Proposed New Entrance Complex
Omega 1

Geo-Environmental Assessment

For

Morgan Sindall plc

Report ref	Issue	Prepared by	Date	Reviewed by	Date
13084	1	A Bradley	30.07.14	A Coverdale	30.07.14

Client:

Morgan Sindall plc
Nelson House
No 2 George Mann Way
Hunslet
LS10 1DR

3e Consulting Engineers Ltd
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel : 01924 240420

Proposed New Entrance Complex
Omega 1

CONTENTS

Figures

Appendices

Executive Summary

Site Investigation	The investigation has involved: • A review of desk study information. • 5 mini percussion boreholes to a maximum depth of 2.2m. • 6 trial pits to a maximum depth of 2.4m. • Infiltration testing • Installation of ground gas monitoring wells. • Geotechnical and contamination related testing. • Ground gas and groundwater monitoring.
Site History	The site comprised open land until the redevelopment and extension of the Wireless Station in the late 1970s or 1980s. Within the surrounding area, land uses have been wireless station and residential properties.
Current Use	The development area is currently open land used for grazing and the southern part of the current MOD establishment within security fences.
Environmental Setting	• Geological information indicates that there are no superficial deposits present on the site. The solid geology beneath the site is indicated to be the Lower Calcareous Grit Formation (sandstone). • Site does not lie in a flood risk area. • There are no landfill sites is recorded within 250m. • The nearest recorded watercourse is some 600m north east. • The underlying strata are classified as a Principal Aquifer. • There are 2 licensed groundwater abstractions within 1000m. This is for domestic and farming use. • There are no one discharge consents within 250m. • Radon protection measures are required for future developments. • There are no Pollution and Prevention Controls within 500m.
Ground Conditions	Made Ground was encountered to depths of between 0.20m and 1.0m, and comprised topsoil with gravel of brick, concrete or glass (BH1 to BH5, TP2, TP3, TP5 and TP6) or limestone hardcore (TP1 and TP4). The made ground is generally underlain by medium dense and locally loose gravelly sand/silty sand overlying weathered sandstone comprising very sandy gravel and cobbles of sandstone. Weathered bedrock comprising very weak to weak sandstone was encountered in all locations.
Groundwater	During both the intrusive works and the preliminary gas monitoring visits, no groundwater was encountered on the site.
Gas Monitoring	Ground gas monitoring has been carried out on 2 occasions to date. A further two visits are planned. The preliminary gas monitoring results indicate that combustible ground gas (methane) is not present and carbon dioxide is present at levels slightly in excess of 5% in BH3. The results suggest a CIRIA C665 Characteristic Situation 2.

Contamination	The intrusive works identified generally made ground to depths of between 0.20m and 1.0m, and comprised reworked topsoil or limestone hardcore. No physical evidence of contamination or asbestos was encountered. The results of the laboratory chemical analysis on samples of made ground recorded that none of the samples were elevated above the generic assessment criteria for a commercial end use. The contamination assessment and conceptual site model indicates that there is a negligible risk to human health and a negligible risk to the wider environment from contamination on the site.
Appraisal	Remediation – Based on the results of the investigation, remediation is not considered necessary for the proposed development. Mining – The site is considered to be stable with respect to coal mining. Building near trees - A number of trees were located within and in the vicinity of proposed structures. Based on the soils being locally classified as having a low plasticity, heave precautions are considered to be required for the structures. All roots within the base of excavations should be removed. Foundations – Traditional pad and strip foundations are considered suitable for the proposed development. With respect to the underlying gravelly or silty sand encountered in all boreholes in the vicinity of the buildings, an allowable bearing capacity of 100kN/m^2 is considered appropriate for the new gatehouse, however, in the vicinity of the proposed DGS structure an allowable bearing capacity of 45kN/m^2 should be assumed on the loose gravelly sand. The shallow weathered bedrock is considered to have an allowable bearing capacity of 200kN/m^2. Floor Slab - A cast in-situ suspended floor slab is recommended based on the requirements of the ground conditions encountered on the site. External Works – A CBR value of 2% should be adopted for pavement design on the natural granular soils, following proof rolling and suitable treatment of soft spots. Surface Water Disposal - Based on the findings of the ground conditions encountered and the results of the infiltration testing, the disposal of surface water by soakaway is considered suitable within the weathered sandstone bedrock with an assumed permeability rate of 4.5 x 10^{-5} m/s. Gas precautions – Basic gas protection measures are considered necessary, subject to further gas monitoring visits. Sulphate attack on buried concrete – The results of the chemical analyses indicate a BRE Special Digest 1:2005 Design Sulphate Class DS-1 with an ACEC site classification AC-3z for the made ground and Design Sulphate Class DS-1 with an ACEC site classification AC-2z for the natural soils. Buried concrete should be designed accordingly.

1 INTRODUCTION

1.1 3e Consulting Engineers Ltd (3e) were commissioned by Morgan Sindall plc to carry out a geo-environmental assessment for a proposed new entrance complex including gatehouse and car park at Omega 1. The site comprises a defence establishment and neighbouring agricultural land. The existing site features and proposed are provided in **Appendix A**.

1.2 The objectives of this assessment were:

- To carry out a review of environmental, geological and historical information pertaining to the site.
- To investigate near surface soil and groundwater conditions.
- To determine the potential risks posed by any ground or groundwater contamination and provide recommendations on remedial measures to manage such risks.
- To assess the risk posed by hazardous ground gas.
- To provide advice relating to geotechnical issues associated with the site.
- To provide foundation recommendations.

1.3 Fieldwork was undertaken on the 3rd July 2014 and comprised the excavation of five mini percussive boreholes to 2.22m depth and six machine excavated trial pits to 2.4m depth with associated sampling, testing and monitoring. Soakaway tests were carried out in two of the trial pit to provide an assessment of the infiltration rate at the site for surface water disposal.

1.4 This report presents the factual information available during this appraisal, interpretation of the data obtained and recommendations relevant to the scope of works outlined above.

1.5 The production of this report is based on the assumption that the site will continue to be used for commercial activities.

1.6 The comments and opinions presented in this report are based on the findings of the intrusive investigation carried out by 3e and the results of laboratory analysis. Responsibility cannot be accepted for any conditions not revealed by this investigation and which have not

been taken into account by this report. Any diagram or opinion relating to site geology, contamination or other spatially variable features between or beyond investigation positions is conjectural and provided for guidance only. Confirmation of ground conditions between exploratory holes should be undertaken if deemed necessary. Evaluation of ground gas and groundwater is based on observations made at the time of the investigation and any monitoring visits, but it should be noted that levels and quality may vary due to seasonal and other effects.

1.7 This report has been prepared for the sole use of Morgan Sindall plc. No other third party may rely upon or reproduce the contents of this report without the written approval of 3e. If any unauthorised third party comes into possession of this report, they rely on it entirely at their own risk and 3e do not owe them any Duty of Care or Skill.

2 THE SITE

Location and Description

2.1 The site, centred on National Grid Reference 501230, 486680, is located approximately 3.5km south west of Scarborough town centre. The site occupies an area of 1.60Ha, is roughly rectangular in shape.

2.2 Land uses in the immediate vicinity of the site are summarised below:

North : MOD property

East : Open Land

South : Residential properties, caravan park and farm buildings

West : Un-named road with open land beyond

2.3 The development area is currently open land used for grazing and the southern part of the current MOD establishment within a security fence. An access road, leading off the highway to the west which marks the southern boundary of the site area.

2.4 During the investigations, evidence of potential contamination sources was not encountered.

2.5 A location plan is provided as **Figure 1**.

3 SITE HISTORY

3.1 In order to establish the site's history, an inspection of historical maps dating between 1854 and 2014 and obtained as part of an Envirocheck report has been made (Ref. 5781467_1_1 dated 30 June2014). A summary of the information is provided below and a copy of the maps is included as **Appendix B**.

Map Dates	On-Site Features	Relevant Off-Site Features within 250m
1854 – 1970	Open land.	Un named road adjacent to west, 'Racecourse Plantation' indicated adjacent to south. Numerous small building indicated 100m to north by1953.
1970- 1989	No significant change.	Wireless Station indicated 100m to north. Residential properties indicated to south.
1989 - present	Security fence crossing northern part of site.	Current building layout of Wireless Station indicated.

3.2 In summary, the site comprised open land until the redevelopment and extension of the Wireless Station in the late 1970s or 1980s.

3.3 Within the surrounding area, land uses have been a wireless station and residential properties.

3.4 Significant contamination is not anticipated based on the generally agricultural land use.

4 ENVIRONMENTAL SETTING

4.1 This section is based principally upon a search of information available on public registers through an Envirocheck search (Reference 5781467_1_1) included as **Appendix C**, together with other sources as indicated.

Geology and Mining

4.2 A summary of the site geology, based on available published information, is provided below.

Sources of Information	British Geological Survey (BGS) maps: Scarborough, Sheet 54, 1:50 000 scale, Solid Edition. BGS borehole records local to the site (within 50m). Previous investigation at locality. The Coal Authority Interactive Viewer.
Made Ground	None recorded although given the previous developments and enabling works some made ground is anticipated.
Superficial Deposits (drift)	None recorded
Solid Geology	BGS records indicate Lower Calcareous Grit Formation - sandstone strata beneath the site. BGS borehole records indicate shallow bedrock at depths of between 0.3m and 0.8m. This comprises weather sandstone which was excavated as gravel in the upper margins. The previous investigation at the site indicate similar ground conditions with sandstone present at depths less than 1m.
Mining	The site does not lie in an area where a Coal Authority report is necessary.
Quarrying	None indicated within 500m.

Hydrology and Hydrogeology

4.3 A summary of available information pertaining to hydrology, hydrogeology, flood risk potential, water abstractions, discharge consents and pollution incidents to controlled waters is provided below.

Watercourses	The nearest watercourse is an un named stream flowing to the NE recorded 600m north east.
Flood Risk	The site does not lie within a fluvial flood plain considered to be at risk of flooding.
Groundwater Classification	Solid Geology: Principal Aquifer. Superficial Geology: Not recorded.
Source Protection Zones	The site lies in Zone II of a source protection zone; the Zone III inner protection zone lies 250m to the south west.
Springs	NR.
Wells	NR.
Licensed Surface Water Abstractions	1 within 1000m, approximately 860m to north for domestic use.
Licensed Groundwater Abstractions	1 within 1000m, approximately 870m north for farming and domestic use.
Discharge Consents	NR.
Pollution Incidents	NR.

NR – None Recorded within 250m unless indicated otherwise.

Landfill Sites and Waste Management

4.4 A summary of information regarding landfill sites (historical or current) and waste management facilities is provided below.

Local Authority Recorded Landfills	NR
BGS / EA Recorded Landfills	NR
Other Waste Management Facilities	NR

Pollution Controls and Industrial Land Use

4.5 A summary of Pollution Control records and potentially polluting activities (fuel stations) is provided on the following table.

Integrated Pollution Controls (IPC)	NR
Integrated Pollution Prevention and Control (IPPC)	NR
Pollution Prevention and Controls (PPC)	NR
Petrol Filling Stations	NR

NR – None Recorded within 250m unless indicated otherwise.

Radon

4.6 Inspection of the BRE publication BR211 (2007), "Radon: Guidance on protective measures for new buildings" indicates that the site lies in an area where basic radon protection measures are required.

Other

4.7 Other sensitive land uses or potentially contaminative activities are listed below. The entries relate to activities within approximately 250m of the site.

- No other contaminative activities recorded.

5 CONCEPTUAL SITE MODEL

5.1 Based on the available desk study information, a conceptual site model (CSM) has been developed for the proposed end use (industrial/commercial). This summarises the understanding of the existing site and its historical development, the site geology, the potential contaminant sources, transport pathways and receptors in order to assess potential pollutant linkages. In assessing the potential contaminants present at the site, reference has also been made to the relevant sections of CLR 8, the Department of the Environment Industry Profile reports and any other relevant supporting documentation.

5.2 It is proposed to construct an new gate house complex and car park for the MOD establishment as shown on the outline site plan in **Appendix A**.

Sources of Contamination

- Imported made ground associated with the previous/existing development.

Potential Pollution Pathways

- Humans: direct contact, soil ingestion and dust inhalation.
- Controlled waters: Lateral and vertical migration of leachable/mobile contamination.
- Adjacent Properties: Lateral migration of leachable/mobile contamination.

Receptors

- Site end users.
- Construction workers.
- Underlying Principal Aquifer.
- Nearby property.

Pollutant Linkage Assessment

5.3 A qualitative risk assessment has been made of the likelihood of any pollutant linkage operating and its potential significance, as summarised in the table below:

Contamination Source	Pathway	Hazard	Potential Receptors	Linkage Complete
Contaminants associated with made ground on site	Direct contact, ingestion and dust inhalation	Human health risk	Site construction workers	Yes. However, significant contamination is not anticipated and the risk can be removed by the use of appropriate PPE and limited exposure.
			Site end users	Unlikely as the proposed development will comprise a majority of hardstanding which will break the pathway to end users.
	Vertical or lateral migration	Leaching of contamination in relatively impermeable soils	Principal Aquifer	Yes, although significant contamination is not anticipated.
	Lateral migration	Leaching of contamination in permeable soils.	Adjacent properties and controlled waters	Yes, although significant contamination is not anticipated.

5.4 At this stage, it is considered unlikely that the site will be significantly contaminated.

6 ENVIRONMENTAL RISK ASSESSMENT

6.1 The potential environmental risk has been assessed based on the 'source-pathway-target' pollutant linkages identified in the Conceptual Site Model, which requires that for a liability to arise each stage of the pollutant linkage must be present. References to risk classifications are made according to the following definitions:

- **Low risk** – it is unlikely that an issue will arise with respect to causing significant harm to human health or controlled waters.

- **Medium risk** – it is possible that an issue could arise with respect to causing significant harm to human health or controlled waters.

- **High risk** – it is likely that an issue will arise with respect to causing significant harm to human health or controlled waters.

6.2 Having evaluated the information gathered during this study and described in the previous sections the following risk assessment has been produced.

ENVIRONMENTAL RISK ASSESSMENT		
	Risk rating	**Reason**
Contamination potential for:		
On-site contamination	Low	Made ground is potentially present associated with previous/current site use, however, significant contamination is not anticipated.
Contaminants migrating off site	Low	Significant contamination is not anticipated.
Contaminants migrating onto site	Low	Surrounding land use is commercial and residential with limited contaminative sources or activities.
Other environmental issues giving rise to concern	Low	None identified.
Environmental consequences:		
Pollution of controlled waters	Low	Significant contamination is not anticipated.
Harm to human health	Low	Unlikely that significant quantities of contamination exist on site. The site will be covered with hardstanding and buildings.
OVERALL RISK	**Low**	

Ground Gas Risk Assessment

6.3 Based on the above information gained through the Envirocheck report, the risk of ground gas emissions is considered to be low. The following summarises the gas risk for the site:

Potential Gas Source	Hazard	Risk Rating	Justification
Offsite sources (CH_4, CO_2)	Humans: health risk Buildings: explosion	Low	No landfill sites recorded in vicinity.
Made ground on site (CH_4, CO_2)	Humans: health risk Buildings: explosion	Low	Made ground is potentially present associated with previous/current sit use, significant made ground is not anticipated and this is unlikely to be putrescible.
Alluvial Deposits (CH_4, CO_2)	Humans: health risk Buildings: explosion	N/A	No drift deposits recorded
Coal and historical mining	Humans: health risk Buildings: explosion	N/A	Site is not in an area of coal mining.
Radon	Humans: health risk	Moderate	Basic precautions required for development.
Overall Risk		**Low to Moderate**	

7 METHOD OF INVESTIGATION

Fieldwork

7.1 The intrusive works comprised five mini percussive boreholes sunk to a depth of 2.22m below ground level (bgl) and six trial pits excavated to a maximum depth of 2.4m bgl. on the 3rd July 2014. The boreholes were located within or close to the footprint of the proposed new buildings, making allowance for buried utilities and existing security fence.

7.2 The trial pits were excavated to provide an assessment of the shallow soil profile and to allow samples to be recovered for geotechnical and contamination related analysis. In addition, infiltration tests were carried out in two of the trial pits to assess the suitability of soakaways for surface water disposal.

7.3 The boreholes were sunk in order to determine the soil profile and to allow ground gas and groundwater monitoring wells to be installed. Disturbed samples were recovered as appropriate for soil descriptions and laboratory testing. Standard penetration tests (SPT) were carried out to provide an assessment of the insitu strength of the cohesive strata and the relative density of the granular made ground and natural deposits.

7.4 The gas/groundwater monitoring wells, comprising slotted 19mm diameter HDPE pipe set within a granular filter, were installed in two boreholes to a depth of between 2.0m and 2.1m. The wells were sealed at the surface using bentonite and a lockable cover was fitted at the surface. To date, the wells have been monitored on two occasions between 18th and 25th July 2014 for methane, carbon dioxide and oxygen using a portable infra-red gas monitor. The rate of gas flow from the boreholes was also recorded using a portable flow meter and the groundwater levels were recorded using a portable dip meter. A further two gas monitoring visits are planned and the full set of results together with final recommendations for gas protection measures will be issued as an addendum to this report.

7.5 The locations of the boreholes are shown in **Figure 2** (Exploratory Hole Location Plan).

7.6 Fieldwork and soil descriptions were carried out in general accordance with BS5930:1999, "Code of Practice for Site Investigations".

Laboratory Chemical Testing

7.7 In order to provide a preliminary assessment of contamination, six samples of made ground soil were screened for the following determinands:

- Arsenic
- Boron
- Cadmium
- Chromium
- Lead
- Mercury
- Nickel
- Selenium
- Copper
- Zinc
- Speciated polyaromatic hydrocarbons (PAH)
- Water soluble sulphate
- pH
- Total organic carbon (TOC)
- Organic Matter Content
- Asbestos

7.8 In addition, 8 samples of the underlying natural soil were scheduled for water soluble sulphate and pH determinations to assess the potential for sulphate attack on buried concrete.

7.9 The analyses were carried out at an MCERTS registered and UKAS accredited laboratory.

7.10 The results of the chemical test results are included as **Appendix G**.

Laboratory Geotechnical Testing

7.11 Geotechnical related testing was carried out to determine the physical characteristics of the soils and comprised the following:

- Three dry density moisture content relationship test tests to classify soils and assist with earthworks assessment;
- Three laboratory remoulded CBR tests to determine the strength of potential sub grades to pavements and hardstandings;
- Three particle size determinations were carried out to assist with classification of the granular soils;
- Eight Atterberg limits determinations to confirm field descriptions and classify cohesive soils.

7.12 The results of the geotechnical test results are included as **Appendix H**.

8 RESULTS OF THE INVESTIGATION

Soil Profile

8.1 Detailed descriptions of the materials encountered together with observations of groundwater behaviour, the results of insitu testing and sampling information are given on the exploratory hole records included as **Appendix D**. A summary of the ground conditions encountered is presented below:

Made Ground

8.2 Made Ground was encountered to depths of between 0.20m and 1.0m, and comprised topsoil with gravel of brick, concrete or glass (BH1 to BH5, TP2, TP3, TP5 and TP6) or limestone hardcore (TP1 and TP4).

Natural Deposits

8.3 The made ground is generally underlain by medium dense and locally loose gravelly sand/silty sand overlying weathered sandstone comprising very sandy gravel and cobbles of sandstone. Weathered bedrock comprising very weak to weak sandstone was encountered in all locations.

8.4 SPT N values varied between N8 and N29 within the silty or gravelly sand deposits and between N25 and N52 within the sandstone bedrock.

Groundwater

8.5 During both the intrusive works and the preliminary gas monitoring visits, no groundwater was encountered on the site.

8.6 It should be noted that groundwater levels vary seasonally and that a higher water table than recorded could occur.

Infiltration Testing

8.7 Infiltration tests were carried out in TP4 and TP6 where granular soils, including weathered bedrock was encountered at shallow depth. Three tests were carried out in the

weathered bedrock of TP4 which recorded infiltration rates between 4.56×10^{-5} m/s and 7.28×10^{-5} m/s. Within shallow silty sand in TP6 only a single test was performed which recorded an infiltration rate of 1.27×10^{-5} m/s. The results of the tests are enclosed in **Appendix E**.

8.8 Based on the results of the testing the calculated infiltration rate for soakaway design is 4.5×10^{-5} m/s founded within the weathered bedrock.

Physical Evidence of Contamination

8.9 No physical evidence of contamination was encountered.

8.10 No asbestos was visually identified during the investigation.

Gas Monitoring

8.11 The results of the preliminary ground gas monitoring visits carried out on 18th and 25th July 2014 are presented in **Appendix F** and summarised in the following table:

Location	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	Flow (l/hr)	Barometric Pressure Range (mb)	Maximum GSV* (l/hr)	
						CH_4	CO_2
BH1	0.0-0.1	4.1-4.3	16.8-17.3	0.0	1005-1009	<0.07	<0.07
BH3	0.0-0.1	5.1-5.7	16.4-16.6	0.0	1005-1009	<0.07	<0.07

* CIRIA 665 Gas Screening Value

8.12 In summary, combustible ground gas was not detected and carbon dioxide was recorded in excess of 5% in BH3. No flow was detected during the monitoring and CIRIA Gas Screening Value (GSV) were less than 0.07l/hr, indicating CIRIA C665 Characteristic Situation 2 (based on elevated carbon dioxide).

Contamination Related Testing

8.13 The results of the contamination related testing undertaken on four samples of made ground and two samples of natural soil are included as **Appendix G**. Generally, the results have been assessed using guidelines introduced by DEFRA in 2002 and 2009 (where

applicable) and by the joint Land Quality Management Ltd (LQM) and Chartered Institute of Environmental Health (CIEH), 2009.

8.14 The CLEA guidelines include Soil Guidelines Values (SGVs) appropriate to standard land uses. SGVs are currently available for a limited number of metalloid and organic contaminants and provide generic assessment criteria for assessing the risk to human health. The LQM/CIEH guidelines include Generic Assessment Criteria (GAC) appropriate to standard land uses and applicable to a wider range of both inorganic and organic contaminants. The proposed development is for a new entrance complex including gatehouse and car park at Omega 1, therefore, the most appropriate values are considered to be the SGVs and LQM/CIEH GACs given for a commercial end use. An SOM of 1% has been used in the assessment.

8.15 A summary of the contamination related testing is presented below.

MADE GROUND SOILS					
Determinand	Maximum conc. mg/kg	Minimum conc. mg/kg	No of Samples Tested	Generic Assessment Criteria (GAC) mg/kg	No of Samples Exceeding GAC
Arsenic	13	9.2	6	640(1)	0
Boron	1	<0.5	6	192000(2)	0
Cadmium	0.2	<0.2	6	230(1)	0
Chromium	88	59	6	30,400(1)	0
Lead	46	33	6	750(1)	0
Mercury	<0.5	-	6	3600(1)	0
Selenium	1.1	0.8	6	13000(1)	0
Copper	14	6.7	6	71,700(2)	0
Nickel	17	8.4	6	1800(1)	0
Zinc	95	30	6	665,000(2)	0
Total PAH					
Naphthalene	0.1	<0.1	6	480(2)	0
Flourene	<0.1	-	6	69000(2)	0
Benzo(a)pyrene	0.11	0.03	6	14(2)	0
Dibenz(ah)anthracene	0.03	<0.01	6	13(2)	0

Notes:
(1) CLEA soil guidance value for commercial/industrial end use
(2) LQM/CIEH GAC for commercial/industrial end use

8.16 Of the determinands tested none were elevated above the generic assessment criteria for a commercial end use.

Asbestos

8.17 None of the three samples of made ground screened for asbestos detected any fibres.

Sulphate and pH Determinations

8.18 Within the made ground, water soluble sulphate concentrations varied between 29mg/l and 15mg/l with pH values between 5.2 and 6.3. Within the natural soils water soluble sulphate concentrations ranged between <10mg/l and 31mg/l with pH values between 5.2 and 8.4. These indicate a BRE Special Digest 1:2005 Design Sulphate Class DS-1 with an ACEC site classification AC-3z for the made ground and Design Sulphate Class DS-1 with an ACEC site classification AC-2z for the natural soils.

Modified Site Conceptual Model

Sources of Contamination

8.19 From the information gathered during the desk study, it was concluded that the only potentially contaminative sources include imported made ground on the site from the existing development.

8.20 The intrusive works identified generally made ground to depths of between 0.20m and 1.0m, and comprised topsoil with gravel of brick, concrete or glass (BH1 to BH5, TP2, TP3, TP5 and TP6) or limestone hardcore (TP1 and TP4).

8.21 No physical evidence of contamination or asbestos was encountered.

8.22 The results of the laboratory chemical analysis on samples of made ground recorded that none of the samples were elevated above the generic assessment criteria for a commercial end use.

8.23 The results of the preliminary ground gas monitoring indicate that methane is not present and carbon dioxide is present at levels in excess of 5%. Gas screening values are less than 0.07l/hr throughout indicating CIRIA C665 Characteristic Situation 2. Further gas monitoring is planned and the final set of results will be issued as an addendum to this report.

Pathways and receptors

8.24 Based on the results of the laboratory chemical analysis, the risk to human health from contamination on the site is considered to be negligible.

8.25 With respect to potential environmental receptors, the following pathways are considered:

- Vertical migration to Principal Aquifer – Given the results of the chemical analysis the risk to the underlying Principal Aquifer is negligible.
- Lateral migration to surface waters – Given the distance to the surface water and lack of mobile groundwater, the risk is negligible.
- Adjacent property – Given the results of the chemical analysis the risk to adjacent property is considered to be negligible.

Pollutant Linkage Assessment

8.26 In view of the low determinand concentrations and the distance to any surface water receptors, the pollutant linkage assessment indicates that the site poses a negligible risk to humans and the wider environment.

Geotechnical Related Testing

Classification Tests

8.27 Eight Atterberg limits determinations were made on the shallow natural cohesive deposits at depths of between 0.3 and 1.0m. The results indicate plasticity indices of between 12% and 14%, indicative of clays of low plasticity and low volume change potential. Three samples retrieved from the site were recorded as non-plastic.

Dry Density and Moisture Content Relationship

8.28 Three bulk samples of the natural granular soils at depths of between 0.6m and 1.2m were scheduled for optimum.

Material Type and Source	Sample Location and Depth (m)	Maximum Dry Density (MDD) (Mg/m^3)	Optimum Moisture Content (OMC) (%)	Moisture Content Range at 95% Compaction (%)	Field Moisture Content (%)
Brown GRAVEL and COBBLES	TP01 0.9-1.2	1.83	14	17.0-20.0	16
	TP4 1.0	1.88	12	15.8-18.5	15
Brown gravelly SAND	TP04 0.6-0.8	1.84	14	16.5-19.5	15
Mean Value	-	**1.85**	**13.3**	**16.4-19.3**	**15.3**

8.29 Initial indications suggest that for the natural granular materials, the field moisture contents of the in-situ materials lie slightly above their optimum values and, hence, these materials can be regarded as being slightly dry of optimum.

California Bearing Ratio

8.30 CBR tests carried out on the near surface natural granular soils at between 0.6 and 1.0m depth in the proposed new car park gave remoulded CBR values of between 1.4% and 9.1%.

Particle Size Distribution

8.31 The results of the grading analyses undertaken on the shallow more granular natural soils indicate these materials to comprise very sandy slightly clayey gravel and slightly clayey sand and gravel, generally confirming the field descriptions. The proportion of fines passing the 63µm sieve was between 12% and 19%.

8.32 Results of the geotechnical laboratory testing are presented in **Appendix H**.

9 DISCUSSION

9.1 Development proposals are for a proposed new entrance complex including gatehouse and car park at Omega 1. This investigation was carried out primarily to provide geotechnical information with respect to foundations for the proposed developments. Contamination related testing has been carried out to provide a preliminary assessment to outline potential constraints on the development.

Contamination Assessment

9.2 Information obtained during the desk study indicated a low risk of contamination following enabling works for the current development. No physical evidence of significant contamination was encountered during the intrusive works and the results of the laboratory chemical analysis indicated no exceedences of the generic assessment criteria for human health.

9.3 Given the results of the laboratory analysis, and the distance to surface water receptors, the risk to the wider environment is considered to be negligible.

Remediation

9.4 Should landscaping be required a remedial capping layer in landscaped areas will be sufficient to break the latent pollutant pathway between the made ground and end users, with hardcover providing a pollutant break elsewhere. It is usual to use a capping layer 300mm, however, this will need to be agreed with the local authority.

9.5 In order to prevent the generation of dust, made ground should be dampened to allow suitable handling as precaution to prevent generation of dust and covered when stockpiled to prevent drying. In addition, if areas of made ground are trafficked by plant during construction then suitable precautions will be required to prevent dust generation.

Disposal of Materials

9.6 Waste classification testing has not been carried out, however, the results of the chemical analyses allow an initial assessment and suggest that generally, the made ground is suitable for disposal to an inert landfill.

9.7 It is recommended that the results of the investigation are made available to the waste carrier/receptor in order to determine costs for offsite disposal.

Water Supply Pipes

9.8 UKWIR analysis has not been undertaken as part of this assessment. Given the laboratory test results for made ground and natural soils on the site it is considered that no precautions are required. It is recommended that the results of this investigation are made available to the utility supplier to determine a suitable pipe material.

Mining Assessment

9.9 The site does not lie in an area where a Coal Authority report is necessary.

Building near trees

9.10 A number of trees were located within and in the vicinity of proposed structures. Based on the soils being locally classified as having a low plasticity, heave precautions are considered to be required for the structures. All roots within the base of excavations should be removed.

Foundations

9.11 The proposed development area is underlain by a thin layer of made ground comprising either gravelly topsoil or limestone hardcore. Underlying this made ground, up to a maximum of 1.95m is medium dense, locally loose gravelly or silty sand, overlying weathered sandstone bedrock encountered as sandy cobbles proven to 2.40m deep.

9.12 Traditional pad and strip foundations are considered suitable for the proposed development. With respect to the underlying gravelly or silty sand encountered in all boreholes in the vicinity of the buildings, an allowable bearing capacity of 100kN/m^2 is considered appropriate for the new gatehouse, however, in the vicinity of the proposed DGS structure an allowable bearing capacity of 45kN/m^2 should be assumed on the loose gravelly sand. The shallow weathered bedrock is considered to have an allowable bearing capacity of 200kN/m^2.

9.13 A cast in-situ suspended floor slab is recommended based on the requirements of the ground conditions encountered on the site.

Gas Protection Measures

9.14 Radon protection measures are required for the proposed development.

9.15 The results of the preliminary ground gas monitoring indicate carbon dioxide concentrations to be in excess of 5% in BH3, with a gas screening value (GSV) of less than 0.07l/hr throughout. CIRIA C665 Characteristic Situation 2 is considered suitable and basic gas protection measures are considered necessary. This recommendation is subject to revision following completion of the gas monitoring and issue of the gas monitoring addendum report.

External Works

9.16 A CBR value of 2% should be adopted for pavement design on the natural granular soils, following proof rolling and suitable treatment of soft spots.

Excavations and Dewatering

9.17 If man entry is proposed into excavations, the use of support to excavation sides is recommended, in line with health and safety guidelines.

9.18 Significant groundwater ingress into shallow excavations is not anticipated.

Disposal of Surface Water

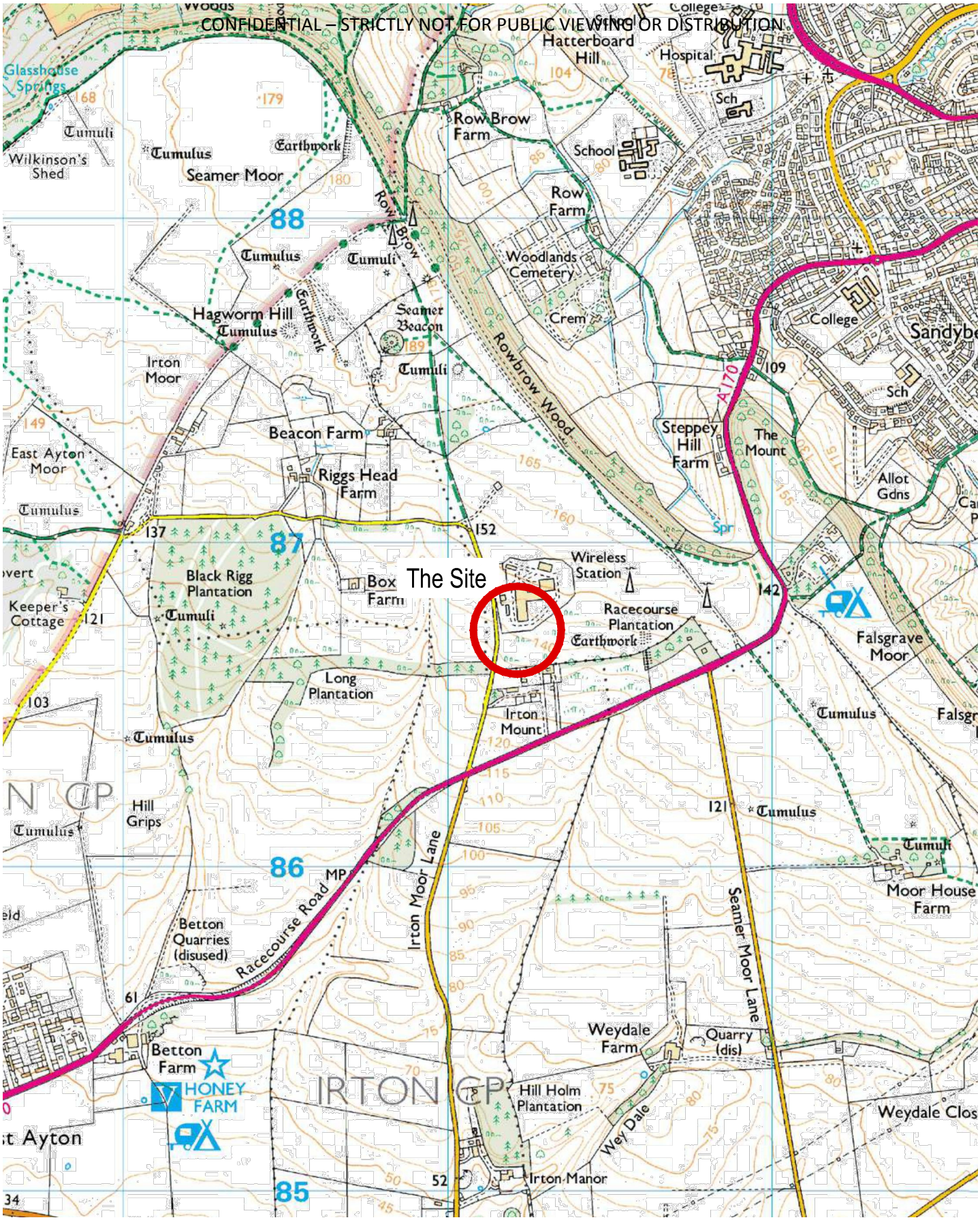
9.19 Based on the findings of the ground conditions encountered and the results of the infiltration testing, the disposal of surface water by soakaway is considered suitable within the weathered sandstone bedrock with an assumed permeability rate of 4.5×10^{-5} m/s within this strata.

Sulphate Attack on Buried Concrete

9.20 The results of the chemical analyses indicate a BRE Special Digest 1:2005 Design Sulphate Class DS-1 with an ACEC site classification AC-3z for the made ground and Design

Sulphate Class DS-1 with an ACEC site classification AC-2z for the natural soils. Buried concrete should be designed accordingly.

Figures



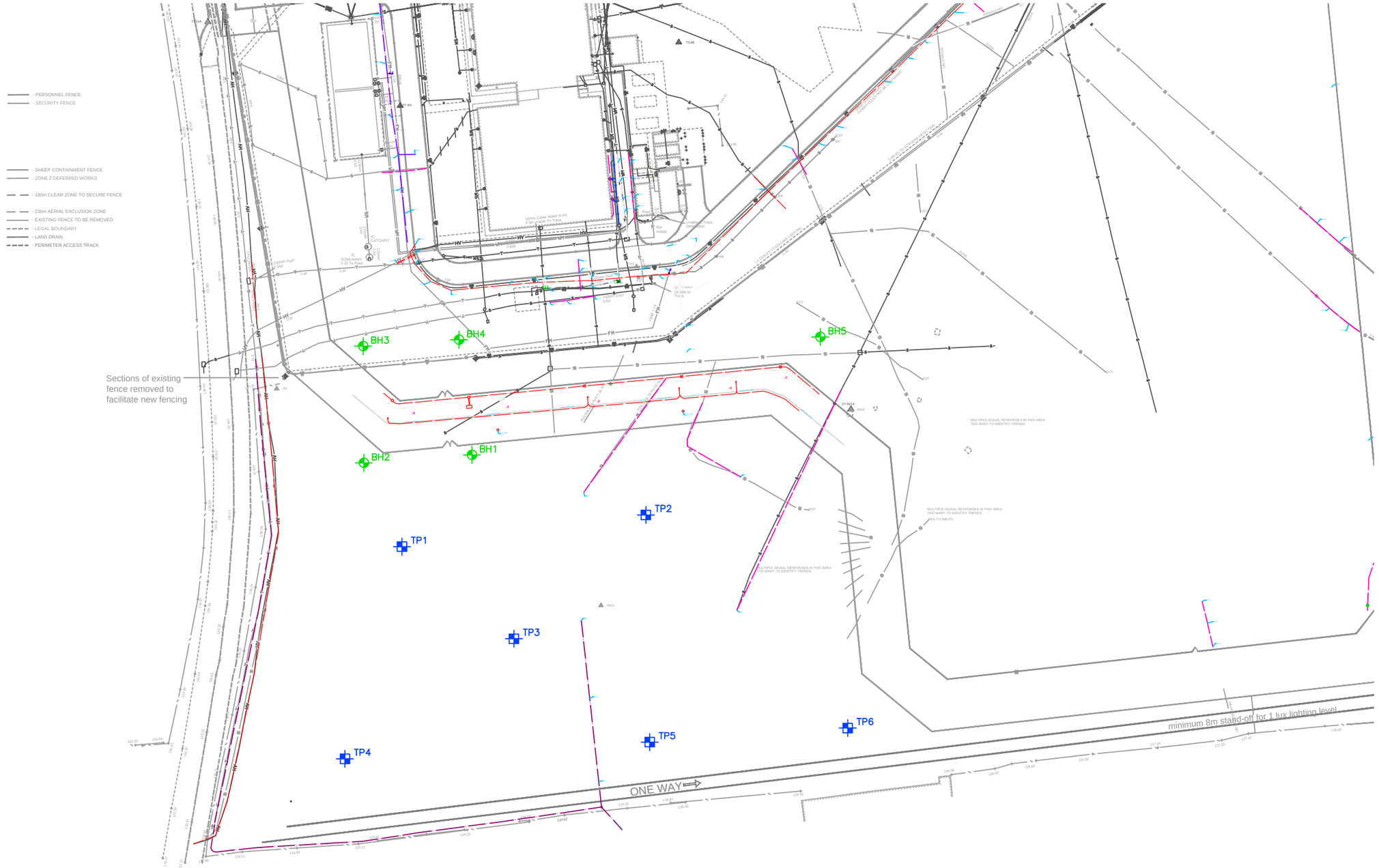
consulting engineers

4, Calder Close
Calder Park
Wakefield
WF4 3BA

tel: 01924 240 420
fax: 019924 240 421

www.3econsult.com

Project	PROPOSED NEW ENTRANCE, OMEGA 1 FOR MORGAN SINDALL		
Title	SITE LOCATION PLAN		
Scale 1:25,000	Drawn AHC	Checked AP	Date JULY '14
Job No. 13084	Drawing No. FIGURE 1		Rev 0



TP1 MACHINE EXCAVATED TRIAL PIT LOCATION

BH1 WINDOWLESS SAMPLE BOREHOLE LOCATION

consulting engineers

4 Calder Close,
Calder Park
Wakefield
WF4 3BA

tel: 01924 240420
fax: 01924 240421

www.3econsult.com

Project	OMEGA 1 FOR MORGAN SINDALL			
Title	EXPLORATORY HOLE LOCATION PLAN			
Scale	1:1000	Drawn AHC	Checked AP	Date JULY '14
Job No.	13084	Drawing No. Figure 2		Rev 0

Appendix A

Proposed Development Plan

Earthing area details see drawing B21-007

New linebacker vehicle arrest barriers installed to part zone 1 only

Existing fence removed between entrance roadway and new fence crossover

Limited PWIC allowed for within X11

Supply & X002 holders work, repairs and alterations)

Power and data duct links to

FEEDER PILLAR ZONE 1

DGS

5 STAFF DDA

DRIVE THROUGH COVERED SEARCH BAY AND VISITOR PASSES

ENTRANCE

GUARDHOUSE

201 STAFF

50 VISITORS

EXIT

VRC

OPERATIONS 2 TRAINING WING

TARMAC ROAD

STORM TANK

STORM TANK X22

CANOPIES

CHILLER

CONCRETE PLATFORM

CONCRETE BASE

PUMP HOUSE X26

PLANT ROOM X02

X11 PLANT ROOM

X21 SUB STN

ACU

CCTV & BEAM SUPPLY BOX

CCTV & BEAM SUPPLY BOXES AS INDICATED

CCTV 6

MAST 22

MAST 29 FOLDED DOWN

MAST 25 BASE 34.45m Ht

U/SIDE BALUN Ht=139.86m

U/SIDE BALUN Ht=139.79m

RELOCATED PERSONNEL FENCE

RELOCATED SECURITY FENCE

REMOVED PERSONNEL FENCE

REMOVED SECURITY FENCE

CONCRETE POST & CHAINLINK 2.4M ht 3 off B/WIRE & RAZOR WIRE CRANKED OUT

30m SAN DROP OFF

DROP OFF

GATES

ANCHOR BLOCKS

OLD ANCHOR BLOCK

OLD ANCHOR BLOCKS

OLD MAST BASE

CABLES PIT

CABLE PIT

SINGLE OVERHEAD WIRE

STAY COAX CABLE ABOVE GROUND BETWEEN POSTS

COAX CABLES

MULTIPLE SIGNAL RESPONSES IN THIS AREA TOO MANY TO IDENTIFY TRENDS

MULTIPLE SIGNAL RESPONSES TOO MANY TO IDENTIFY

MULTI-CABLES

ER NOT VISIBLE MAR 10

EARTH MAT

EARTH RODS

Unable to Trace Destination

50mm Cable Noted In Pit 0.9d Unable To Trace

100mm Duct 0.6d

100mm Duct 0.5d

Old Cables Unable to Trace

CABLE MKR (NFI)

CABLE MKR

ASSUMED ABANDONED

TRENCH SCAR

ROAD EDGE

TARMAC ROAD

MAPLE 11/0.5

ASH 7/0.5

ASH 6/0.5

14/0.6 ASH

HAWTHORN/GORSE OUTLINE 2m HT

HAWTHORN HEDGE Ht 5m

HAWTHORNS 4m Ht

CONIFERS 6m Ht

DILAPIDATED WOOD FENCE Ht 2.0m

TIMBER POST & B/W/FENCE Ht 1.0m

FARM OUTBUILDING

SHEEP NET FENCE Ht 1.0m

B/W FENCE Ht 1.8m

HAWTHORNS 4.5m Ht OUTLINE

FERNS/BRAMBLES 2m Ht

GRASS

STUMP

FOOTPATH

PHONE

LPG TANK (NFI)

R15000

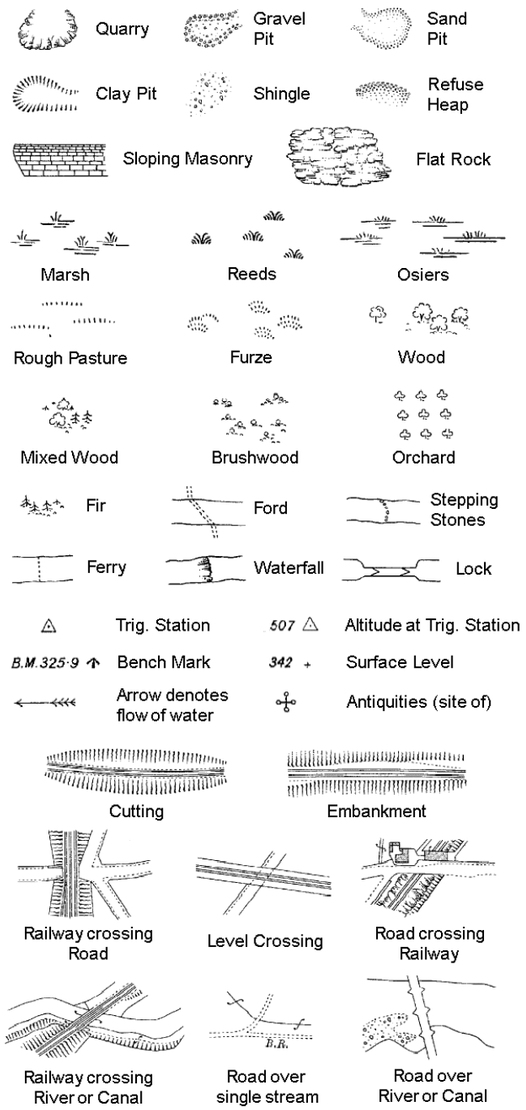
R12500

Appendix B

Historical Records

Historical Mapping Legends

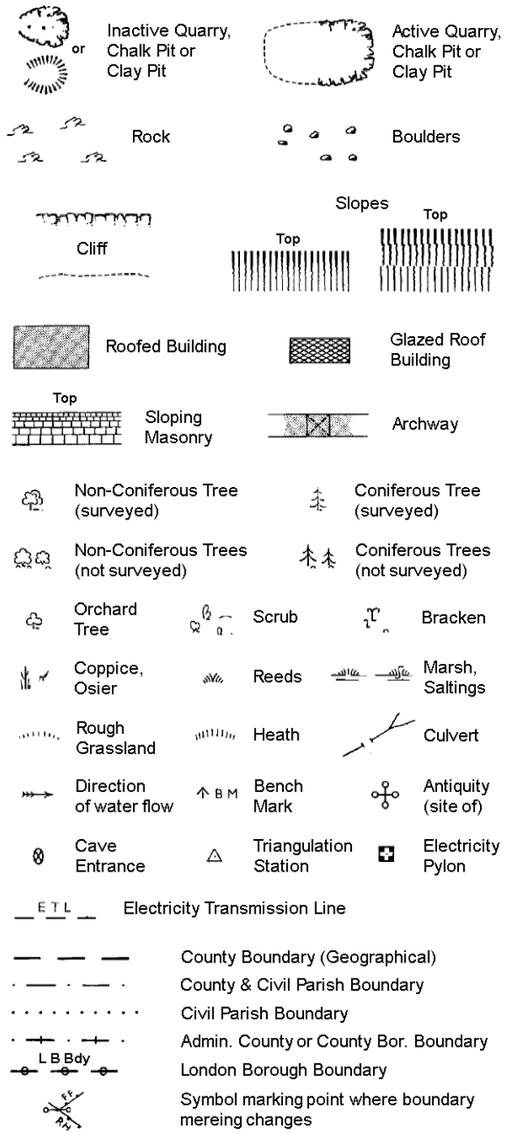
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy.
County Borough Boundary (England)
Co. Burgh Bdy.
County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

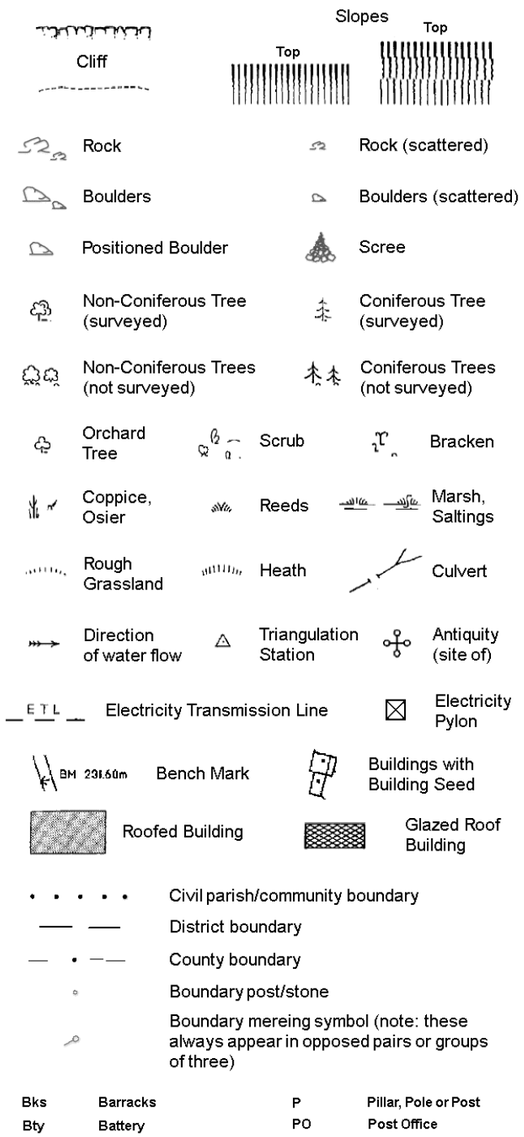
Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



County Boundary (Geographical)
County & Civil Parish Boundary
Civil Parish Boundary
Admin. County or County Bor. Boundary
L B Bdy
London Borough Boundary
Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



Civil parish/community boundary
District boundary
County boundary
Boundary post/stone
Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

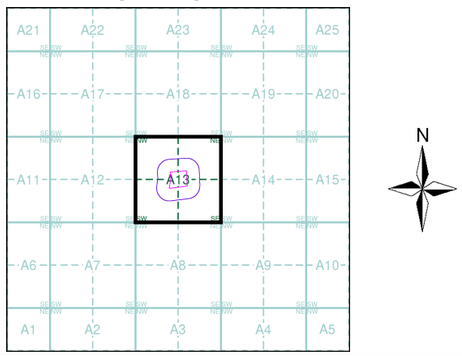
Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

consulting engineers

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:2,500	1893	2
Yorkshire	1:2,500	1912	3
Yorkshire	1:2,500	1928	4
Ordnance Survey Plan	1:2,500	1970	5
Additional SIMs	1:2,500	1989	6
Large-Scale National Grid Data	1:2,500	1994	7
Large-Scale National Grid Data	1:1,250	1994	8

Historical Map - Segment A13



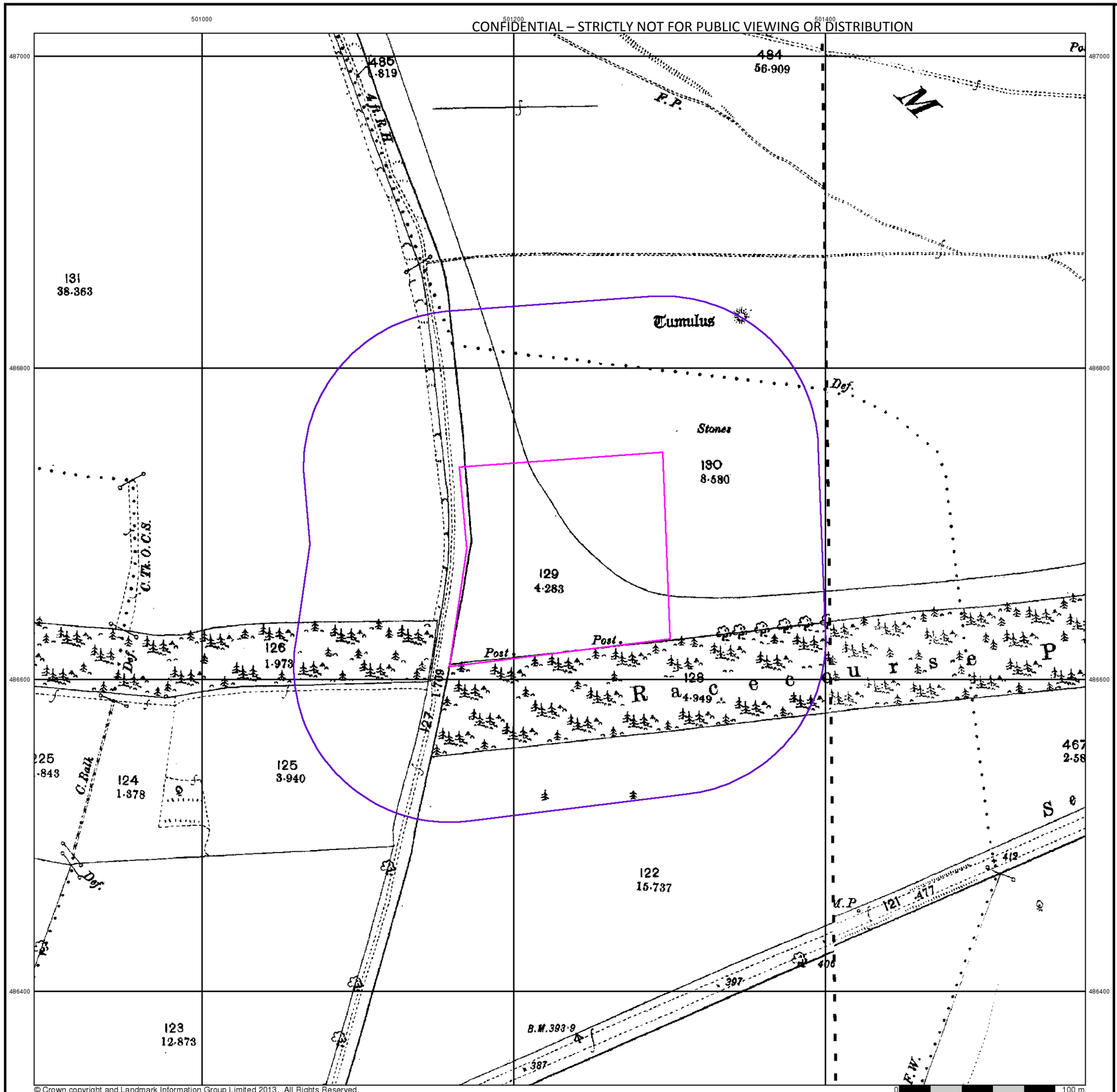
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	100

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

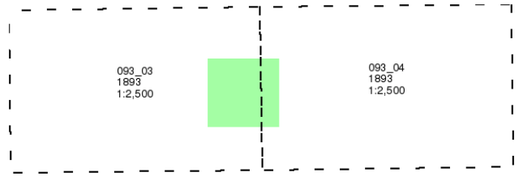
Yorkshire

Published 1893

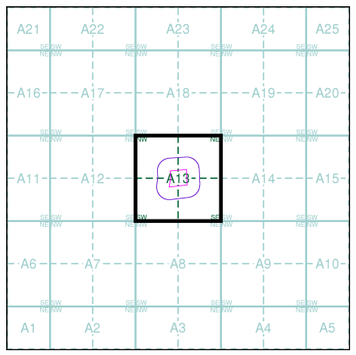
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



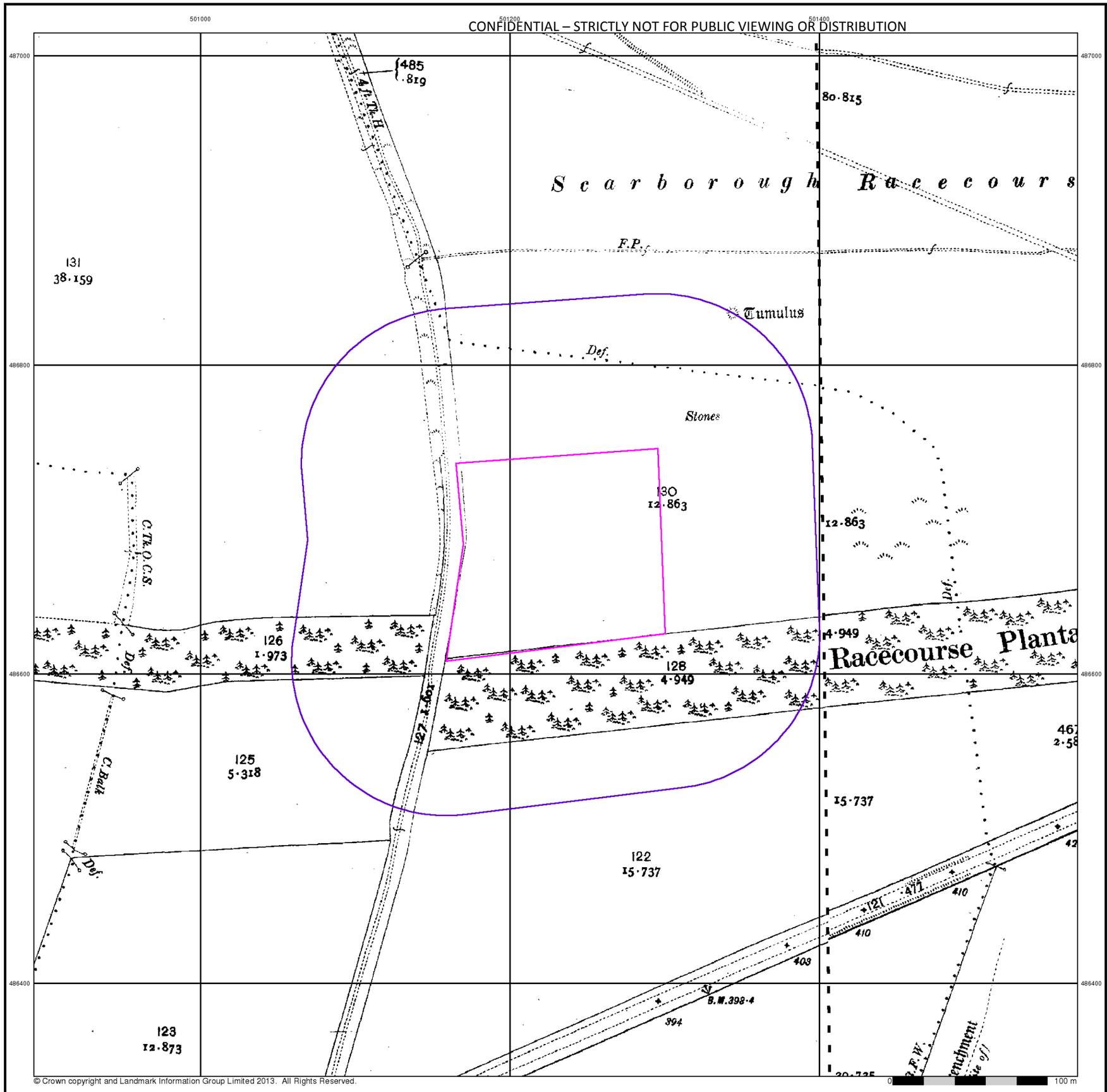
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	100

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

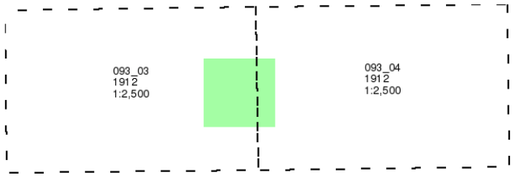
Yorkshire

Published 1912

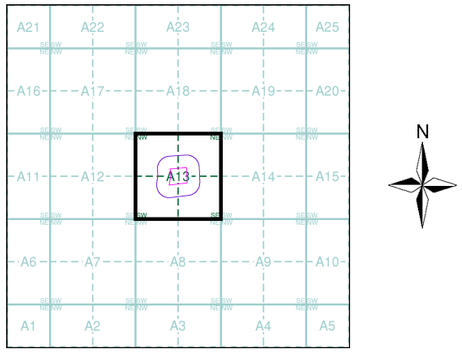
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



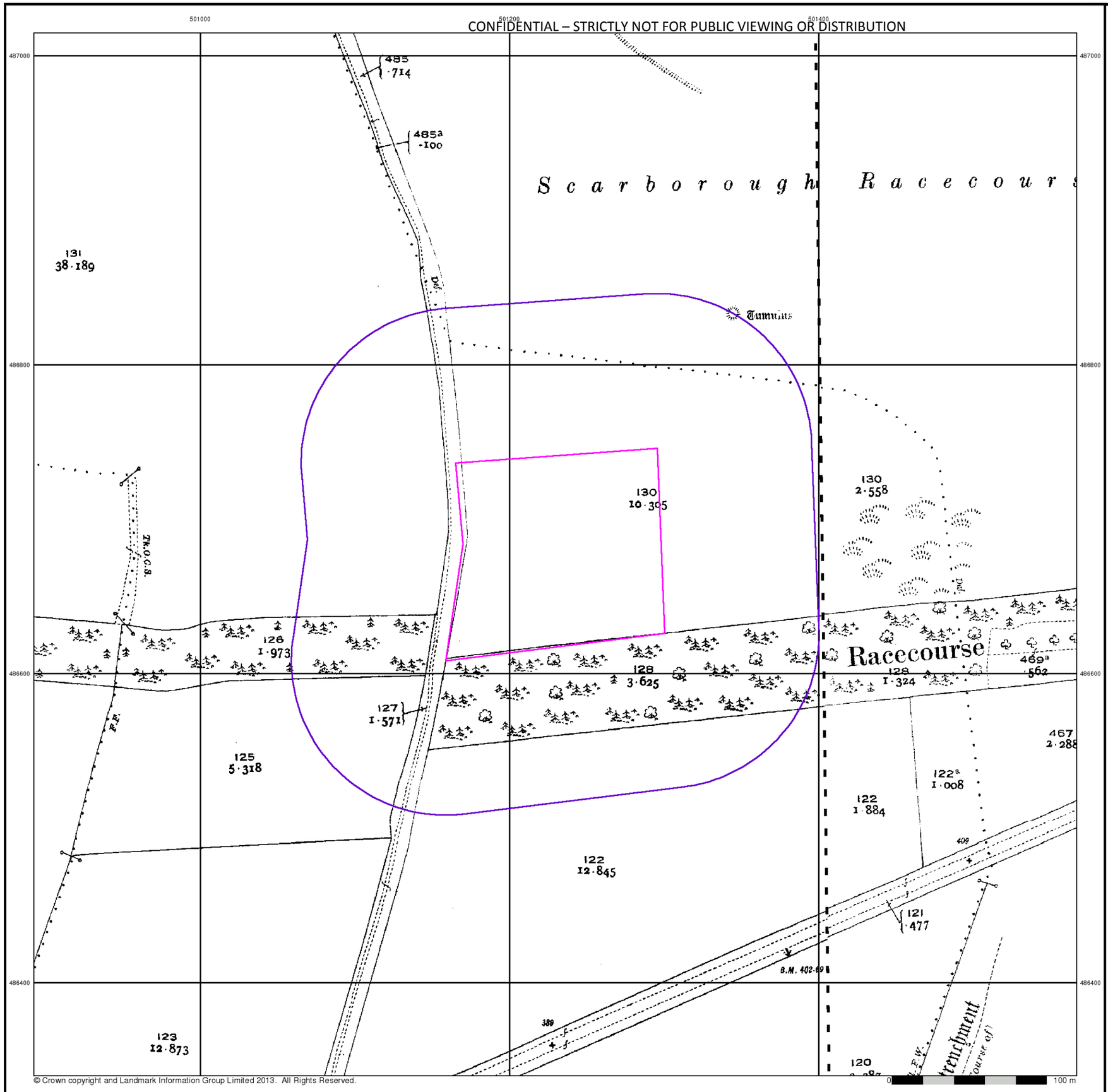
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	100

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

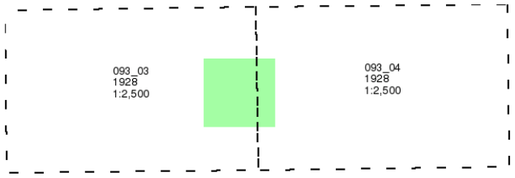
Yorkshire

Published 1928

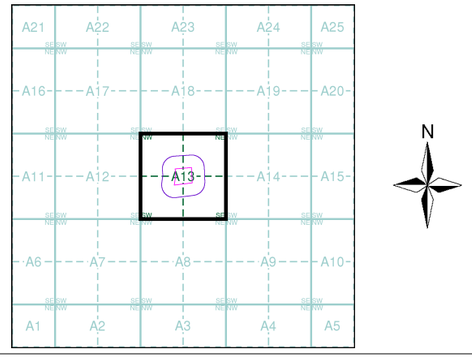
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



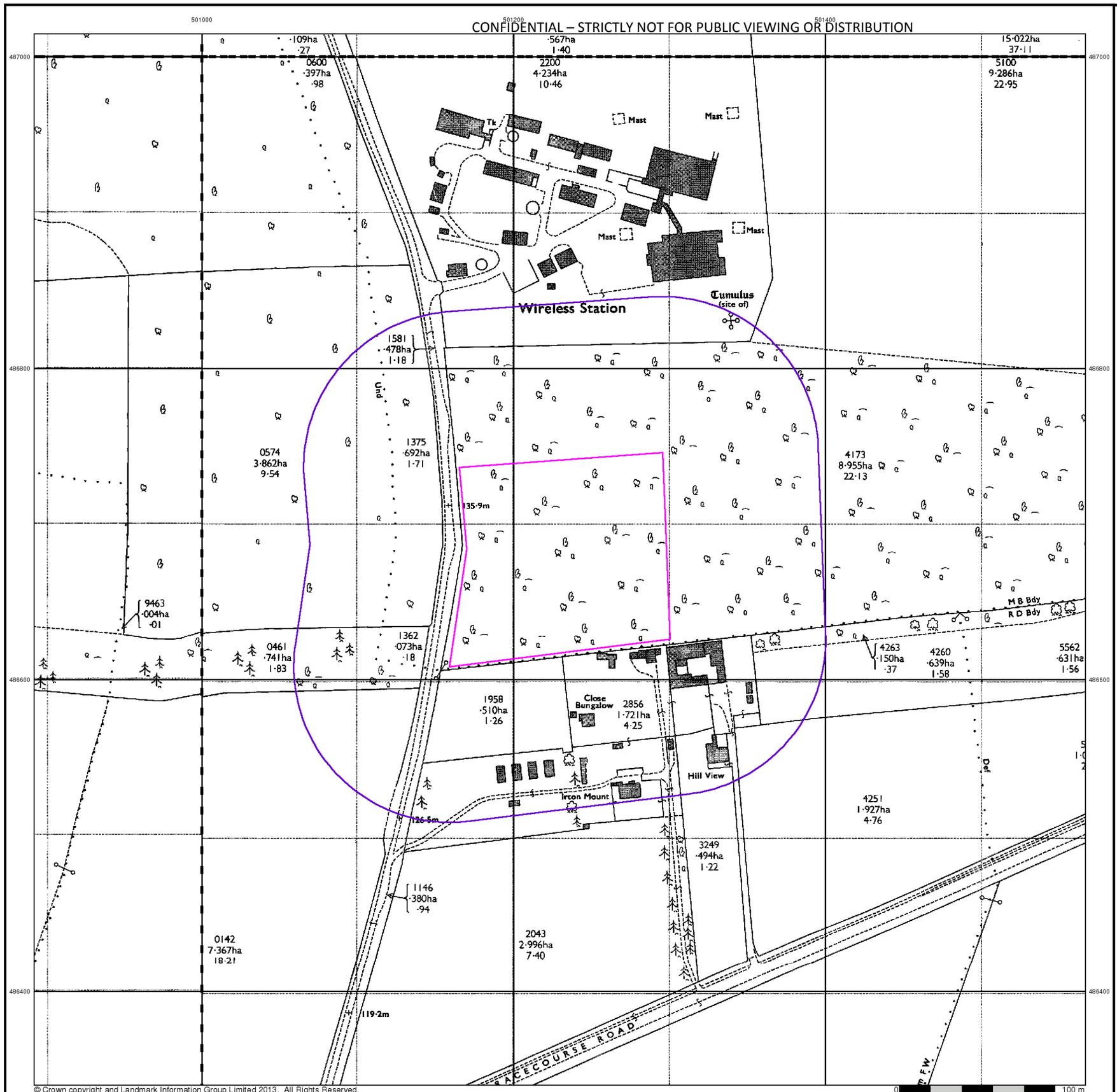
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	100

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

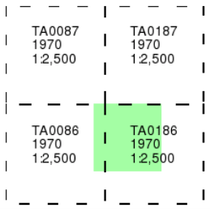
Ordnance Survey Plan

Published 1970

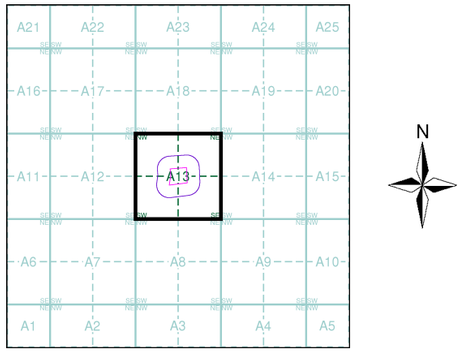
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



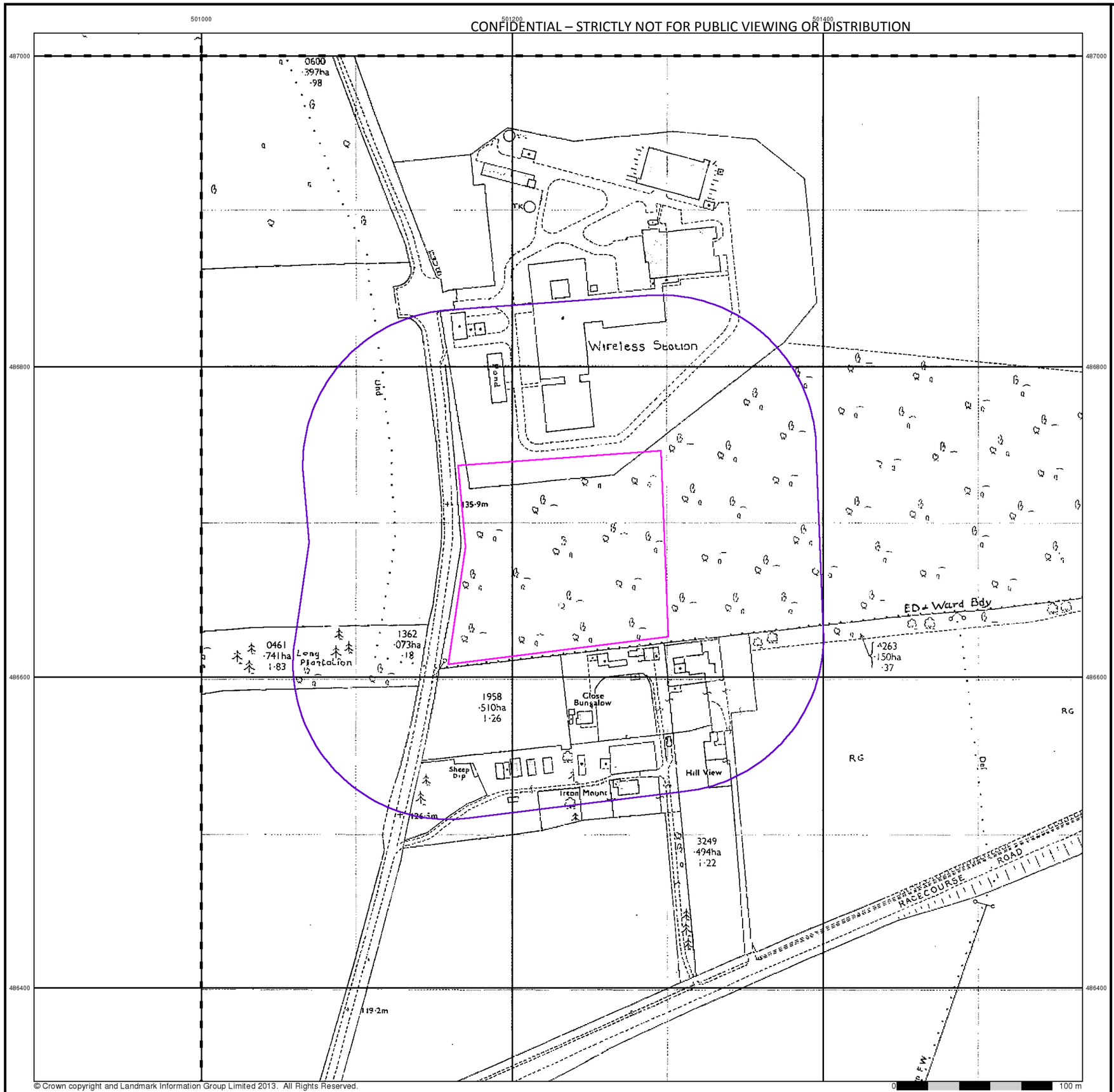
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	100

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

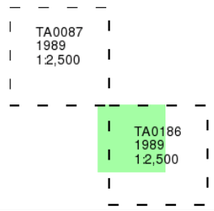
Additional SIMs

Published 1989

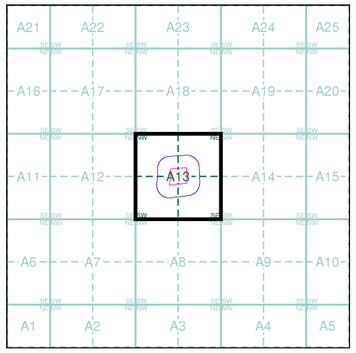
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



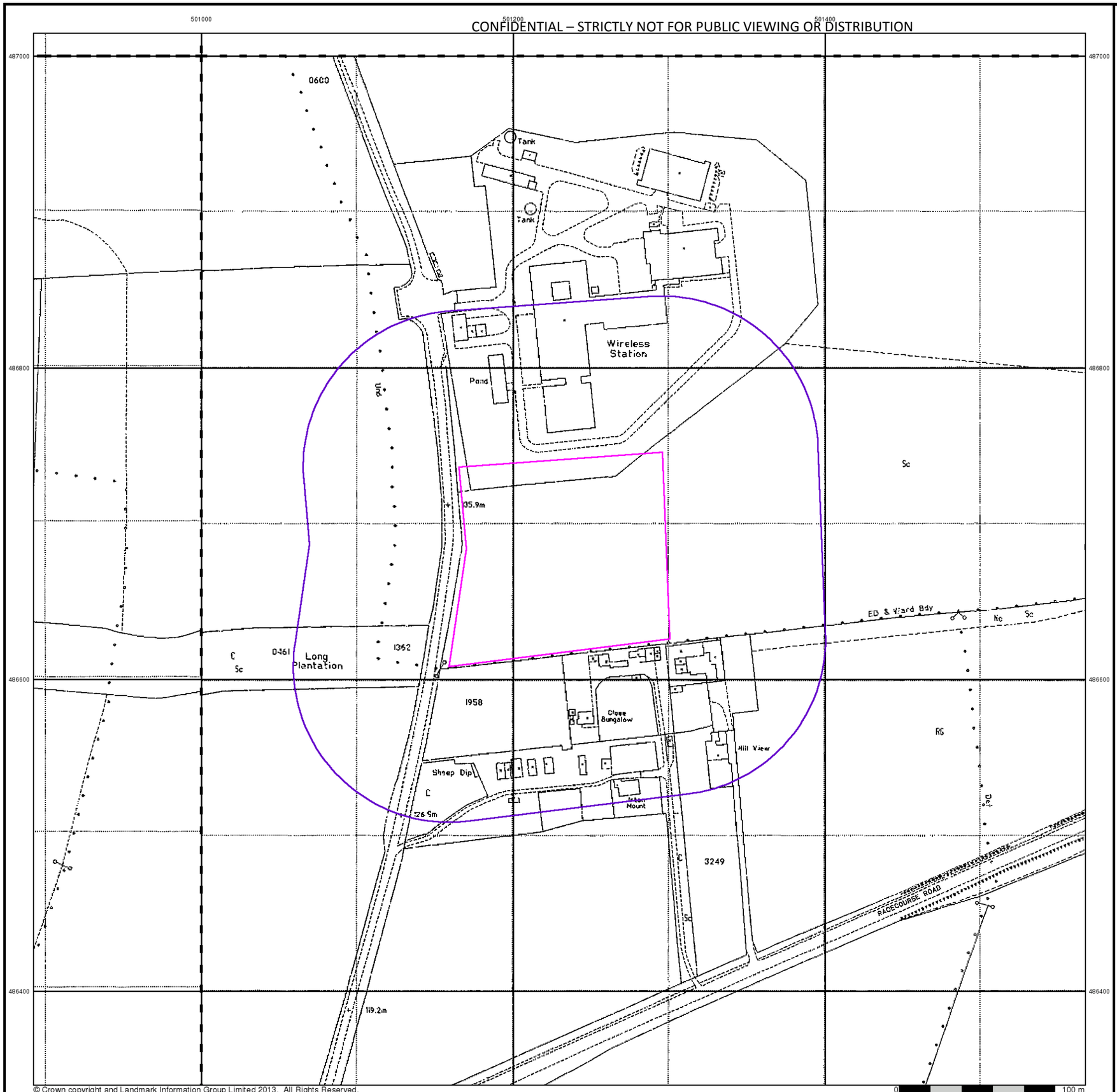
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	100

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

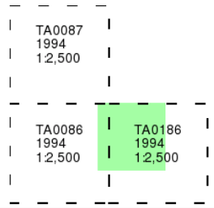
Large-Scale National Grid Data

Published 1994

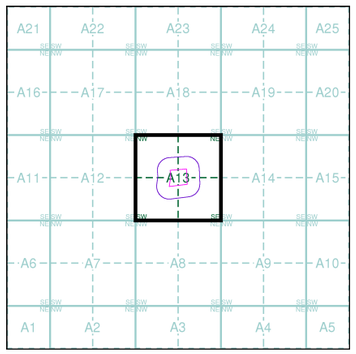
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



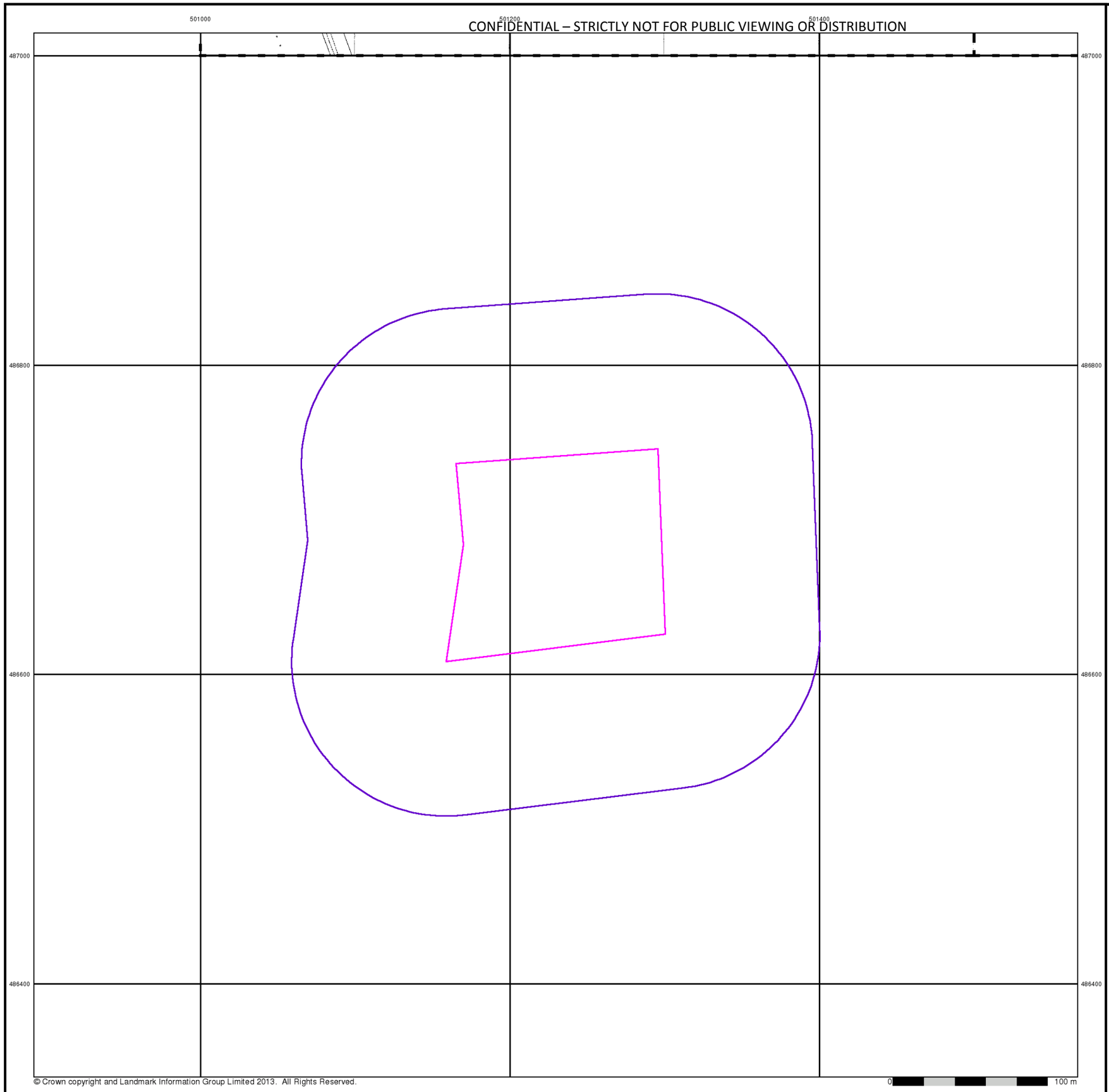
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	100

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

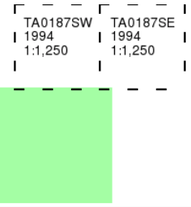
Large-Scale National Grid Data

Published 1994

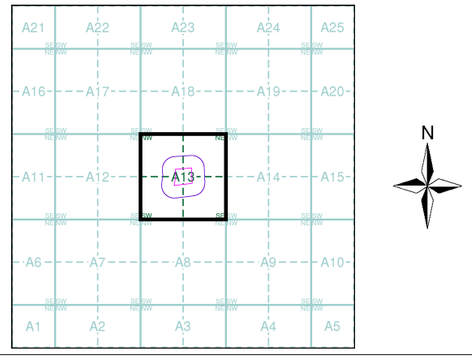
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	100

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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

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
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
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
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. 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
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Pylon
Electricity Transmission Line
Sloping Masonry
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
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, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping

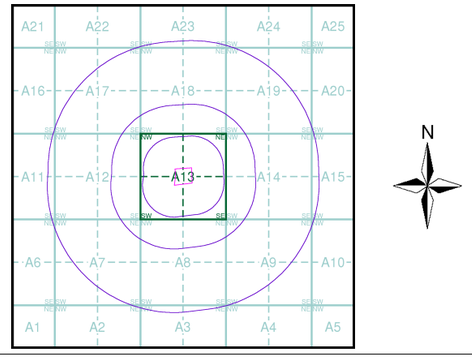
Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Mud
Sand
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or 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
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m 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

consulting engineers

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Yorkshire	1:10,560	1854	2
Yorkshire	1:10,560	1895	3
Yorkshire	1:10,560	1914	4
Yorkshire	1:10,560	1929 - 1930	5
Yorkshire	1:10,560	1929 - 1930	6
Yorkshire	1:10,560	1930	7
Yorkshire	1:10,560	1938	8
Yorkshire	1:10,560	1953	9
Ordnance Survey Plan	1:10,000	1958	10
Ordnance Survey Plan	1:10,000	1972 - 1977	11
Ordnance Survey Plan	1:10,000	1986	12
10K Raster Mapping	1:10,000	2006	13
VectorMap Local	1:10,000	2014	14

Historical Map - Slice A



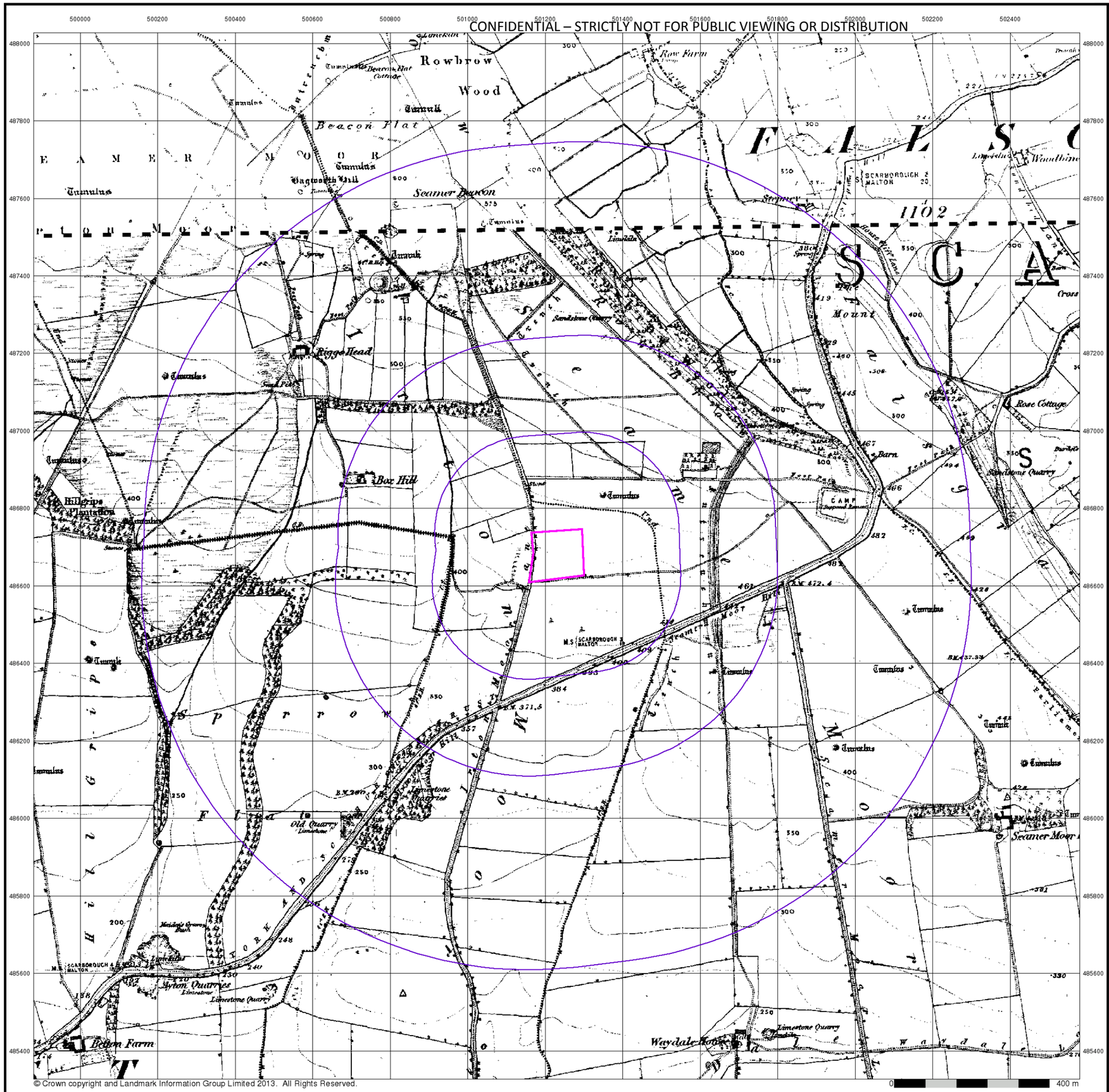
Order Details

Order Number: 57814167_1_1
Customer Ref: 13084
National Grid Reference: 501230, 486680
Slice: A
Site Area (Ha): 1.64
Search Buffer (m): 1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

Yorkshire

Published 1854

Source map scale - 1:10,560

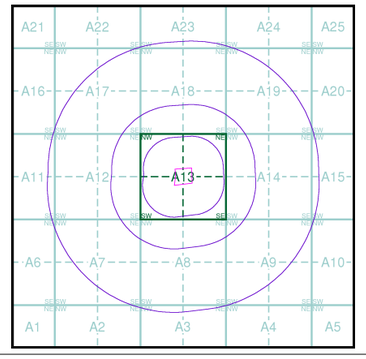
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

07700
1854
1:10,560

09300
1854
1:10,560

Historical Map - Slice A



Order Details

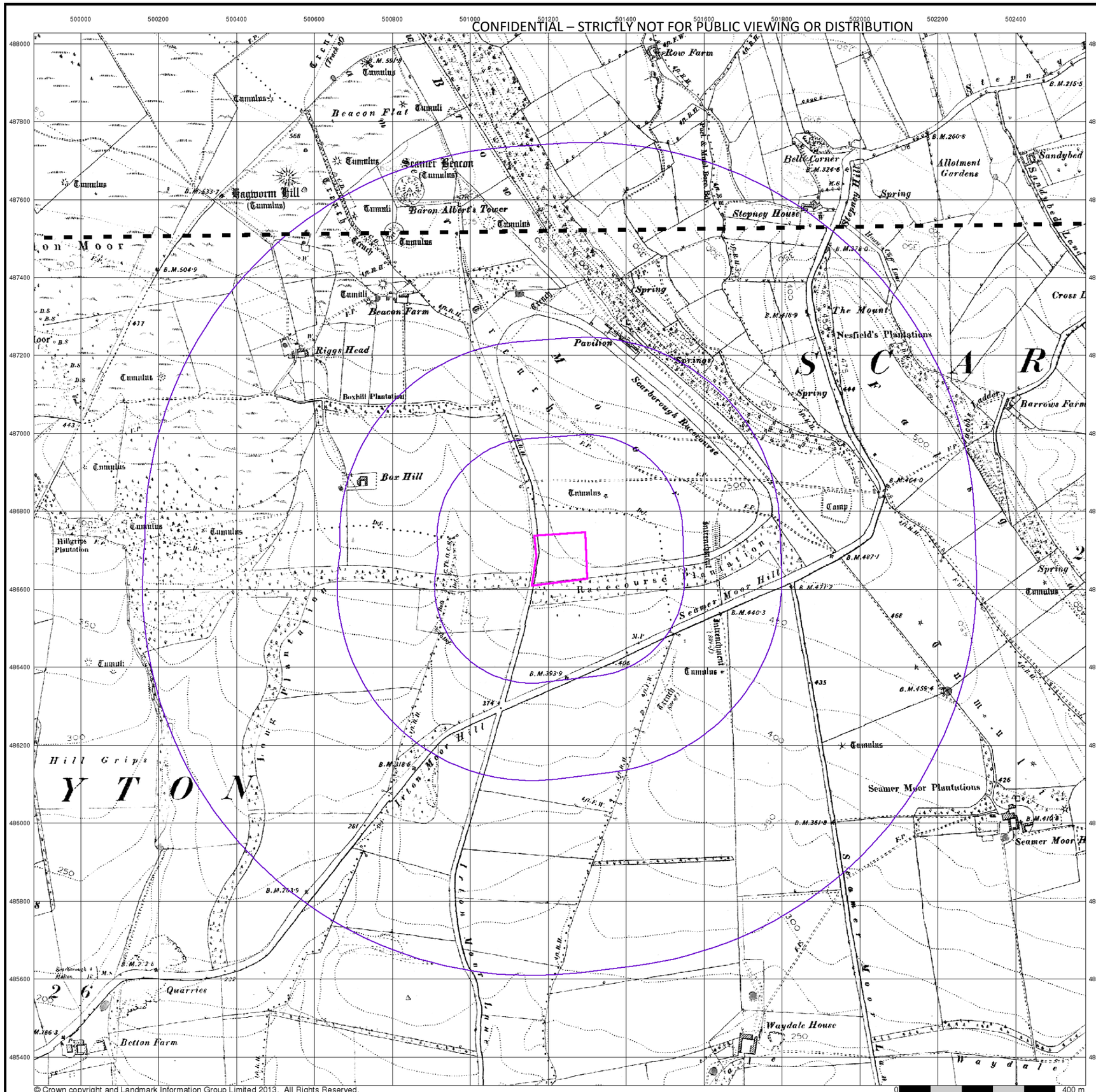
Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark Information Group

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



consulting engineers

Yorkshire

Published 1895

Source map scale - 1:10,560

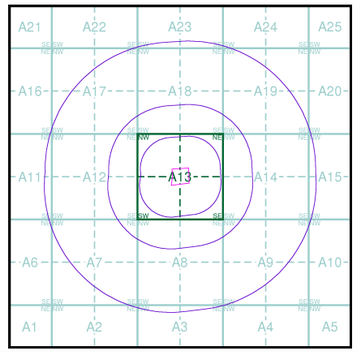
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

077SE
1895
1:10,560

093NE
1895
1:10,560

Historical Map - Slice A



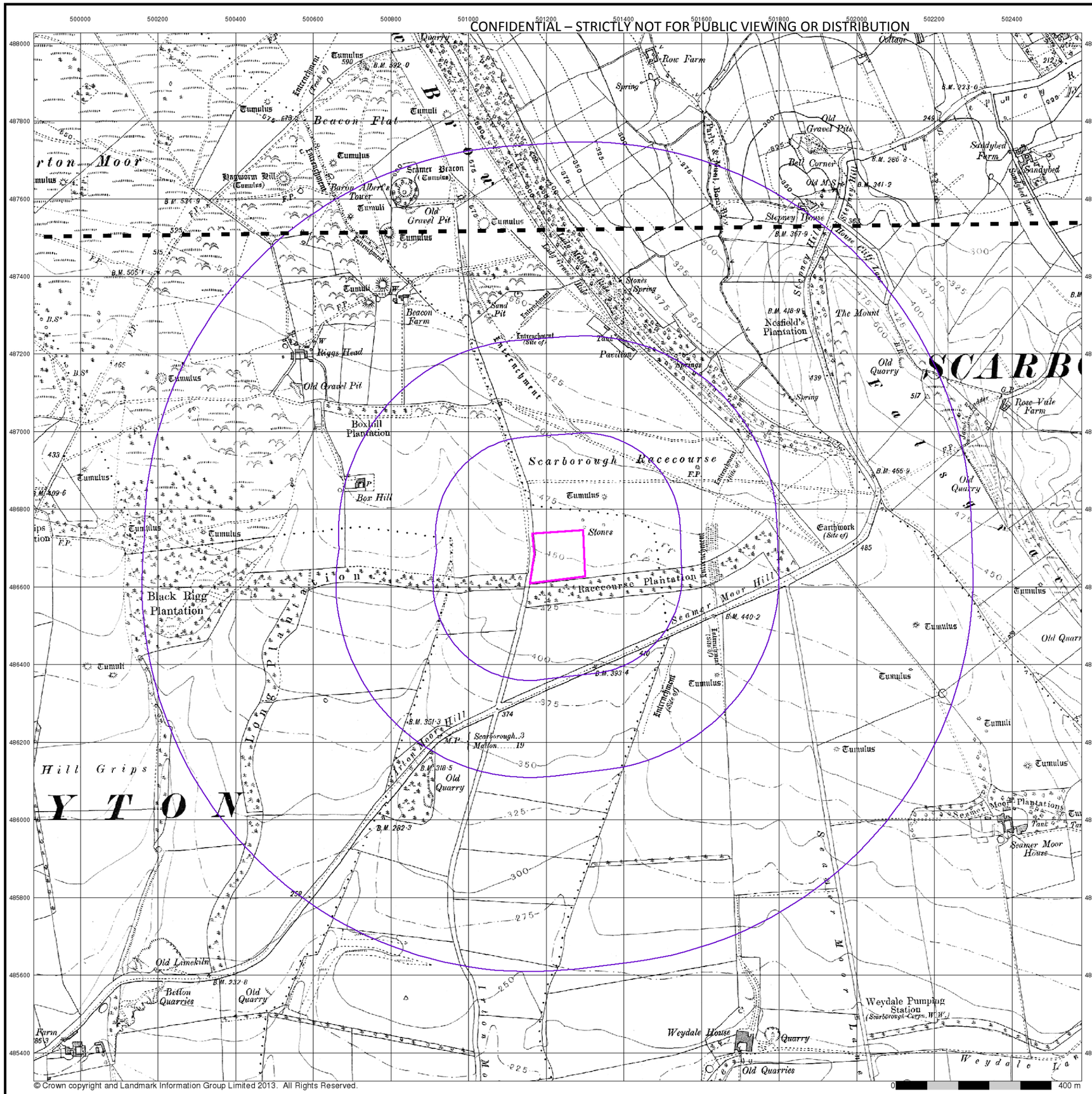
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

Yorkshire

Published 1914

Source map scale - 1:10,560

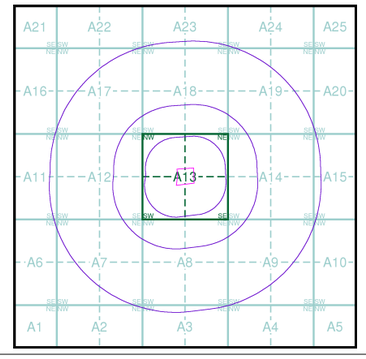
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

077SE
1914
1:10,560

093NE
1914
1:10,560

Historical Map - Slice A



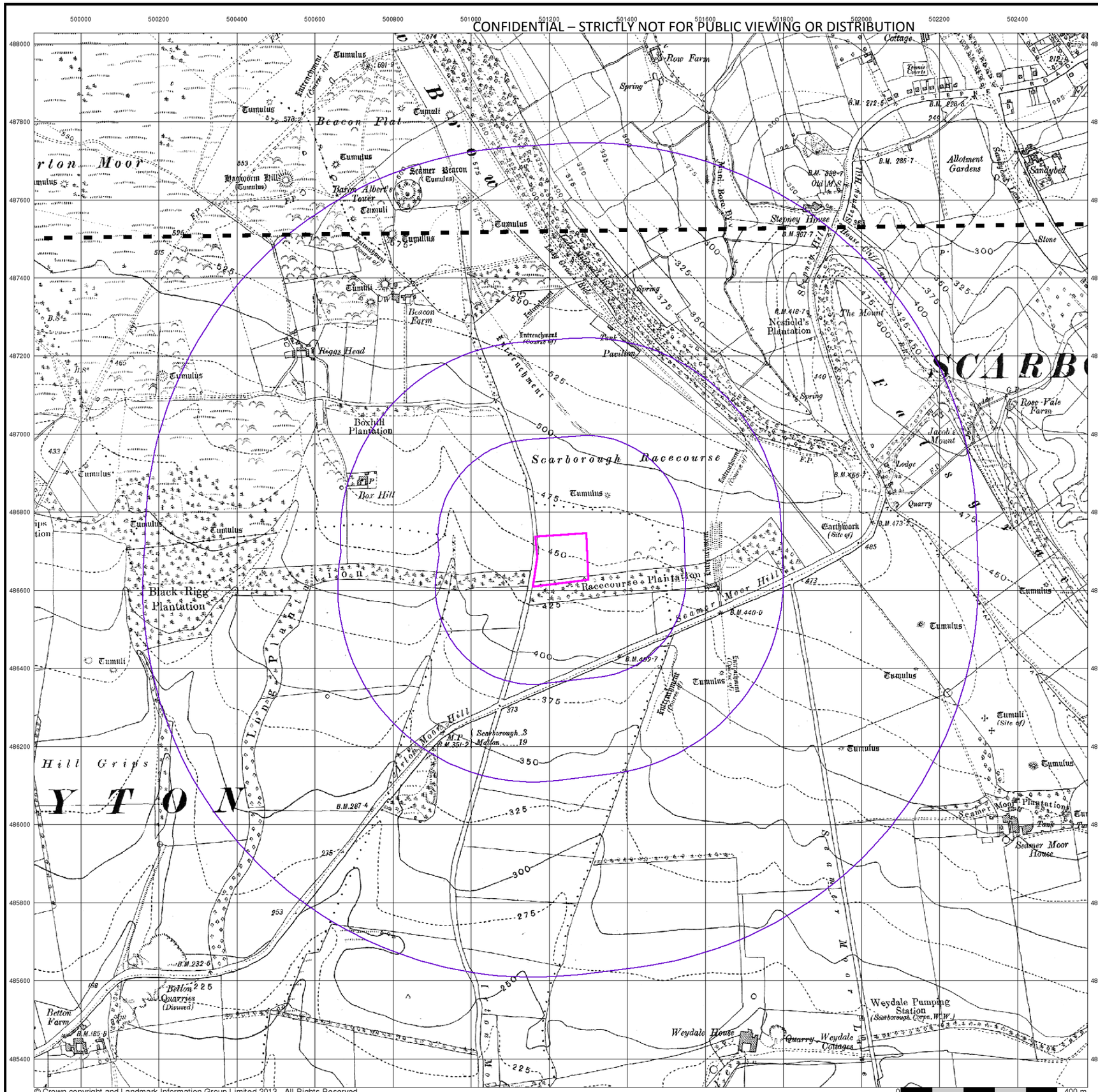
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

Yorkshire

Published 1929 - 1930

Source map scale - 1:10,560

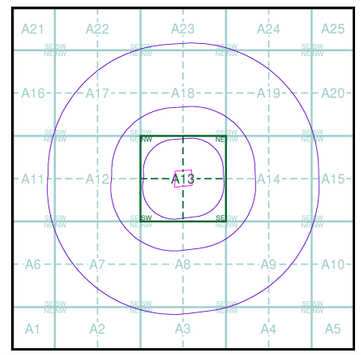
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

077SE
1930
1:10,560

093NE
1929
1:10,560

Historical Map - Slice A



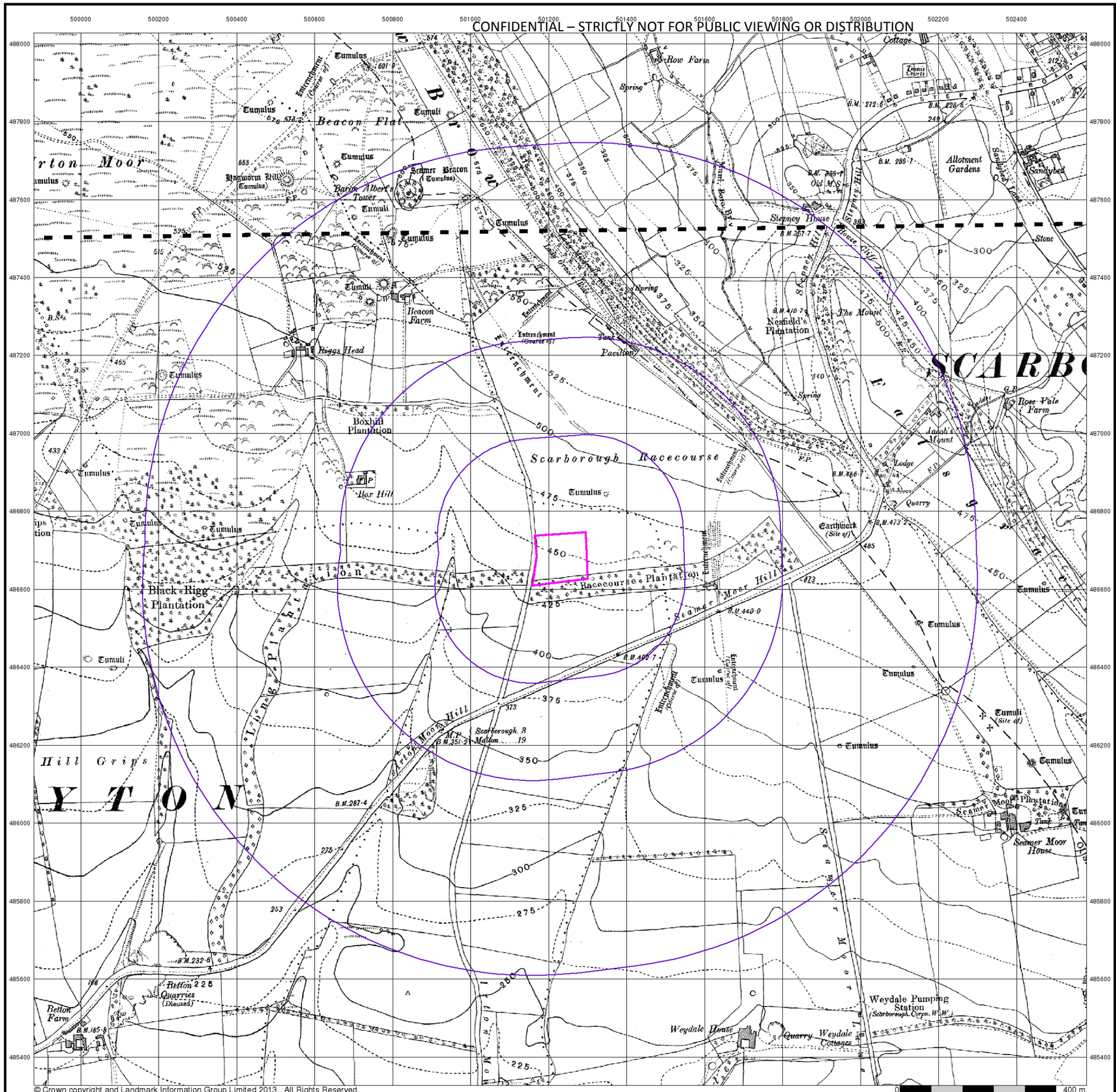
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

Yorkshire

Published 1929 - 1930

Source map scale - 1:10,560

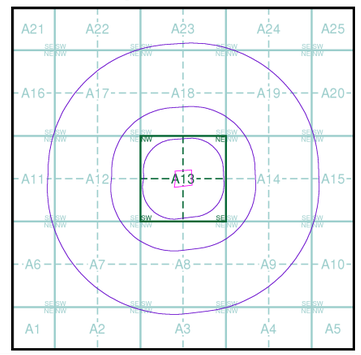
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

077SE
1930
1:10,560

093NE
1929
1:10,560

Historical Map - Slice A



N

Order Details

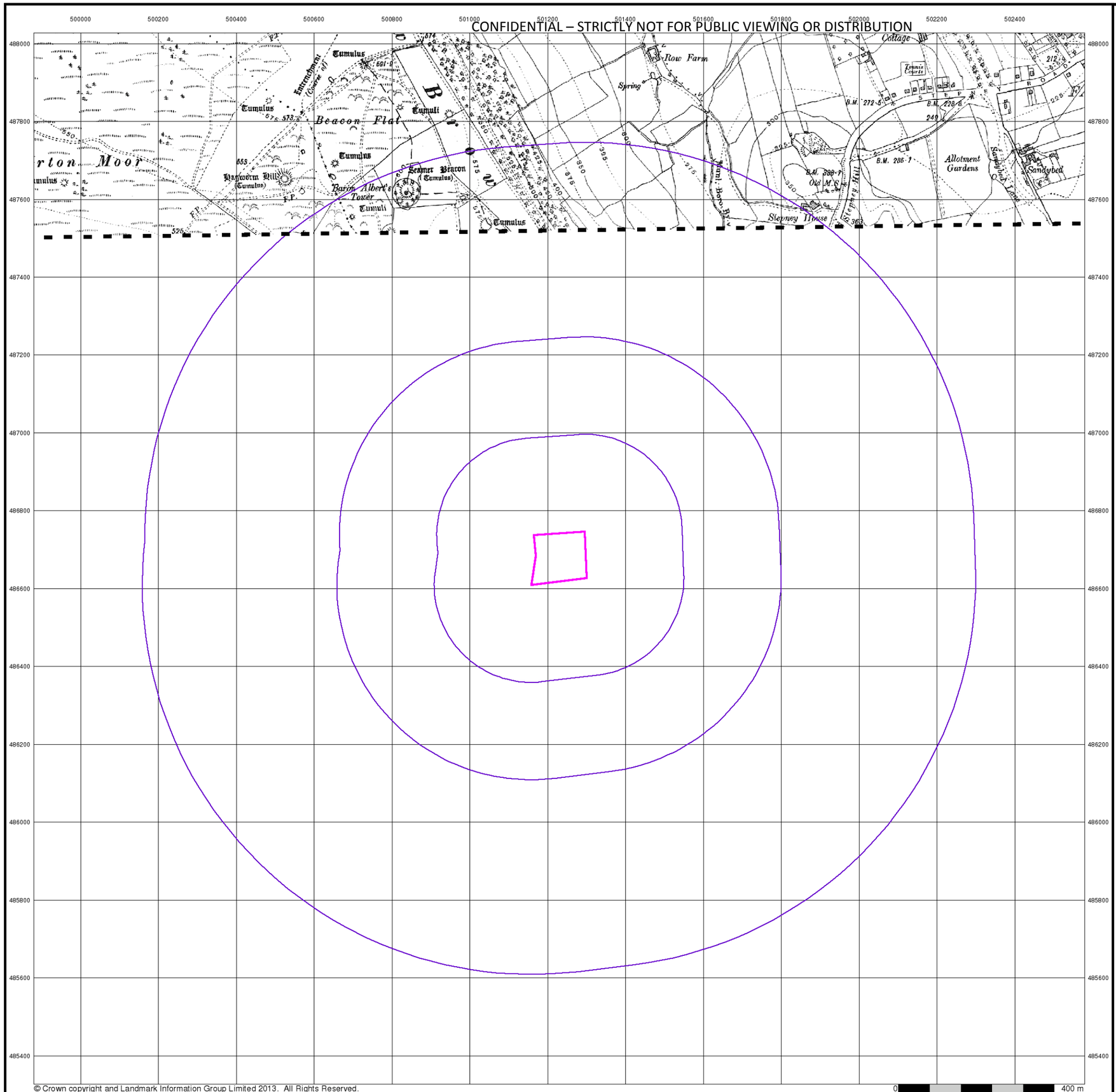
Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark Information Group

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



consulting engineers

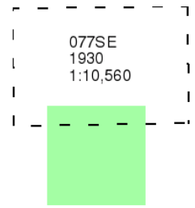
Yorkshire

Published 1930

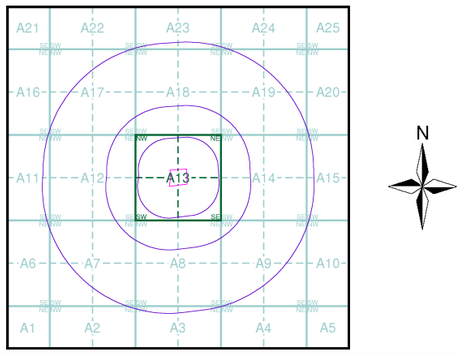
Source map scale - 1:10,560

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



Order Details

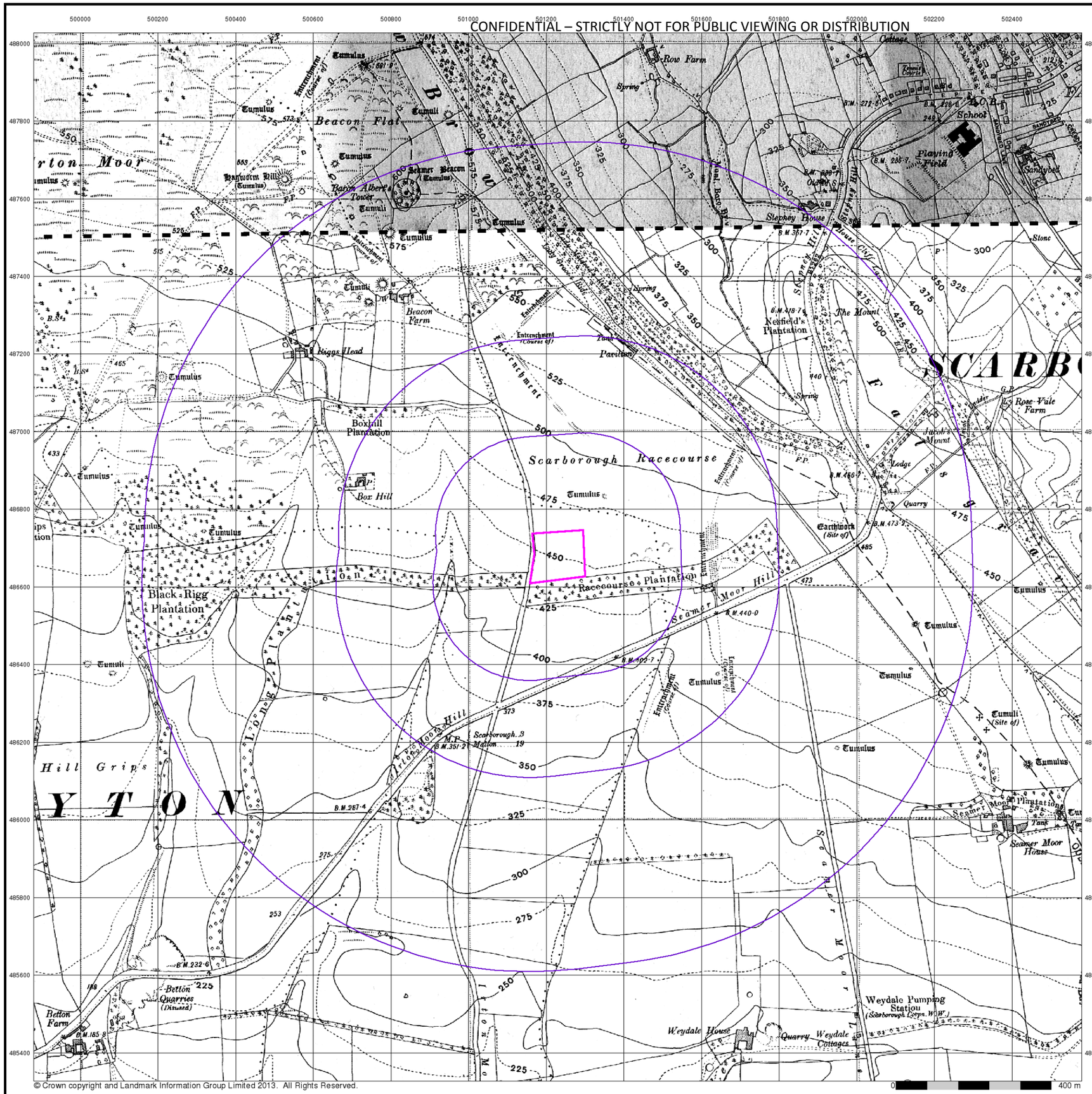
Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark Information Group

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



consulting engineers

Yorkshire

Published 1938

Source map scale - 1:10,560

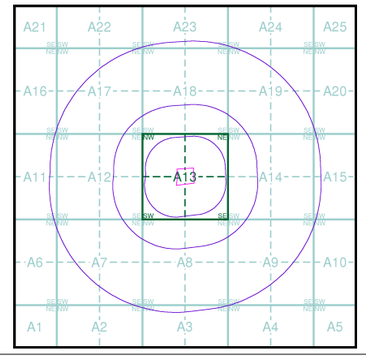
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

077SE
1938
1:10,560

093NE
1938
1:10,560

Historical Map - Slice A



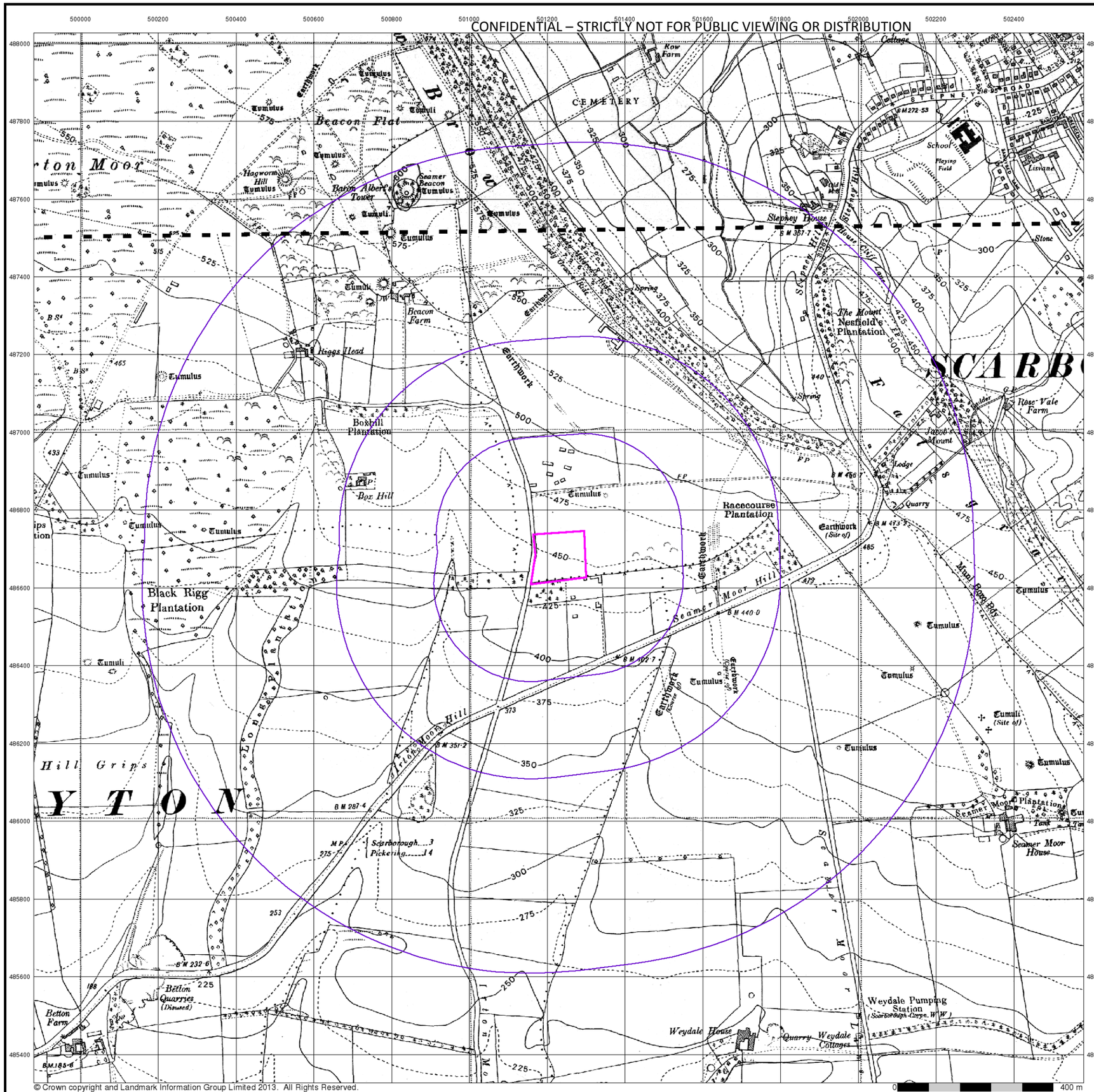
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

Yorkshire

Published 1953

Source map scale - 1:10,560

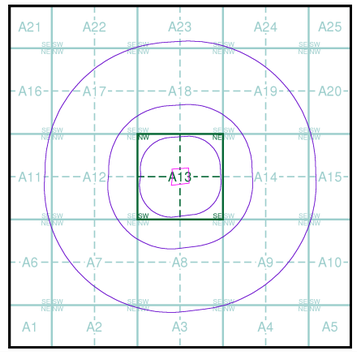
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

077SE
1953
1:10,560

093NE
1953
1:10,560

Historical Map - Slice A



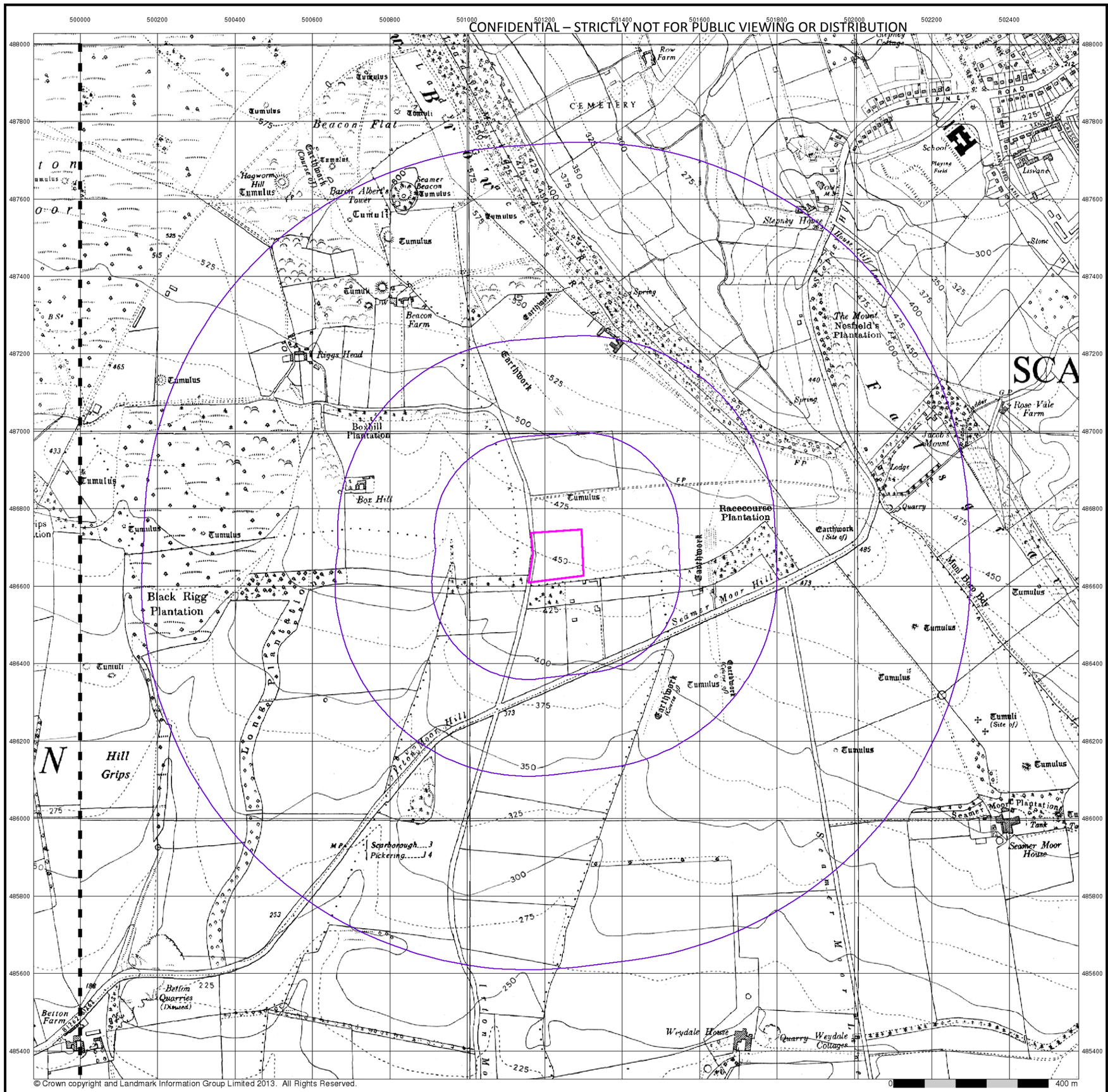
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

Ordnance Survey Plan

Published 1958

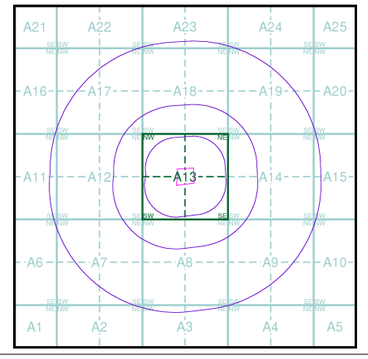
Source map scale - 1:10,000

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)

SE98NE 1958 1:10,560	TA08NW 1958 1:10,560

Historical Map - Slice A



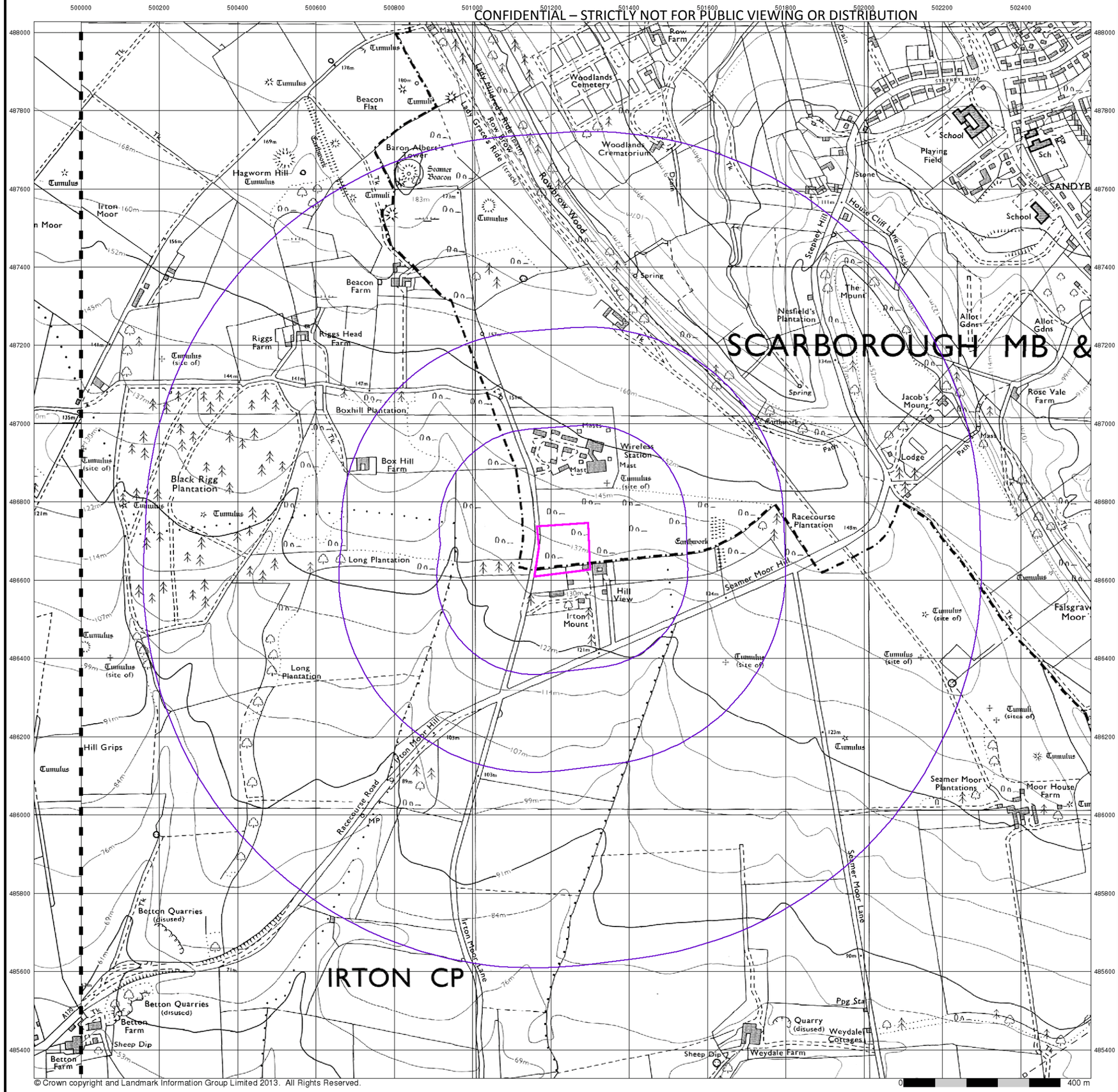
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



0 400 m

consulting engineers

Ordnance Survey Plan

Published 1972 - 1977

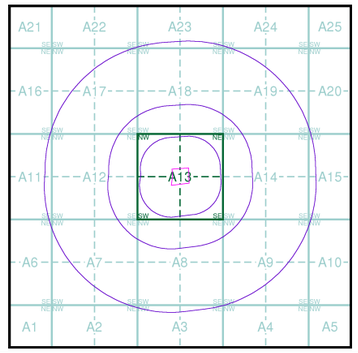
Source map scale - 1:10,000

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)

SE98NE 1977 1:10,000	TA08NW 1972 1:10,000

Historical Map - Slice A



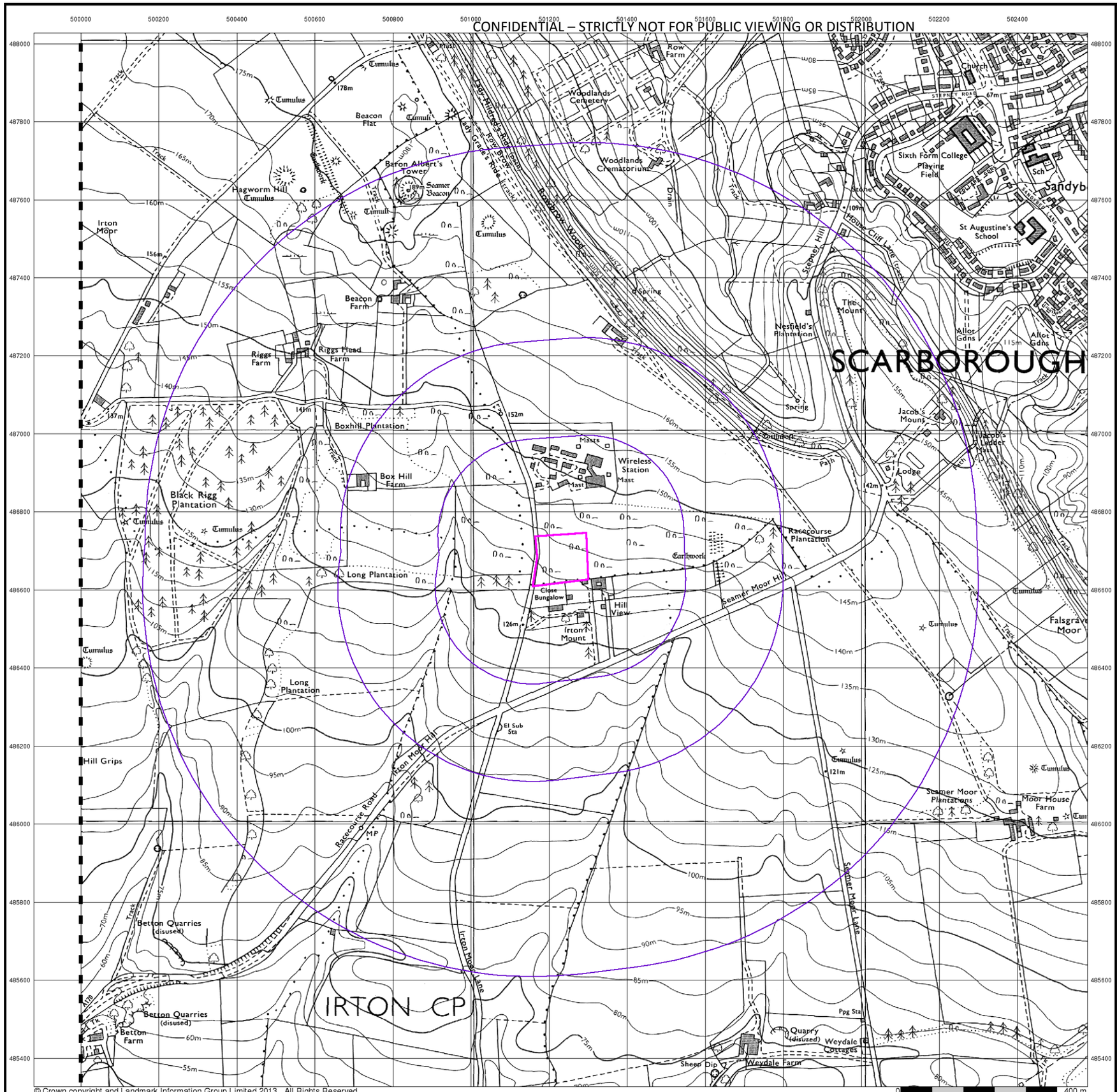
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

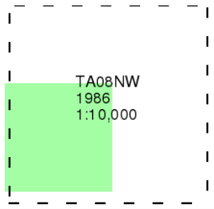
Ordnance Survey Plan

Published 1986

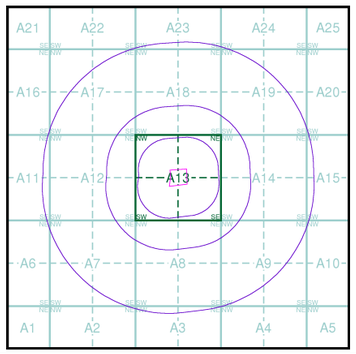
Source map scale - 1:10,000

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



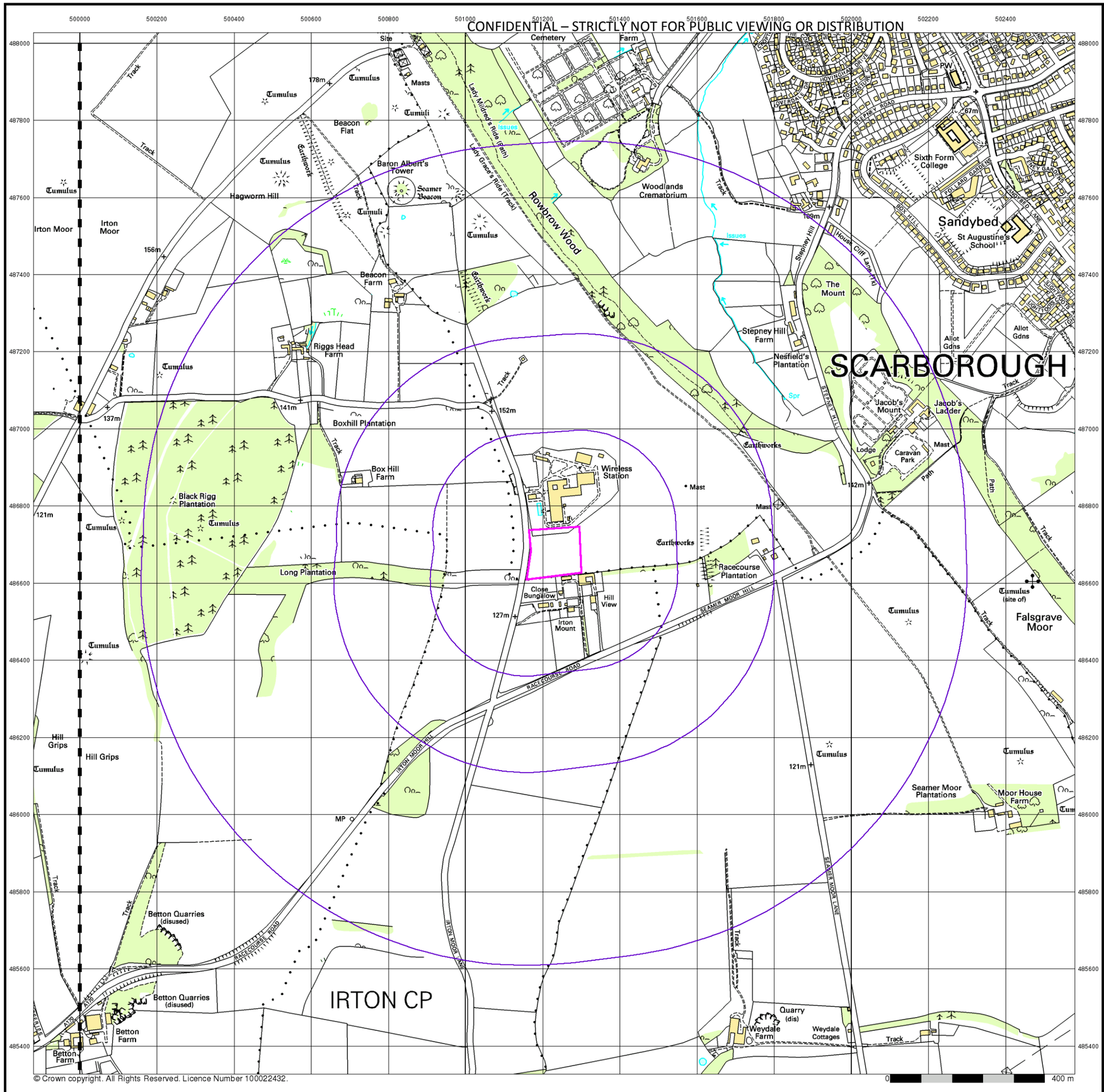
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

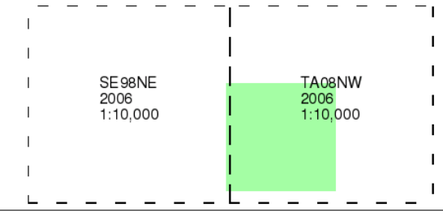
10k Raster Mapping

Published 2006

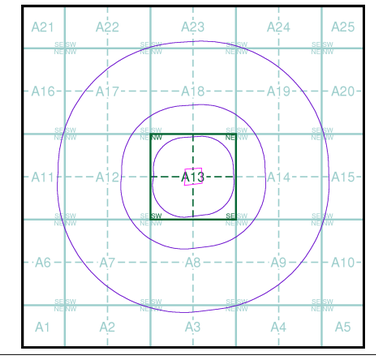
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



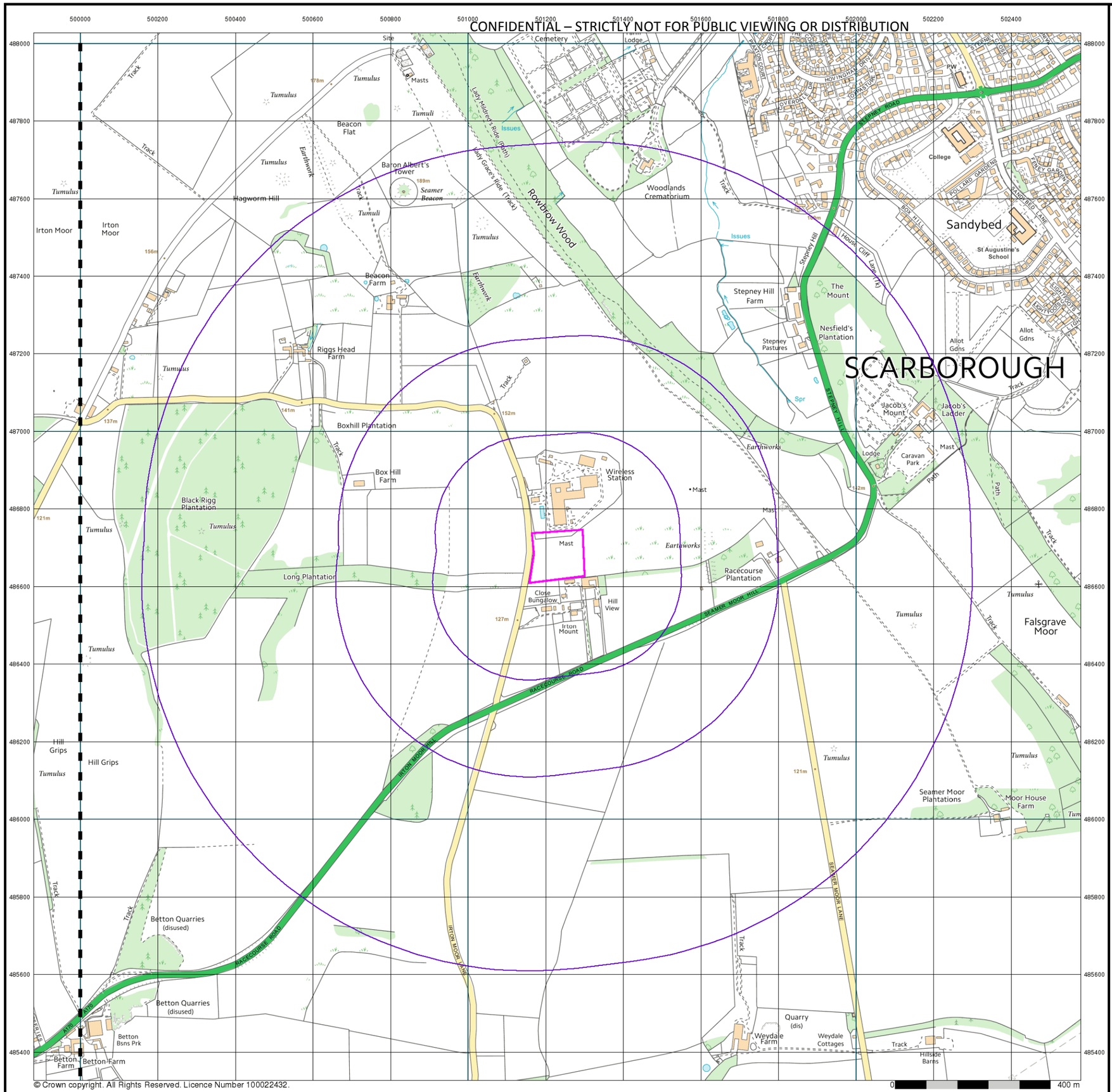
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

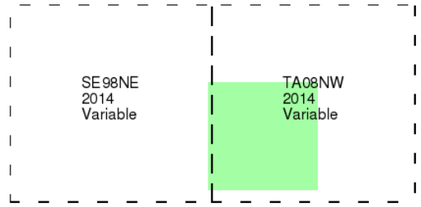
VectorMap Local

Published 2014

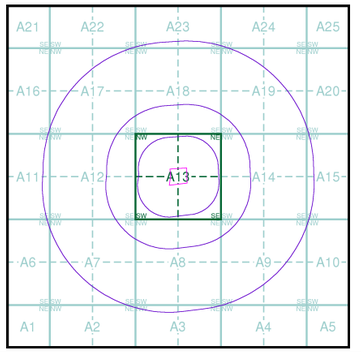
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark® Information Group

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

Appendix C

Envirocheck Report

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
57814167_1_1

Customer Reference:
13084

National Grid Reference:
501230, 486680

Slice:
A

Site Area (Ha):
1.64

Search Buffer (m):
1000

Site Details:

OMEGA 1
Scarborough
YO12 5TQ

Client Details:

Mr J Roberts
3e Consulting Engineers Ltd
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Contents

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

Copyright Notice

Natural England Copyright Notice

Ove Arup Copyright Notice

Peter Brett Associates Copyright Notice

Radon Potential dataset Copyright Notice

Report Version v47.0

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
Contaminated Land Register Entries and Notices					
Discharge Consents					
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 1				1
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 1		Yes		
Pollution Incidents to Controlled Waters					
Prosecutions Relating to Authorised Processes					
Prosecutions Relating to Controlled Waters					
Registered Radioactive Substances					
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register					
Water Abstractions	pg 1				2 (*2)
Water Industry Act Referrals					
Groundwater Vulnerability	pg 2	Yes	n/a	n/a	n/a
Bedrock Aquifer Designations	pg 2	Yes	n/a	n/a	n/a
Superficial Aquifer Designations			n/a	n/a	n/a
Source Protection Zones	pg 2	2		1	
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
Detailed River Network Lines					n/a
Detailed River Network Offline Drainage					n/a

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites					
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Recorded Landfill Sites					
Registered Landfill Sites					
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 4	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 4	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 10				4
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
Brine Compensation Area			n/a	n/a	n/a
Coal Mining Affected Areas			n/a	n/a	n/a
Mining Instability			n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 11	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards				n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 11	Yes		n/a	n/a
Potential for Running Sand Ground Stability Hazards				n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards				n/a	n/a
Radon Potential - Radon Affected Areas	pg 11	Yes	n/a	n/a	n/a
Radon Potential - Radon Protection Measures	pg 11	Yes	n/a	n/a	n/a

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Industrial Land Use					
Contemporary Trade Directory Entries	pg 12				2
Fuel Station Entries					
Sensitive Land Use					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 13	1			
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	**Local Authority Pollution Prevention and Controls** Name: Woodlands Crematorium Location: Woodlands Crematorium, Woodlands Drive, Scarborough, North Yorkshire, YO12 6QN Authority: Scarborough Borough Council, Environmental Health Permit Reference: PPC/crematorium Dated: 16th November 1992 Process Type: Local Authority Pollution Prevention and Control Description: PG5/2 Crematoria **Status: Permitted** Positional Accuracy: Automatically positioned to the address	A23SE (N)	969	1	501475 487698
	Nearest Surface Water Feature	A13NW (N)	37	-	501198 486776
2	**Water Abstractions** Operator: Scarborough Borough Council Licence Number: 2/27/26/033 Permit Version: Not Supplied Location: Town Hall, St Nicholas Street, SCARBOROUGH Authority: Environment Agency, North East Region Abstraction: Domestic & Agriculture Abstraction Type: Not Supplied Source: Spring Daily Rate (m3): 16 Yearly Rate (m3): 2818 Details: Licence Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A18NW (N)	859	2	501200 487600
3	**Water Abstractions** Operator: Mr P Harrison Licence Number: 2/27/27/034 Permit Version: 100 Location: Borehole - Corallian Authority: Environment Agency, North East Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 0 Yearly Rate (m3): 248 Details: Riggs Farm, Racecourse, Scarborough, North Yorkshire Authorised Start: 01 January Authorised End: 31 December Permit Start Date: 18th December 1972 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A17SW (NW)	872	2	500500 487300
	Water Abstractions Operator: J D Robinson Licence Number: 2/27/27/133 Permit Version: Not Supplied Location: Location Description Not Available Authority: Environment Agency, North East Region Abstraction: Domestic & Agriculture Abstraction Type: Not Supplied Source: Groundwater Daily Rate (m3): 14 Yearly Rate (m3): 4977 Details: Corallian Limestone Licence Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A7SE (SW)	1018	2	500700 485700

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Scarborough Borough Council Licence Number: 2/27/27/050 Permit Version: 100 Location: Borehole - Corallian - Irton Moor Scarborough Authority: Environment Agency, North East Region Abstraction: General Farming And Domestic Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): 5 Yearly Rate (m3): 1227 Details: Irton Moor, East Ayton, Scarborough, North Yorkshire Authorised Start: 01 March Authorised End: 31 December Permit Start Date: 13th January 1971 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A11NE (W)	1293	2	499900 487000
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (H3)- Coarse textured or moderately shallow soils which readily transmit non-absorbed pollutants and liquid discharges but which have some ability to attenuate absorbed pollutants because of their large clay or organic matter contents Map Sheet: Sheet 9 North East Yorkshire Scale: 1:100,000	A13NW (SE)	0	2	501229 486677
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	A13NW (SE)	0	3	501229 486677
	Superficial Aquifer Designations No Data Available				
4	**Source Protection Zones** Name: Various Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone II (Outer Protection Zone): Either 25% of the source area or a 400 day travel time whichever is greater.	A13NW (SE)	0	2	501229 486677
5	**Source Protection Zones** Name: Various Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone III (Total Catchment): The total area needed to support the discharge from the protected groundwater source.	A13NW (SE)	0	2	501229 486677
6	**Source Protection Zones** Name: Various Source: Environment Agency, Head Office Reference: Not Supplied Type: Zone I (Inner Protection Zone): Travel time of 50 days or less to the groundwater source.	A13SW (S)	253	2	501109 486360
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
	Detailed River Network Lines None				
	Detailed River Network Offline Drainage None				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Local Authority Landfill Coverage Name: Scarborough Borough Council - Has no landfill data to supply		0	1	501229 486677
	Local Authority Landfill Coverage Name: North Yorkshire County Council - Has no landfill data to supply		0	7	501229 486677

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Corallia	A13NW (SE)	0	3	501229 486677
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A13NW (SE)	0	4	501229 486677
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A13NW (W)	159	4	501000 486677
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A13NW (N)	254	4	501229 487000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8NW (S)	304	4	501093 486312
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A13NW (NW)	311	4	501000 487000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8NW (SW)	323	4	501000 486327

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8NW (S)	374	4	501063 486247
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8NW (SW)	384	4	501000 486260
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A19SW (NE)	457	4	501615 487071
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NW (NE)	470	4	501690 487000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A18SW (N)	498	4	501055 487223
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 90 - 120 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A18SW (NW)	509	4	501000 487217

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A19SW (NE)	565	4	501668 487169
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8SW (S)	609	4	501229 486000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A19SW (NE)	611	4	501804 487084
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A19SW (NE)	611	4	501806 487081
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A19SW (NE)	616	4	501831 487049
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8SE (S)	620	4	501287 486000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NW (NE)	623	4	501864 487000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8NE (S)	623	4	501488 486032
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A8SW (S)	629	4	501000 486000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NE (E)	673	4	501934 486960
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A14NE (NE)	673	4	501918 487000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A9SW (SE)	682	4	501571 486000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A14NE (E)	700	4	502000 486677
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NE (E)	706	4	502000 486774
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A14NE (E)	707	4	502000 486796
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A19SE (NE)	732	4	501974 487022
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A14NE (NE)	735	4	501984 487000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A9SW (SE)	735	4	501684 486000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A14NE (NE)	749	4	502000 487000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A19NW (NE)	794	4	501789 487368
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A19NW (NE)	866	4	501750 487482
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A19SE (NE)	881	4	502000 487275
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A19NW (NE)	894	4	501731 487526
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A7SE (SW)	922	4	500830 485748

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: <15 mg/kg	A9SE (SE)	939	4	502000 486000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: <15 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A7SE (SW)	966	4	500795 485714
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A19NE (NE)	972	4	502000 487415
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic Concentration: 15 - 25 mg/kg Cadmium Concentration: <1.8 mg/kg Chromium Concentration: 60 - 90 mg/kg Lead Concentration: <150 mg/kg Nickel Concentration: 15 - 30 mg/kg	A15NW (E)	993	4	502255 487000
7	**BGS Recorded Mineral Sites** Site Name: Sparrow Flat Location: , East Ayton, Scarborough, North Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 119109 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Jurassic Geology: Hambleton Oolite Member Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A7NE (SW)	574	3	500889 486102
8	**BGS Recorded Mineral Sites** Site Name: Rowbrow Wood Location: , <Null>, Scarborough, North Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 119114 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Jurassic Geology: Lower Calcareous Grit Formation Commodity: Sandstone Positional Accuracy: Located by supplier to within 10m	A18SE (N)	582	3	501407 487317

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
9	**BGS Recorded Mineral Sites** Site Name: Sparrow Flat Location: , East Ayton, Scarborough, North Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 119108 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Jurassic Geology: Hambleton Oolite Member Commodity: Limestone Positional Accuracy: Located by supplier to within 10m	A7SE (SW)	761	3	500705 485998
10	**BGS Recorded Mineral Sites** Site Name: The Mount Location: , Lebberston, Scarborough, North Yorkshire Source: British Geological Survey, National Geoscience Information Service Reference: 119120 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Jurassic Geology: Oxford Clay Formation Commodity: Common Clay and Shale Positional Accuracy: Located by supplier to within 10m	A19SE (NE)	927	3	502115 487178
	BGS Measured Urban Soil Chemistry No data available				
	BGS Urban Soil Chemistry Averages No data available				
	Coal Mining Affected Areas In an area that might not be affected by coal mining				
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (SE)	0	3	501229 486677
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (SE)	0	3	501229 486677
	Potential for Ground Dissolution Stability Hazards No Hazard				
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (SE)	0	3	501229 486677
	Potential for Running Sand Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (SE)	0	3	501229 486677
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NW (SE)	0	3	501229 486677
	Radon Potential - Radon Protection Measures Protection Measure: Basic radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NW (SE)	0	3	501229 486677
	Radon Potential - Radon Affected Areas Affected Area: The property is in an intermediate probability radon area, as between 3 and 5% of homes are above the action level Source: British Geological Survey, National Geoscience Information Service	A13NW (SE)	0	3	501229 486677

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
11	**Contemporary Trade Directory Entries** Name: Smith Building Preservations Location: Stepney Pastures, Stepney Road, Scarborough, North Yorkshire, YO12 5NL Classification: Damp & Dry Rot Control **Status: Inactive** Positional Accuracy: Automatically positioned to the address	A19SW (NE)	740	-	501862 487222
12	**Contemporary Trade Directory Entries** Name: Woodlands Crematorium Location: Woodlands Crematorium, Woodlands Drive, Scarborough, North Yorkshire, YO12 6QN Classification: Cemeteries & Crematoria **Status: Active** Positional Accuracy: Automatically positioned to the address	A23SE (N)	969	-	501475 487698

Sensitive Land Use

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
13	**Nitrate Vulnerable Zones** Name: Not Supplied Description: NVZ Area Source: Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	A13NW (SE)	0	6	501229 486677

Data Currency

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
Ryedale District Council - Environmental Health	January 2013	Annual Rolling Update
Scarborough Borough Council - Environmental Health	March 2014	Annual Rolling Update
Discharge Consents		
Environment Agency - North East Region	May 2014	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - North East Region	March 2013	As notified
Integrated Pollution Controls		
Environment Agency - North East Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control		
Environment Agency - North East Region	May 2014	Quarterly
Local Authority Integrated Pollution Prevention And Control		
Scarborough Borough Council - Environmental Health	April 2013	Annual Rolling Update
Ryedale District Council - Environmental Health	April 2014	Annual Rolling Update
Local Authority Pollution Prevention and Controls		
Scarborough Borough Council - Environmental Health	April 2013	Annual Rolling Update
Ryedale District Council - Environmental Health	April 2014	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements		
Scarborough Borough Council - Environmental Health	April 2013	Annual Rolling Update
Ryedale District Council - Environmental Health	April 2014	Annual Rolling Update
Nearest Surface Water Feature		
Ordnance Survey	July 2012	Quarterly
Pollution Incidents to Controlled Waters		
Environment Agency - North East Region	December 1998	Not Applicable
Prosecutions Relating to Authorised Processes		
Environment Agency - North East Region	March 2013	As notified
Prosecutions Relating to Controlled Waters		
Environment Agency - North East Region	March 2013	As notified
Registered Radioactive Substances		
Environment Agency - North East Region	May 2014	Quarterly
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points		
Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points		
Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register		
Environment Agency - North East Region - Dales Area	May 2014	Quarterly
Environment Agency - North East Region - Yorkshire Area	May 2014	Quarterly
Water Abstractions		
Environment Agency - North East Region	April 2014	Quarterly
Water Industry Act Referrals		
Environment Agency - North East Region	May 2014	Quarterly
Groundwater Vulnerability		
Environment Agency - Head Office	January 2011	Not Applicable
Drift Deposits		
Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations		
British Geological Survey - National Geoscience Information Service	October 2012	Annually
Superficial Aquifer Designations		
British Geological Survey - National Geoscience Information Service	October 2012	Annually

Data Currency

Agency & Hydrological	Version	Update Cycle
Source Protection Zones Environment Agency - Head Office	April 2014	Quarterly
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2014	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	May 2014	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	May 2014	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	May 2014	Quarterly
Flood Defences Environment Agency - Head Office	February 2014	Quarterly
Detailed River Network Lines Environment Agency - Head Office	March 2012	Annually
Detailed River Network Offline Drainage Environment Agency - Head Office	March 2012	Annually

Data Currency

Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites		
Environment Agency - North East Region - Dales Area	May 2014	Quarterly
Environment Agency - North East Region - Yorkshire Area	May 2014	Quarterly
Environment Agency - South East Region - Kent & South London Area	May 2014	Quarterly
Environment Agency - South East Region - North East Thames Area	May 2014	Quarterly
Environment Agency - South East Region - Solent & South Downs Area	May 2014	Quarterly
Environment Agency - South East Region - West Thames Area	May 2014	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - North East Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - North East Region - Dales Area	February 2014	Quarterly
Environment Agency - North East Region - Yorkshire Area	February 2014	Quarterly
Environment Agency - South East Region - Kent & South London Area	February 2014	Quarterly
Environment Agency - South East Region - North East Thames Area	February 2014	Quarterly
Environment Agency - South East Region - Solent & South Downs Area	February 2014	Quarterly
Environment Agency - South East Region - West Thames Area	February 2014	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - North East Region - Dales Area	February 2014	Quarterly
Environment Agency - North East Region - Yorkshire Area	February 2014	Quarterly
Local Authority Landfill Coverage		
North Yorkshire County Council	May 2000	Not Applicable
Ryedale District Council - Environmental Health	May 2000	Not Applicable
Scarborough Borough Council - Environmental Health	May 2000	Not Applicable
Local Authority Recorded Landfill Sites		
North Yorkshire County Council	May 2000	Not Applicable
Ryedale District Council - Environmental Health	May 2000	Not Applicable
Scarborough Borough Council - Environmental Health	May 2000	Not Applicable
Registered Landfill Sites		
Environment Agency - North East Region - Dales Area	March 2003	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - North East Region - Dales Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites		
Environment Agency - North East Region - Dales Area	March 2003	Not Applicable
Hazardous Substances	**Version**	**Update Cycle**
Control of Major Accident Hazards Sites (COMAH)		
Health and Safety Executive	March 2014	Bi-Annually
Explosive Sites		
Health and Safety Executive	November 2013	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS)		
Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements		
Ryedale District Council - Planning Department	November 2012	Annual Rolling Update
Scarborough Borough Council	November 2013	Annual Rolling Update
North Yorkshire County Council	October 2007	Annual Rolling Update
North Yorkshire Moors National Park	September 2007	Annual Rolling Update
Planning Hazardous Substance Consents		
Ryedale District Council - Planning Department	November 2012	Annual Rolling Update
Scarborough Borough Council	November 2013	Annual Rolling Update
North Yorkshire County Council	October 2007	Annual Rolling Update
North Yorkshire Moors National Park	September 2007	Annual Rolling Update

Data Currency

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	August 1996	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	January 2010	Variable
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	April 2014	Bi-Annually
Brine Compensation Area Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Mining Report Service	December 2013	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	February 2011	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	October 2013	As notified
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified
Industrial Land Use	**Version**	**Update Cycle**
Contemporary Trade Directory Entries Thomson Directories	May 2014	Quarterly
Fuel Station Entries Catalist Ltd - Experian	March 2014	Quarterly

Data Currency

Sensitive Land Use	Version	Update Cycle
Areas of Adopted Green Belt Ryedale District Council	May 2014	As notified
Areas of Unadopted Green Belt Ryedale District Council	May 2014	As notified
Areas of Outstanding Natural Beauty Natural England	January 2014	Bi-Annually
Environmentally Sensitive Areas Natural England	July 2013	Annually
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	March 2014	Bi-Annually
Marine Nature Reserves Natural England	July 2013	Bi-Annually
National Nature Reserves Natural England	March 2014	Bi-Annually
National Parks Natural England	January 2014	Bi-Annually
Nitrate Sensitive Areas Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2012	Not Applicable
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2013	Annually
Ramsar Sites Natural England	March 2014	Bi-Annually
Sites of Special Scientific Interest Natural England	March 2014	Bi-Annually
Special Areas of Conservation Natural England	March 2014	Bi-Annually
Special Protection Areas Natural England	March 2014	Bi-Annually

Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	Ordnance Survey Licensed Partner
Environment Agency	Environment Agency
Scottish Environment Protection Agency	SEPA Scottish Environment Protection Agency
The Coal Authority	THE COAL AUTHORITY
British Geological Survey	British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
Centre for Ecology and Hydrology	Centre for Ecology & Hydrology NATURAL ENVIRONMENT RESEARCH COUNCIL
Countryside Council for Wales	CYNGOR CEFN GWLAD CYMRU COUNTRYSIDE COUNCIL FOR WALES
Scottish Natural Heritage	SCOTTISH NATURAL HERITAGE
Natural England	NATURAL ENGLAND
Public Health England	Public Health England
Ove Arup	ARUP
Peter Brett Associates	pba peterbrett

Useful Contacts

Contact	Name and Address	Contact Details
1	**Scarborough Borough Council - Environmental Health** Town Hall, St Nicholas Street, Scarborough, North Yorkshire, YO11 2HG	Website: www.scarborough.gov.uk
2	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 08708 506 506 Email: enquiries@environment-agency.gov.uk
3	**British Geological Survey - Enquiry Service** British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
4	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmark.co.uk Website: www.landmarkinfo.co.uk
5	**Natural England** Suite D, Unex House, Bourges Boulevard, Peterborough, Cambridgeshire, PE1 1NG	Telephone: 0845 600 3078 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
6	**Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)** Government Buildings, Otley Road, Lawnswood, Leeds, West Yorkshire, LS16 5QT	Telephone: 0113 2613333 Fax: 0113 230 0879
7	**North Yorkshire County Council** County Hall, Northallerton, North Yorkshire, DL7 8AD	Telephone: 01609 780780 Fax: 01609 778199 Website: www.northyorks.gov.uk
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / SEPA have a charging policy in place for enquiries.

consulting engineers

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

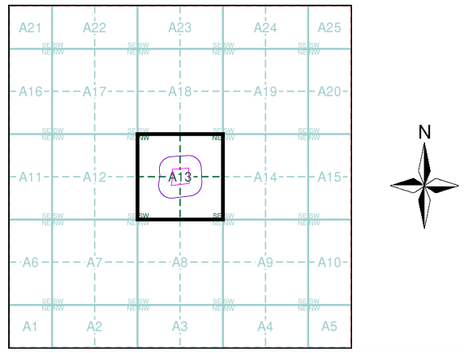
Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Segment A13



Order Details

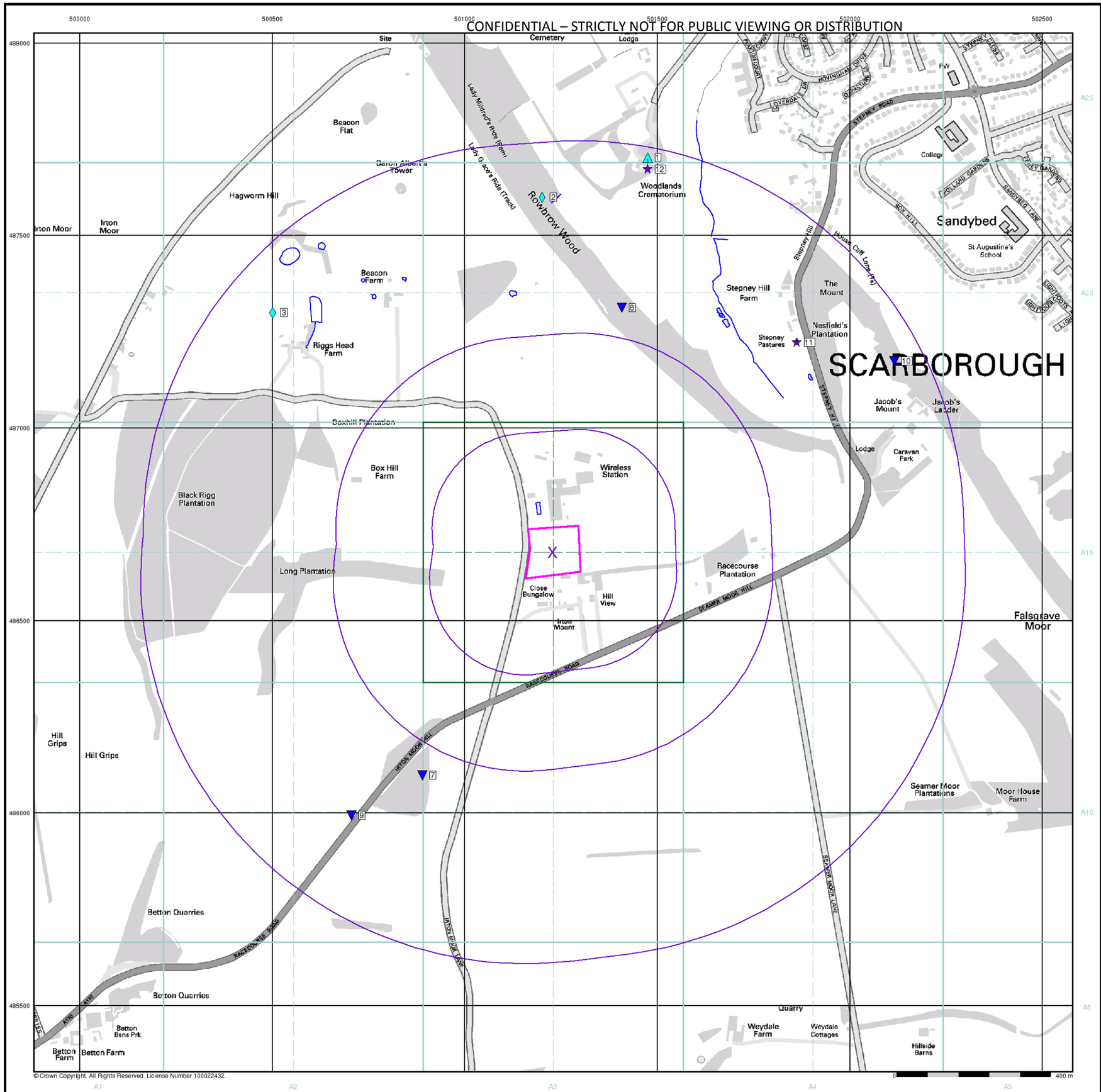
Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64

Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark Information Group

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



consulting engineers

General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Map ID
Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

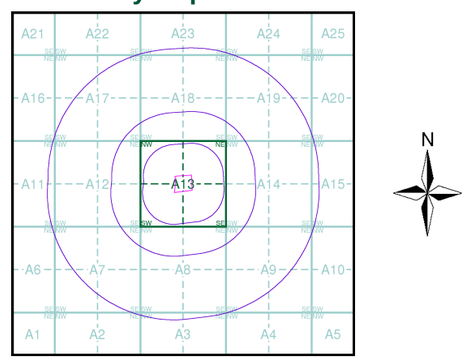
Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Slice A



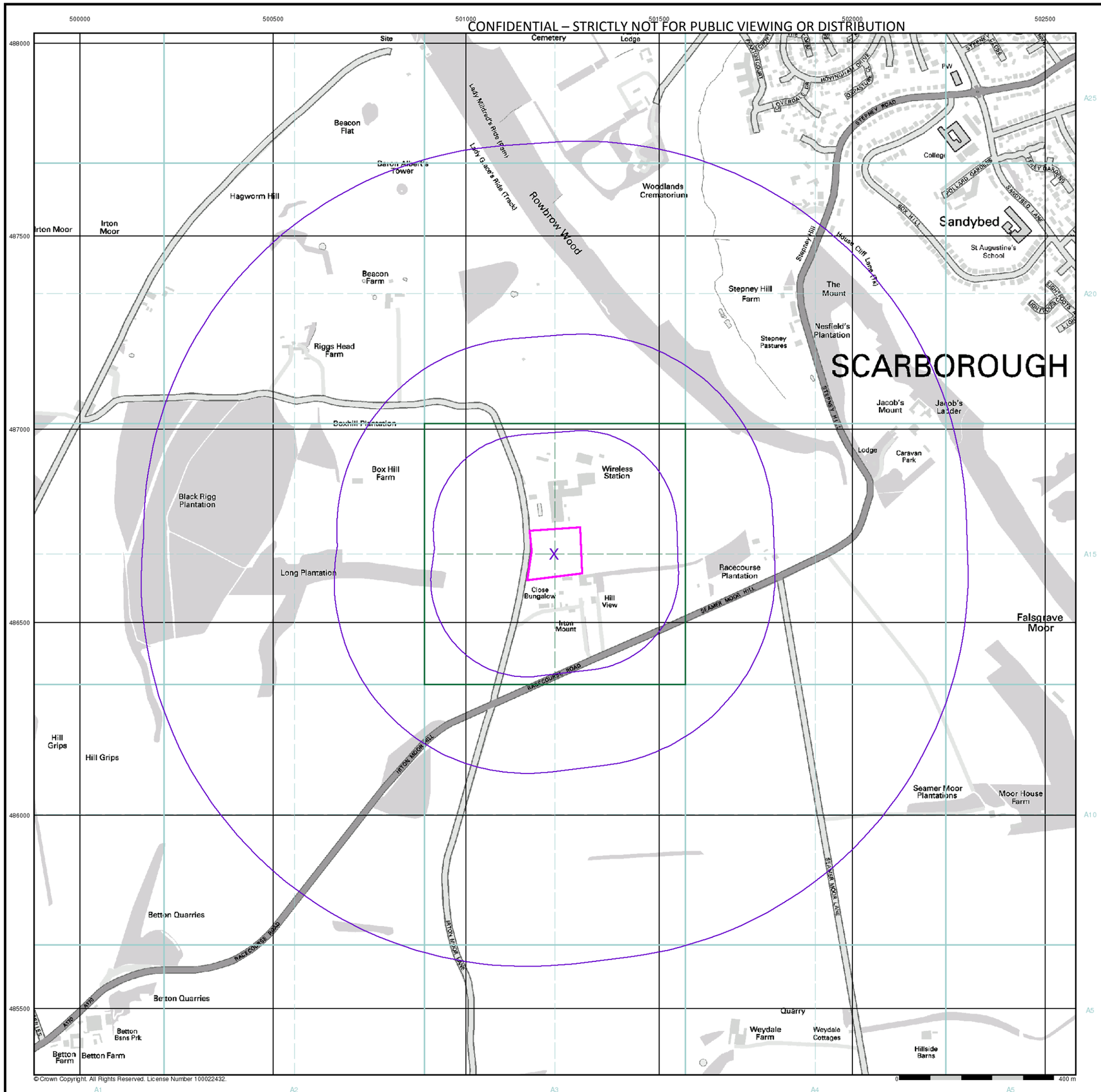
Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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



consulting engineers

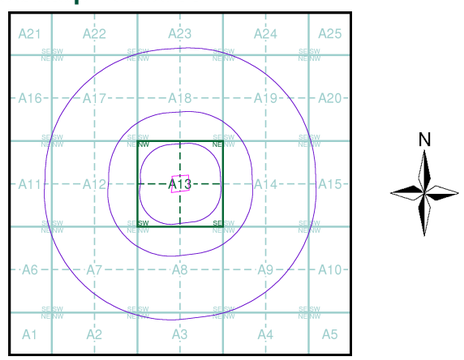
General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

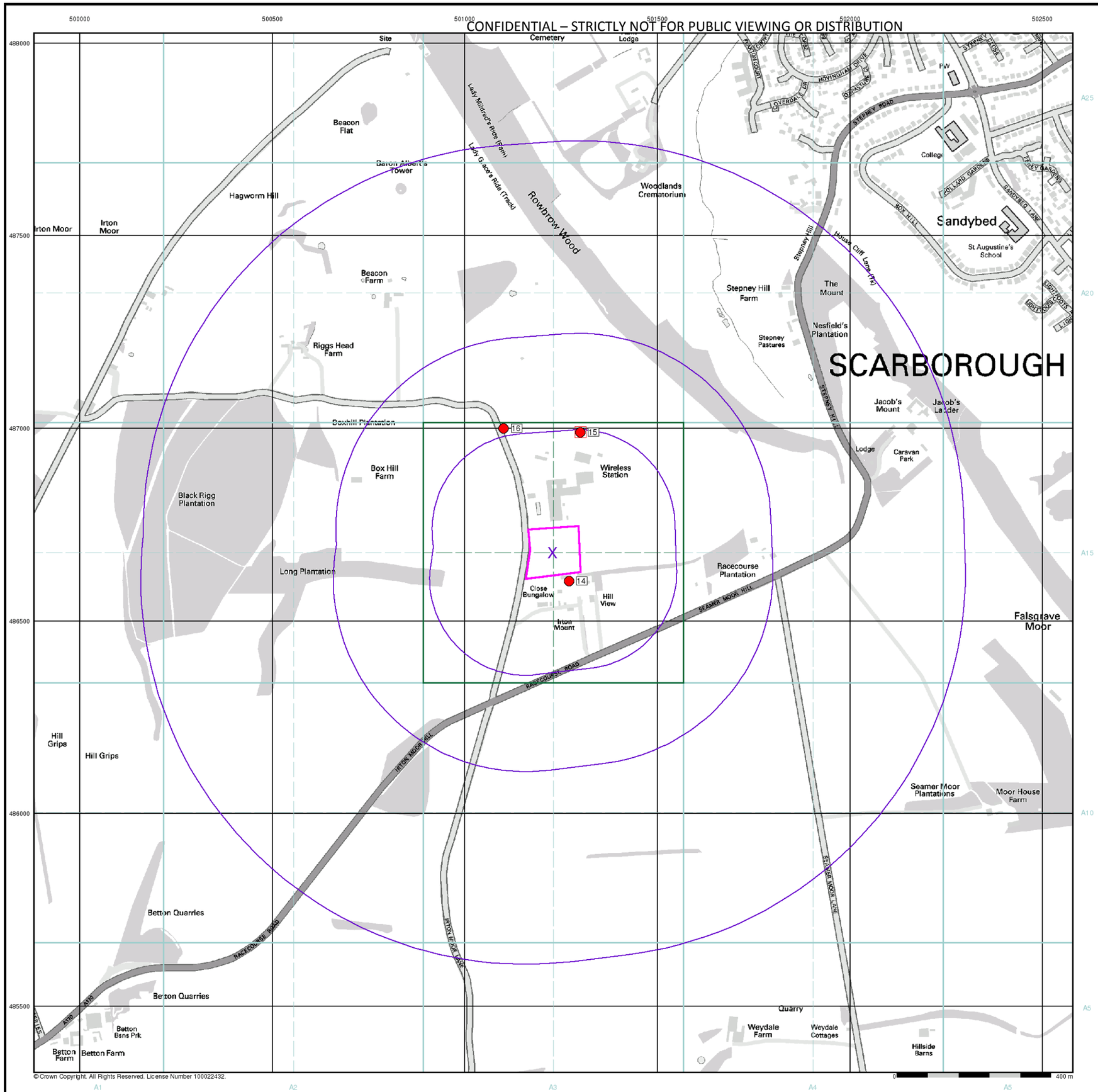
Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark Information Group

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



consulting engineers

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

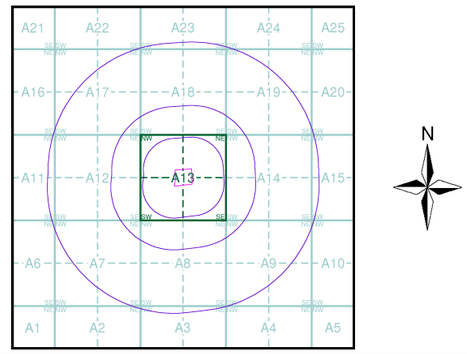
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



Order Details

Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

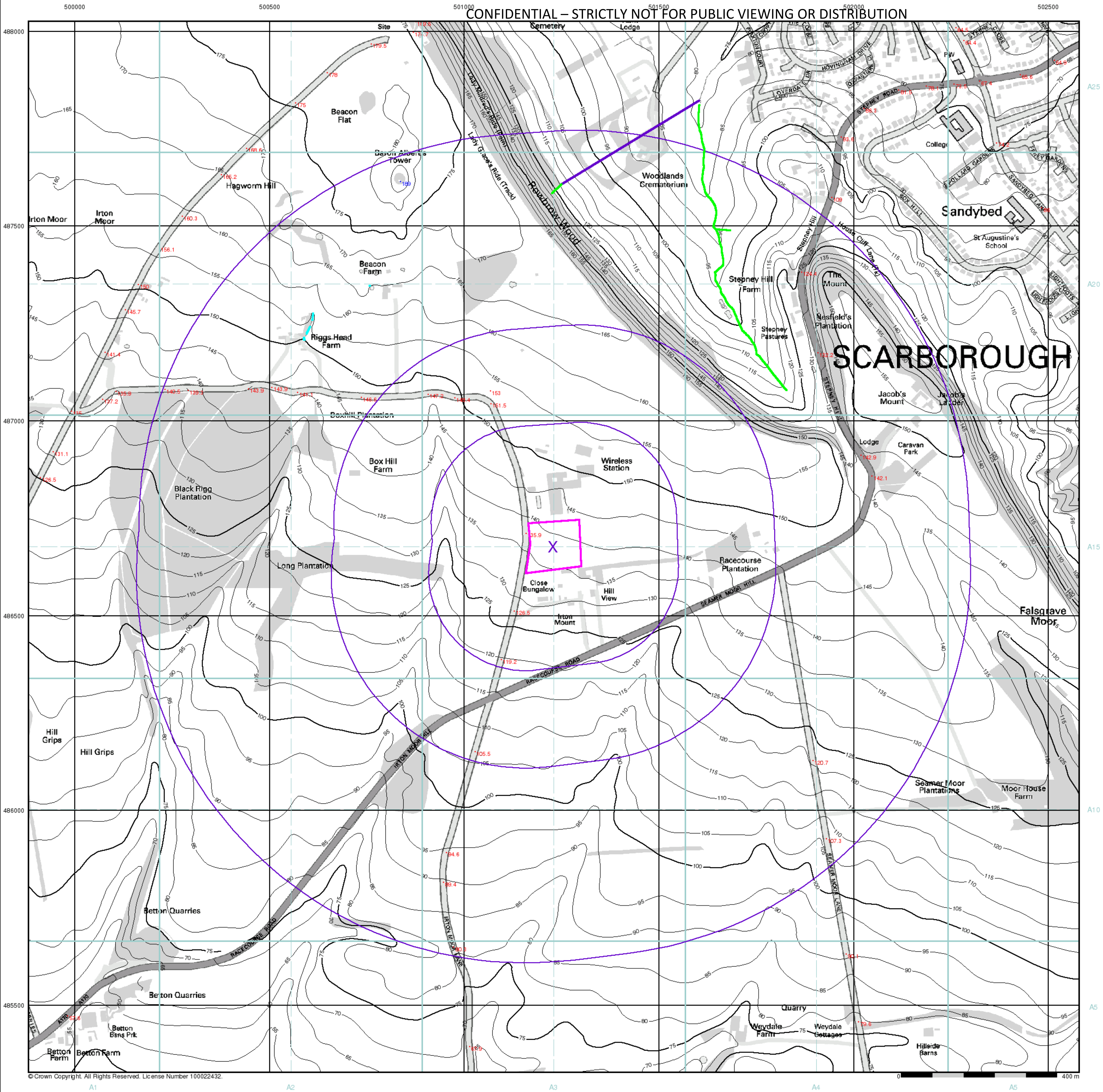
Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark® Information Group

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

CONFIDENTIAL – STRICTLY NOT FOR PUBLIC VIEWING OR DISTRIBUTION



consulting engineers

General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point
- Map ID

EA Detailed River Network Data

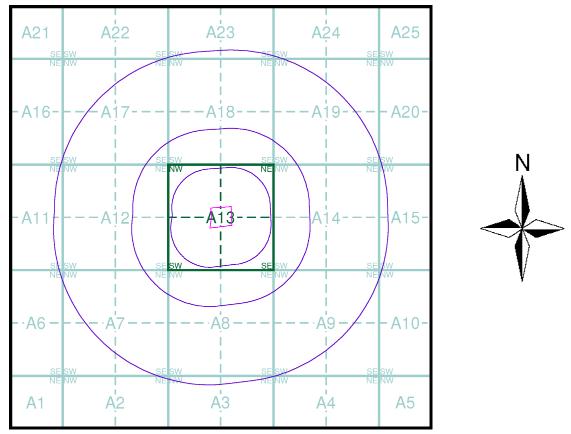
Primary River	Extended Culvert (greater than 50m
Secondary River	Underground River (inferred))
Tertiary River	Underground River (local knowledge
Canal	Downstream of High Water Mark)
Canal Tunnel	Downstream of Seaward Extension
Undefined River	Not assigned River feature
Lake/Reservoir	
Offline Drainage Feature	

Contours (height in metres)

Standard Contour — 105   167.3 Spot Height

Index Contour — 100 95   45.8 Air Height

EA Detailed River Network Map - Slice A



Order Details

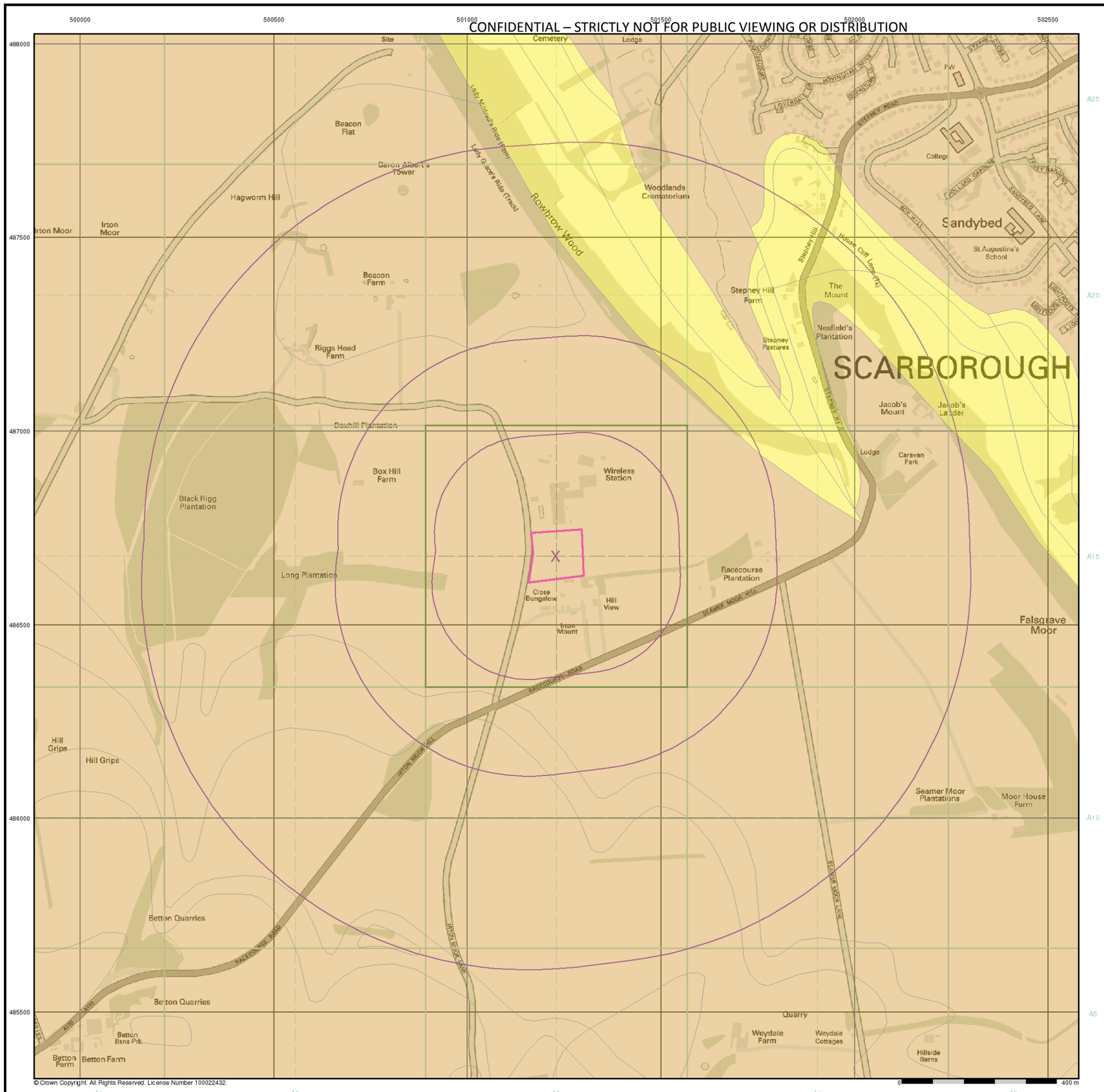
Order Number:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark Information Group

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



consulting engineers

General

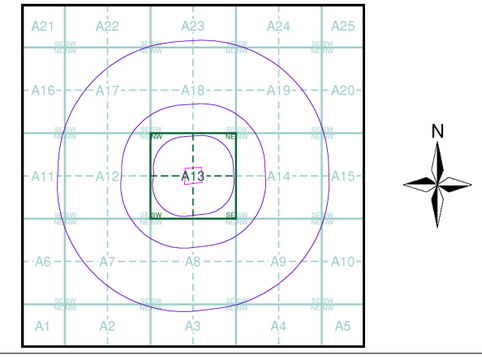
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg

- < 15
- 15 - 25
- 25 - 35
- 35 - 45
- 45 - 60
- 60 - 120
- > 120

Estimated Soil Chemistry Arsenic - Slice A



Order Details

Order Details:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark® Information Group

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

consulting engineers

General

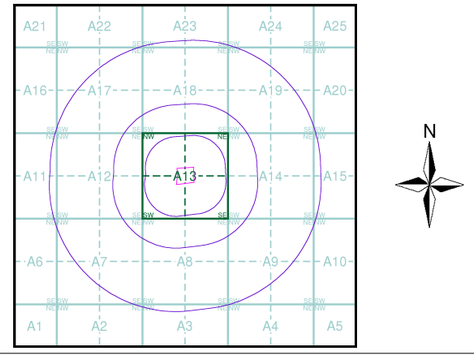
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg

- < 1.8
- 1.8 - 2.2
- 2.2 - 3.0
- > 3.0

Estimated Soil Chemistry Cadmium - Slice A



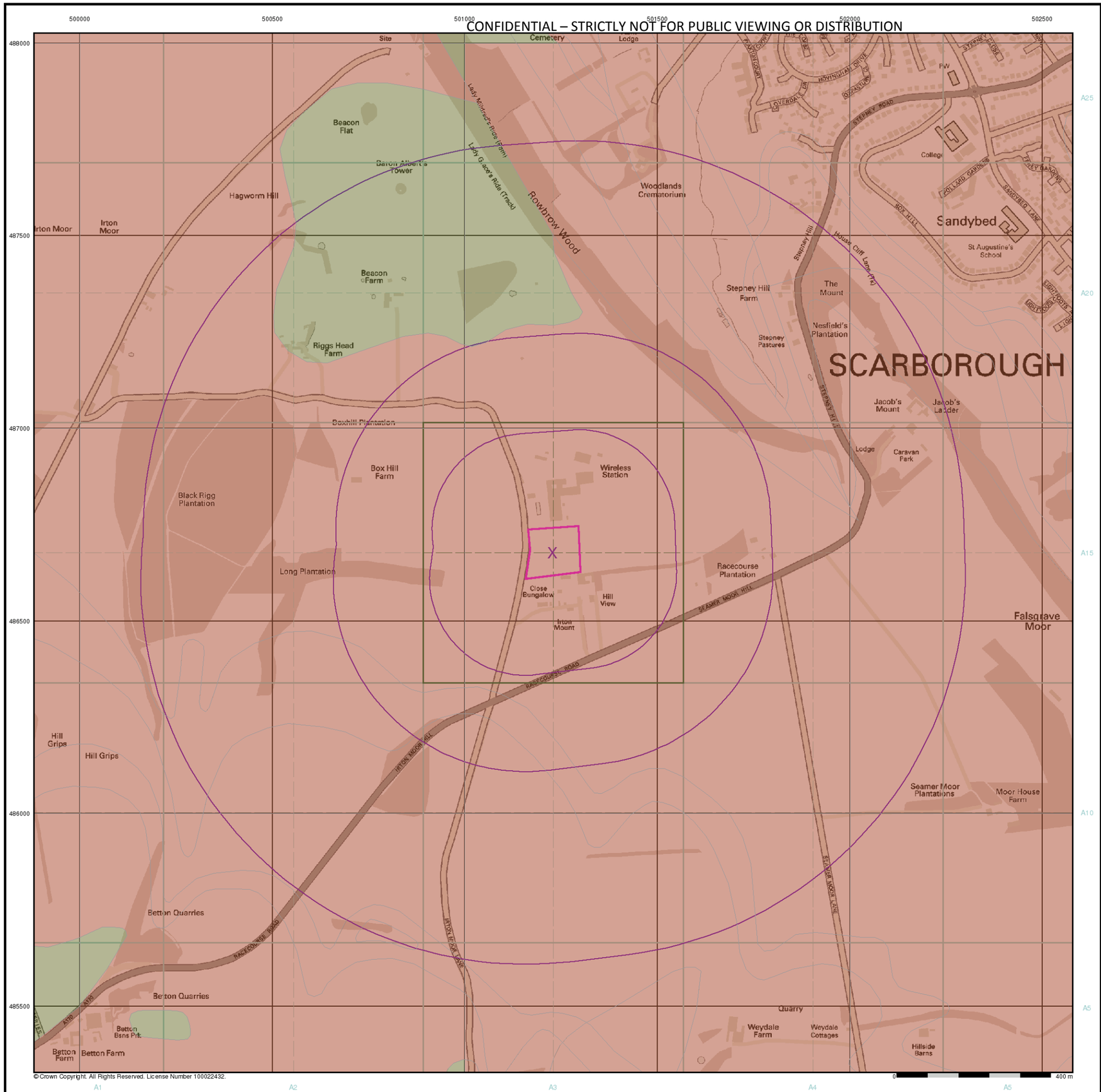
Order Details

Order Details:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark® Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



consulting engineers

General

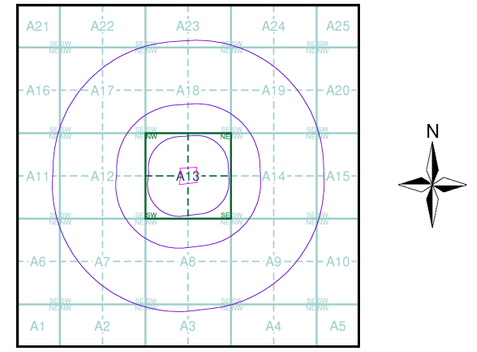
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg

- < 20
- 20 - 40
- 40 - 60
- 60 - 90
- 90 - 120
- 120 - 180
- > 180

Estimated Soil Chemistry Chromium - Slice A



Order Details

Order Details:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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

consulting engineers

General

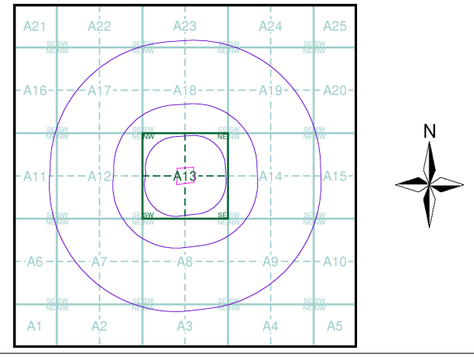
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg

- < 150
- 150 - 300
- 300 - 600
- 600 - 900
- > 900

Estimated Soil Chemistry Lead - Slice A



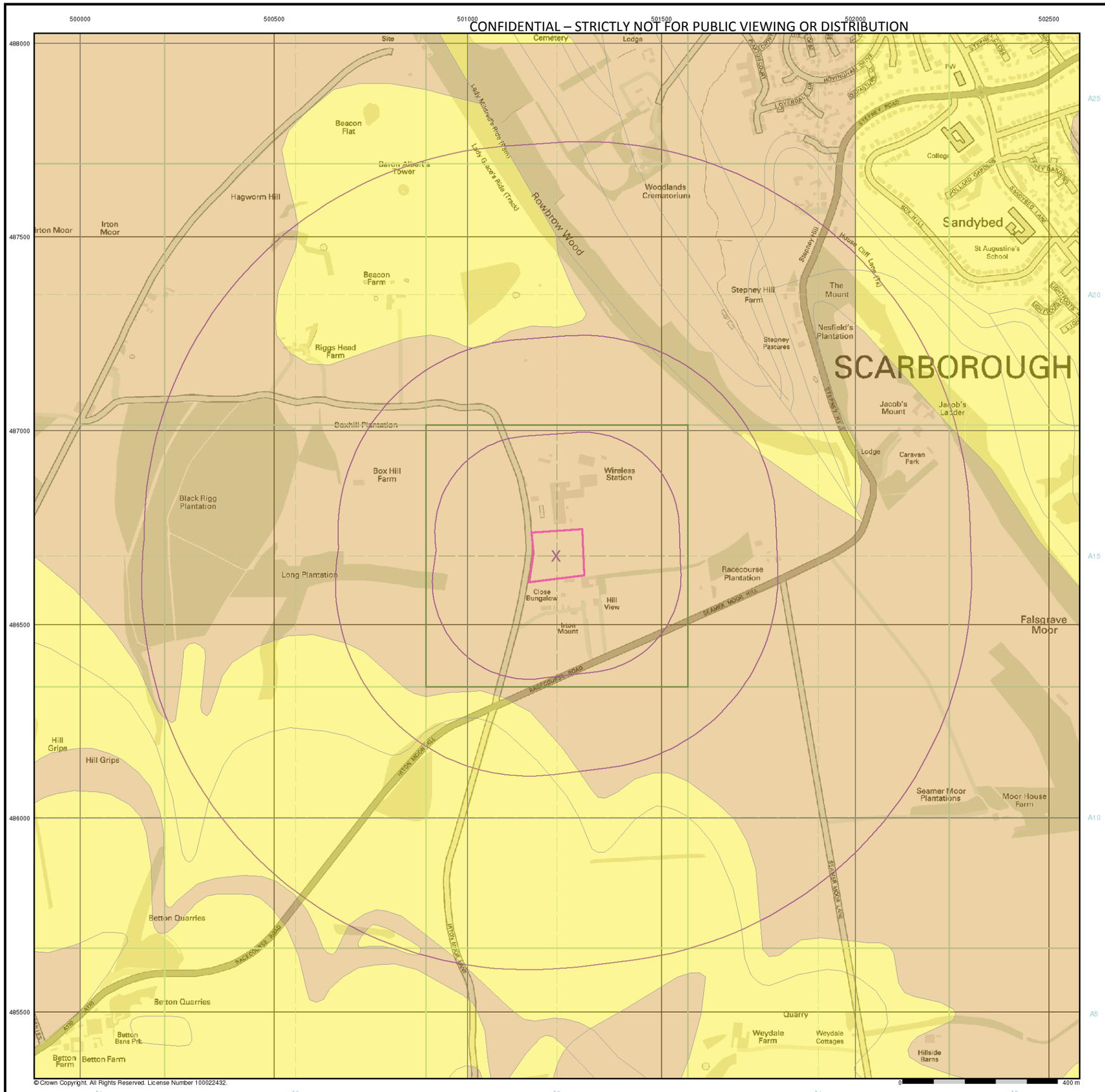
Order Details

Order Details:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

Landmark® Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



consulting engineers

General

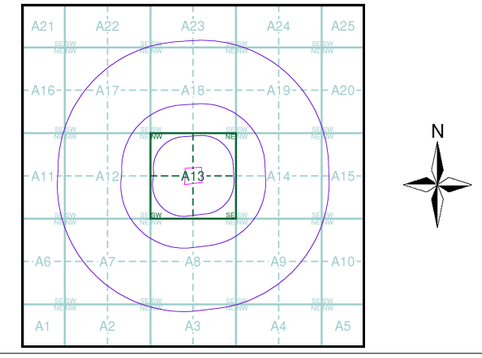
Specified Site | Specified Buffer(s) | X Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg

- < 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 80
- 80 - 100
- > 100

Estimated Soil Chemistry Nickel - Slice A



Order Details

Order Details:	57814167_1_1
Customer Ref:	13084
National Grid Reference:	501230, 486680
Slice:	A
Site Area (Ha):	1.64
Search Buffer (m):	1000

Site Details

OMEGA 1, Scarborough, YO12 5TQ

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

Appendix D

Exploratory Hole Records

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Trial Pit Log

TP01

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Key: B = Large Disturbed Sample; D = Small Disturbed Sample; W = Water Sample; HSV = Hand Shear Vane; CBR = Mexecone; ES = Environmental Sample

Plant: JCB 3CX
Date: 03/07/2014
Logged By: AJB

Samples		Tests			Strata Details				
Depth (m)	Type	Depth (m)	HSV (kPa)	CBR (%)	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend
					(0.25) 0.25	MADE GROUND: Limestone hardcore with localised traces of topsoil along the base.			
0.30	D				(0.55) 0.80	Light brown very gravelly and cobbly slightly silty SAND. Gravel and cobbles of subrounded to subangular calcareous sandstone.			
0.90-1.20	B				(1.05) 1.85	Light brown very sandy GRAVEL and COBBLES of sandstone with occasional boulders (Highly weathered sandstone).	1.0		
1.20	D					*End of Exploratory Hole at 1.85m*			

Groundwater Observations		
No.	Struck (m)	Remarks
		No Groundwater Encountered

Stability / Dimensions
Stability: Good
Length:
Width:
Orientation:

General Remarks
1. No groundwater encoutered.
2. Pit terminated on hard digging.
3. Backfilled with arisings.

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Trial Pit Log

TP02

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Key: B = Large Disturbed Sample; D = Small Disturbed Sample; W = Water Sample; HSV = Hand Shear Vane; CBR = Mexecone; ES = Environmental Sample

Plant: JCB 3CX
Date: 03/07/2014
Logged By: AJB

Samples		Tests			Strata Details				
Depth (m)	Type	Depth (m)	HSV (kPa)	CBR (%)	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend
0.15	D				(0.25) 0.25	Brown gravelly TOPSOIL. Gravel of angular concrete and sandstone.			
0.60-0.80	B				(0.55) 0.80	Orange brown very gravelly slightly clayey SAND with occasional cobbles. Gravel and cobbles of subrounded to subangular calcareous sandstone.			
0.80	D				(0.90) 1.70	Orange brown very sandy GRAVEL and COBBLES of sandstone with occasional boulders (Highly weathered sandstone).	1.0		
						End of Exploratory Hole at 1.7m			

Groundwater Observations		
No.	Struck (m)	Remarks
		No Groundwater Encountered

Stability / Dimensions
Stability: Good
Length:
Width:
Orientation:

General Remarks
1. No groundwater encoutered.
2. Pit terminated on hard digging.
3. Backfilled with arisings.

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Trial Pit Log

TP03

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Key: B = Large Disturbed Sample; D = Small Disturbed Sample; W = Water Sample; HSV = Hand Shear Vane; CBR = Mexecone; ES = Environmental Sample

Plant: JCB 3CX
Date: 03/07/2014
Logged By: AJB

Samples		Tests			Strata Details				
Depth (m)	Type	Depth (m)	HSV (kPa)	CBR (%)	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend
0.20	D				(0.40) 0.40	MADE GROUND: Reworked brown gravelly TOPSOIL. Gravel of angular concrete, glass and sandstone.			
					(0.30) 0.70	Brown gravelly TOPSOIL. Gravel of angular concrete and sandstone.			
0.80-1.00 0.80	B D				(0.70) 1.40	Light brown very gravelly, slightly clayey SAND with occasionbal cobbles. Gravel and cobbles of subrounded to subangular calcareous sandstone.	1.0		
1.50	D				(1.00) 2.40	Light brown very sandy GRAVEL and COBBLES of sandstone with occasional boulders (Highly weathered sandstone).	2.0		
						End of Exploratory Hole at 2.4m			

Groundwater Observations		
No.	Struck (m)	Remarks
		No Groundwater Encountered

Stability / Dimensions
Stability: Good
Length:
Width:
Orientation:

General Remarks
1. No groundwater encoutered.
2. Pit terminated on hard digging.
3. Backfilled with arisings.

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Trial Pit Log

TP04

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Key: B = Large Disturbed Sample; D = Small Disturbed Sample; W = Water Sample; HSV = Hand Shear Vane; CBR = Mexecone; ES = Environmental Sample

Plant: JCB 3CX
Date: 03/07/2014
Logged By: AJB

Samples		Tests			Strata Details				
Depth (m)	Type	Depth (m)	HSV (kPa)	CBR (%)	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend
0.15	D				(0.25) 0.25	MADE GROUND: Limestone hardcore with occasional rags at the base.			
					(0.30) 0.55	MADE GROUND: Reworked light brown SAND and GRAVEL of sandstone.			
0.60	D				(0.35) 0.90	Relict loamy TOPSOIL with some wood fragments and roots.			
1.00	B					Light brown very clayey sandy GRAVEL and COBBLES of sandstone with occasional boulders (Highly weathered sandstone).	1.0		
1.20	D				(1.50)				
					2.40		2.0		
						End of Exploratory Hole at 2.4m			

Groundwater Observations		
No.	Struck (m)	Remarks
		No Groundwater Encountered

Stability / Dimensions
Stability: Good
Length:
Width:
Orientation:

General Remarks
1. No groundwater encoutered.
2. Pit terminated on hard digging.
3. Soakaway tests performed in the trial pit.
4. Backfilled with arisings.

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Trial Pit Log

TP05

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Key: B = Large Disturbed Sample; D = Small Disturbed Sample; W = Water Sample; HSV = Hand Shear Vane; CBR = Mexecone; ES = Environmental Sample

Plant: JCB 3CX
Date: 03/07/2014
Logged By: AJB

Samples		Tests			Strata Details				
Depth (m)	Type	Depth (m)	HSV (kPa)	CBR (%)	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend
0.20	D				(0.30) 0.30	Brown gravelly TOPSOIL. Gravel of angular concrete and sandstone.			
0.50	D				(0.60) 0.90	Light brown very gravelly and cobbly slightly cobbly slightly silty SAND. Gravel and cobbles of subrounded to subangular calcareous sandstone.			
0.60-0.80	B								
1.50	D				(0.95) 1.85	Light brown very sandy GRAVEL and COBBLES of sandstone with occasional boulders (Highly weathered sandstone).	1.0		
						End of Exploratory Hole at 1.95m			

Groundwater Observations		
No.	Struck (m)	Remarks
		No Groundwater Encountered

Stability / Dimensions
Stability: Good
Length:
Width:
Orientation:

General Remarks
1. No groundwater encoutered.
2. Pit terminated on hard digging.
3. Backfilled with arisings.

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Trial Pit Log

TP06

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Key: B = Large Disturbed Sample; D = Small Disturbed Sample; W = Water Sample; HSV = Hand Shear Vane; CBR = Mexecone; ES = Environmental Sample

Plant: JCB 3CX
Date: 03/07/2014
Logged By: AJB

Samples		Tests			Strata Details				
Depth (m)	Type	Depth (m)	HSV (kPa)	CBR (%)	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend
0.15	D				(0.20) 0.20	Brown gravelly TOPSOIL. Gravel of angular concrete and sandstone.			
0.40	D				(0.30) 0.50	Light brown slightly gravelly SAND. Gravel of subrounded to subangular sandstone.			
0.60-0.80	B				(0.70) 1.20	Light brown very sandy slghtly clayey rounded to subangular GRAVEL of sandstone with occasional cobbles and boulders.	1.0		
1.00	D				(0.20) 1.40	Light brown very slighlty silty gravelly SAND. Gravel of subangular sandstone (Highly weathered sandstone).			
						End of Exploratory Hole at 1.4m			

Groundwater Observations		
No.	Struck (m)	Remarks
		No Groundwater Encountered

Stability / Dimensions

Stability: Good
Length:
Width:
Orientation:

General Remarks

1. No groundwater encoutered.
2. Pit terminated at 1.40m to perform soakaway test.
3. Backfilled with arisings.

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Mini-Percussive Log

BH01

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Contractor:

Key: = Water Strike Depth & No. = Resting Water Depth & No.
D = Small Disturbed Sample
B = Large Disturbed Sample
ES = Environmental Sample
W = Water Sample
HSV = Hand Shear Vane (kPa)
S / C = Split Spoon / Cone
N = SPT N Value

Plant: Dando Terrier
Date: 03/07/2014
Logged By: AHC

Samples/Tests			Strata Details					Well	
Depth (m)	Type	Results	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend	Strike	Log
0.10	D		(0.20) 0.20	Brown TOPSOIL with occasional angular brick gravel. MADE GROUND					
0.30	D			Medium dense brown very clayey gravelly SAND. Gravel is angular to subangular sandstone. (Highly weathered sandstone)					
			(1.30)						
1.00	C	N28 (6/6/7/7/7/7)			1.0				
1.30	D								
1.50	C	N52/225mm (7/7/10/14/28/-)	1.50						
			(0.38)	Very weak to weak yellow/brown flaggy SANDSTONE, recovered as angular tabular gravel.					
			1.88						
				End of Exploratory Hole at 1.875m					

Groundwater Observations			Window Sample Run				General Remarks
No.	Struck (m)	Remarks	From (m)	To (m)	Dia. (mm)	Recovery (%)	1. Hand dug inspection pit to 1.0m. 2. Completed on refusal. 3. Monitoring well installed.
		No Groundwater Encountered					

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Mini-Percussive Log

BH02

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Contractor:

Key:
= Water Strike Depth & No.
= Resting Water Depth & No.
D = Small Disturbed Sample
B = Large Disturbed Sample
ES = Environmental Sample
W = Water Sample
HSV = Hand Shear Vane (kPa)
S / C = Split Spoon / Cone
N = SPT N Value

Plant: Dando Terrier
Date: 03/07/2014
Logged By: AHC

Samples/Tests			Strata Details					Well	
Depth (m)	Type	Results	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend	Strike	Log
0.10	D		(0.70) 0.70	Brown TOPSOIL with occasional angular brick gravel. MADE GROUND					
0.90	D		(0.30) 1.00	Light grey angular GRAVEL of limestone. MADE GROUND					
1.00	C	N29 (6/6/7/7/7/8)			1.0				
1.30	D		(0.50) 1.50	Medium dense brown gravelly SAND. Gravel is angular to subangular sandstone. (Highly weathered sandstone)					
1.50	C	N52 (7/7/9/11/14/18)	(0.45) 1.95	Very weak to weak yellow/brown flaggy SANDSTONE, recovered as angular tabular gravel.					
				End of Exploratory Hole at 1.95m					

Groundwater Observations			Window Sample Run				General Remarks
No.	Struck (m)	Remarks	From (m)	To (m)	Dia. (mm)	Recovery (%)	
		No Groundwater Encountered					1. Hand dug inspection pit to 1.0m. 2. Completed on refusal. 3. Backfilled with arisings.

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Mini-Percussive Log

BH03

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Contractor:

Key:
= Water Strike Depth & No.
= Resting Water Depth & No.
D = Small Disturbed Sample
B = Large Disturbed Sample
ES = Environmental Sample
W = Water Sample
HSV = Hand Shear Vane (kPa)
S / C = Split Spoon / Cone
N = SPT N Value

Plant: Dando Terrier
Date: 03/07/2014
Logged By: AHC

Samples/Tests			Strata Details					Well	
Depth (m)	Type	Results	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend	Strike	Log
0.05	D		(0.20) 0.20	Brown TOPSOIL with occasional angular brick gravel. MADE GROUND					
0.60	D		(0.90)	Medium dense brown gravelly SAND. Gravel is angular to subangular sandstone. (Highly weathered sandstone)					
0.95	D								
1.00	C	N42 (3/3/5/10/11/16)	1.10		1.0				
			(0.85)	Dense yellow/brown silty SAND. 1.50 becoming damp					
1.80	D		1.95						
2.00	C	N50/0mm (25/-/50/-/-/-)	2.00	Yellow/brown SANDSTONE. (Poor recovery) *End of Exploratory Hole at 2m*	2.0				

Groundwater Observations			Window Sample Run				General Remarks
No.	Struck (m)	Remarks	From (m)	To (m)	Dia. (mm)	Recovery (%)	1. Hand dug inspection pit to 1.0m. 2. Completed on refusal. 3. Monitoring well installed.
		No Groundwater Encountered					

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Mini-Percussive Log

BH04

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Contractor:

Key: = Water Strike Depth & No. = Resting Water Depth & No.
D = Small Disturbed Sample
B = Large Disturbed Sample
ES = Environmental Sample
W = Water Sample
HSV = Hand Shear Vane (kPa)
S / C = Split Spoon / Cone
N = SPT N Value

Plant: Dando Terrier
Date: 03/07/2014
Logged By: AHC

Samples/Tests			Strata Details					Well	
Depth (m)	Type	Results	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend	Strike	Log
0.10	D		(0.25) 0.25	Brown TOPSOIL with occasional angular brick gravel. MADE GROUND					
0.80	D			Medium dense brown gravelly SAND. Gravel is angular to subangular sandstone. (Highly weathered sandstone)					
1.00	C	N29 (4/4/4/6/9/10)	(1.45)		1.0				
1.60	D		1.70						
1.70	C	N25 (8/8/8/8/5/4)		Very weak to weak yellow/brown flaggy SANDSTONE, recovered as angular tabular gravel.					
2.15	C	N52/75mm (3/2/2/50/-/-)	(0.53) 2.23		2.0				
				End of Exploratory Hole at 2.225m					

Groundwater Observations			Window Sample Run				General Remarks
No.	Struck (m)	Remarks	From (m)	To (m)	Dia. (mm)	Recovery (%)	1. Hand dug inspection pit to 1.0m. 2. Completed on refusal. 3. Backfilled with arisings.
		No Groundwater Encountered					

consulting engineers
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Tel. 01924 240420

Mini-Percussive Log

BH05

Site Name: Omega 1a
Client: Morgan Sindall
Project No: 13084

Ground Level:
Easting:
Northing:

Contractor:

Key:
= Water Strike Depth & No.
= Resting Water Depth & No.
D = Small Disturbed Sample
B = Large Disturbed Sample
ES = Environmental Sample
W = Water Sample
HSV = Hand Shear Vane (kPa)
S / C = Split Spoon / Cone
N = SPT N Value

Plant: Dando Terrier
Date: 03/07/2014
Logged By: AHC

Samples/Tests			Strata Details					Well	
Depth (m)	Type	Results	Depth (m) (Thickness)	Strata Description	Depth (m)	Level (AOD)	Legend	Strike	Log
0.10	D		(0.25) 0.25	Brown TOPSOIL with occasional angular brick gravel. MADE GROUND					
0.60	D			Loose brown very clayey gravelly SAND. Gravel is angular to subangular sandstone. (Highly weathered sandstone)					
1.00	C	N8 (3/3/2/2/2/2)	(1.70)		1.0				
1.60	D								
2.00	C	N50/0mm (25/-/50/-/-/-)	1.95 2.00	Very weak to weak yellow/brown SANDSTONE. (Poor recovery)	2.0				
				End of Exploratory Hole at 2m					

Groundwater Observations			Window Sample Run				General Remarks
No.	Struck (m)	Remarks	From (m)	To (m)	Dia. (mm)	Recovery (%)	1. Hand dug inspection pit to 0.8m. 2. Completed on refusal. 3. Backfilled with arisings.
		No Groundwater Encountered					

Appendix E

Soakaway Tests

Gas monitoring record

3e Consulting Engineers Ltd
4 Calder Close
Calder Park
Wakefield
WF4 3BA

Job no: 13084
Site: Omega 1a

Date: 18.7.14
Weather: Overcast
Pressure Trend: Falling

BH No	Methane (%v/v)	Carbon dioxide (%v/v)	Oxygen (%v/v)	Barometric Pressure (mb)	Flow (l/hr)	Water level (m bgl)	Remarks
BH1	0.1	4.1	17.3	1005	0.0	Dry	
BH3	0.1	5.1	16.6		0.0	Dry	

Date: 25.7.14
Weather: Clear, sunny
Pressure Trend: Falling

BH No	Methane (%v/v)	Carbon dioxide (%v/v)	Oxygen (%v/v)	Barometric Pressure (mb)	Flow (l/hr)	Water level (m bgl)	Remarks
BH1	0.0	4.3	16.8	1009	0.0	Dry	
BH3	0.0	5.7	16.4		0.0	Dry	

Appendix F

Gas and Groundwater Monitoring Records

CALCULATIONS/SKETCHES

PROJECT	Omega 1, Scarborough				
JOB No	13084	PREPARED BY	AJB	Test Ref.	TP4 T1
DATE	3-Jul-14	CHECKED BY	AHC	REV	0

consulting engineers

Calculation of soil infiltration rate in accordance with BRE Digest 365

Length of trial pit = L_{TP} = 1.900 *m*
Width of trial pit = W_{TP} = 0.800 *m*
Effective Depth = D_{TP} = 0.330 *m* *(measured below incoming invert)*

75% Effective Depth of trial pit = D_{75} = (D_{TP} x 0.75) = 0.248 *m*
50% Effective Depth of trial pit = D_{50} = (D_{TP} x 0.50) = 0.165 *m*
25% Effective Depth of trial pit = D_{25} = (D_{TP} x 0.25) = 0.083 *m*

Pit Voids = PV = 100 % *(For open pits, PV = 100%. For stone filled pits, PV = 30%)*

Time to fall from 75% to 25% effective depth = T_1 = 24 *mins*

Volume of water escaping during this test between D_{75} and D_{25}
= V_{TP75_25} = (L_{TP} x W_{TP} x (D_{75} - D_{25}) x PV) = 0.251 *cu m.*

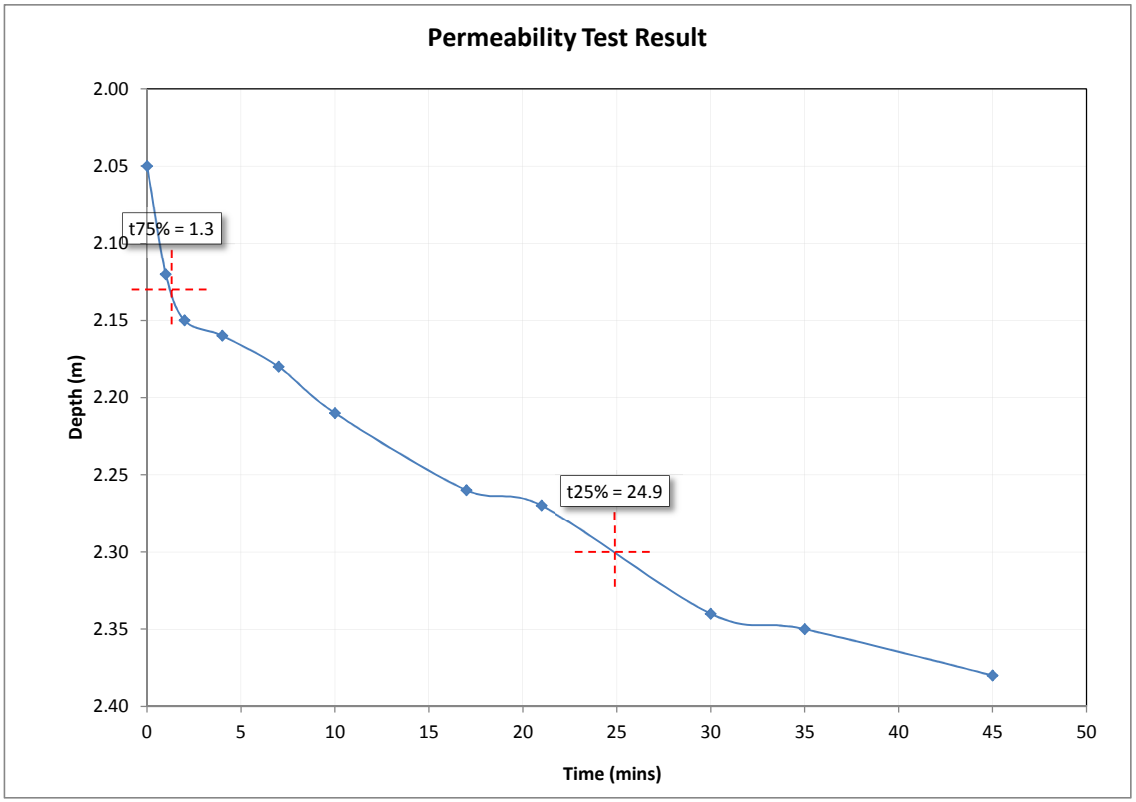
The mean surface area through which the above volume escapes, is the *wetted area.*
Only 50% of the effective depth is allowed in the calculation.

ie A_{P50} = (Wet Base Area + 50% of Wet Sides Area)
A_{P50} = (L_{TP} x W_{TP}) + (2L_{TP}+2W_{TP}) x D_{50}
A_{P50} = 1.520 + 0.891
A_{P50} = 2.411 *sq m*

Soil Infiltration Rate = f = $\frac{V_{TP75\_25}}{A_{P50} \times 60 \times T_L}$ *m/s*

Soil Infiltration Rate = f = 7.22E-05 *m/s*

Trial Pit:	TP4 Test 1
Time (mins)	**Water Depth (bgl)**
0	2.05
1	2.12
2	2.15
4	2.16
7	2.18
10	2.21
17	2.26
21	2.27
30	2.34
35	2.35
45	2.38



Total Fall (m):	0.33
75% Depth (m)	2.13
50% Depth (m)	2.22
25% Depth (m)	2.30
Effective Range 75% - 25% (m)	0.17

Time to fall to 75% Depth (mins)	1
Time to fall to 25% Depth (mins)	25
Time from 75% to 25% Depth (mins)	24

CALCULATIONS/SKETCHES

PROJECT	Omega 1, Scarborough				
JOB No	13084	PREPARED BY	AB	Test Ref.	TP4 T2
DATE	3-Jul-14	CHECKED BY	AHC	REV	0

consulting engineers

Calculation of soil infiltration rate in accordance with BRE Digest 365

Length of trial pit = L_{TP} = 1.900 *m*
Width of trial pit = W_{TP} = 0.800 *m*
Effective Depth = D_{TP} = 0.670 *m* *(measured below incoming invert)*

75% Effective Depth of trial pit = D_{75} = (D_{TP} x 0.75) = 0.503 *m*
50% Effective Depth of trial pit = D_{50} = (D_{TP} x 0.50) = 0.335 *m*
25% Effective Depth of trial pit = D_{25} = (D_{TP} x 0.25) = 0.168 *m*

Pit Voids = PV = 100 % *(For open pits, PV = 100%. For stone filled pits, PV = 30%)*

Time to fall from 75% to 25% effective depth = T_1 = 35 *mins*

Volume of water escaping during this test between D_{75} and D_{25}
= V_{TP75_25} = (L_{TP} x W_{TP} x (D_{75} - D_{25}) x PV) = 0.509 *cu m.*

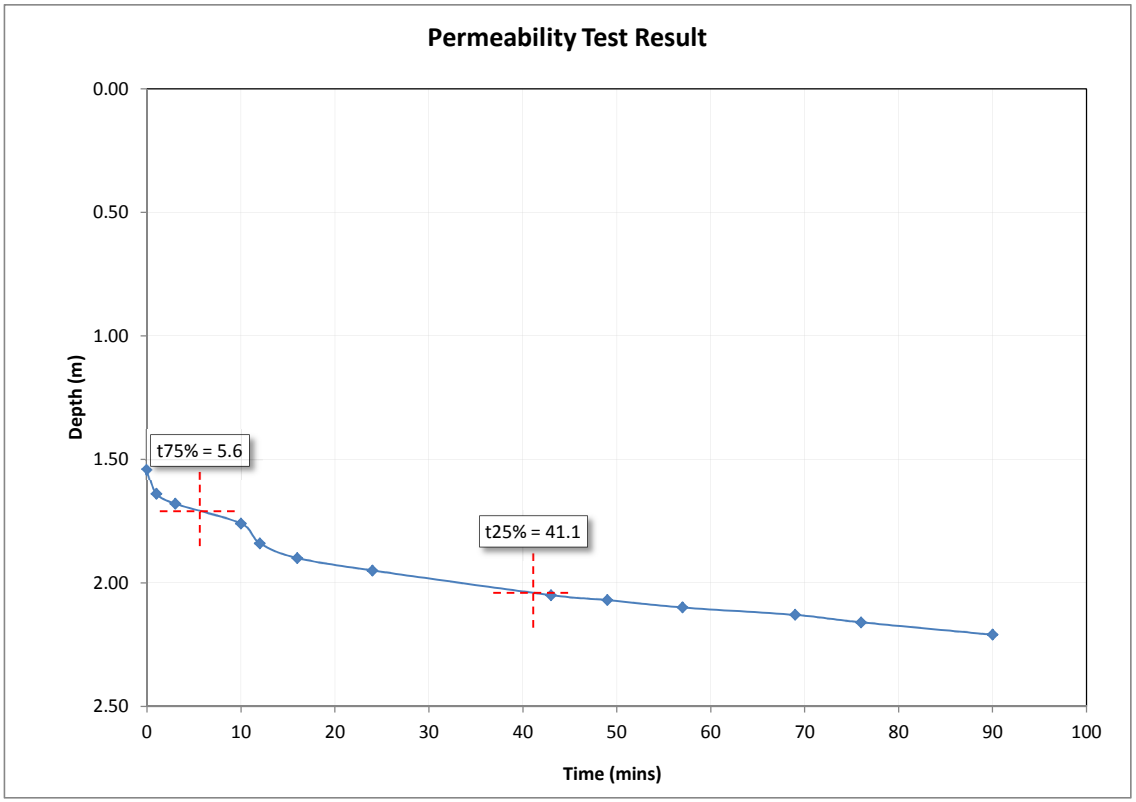
The mean surface area through which the above volume escapes, is the *wetted area.*
Only 50% of the effective depth is allowed in the calculation.

ie A_{P50} = (Wet Base Area + 50% of Wet Sides Area)
A_{P50} = (L_{TP} x W_{TP}) + (2L_{TP}+2W_{TP}) x D_{50}
A_{P50} = 1.520 + 1.809
A_{P50} = 3.329 *sq m*

Soil Infiltration Rate = f = $\frac{V_{TP75\_25}}{A_{P50} \times 60 \times T_L}$ *m/s*

Soil Infiltration Rate = f = 7.28E-05 *m/s*

Trial Pit:	TP1 Test 2
Time (mins)	**Water Depth (bgl)**
0	1.54
1	1.64
3	1.68
10	1.76
12	1.84
16	1.90
24	1.95
43	2.05
49	2.07
57	2.10
69	2.13
76	2.16
90	2.21



Total Fall (m):	0.67
75% Depth (m)	1.71
50% Depth (m)	1.88
25% Depth (m)	2.04
Effective Range 75% - 25% (m)	0.33

Time to fall to 75% Depth (mins)	6
Time to fall to 25% Depth (mins)	41
Time from 75% to 25% Depth (mins)	35

CALCULATIONS/SKETCHES

PROJECT	Omega 1, Scarborough				
JOB No	13084	PREPARED BY	AJB	Test Ref.	TP4 T3
DATE	3-Jul-14	CHECKED BY	AHC	REV	0

consulting engineers

Calculation of soil infiltration rate in accordance with BRE Digest 365

Length of trial pit = L_{TP} = 1.900 *m*
Width of trial pit = W_{TP} = 0.800 *m*
Effective Depth = D_{TP} = 0.890 *m* *(measured below incoming invert)*

75% Effective Depth of trial pit = D_{75} = (D_{TP} x 0.75) = 0.668 *m*
50% Effective Depth of trial pit = D_{50} = (D_{TP} x 0.50) = 0.445 *m*
25% Effective Depth of trial pit = D_{25} = (D_{TP} x 0.25) = 0.223 *m*

Pit Voids = PV = 100 % *(For open pits, PV = 100%. For stone filled pits, PV = 30%)*

Time to fall from 75% to 25% effective depth = T_1 = 63 *mins*

Volume of water escaping during this test between D_{75} and D_{25}
= V_{TP75_25} = (L_{TP} x W_{TP} x (D_{75} - D_{25}) x PV) = 0.676 *cu m.*

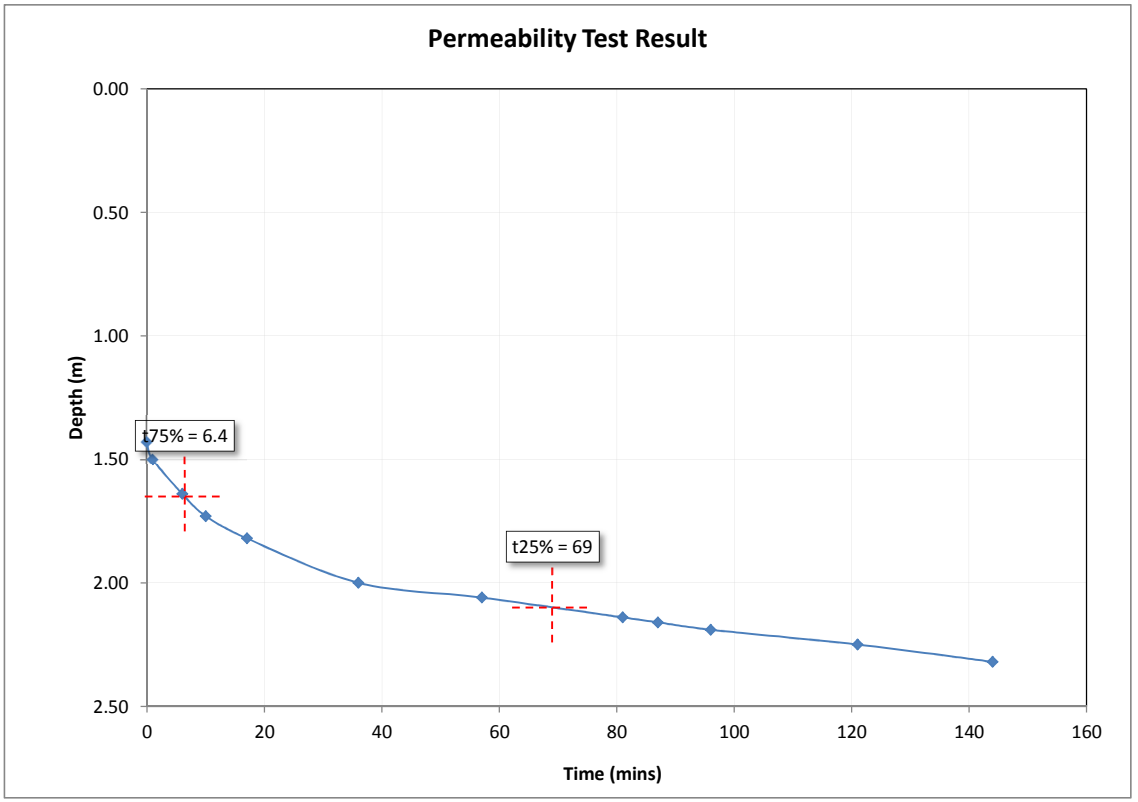
The mean surface area through which the above volume escapes, is the *wetted area.*
Only 50% of the effective depth is allowed in the calculation.

ie A_{P50} = (Wet Base Area + 50% of Wet Sides Area)
A_{P50} = (L_{TP} x W_{TP}) + (2L_{TP}+2W_{TP}) x D_{50}
A_{P50} = 1.520 + 2.403
A_{P50} = 3.923 *sq m*

Soil Infiltration Rate = f = $\frac{V_{TP75\_25}}{A_{P50} \times 60 \times T_L}$ *m/s*

Soil Infiltration Rate = f = 4.56E-05 *m/s*

Trial Pit:	TP1 Test 3
Time (mins)	**Water Depth (bgl)**
0	1.43
1	1.50
6	1.64
10	1.73
17	1.82
36	2.00
57	2.06
81	2.14
87	2.16
96	2.19
121	2.25
144	2.32



Total Fall (m):	0.89
75% Depth (m)	1.65
50% Depth (m)	1.88
25% Depth (m)	2.10
Effective Range 75% - 25% (m)	0.45

Time to fall to 75% Depth (mins)	6
Time to fall to 25% Depth (mins)	69
Time from 75% to 25% Depth (mins)	63

CALCULATIONS/SKETCHES

PROJECT	Omega 1, Scarborough				
JOB No	13084	PREPARED BY	AJB	Test Ref.	TP6 T1
DATE	3-Jul-14	CHECKED BY	AHC	REV	0

consulting engineers

Calculation of soil infiltration rate in accordance with BRE Digest 365

Length of trial pit = L_{TP} = 1.650 *m*
Width of trial pit = W_{TP} = 0.600 *m*
Effective Depth = D_{TP} = 0.190 *m* *(measured below incoming invert)*

75% Effective Depth of trial pit = D_{75} = (D_{TP} x 0.75) = 0.143 *m*
50% Effective Depth of trial pit = D_{50} = (D_{TP} x 0.50) = 0.095 *m*
25% Effective Depth of trial pit = D_{25} = (D_{TP} x 0.25) = 0.048 *m*

Pit Voids = PV = 100 % *(For open pits, PV = 100%. For stone filled pits, PV = 30%)*

Time to fall from 75% to 25% effective depth = T_1 = 87 *mins*

Volume of water escaping during this test between D_{75} and D_{25}
= V_{TP75_25} = (L_{TP} x W_{TP} x (D_{75} - D_{25}) x PV) = 0.094 *cu m.*

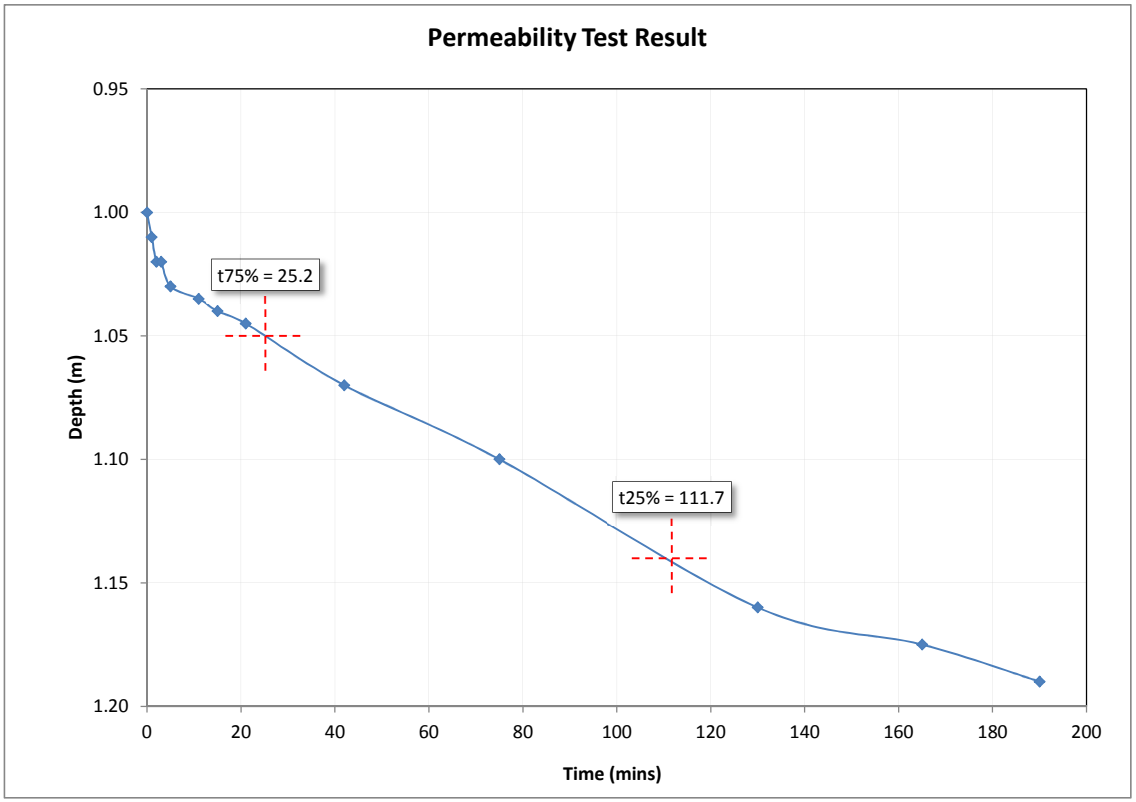
The mean surface area through which the above volume escapes, is the *wetted area.*
Only 50% of the effective depth is allowed in the calculation.

ie A_{P50} = (Wet Base Area + 50% of Wet Sides Area)
A_{P50} = (L_{TP} x W_{TP}) + (2L_{TP}+2W_{TP}) x D_{50}
A_{P50} = 0.990 + 0.428
A_{P50} = 1.418 *sq m*

Soil Infiltration Rate = f = $\frac{V_{TP75\_25}}{A_{P50} \times 60 \times T_L}$ *m/s*

Soil Infiltration Rate = f = 1.27E-05 *m/s*

Trial Pit:	TP6 Test 1
Time (mins)	**Water Depth (bgl)**
0	1.00
1	1.01
2	1.02
3	1.02
5	1.03
11	1.04
15	1.04
21	1.05
42	1.07
75	1.10
130	1.16
165	1.18
190	1.19



Total Fall (m):	0.19
75% Depth (m)	1.05
50% Depth (m)	1.10
25% Depth (m)	1.14
Effective Range 75% - 25% (m)	0.09

Time to fall to 75% Depth (mins)	25
Time to fall to 25% Depth (mins)	112
Time from 75% to 25% Depth (mins)	87

Appendix G

Laboratory Chemical Test Results

2531

ANALYTICAL TEST REPORT

Contract no: 51967

Contract name: Omega 1a

Client reference: 13084

Clients name: 3E Consulting Engineers Ltd

Clients address: 4 Calder Close
Calder Park
Wakefield
WF4 3BA

Samples received: 07 July 2014

Analysis started: 07 July 2014

Analysis completed 11 July 2014

Report issued: 11 July 2014

Notes:
Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, withour prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key:
U UKAS accredited test
M MCERTS & UKAS accredited test
$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:

Karan Campbell
Director

John Campbell
Director

Dave Bowerbank
Customer Services Co-ordinator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
51967-1	BH 01	0.10	Sandy Clay with Stones & Roots	-	-	13.3
51967-2	BH 01	1.30	Sandy Clay with Stones	-	-	12.7
51967-3	BH 02	0.10	Sandy Clay with Stones & Roots	-	-	22.6
51967-4	BH 02	1.30	Sandy Clay with Stones	-	-	11.4
51967-5	BH 03	1.80	Sandy Clay with Stones	-	-	15.6
51967-6	BH 04	0.10	Sandy Clay with Gravel & Roots	-	-	16.6
51967-7	BH 04	1.60	Sandy Clay with Stones	-	-	14.1
51967-8	BH 05	0.10	Sandy Clay with Stones & Roots	-	-	9.2
51967-9	TP 01	1.20	Sandy Clay with Stones	-	-	10.3
51967-10	TP 03	0.20	Sandy Clay with Stones	-	-	13.4
51967-11	TP 03	1.50	Sandy Clay with Stones	-	-	11.5
51967-12	TP 04	1.20	Sandy Clay with Stones	-	-	13.9
51967-13	TP 06	0.15	Sandy Clay with Stones	-	-	10.5
51967-14	TP 06	0.40	Sand with Stones	-	-	8.4

Chemtech Environmental Limited

SOILS

Lab number			51967-1	51967-2	51967-3	51967-4	51967-5	51967-6
Sample id			BH 01	BH 01	BH 02	BH 02	BH 03	BH 04
Depth (m)			0.10	1.30	0.10	1.30	1.80	0.10
Date sampled			03/07/2014	03/07/2014	03/07/2014	03/07/2014	03/07/2014	03/07/2014
Test	**Method**	**Units**						
Arsenic (total)	CE127 M	mg/kg As	11	-	11	-	-	13
Boron (water soluble)	CE063 M	mg/kg B	<0.5	-	1.0	-	-	0.6
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	-	<0.2	-	-	0.2
Chromium (total)	CE127 M	mg/kg Cr	59	-	88	-	-	77
Copper (total)	CE127 M	mg/kg Cu	6.7	-	9.0	-	-	14
Lead (total)	CE127 M	mg/kg Pb	33	-	34	-	-	46
Mercury (total)	CE127 M	mg/kg Hg	<0.5	-	<0.5	-	-	<0.5
Nickel (total)	CE127 M	mg/kg Ni	8.4	-	10	-	-	17
Selenium (total)	CE127 M	mg/kg Se	0.8	-	0.9	-	-	1.0
Zinc (total)	CE127 M	mg/kg Zn	30	-	46	-	-	95
pH	CE004 M	units	5.7	5.2	7.2	8.4	5.4	6.3
Sulphate (2:1 water soluble)	CE061 M	mg/l SO_4	19	16	29	15	12	17
Total Organic Carbon (TOC)	CE072 M	% w/w C	2.20	-	2.88	-	-	2.19
Estimate of OMC (calculated from TOC)	CE072	% w/w	3.79	-	4.97	-	-	3.78
PAH								
Naphthalene	CE087	mg/kg	<0.01	-	<0.01	-	-	0.01
Acenaphthylene	CE087	mg/kg	<0.01	-	<0.01	-	-	<0.01
Acenaphthene	CE087	mg/kg	<0.01	-	<0.01	-	-	<0.01
Fluorene	CE087	mg/kg	<0.01	-	<0.01	-	-	<0.01
Phenanthrene	CE087	mg/kg	0.03	-	0.03	-	-	0.04
Anthracene	CE087	mg/kg	<0.01	-	<0.01	-	-	<0.01
Fluoranthene	CE087	mg/kg	0.06	-	0.08	-	-	0.15
Pyrene	CE087	mg/kg	0.05	-	0.06	-	-	0.13
Benzo(a)anthracene	CE087	mg/kg	0.02	-	0.02	-	-	0.11
Chrysene	CE087	mg/kg	0.04	-	0.06	-	-	0.13
Benzo(b)fluoranthene	CE087	mg/kg	0.06	-	0.05	-	-	0.15
Benzo(k)fluoranthene	CE087	mg/kg	0.02	-	0.02	-	-	0.06
Benzo(a)pyrene	CE087	mg/kg	0.03	-	0.03	-	-	0.11
Indeno(123cd)pyrene	CE087	mg/kg	0.02	-	0.03	-	-	0.08
Dibenz(ah)anthracene	CE087	mg/kg	0.01	-	<0.01	-	-	0.03
Benzo(ghi)perylene	CE087	mg/kg	0.02	-	0.02	-	-	0.06
PAH (total of USEPA 16)	CE087	mg/kg	0.36	-	0.40	-	-	1.06
Subcontracted analysis								
Asbestos	$	-	NAD	-	-	-	-	-

Chemtech Environmental Limited

SOILS

Lab number			51967-7	51967-8	51967-9	51967-10	51967-11	51967-12
Sample id			BH 04	BH 05	TP 01	TP 03	TP 03	TP 04
Depth (m)			1.60	0.10	1.20	0.20	1.50	1.20
Date sampled			03/07/2014	03/07/2014	03/07/2014	03/07/2014	03/07/2014	03/07/2014
Test	**Method**	**Units**						
Arsenic (total)	CE127 M	mg/kg As	-	9.2	-	11	-	-
Boron (water soluble)	CE063 M	mg/kg B	-	<0.5	-	0.6	-	-
Cadmium (total)	CE127 M	mg/kg Cd	-	<0.2	-	<0.2	-	-
Chromium (total)	CE127 M	mg/kg Cr	-	70	-	70	-	-
Copper (total)	CE127 M	mg/kg Cu	-	7.8	-	13	-	-
Lead (total)	CE127 M	mg/kg Pb	-	44	-	45	-	-
Mercury (total)	CE127 M	mg/kg Hg	-	<0.5	-	<0.5	-	-
Nickel (total)	CE127 M	mg/kg Ni	-	13	-	11	-	-
Selenium (total)	CE127 M	mg/kg Se	-	0.9	-	1.0	-	-
Zinc (total)	CE127 M	mg/kg Zn	-	41	-	50	-	-
pH	CE004 M	units	5.4	5.2	7.6	6.0	6.3	5.5
Sulphate (2:1 water soluble)	CE061 M	mg/l SO_4	12	15	13	23	<10	31
Total Organic Carbon (TOC)	CE072 M	% w/w C	-	2.54	-	3.05	-	-
Estimate of OMC (calculated from TOC)	CE072	% w/w	-	4.38	-	5.26	-	-
PAH								
Naphthalene	CE087	mg/kg	-	<0.01	-	<0.01	-	-
Acenaphthylene	CE087	mg/kg	-	<0.01	-	<0.01	-	-
Acenaphthene	CE087	mg/kg	-	<0.01	-	<0.01	-	-
Fluorene	CE087	mg/kg	-	<0.01	-	<0.01	-	-
Phenanthrene	CE087	mg/kg	-	0.03	-	0.07	-	-
Anthracene	CE087	mg/kg	-	<0.01	-	<0.01	-	-
Fluoranthene	CE087	mg/kg	-	0.07	-	0.18	-	-
Pyrene	CE087	mg/kg	-	0.07	-	0.16	-	-
Benzo(a)anthracene	CE087	mg/kg	-	0.04	-	0.09	-	-
Chrysene	CE087	mg/kg	-	0.07	-	0.15	-	-
Benzo(b)fluoranthene	CE087	mg/kg	-	0.09	-	0.20	-	-
Benzo(k)fluoranthene	CE087	mg/kg	-	0.03	-	0.06	-	-
Benzo(a)pyrene	CE087	mg/kg	-	0.05	-	0.11	-	-
Indeno(123cd)pyrene	CE087	mg/kg	-	0.04	-	0.09	-	-
Dibenz(ah)anthracene	CE087	mg/kg	-	0.02	-	0.03	-	-
Benzo(ghi)perylene	CE087	mg/kg	-	0.04	-	0.08	-	-
PAH (total of USEPA 16)	CE087	mg/kg	-	0.55	-	1.22	-	-
Subcontracted analysis								
Asbestos	$	-	-	NAD	-	NAD	-	-

Chemtech Environmental Limited

SOILS

Lab number			51967-13	51967-14
Sample id			TP 06	TP 06
Depth (m)			0.15	0.40
Date sampled			03/07/2014	03/07/2014
Test	**Method**	**Units**		
Arsenic (total)	CE127 M	mg/kg As	11	-
Boron (water soluble)	CE063 M	mg/kg B	<0.5	-
Cadmium (total)	CE127 M	mg/kg Cd	<0.2	-
Chromium (total)	CE127 M	mg/kg Cr	76	-
Copper (total)	CE127 M	mg/kg Cu	7.9	-
Lead (total)	CE127 M	mg/kg Pb	42	-
Mercury (total)	CE127 M	mg/kg Hg	<0.5	-
Nickel (total)	CE127 M	mg/kg Ni	13	-
Selenium (total)	CE127 M	mg/kg Se	1.1	-
Zinc (total)	CE127 M	mg/kg Zn	53	-
pH	CE004 M	units	5.7	6.0
Sulphate (2:1 water soluble)	CE061 M	mg/l SO_4	17	11
Total Organic Carbon (TOC)	CE072 M	% w/w C	2.07	-
Estimate of OMC (calculated from TOC)	CE072	% w/w	3.57	-
PAH				
Naphthalene	CE087	mg/kg	<0.01	-
Acenaphthylene	CE087	mg/kg	<0.01	-
Acenaphthene	CE087	mg/kg	<0.01	-
Fluorene	CE087	mg/kg	<0.01	-
Phenanthrene	CE087	mg/kg	0.06	-
Anthracene	CE087	mg/kg	<0.01	-
Fluoranthene	CE087	mg/kg	0.29	-
Pyrene	CE087	mg/kg	0.23	-
Benzo(a)anthracene	CE087	mg/kg	0.07	-
Chrysene	CE087	mg/kg	0.15	-
Benzo(b)fluoranthene	CE087	mg/kg	0.14	-
Benzo(k)fluoranthene	CE087	mg/kg	0.03	-
Benzo(a)pyrene	CE087	mg/kg	0.05	-
Indeno(123cd)pyrene	CE087	mg/kg	0.05	-
Dibenz(ah)anthracene	CE087	mg/kg	0.01	-
Benzo(ghi)perylene	CE087	mg/kg	0.04	-
PAH (total of USEPA 16)	CE087	mg/kg	1.12	-
Subcontracted analysis				
Asbestos	$	-	NAD	-

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry	M	0.5	mg/kg B
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	Wet	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	M	10	mg/l SO_4
CE072	Total Organic Carbon (TOC)	Removal of IC by acidification, Carbon Analyser	Dry	M	0.1	% w/w C
CE072	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry		0.1	% w/w
CE087	PAH (speciated)	Solvent extraction, GC-MS	Wet		0.01	mg/kg
$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
A	Sampling date not provided
B	Sampling time not provided (waters only)
C	Sample exceeded holding time(s)
D	Sample not received in appropriate containers
E	Headspace present in sample container
F	Sample not chemically fixed (where appropriate)
G	Sample not cooled
H	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
51967-1	BH 01	0.10	N	
51967-2	BH 01	1.30	N	
51967-3	BH 02	0.10	N	
51967-4	BH 02	1.30	N	
51967-5	BH 03	1.80	N	
51967-6	BH 04	0.10	N	
51967-7	BH 04	1.60	N	
51967-8	BH 05	0.10	N	
51967-9	TP 01	1.20	N	
51967-10	TP 03	0.20	N	
51967-11	TP 03	1.50	N	
51967-12	TP 04	1.20	N	
51967-13	TP 06	0.15	N	
51967-14	TP 06	0.40	N	

Appendix H

Laboratory Geotechnical Test Results

PSL
Professional Soils Laboratory

LABORATORY REPORT

UKAS TESTING
4043

Contract Number: PSL14/3399

Client's Reference: Report Date: 28 July 2014

Client Name: 3E Consulting Engineers Ltd
1st Floor, Block C
Holland Park
Holland Drive
Newcastle Upon Tyne
NE2 4LD

For the attention of: Andrew Hampson

Contract Title: Omega 1a

Date Received: 8/7/2014
Date Commenced: 8/7/2014
Date Completed: 28/7/2014

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

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)
A Watkins (Director)
M Beastall (Laboratory Manager)

D Lambe (Senior Technician)
S Royle (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Depth m	Description of Sample
BH1			0.30	Brown gravelly very sandy very silty CLAY.
BH3			0.60	Brown gravelly SAND.
BH4			0.80	Brown gravelly SAND.
BH5			0.60	Brown gravelly very sandy CLAY.
TP01			0.90-1.20	Brown very gravelly clayey SAND.
TP02			0.60-0.80	Brown very sandy clayey GRAVEL.
TP02			0.80	Brown gravelly SAND.
TP03			0.80	Brown slightly gravelly SAND.
TP03			0.80-1.00	Brown very sandy clayey GRAVEL.
TP04			1.00	Brown very gravelly very sandy CLAY.
TP05			0.50	Brown gravelly SAND.
TP05			0.60-0.80	Brown clayey very sandy GRAVEL.
TP06			0.60-0.80	Brown silty SAND & GRAVEL.

PSL
Professional Soils Laboratory

Compiled by	Date	Checked by	Date	Approved by	Date
	28/07/14		28/07/14		28/07/14

OMEGA 1A.

Contract No: PSL14/3399

Client Ref: 13084

SUMMARY OF SOIL CLASSIFICATION TESTS

(B.S. 1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Depth m	Moisture Content % Clause 3.2	Bulk Density Mg/m^3 Clause 7.2	Dry Density Mg/m^3 Clause 7.2	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4.4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	% Passing .425mm	Remarks
BH1			0.30	19				39	25	14	80	Intermediate plasticity CI.
BH3			0.60	14					NP			
BH4			0.80	18					NP			
BH5			0.60	19				32	18	14	84	Low plasticity CL.
TP04			1.00	15				35	23	12	72	Intermediate plasticity CI.
TP02			0.80	14					NP			
TP03			0.80	16					NP			
TP05			0.50	16					NP			

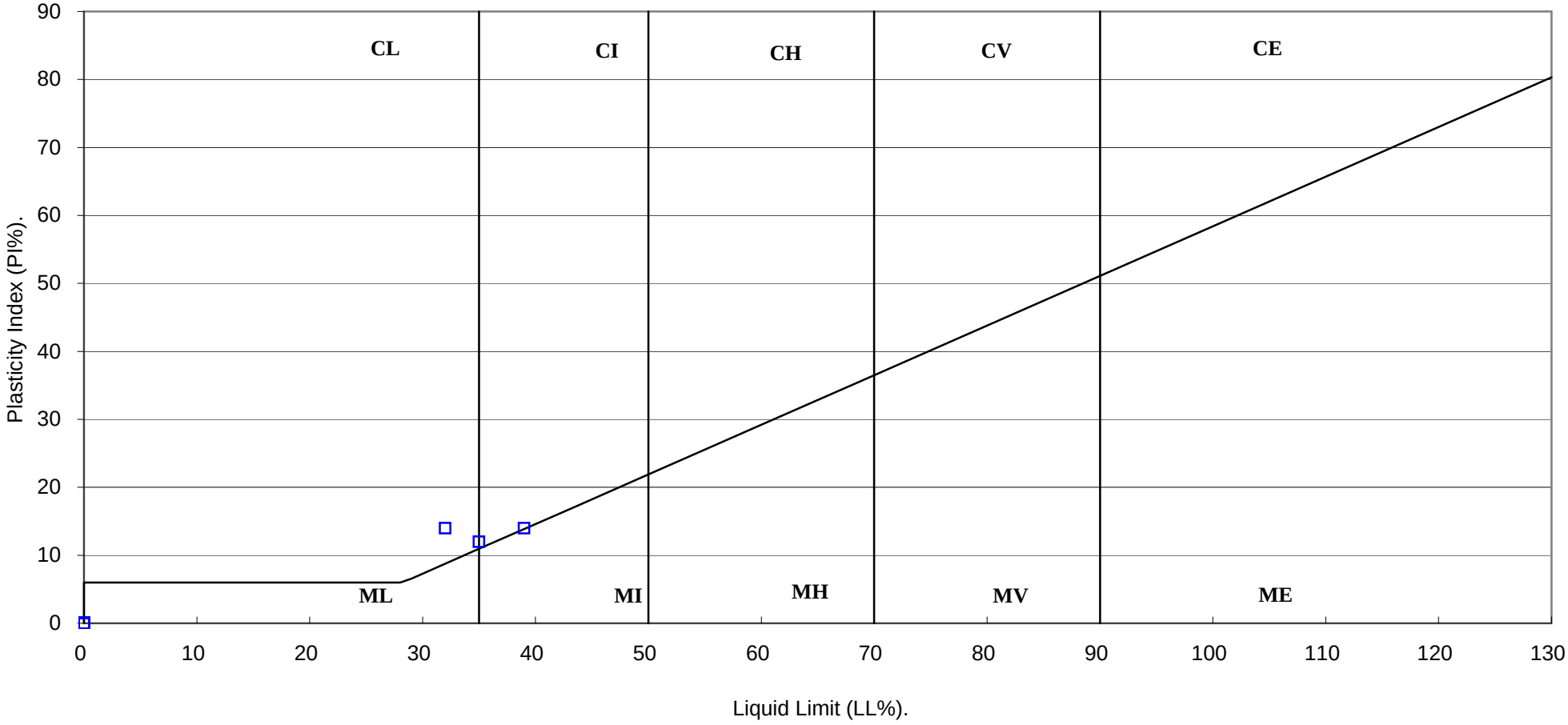
SYMBOLS : NP : Non Plastic *** : Liquid Limit and Plastic Limit Wet Sieved.**

PSL
Professional Soils Laboratory

Compiled by	Date	Checked by	Date	Approved by	Date
	28/07/14		28/07/14		28/07/14
OMEGA 1A.				Contract No:	PSL14/3399
				Client Ref:	13084

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(B.S.5930 : 1999)



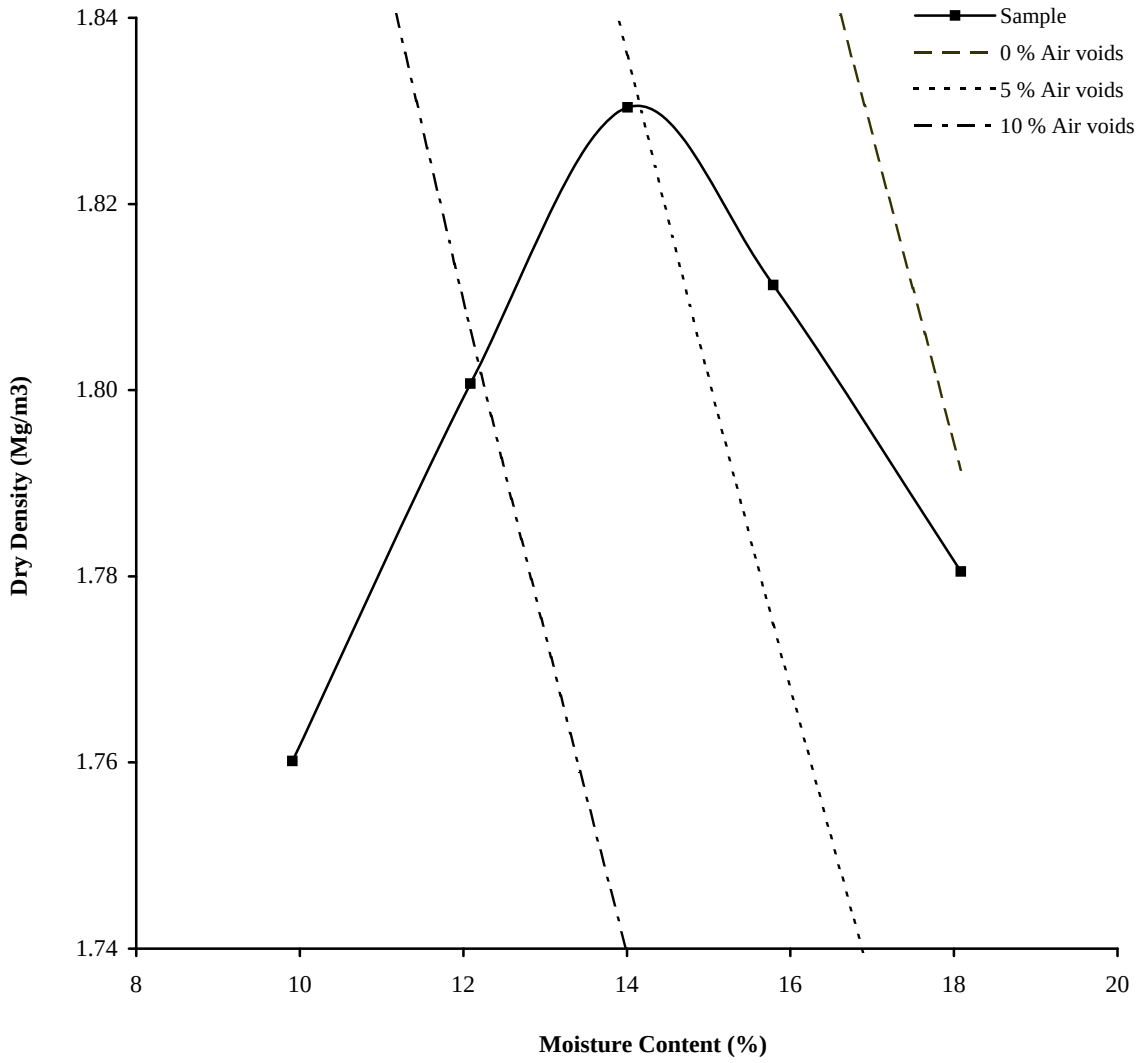
PSL Professional Soils Laboratory	Compiled by	Date	Checked by	Date	Approved by	Date
		28/07/14		28/07/14		28/07/14
	OMEGA 1A.				Contract No:	PSL14/3399
					Client Ref:	13084

Dry Density/Moisture Content Relationship Test

NONE COMPLIANT WITH BS 1377 : Part 4 : 1990

Hole Number: TP01 **Depth (m) :** 0.90-1.20

Sample Number: **Sample Type:** B



Initial Moisture Content:	16	Method of Compaction	4.5kg / Separate Sample	
Particle Density (Mg/m3):	2.65	Assumed	Material Retained on 37.5 mm Test Sieve (%):	34
Maximum Dry Density (Mg/m3):		1.83	Material Retained on 20.0 mm Test Sieve (%):	21
Optimum Moisture Content (%):		14		
Remarks	See Summary of Soil Descriptions.			

Checked By	Date	Approved By	Date
	28/07/14		28/07/14

PSL Professional Soils Laboratory

OMEGA 1A.

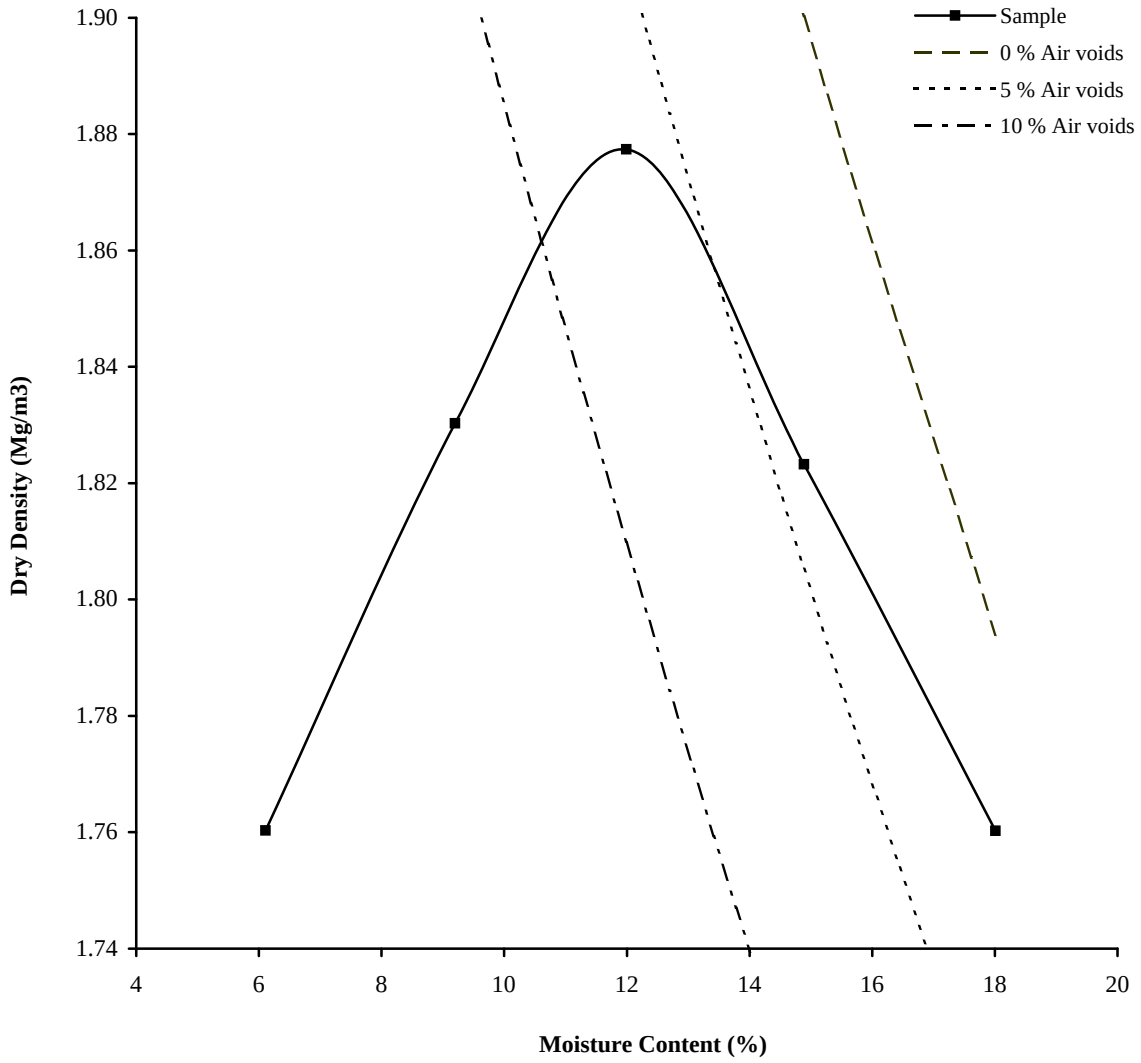
Contract No. PSL14/3399

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Hole Number: TP04 **Depth (m) :** 1.00

Sample Number: **Sample Type:** B



Initial Moisture Content:	15	Method of Compaction	4.5kg / Separate Sample	
Particle Density (Mg/m3):	2.65	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m3):		1.88	Material Retained on 20.0 mm Test Sieve (%):	9
Optimum Moisture Content (%):		12		
Remarks	See Summary of Soil Descriptions.			

	Checked By	Date	Approved By	Date
		28/07/14		28/07/14

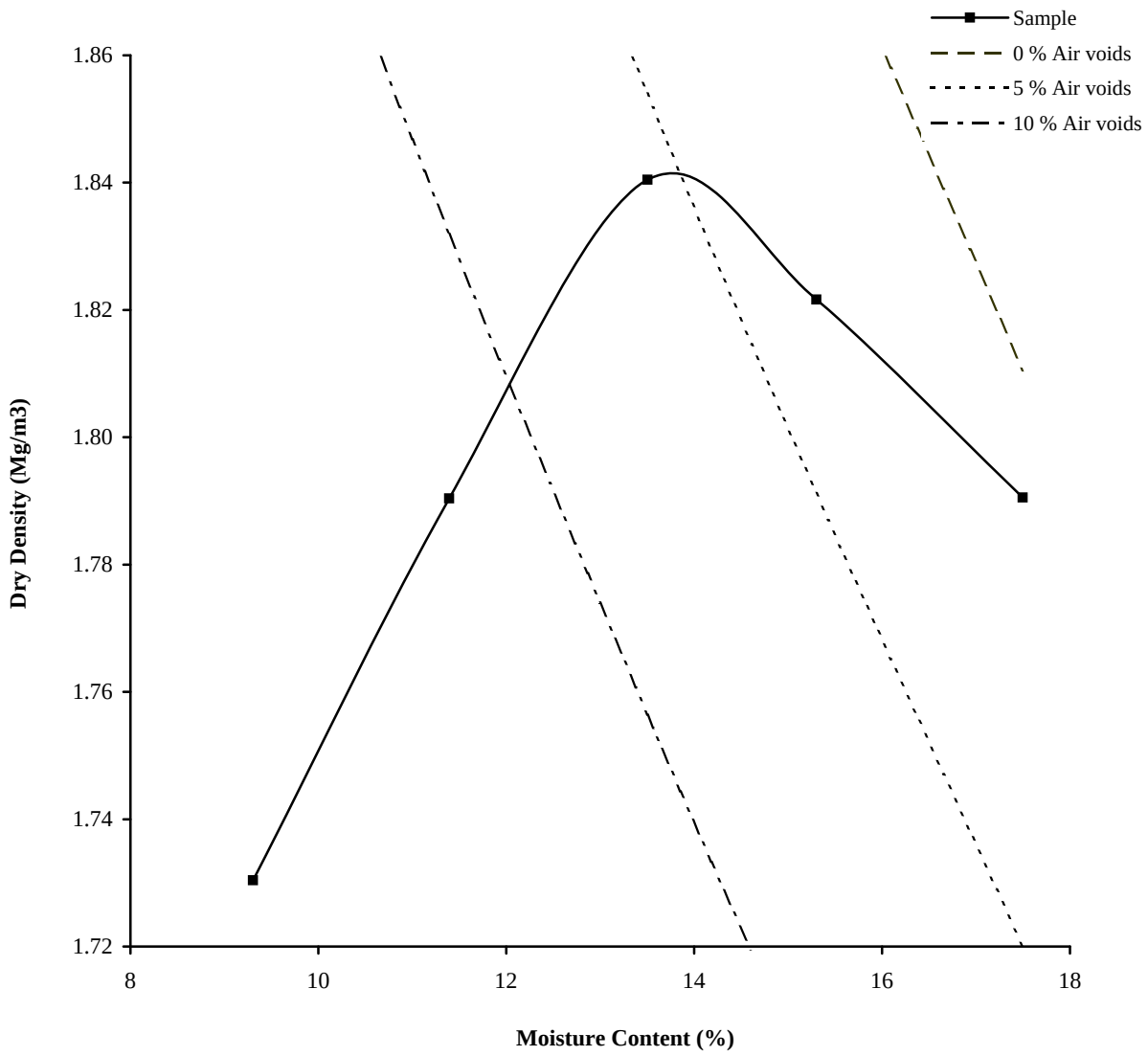
PSL Professional Soils Laboratory	**OMEGA 1A.**	**Contract No. PSL14/3399**

Dry Density/Moisture Content Relationship Test

BS 1377 : Part 4 : 1990

Hole Number: TP05 **Depth (m) :** 0.60-0.80

Sample Number: **Sample Type:** B



Initial Moisture Content:	15	Method of Compaction	4.5kg / Separate Sample	
Particle Density (Mg/m3):	2.65	Assumed	Material Retained on 37.5 mm Test Sieve (%):	32
Maximum Dry Density (Mg/m3):		1.84	Material Retained on 20.0 mm Test Sieve (%):	18
Optimum Moisture Content (%):		14		
Remarks	See Summary of Soil Descriptions.			

	Checked By	Date	Approved By	Date
		28/07/14		28/07/14

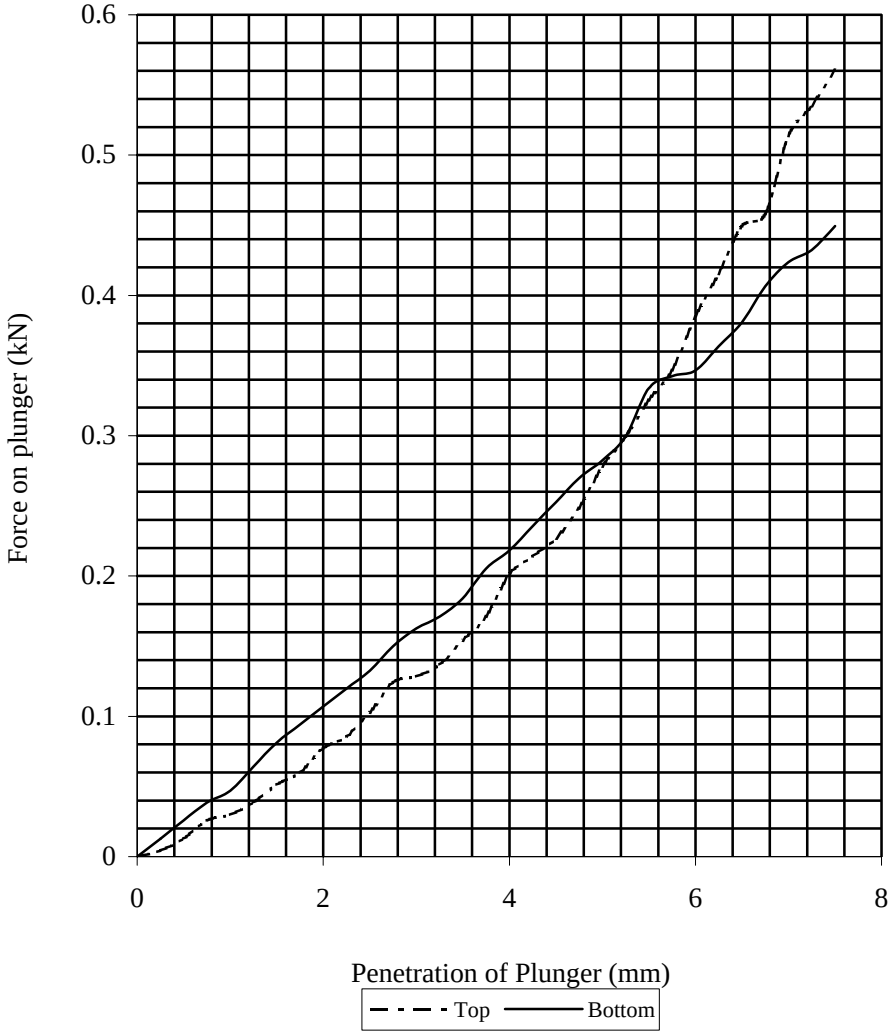
PSL Professional Soils Laboratory	**OMEGA 1A.**	**Contract No. PSL14/3399**

California Bearing Ratio Test.

BS 1377 : Part 4 : 1990

Hole Number: **TP06** **Depth (m):** **0.60-0.80**

Sample Number: **Sample Type:** **B**



Initial Sample Conditions		Test Conditions		Method of compaction	2.5Kg Rammer		
Moisture Content:	18	Surcharge Kg:	4.20	Final Moisture Content %		C.B.R. Value %	
Bulk Density Mg/m3:	2.04	Soaking Time hrs	0	Sample Top	18	Sample Top	1.4
Dry Density Mg/m3:	1.73	Swelling mm:	0	Sample Bottom	18	Sample Bottom	1.4
Percentage retained on 20mm BS test sieve:	0	Remarks:	See Summary of Soil Description.				

Checked by	Date	Approved By	Date
	28/07/14		28/07/14

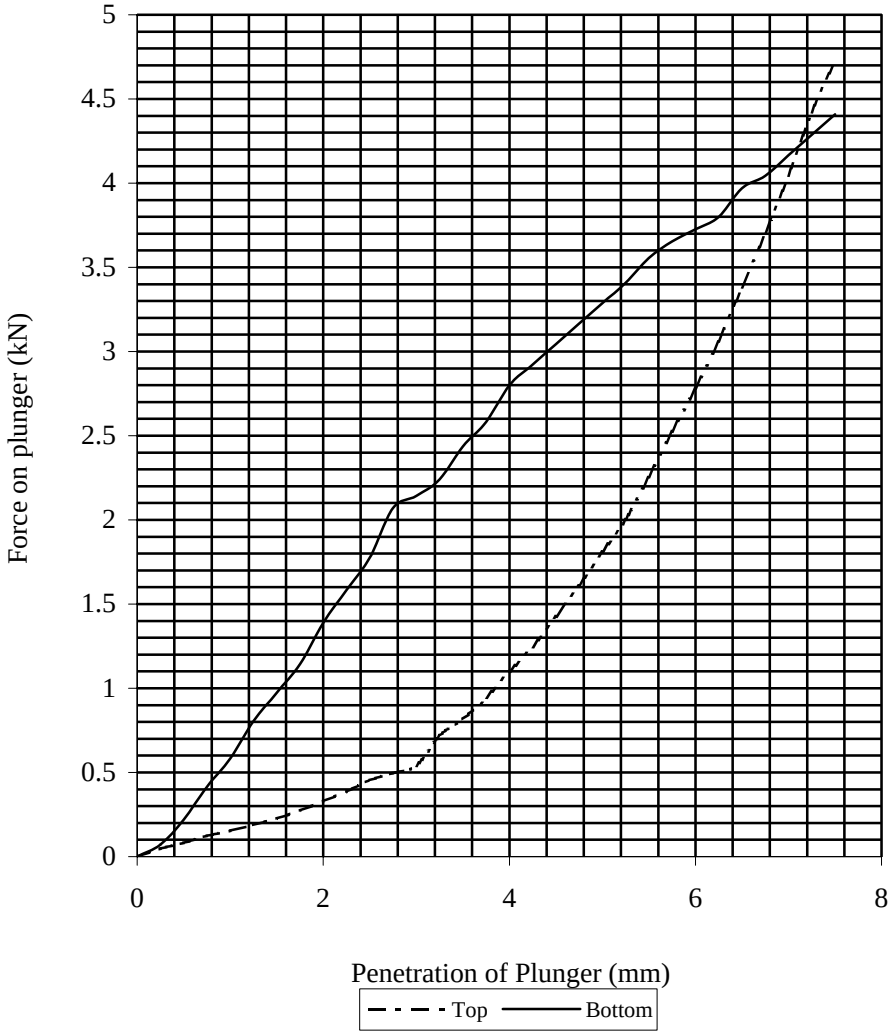
PSL Professional Soils Laboratory	**OMEGA 1A.**	**Contract No. PSL14/3399**

California Bearing Ratio Test.

BS 1377 : Part 4 : 1990

Hole Number: **TP02** **Depth (m):** **0.60-0.80**

Sample Number: **Sample Type:** **B**



Initial Sample Conditions		Test Conditions		Method of compaction	2.5Kg Rammer		
Moisture Content:	14	Surcharge Kg:	4.20	Final Moisture Content %		C.B.R. Value %	
Bulk Density Mg/m3:	2.12	Soaking Time hrs	0	Sample Top	14	Sample Top	9.1
Dry Density Mg/m3:	1.86	Swelling mm:	0	Sample Bottom	14	Sample Bottom	16.4
Percentage retained on 20mm BS test sieve:	11	Remarks: See Summary of Soil Description.					

Checked by	Date	Approved By	Date
M.Burton	28/07/14	M.Burton	28/07/14

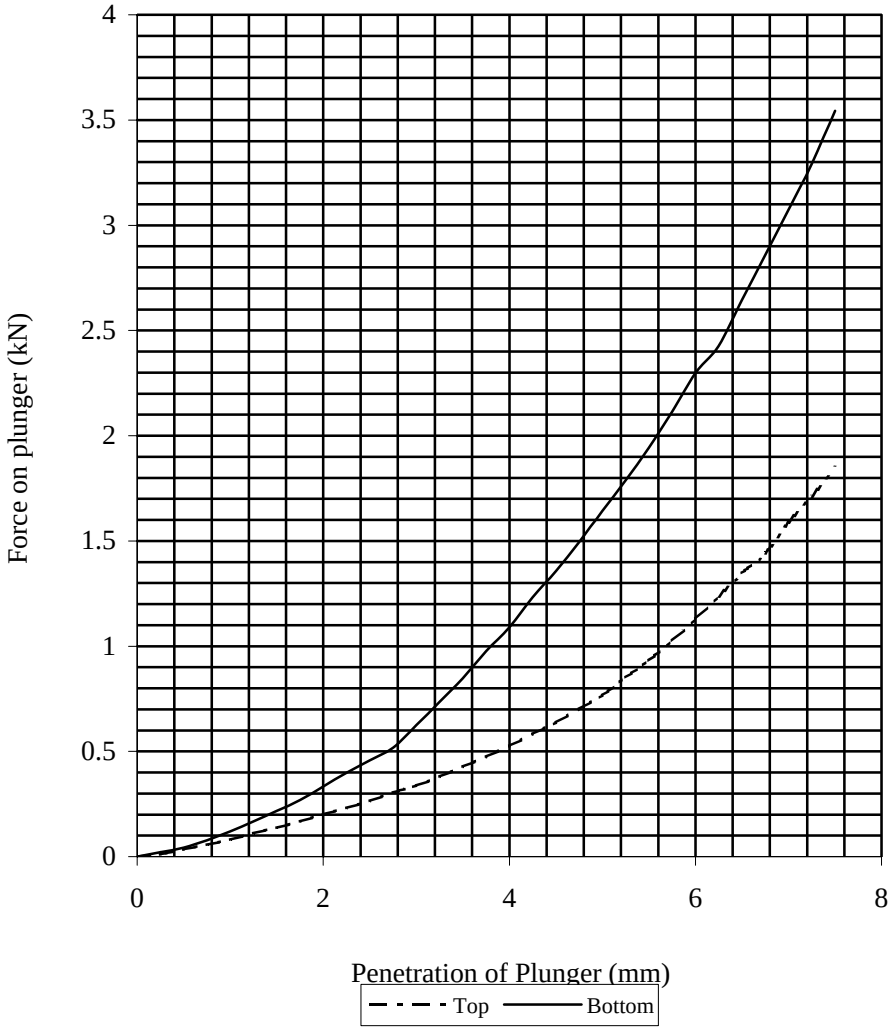
PSL Professional Soils Laboratory	OMEGA 1A.	Contract No. PSL14/3399

California Bearing Ratio Test.

NONE COMPLIANT WITH BS 1377 : Part 4 : 1990

Hole Number: **TP03** **Depth (m):** **0.80-1.00**

Sample Number: **Sample Type:** **B**



Initial Sample Conditions		Test Conditions		Method of compaction	2.5Kg Rammer		
Moisture Content:	14	Surcharge Kg:	4.20	Final Moisture Content %		C.B.R. Value %	
Bulk Density Mg/m3:	2.08	Soaking Time hrs	0	Sample Top	15	Sample Top	3.8
Dry Density Mg/m3:	1.82	Swelling mm:	0	Sample Bottom	14	Sample Bottom	8.2
Percentage retained on 20mm BS test sieve:	48	Remarks: See Summary of Soil Description.					

Checked by	Date	Approved By	Date
M.Sm	28/07/14	M.Sm	28/07/14

PSL Professional Soils Laboratory	**OMEGA 1A.**	**Contract No. PSL14/3399**

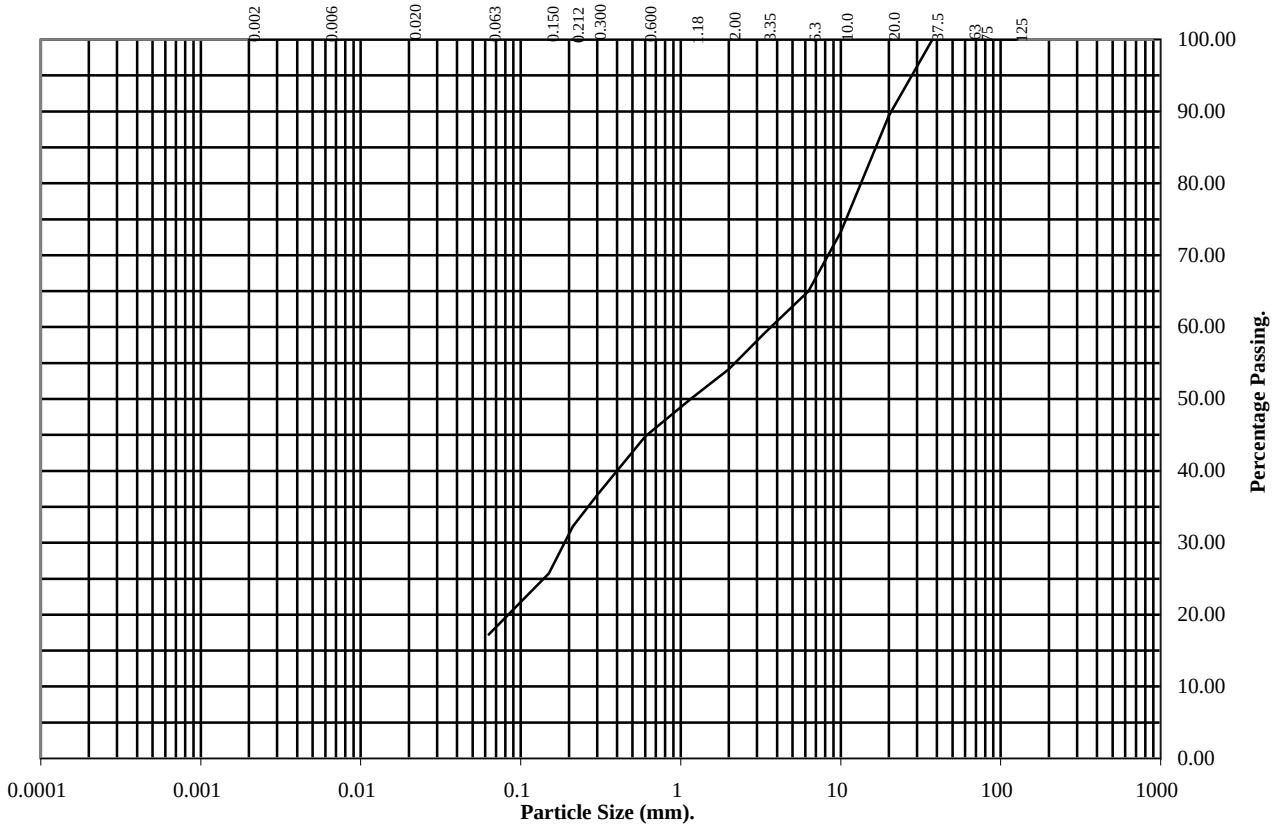
Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP2 **Depth (m):** 0.60-0.80

Sample Number: **Sample Type:** B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	89
10	73
6.3	65
3.35	59
2	54
1.18	50
0.6	45
0.3	37
0.212	32
0.15	26
0.063	17

Soil Fraction	Total Percentage
Cobbles	0
Gravel	46
Sand	37
Silt / Clay	17

Remarks:
See summary of soil descriptions.

Checked By	Date	Approved By	Date
	28/07/14		28/07/14

PSL Professional Soils Laboratory	**OMEGA 1A.**	**Contract No.: PSL14/3399**

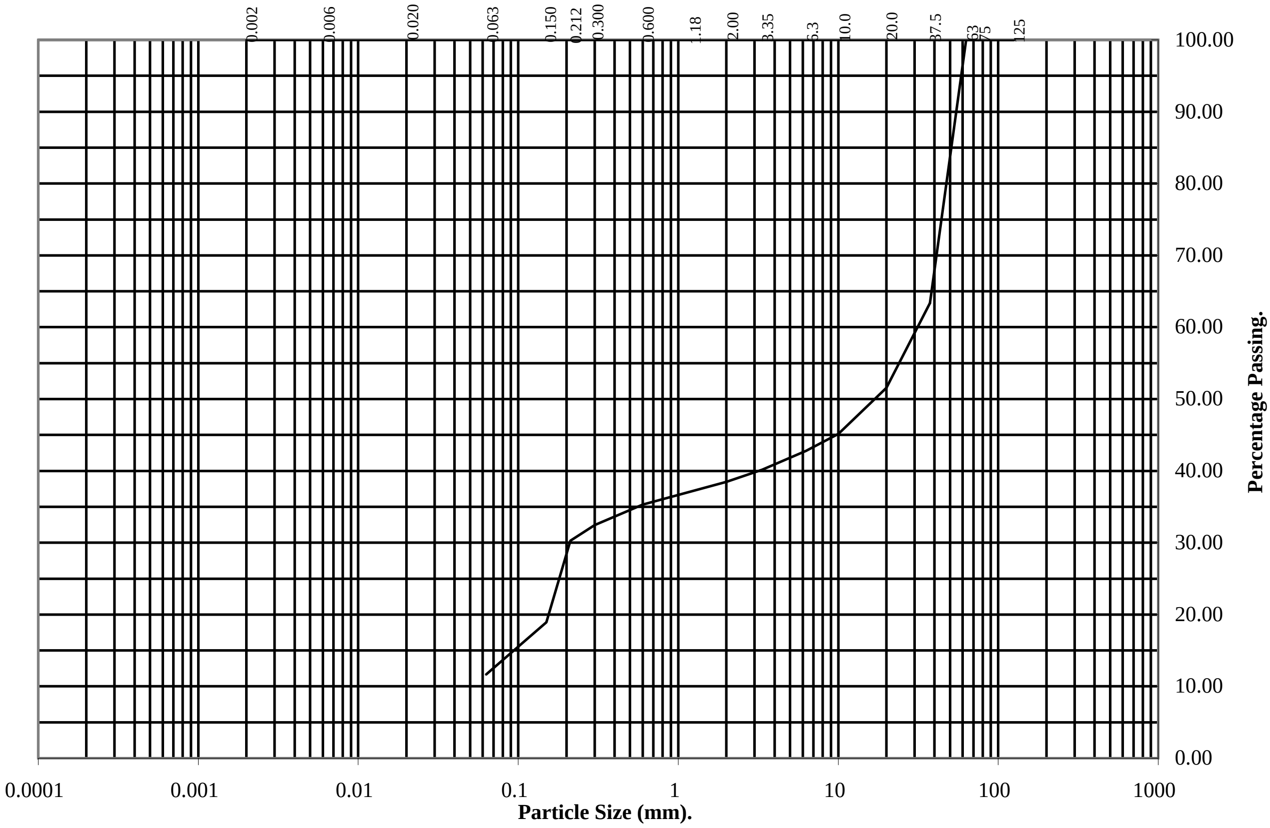
Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: TP3 **Depth (m):** 0.80-1.00

Sample Number: **Sample Type:** B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	63
20	52
10	45
6.3	43
3.35	40
2	38
1.18	37
0.6	35
0.3	32
0.212	30
0.15	19
0.063	12

Soil Fraction	Total Percentage
Cobbles	0
Gravel	62
Sand	26
Silt / Clay	12

Remarks:
See summary of soil descriptions.

Checked By	Date	Approved By	Date
[signature]	28/07/14	[signature]	28/07/14

PSL Professional Soils Laboratory	OMEGA 1A.	Contract No.: PSL14/3399

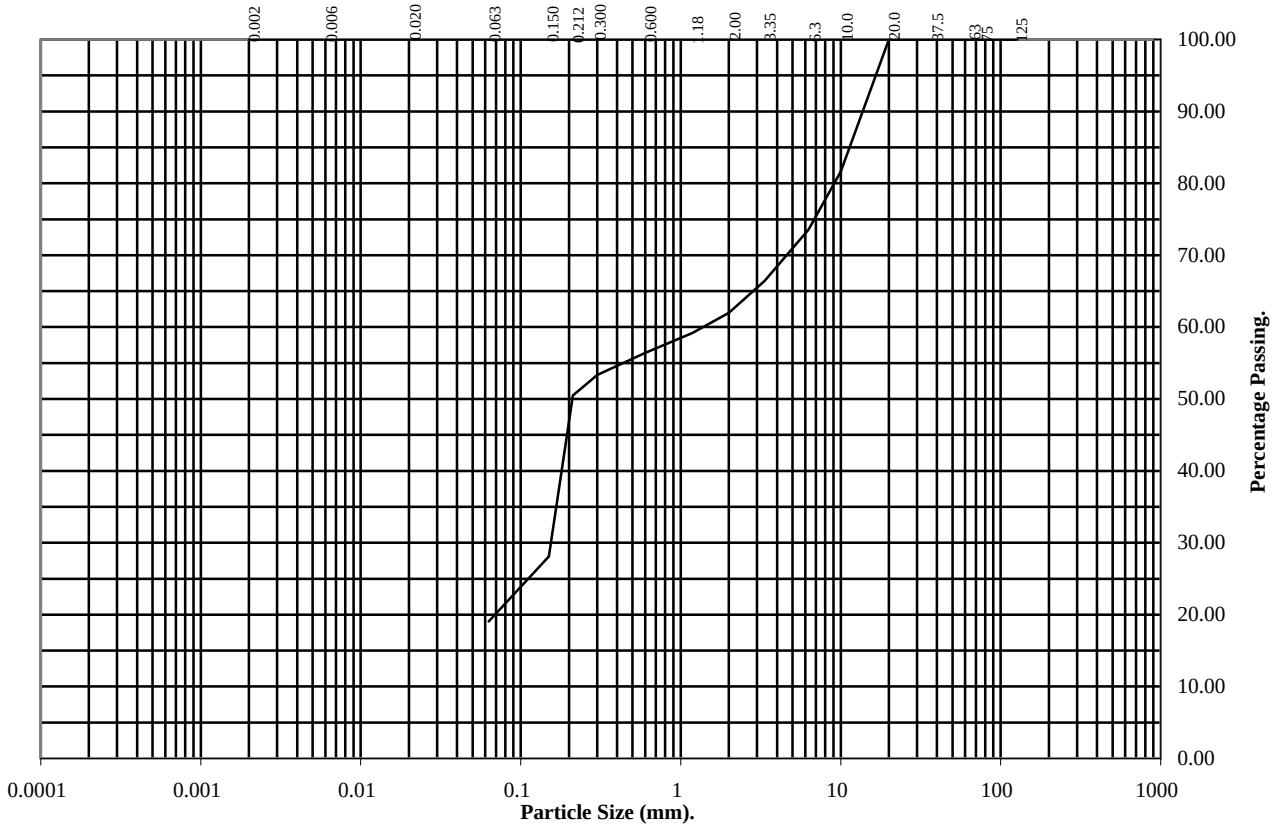
Particle Size Distribution Test

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: **TP6** **Depth (m):** **0.60-0.80**

Sample Number: **Sample Type:** **B**



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	82
6.3	74
3.35	66
2	62
1.18	59
0.6	56
0.3	53
0.212	50
0.15	28
0.063	19

Soil Fraction	Total Percentage
Cobbles	0
Gravel	38
Sand	43
Silt / Clay	19

Remarks:
See summary of soil descriptions.

Checked By	Date	Approved By	Date
M.Sm	28/07/14	M.Sm	28/07/14

PSL Professional Soils Laboratory	**OMEGA 1A.**	**Contract No.: PSL14/3399**