



Preliminary Geo-Environmental Risk Assessment

Langstone Technology Park, Portsmouth

Presented to **AG Langstone B.V.** and Trinity Investment Management

Issued: July 2019

Delta-Simons Project No. 19-0687.01



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Report Details

Client	AG Langstone B.V. and Trinity Investment Management
Report Title	Preliminary Geo-Environmental Risk Assessment
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Project No.	19-0687.01
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About us

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Specialising in Environment, Health & Safety and Sustainability, Delta-Simons provide support and advice within the property development, asset management, corporate and industrial markets. Operating from nine locations - Lincoln, Birmingham, Dublin, Durham, Leeds, London, Manchester, Norwich and Nottingham - we employ over 75 environmental professionals, bringing experience from across the private consultancy and public sector markets.

Delta-Simons is proud to be a founder member of the Inogen® Environmental Alliance, a global corporation providing multinational organisations with consistent, high quality and cost effective environmental, health, safety, energy and sustainability solutions. Inogen assists multinational clients by resolving liabilities from the past, addressing today's requirements and delivering solutions for the future. With more than 200 offices located on every continent, more than 6,430 staff worldwide, and projects completed in more than 120 countries, Inogen provides a single point of contact for diverse markets as Automotive, Chemical, Consumer Products & Retail, Financial, Food & Beverage, Healthcare, Insurance, Manufacturing, Non Profit Organisations, Oil & Gas, Real Estate, Services Firms, Technology and Transportation, among others.

Executive Summary

Brief	Delta-Simons Environmental Consultants Limited ("Delta-Simons") was instructed by AG Langstone B.V. and Trinity Investment Management to prepare a Preliminary Geo-Environmental Risk Assessment for the Langstone Technology Park, Langstone Road, Havant, Portsmouth, PO9 1SA. (the "Site"). It is understood that the Client is proposing to redevelop the southern car park with light industrial/commercial units and associated parking. In the northeast of the Site it is proposed that an existing building and car parking will be partially demolished/reconfigured to extend the area as additional parking.
Site Use & Surrounding Area	The Site is currently occupied by Langstone Technology Park, which comprises mixed commercial and industrial units used for offices, laboratories, light manufacturing/engineering, a gym and a nursery, with associated parking and access roads. The Site is located within a predominantly commercial/ light industrial area.
Environmental Setting	The Site is underlain by a sequence of Made Ground, Alluvium and River Terrace Deposits (Secondary A Aquifer), a limited band of superficial Head deposits in the southern central area of the Site. The bedrock geology is indicated to comprise the Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation and Culver Chalk Formation (Principal Aquifer). The nearest surface water feature is the Langstone Mill Channel running north-south adjacent to the eastern boundary of the Site.
Contamination Potential Sources	Potential historical sources of on-Site contamination identified include a sewage works and various tanks and former works including diesel storage. Within the wider area, potential sources of contamination include various unspecified works, a mill and sewage works.
Contaminated Land Risk Associated with Ownership	There is considered to be a low risk of enforcement action by the regulatory authorities under Part 2A of the Environmental Protection Act, the Water Resources Act or the Environmental Damage Regulations. The potential for legal action by surrounding landowners / Third Parties based on the potential for contamination to migrate off-Site (ongoing or historically) is considered to be low.
Development Considerations	Widespread contamination is considered unlikely and the preliminary risk assessment has identified a low to moderate risk of soil/groundwater contamination and hazardous ground gas at the Site. Asbestos may be present within the localised Made Ground. Alluvium containing localised peat is likely present beneath the Site, however this is not thought to represent a substantial geotechnical risk. Depending on the loads of the proposed development, piled foundations into the Chalk bedrock may be required.
Recommendations	It is recommended that an intrusive Site investigation is undertaken to assess the potential for contamination and ground gases to impact on the proposed development. The investigation will also refine the Site-specific ground model and groundwater regime and enable an assessment of foundation and engineering solutions to be made.
This is intended as a summary only. Further detail and the limitations of the assessment is provided within the main body of the Report.	

Table of Contents

1.0 INTRODUCTION	1
1.1 Appointment.....	1
1.2 Context & Purpose	1
1.3 Scope of Works	1
1.4 Limitations.....	2
2.0 SITE CONTEXT & DATA REVIEW.....	3
2.1 Site information.....	3
2.2 Environmental Setting	3
2.3 Historical Use of the Site & Surrounding Area	4
2.4 Environmental Database Review	5
2.5 Planning Review / Regulatory Enquiries	6
2.6 Previous Reports	6
2.7 Unexploded Ordnance (UXO)	8
3.0 CONCEPTUAL SITE MODEL	9
3.1 Introduction	9
3.2 Potential Contamination Sources	9
4.0 PRELIMINARY GROUND ENGINEERING APPRAISAL	12
4.1 Preliminary Ground Model.....	12
4.2 Plausible Geohazards	12
5.0 DEVELOPMENT CONSIDERATIONS.....	13
5.1 Potential Remediation Requirements & Solutions.....	13
5.2 Geotechnical Considerations.....	13
6.0 CONCLUSIONS & RECOMMENDATIONS	14
6.1 Land Contamination	14

Figures

Figure 1 Site Location Plan

Figure 2 Site Layout Plan

Appendices

Appendix A Limitations

Appendix B Proposed Development Layout

Appendix C Historical Maps

Appendix D Landmark Envirocheck® Report

Appendix E Site Photographs from July 2015 Site Reconnaissance

1.0 Introduction

1.1 Appointment

Delta-Simons Environmental Consultants Limited ("Delta-Simons") was instructed by AG Langstone B.V. and Trinity Investment Management (jointly the "Client") to prepare a Preliminary Geo-Environmental Risk Assessment for the Langstone Technology Park, Langstone Road, Havant, Portsmouth, PO9 1SA. (the "Site").

1.2 Context & Purpose

The aim of this report is to identify likely environmental and geotechnical issues associated with soil and groundwater conditions that may affect the proposed redevelopment of the Site. This report is designed in accordance with 'the Model Procedures for the Management of Land Contamination (CLR 11)', the relevant requirements of the National Planning Policy Framework 2019 (NPPF) (paragraphs 170 & 178-180)¹ and the Planning Practice Guidance (Land Affected by Contamination)².

It is understood that the Client is proposing to redevelop the southern car park with light industrial/ commercial units and associated parking. In the northeast of the Site it is proposed that an existing building and car parking will be partially demolished/reconfigured to extend the area as additional parking.

1.3 Scope of Works

- ▲ Review of the environmental setting of the Site, including the current use / status of the Site and surrounding area, and review of the geology, hydrogeology and hydrology;
- ▲ Review of the historical activities of the Site and surrounding area;
- ▲ Review of regulatory information relating to the Site;
- ▲ Review of the online planning records for the Site;
- ▲ Consult and review information from the Local Authority in relation to Part 2A of the 1990 Environmental Protection Act;
- ▲ Review of provided relevant third party reports relating to the Site or surrounding area;
- ▲ Develop an outline Conceptual Site Model and undertake a Preliminary Risk Assessment with respect to potential contamination focussed on the proposed land use; and
- ▲ Provide commentary on potential land contamination and geotechnical constraints in the context of the proposed development.

In completing this Assessment, Delta-Simons has utilised the following data sources and third party information:

- ▲ Current and Historical Ordnance Survey (OS) maps;
- ▲ British Geological Survey (BGS) data;
- ▲ Environment Protection Agency (EPA) online data;
- ▲ Coal Authority (CA) online data;
- ▲ A Landmark Envirocheck Report for the Site (Ref. 203439487_1_1), dated May 2019;
- ▲ Historical Maps included as part of the Envirocheck Report; and
- ▲ Information provided by Havant Borough Council.

In addition, a detailed unexploded ordnance (UXO) appraisal for the Site has been procured, this will be provided separately.

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf

² <https://www.gov.uk/guidance/land-affected-by-contamination>

1.4 Limitations

The standard limitations associated with this assessment are presented in Appendix A. In addition, there are the following specific limitations that apply to this assessment:

- ▲ The scope of works did not include a Site reconnaissance, however, information obtained as part of a Site reconnaissance undertaken by Delta-Simons in July 2015 has been included (it is understood from discussions with the Client that no significant changes to the Site have been made since); and
- ▲ The report includes a preliminary assessment for the potential for radon gas hazards. A detailed radon assessment falls outside of the scope of this report, and the requirement for radon mitigation measures in the proposed development should be identified separately to the satisfaction of Havant Borough Council Building Control.

2.0 Site Context & Data Review

2.1 Site information

Co-ordinates	Centred approximately at National Grid Reference 471300, 105700		Elevation	~4 m AOD
			Area	~16 Ha
Site Location	The Site is located on the southern side of the A27, 600 m southwest of Havant town centre. A Site location map is provided as Figure 1.			
Current Site Use	The Site is currently occupied by Langstone Technology Park, which comprises mixed commercial and industrial units used for offices, laboratories, light manufacturing/ engineering, a gym and a nursery, with associated parking and access roads. External areas predominantly comprise hardstanding with soft landscaping confined to limited grass areas and planted trees.			
Proposed Development Description	The Client is seeking full planning permission for the part-demolition of Building 1000, installation of a new flank elevation to the East, a new elevation to the North of Building 4000 as a result of the aforementioned part-demolition of Building 1000, the erection of new buildings in flexible B1c, B2 and B8 use in the South-West corner of the site with associated parking; and the creation of new car parking areas and the rationalisation of existing parking areas. Proposed development plans are included as Appendix B.			
Current Surrounding Area	North	The A27 with light industrial and commercial units beyond, including a petrol filling station.		
	East	Undeveloped land/ woodland with residential properties beyond.		
	South	Light industrial and commercial units.		
	West	Light industrial and commercial units.		
	The petrol filling station is considered to represent a potential off-Site source of contamination.			

2.2 Environmental Setting

Published Geology	From published British Geological Survey mapping (1:50,000 Sheet Number 316, Fareham), the Site is indicated as being underlain by superficial Alluvium (clay, silt, sand, locally organic with gravel). Areas along the western boundary of the Site are indicated as being underlain by River Terrace Deposits (sand, silt and clay). A limited band of superficial Head deposits (clay and gravel) is indicated to be present in the southern central area of the Site. The bedrock geology is indicated to comprise the Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation and Culver Chalk Formation. Made Ground is likely to be present beneath the Site associated with the current development.
Specific Ground Conditions	The BGS borehole record identifies a total of 12 historical borehole records located on-Site (SU70NW104-107, 109-112 and 114-117), all of which were drilled in 1966 as part of a 'proposed development at Brookside Road'. Ground conditions generally comprised: ▲ Topsoil to a maximum depth of 0.80 m bgl;

	▲ Superficial deposits comprising clay, silt, gravel and occasional peat layers; and ▲ Chalk bedrock comprising cobbles in a matrix of firm putty chalk with flints encountered to a maximum depth of 5.60 m bgl.
Hydrogeology	The EA classify the superficial deposits (Alluvium) as a Secondary A Aquifer and the bedrock (Chalk) as a Principal Aquifer. The EA data also indicates that the Site is not in a designated groundwater Source Protection Zone (SPZ), although an SPZ Zone I (Inner Protection Zone) is located approximately 180 m northeast of the Site. According to the Envirocheck® Report, there are three licensed abstraction records from groundwater located within 1 km of the Site. The available BGS borehole information recorded groundwater levels between 0.80 m and 2.30 m bgl.
Hydrology	The nearest surface water feature is the Langstone Mill Channel running north-south adjacent to the eastern boundary of the Site. According to the Envirocheck Report, there are no licensed abstraction records from surface water located within 500 m of the Site.
Coal Mining	Reference to the Coal Authority on-line viewer indicates that the Site is not with a Coal Mining Reporting Area. Consequently, a Coal Mining Risk Assessment (CMRA) is unlikely to be required under the planning regime.
Radon Gas	The Site lies within an area where less than 3 to 5% of homes are above the National Radiological Protection Board (NRPB) recommended "action level" for radon. BRE211 (2007) indicates that basic radon protective measures may be necessary in the construction of new buildings at the Site.
Ecological Receptors	It is understood from information provided within the Envirocheck® Report, there are no statutory ecological receptors located within 500 m of the Site.
Heritage Interest	According to historicengland.org.uk there is one area of heritage interest located within 100 m of the Site associated with a Grade II Listed Building known as Langstone Hotel.
Environmental Sensitivity	The Site is considered to be of a moderate environmental sensitivity given the presence of the underlying Secondary A Aquifer, Principal Aquifer at depth, the absence of any ecological receptors and the commercial/industrial use of the Site and surrounding area.

2.3 Historical Use of the Site & Surrounding Area

Approach	The historical development of the Site and surrounding area has been assessed through a review of available historical OS maps and Google Earth historical satellite imagery. A summary of the key historical Site uses and developments in the surrounding area is presented below. Copies of pertinent historical maps are included as Appendix C.
Historical Features On-Site	First available maps date back to 1867, when the Site comprised open fields, with some small unspecified buildings in the northwest corner and west of the Site. By 1897, an aqueduct and sluice were present in the southwest corner of the Site. By 1909, a sewage works with an engine house had been developed in the north-east of the Site, which showed expansion by 1932 with filter beds being labelled and a small unspecified buildings in the centre and northwest of the Site. By 1953 tanks and valves were labelled associated with the sewage works, with some of the filter beds being labelled as sludge beds, the central area of the Site was labelled as allotment gardens. Between 1961 and 1962, the sewage works were noted as

	disused and relabelled as Works. By 1972, the majority of the Site was occupied by a larger building labelled as works, with a further building and associated electricity substation in the south. By 1989 the building and electricity substation in the south had been replaced with a car park, with tanks and an electricity substation being present in the southwest of the Site. By 1993 the Site is thought to be in its current layout. The sewage works present from 1909 until circa 1962, and later works prior to the current development represent potential historical sources of contamination.
Potentially Contaminative Historical Features Off-Site	Potential sources of contamination within 150 m of the Site include: ▲ Havant Mill shown approximately 60 m to the northeast of the Site between 1867 to circa 1973; ▲ Sewage works shown approximately 150 m southwest of the Site between 1962 and present day; ▲ Unspecified Works shown approximately 50 m northeast of the Site between 1966 to present day; and ▲ Unspecified Works shown approximately 10 m southwest of the Site between 1972 and present day. Other various works, a depot and tanks have also been present beyond 150 m to the northwest and north of the Site.

2.4 Environmental Database Review

Approach	The Landmark Envirocheck® Report provides a database of environmental information held by various statutory bodies including the EA, Local Authority (LA), Health & Safety Executive (HSE) and HPA amongst others. A full copy of the Envirocheck® Report is provided in Appendix D and the most relevant information is summarised below.
Features On-Site	The Landmark Envirocheck® Report lists nine entries for potentially infilled land (water) on-Site, which are thought to be associated with the drains/ aqueduct shown on historical maps. There is one entry for a Licensed Waste Management Facility registered to Teleplan and White Electronics B V, which was issued in June 2013 for waste electrical and electronic equipment. There are two inactive Contemporary Trade Directories associated with the Site for a printers and general engineers/ computer manufacturers. There are three Points of Interest for Manufacturing and Production for industrial features and tanks.
Potentially Contaminative Features Off-Site	Pertinent entries included within the Landmark Envirocheck® Report located within 150 m from the Site include 14 active and inactive Contemporary Trade Directory Entries associated with tool design, manufacturers & makers, catering equipment, spraying – paint & coatings, commercial vehicle bodybuilders & repairers, precision engineers, aviation engineers and engineering services. One fuel station entry approximately 150 m north associated with the Tesco Superstore. Within the wider area, pertinent entries include a Historical Landfill Site (Land South of Budds Farm Sewage Works) recorded approximately 200 m southwest of the Site, which deposited household waste. There are no BGS, LA and EA registered landfill sites on or within 500 m of the Site.
Implications for Land Contamination Risk	Potential sources of contamination have been identified at the Site from the regulatory information. Potential off-Site sources of contamination have also been identified that will be considered in the preliminary risk assessment.

2.5 Planning Review / Regulatory Enquiries

On-line Planning Portal	Havant Borough Council	Date Accessed	13/05/19
Findings	There are a number of online planning applications relating to the Site, the majority of which relate to minor external changes or changes in use of on-Site buildings. The following pertinent applications have been identified: ▲ Demolition of existing steel-clad building and two portacabins to make way for a single storey timber framed building to house a 52 place nursery school (ref. APP/10/00272, dated August 2010); ▲ Construction of Waste Compactor Housing and Consumables store (ref. APP/11/00168, dated February 2011); and ▲ Installation of 2 no. roof mounted condenser units and associated chiller pipework to support 2 no. additional internal computer room air conditioning units (ref. APP/15/01225, dated October 2015). No additional potentially contaminative activities or other information pertinent to this assessment was identified from the historical planning records.		
Part 2A of the Environmental Protection Act (EPA) 1990	The Contaminated Land Officer (CLO) has been contacted, but at the time of reporting no response had been received.		

2.6 Previous Reports

Delta-Simons Phase I Environmental Assessment, 2015	Delta-Simons previously completed a Phase I Environmental Assessment, dated September 2015 (ref. 15-0754.01). The report was undertaken as an appraisal of <i>in-ground</i> environmental risks and liabilities, as part of a pre-divestment assessment of the Site. It was undertaken in the context of the Site remaining in a commercial/ industrial use. Additional information provided within this report is from a site walkover. At the time, the Site was occupied by several industrial/ commercial properties used for offices, laboratories, light manufacturing/ engineering, a gym, and a nurse. It is understood the at the Site use and layout remains the same. Site photographs taken as part of Delta-Simons' Site Reconnaissance in July 2015 are included as Appendix E. It was noted that external areas predominantly comprised hardstanding to include a service yard in the west, car parks in the south and east and access roads. Soft landscaping was confined to limited grass areas and planted trees. The following potential sources of contamination were identified during the Site walkover carried out on 29th July 2015: ▲ Waste storage areas were identified in the east and west of the Site. The Site Facilities Manager stated that the western storage area had been used by the former tenant (IBM) as a chemical storage and processing area, with associated plant remaining, including two above ground storage tanks alongside Building 22 (now redundant). The former set up was understood to include air and chemical extraction systems, solvent recovery plant, carbon absorption tanks, and storage of hydrochloric acid, sodium hyperchloride, xylene, nitrogen and cyanide; ▲ Further general waste storage areas were observed to the west and south-west of Building 5000 (comprising vegetation, metal cardboard, domestic waste, vehicle tyres and drums);
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	▲ Beneath Building 1000 in north-western corner of the Site, a drum store was present. Drums containing chemicals were stored with secondary containment; ▲ Electricity sub-stations were identified in the south-western corner and in the centre of the Site; ▲ A back-up generator was located between Building 3000 (in which a boiler room was located) and Building 4000 (central area of the Site); ▲ In the south-west corner of the Site, a deionised water production plant and caustic storage area were present, in addition to an effluent treatment plant and buffer holding tanks. It was understood that this area had undergone intrusive investigation works, however, no further information was available. It was noted that the southern part of this area is now used as a gym for on-Site tenants. Used engines/ motors were noted to be stored on pallets externally in this area; and ▲ It was noted that Asbestos Containing Materials were present within the fabric of the buildings on-Site, and were managed via an Asbestos Register. No evidence of leakages/ spillages was observed during the walkover and no significant issues of potential environmental concern were identified. The following features/issues were noted from the Site visit: ▲ It was understood that surface water pooling occurs in car park areas during periods of high precipitation; ▲ Delta-Simons was informed by the Facilities Manager that a pollution incident which required remediation works had taken place in 1984, however, no further details were available. Given the time since this incident occurred and that remediation is understood to have taken place, it is not considered to represent a significant concern in the context of the current commercial/ industrial use of the Site; ▲ Two oil interceptors were present in the eastern car parks; ▲ Two tunnel entries (into an embankment) were present at Building 1000 in the north-western corner of the Site; and ▲ A surface water pump house was observed to the east of Building 6000. Within the surrounding area, the following was noted: ▲ Adjacent to the west and south of the Site are further commercial/ industrial land uses; ▲ Immediately to the east is undeveloped land/ woodland, with residential properties beyond (approximately 50 to 130 m); ▲ Adjacent to the north of the Site is the A27, with industrial/ commercial properties beyond; and ▲ Two residential properties are located approximately 50 m north-west of the Site.
WSP Phase I Environmental Assessment, 2005	As part of the Delta-Simons 2015 report, a review of a previous report by WSP titled Phase I Environmental Assessment – Langstone Technology Park, dated December 2005 (ref. 12022767) was included. The WSP report was undertaken in the context of the proposed investment purchase of the Site. Potentially contaminative activities identified during a Site walkover were limited to the storage of diesel fuel in two above ground storage tanks (with a total capacity of 3,000 litres) and the storage of waste materials. No significant issues were identified associated with the current use of the Site. The Contaminated Land Officer at Havant Borough Council was contacted. It was reported that the Officer stated that given the historical and neighbouring land uses and the use of good quality hardstanding across the Site, the Site was not considered to

	pose a concern with regards to human health and a continued use as a science park. It was noted that in the case of redevelopment, further intrusive investigations would be required. The following third-party reports were also reviewed as part of WSP's assessment (not seen by Delta-Simons): ▲ A 1999 Environmental Monitoring Program undertaken by CASELLA Ltd. The report detailed results of effluent monitoring, industrial emissions monitoring, ground water monitoring, surface water monitoring and building fabric monitoring. It was stated that the report reviewed a number of intrusive and non-intrusive investigations at the Site, which identified potential issues associated with low concentrations of toluene and purgeable hydrocarbons from effluent monitoring for Building 2000; groundwater contamination associated with chlorinated solvents; and copper contamination within a concrete slab. It was noted by WSP that the effluent treatment facility had been decommissioned, that the identified groundwater contamination was outside of the Site boundary and that the concrete slab had been remediated; ▲ A 1999 Phase I Environmental Audit undertaken by WSP Environmental; ▲ A 1999 Initial Ground Investigation by Soil Consultants Limited, which was stated to have identified potential issues associated with elevated levels of cadmium within two boreholes, and elevated levels of arsenic, lead, copper, zinc and mercury within a single borehole, however, it was noted by WSP that the soil guidance values used for comparison at that time were no longer applicable; and ▲ A 2003 and 2004 Addendum Site Investigation Report undertaken by STATS. It was stated that the report identified potential issues associated with elevated levels of ground gas within Made Ground. It was noted that the report was based on a single monitoring event and did not record flow rate. It was stated that based upon the information and intrusive investigations reviewed, no significant contamination issues had been identified for the continued commercial use of the Site. However, it was noted that the potential presence of residual contamination, which may require remediation in the event of redevelopment could not be discounted. Based upon the information reviewed, it was considered that the Site represented a low/ medium environmental risk. Given the ground gas concentrations identified in a previous investigation at the Site, it was considered that the presence of ground gas could not be discounted, as such, further ground gas testing was recommended.
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2.7 Unexploded Ordnance (UXO)

UXO Assessment	Delta-Simons commissioned a Detailed UXO Risk Assessment Report from 1 st Line Defence. At the time of reporting the Detailed UXO Risk Assessment was not available for review. This will be provided separately.
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3.0 Conceptual Site Model

3.1 Introduction

A Conceptual Site Model (CSM) represents the relationships between contaminant sources, pathways and receptors, to support the identification and assessment of Possible Pollutant Linkages (PPL).

3.2 Potential Contamination Sources

The Site is currently occupied by a technology park comprising a number of interlinked commercial/ industrial properties understood to have been originally developed in the early 1970s as an IBM computer product manufacturer. Ground cover predominantly comprises buildings, hardstanding and access roads. Potential sources of contamination at the Site include limited quantities of fuel and chemical storage associated with the current Site use, former chemicals and activities associated with the Site's former use for computer product manufacture, and the Site's historical use as a sewage works from 1909 to circa 1961.

Potential historical off-Site sources of contamination (within 150 m) include a mill, a sewage works, factories, an engineering works, a warehouse, a boatbuilding works/ works, a plastics factory and a pumping station with a tank. Current potential off-Site sources of contamination include vehicle respraying processes, metal coating processes, a landfill, a fuel station and facilities for tool design, precision engineers, aviation engineers and engineering services.

Source(s)	Pathway(s)	Receptor(s)	Risk Rating	Justification & Mitigation (if required)
Potentially contaminated soils and/ or groundwater beneath the Site. Principally from Made Ground and from historical land uses.	Direct contact, ingestion and inhalation of dust and vapours	Site users	Low Risk	Given that the Site has not undergone significant phases of demolition, Made Ground at the Site is anticipated to be shallow and limited in extent. Made Ground in some areas within the on-Site buildings may be more significant due to their industrial uses. The proposed redevelopment of the south of the Site will comprise new commercial units and associated access infrastructure, and so it is assumed that there will be hardcover over the majority of the Site breaking the potential pathways. However, it is anticipated that an intrusive investigation will be required to confirm the current status of the Site and potential risks.
		Maintenance and groundworkers during any future sub-surface works at the Site	Low to Moderate Risk	The risk posed to future Site workers during the redevelopment is considered to be low to moderate as safe working procedures should be implemented, good standards of personal hygiene should be observed and appropriate levels of personal protective equipment (PPE) provided and utilised to reduce potential risks. The walkover undertaken in July 2015 noted that Asbestos Containing Materials were present within the fabric of the buildings on-Site and were managed via an Asbestos Register. Maintenance and groundworkers should be made aware of encountering ACMs across the Site, especially during any demolition, and an appropriate protocol should be in place should any expected finds be encountered. As above, risk should be mitigated through safe working procedures, and appropriate levels of PPE should be provided and utilised. This information should be captured in Site health and safety documentation and in maintenance plans.
	Leaching of contaminants and vertical migration	Groundwater beneath the Site	Low to Moderate Risk	A Secondary A Aquifer is present within the shallow superficial deposits beneath the Site, which is likely to be in hydraulic continuity with the stream adjacent to the east of the Site and the underlying Principal Aquifer. Widespread significant contamination of the wider Site is unlikely.
	Lateral migration through groundwater and via overland flow/surface run-off	Surface watercourses located in close vicinity of the Site		It is understood that the proposed redevelopment is to include buildings and hardcover, which will limit the infiltration of rainfall and, therefore, the leaching and migration of any mobile or soluble contaminants. present across the Site and in the surrounding area will limit the infiltration of rainfall and, therefore, the leaching and migration of any mobile or soluble contaminants. However, it is anticipated that an intrusive investigation will be required to confirm the current status of the Site and potential risks.

Source(s)	Pathway(s)	Receptor(s)	Risk Rating	Justification & Mitigation (if required)
	Permeation of hydrocarbons through plastic pipework	Water supply pipes	Low Risk	Hydrocarbons, especially aromatics and chlorinated solvents are known to permeate plastic pipes, particularly when encountered at high concentrations. However, it is considered unlikely that significant widespread sources of hydrocarbon contamination are present given the current and historical uses of the Site. No problems associated with the water supply pipework have been reported.
	Neighbouring properties and users	Lateral migration through any groundwater beneath the Site	Low Risk	Given a significant risk to groundwater has not been identified and the nature of the majority of the surrounding land uses, potential for significant pollutant linkages to be present is low.
Ground gas from underlying Made Ground and peat within natural alluvium	Vertical and lateral migration of ground gases	Site users and on-Site buildings	Low to Moderate Risk	Elevated ground gas concentrations are understood to have been identified during a 2003/4 assessment by STATS, however, flow rates were not recorded, and they were based on one monitoring event. Given the potential sources of ground gases and the current commercial/ industrial use of the Site, the risk to the buildings and Site users is considered to be low to moderate. In addition, potential ground gas risks could be further mitigated through passive ground gas protection measures incorporated into the design of additional ground floor areas (if required). It is recommended that an intrusive investigation including ground gas monitoring is undertaken at the Site in order to confirm an appropriate Characteristic Situation (CS Class).
Potentially contaminated soil and groundwater from off-Site sources	Lateral migration and subsequent inhalation	Groundwater beneath the Site and future Site users	Low Risk	Whilst potential off-Site sources of contamination have been identified, given the current commercial use of the Site (predominantly covered by buildings and hardstanding), the risk to Site users is considered to be low.
Localised 'hotspots' of contamination	All Pathways	All Receptors	Low Risk	A discovery strategy should be implemented during the redevelopment to ensure that potential contamination is appropriately assessed and reported.

4.0 Preliminary Ground Engineering Appraisal

4.1 Preliminary Ground Model

Based on the available information, it is anticipated that the Site is likely underlain by a sequence of Made Ground underlain by superficial Alluvium (clay, silt, sand, locally organic with gravel). Areas along the western boundary of the Site are indicated as being underlain by River Terrace Deposits (sand, silt and clay). A limited band of superficial Head deposits (clay and gravel) is indicated to be present in the southern central area of the Site. The bedrock geology is indicated to comprise the Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation and Culver Chalk Formation. Made Ground is likely to be present beneath the Site associated with the current development.

4.2 Plausible Geohazards

The geohazards listed below have been identified to follow guidance presented in the HA document HD22/08 'Managing Geotechnical Risk' (2008) which aims to identify and manage the geotechnical risks associated with a scheme throughout its lifespan, from planning to construction to maintenance.

It is anticipated that the Site is underlain by Alluvium, which is locally organic, however this is not considered to be a substantial ground related risk. There are no substantial ground related risks associated with the proposed redevelopment.

Potential solutions and further steps to address the aforementioned issues are discussed in Section 5.

5.0 Development Considerations

5.1 Potential Remediation Requirements & Solutions

Soils	The risk of the Site requiring widespread remediation to protect end users is considered to be low, although localised remedial measures, for example provision of a clean soil cover for proposed soft landscaping, may be required in areas of Made Ground.
Groundwater	Significant widespread groundwater contamination is not anticipated.
Ground Gas	A 2003/2004 report by STATS (not seen by Delta-Simons) is understood to have identified elevated ground gas concentrations at the Site, however, flow rates were recorded and only one round of monitoring was undertaken. Potential sources of ground gas at the Site include Made Ground and organic content within the natural Alluvium. It would be prudent to allow for basic ground gas protection measures in new buildings on Site until a full set of monitoring data is available for interpretation.
Building Fabric & Services	Widespread contamination at the Site is considered unlikely. However, new services are recommended to be placed in clean corridors. A drinking water pipeline assessment may be required following soils chemical results. Aggressive ground chemistry may attack buried concrete and therefore there may be a requirement for protection measures to be put in place at the Site.

5.2 Geotechnical Considerations

Foundations & Floor Slabs	The shallow ground conditions are anticipated to comprise of Made Ground (associated with the current development) underlain by a sequence of superficial Alluvium, River Terrace Deposits with a limited band of superficial Head deposits in the southern central area. The bedrock geology is indicated to comprise the Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation and Culver Chalk Formation. Depending on the loads required for the redevelopment and the presence of localised peat, piling into the chalk bedrock may be required.
Groundworks	Hard surfacing and buildings are present in the proposed redevelopment areas in the southwest and northeast of the Site, associated foundations and below ground infrastructure may require removal prior to redevelopment. The on-Site BGS historical borehole logs indicate potentially shallow groundwater levels, which may cause problems with excavation.
External Works	California Bearing Ratio testing will be required to determine road construction thickness. Consideration will need to be given for the potential for differential settlement to affect road surfaces and services and appropriately mitigated within the design.

6.0 Conclusions & Recommendations

6.1 Land Contamination

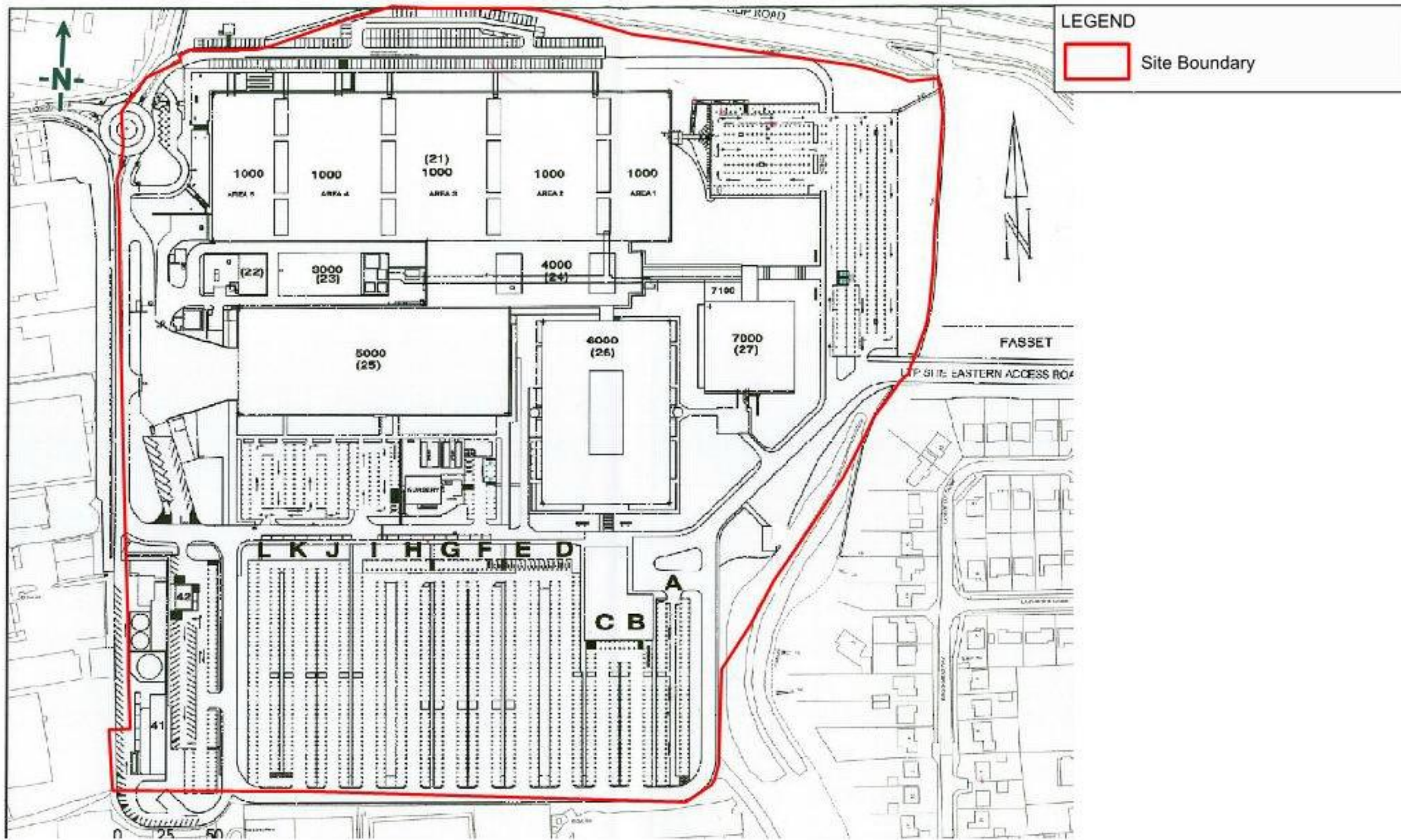
Contamination Risks Associated with Ownership (Current Use)	There is considered to be a low risk of enforcement action by the regulatory authorities under Part 2A of the Environmental Protection Act, the Water Resources Act or the Environmental Damage Regulations, whilst the Site remains in its current light industrial/ commercial use. The potential for legal action by surrounding landowners / Third Parties based on the potential for contamination to migrate off-Site (ongoing or historically) is considered to be low .
Potential Contaminated Land Development Risks	Widespread contamination is considered unlikely and the preliminary risk assessment has identified a low to moderate risk of soil/groundwater contamination and hazardous ground gas at the Site. Asbestos may be present within the Made Ground.
Plausible Geotechnical Development Risks	The presence of Alluvium containing occasional peat layers beneath the Site indicates the potential for compressible ground, however this is not thought to present a substantial geotechnical development risk to the proposed redevelopment. BGS borehole records indicate potential shallow groundwater, which may cause problems with excavations.
Recommendations	Given that the proposed redevelopment requires the partial demolition of existing on-Site buildings in the northeast of the Site and the construction of new buildings in the southwest of the Site, it is recommended that an intrusive Site investigation is undertaken to assess uncertainties/ data gaps identified in the preliminary Conceptual Site Model. An intrusive Site investigation would determine the following: ▲ Presence, thickness and nature of any Made Ground; ▲ Presence, concentrations and leachability of substances of concern in shallow soils (including Made Ground) on-Site; ▲ Presence of substances of concern in any perched water/ soil pore water or shallow groundwater beneath Site; and ▲ Likelihood of significant ground gas and/ or soil vapour intrusion into future on-Site and off-Site buildings. It is anticipated that the environmental site investigation would be undertaken in conjunction with a geotechnical investigation. This will help establish the Site-specific ground model and groundwater regime at the Site and enable an assessment of foundations and engineering solutions to be made.

Figure 1 – Site Location Map



Ordnance Survey, (c) Crown Copyright 2015. All rights reserved.

Figure 2 – Site Layout Map



Appendix A – Limitations

Limitations

The recommendations contained in this Report represent Delta-Simons professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Delta-Simons obtained, reviewed and evaluated information in preparing this Report from the Client and others. Delta-Simons conclusions, opinions and recommendations has been determined using this information. Delta-Simons does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Delta-Simons has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

Appendix B – Proposed Development Layout

Sub Sta

INDUSTRIAL AND OFFICE ACCESS

822

211

EXTENT OF NEW
ELEVATION
REF: 4046A-0200

135,000sq ft FLEXIBLE B1C, B2 & B8
(UNITS. REF 4046C-0110

Notes

This drawing may be scaled for the purposes of Planning Applications, Land Registry and for Legal plans where the scale bar is used, and where it verifies that the drawing is an original or an accurate copy. It may not be scaled for construction purposes. Always refer to figured dimensions. All dimensions are to be checked on site. Discrepancies and/or ambiguities between this drawing and information given elsewhere must be reported immediately to this office for clarification before proceeding. All drawings are to be read in conjunction with the specification and all works to be carried out in accordance with latest British Standards / Codes of Practice.

H	28.06.19	CJ	Roof lights updated. Trees omitted	U
G	26.06.19	CJ	Industrial area and landscape coordinated.	

File	Date	Init	Notes	Child
------	------	------	-------	-------



Client

Drawing Originator



AWW inspired environments

London - 106 Weston Street London SE1 3QB 020 7160 6000
Bristol - Rivergate House, Bristol, BS1 6LS 0117 923 2535
Plymouth - East Quay House, Plymouth, PL4 0HX 01752 261 282

RIBA Chartered Practice

www.zww-uk.com

Project Title

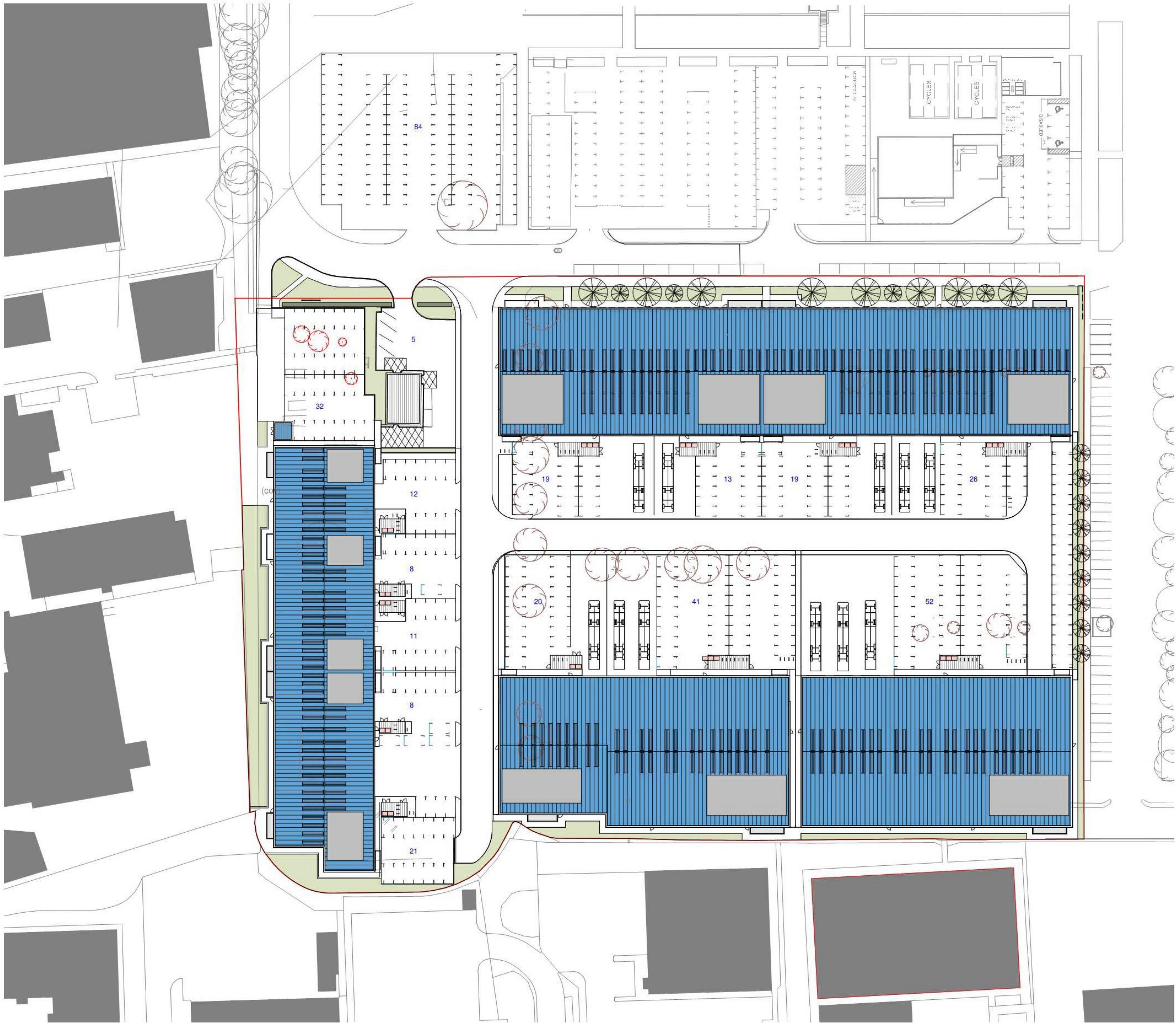
Langstone Technology Park

Drawing Title

Proposed Layout Plan Opt 02

Scale	Sheet	Drawn	Checked	Date
1 : 2000	A3	CJ	IJ	19.03.19

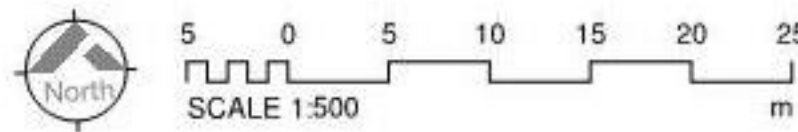
Status PLANNING	Project No. 4046	
Drawing Reference:	Drawing No. 0152	Revision H



Notes
This drawing may be scaled for the purposes of Planning Applications, Land Registry and for legal plans where the scale bar is used, and where it verifies that the drawing is an original or an accurate copy. It may not be scaled for construction purposes.
Always refer to figured dimensions. All dimensions are to be checked on site. Discrepancies and/or ambiguities between this drawing and information given elsewhere must be reported immediately to this office for clarification before proceeding. All drawings are to be read in conjunction with the specification and all works to be carried out in accordance with latest British Standards / Codes of Practice.

B	28/06/19	JH	Minor updates	U
A	27/06/19	JH	First Issue	U

Rev	Date	Int.	Notes	Chkd
-----	------	------	-------	------



Client:

Drawing Originator

AWW inspired environments
London - 106 Weston Street London SE1 3QB 020 7160 6000
Bristol - Rivergate House, Bristol, BS1 4LS 0117 923 2535
Plymouth - East Quay House, Plymouth, PL4 0HX 01752 261 282
RIBA Chartered Practice www.aww-uk.com

Project Title
**Proposed Industrial Units
Langstone Technology Park,
Havant**

Drawing Title
Site Plan

Scale	Sheet	Drawn	Checked	Date
1 : 500	A1	CJ	IJ	04.06.91

Status	Project No.
PLANNING	4046C

Drawing Reference	Drawing No.	Revision
	0110	B

Appendix C – Historical Maps

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

	Gravel Pit		Sand Pit		Other Pits
	Quarry		Shingle		Orchard
	Osiers		Reeds		Marsh
	Mixed Wood		Deciduous		Brushwood
	Fir		Furze		Rough Pasture
	Arrow denotes flow of water		Trigonometrical Station		
	Site of Antiquities		Bench Mark		
	Pump, Guide Post, Signal Post		Well, Spring, Boundary Post		
	•285 Surface Level				
	Sketched Contour		Instrumental Contour		
	Main Roads		Minor Roads		
	Sunken Road		Raised Road		
	Road over Railway		Railway over River		
	Railway over Road		Level Crossing		
	Road over River or Canal		Road over Stream		
	Road over Stream				
	County Boundary (Geographical)				
	County & Civil Parish Boundary				
	Administrative County & Civil Parish Boundary				
	County Borough Boundary (England)				
	County Borough Boundary (Scotland)				
	Rural District Boundary				
	Civil Parish Boundary				

Ordnance Survey Plan 1:10,000

	Chalk Pit, Clay Pit or Quarry		Gravel Pit
	Sand Pit		Disused Pit or Quarry
	Refuse or Slag Heap		Lake, Loch or Pond
	Dunes		Boulders
	Coniferous Trees		Non-Coniferous Trees
	Orchard		Scrub
	Bracken		Heath
	Marsh		Reeds
	Building		Glasshouse
	Sloping Masonry		Pylon
	Cutting		Embankment
	Road Under		Road Over
	Level Crossing		Foot Bridge
	Standard Gauge Multiple Track		Standard Gauge Single Track
	Siding, Tramway or Mineral Line		Narrow Gauge
	Geographical County		Administrative County, County Borough or County of City
	Municipal Borough, Urban or Rural District, Borough or District Council		Borough, Borough or County Constituency
	Civil Parish		
	Boundary Post or Stone		Police Station
	Church		Post Office
	Club House		Public Convenience
	Fire Engine Station		Public House
	Foot Bridge		Signal Box
	Fountain		Spring
	Guide Post		Telephone Call Box
	Mile Post		Telephone Call Post
	Mile Stone		Well

1:10,000 Raster Mapping

	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil, parish or community boundary
	District, Unitary, Metropolitan, London Borough boundary		Constituency boundary
	Area of wooded vegetation		Non-coniferous trees
	Non-coniferous trees (scattered)		Coniferous trees
	Coniferous trees (scattered)		Positioned tree
	Orchard		Coppice or Osiers
	Rough Grassland		Heath
	Scrub		Marsh, Salt Marsh or Reeds
	Water feature		Flow arrows
	Mean high water (springs)		Mean low water (springs)
	Telephone line (where shown)		Electricity transmission line (with poles)
	Bench mark (where shown)		Triangulation station
	Point feature (e.g. Guide Post or Mile Stone)		Pylon, flare stack or lighting tower
	Site of (antiquity)		Glasshouse
	General Building		Important Building

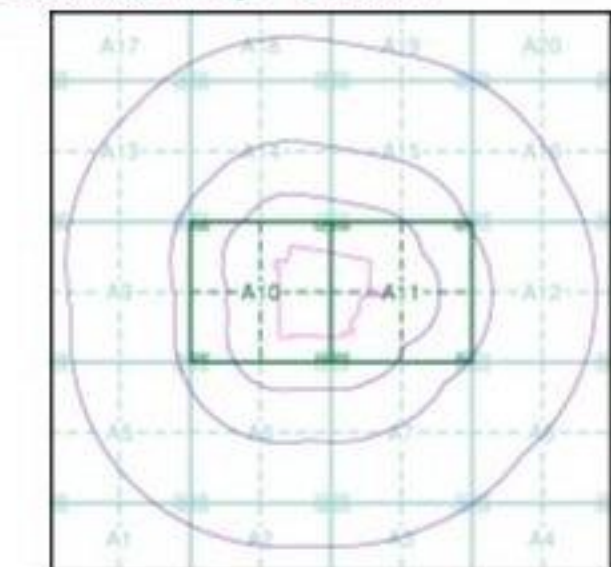
Envirocheck

LANDMARK INFORMATION GROUP

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Hampshire & Isle Of Wight	1:10,560	1870	3
Sussex	1:10,560	1879	4
Hampshire & Isle Of Wight	1:10,560	1898	5
Sussex	1:10,560	1899	6
Hampshire & Isle Of Wight	1:10,560	1909 - 1910	7
Sussex	1:10,560	1914	8
Sussex	1:10,560	1932	9
Hampshire & Isle Of Wight	1:10,560	1932	10
Hampshire & Isle Of Wight	1:10,560	1932	11
Sussex	1:10,560	1932	12
Sussex	1:10,560	1932	13
Hampshire & Isle Of Wight	1:10,560	1933	14
Hampshire & Isle Of Wight	1:10,560	1933	15
Hampshire & Isle Of Wight	1:10,560	1938 - 1942	16
Ordnance Survey Plan	1:10,000	1962 - 1963	17
Ordnance Survey Plan	1:10,000	1966	18
Ordnance Survey Plan	1:10,000	1972 - 1975	19
Ordnance Survey Plan	1:10,000	1982	20
Havant	1:25,000	1983	21
Portsmouth	1:10,000	1988	22
Ordnance Survey Plan	1:10,000	1990 - 1992	23
10K Raster Mapping	1:10,000	2000	24
10K Raster Mapping	1:10,000	2006	25
VectorMap Local	1:10,000	2019	26

Historical Map - Slice A



Order Details

Order Number: 203439487_1_1
 Customer Ref: 19-0687.01
 National Grid Reference: 471300, 105700
 Slice: A
 Site Area (Ha): 16.11
 Search Buffer (m): 1000

Site Details

Hydroco, Langstone Technology Park 2b, Langstone Road, HAVANT, PO9 1SA

Landmark
 INFORMATION GROUP

Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale



243.8 Values for prominent elevations

186.0 Numbers for spot elevations, depth soundings, contour lines, etc.

0.2 Velocity of the current, width of river bed, depth of river

182.12 Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A) З з (Z) П п (P) Ч ч (CH)

Б б (B) И и (I) Р р (R) Ш ш (SH)

В в (V) Й й (Y) С с (S) Щ щ (SHCH)

Г г (G) К к (K) Т т (T) Ъ ъ (-)

Д д (D) Л л (L) У у (U) Ы ы (Y)

Е е (E) М м (M) Ф ф (F) Ь ь (')

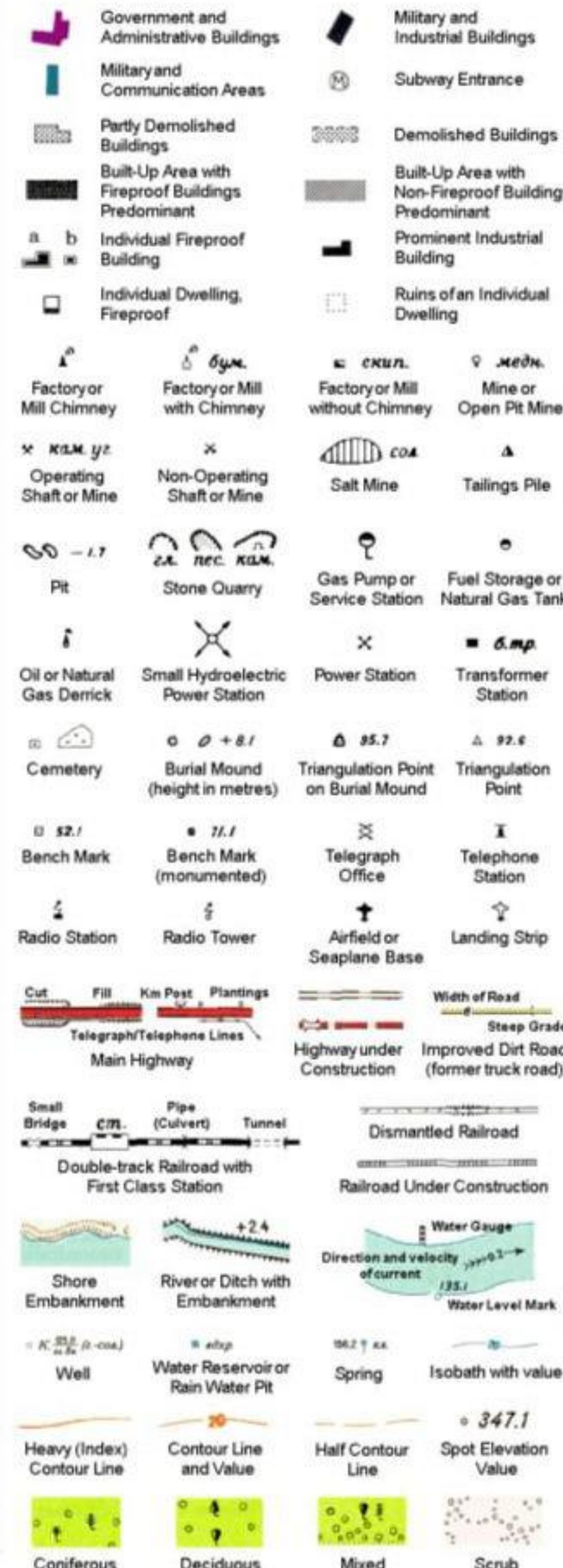
Ё ё (YO) Н н (N) Х х (KH) Э э (E)

Ж ж (ZH) О о (O) Ц ц (TS) Ю ю (YU or IU)

Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale



Key to Numbers on Mapping

SU70_Havant

No.	Description
7	Factory (Chemicals)
10	Post Office
15	Railway Station (Freight And Passenger)
16	Sewage Works
17	Sewage Works

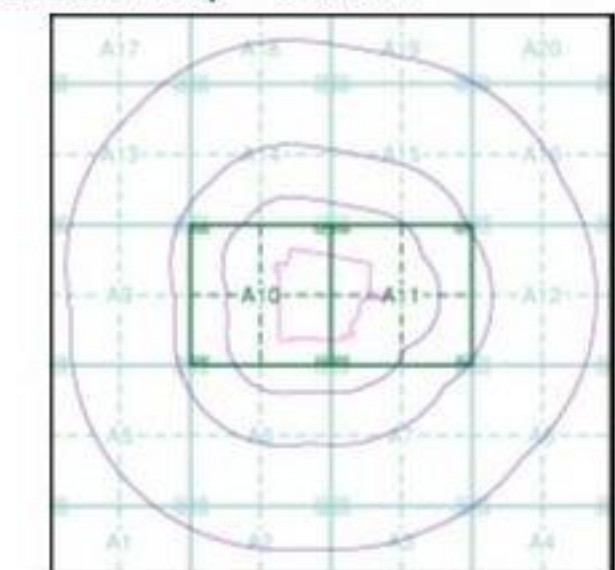
Envirocheck

LANDMARK INFORMATION GROUP

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
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Sussex	1:10,560	1879	4
Hampshire & Isle Of Wight	1:10,560	1898	5
Sussex	1:10,560	1899	6
Hampshire & Isle Of Wight	1:10,560	1909 - 1910	7
Sussex	1:10,560	1914	8
Sussex	1:10,560	1932	9
Hampshire & Isle Of Wight	1:10,560	1932	10
Hampshire & Isle Of Wight	1:10,560	1932	11
Sussex	1:10,560	1932	12
Sussex	1:10,560	1932	13
Hampshire & Isle Of Wight	1:10,560	1933	14
Hampshire & Isle Of Wight	1:10,560	1933	15
Hampshire & Isle Of Wight	1:10,560	1938 - 1942	16
Ordnance Survey Plan	1:10,000	1962 - 1963	17
Ordnance Survey Plan	1:10,000	1966	18
Ordnance Survey Plan	1:10,000	1972 - 1975	19
Ordnance Survey Plan	1:10,000	1982	20
Havant	1:25,000	1983	21
Portsmouth	1:10,000	1988	22
Ordnance Survey Plan	1:10,000	1990 - 1992	23
10K Raster Mapping	1:10,000	2000	24
10K Raster Mapping	1:10,000	2006	25
VectorMap Local	1:10,000	2019	26

Russian Map - Slice A



Order Details

Order Number: 203439487_1_1
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 National Grid Reference: 471300, 105700
 Slice: A
 Site Area (Ha): 16.11
 Search Buffer (m): 1000

Site Details

Hydroco, Langstone Technology Park 2b, Langstone Road, HAVANT, PO9 1SA

Landmark
 INFORMATION GROUP

Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

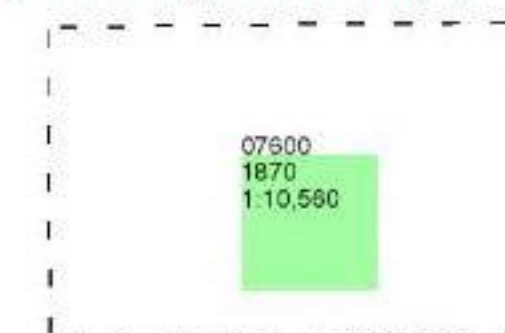
Hampshire & Isle Of Wight

Published 1870

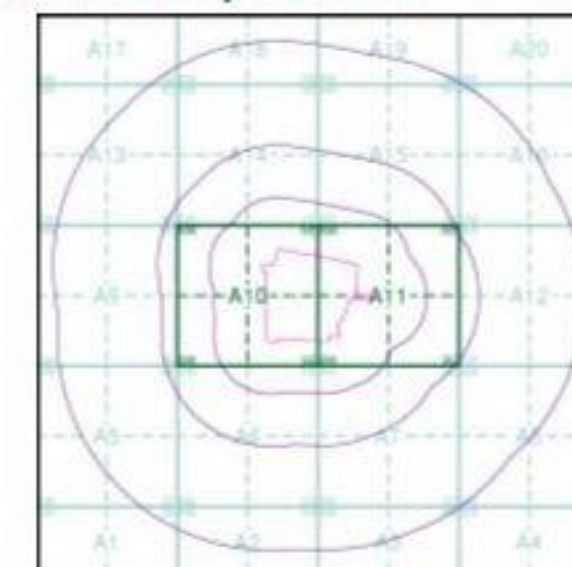
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A

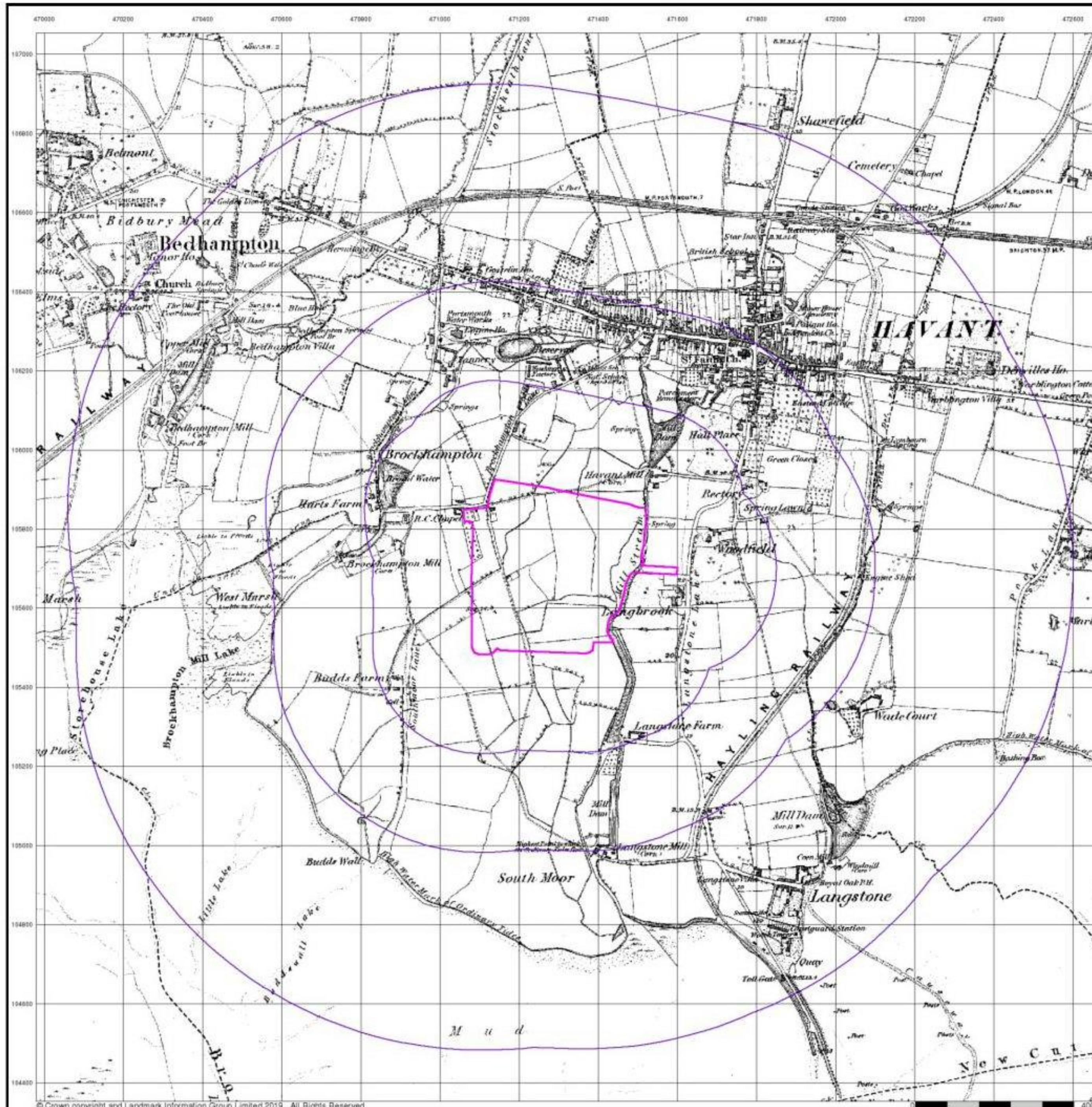


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Site Details

Hydroco, Langstone Technology Park 2b, Langstone Road, HAVANT, PO9 1SA



Sussex

Published 1879

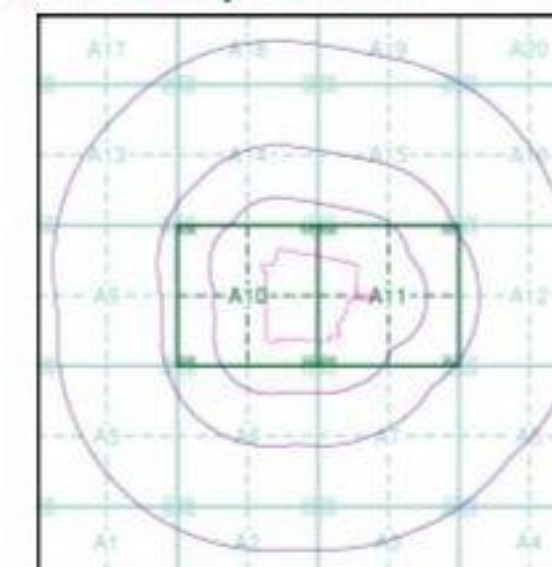
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Map Name(s) and Date(s)



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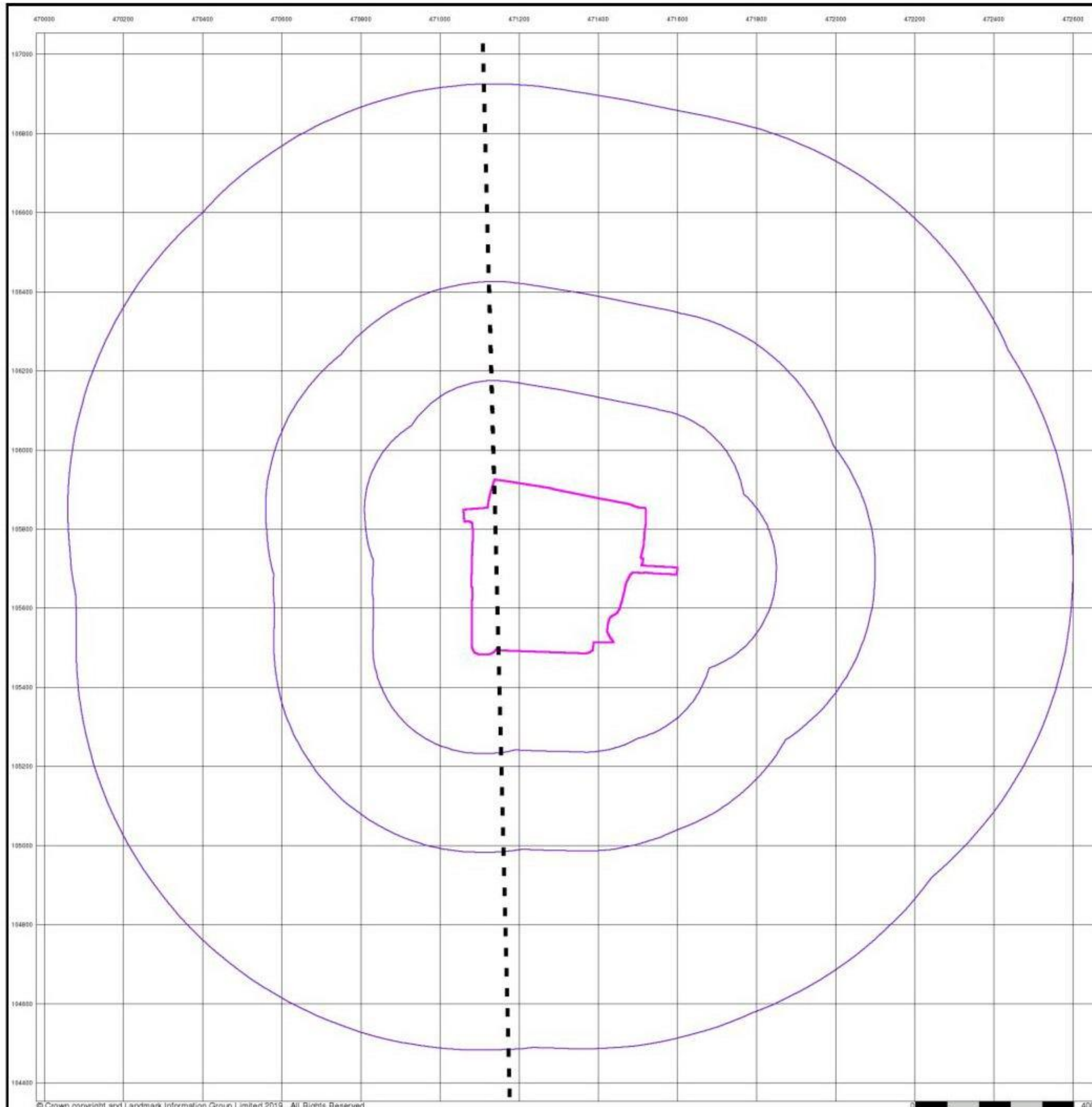


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Site Details

Hydroco, Langstone Technology Park 2b, Langstone Road,
 HAVANT, PO9 1SA



Hampshire & Isle Of Wight

Published 1898

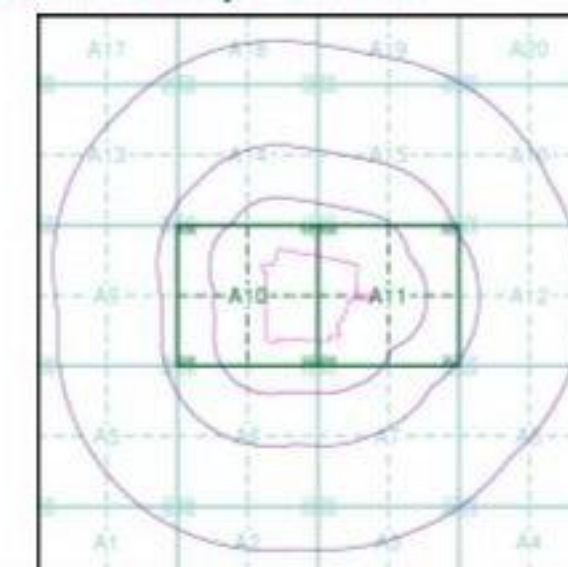
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Map Name(s) and Date(s)

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076SW 1898 1:10,560	076SE 1898 1:10,560

Historical Map - Slice A

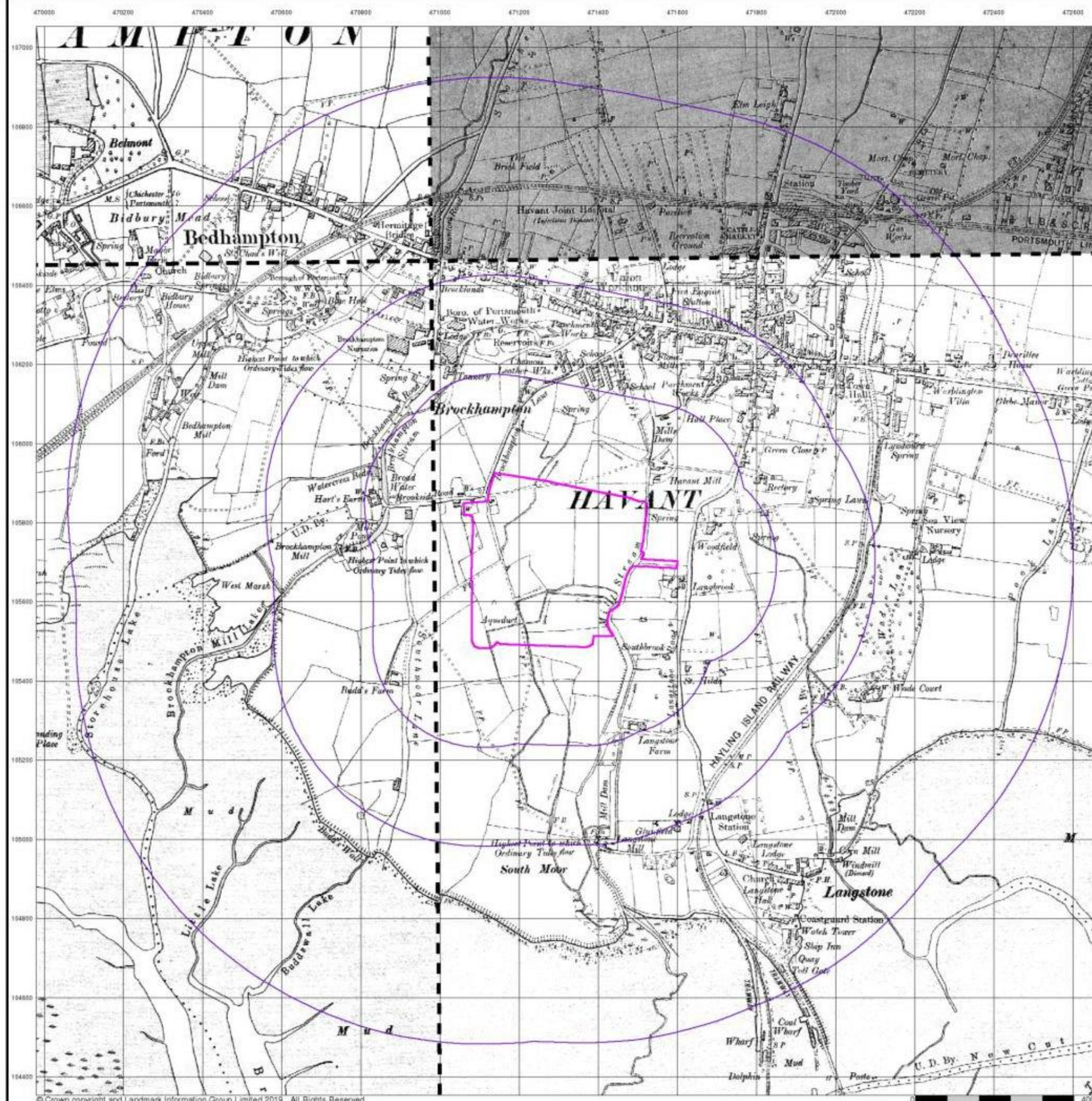


Order Details

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 Search Buffer (m): 1000

Site Details

Hydroco, Langstone Technology Park 2b, Langstone Road,
 HAVANT, PO9 1SA



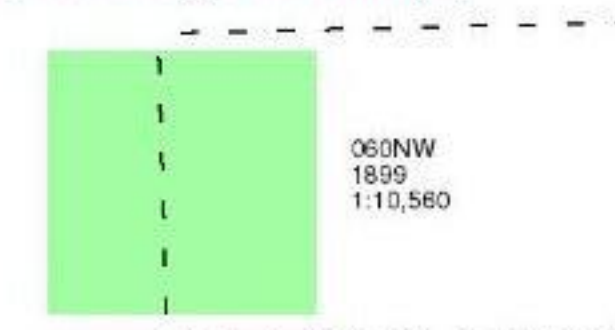
Sussex

Published 1899

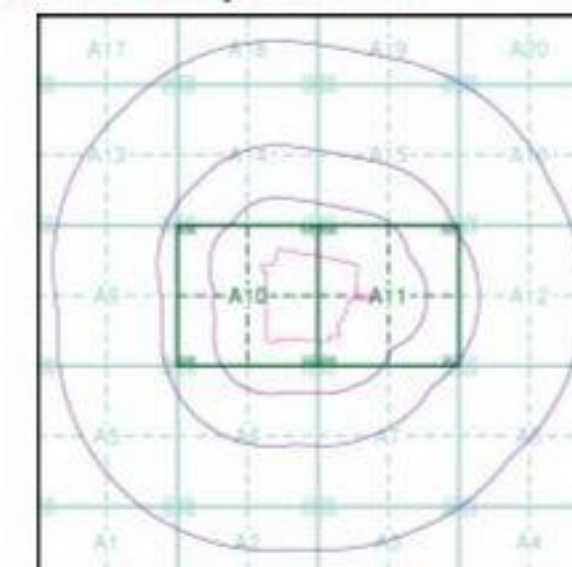
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Map Name(s) and Date(s)



Historical Map - Slice A

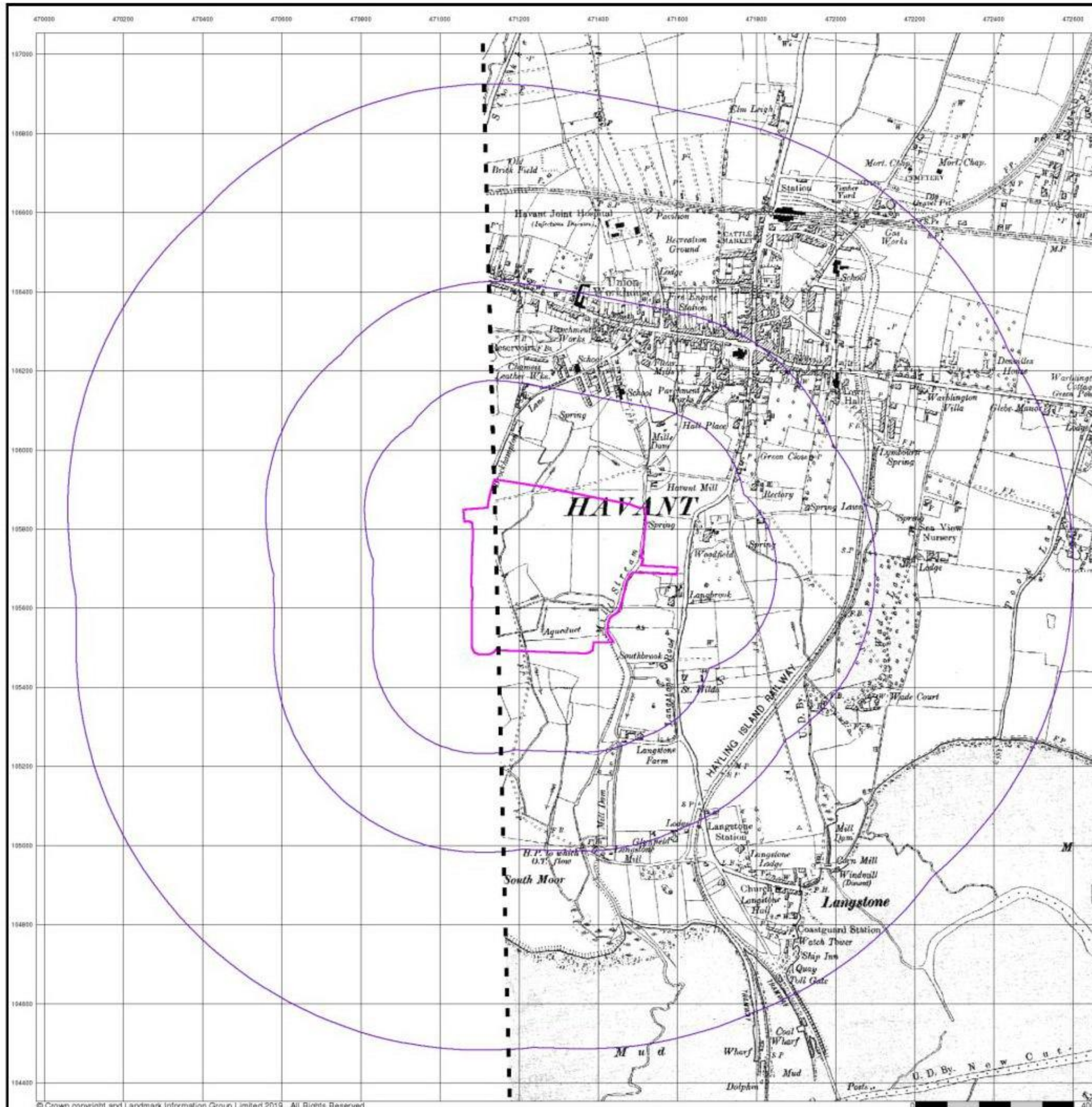


Order Details

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National Grid Reference: 471300, 105700
Slice: A
Site Area (Ha): 16.11
Search Buffer (m): 1000

Site Details

Hydroco, Langstone Technology Park 2b, Langstone Road, HAVANT, PO9 1SA



Hampshire & Isle Of Wight

Published 1909 - 1910

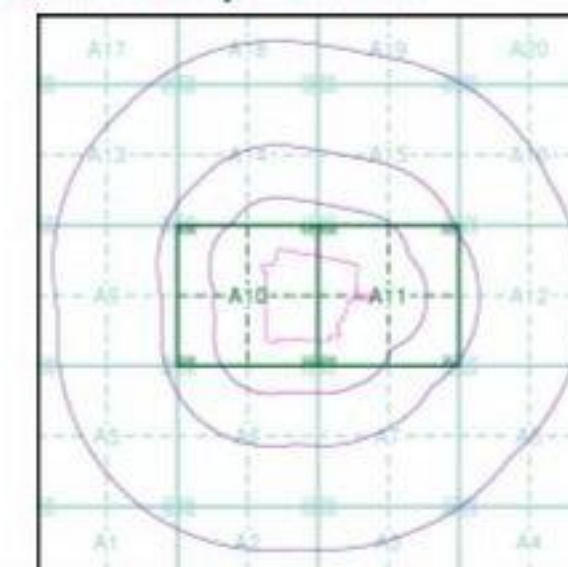
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Map Name(s) and Date(s)

076NW 1909 1:10,560	076NE 1910 1:10,560
076SW 1910 1:10,560	076SE 1910 1:10,560

Historical Map - Slice A



Order Details

Order Number: 203439487_1_1
Customer Ref: 19-0687.01
National Grid Reference: 471300, 105700
Slice: A
Site Area (Ha): 16.11
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