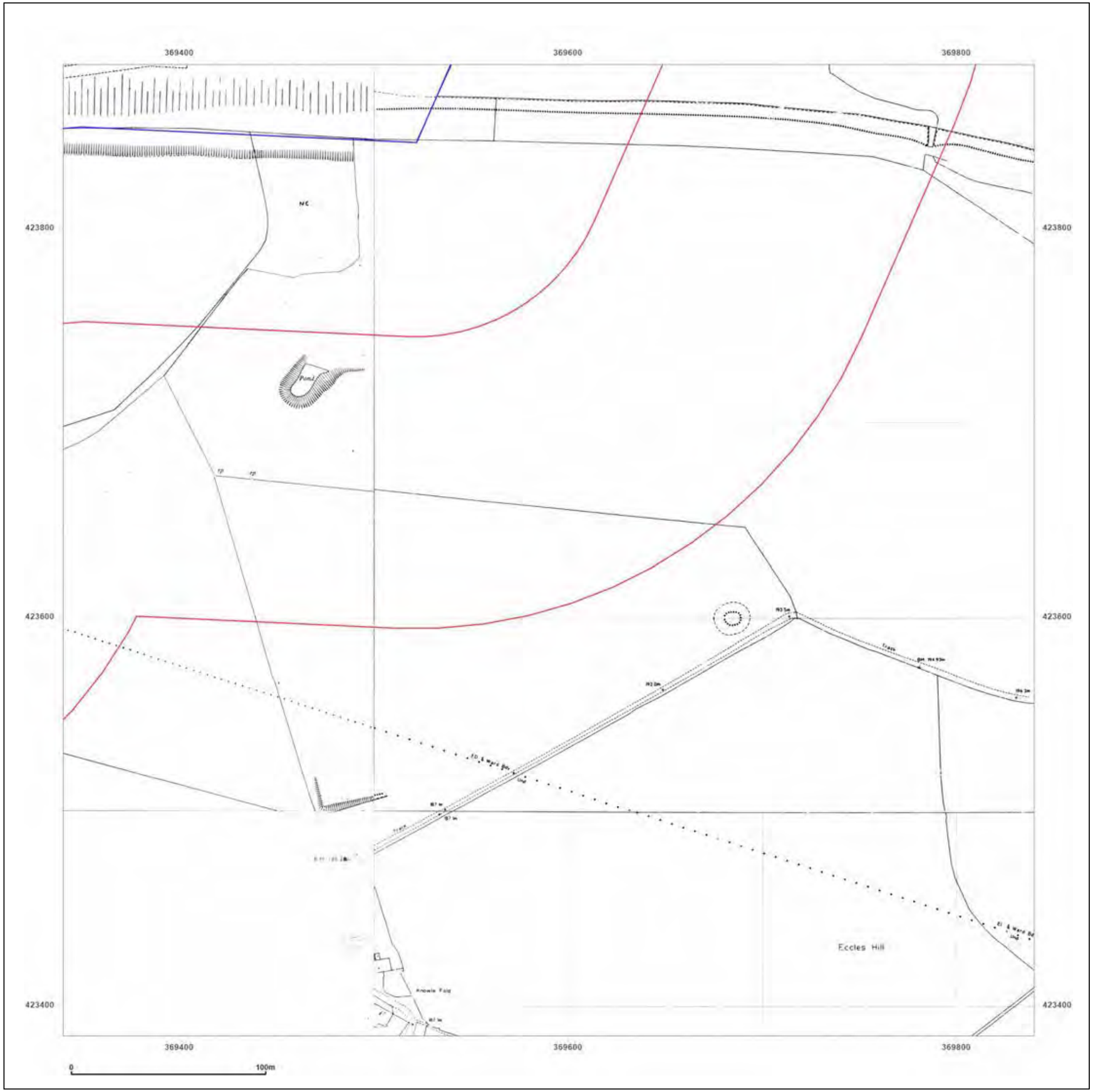

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_1
Grid Ref: 369590, 423634

Map Name: National Grid
Map date: **1990-1993**
Scale: 1:1,250
Printed at: 1:2,000

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Surveyed 1961 Revised 1990 Edition N/A Copyright 1990 Levelled 1961		Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A
Surveyed N/A Revised N/A Edition N/A Copyright 1991 Levelled 1961		Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A

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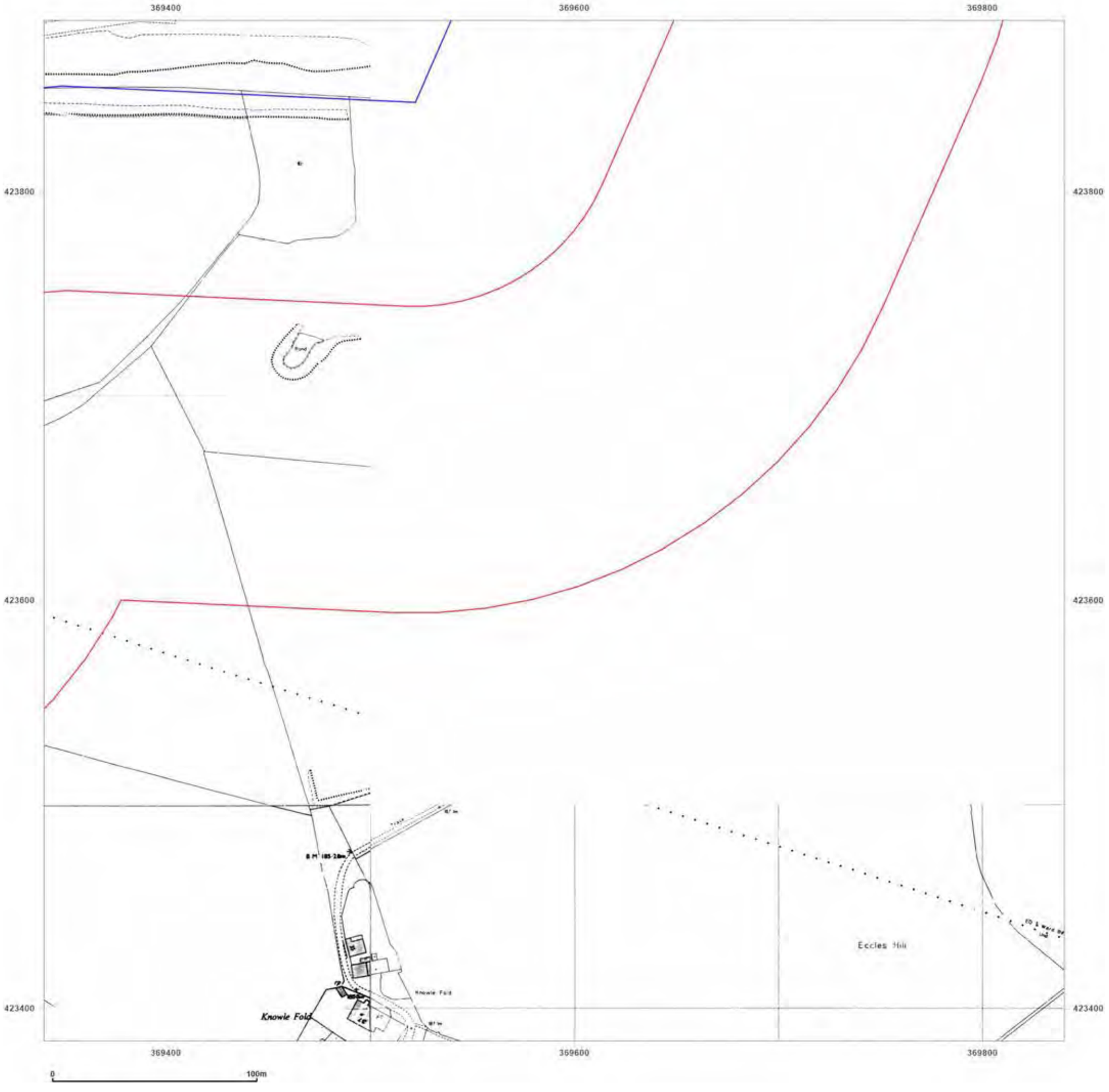

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_1
Grid Ref: 369590, 423634

Map Name: National Grid
Map date: **1991-1994**
Scale: 1:1,250
Printed at: 1:2,000

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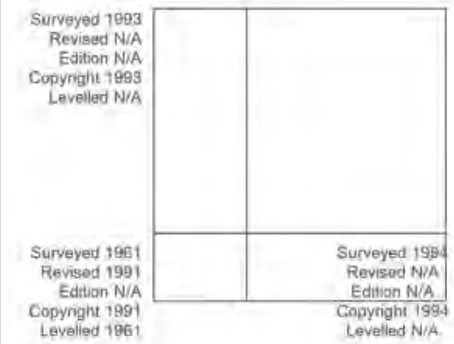

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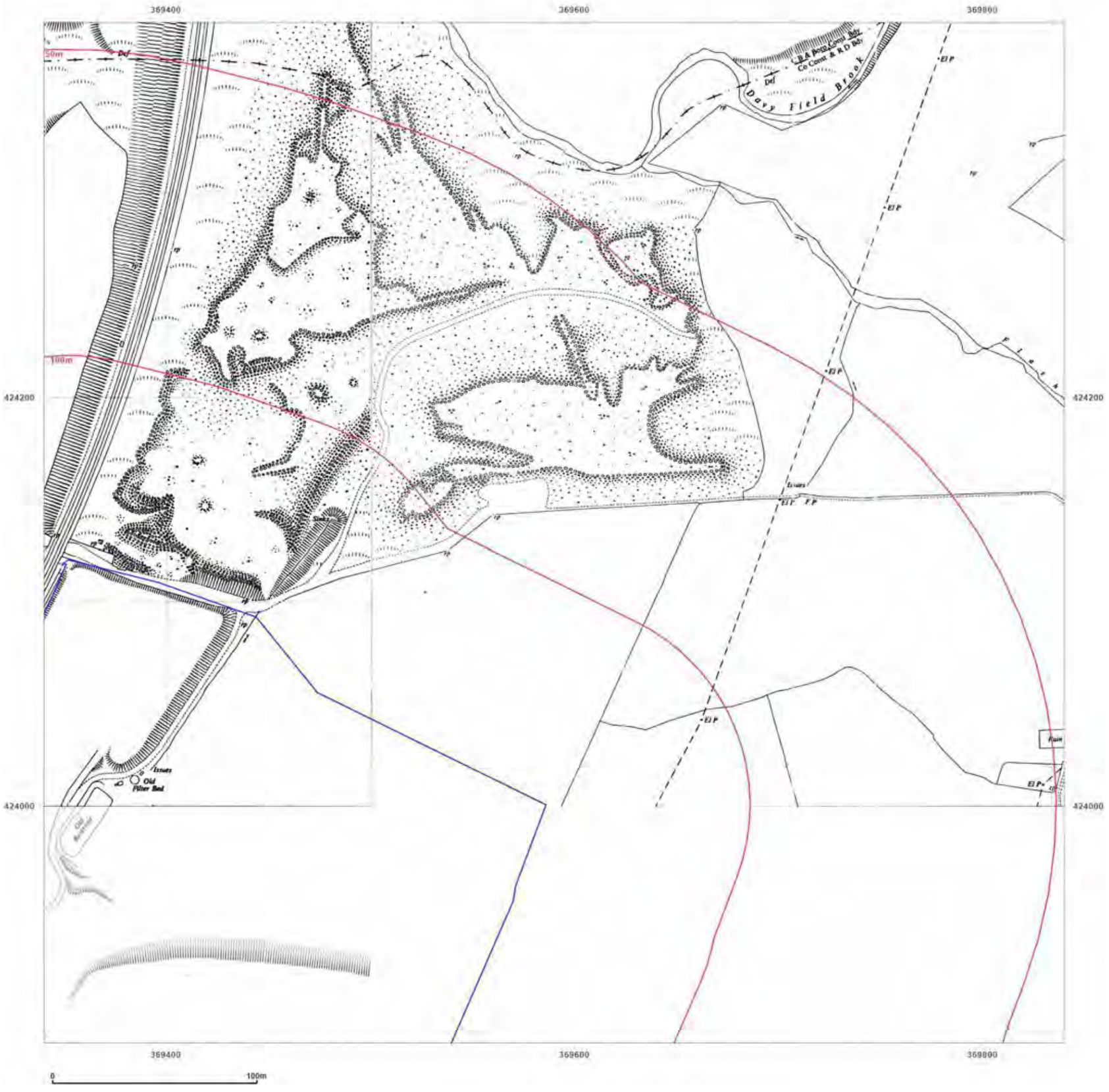

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_2
Grid Ref: 369590, 424134

Map Name: National Grid

Map date: **1954-1955**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1954 Revised 1954 Edition N/A Copyright N/A Levelled 1928			

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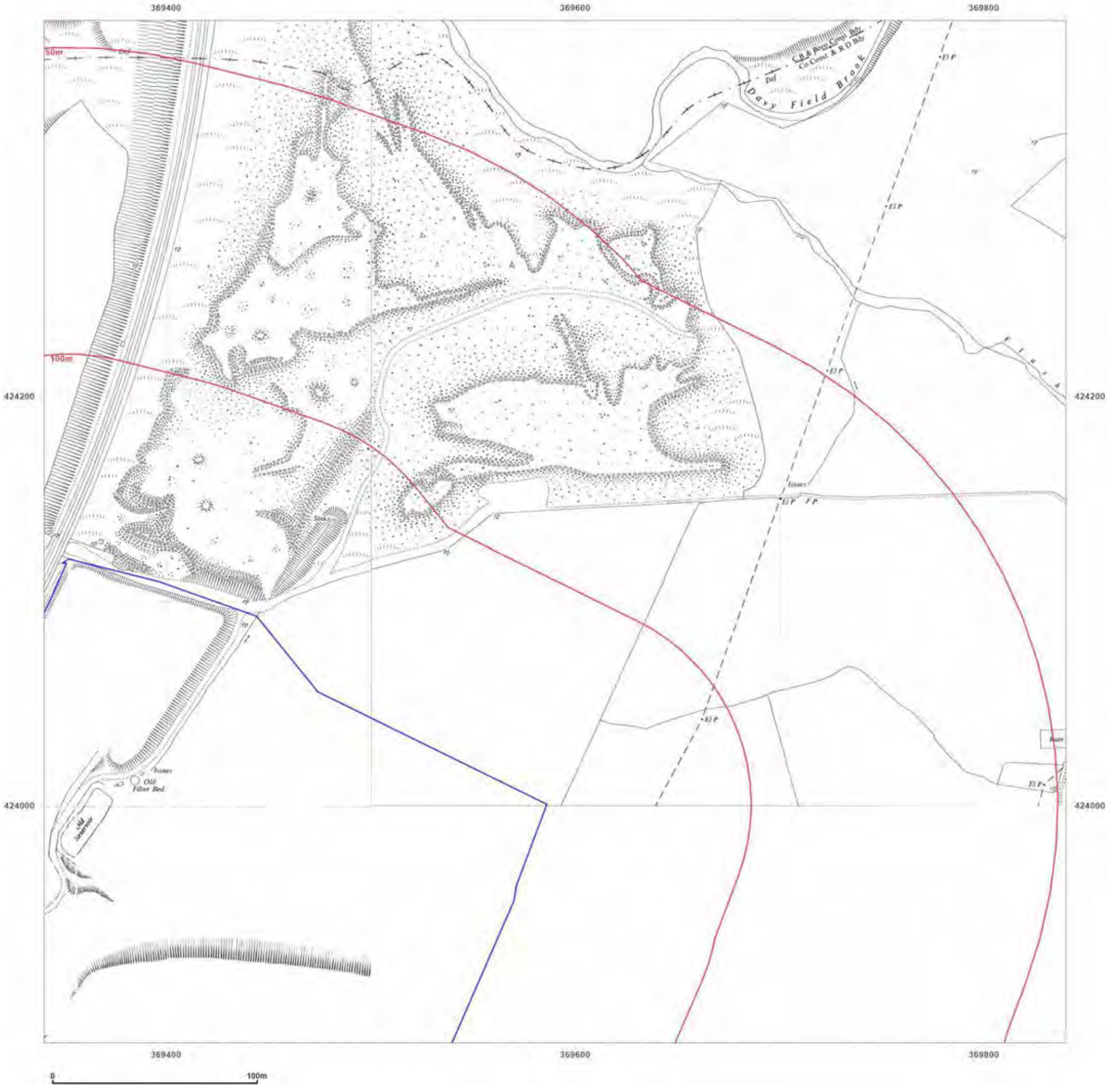

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_2
Grid Ref: 369590, 424134

Map Name: National Grid
Map date: **1955**
Scale: 1:1,250
Printed at: 1:2,000

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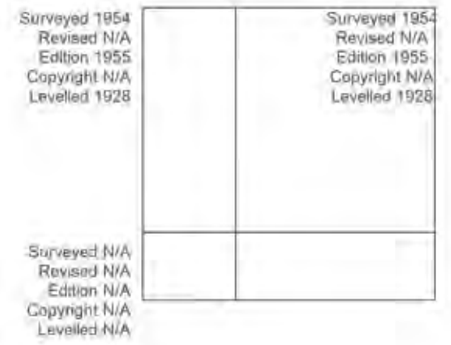

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Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_2
Grid Ref: 369590, 424134

Map Name: National Grid

Map date: **1976-1980**

Scale: 1:1,250

Printed at: 1:2,000

N
W E
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Surveyed 1954 Revised 1976 Edition 1977 Copyright 1955 Levelled 1928	Surveyed 1954 Revised 1976 Edition 1977 Copyright 1955 Levelled 1928
Surveyed 1961 Revised 1980 Edition N/A Copyright 1980 Levelled 1961	Surveyed 1954 Revised 1975 Edition 1976 Copyright 1955 Levelled 1928

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Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_2
Grid Ref: 369590, 424134

Map Name: National Grid
Map date: **1981**
Scale: 1:1,250
Printed at: 1:2,000

N
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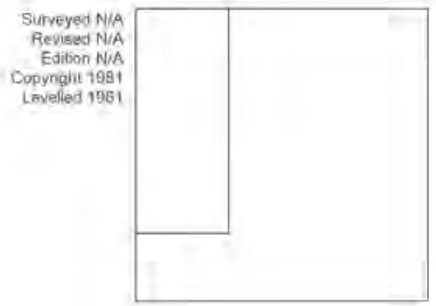

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Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_1250_2_2
Grid Ref: 369590, 424134

Map Name: National Grid
Map date: **1990-1993**
Scale: 1:1,250
Printed at: 1:2,000

N
W E
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Surveyed 1961 Revised 1990 Edition N/A Copyright 1990 Levelled 1961	Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A
Surveyed 1961 Revised 1990 Edition N/A Copyright 1990 Levelled 1961	Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A

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Production date: 21 April 2022

Map legend available at:
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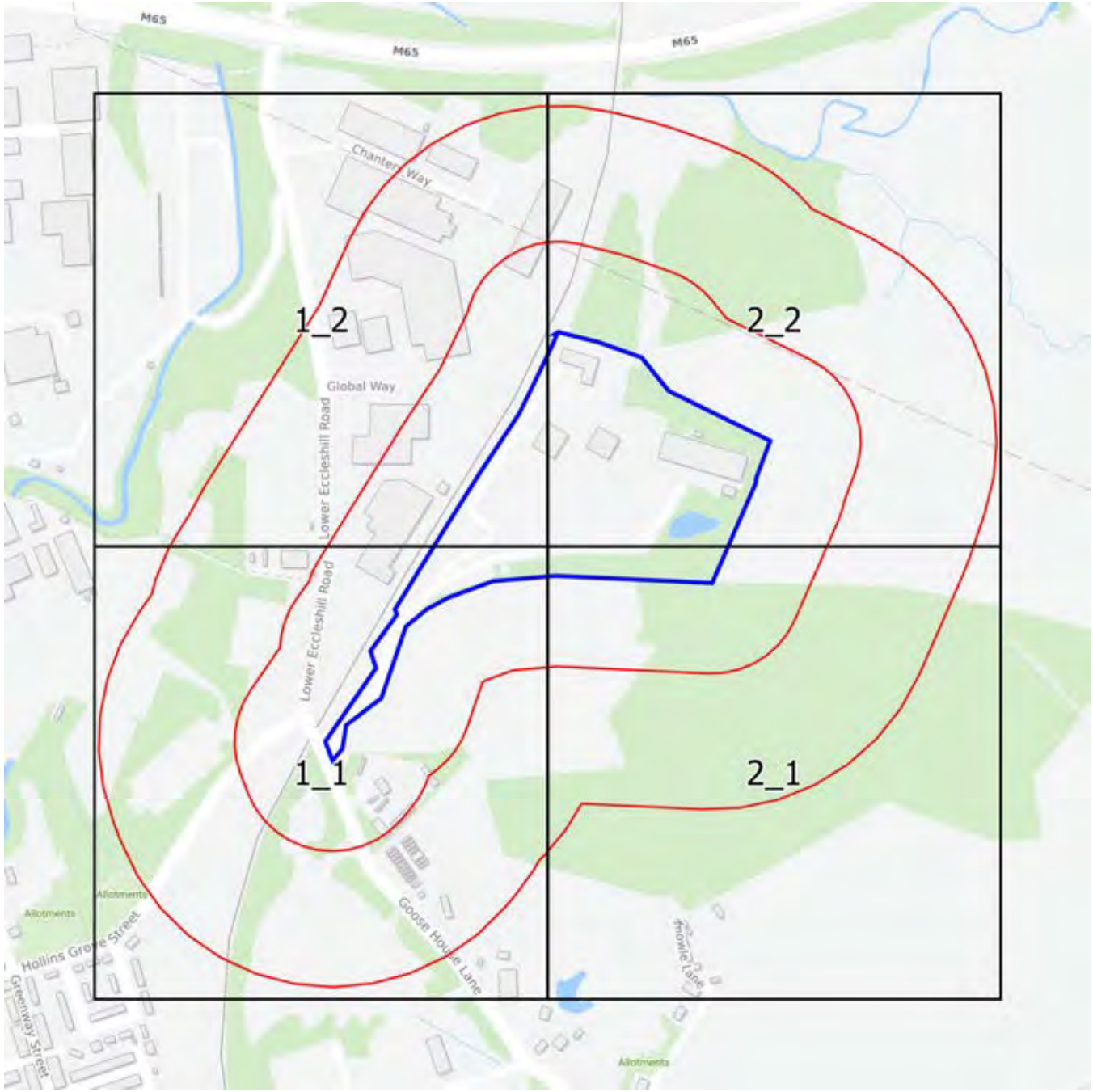

Groundsure INSIGHTS

1:1,250 Scale Grid Index

N
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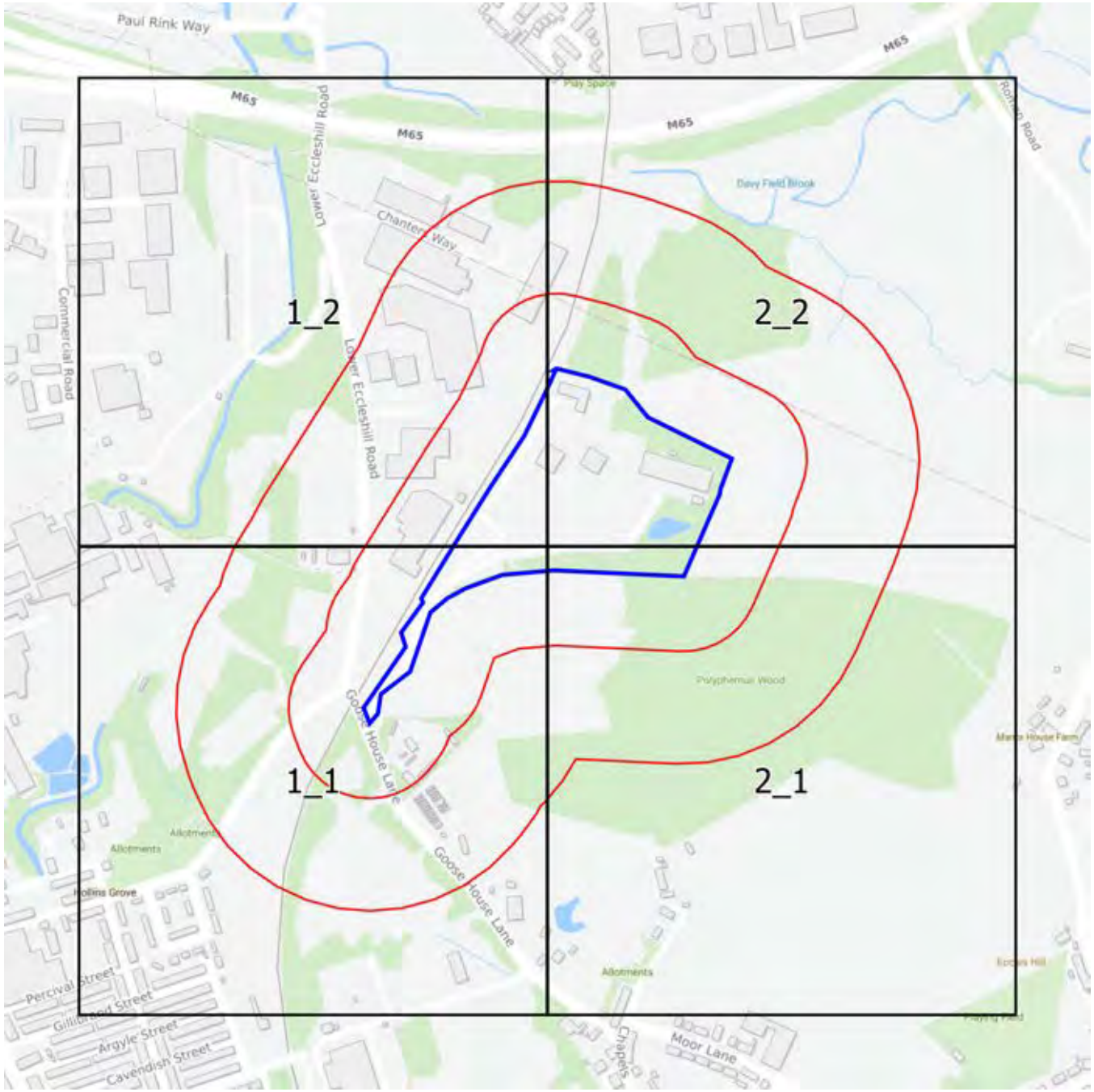

Groundsure INSIGHTS

1:2,500 Scale Grid Index

N
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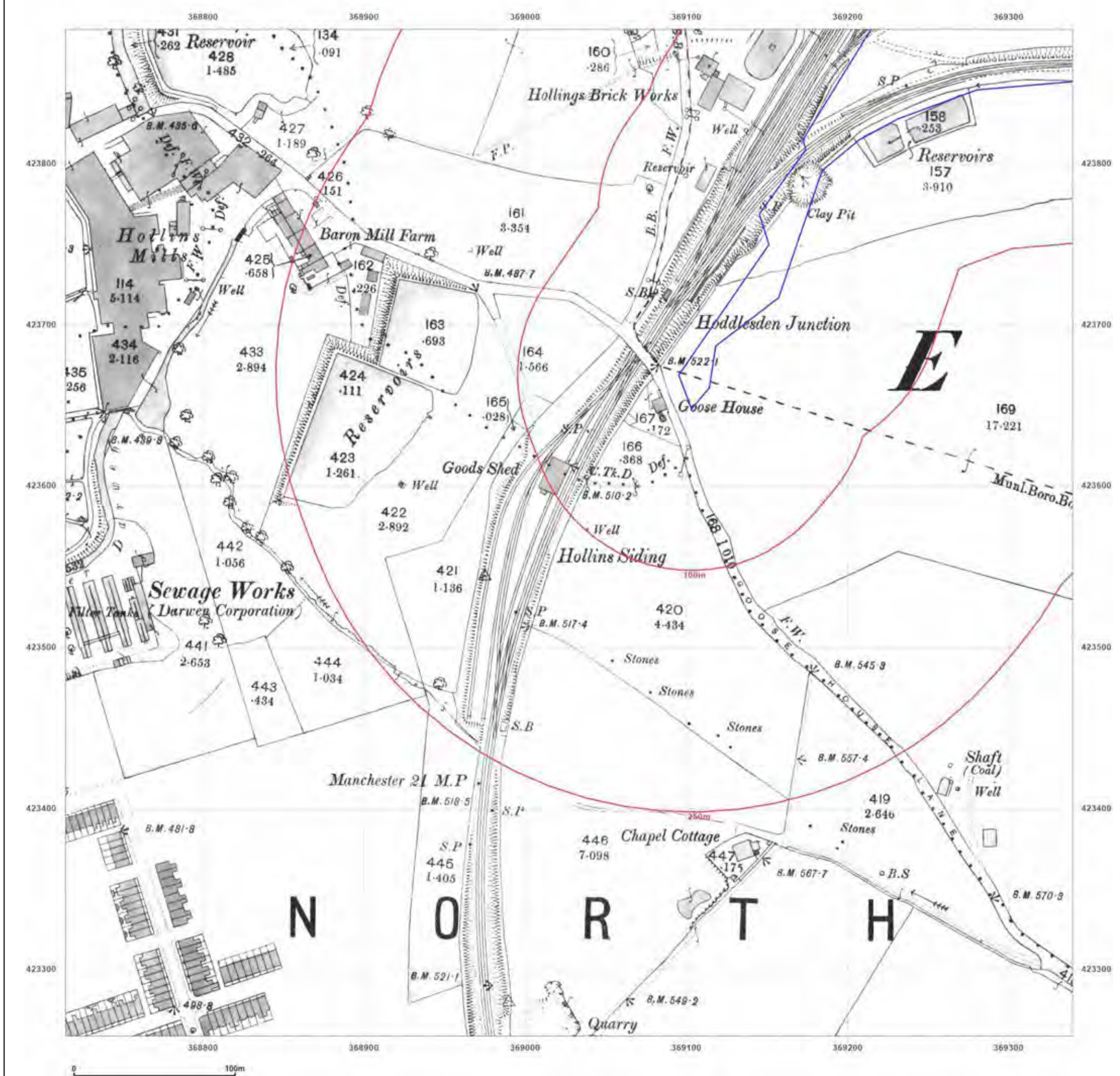

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_1_1
Grid Ref: 369027, 423571

Map Name: County Series
Map date: **1891**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

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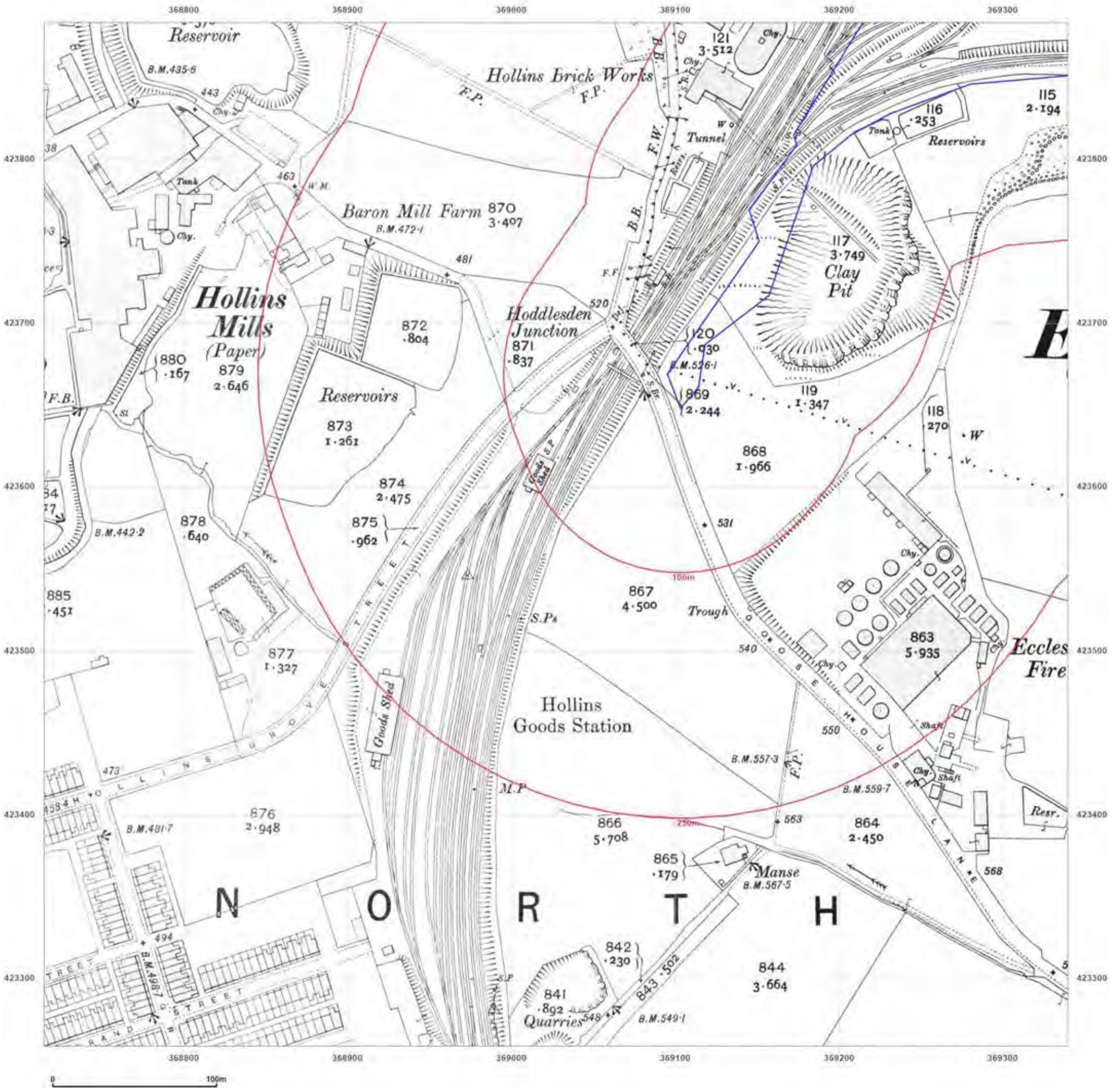

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_1_1
Grid Ref: 369027, 423571

Map Name: County Series
Map date: 1911
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

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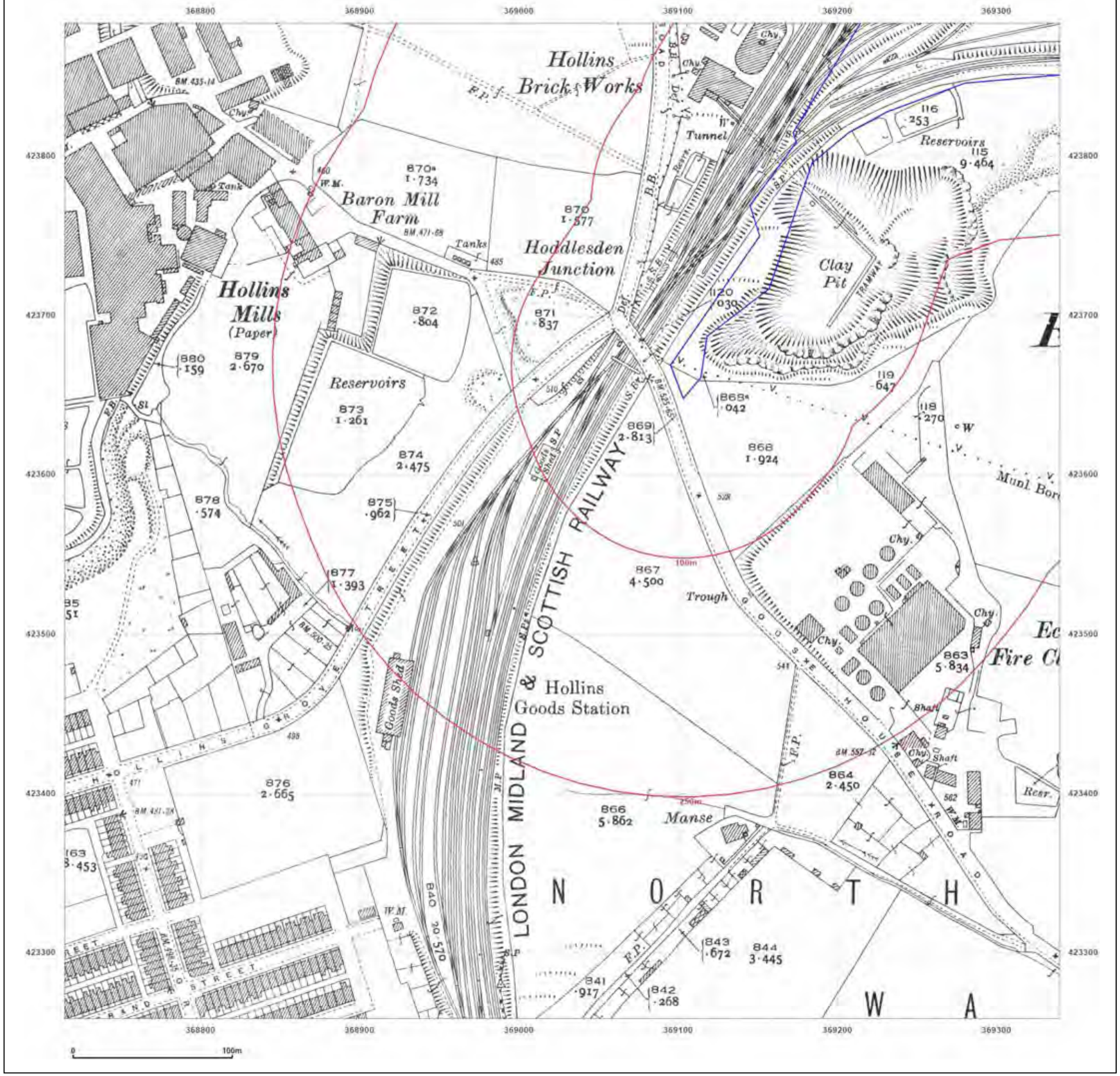

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_1_1
Grid Ref: 369027, 423571

Map Name: County Series
Map date: 1930
Scale: 1:2,500
Printed at: 1:2,500

N
W E
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Surveyed 1930
Revised 1930
Edition N/A
Copyright N/A
Levelled N/A

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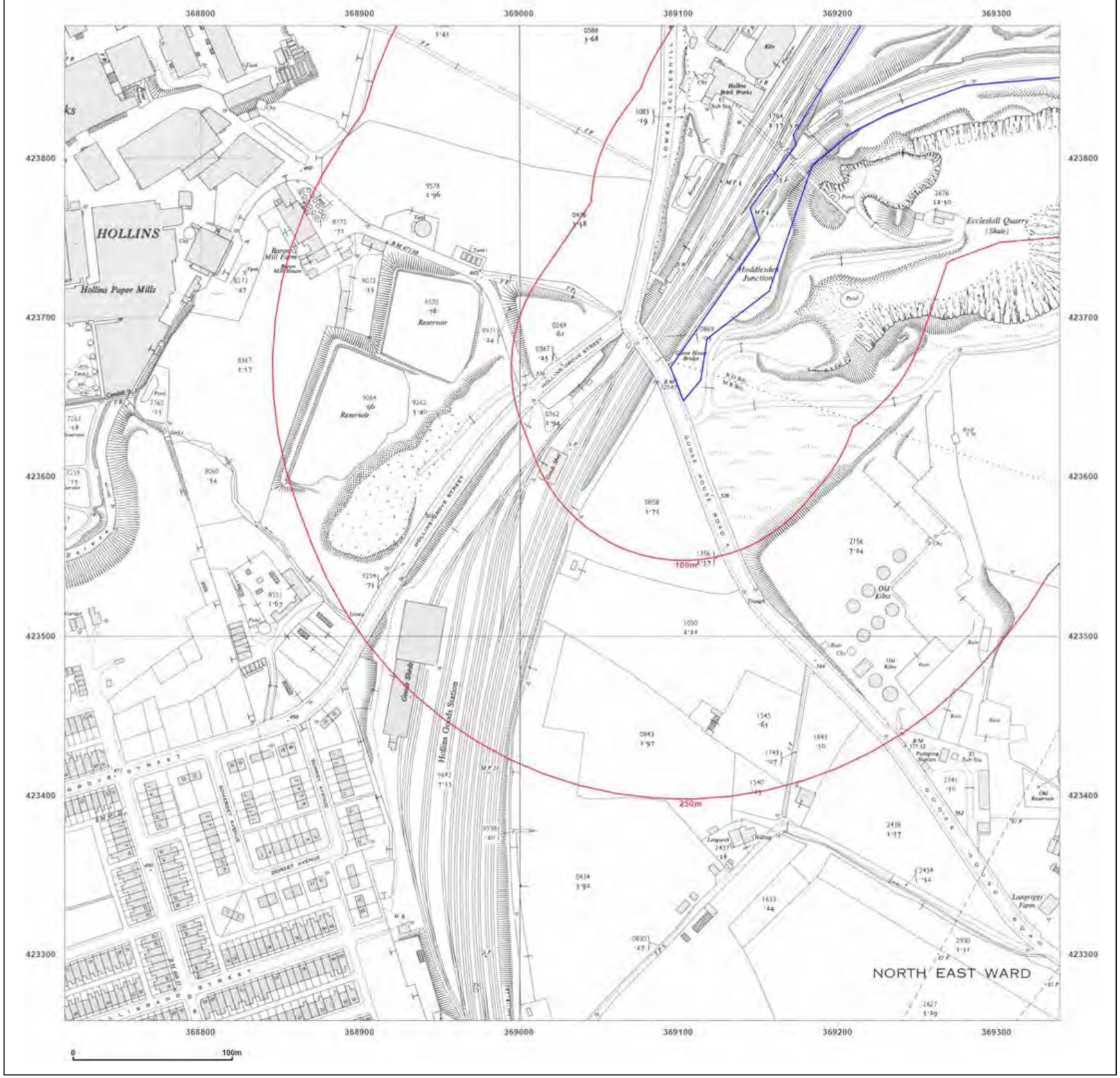

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_1_1
Grid Ref: 369027, 423571

Map Name: National Grid
Map date: **1955**
Scale: 1:2,500
Printed at: 1:2,500

N
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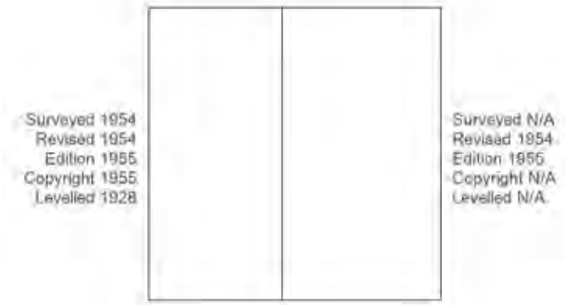

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Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_1_1
Grid Ref: 369027, 423571

Map Name: National Grid

Map date: **1969**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised 1968
Edition 1969
Copyright 1969
Levelled 1961

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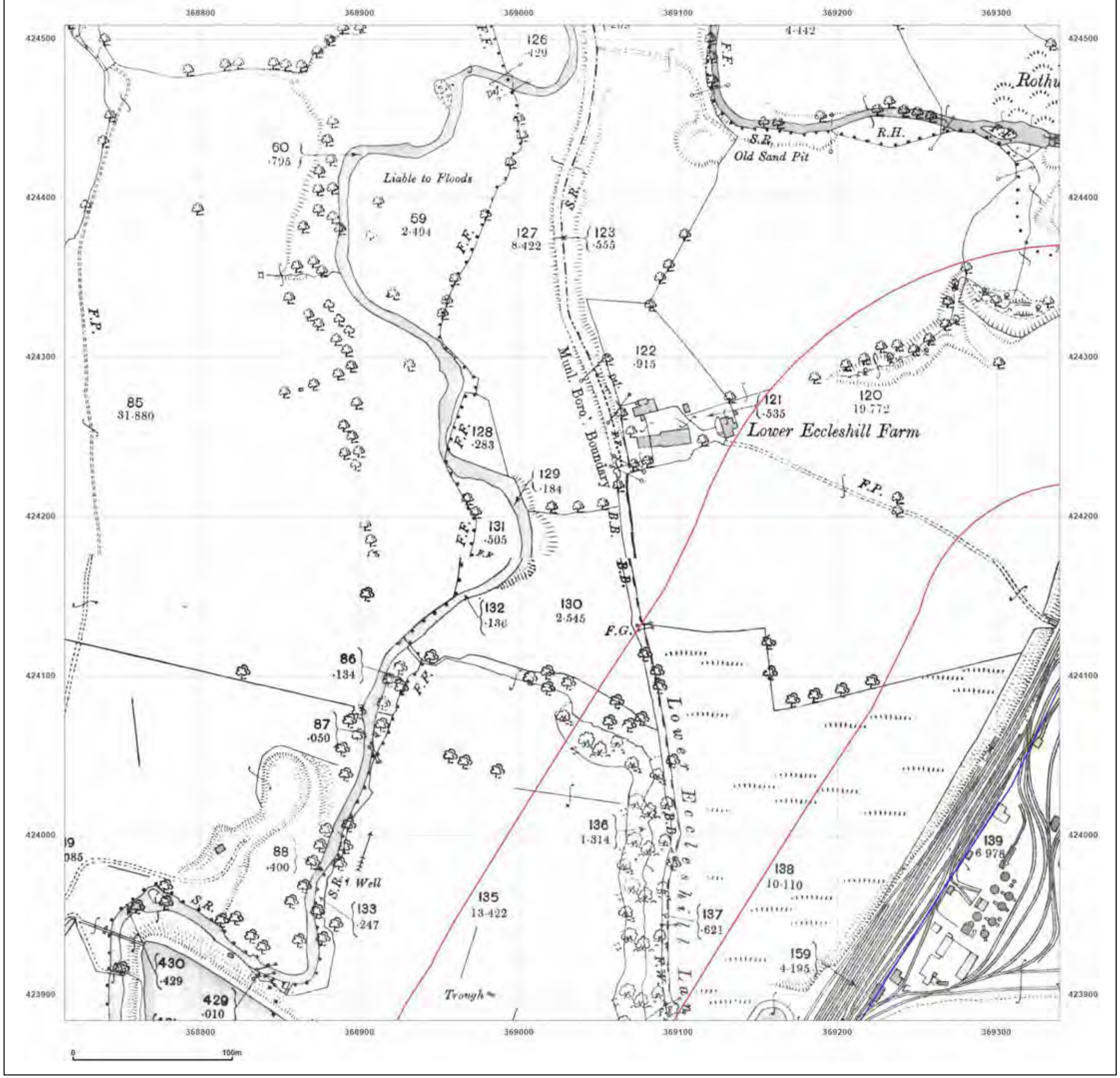

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_1_2
Grid Ref: 369027, 424196

Map Name: County Series
Map date: **1891**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 21 April 2022

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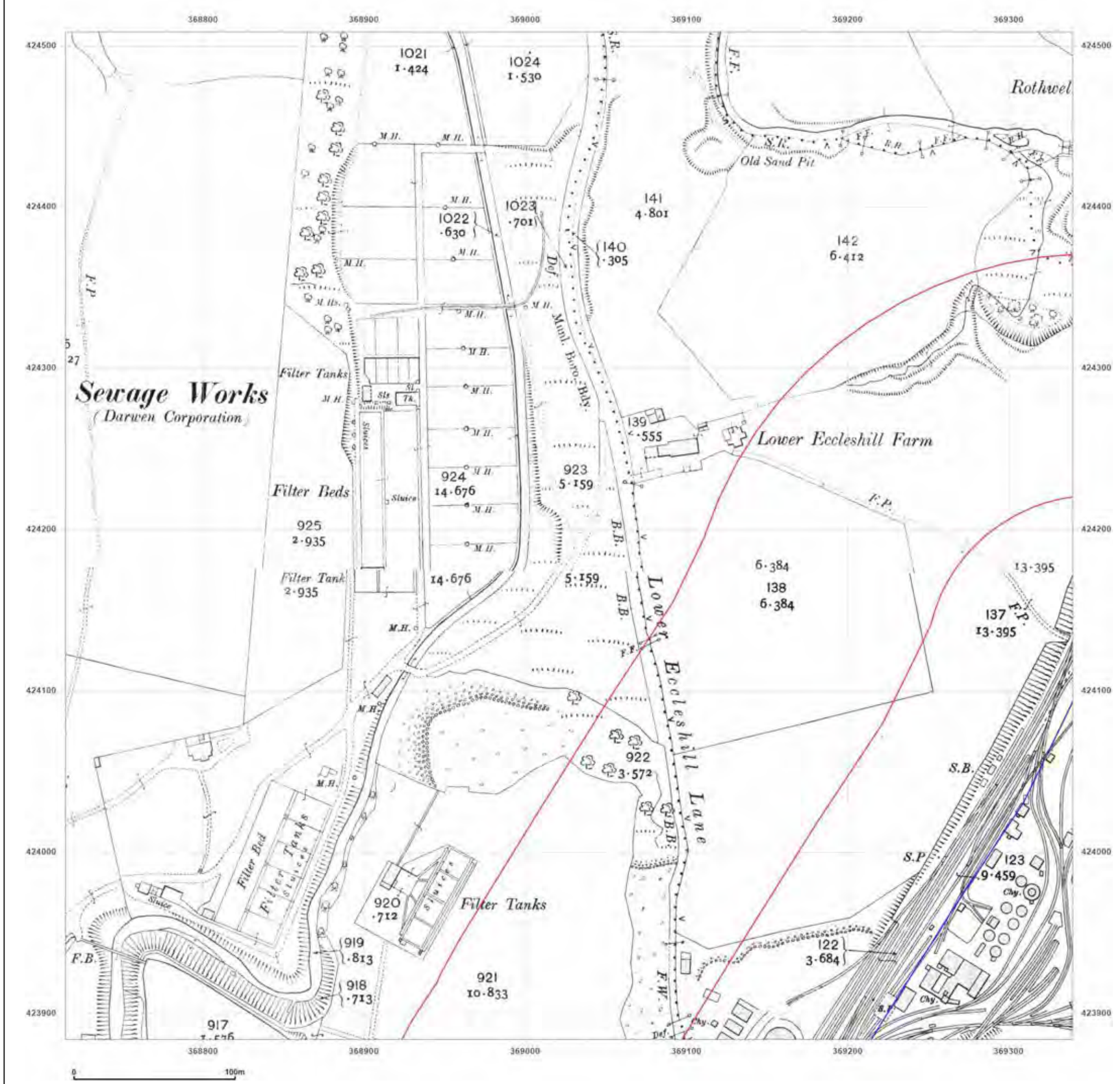

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_1_2
Grid Ref: 369027, 424196

Map Name: County Series
Map date: 1911
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1911
Revised 1911
Edition N/A
Copyright N/A
Levelled N/A

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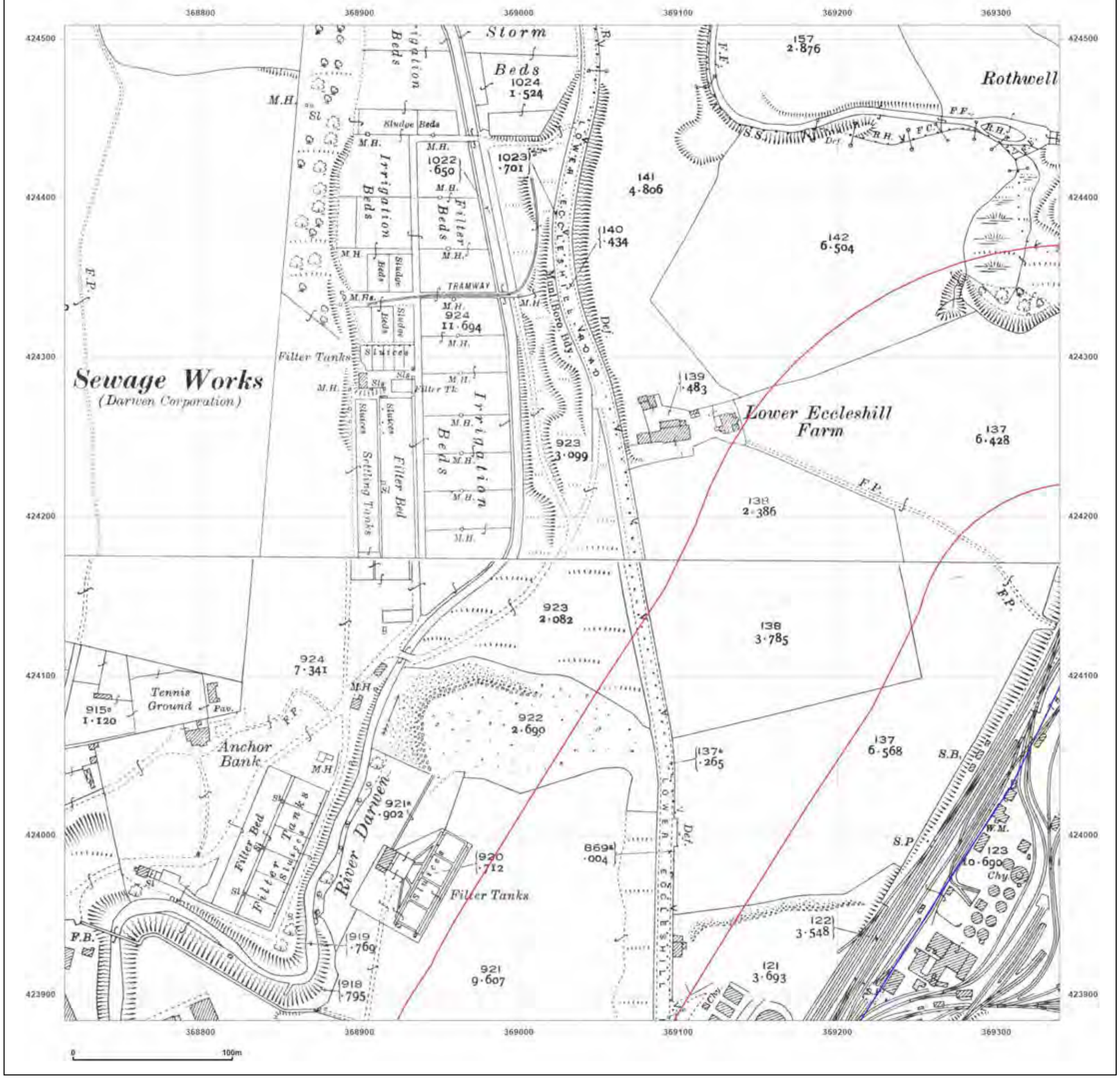

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_1_2
Grid Ref: 369027, 424196

Map Name: County Series
Map date: **1930-1931**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1931
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A

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

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Production date: 21 April 2022

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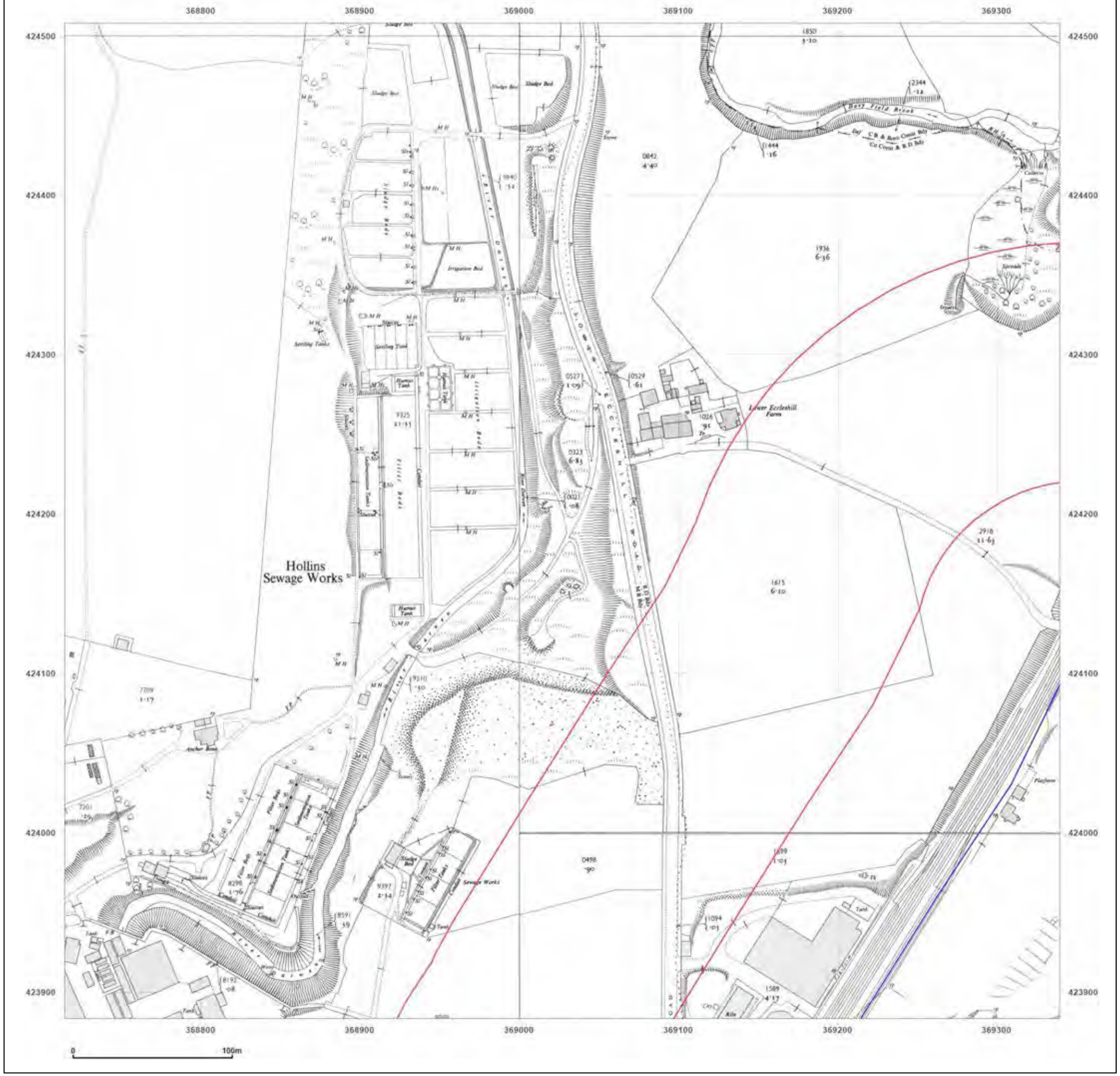

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_1_2
Grid Ref: 369027, 424196

Map Name: National Grid
Map date: **1955-1956**
Scale: 1:2,500
Printed at: 1:2,500

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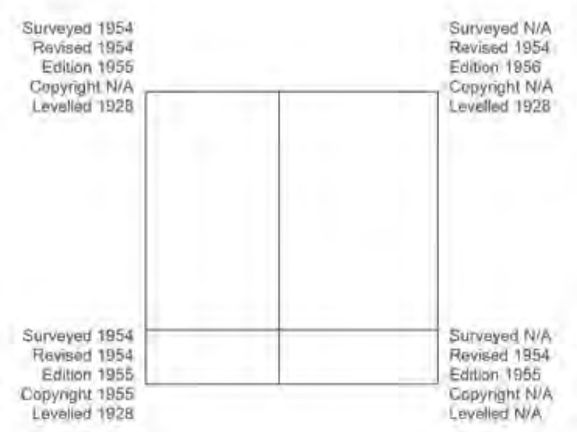

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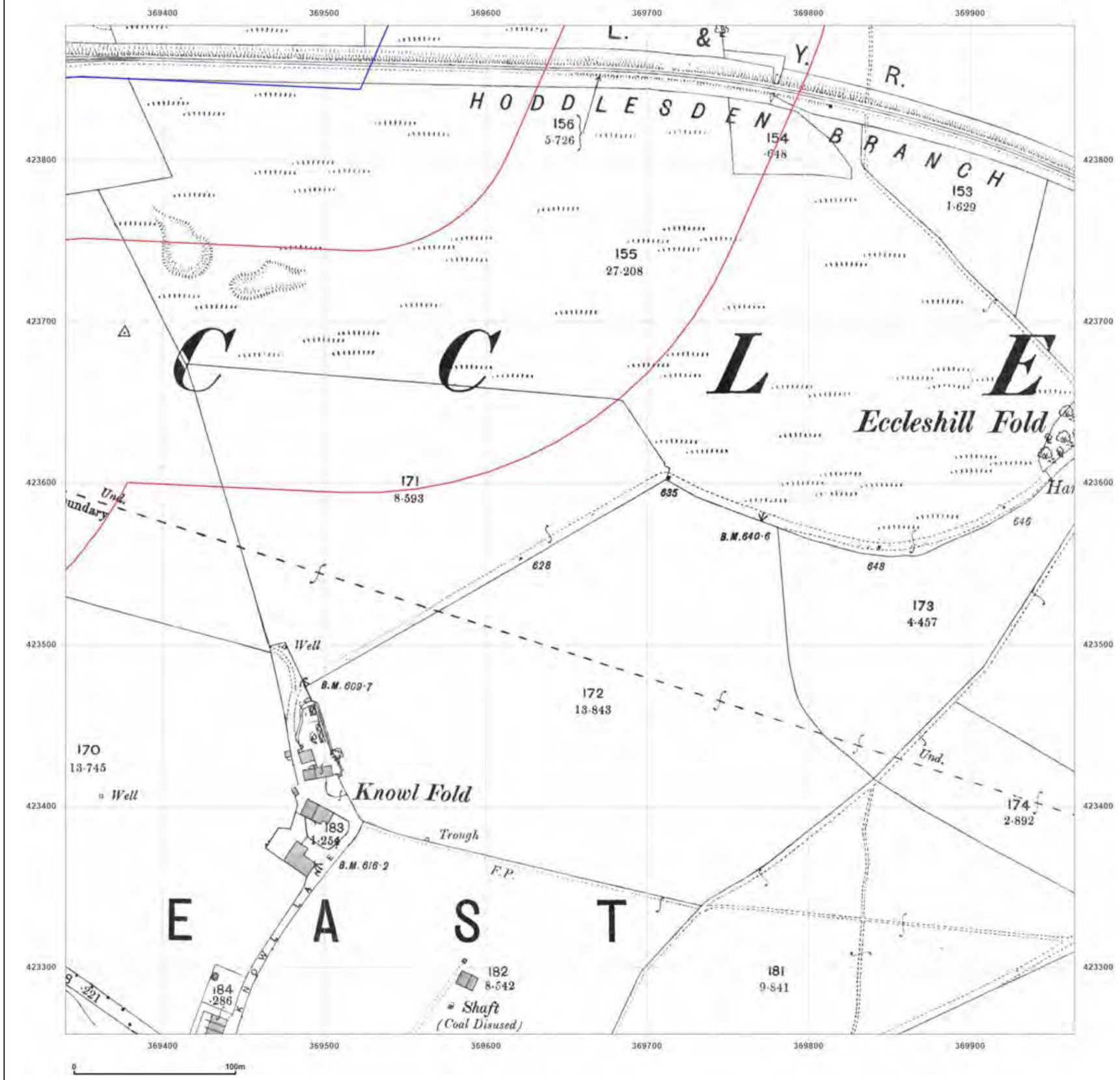

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_2_1
Grid Ref: 369652, 423571

Map Name: County Series
Map date: **1891**
Scale: 1:2,500
Printed at: 1:2,500

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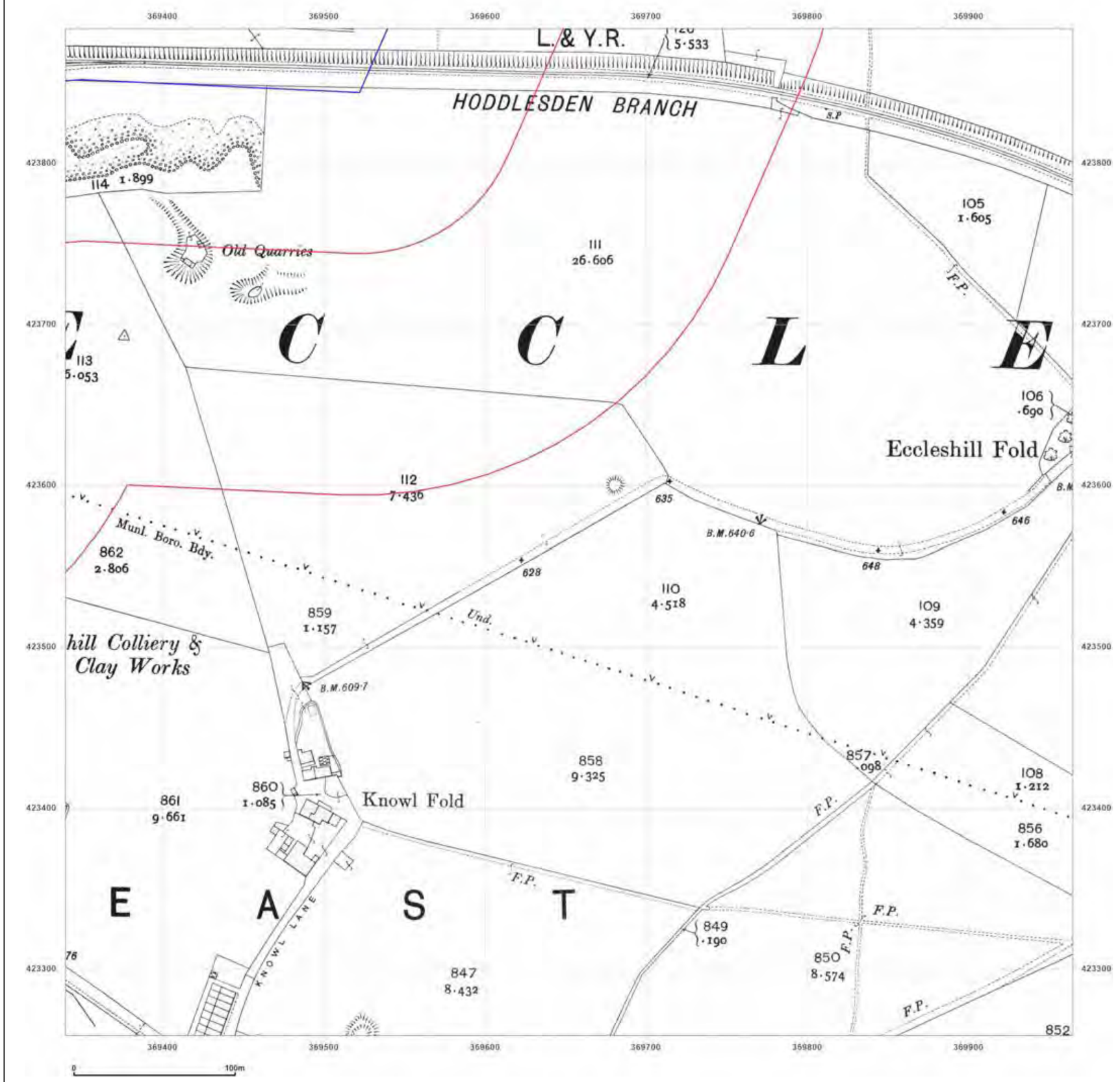

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_2_1
Grid Ref: 369652, 423571

Map Name: County Series
Map date: 1911
Scale: 1:2,500
Printed at: 1:2,500

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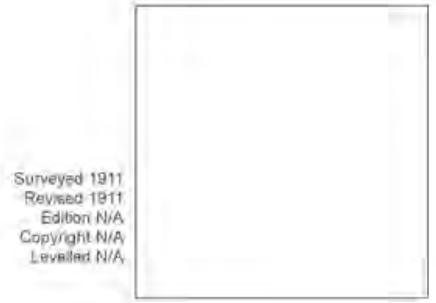

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Production date: 21 April 2022

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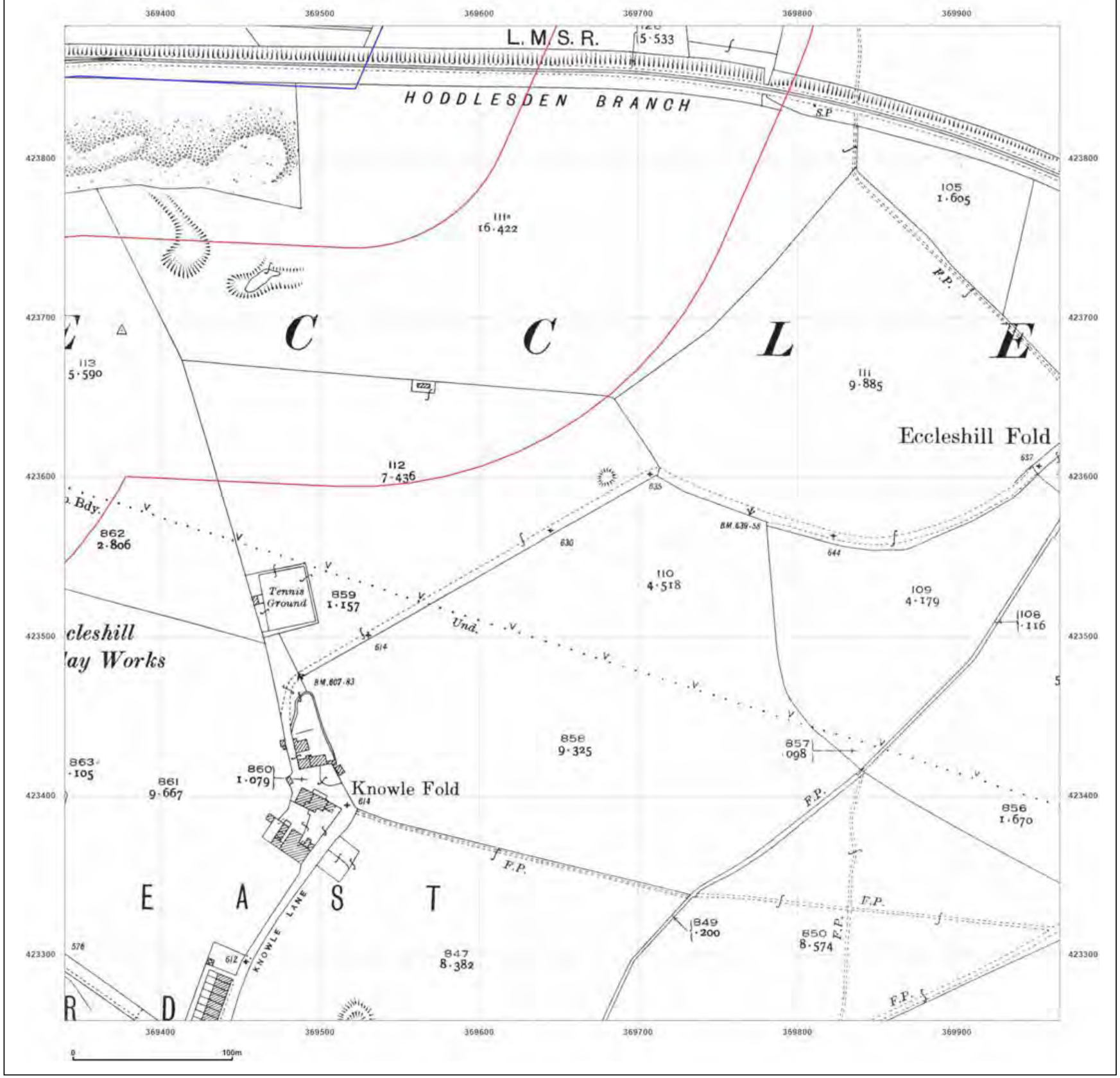

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_2_1
Grid Ref: 369652, 423571

Map Name: County Series
Map date: **1930**
Scale: 1:2,500
Printed at: 1:2,500

N
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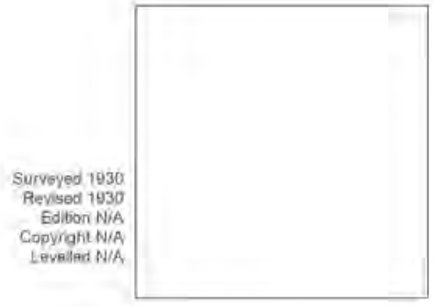

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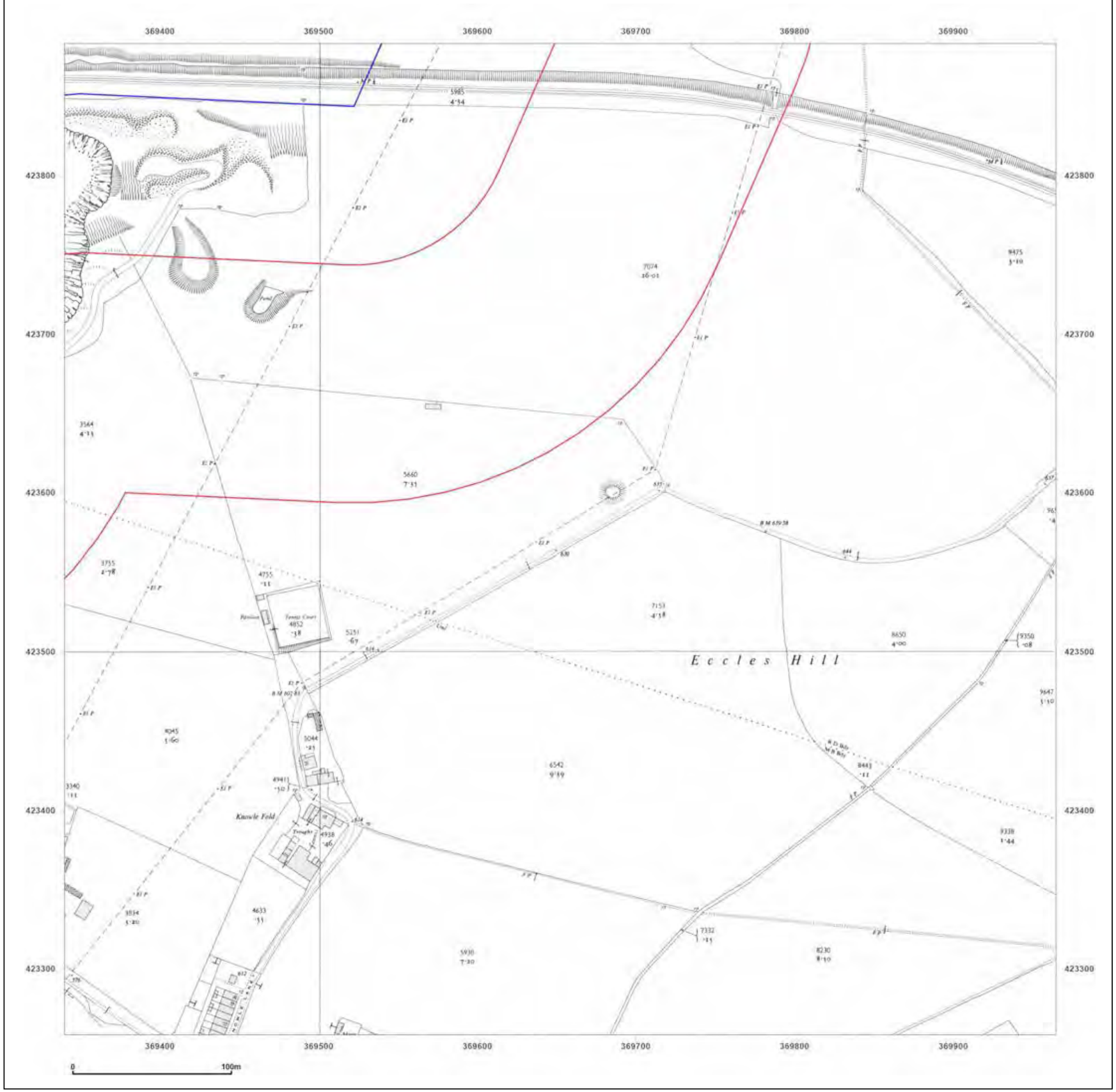

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_2_1
Grid Ref: 369652, 423571

Map Name: National Grid
Map date: **1955**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised 1954
Edition 1955
Copyright N/A
Levelled N/A

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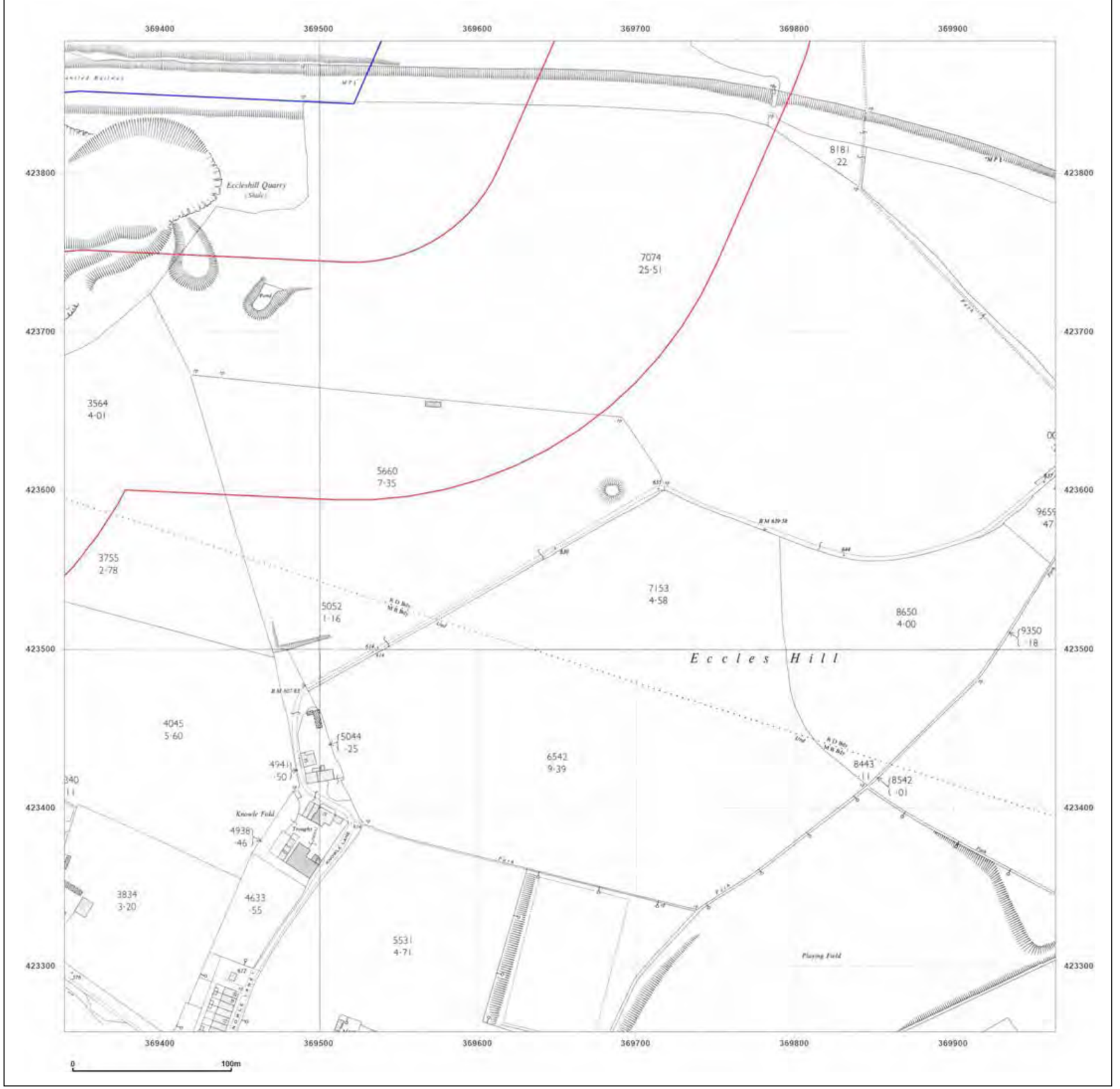

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_2_1
Grid Ref: 369652, 423571

Map Name: National Grid
Map date: **1969**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised 1968
Edition 1969
Copyright 1969
Levelled 1961

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Production date: 21 April 2022

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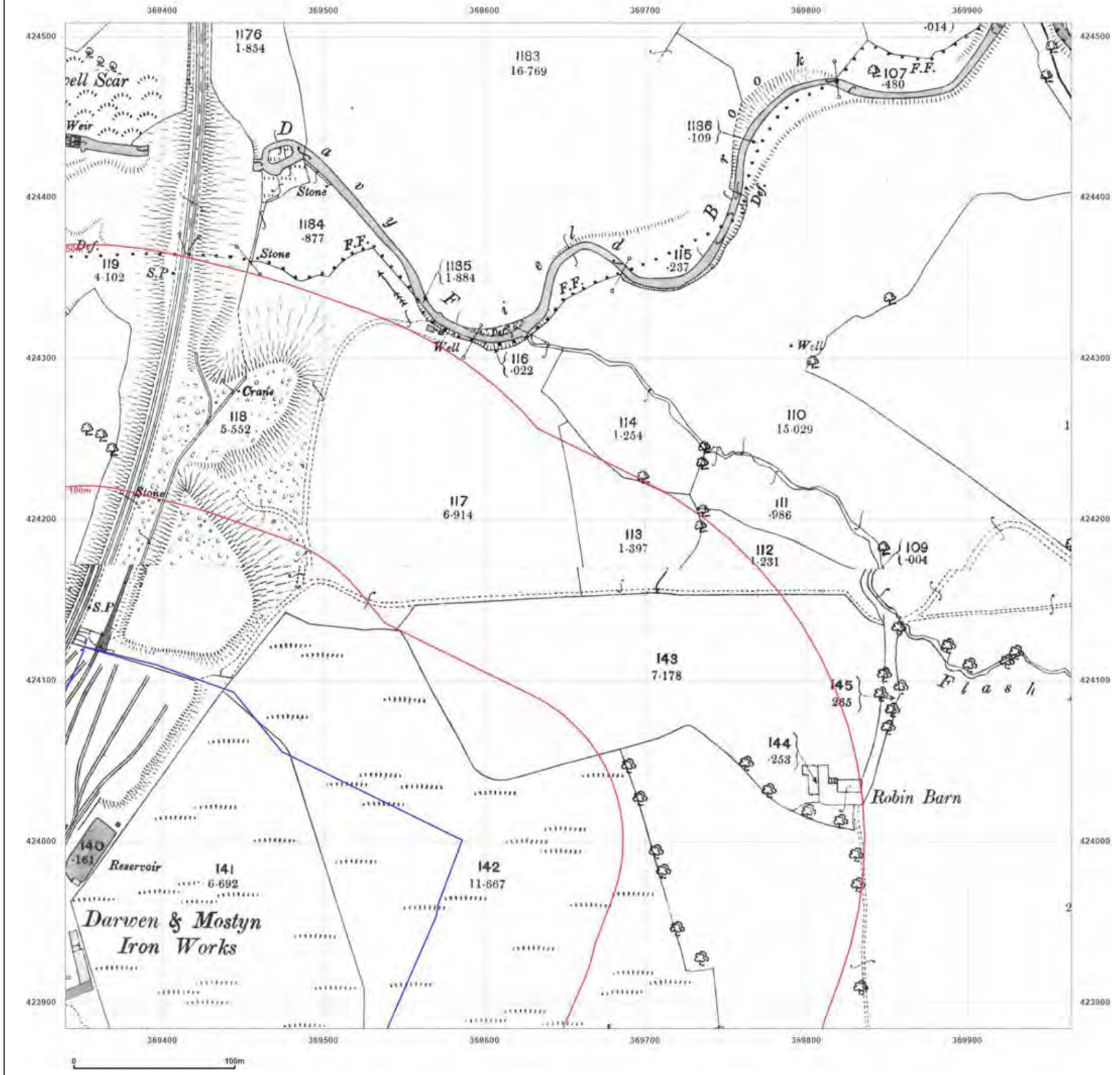

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_2_2
Grid Ref: 369652, 424196

Map Name: County Series
Map date: **1891**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
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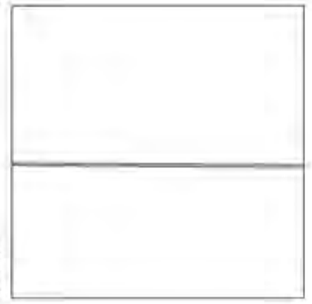
Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1891
Revised 1891
Edition N/A
Copyright N/A
Levelled N/A

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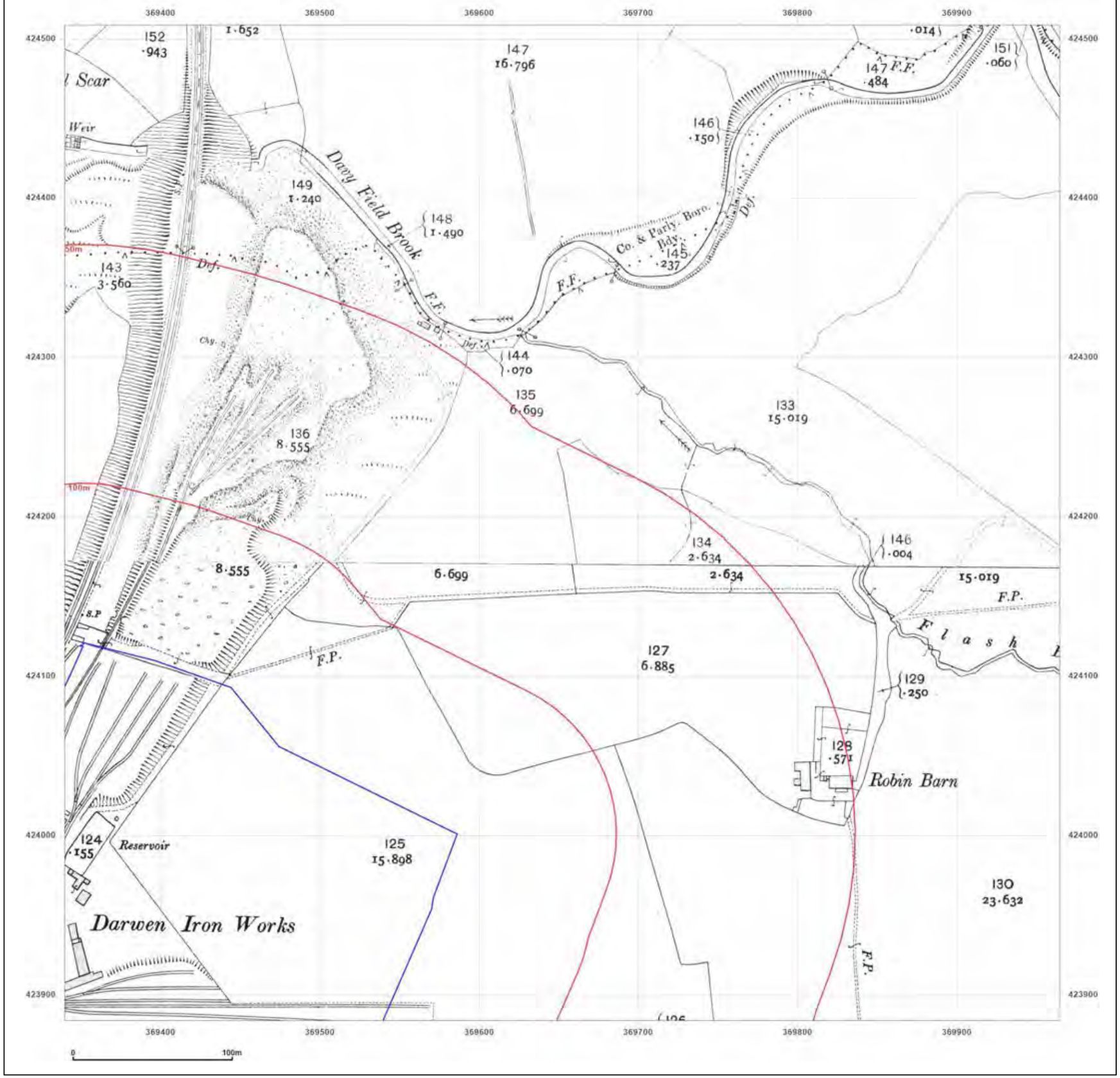

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_2_2
Grid Ref: 369652, 424196

Map Name: County Series
Map date: **1911**
Scale: 1:2,500
Printed at: 1:2,500

N
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Powered by OS

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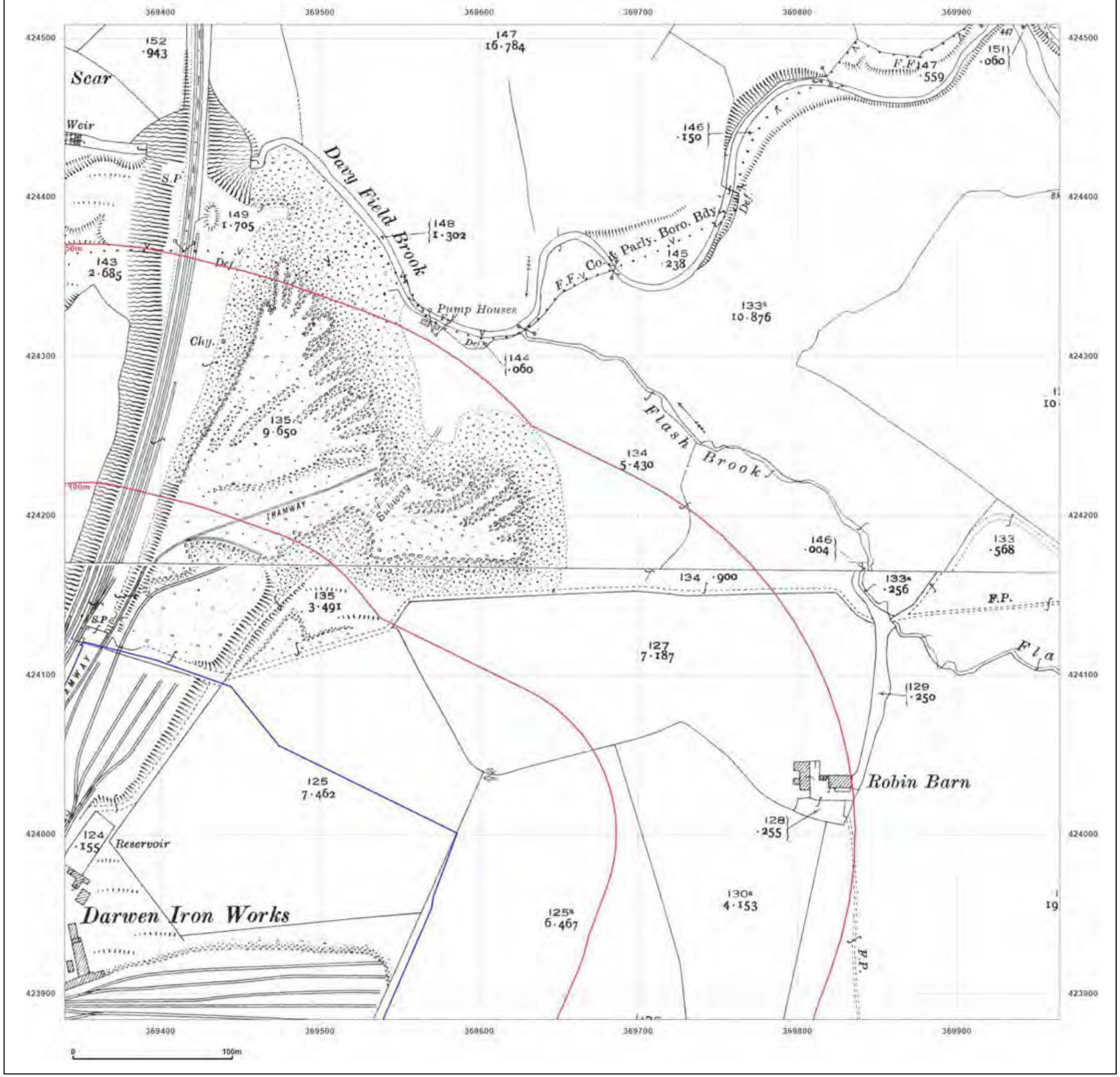

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_LS_2_2
Grid Ref: 369652, 424196

Map Name: County Series
Map date: **1930-1931**
Scale: 1:2,500
Printed at: 1:2,500

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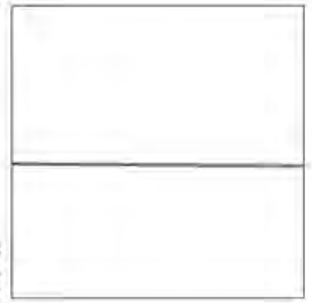
Surveyed 1931
Revised 1931
Edition N/A
Copyright N/A
Levelled N/A



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Revised 1930
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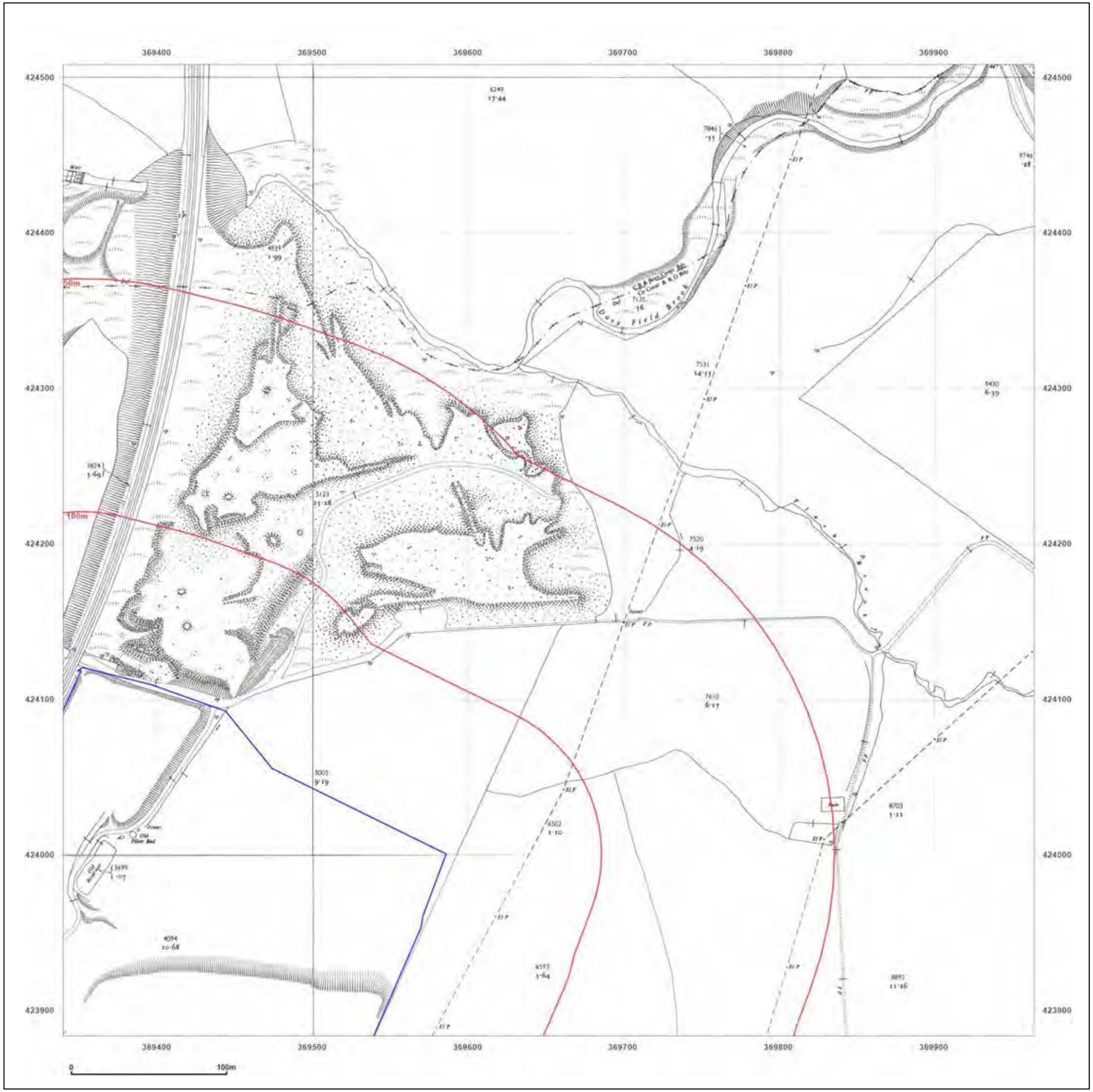

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Client Ref: Suez_Darwen_PO_26010482
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Grid Ref: 369652, 424196

Map Name: National Grid
Map date: **1955-1956**
Scale: 1:2,500
Printed at: 1:2,500

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Site Details:

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Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_Landline_1_1
Grid Ref: 369190, 423734

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_Landline_1_2
Grid Ref: 369190, 424034

Map Name: LandLine
Map date: 2003
Scale: 1:1,250
Printed at: 1:1,250

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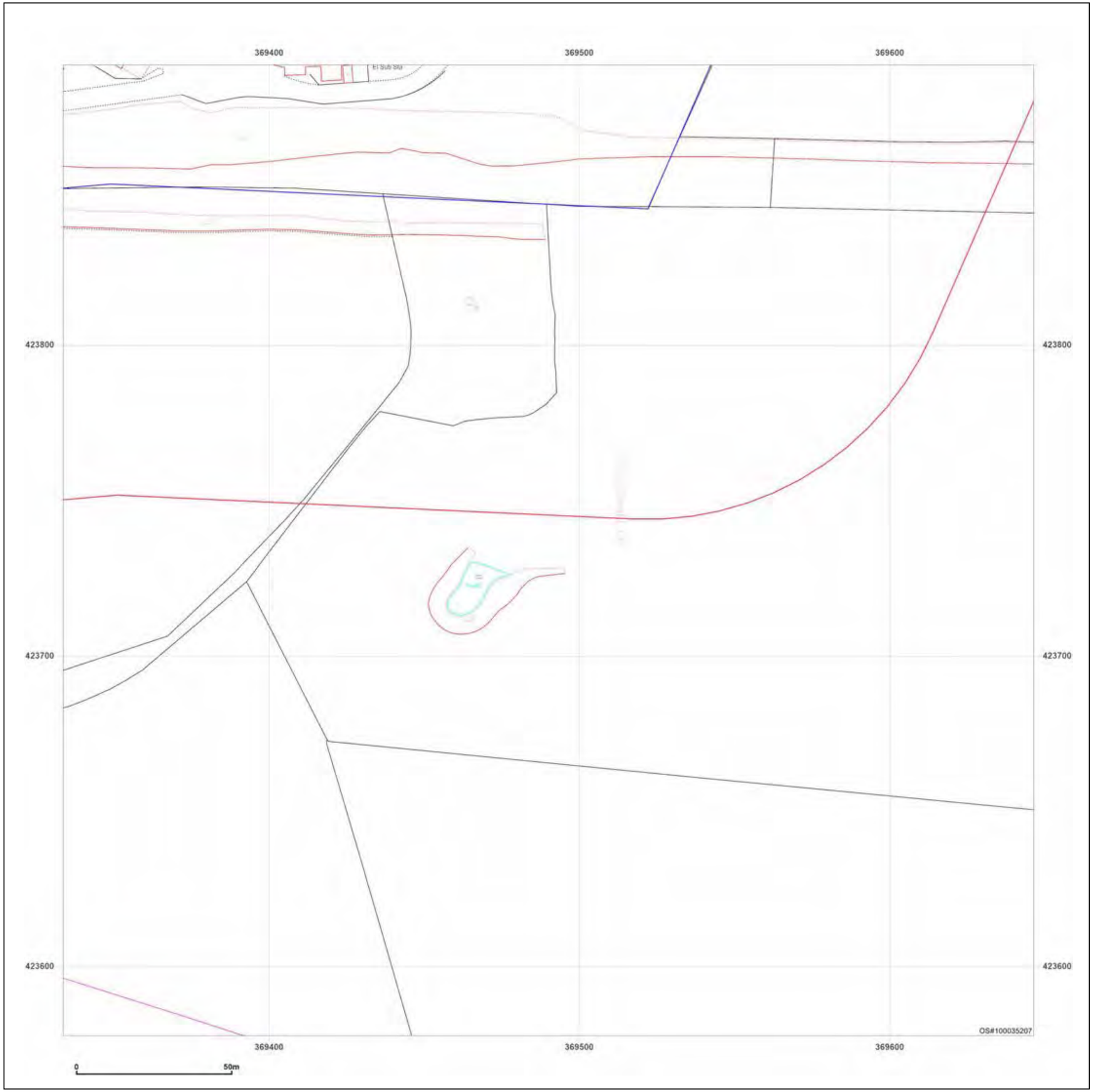

Groundsure INSIGHTS

Site Details:

S U E Z, SUEZ UK LTD, LOWER ECCLESHILL ROAD, DARWEN, BB3 0RP

Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_Landline_2_1
Grid Ref: 369490, 423734

Map Name: LandLine
Map date: 2003
Scale: 1:1,250
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Client Ref: Suez_Darwen_PO_26010482
Report Ref: GS-8685612_Landline_2_2
Grid Ref: 369490, 424034

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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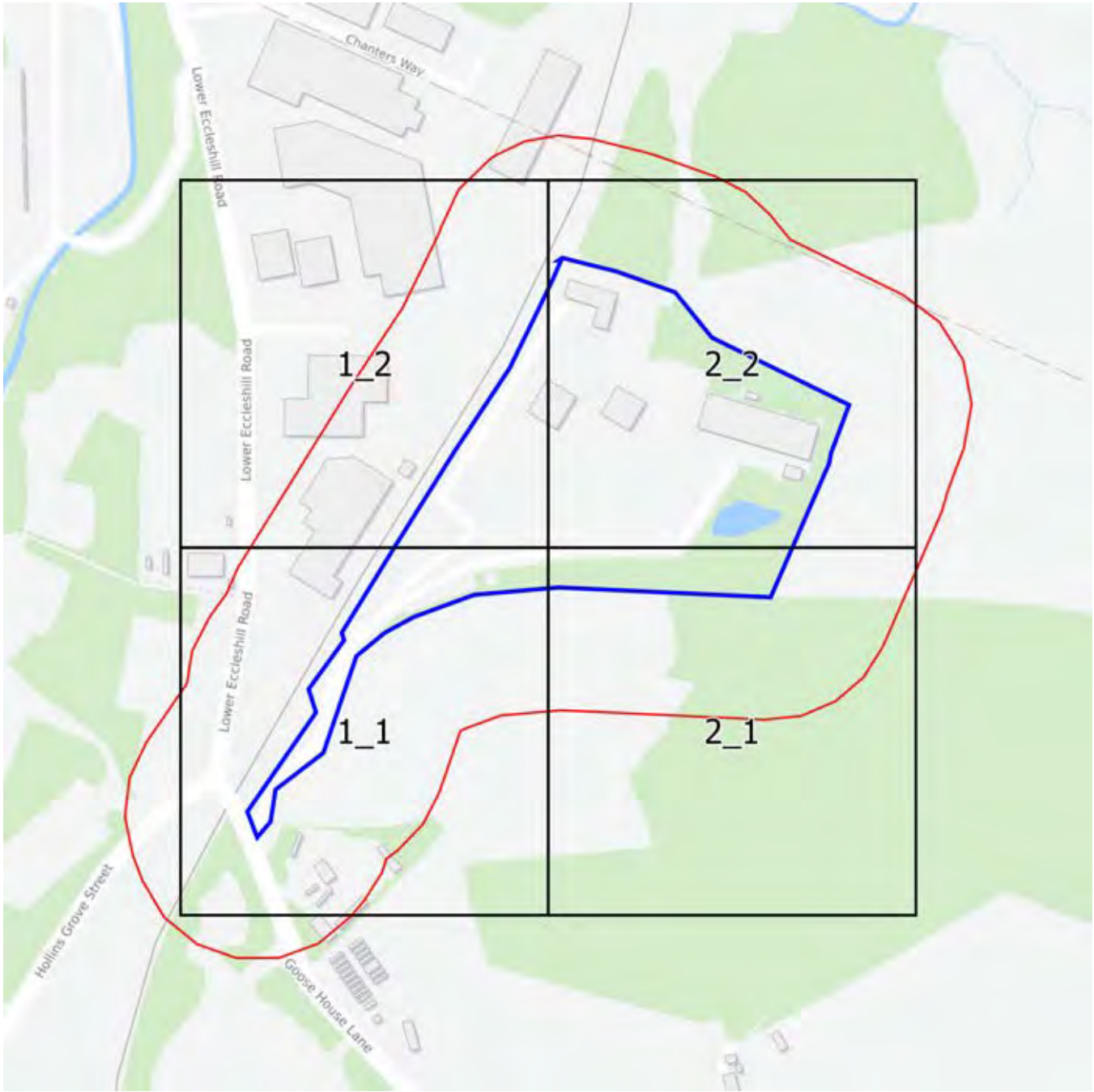

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Landline Scale Grid Index

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Appendix C
Risk Assessment Approach

Preliminary Risk Assessment Methodology

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risks to receptors. The receptor may be human health, a controlled water, a sensitive local ecosystem or even future construction materials. Receptors can be linked with the hazard under consideration via one or several exposure pathways (e.g. the pathway of direct contact). Risks are generally managed by isolating or removing the hazard, isolating the receptor, or by intercepting the exposure pathway. Without the three essential components of a source (hazard), pathway and receptor, there can be no risk. Thus, the mere presence of a hazard at a site does not mean that there will necessarily be attendant risks. The following risk assessment thus focuses on those parts of the site where hazards or potential hazards have been identified and is not general to the whole site.

Hazards

Potential sources of contamination are identified for the site, based on a review of the current and previous site uses. Not only the nature but also the likely extent of any contamination is considered, e.g. whether such contamination is likely to be localised or widespread.

Receptors

The varying effects of a hazard on individual receptors depends largely on the sensitivity of the target. Receptors include any people, animal or plant population, or natural or economic resources within the range of the source which are connected to the source by the transport pathway. Receptors can, in addition, extend to remediation processes and future construction materials that may be adversely affected by on-site contamination. In general, however, receptors can be divided into a number of groups depending on the final use of the site.

Pathways

The mere presence of contamination does not infer a risk. The exposure pathway determines the dose delivered to the receptor and the effective dose determines the extent of the adverse effect on the receptor. The pathway which transports the contaminants to the receptor or target generally involves conveyance via soil, water or air.

Exposure Assessment

By considering the source, pathway and receptor, an assessment is made for each contaminant on a receptor by receptor basis with reference to the significance and degree of the risk. In assessing this information, a measure is made of whether the source contamination can reach a receptor, determining whether it is of a major or minor significance. The exposure risks are assessed against the present site conditions.

A preliminary risk assessment has been undertaken for these potential source-pathway-receptor linkages to identify potentially unacceptable risks on a qualitative basis. This approach is based on DEFRA and CIRIA guidance on risk assessment and Model Procedures. Risk is based on a consideration of both:

- The likelihood of an event (probability); [takes into account both the presence of the hazard and receptor and the integrity of the pathway].
- The severity of the potential consequence [takes into account both the potential severity of the hazard and the sensitivity of the receptor].

The definitions of the classification of consequence and likelihood are given below.

Likelihood of Contaminant Linkage	
High likelihood	An event is very likely to occur in the short term and is almost inevitable over the long term OR there is evidence at the receptor of harm or pollution.
Likely	It is probable than an event will occur. It is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	Circumstances are possible under which an event could occur. It is by no means certain that even over a longer period such an event would take place, and less likely in the short term.
Unlikely	It is improbable that an event would occur even in the very long term.

Potential Consequence of Contaminant Linkage	
Severe	Acute risks to human health. Short-term risk of pollution of sensitive water resource (e.g. major spillage into controlled waters). Impact on controlled waters e.g. large scale pollution or very high levels of contamination. Catastrophic damage to buildings or property (e.g. explosion causing building collapse). Ecological system effects – irreversible adverse changes to a protected location. Immediate risks.
Medium	Chronic risks to human health. Pollution of sensitive water resources (e.g. leaching of contaminants into controlled waters). Ecological system effects – substantial adverse changes to a protected location. Significant damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy, such as foundation damage).
Mild	Non-permanent health effects to human health. Pollution of non-sensitive water resources (e.g. pollution of non-classified groundwater). Damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy, such as foundation damage). Substantial damage to non-sensitive environments (unprotected ecosystems e.g. crops).
Minor/ Negligible	Non-permanent health effects to human health (easily prevented by appropriate use of PPE). Minor pollution to non-sensitive water resources. Minor damage to non-sensitive environments (unprotected ecosystems e.g. crops). Easily repairable effects of damage to buildings, structures, services or the environment (e.g. discoloration of concrete, loss of plants in a landscaping scheme).

In order to then determine the risk to the identified receptor, both the likelihood and severity of the potential hazard is input into a risk assessment matrix as follows:

Potential Significance of Contaminant Linkage Matrix

Matrix		Likelihood			
		High Likelihood	**Likely**	**Low Likelihood**	**Unlikely**
Potential consequence	**Severe**	Very High	High	Moderate	Moderate/Low
	Medium	High	Moderate	Moderate/Low	Low
	Mild	Moderate	Moderate/Low	Low	Negligible
	Minor / Negligible	Moderate/Low	Low	Negligible	Negligible

The overall definition of risk is given below.

Potential Significance	
Very High Risk	Severe harm to a receptor may already be occurring OR a high likelihood that severe harm will arise to a receptor unless immediate remedial works/mitigation measures are undertaken.
High Risk	Harm is likely to arise to a receptor, and is likely to be severe, unless appropriate remedial actions/mitigation measures are undertaken. Remedial works may be required in the short term, but likely to be required over the long term.
Moderate Risk	Possible that harm could arise to a receptor, but low likelihood that such harm would be severe. Harm is likely to be medium. Some remedial works may be required in the long term.
Low Risk	Possible that harm could arise to a receptor. Such harm would at worse normally be mild.
Negligible	Low likelihood that harm could arise to a receptor. Such harm unlikely to be any worse than mild.

Appendix D
Site Walkover Photographs

Plate 1, Onsite pond in eastern part of site

Plate 2, Stream leaving pond heading north

Plate 3, Stream crossing northern boundary

Plate 4, Outflow from interceptor into small stream

Plate 5, Interceptor with closeup of outfall pipe (inset)

Plate 6, Davy Field Brook

Plate 7, Davy Field Brook entering culvert under motorway to north of the site.

Plate 8, Cutting to the north of the site (top) associated with railway line (bottom)

Plate 9, Area of slaggy ground to north of the site

Plate 10, Onsite substation to north of the ink building

Plate 11, New fire water pond under construction in east of the site

Plate 12, Existing borehole G2 with site in background.

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