AN APPLICATION FOR AN ENVIRONMENTAL PERMIT TO AUTHORISE THE TRANSFER AND DEPOSITION OF WASTE ON LAND AS A RECOVERY ACTIVITY FOR THE RESTORATION OF THE SOUTHERN EXTENSION TO SWARKESTONE QUARRY, BARROW UPON TRENT, DERBYSHIRE

ENVIRONMENTAL SETTING AND SITE DESIGN REPORT (ESSD)

Report reference: TAR/SW/AW/5655/01/ESSD
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Although now withdrawn, the Environment Agency Template: Conceptual Site Model, Environmental Setting and Site Design Report. Version 1 dated 14 October 2016 (the ESSD Template) provided a suggested list of drawings to illustrate the conceptual site model and environmental setting and stated that "*You can use other formats as long as you present all of the required information*". The drawings listed above have been prepared with reference to the relevant features included in the former ESSD Template. The features in the former ESSD Template relevant to Figure ESSD 3, 4, 5, 6, 7 and 12 are shown on other drawings included with this application. It is acknowledged that the ESSD template has been updated but the information provided in the drawings remains valid under the updated guidance.

APPENDICES

Appendix ESSD A Planning permission reference CM9/1215/122

Appendix ESSD B A copy of the topographical survey carried out at the site on 21 Janaury 2021

Appendix ESSD C Envirocheck report (Reference 282769828_1_1)

Appendix ESSD D Copies of drawing numbers S346.00053a, 54a, 55a, 56a, 57a, 58a, 59a, 63, 64, 65, 66, 67, 68, 69 and 70 in respect of the phasing of the operations at the Southern Extension to Swarkestone Quarry

Appendix ESSD E Copies of drawing numbers L10888_LD-01 Rev C and L10888_LD-02 Rev C in respect of the restoration of the Southern Extension to Swarkestone Quarry

Appendix ESSD F Copies of drawing references TAR/SW/01-21/22220 and TAR/SW/01-21/22221

Appendix ESSD G Logs of mineral proving and groundwater monitoring boreholes

Appendix ESSD H Information provided by the Environment Agency with respect to surface water and groundwater quality

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Appendix ESSD J Groundwater level hydrographs and groundwater quality chemographs

Appendix ESSD K Map showing the location of Environment Agency groundwater monitoring boreholes

Appendix ESSD l Water monitoring database

1. Introduction

Report context

1.1 MJCA is commissioned by Tarmac Trading Limited (Tarmac) to prepare an application for a bespoke Environmental Permit for the deposition of waste on land as a recovery activity in order to restore Phases 1 and 2 and parts of Phases 3 and 4 of the Southern Extension to Swarkestone Quarry, Twyford Road, Barrow upon Trent, Derbyshire. Throughout this application Phases 1 and 2 and those parts of Phases 3 and 4 in which waste will be deposited together with the area adjacent to the existing Swarkestone Quarry exclusively for the storage and transfer of restoration materials (proposed transfer area) are referred to as the site (shown on Figure ESSD 1). This report comprises the Conceptual Site Model, Environmental Setting and Site Design (ESSD) report including the Conceptual Site Model (CSM) to support the application. The ESSD report has been prepared with reference to the Environment Agency (EA) guidance on what to include in your Environmental Setting and Site Design report[1]' published in January 2020 and last updated on 17 February 2022.

1.2 A Waste Recovery Plan (WRP) presenting justification that the activity comprises recovery was submitted to the Environment Agency (EA) on 19 October 2021. Further information in respect of the recovery status of the activity was submitted to the EA on 5 January 2022 and in an email dated 14 January 2022 the EA provided a completed *'RvD Advice Form'* in which it is confirmed that the activity comprises recovery. The approved WRP is presented at Appendix B to the application report. The further submission to the EA dated 5 January 2022 is presented at Appendix C to the application report. The further submission reproduces comments from the EA dated 16 December 2021. The email from the EA dated 14 January 2022 and the attached completed *'RvD Advice Form'* in which it is confirmed that the activity comprises recovery is presented at Appendix D to the application report.

1.3 Planning permission reference CM9/1215/122 (the planning permission) was granted on 29 March 2019 by Derbyshire County Council (DCC) for:

[1] https://www.gov.uk/guidance/landfill-operators-environmental-permits/what-to-include-in-your-environmental-setting-and-site-design-report

> *"…a 61 hectares extension to existing sand and gravel quarry including use of existing processing plant with restoration to a mixture of agriculture and nature conservation at Swarkestone Quarry, Twyford Road, Barrow-on Trent"*

A copy of the planning permission is presented at Appendix ESSD A.

Site details

1.4 The Swarkestone Quarry complex is located approximately 475m west-south west of the village of Barrow upon Trent in a predominantly rural area (Figure ESSD 1). The Southern Extension to Swarkestone Quarry forms part of the wider Swarkestone Quarry complex of mineral workings which includes an area the subject of Environmental Permit number EPR/FP3193SY for restoration to agriculture by the importation of inert waste materials. The Southern Extension to Swarkestone Quarry is located in the south west of the Swarkestone Quarry complex to the south and west of the River Trent. The proposed transfer area is within the Swarkestone Quarry complex and to the north east of the Southern Extension.

1.5 The Southern Extension is located approximately 1.5km south west of the village of Barrow upon Trent and is centred approximately on National Grid Reference (NGR) SK 335 275. The villages of Foremark, Ingleby and Twyford are located approximately 500m south, 850m east-south east and 850m north west of the site respectively. As explained above, the site is located in a predominantly rural area and the majority of the surrounding land is in agricultural use. The closest properties to the site are the buildings associated with Foremark Hall located approximately 415m south-south east of the site. Foremark Hall is part of the wider Repton Prep School which is a major part of Foremark Village located approximately 500m south of the site. Foremark Playing Fields are located approximately 370m south west of the site and comprise part of the grounds of Repton Prep School. Anchor Church is the closest Grade II listed building located approximately 150m east south east of the site with historical cave features also comprising a small area of publicly accessible woodland. Approximately 270m north of the Southern Extension is an area of land adjacent to the northern bank of the River Trent which is used for water based

recreational activities. As shown on Figure ESSD 2 there are no sensitive receptors[2] comprising residential properties, schools, hospitals, nursing homes or food preparation facilities within 500m downwind (north east) of the site. From the proposed transfer area, the closest sensitive receptors are residential properties and farms approximately 400m to the north although these are not downwind.

1.6 There are five phases of mineral extraction in the Southern Extension to Swarkestone Quarry and as explained above the area the subject of this application comprises Phases 1 and 2 and those parts of Phases 3 and 4 in which waste will be deposited together with the proposed transfer area which are referred to collectively as the site. The remaining parts of Phases 3 and 4 together with Phase 5 will be restored with site-derived materials. The layout of the Southern Extension and proposed transfer area to Swarkestone Quarry including the site is shown on Figure ESSD 2.

1.7 The main access to the site is from the existing entrance to the Swarkestone Quarry complex off the A5132 Twyford Road to the proposed transfer area and Phases 1 to 4 are accessible via a haul road and bailey bridge over the River Trent adjacent to the south eastern corner of the Southern Extension. The A5132 joins the A50 which runs in a generally east to west direction approximately 2.2km north of the site. With the exception of the eastern and northern boundaries which boarder the River Trent the Southern Extension to Swarkestone Quarry is bounded by hedgerows or woodland. The proposed transfer area is within the Swarkestone Quarry complex adjacent to the existing mineral processing area.

1.8 Ground levels across the site prior to the commencement of mineral extraction operations were recorded in the approximate range of 38mAOD to 39.5mAOD. A topographical survey of the site is presented at Appendix ESSD B. Mineral extraction operations have commenced in Phase 1 of the site

1.9 There are several Public Rights of Way (PRoW) at and in the vicinity of the site as shown on Figure ESSD 2. The only PRoW which crosses the site is Footpath Foremark FP 11 which runs in a generally north-north west direction crossing the south western corner of Phase 2 before turning generally west-north west, crossing Phase 5 and joining Footpath Foremark FP9 approximately 300m west of Phase 2.

[2] Sensitive receptors as defined in Environment Agency guidance Control and monitor emissions for your environmental permit – Emissions management plan for dust

As shown on Figure ESSD 2 to the south Footpath Foremark FP11 and to the north Footpath Foremark FP9 join the wider footpath network in the area of the site. Footpath Foremark FP 11 will be diverted during the operation of the site.

1.10 Based on information from the Defra MAGIC website there are no Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA), Special Areas of Conservation (SACs), National Nature Reserves (NNRs) or Local Nature Reserves (LNR) located within 2km of the site. Anchor Church and Anchor Church Rocks West are the only Local Wildlife Sites (LWS) located within 1km of the site and as explained above are located approximately 150m to the east-south east of the site. Sinfin Moor Local Nature Reserve is located approximately 2.6km north-north east of the site and Ticknall Quarries SSSI is located approximately 3.4km to the south east of the site.

2. Source

Historical development

2.1 Historical maps for the period 1879 to 2021 are provided with the Envirocheck reports presented at Appendix ESSD C. Information in respect of pollution incidents in the area of the site are presented in Section 3.

2.2 The historical maps show no historical developments within the site boundary. There are no historical landfill sites within 500m of the site listed in the Envirocheck report. There are two Licensed Waste Management Facilities within 500m of the site listed in the Envirocheck report both registered to Tarmac Aggregates Limited and both relating to the inert Swarkestone Landfill Site to the east of the waste recovery area and to the south and west of the proposed transfer area.

Proposed development

2.3 As explained above and shown on Figure ESSD 2 there are 5 phases of mineral extraction at the Southern Extension to Swarkestone Quarry which will be worked over a period of approximately 8 years. Approximately 2.5 million tonnes of sand and gravel will be extracted from the Southern Extension to Swarkestone Quarry. Restoration to agriculture and nature conservation habitats will be undertaken in a phased manner. It is anticipated that it will take an additional 2 years to complete the restoration works following the completion of mineral extraction operations. To provide for the restoration of the Southern Extension to Swarkestone Quarry it will be necessary to import approximately 808,000m^3 of inert restoration materials which will be transferred and temporarily stored in the proposed transfer area prior to being deposited in Phases 1 and 2, the south western part of Phase 3 and the south eastern part of Phase 4. The approved phasing drawings are presented at Appendix ESSD D and the approved restoration drawings are presented at Appendix ESSD E.

2.4 The total quantity of waste that will need to be deposited to complete the restoration is limited by the final levels shown on the approved restoration scheme. Drawing numbers L10888-LD-01 Rev C and L10888-LD-02 Rev C (Appendix ESSD E) and drawing numbers TAR/SW/01-21/22220 and TAR/SW/01-21/22221 (Appendix ESSD F) comprise the relevant contour plans for the site which it is proposed will be specified in the Environmental Permit.

2.5 The waste types that will be accepted at the site the subject of the Environmental Permit are presented in Table ESSD 1. The waste types listed in Table ESSD 1 are specified in the guidance[3] as waste types that may not need to be tested, apart from testing for classification purposes with the exception of List of Waste (LoW) code 01 04 12 (tailings and other wastes from washing and cleaning of minerals other than those mentioned in 01 04 07 and 01 04 11). The waste types listed in Table ESSD 1 are consistent with those listed in the approved Waste Recovery Plan (Appendix B of the application report). Detailed waste acceptance procedures will be in place to minimise the risk that unacceptable waste materials are accepted at the site and procedures will be in place for the rejection of non-conforming loads. The waste acceptance procedures are presented at Appendix M of the application report. The receipt, handling and storage of materials are the subject of procedures in the company management system which is the subject of the ISO 14001 Environmental Management System (EMS).

[3] www.gov.uk/government/publications/deposit-for-recovery-operators-environmental-permits/waste-acceptance-procedures-for-deposit-for-recovery

3. Pathway and receptor

Geology

3.1 The geology of the Southern Extension is taken from the British Geological Survey (BGS) 1:50,000 scale Sheet 141 Loughborough solid and drift edition and associated BGS Sheet 141 explanation, information provided by Tarmac including logs of mineral proving boreholes and groundwater monitoring boreholes drilled at and in the vicinity of the Southern Extension provided by Tarmac and information made available online by the BGS including the geological mapping. A plan showing the geology at and in the vicinity of the site is presented at Figure ESSD 8. The logs of the mineral proving boreholes and groundwater monitoring boreholes together with a plan showing the locations of the mineral proving boreholes are presented at Appendix ESSD G. The locations of the groundwater monitoring boreholes are shown on Figure ESSD 11A.

3.2 Based on the BGS geological map the Southern Extension will be excavated in Quaternary superficial deposits comprising alluvium and the Hemington Member of the Trent Valley Formation associated with the River Trent. The superficial Quaternary deposits overlie the Gunthorpe Member of the Triassic Sidmouth Mudstone Formation of the Mercia Mudstone Group beneath the northern part of the Southern Extension and in the southern part of the Southern Extension the bedrock comprises the Triassic Chester Formation and Permo-Triassic Moira Formation of the Sherwood Sandstone Group. The boundary between the Mercia Mudstone Group and the Sherwood Sandstone Group comprises the Barrow Fault which is downthrown to the north bringing the Mercia Mudstone Group adjacent to the underlying Sherwood Sandstone Group (Figure ESSD 8).

3.3 Based on the records of the boreholes drilled at and in the vicinity of the Southern Extension the thickness of superficial deposits is generally between 4.2m and 7.8m at the Southern Extension comprising clay and sandy or gravelly clay and rare peat over varying quantities of silts, sands and gravels. The thickness of workable sand and gravel ranges between 0.6m and 6.0m with an average thickness of approximately 3.7m.

3.4 The superficial sand and gravel deposits are mainly recorded as underlain by stiff to hard green, grey and reddish brown marl and sandy marl, mudstone and siltstone

and hard light brown mottled or light brown green sandstone. The majority of boreholes typically terminate within the uppermost 0.2m to 0.3m of bedrock strata.

3.5 The BGS Lexicon described the lithology of the Gunthorpe Member of the Mercia Mudstone Group as comprising dominantly red brown mudstone and subordinate green grey dolomitic siltstones and fine grained sandstone. The Chester Formation of the Sherwood Sandstone Group is described as comprising conglomerates and reddish brown cross-bedded pebbly sandstones with subordinate beds of red-brown mudstone in Cheshire and Leicestershire and as comprising pinkish red or buff-grey, medium and coarse-grained, pebbly, cross-bedded, friable sandstone in Nottinghamshire. It is noted that in Leicestershire and Cheshire the formation fines upwards generally with the rare mudstones generally observed towards the top of the Formation. The Moira Formation of the Sherwood Sandstone Group is described as comprising typically subangular conglomerate with locally derived clasts in a red, sandy mudstone matrix or sandstones interbedded with mudstones. Based on the BGS Sheet 141 explanation the Moira Formation is exposed around Ingleby where it comprises red brown or green micaceous mudstones interbedded with red to buff, fine to medium grained sandstones. Information published by the BGS describes the Gunthorpe Member of the Mercia Mudstone Group as having a thickness of 70m to 90m, describes the Chester Formation as having a thickness of up to 220m and the Moira Formation, which forms the base of the Sherwood Sandstone Group, as having a thickness of generally 0m to 15m and up to 55m.

3.6 Based on the limited available information the records of mineral exploration and groundwater monitoring boreholes drilled at and in the vicinity of the Southern Extension are consistent generally with the BGS maps and suggest that the superficial deposits are underlain by Chester Formation and Moira Formation strata of the Sherwood Sandstone Group in the area of the proposed deposition of waste on land as a recovery activity.

Hydrology

3.7 Information on the local hydrology is taken from Ordnance Survey base maps at 1:10,000 scale (Figure ESSD 2) and 1:25,000 scale (Figure ESSD 9) and from information provided by the EA and South Derbyshire District Council.

3.8 The Southern Extension is located adjacent to the River Trent and within a meander loop such that to the north of the Southern Extension the River Trent flows generally towards the north east, east and southeast before turning south to flow along the eastern boundary of the Southern Extension then east to flow generally eastwards near to the south east corner of the Southern Extension. The northern and eastern boundaries of the Southern Extension follow the bank of the River Trent. At its closest point the River Trent is approximately 70m east of the area in which waste will be deposited. At Willington gauging station located approximately 3.8km downstream of the Southern Extension the river level has a typical range of 1.492m.

3.9 Milton Brook flows northwards generally from Foremark Reservoir located approximately 2.6km south of the Southern Extension and past Milton village before turning eastwards approximately 750m west of the Southern Extension. Milton brook then flows from west to east along the southern boundary of the Southern Extension and discharges to the River Trent adjacent to the south east corner of the Southern Extension approximately 310m east south east of the area in which waste will be deposited at its closest point. An unnamed tributary joins the Milton Brook from the south approximately 100m west of the south west corner of the area in which waste will be deposited. Two small drainage ditches join the Milton Brook from the south to the south and south west of the area in which waste will be deposited. To the west of the Southern Extension land is drained by drainage ditches which flow generally west to east before joining a drainage ditch that flows generally southwards to join Milton Brook approximately 270m west of the Southern Extension apart from its northernmost section that flows northwards to the River Trent.

3.10 Two small waterbodies are located in the north eastern and south eastern parts of the Southern Extension in the area of mineral extraction. To the north of the River Trent a small water body is located approximately 360m north of the area in which waste will be deposited and a number of water bodies and lagoons are located to the south of the proposed transfer area associated with the Swarkestone Quarry Complex. A water body is located at Repton Prep School approximately 330m south south west of the area in which waste will be deposited. This water body is located up hydraulic gradient with respect to the Southern Extension. There are no other surface water bodies within 500m of the area in which waste will be deposited. Notwithstanding the two small surface water bodies located within the area of the Southern Extension the only surface water body located down hydraulic gradient of

the area in which waste will be deposited is the River Trent. The watercourses and waterbodies in the vicinity of the site are shown on Figure ESSD 9.

3.11 The site is in Flood Zone 3b (functional floodplain), which is defined in the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance: (PPG) as land where water has to flow or be stored in times of flood. The South Derbyshire Strategic Flood Risk Assessment (SDSFRA) defines Flood Zone 3b as 'land falling within the 1 in 20 year floodplain (or 1 in 25 year agreed in conjunction with the EA and local area authority) or land that is designed to flood within an extreme event'.

3.12 Based on information provided by the EA no major (Category 1) or significant (Category 2) pollution incidents to land or water have been recorded within 500m of the Southern Extension. A total of two minor (Category 3) pollution incidents affecting water and one affecting land are recorded within 500m of the Southern Extension relating to below ground pipe failure and pollution by oils and fuel. Details of the pollution incidents affecting land or water classified as Category 4 or above within 2km of the Southern Extension are presented in Appendix ESSD H.

3.13 The quality of the surface water at and in the vicinity of the site is classified by the EA under the Water Framework Directive (WFD). The WFD classifications and objectives are presented in the River Basin Management Plans (RBMP) with supporting information available on the EA Catchment Data Explorer web pages[4]. The RBMP relevant to the Southern Extension comprises the Humber River Basin District. A 30km reach of the River Trent as it passes the Southern Extension was classified by the EA in 2019 under the WFD as "Moderate" with respect to ecological quality and "Fail" with respect to chemical quality. The reason given for the fail with respect to chemical quality were the hazardous substances polybrominated diphenyl ethers (PBDE), perfluorooctane sulphate (PFOS) and mercury and its compounds. Based on a map provided by the EA and presented at Appendix ESSD H the Southern Extension and proposed transfer area is within a drinking water protected area for surface water.

3.14 From information obtained from the EA there are three licensed surface water abstractions from the River Trent from seven locations and one deregulated surface

[4] https://environment.data.gov.uk/catchment-planning/WaterBody/GB104028047420

water abstraction within 2km of the Southern Extension. One of the licensed surface water abstractions is from the River Trent upstream of the Southern Extension, one is from the River Trent at five locations upstream and adjacent to the Southern Extension and one is from the River Trent downstream of the Southern Extension. The deregulated surface water abstraction is from Twyford Brook located to the north of the River Trent. The closest surface water abstraction to the Southern Extension comprises a licensed abstraction from the River Trent adjacent to the Southern Extension and is for spray irrigation. Information obtained from the EA includes a further three unlicensed abstractions within 2km of the Southern Extension for which the source is unknown but is potentially surface water based on proximity to the River Trent. South Derbyshire District Council (SDDC) have confirmed that they do not hold any records of private surface water supplies within 2km of the Southern Extension. The locations of the licenced and deregulated surface water abstractions and potential surface water unlicensed abstractions within 2km of the Southern Extension are shown on Figure ESSD 10 and details of the abstractions are presented at Appendix ESSD I.

3.15 Based on information provided by the EA and Tarmac there are five consented discharges within 1km of the area in which waste will be deposited. Of these five consented discharges three are from Swarkestone Quarry to reaches of the River Trent and Milton Brook adjacent to the Southern Extension and to a tributary of the River Trent which joins the River Trent to the south east of Barrow upon Trent. Notwithstanding the discharges associated with Swarkestone Quarry the nearest consented discharge is at Poplars Cottage which is located approximately 1km north of the area in which waste will be deposited for discharge to a tributary of the River Trent which joins the River Trent to the southeast of Barrow upon Trent. The remaining consented discharge within 1km of the area in which waste will be deposited is at Elm Farm to the River Trent located approximately 1km to the east south east of the area in which waste will be deposited. Consented discharges to the River Trent or Tributaries of the River Trent upstream of the Southern Extension include discharges from Milton Waste Water Treatment Works and Milton Water Treatment Works located approximately 1.2km west and north west of the area in which waste will be deposited respectively. Details of the discharge consents within 2km of the area in which waste will be deposited are presented in Appendix ESSD H.

Hydrogeology

3.16 Information on the hydrogeology of the site was provided by the EA and South Derbyshire District Council and taken from the logs of boreholes drilled at the Southern Extension and groundwater monitoring data for the period from 2004 to 2022. Groundwater level hydrographs are presented at Appendix ESSD J.

Aquifer Characteristics

3.17 The Quaternary deposits at the Southern Extension are water bearing. It is likely that the Quaternary alluvium has a low to moderate permeability depending on the proportion of clay present and that the sand and gravel has a moderate to high intergranular permeability. Based on the hydrogeological impact assessment (2018 HIA) report[5] for the Southern Extension the average hydraulic conductivity for the sand and gravel deposits is 1 x 10^{-3}m/s based on site specific data. The Mercia Mudstone Group comprises predominantly low permeability mudstone strata. The Chester Formation and the Moira Formation of the Sherwood Sandstone Group are water bearing. The Chester Formation and the sandstones and conglomerates of the Moira Formation are likely to exhibit a low to moderate intergranular permeability and a moderate to high secondary permeability due to the presence of fractures. The Moira Formation may include low permeability mudstone strata. The geomean bulk hydraulic conductivity for the Chester Formation (formerly the Kidderminster Sandstone Formation) of the Sherwood Sandstone Group as presented in the HIA and taken from BGS Technical Report WD/97/34[6] is 5.7 x 10-5m/s. In the southern part of the Southern Extension where Quaternary sands and gravels overlie the Sherwood Sandstone Group it is considered that the superficial deposits and the bedrock are in hydraulic continuity and form a single aquifer unit.

3.18 The Quaternary alluvium and Hemington Member are classified by the EA as Secondary A aquifers. A Secondary A aquifer is defined by the EA as having permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers. The Mercia Mudstone Group bedrock is classified by the EA as a Secondary B aquifer. A

5 Golder. 2018. Swarkestone Quarry Southern Extension. Hydrogeological Impact Assessment and Flood Risk Assessment for Proposed Extraction of Sand and Gravel.

6 BGS. 1997. The physical properties of major aquifers in England and Wales. Hydrogeology Group Technical Report WD/97/34. Environment Agency R&D Publication 8.

Secondary B aquifer is defined by the EA as having predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. The Chester and Moira Formations of the Sherwood Sandstone Group are classified by the EA as a Principal Aquifer. Principal Aquifers are defined by the EA as layers of rock or drift deposits that have high intergranular and/or fracture permeability which usually provide a high level of water storage. Principal aquifers may support water supply and/or river base flow on a strategic scale.

3.19 The site is not located within a Source Protection Zone of a public water supply. A Source Protection Zone is located approximately 0.9km to the south west of and up hydraulic gradient of the Southern Extension. The site is located within a Nitrate Vulnerable Zone for groundwater. A Source Protection Zone map and Nitrate Vulnerability Zone map provided by the EA are presented at Appendix ESSD H.

Groundwater flow

3.20 Groundwater monitoring boreholes WMP1, WMP3, WMP4 and WMP5 were drilled and installed round the perimeter of the Southern Extension in 2004. A replacement for borehole WMP1, WMP1A, and an additional borehole WMP6 were installed in May 2022. The logs of the boreholes are presented at Appendix ESSD G and the location of the groundwater monitoring boreholes is shown on Figure ESSD 11A. Groundwater levels recorded at the boreholes recorded between April 2004 and April 2022 are shown on the hydrographs presented at Appendix ESSD J.

3.21 Groundwater levels in the superficial deposits were recorded at depths between approximately 0.89m below ground level (bgl) and 3.35mbgl and at elevations of between 39.27m above Ordnance Datum (AOD) and 36.49mAOD. The highest groundwater levels are typically recorded at boreholes WMP1 and WMP3 to the west of the Southern Extension and the lowest groundwater level is typically recorded at borehole WMP5 in the east of the Southern Extension. The groundwater levels fluctuate seasonally by approximately 1.0m to 1.5m. Based on groundwater levels recorded between April 2004 and April 2022 groundwater flow is towards the east to south east generally. This is consistent generally with the direction of flow of the River Trent and suggests that groundwater in the superficial deposits is in hydraulic continuity with the River Trent. It is also considered likely that the groundwater in the superficial deposits is in hydraulic continuity with Milton Brook. The fall in

groundwater levels across the Southern Extension generally is less than 1m. Based on the monitoring record for the Southern Extension the average hydraulic gradient in the superficial deposits across the Southern Extension is approximately 0.001. Groundwater level contours interpolated from groundwater levels recorded in the superficial deposits on 25 September 2018 at the monitoring boreholes at the Southern Extension are presented on Figure ESSD 11A.

3.22 Groundwater level data was provided by the EA for groundwater monitoring boreholes at Repton, Repton Park, Bendalls Farm and Ingleby Crossroads. A map showing the location of the boreholes is presented at Appendix ESSD K with a hydrograph showing available data recorded between January 2011 and September 2020 presented at Appendix J. The boreholes are all located to the south of the Southern Extension and the River Trent and are in an area where the dominant bedrock is the Sherwood Sandstone Group which forms a series of steep sided valleys and broad undulating ridges with elevations of up to approximately 120mAOD. The groundwater levels on the hydrograph shows that groundwater flow in the Sherwood Sandstone Group is to the north generally towards the River Trent and follows the topography which generally falls towards the north. Based on the monitoring record from the EA, the average hydraulic gradient in the Sherwood Sandstone Group to the south of the Southern Extension is approximately 0.016. Groundwater level contours interpolated from groundwater levels recorded on 25 September 2018 at the EA boreholes are presented on Figure ESSD 11B. Groundwater levels recorded in the superficial deposits on 25 September 2018 at the monitoring boreholes at the Southern Extension are presented on Figure ESSD 11B for comparison.

3.23 There are three springs and four issues recorded on the 1:10,000 OS map within approximately 3km of the Southern Extension and within the catchment of Milton Brook. The closest to the Southern Extension comprises a spring located approximately 90m south east of the area in which waste will be deposited near to caves at Anchor Church. The remaining springs and issues are located west, south west and south of the area in which waste will be deposited at between approximately 1.4km and approximately 3.1km. The majority of the springs and issues discharge from the Sherwood Sandstone Group up hydraulic gradient from the Southern Extension. The spring to the west of the Southern Extension may issue from the superficial deposits or the Sherwood Sandstone Group up hydraulic gradient from the

Southern Extension. The springs and issues in the vicinity of the Southern Extension are shown on Figure ESSD 9.

3.24 It is considered that the groundwater from the Sherwood Sandstone Group in the vicinity of the Southern Extension discharges to the River Trent via springs and watercourses associated with the catchment of Milton Brook and via the superficial sand and gravel deposits.

Groundwater abstractions

3.25 From information obtained from the EA there is one licensed groundwater abstraction and eight deregulated groundwater abstractions located within 2km of the Southern Extension. The licensed groundwater abstraction is for public water supply (PWS) at Milton Water Works. Based on the 2018 HIA report and the groundwater Source Protection Zone map provided by the EA, groundwater is abstracted from three locations the closest of which is approximately 1km south west of the Southern Extension. No information was provided by the EA with regard to the location of the abstractions or the current operational status of the abstractions. It is considered that the groundwater from the PWS is abstracted from the Sherwood Sandstone Group Principal Aquifer. Of the eight deregulated groundwater abstractions within 2km of the Southern Extension six are located to the north of the River Trent and the Southern Extension and the source of abstractions may be groundwater from Quaternary superficial deposits. The remaining two abstractions are located near Milton and Seven Sprouts Farm to the south west and south east of the Southern Extension respectively with abstraction from a spring and catchpit respectively. Based on the geology at and in the vicinity of the abstractions it is likely that the source of the abstractions is groundwater from the Sherwood Sandstone Group. The two abstractions are located up hydraulic gradient with respect to the Southern Extension.

3.26 South Derbyshire District Council hold records of three private groundwater supplies within 2km of the Southern Extension. The private water supply at Grange Farm is also listed as a deregulated abstraction. Of the three private water supplies Grange Farm and The Grange are located to the north of the River Trent and the Southern Extension and the source of groundwater may be from the Quaternary superficial deposits. The private water supply at Stanton Farm (Ingleby) comprises abstraction

from a spring and it is likely that the source of groundwater is from the Sherwood Sandstone Group up hydraulic gradient of the Southern Extension.

3.27 The locations of the licenced, deregulated and private groundwater abstractions within 2km of the Southern Extension are shown on Figure ESSD 10 and details of the abstraction data provided by the EA are presented at Appendix ESSD I.

Groundwater quality

3.28 The quality of the groundwater at and in the vicinity of the Southern Extension is classified by the EA under the WFD with the classifications and objectives presented in the Humber River Basin District River Basin Management Plan. The Quaternary alluvium and Hemington Member Secondary A aquifers and the Mercia Mudstone Group Secondary B aquifer form the Lower Trent and Erewash Secondary Combined groundwater body. The Lower Trent and Erewash Secondary Combined groundwater body was classified by the EA in 2019 under the WFD as “Good” with respect to quantitative status and “Good” with respect to chemical quality. The Sherwood Sandstone Group Principal Aquifer is subdivided into a number of groundwater management units (GWMUs) of which the Diseworth GWMU of the Lower Trent and Erewash area and the Burton GWMU in the Tame Anker and Mease area are the GWMUs that are closest to the Southern Extension. The Diseworth GWMU was classified by the EA in 2019 under the WFD as “Good” with respect to quantitative status and “Poor” with respect to chemical quality due to poor nutrient management associated with agriculture and rural land management. The Burton GWMU was classified by the EA in 2019 under the WFD as “Good” with respect to quantitative status and “Poor” with respect to chemical quality due to industrial activity associated with food and drinks producers.

3.29 Groundwater quality in the superficial deposits in the Southern Extension has been monitored in boreholes WMP1, WMP3, WMP4 and WMP5 with boreholes WMP1 and WMP3 comprising the up hydraulic gradient boreholes and WMP4 and WMP5 comprising the down hydraulic gradient boreholes in respect of groundwater flow direction in the Southern Extension. Groundwater quality data has been collected monthly since November 2016 at boreholes WMP1, WMP4 and WMP5 and since February 2017 at borehole WMP3. Groundwater quality monitoring data collected up to March 2022 is presented at Appendix ESSD L. Graphs showing the variation in

groundwater quality at and in the vicinity of the Southern Extension are shown at Appendix ESSD J.

Hazardous substances

3.30 No hazardous substances have been analysed for in the samples taken between 2016 and 2021. In January 2022 the hazardous substances mercury and lead were added to the monthly groundwater quality monitoring suite for boreholes WMP1, WMP3, WMP4 and WMP5. Mercury was recorded in the groundwater samples taken between January and March 2022 at concentrations below the detection of limit (LOD) of the laboratory analytical method used of 0.00003mg/l. Lead was recorded in the groundwater samples taken between January and March 2022 at concentrations below the analytical detection limit of 0.001mg/l in all samples with the exception of the sample of groundwater from borehole WMP5 taken in February 2022 for which a concentration of 0.002mg/l was recorded.

Non-hazardous pollutants

3.31 Between February 2017 and October 2017 ammoniacal nitrogen concentrations recorded in the groundwater at borehole WMP3 up hydraulic gradient of the Southern Extension were frequently above the UK Drinking Water Standard (DWS) of 0.39mg/l with the highest concentration of 1.2mg/l recorded in September 2017. Occasional concentrations above the DWS were also recorded at boreholes WMP4 and WMP5 down hydraulic gradient of the Southern Extension during the same period with the highest concentration of 4.7mg/l recorded at borehole WMP5 in June 2017. Since 2017 occasional exceedances of the DWS have been recorded in the groundwater both up and down hydraulic gradient of the Southern Extension. In general, since 2017 ammoniacal nitrogen concentrations recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension were less than the DWS of 0.39mg/l and prior to August 2019 were frequently below the LOD of 0.05mg/l with concentrations recorded above the LOD intermittently only. Since August 2019 the ammoniacal nitrogen concentrations in the groundwater have remained similar with concentrations exceeding 0.05mg/l intermittently only, however, in September 2019 the LOD of the analytical method used reduced to 0.01mg/l with the majority of results recorded at concentrations above this lower LOD.

3.32 Chloride concentrations recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension were less than the DWS of 250mg/l and typically were recorded at concentrations of less than 50mg/l in the groundwater at the monitoring boreholes.

3.33 Sulphate concentrations recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension were less than the DWS of 250mg/l with the exception of one exceedance of the DWS recorded in December 2019 in the groundwater at down hydraulic gradient borehole WMP5 at a concentration of 342mg/l. Typically sulphate concentrations were recorded at concentrations of less than 150mg/l in the groundwater at the monitoring boreholes.

3.34 Cadmium concentrations recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension were less than the DWS of 0.005mg/l. In general cadmium has been recorded at concentrations above the LOD of the analytical method used of between 0.00002mg/l and 0.0001mg/l on the majority of occasions in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension with a maximum concentration of 0.002mg/l recorded in June 2017 at down hydraulic gradient borehole WMP5.

3.35 Nickel concentrations recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension were less than the DWS of 0.020mg/l with the exception of one marginal exceedance of the DWS recorded in October 2021 in the groundwater at up hydraulic gradient borehole WMP1 at a concentration of 0.021mg/l. In general nickel concentrations at or below the LOD of the analytical method used of 0.001mg/l were recorded in the groundwater at boreholes WMP1 until August 2019 following which concentrations have fluctuated and have generally been record above the LOD with the maximum concentration of 0.021mg/l recorded in October 2021. In general nickel has been recorded at concentrations above the LOD of the analytical method used of between 0.001mg/l and 0.005mg/l in the groundwater at the remaining monitoring boreholes at and in the vicinity of the Southern Extension on the majority of monitoring occasions with concentrations fluctuating and a maximum concentration of 0.013mg/l recorded in the groundwater at borehole WMP5 in June 2017.

3.36 There is no DWS for zinc. The maximum threshold values (TV) for zinc in groundwater of 0.0231mg/l is set for groundwater impacts on surface water in

Schedule 5 of the WFD Standards and Classifications Directions[7]. Zinc concentrations recorded in the groundwater at and in the vicinity of the Southern Extension have been recorded above the TV on occasion in the groundwater at the monitoring Zinc concentrations were recorded above the TV at all locations in the groundwater in December 2021 with a maximum concentration of 0.085mg/l recorded at borehole WMP1 up hydraulic gradient of the Southern Extension. In general, zinc has been recorded at concentrations above the analytical method detection limit of 0.002mg/l in groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension with concentrations fluctuating below the TV.

3.37 Limited copper data is available for samples of groundwater taken in January 2021, February 2022 and March 2022. Copper concentrations recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension were less than the DWS of 2mg/l. Copper concentrations in the groundwater at up hydraulic gradient boreholes WMP1 and WM3 were at or below the LOD of 0.001mg/l and up to 0.005mg/l at down hydraulic gradient boreholes WMp4 and WMP5.

Indicator substances

3.38 The pH of the groundwater at and in the vicinity of the Southern Extension generally is in the range 6.8 to 8.2. Electrical conductivity values recorded in the groundwater at boreholes at and in the vicinity of the Southern Extension are less than the DWS of 2,500 µS/cm and generally are below 800µS/cm.

Man-made subsurface pathways

3.39 We are informed by Tarmac that there are no underground public utility services in the application area.

Receptors and compliance points

3.40 The source-pathway-receptor linkages for the life cycle of the Southern Extension are presented in Table HRA 1 and Figure HRA 1 of the HRA. The receptors comprise groundwater in the superficial deposits and, where in continuity, groundwater in the

[7] The Water Framework Directive (Standards and Classifications) Directions (England and Wales) 2015.

Sherwood Sandstone Group together with the surrounding surface watercourses comprising the River Trent and the Milton Brook.

3.41 The compliance points comprise groundwater quality at borehole WMP4, WMP5 and WMP6 located down hydraulic of the Southern Extension.

4. Pollution control measures and monitoring

Basal and side slope engineering

4.1 The works comprise the deposition of waste on land as a recovery activity in order to restore Phases 1 and 2 and parts of Phases 3 and 4 of the Southern Extension to Swarkestone Quarry to agriculture and nature conservation habitats with waste transferred and temporarily stored in the proposed transfer area prior to deposition.

4.2 The restoration works will be carried out progressively and prior to the placement of the inert waste into each phase dewatering will continue from the mineral extraction operations such that wastes will not be deposited directly into water

4.3 The waste materials imported to the site will comprise a limited range of inert wastes only. Inert waste is defined in the EU Landfill Directive (Council Directive 1999/31/EC) as:

> *'…waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the waste and the eco toxicity of the leachate must be insignificant, and in particular not endanger the quality of surface water and/or groundwater'.*

4.4 It is considered that the waste does not comprise a contaminant source with the potential to have a significant detrimental effect on groundwater quality. Notwithstanding this as the excavated side slopes include sand and gravel deposits and a significant area of the excavated base includes Sherwood Sandstone Group strata that is designated as a Principal Aquifer it is proposed that an attenuation layer equivalent to a natural geological barrier 1m thick is constructed against the base and side slopes of the excavated quarry void prior to the placement of restoration materials. The attenuation layer will comprise Mercia Mudstone available at the site or imported from other sites or suitable overburden from the mineral extraction operations at the site. A schematic cross section through the site is shown on Figure ESSD 12. The construction of the basal and sidewall attenuation layer will be the

subject of Construction Quality Assurance (CQA) consistent with the conditions of the permit. Further details on the construction of the attenuation layer are outlined in the Stability Risk Assessment (SRA) presented at Appendix I to the application report.

Capping

4.5 As the materials imported to the site will comprise inert waste materials only it is not necessary to construct a cap or to provide cap protection soils.

Restoration

4.6 Pursuant to the conditions of planning permission reference CM9/1215/122 the site will be restored to agriculture and nature conservation habitats. The approved restoration scheme is presented at Appendix ESSD E.

Water management

4.7 The mineral deposit at the site is water bearing. As explained above, pumping to facilitate dewatering is being carried out during the operational life of the mineral workings and will be carried out until the level of the filled material is above the natural groundwater level. Groundwater will be pumped to settlement ponds at the site prior to consented discharge to the River Trent (T/36/460734/T).

4.8 As the site will not be capped rainfall incident to the site will continue to either be lost through evapotranspiration, infiltrate to the ground or will run off to the wider surface water management system. It is not necessary to install a drainage layer at the site as inert waste only will be deposited at the site hence the site will present a negligible risk to controlled waters.

Post closure controls (aftercare)

4.9 As only inert waste materials will be deposited at the site no leachate or landfill gas management systems will be necessary. Under the Environmental Permitting (England and Wales) Regulations 2016 the Environmental Permit may be surrendered only when it is concluded that the facility no longer presents a risk to the environment. As only inert waste will be deposited at the site an application will be submitted to surrender the Environmental Permit following the collection of monitoring data over only a limited period of time following the completion of the works at the

site. The surrender application will be supported by the records of the waste materials accepted at the site and of gas, surface water and groundwater monitoring records which will confirm the inert nature of the wastes deposited.

Gas monitoring

4.10 EA guidance on Waste recovery plans and deposit for recovery permits[8] (the recovery guidance) states the following under the heading 'Gas monitoring':-

> *'Where your risk assessment suggests there is a risk of gas and you plan to deposit waste more than 2 metres below the surrounding ground surface, you must monitor your waste for:*
>
> - *methane*
> - *carbon dioxide*
> - *oxygen*
>
> *You must install the appropriate number of monitoring boreholes per hectare as indicated by your risk assessment. The boreholes must extend to the full depth of the waste.'*

4.11 As shown in the Environmental Risk Assessment presented at Appendix G of the application report based on the inert nature of the waste that will be deposited at the site the potential for landfill gas generation is negligible. On this basis it is considered that gas monitoring at the site is unnecessary.

4.12 Although the site does not comprise an inert waste landfill site it is considered that the guidance presented in LFTGN03[7] in respect of the scope of a gas risk assessment for the deposit of inert waste on land is the nearest relevant guidance. In paragraph 2.3.1 of LFTGN03 it is stated that:-

> *'New inert landfills ought not to pose a landfill gas hazard. The emphasis in the risk assessment should, therefore, be placed on the Waste Acceptance Procedures and particularly the waste*

8 https://www.gov.uk/government/publications/deposit-for-recovery-operators-environmental-permits/waste-recovery-plans-and-deposit-for-recovery-permits

7 Environment Agency Guidance on the management of landfill gas. LFTGN03. September 2004.

> *characterisation and compliance monitoring measures introduced to ensure that only inert waste is deposited at the site. If these measures can be shown to be robust, then the landfill gas source should be demonstrably negligible. Provisions for the monitoring of gas within the waste body will normally be required at inert waste landfills.'*

4.13 The site will be the subject of an Environmental Permit restricting the waste types accepted at the site to inert wastes only hence in accordance with paragraph 2.3.1 of LFTGN03 should not pose a gas hazard. Robust waste acceptance procedures (WAP) will be implemented to minimise the risk that non-inert wastes will be accepted at the site. The robust WAP will form part of the externally accredited EMS for the site. Based on the robust waste acceptance procedures it is concluded that the site will comprise a negligible source of gas.

4.14 Nonetheless a programme of confirmatory gas monitoring will be carried out at the site. It is stated in the recovery guidance that:-

> *'You can rely on searcher bar (also called spike test) monitoring where the total depth of the waste is less than 4 metres, or before the deposit is complete. You must record the atmospheric pressure when you take gas readings.'*

4.15 As explained in Section 3, the thickness of workable sand and gravel ranges between 0.6m and 6.0m with an average thickness of approximately 3.7m. It is proposed, in line with recovery guidance, that searcher bar monitoring is used to monitor gas from the inert waste materials during the operational period. In areas of the site where the waste depth may exceed 4m consideration will be given during the operational period to the installation of in waste gas monitoring boreholes. Whether or not in waste gas monitoring boreholes are installed during the operational period will depend on the actual extracted profile and the waste thickness, the progression of the infilling and restoration operations, the results of monitoring using the searcher bar technique and any practical difficulties associated with the installation of boreholes at an operational site. The need to install operational in waste gas monitoring boreholes will be agreed with the EA with reference to the latest guidance. The programme of operational gas monitoring is presented in Table ESSD 2 and a Gas Action Plan is presented at Table ESSD 3.

4.16 In accordance with the recovery guidance post closure in waste gas monitoring boreholes will be installed. It is proposed that the number and location of post closure in waste gas monitoring boreholes will be determined based on the actual extracted profile and the restored profile and the results of the monitoring during the operational period and will be agreed with the EA with reference to the latest guidance. The post closure monitoring will be agreed with the EA.

Groundwater monitoring and surface water monitoring

4.17 No biodegradable waste materials will be deposited at the site which could result in the generation of leachate. Only inert wastes will be deposited at the site which have a limited potential for leaching of contaminants.

4.18 Nonetheless a programme of confirmatory groundwater monitoring is presented in Table ESSD 2. The monitoring will be carried out during the operation of the site and for a limited period following the restoration of the site. The monitoring locations are shown on Figure ESSD 11A. Interim groundwater quality compliance limits and assessment levels are presented in Table HRA 3 of the HRA based on a review of datasets recorded in the monitoring boreholes. As the proposed groundwater monitoring will be sufficient to confirm the environmental performance of the site it is considered unnecessary to set surface water quality compliance and assessment limits. During the operational phase of the site the discharge of water from the water management system to the River Trent will be the subject of discharge limits consistent with the current consented discharge to the River Trent (T/36/460734/T). The post closure monitoring will be agreed with the EA.

5. Site Condition Report

5.1 The application is necessary to authorise the permanent deposit of waste on land to restore the site in accordance with the obligations in planning permission reference CM9/1215/122. The section of the ESSD guidance[9] relevant to preparation of a Site Condition Report states:-

> *"A site condition report (SCR) is not necessary for parts of a permitted activity where you permanently deposit waste. An SCR is necessary for areas of the permitted site where you have not deposited any waste (eg site access areas, site offices, weigh bridge, wheel wash etc)"*

5.2 As the majority of the Environmental Permit boundary comprises the area in which waste will be deposited permanently and the proposed transfer area will only temporarily store materials due to be used in recovery it is unnecessary to provide a SCR with the application.

[9] Conceptual Site Model, Environmental Setting and Site Design Report" Version 1 dated 14 October 2016.

TABLES

Table ESSD 1

Waste types that may be accepted at the Southern Extension and proposed transfer area to Swarkestone Quarry for deposition as a recovery activity

Waste Code	Description (consistent with SR2015_No39)	Restrictions (consistent with SR2015_No39)
01 01	**wastes from mineral excavation**	**-**
01 01 02	Wastes from mineral non-metalliferous excavation	Restricted to waste overburden and interburden only
01 04	**wastes from physical and chemical processing of non-metalliferous minerals**	**-**
01 04 08	Waste gravel and crushed rocks other than those mentioned in 01 04 06	-
01 04 09	Waste sand and clays	-
01 04 12	Tailings and other wastes from washing and cleaning of minerals other than those mentioned in 01 04 07 and 01 04 11	
10 12	**wastes from manufacture of ceramic goods, bricks, tiles and construction products**	**-**
10 12 08	Waste ceramics, bricks, tiles and construction products (after thermal processing)	-
17 01	**concrete, bricks, tiles and ceramics**	**-**
17 01 01	Concrete	-
17 01 02	Bricks	-
17 01 03	Tiles and ceramics	-
17 01 07	Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	Metal from reinforced concrete must have been removed.
17 05	**soil stones and dredging spoil**	**-**
17 05 04	Soil and stones other than those mentioned in 17 05 03	Restricted to topsoil, peat, subsoil and stones only.
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**	**-**
19 12 09	Minerals (for example sand, stones) only	Restricted to wastes from treatment of waste aggregates that are otherwise naturally occurring minerals. Does not include fines from treatment of any non-hazardous waste or gypsum from recovered plasterboard.
20 02	garden and park wastes	**-**
20 02 02	Soil and stones	Restricted to topsoil, peat, subsoil and stones only.

Table ESSD 2

Programme of environmental monitoring during the operational phase of the site

	Location	Frequency	Determinands
Groundwater	WMP1A WMP3 WMP4 WMP5 WMP6	Quarterly	Water level in the borehole together with level of the base of the borehole where such measurements are practicable. pH, electrical conductivity, ammoniacal nitrogen, arsenic, cadmium, chloride, copper, lead, mercury, nickel, sulphate, toluene and zinc.
Gas (searcher bar locations internal to the waste)[1]	Two points per hectare	Six monthly	Methane, carbon dioxide and oxygen concentrations[2]

1. In areas of the site where the waste depth may exceed 4m consideration will be given during the operational period to the installation of in waste gas monitoring boreholes. Whether or not in waste gas monitoring boreholes are installed during the operational period will depend on the actual extracted profile and the waste thickness, the progression of the infilling and restoration operations, the results of monitoring using the searcher bar technique and any practical difficulties associated with the installation of boreholes at an operational site.

2. Meteorological and ground conditions will be recorded during each monitoring visit.

Table ESSD 3

Gas Action Plan

Parameter	**Action limit [1] (% by volume)**
Methane	1% volume/volume (v/v)
Carbon dioxide	1.5% v/v
Frequency	Six monthly
Assessment test Exceedance of the action limit on any one occasion.	
Contingency action	**Response time**
Repeat the monitoring at and in the vicinity of the affected location.	Before the end of the working day.
If the exceedance is sustained repeat the monitoring at and in the vicinity of the affected location.	5 working days.
Advise the Environment Agency.	Within 48 hours of the repeat monitoring.
If the exceedance is sustained assess the risks associated with the presence of the elevated gas concentrations.	Within one week.
Advise the Environment Agency.	Within two working days of the assessment.
If the risks are acceptable re-evaluate the assessment test.	12 months
If the risks are unacceptable implement corrective measures and or additional monitoring which may include the installation of in-waste gas monitoring borehole(s).	Agree timetable with the Environment Agency based on the results of the revised risk assessment

Notes:

[1] Based on the trigger levels specified in Environment Agency LFTGN03 Guidance on the management of landfill gas the action limits comprise 20% of the lower explosive limit for methane and 20% of the 8-hour UK Occupational Exposure Standard for carbon dioxide.

FIGURES

Key / Notes

- Boundary of Environmental Permit number EPR/FP3193SY
- Approximate extent of the Sinfin Moor Local Nature Reserve
- Boundary of planning permission reference CM9/1215/122
- Approximate extent of the Ticknall Quarries SSSI
- Approximate boundary of the site the subject of the Environmental Permit
- Approximate boundary of the site the subject of the Environmental Permit exclusively for the storage and transfer of restoration materials

Rev	Status	Drn	App	Chk	Date
	Final	KR	NCW	GT	19/07/22

Site: SWARKESTONE QUARRY

Client: TARMAC A CRH COMPANY

Title: The site location

Figure ESSD 1

Scale: 1:50,000@A4

Drawing Ref: TAR/SW/06-22/23221

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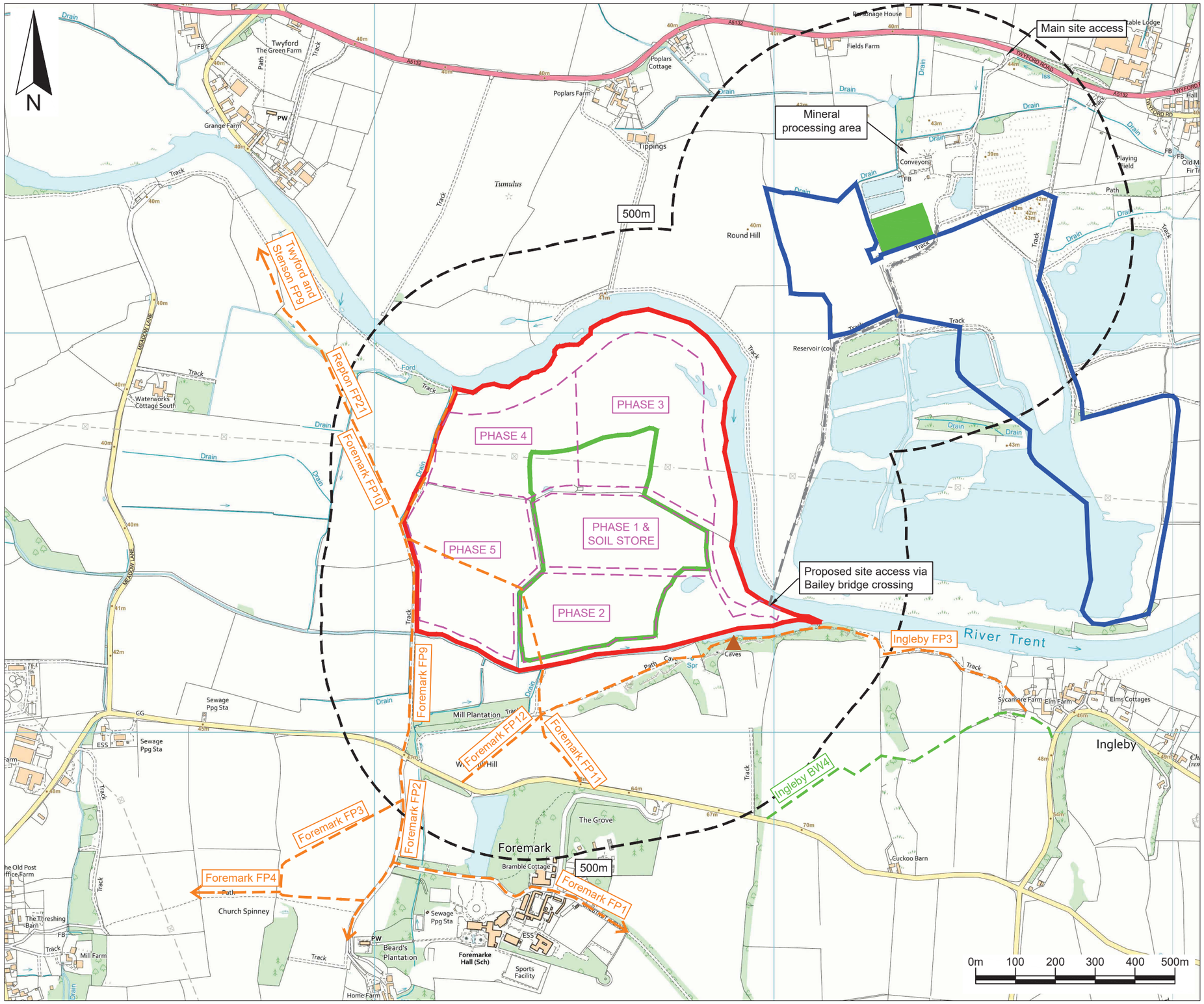

Key / Notes

- Boundary of Environmental Permit number EPR/FP3193SY
- Boundary of planning permission reference CM9/1215/122
- Approximate boundary of the site the subject of the Environmental Permit
- Approximate boundary of the site the subject of the Environmental Permit exclusively for the storage and transfer of restoration materials
- Phase boundaries
- 500m offset from the approximate boundary of the site the subject of the Environmental Permit application
- Listed building within a 500m radius of the site.
- Approximate routes of footpaths generally within 500m of the site
- Approximate route of a bridleway
- Site haul road

Rev	Status	Drn	App	Chk	Date
	Final	KR	NCW	GT	19/07/22

Site: SWARKESTONE QUARRY

Client: TARMAC A CRH COMPANY

Title: The site and surrounding area

Figure ESSD 2 | Scale: 1:10,000@A3

Drawing Ref: TAR/SW/06-22/23222

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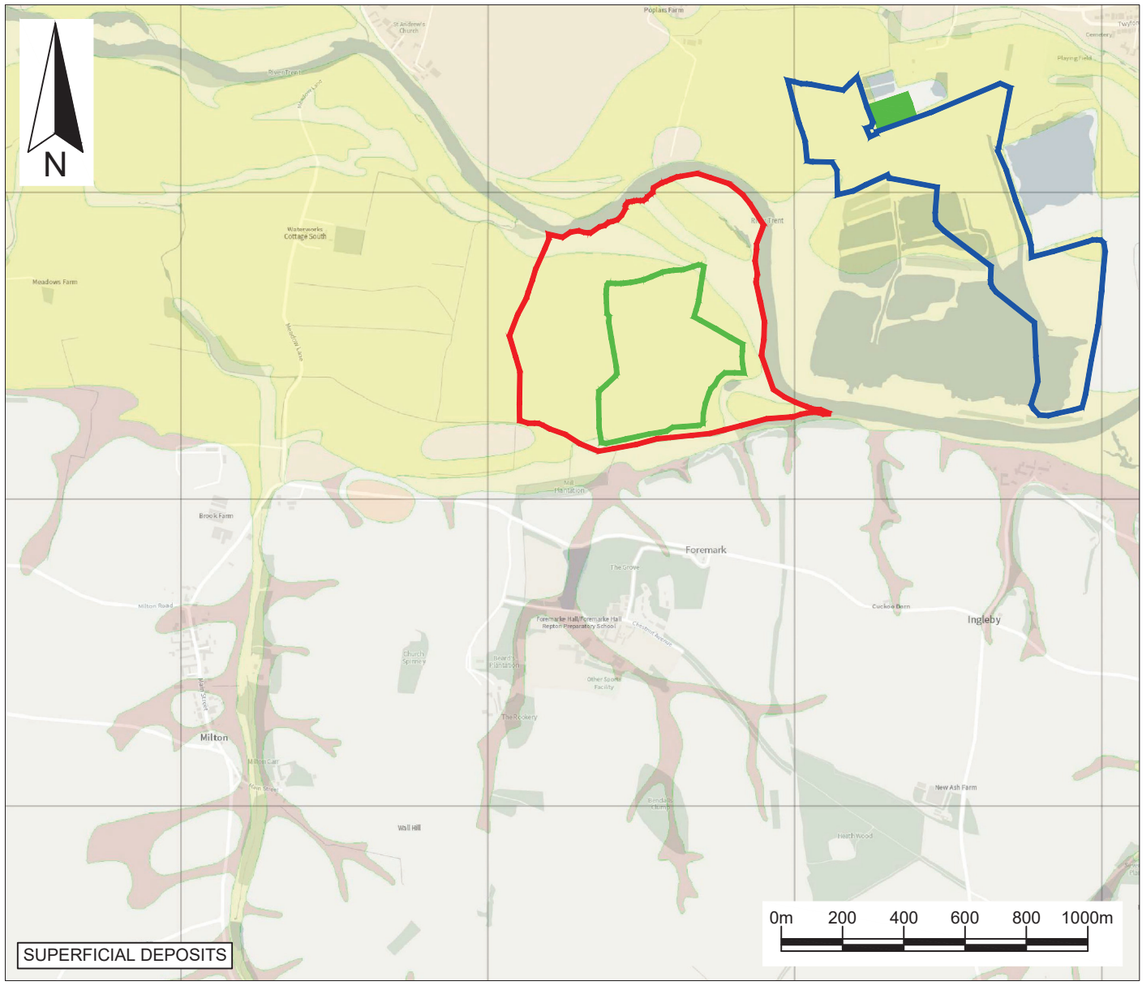

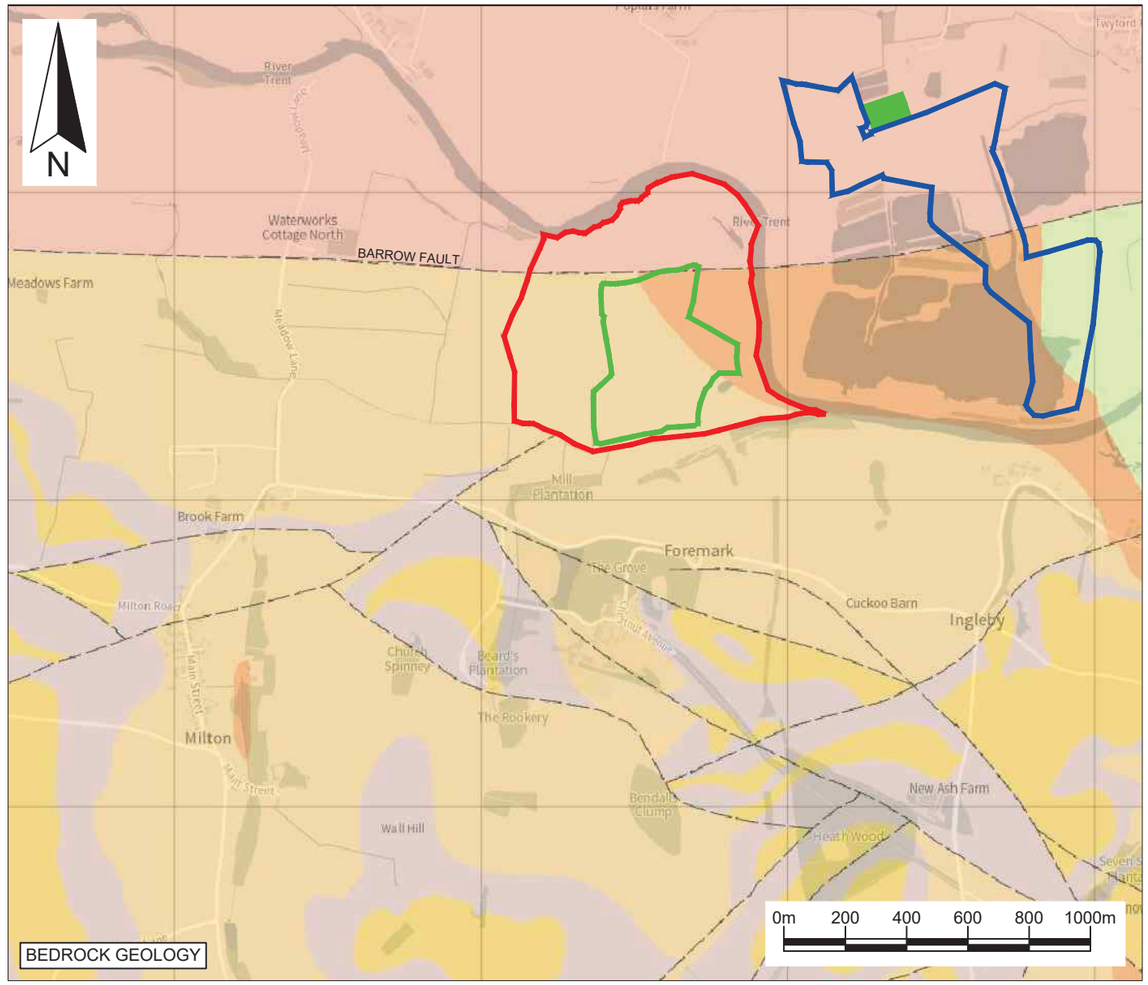

Key / Notes

Approximate boundary of Environmental Permit number EPR/FP3193SY

Boundary of planning permission reference CM9/1215/122

Approximate boundary of the site the subject of the Environmental Permit

Approximate boundary of the site the subject of the Environmental Permit exclusively for the storage and transfer of restoration materials

Superficial Deposits

- Head deposits
- Alluvium
- TRENT VALLEY FORMATION
  - Hemington Member
  - Holme Pierrepont Sand and Gravel Member
  - Beeston Sand and Gravel Member

Bedrock Geology

- MERCIA MUDSTONE GROUP (TRIASSIC)
  - Gunthorpe Member (Sidmouth Mudstone Formation)
  - Tarporley Siltstone Formation
- SHERWOOD SANDSTONE GROUP (PEMIAN - TRIASSIC)
  - Helsby Sandstone Formation - Sandstone
  - Helsby Sandstone Formation - Mudstone
  - Chester Formation
  - Moira Formation
- CRAVEN GROUP (CARBONIFEROUS)
  - Bowland Shale Formation
- Faults in bedrock strata

Rev	Status	Drn	App	Chk	Date
	Final	KR	NCW	GT	19/07/22

Site: SWARKESTONE QUARRY

Client: TARMAC A CRH COMPANY

Title: The regional geology of the site and surrounding area

Figure ESSD 8 | Scale: 1:20,000@A3

Drawing Ref: TAR/SW/06-22/23223

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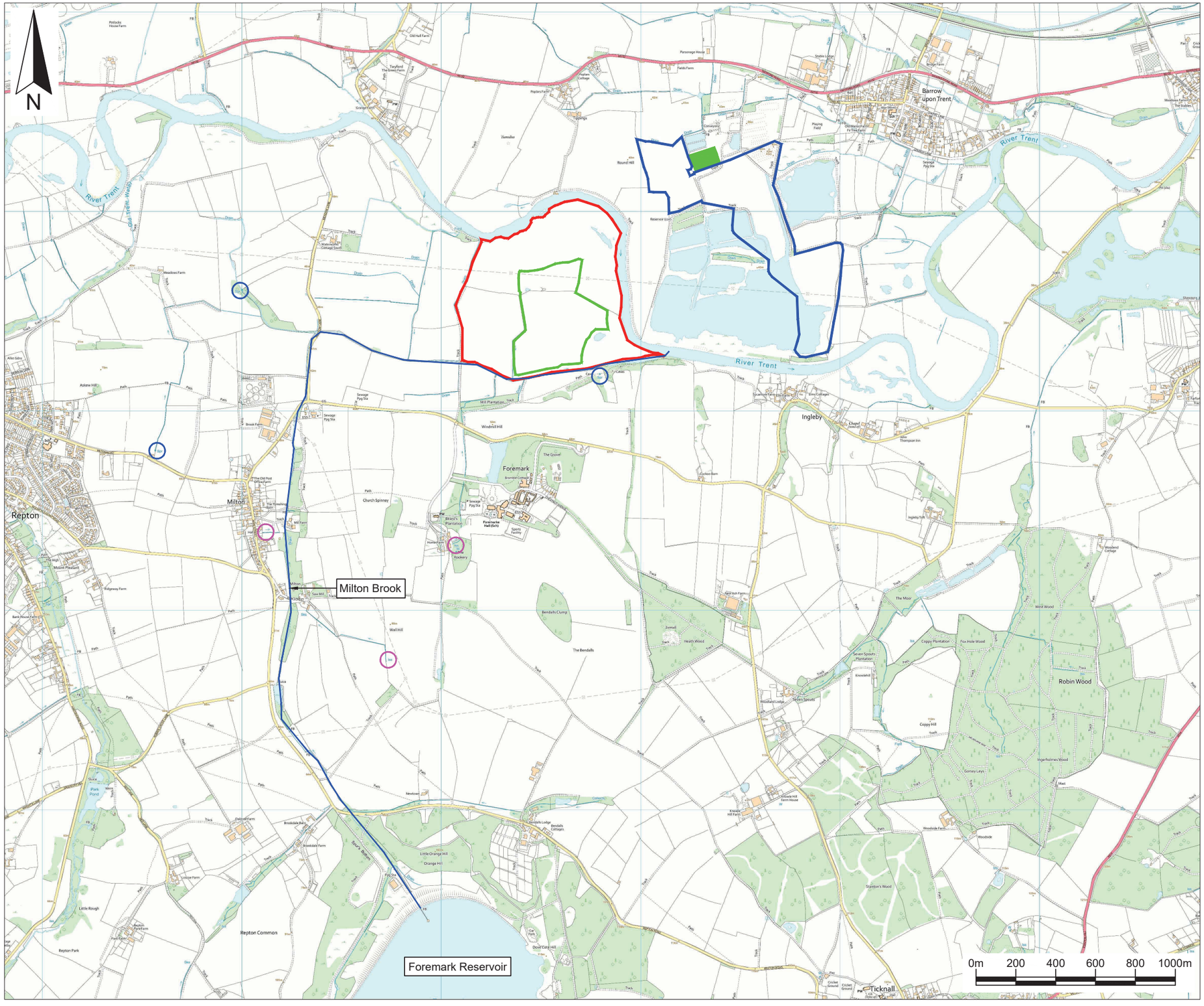

Key / Notes

- Boundary of Environmental Permit number EPR/FP3193SY
- Boundary of planning permission reference CM9/1215/122
- Approximate boundary of the site the subject of the Environmental Permit
- Approximate boundary of the site the subject of the Environmental Permit exclusively for the storage and transfer of restoration materials
- Location of spring
- Location of issue

Rev	Status	Drn	App	Chk	Date
	Final	KR	NCW	GT	19/07/22

Site: SWARKESTONE QUARRY

Client: TARMAC A CRH COMPANY

Title: Surface water features at and in the vicinity of the site

Figure ESSD 9

Scale: 1:20,000@A3

Drawing Ref: TAR/SW/06-22/23224

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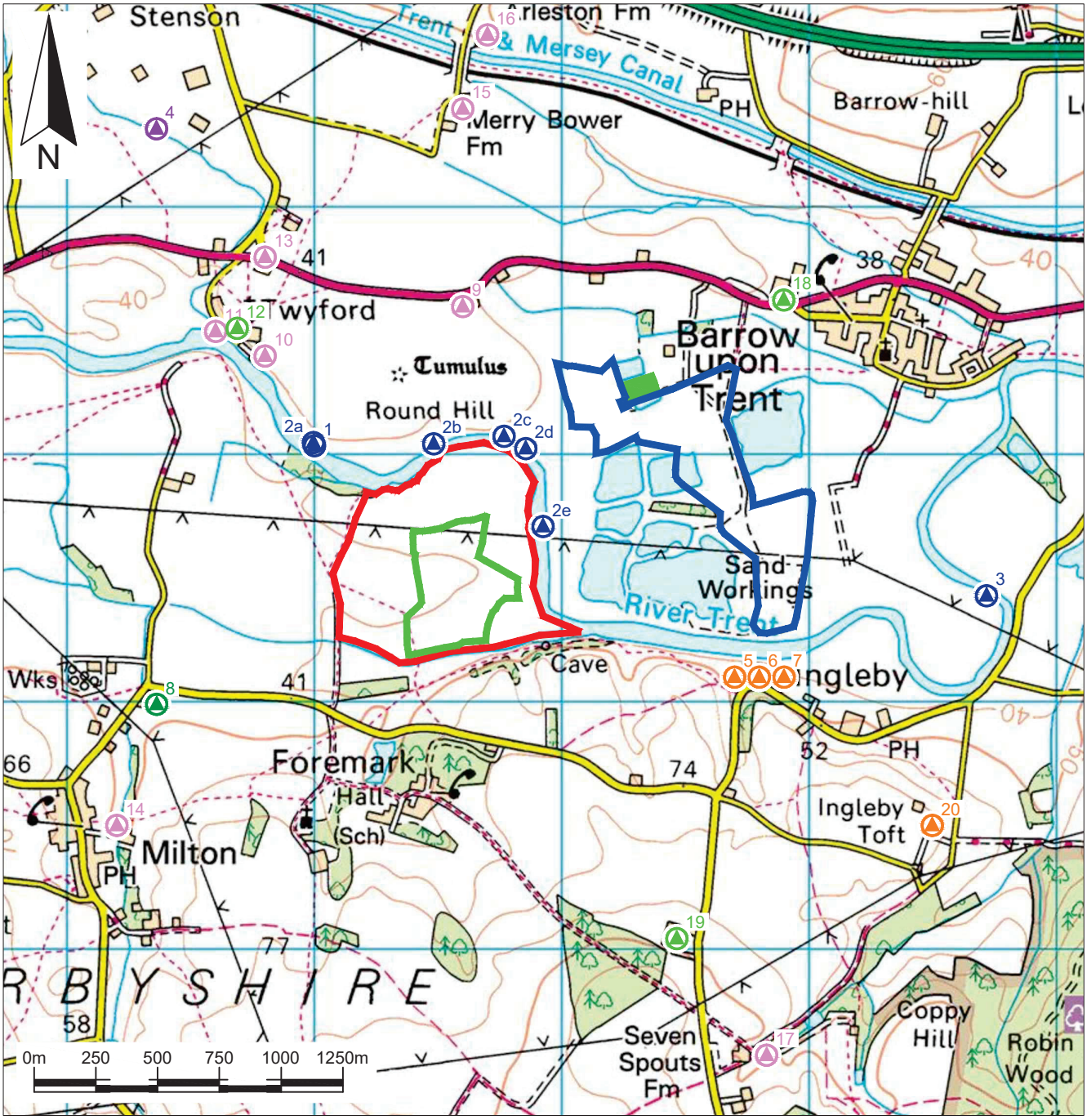

Key / Notes

- Boundary of Environmental Permit number EPR/FP3193SY
- Boundary of planning permission reference CM9/1215/122
- Approximate boundary of the site the subject of the Environmental Permit
- Approximate boundary of the site the subject of the Environmental Permit exclusively for the storage and transfer of restoration materials
- Location of a licensed surface water abstraction
- Location of a deregulated surface water abstraction
- Location of a licensed groundwater abstraction
- Location of a deregulated groundwater abstraction
- Location of a private groundwater abstraction
- Location of a unlicensed surface water or groundwater abstraction

Rev	Status	Drn	App	Chk	Date
	Final	KR	NCW	GT	19/07/22

Site: SWARKESTONE QUARRY

Client: TARMAC A CRH COMPANY

Title: Plan showing the approximate locations of the groundwater and surface water abstractions within 2km of the Southern Extension

Figure ESSD 10

Scale: 1:25,000@A4

Drawing Ref: TAR/SW/06-22/23225

MJCA Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road, Baxterley, Atherstone,
Warwickshire, CV9 2LE.
Telephone : 01827 717891
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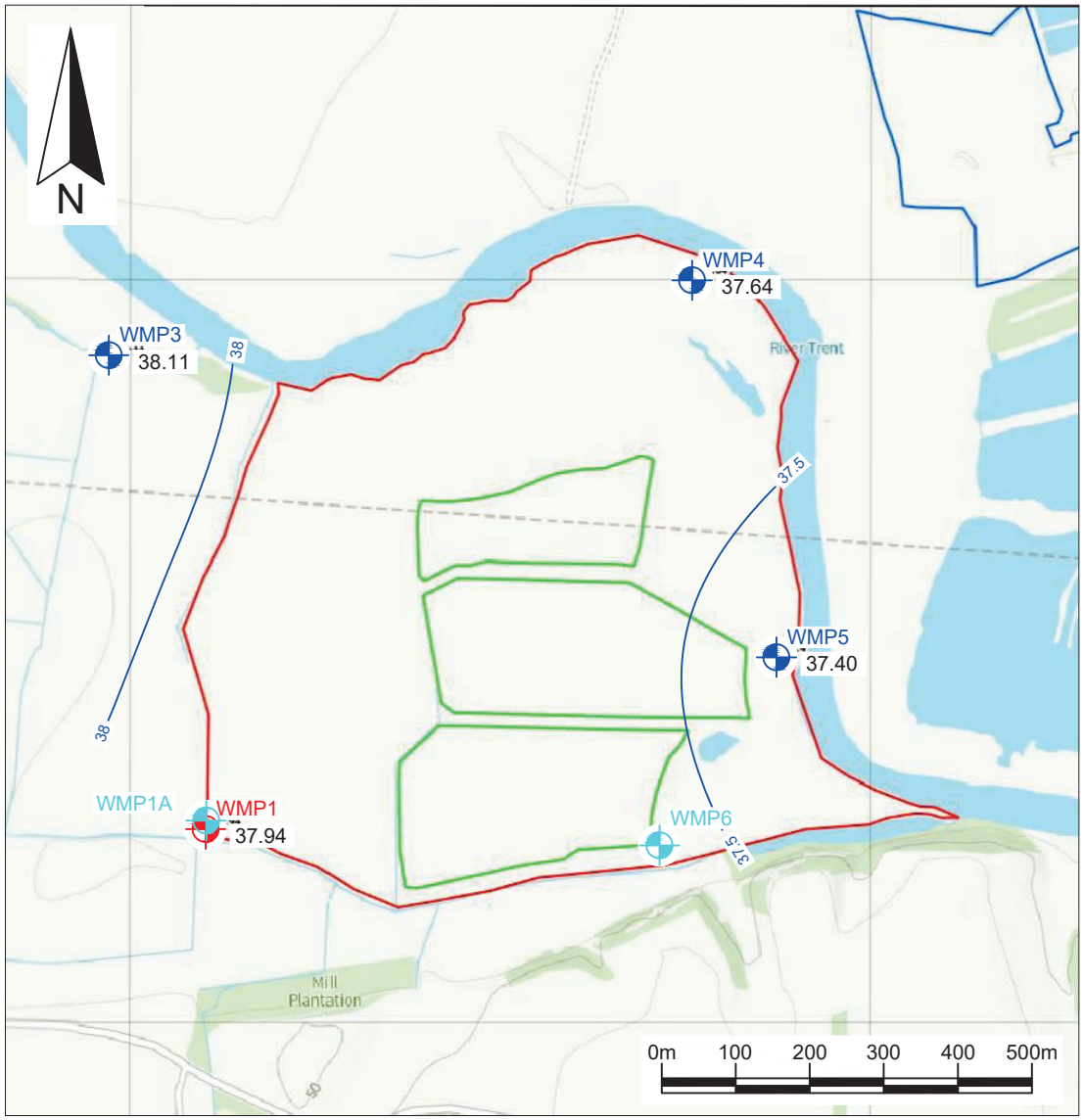

Key / Notes

- Boundary of Environmental Permit number EPR/FP3193SY
- Boundary of planning permission reference CM9/1215/122
- Approximate boundary of the site the subject of the Environmental Permit application
- Groundwater level contour interpolated from groundwater levels recorded on 25 September 2018 (mAOD)
- 38.11 — Groundwater level recorded on 25 September 2018 (mAOD)
- WMP1 — Approximate location of a groundwater monitoring borehole
- WMP6 — Approximate location of a groundwater monitoring borehole installed in May 2022
- WMP1 — Approximate location of a groundwater monitoring borehole that has been destroyed

Rev	Status	Drn	App	Chk	Date
	Final	HL	JAD	JRC	08/08/22

Site
SWARKESTONE QUARRY

Client
TARMAC
A CRH COMPANY

Title
Groundwater contours interpolated from groundwater levels recorded in the superficial sand and gravel deposits at the site on 25 September 2018

Figure ESSD 11A

Scale
1:10,000@A4

Drawing Ref
TAR/SW/08-22/23304

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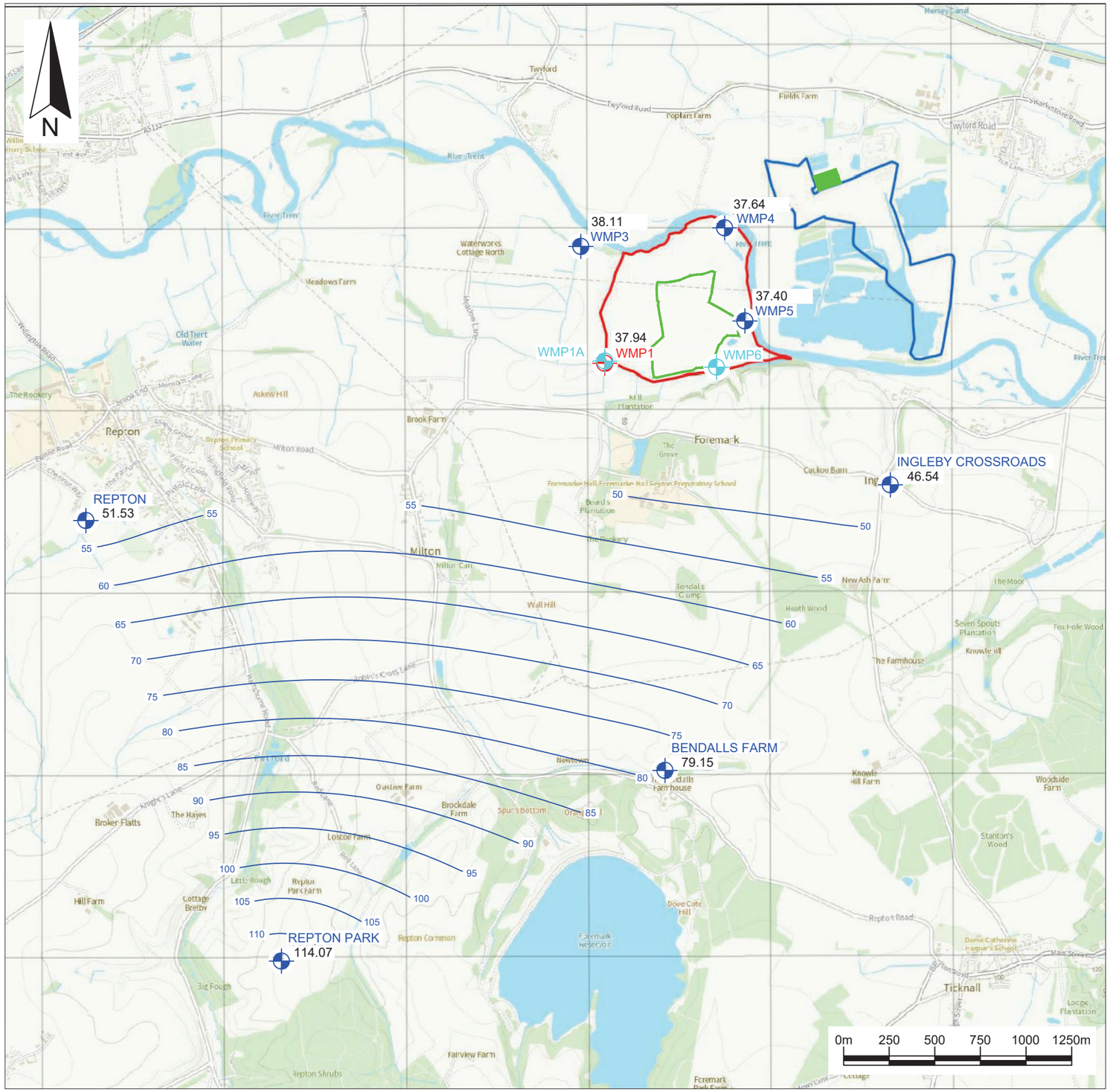

Key / Notes

- Boundary of Environmental Permit number EPR/FP3193SY
- Boundary of planning permission reference CM9/1215/122
- Approximate boundary of the site the subject of the Environmental Permit
- Approximate boundary of the site the subject of the Environmental Permit exclusively for the storage and transfer of restoration materials
- Groundwater level contour interpolated from groundwater levels recorded on 25 September 2018 (mAOD)
- 38.11 — Groundwater level recorded on 25 September 2018 (mAOD)
- WMP1 — Approximate location of a groundwater monitoring borehole
- WMP6 — Approximate location of a groundwater monitoring borehole installed in May 2022
- WMP1 — Approximate location of a groundwater monitoring borehole that has been destroyed

Notes:
Groundwater level data for boreholes at Repton, Repton Park, Bendalls Farm and Ingleby Crossroads provided by the Environmnent Agency.

The 25 September 2018 comprises the most recent date on which groundwater level data was recorded at both the site and EA boreholes and groundwater levels at the site were approximately equal to average groundwater levels.

Groundwater at boreholes Repton, Repton Park, Bednalls Farm and Ingleby Crossroads is in the Sherwood Sandstone Group Aquifer.

Groundwater level data for boreholes at the site is for the superficial sand and gravel deposits and the Sherwood Sandstone Group which are considered to form a single aquifer unit at the site.

Rev	Status	Drn	App	Chk	Date
	Final	KR	NCW	GT	19/07/22

Site: SWARKESTONE QUARRY

Client: TARMAC A CRH COMPANY

Title: Groundwater contours interpolated from groundwater levels recorded in the Sherwood Sandstone Group to the south of the site on 25 September 2018 together with groundwater levels recorded in the superficial sand and gravel deposits at the site on 25 September 2018

Figure ESSD 11B

Scale: 1:25,000@A3

Drawing Ref: TAR/SW/06-22/23226revA

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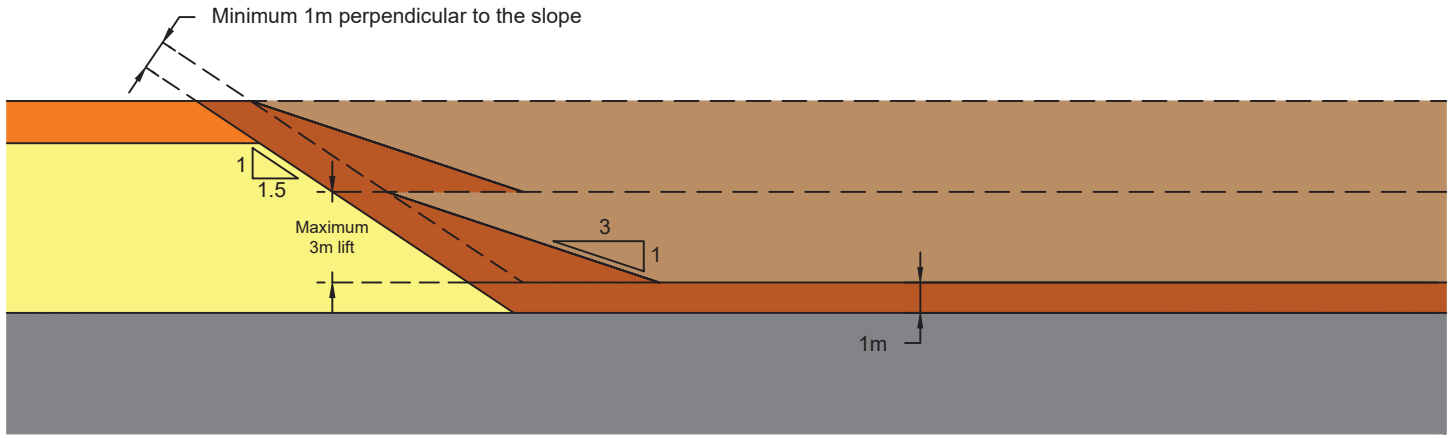

Key / Notes

- Attenuation layer
- Inert restoration materials
- Overburden
- Superficial deposits
- Mercia Mudstone/Sherwood Sandstone

Rev	Status	Drn	App	Chk	Date
	Final	KR	NCW	GT	19/07/22

Site
SWARKESTONE QUARRY

Client
TARMAC
A CRH COMPANY

Title
Schematic drawing of the geology of and inert waste fill in Southern Extension

Figure ESSD 12

Scale
1:250@A4

Drawing Ref
TAR/SW/06-22/23227

MJCA
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APPENDIX ESSD A

PLANNING PERMISSION REFERENCE CM9/1215/122

PUBLIC
Form TCP 3

LET7251

DERBYSHIRE COUNTY COUNCIL

TO: Mrs L Pickford
c/o David L Walker Chartered Surveyors
Albion House
89 Station Road
Eckington
S21 4FW

County Hall
Matlock
Derbyshire
DE4 3AG

9.1589.5

TOWN AND COUNTRY PLANNING ACT 1990

In pursuance of the powers vested in the Council under the above Act and all related Acts, Orders and Regulations, and with reference to your application Code No CM9/1215/122 received on the 17 December 2015 for permission **for a 61 hectares extension to existing sand and gravel quarry including use of existing processing plant with restoration to a mixture of agriculture and nature conservation at Swarkestone Quarry, Twyford Road, Barrow-on-Trent** in the manner described in the application and shown on the accompanying plan(s) and drawing(s), NOTICE IS HEREBY GIVEN that permission for the proposed development is **GRANTED subject to:**

Commencement and Duration

1) The development hereby approved shall be begun within three years of the date of this permission. The Mineral Planning Authority shall be notified, in writing, of the date of commencement of the development within 7 days of such commencement.

Reason: To comply with Section 91 of the Town and Country Planning Act 1990. The Mineral Planning Authority requires prior notification of the date of commencement of the development so that it has sufficient time to ensure that all the requirements of the planning permission are in place and to make arrangements for monitoring the development.

2) All mineral extraction operations, uses and other development as approved by this permission, except for such restoration and landscaping and aftercare of the site as is to be completed later in accordance with other conditions to which this permission is subject, shall be completed within eight years of the date of commencement.

Date 29 March 2019 Signed

Authorised Officer of the Council

Reason: To ensure the timely completion of stages of the development in the interests of the amenity of the area.

Approved Plans and Form of Development

3) Except as may be modified or required by the terms of the other conditions of this permission, the development hereby approved shall be carried out in accordance with the details, including all mitigation measures, set out in the planning application documents, including the Environmental Statement dated December 2015 and the Planning Statement dated December 2015 submitted by David L Walker Limited and received by the Mineral Planning Authority on 17 December 2015, as amended by the supplementary submissions by David L Walker Limited under cover of letters dated May 2017, 20 April 2018 and 13 September 2018.

For the avoidance of doubt the approved development shall be carried out in accordance with the provisions of and shall relate to the area specified in the following drawings and documents:

Drawing No. S346/00003 - Location Plan.
Drawing No. S346/00004 - Site Plan.
Drawing No. S346NC115.PDF - Inert fill areas.
Drawing No. S346STP15.PDF - Plant Site Development.
Drawing No. S346.00053a - Southern Extension Soil Proposed Revised Phasing.
Drawing No. S346.00054a - Southern Extension Soil Handling Scheme Phase 1a.
Drawing No. S346.00055a - Southern Extension Soil Handling Scheme Phase 1b.
Drawing No. S346.00068 - Southern Extension Soil Handling Scheme Phase 1, Imported Fill.
Drawing No. S346.00069 - Southern Extension Soil Handling Scheme Phase 1, Access and Bridge Restoration
Drawing No. S346.00056a - Southern Extension Soil Handling Scheme Phase 2
Drawing No. S346.00059a - Southern Extension Soil Handling Scheme Phase 2 Restoration
Drawing No. S346.00057a - Southern Extension Soil Handling Scheme Phase 3a
Drawing No. S346.00058a - Southern Extension Soil Handling Scheme Phase 3b
Drawing No. S346.00063 - Southern Extension Soil Handling Scheme Phase 4a

Date 29 March 2019 Signed

Authorised Officer of the Council

Drawing No. S346.00064 - Southern Extension Soil Handling Scheme Phase 4b
Drawing No. S346.00065 - Southern Extension Soil Handling Scheme Phase 5a
Drawing No. S346.00066 - Southern Extension Soil Handling Scheme Phase 5b
Drawing No. S346.00067 - Southern Extension Soil Handling Scheme Phase 5b Restoration
Drawing No. S346.00070 - Southern Extension Soil Handling Scheme Completed Restoration
Drawing No. 17547-19389-P-100 Rev A
Swarkestone Quarry Western Extension North Flood Risk Assessment (2D Flood Modelling Update) by Golder Associates (UK) Ltd dated 21 December 2016 as amended by:
Hydrogeological Impact Assessment and Flood Risk Assessment for the Proposed extraction of Sand and Gravel by Golder Associates (UK) Ltd dated September 2018.
Swarkestone Quarry Southern Extension – BS5837 (2012) Tree Survey, Arboricultural Impact Assessment and Arboricultural Method Statement by Ecus Ltd dated January 2018.
Landscape and Visual Impact Assessment (LVIA) Addendum by ECUS September 2018.
Drawing No. L10888-LD-01 Rev C Swarkestone Quarry Restoration Scheme Concept Plan – Landscape Strategy
Drawing No. L10888-LD-02 Rev C Swarkestone Quarry Restoration Scheme – Concept Plan – Typical Sections

For the avoidance of doubt, the programme for the phasing of extraction and restoration shall be carried out in accordance with that indicated on the relevant drawings listed above and on the commencement of each phase, no trees, hedgerows or shrubs shall be removed during the bird nesting season (1 March to 31 August in any year). In addition, there shall be no importation of aggregates for processing at the quarry.

Reason: For the avoidance of doubt and to ensure that the development is carried out in accordance with the approved details in the interests of the amenity of the area and the integrity of the environment.

4) In the event that the proposed Bailey Bridge does not comply with the details on Drawing No. 17547-19389-P-100 Rev A no construction works other than the creation of the internal access road shall be commenced until revised details have been submitted to and approved in writing by

the Mineral Planning Authority and thereafter shall be constructed as so approved.

Reason: To enable the Mineral Planning Authority to retain control over the form and appearance of the bridge in the interests of the visual appearance and character of the area.

Availability of Plans

5) From the date any operations under this permission are commenced, a copy of the permission, including all the documents referred to in it, and any further submissions to, and approved by the Mineral Planning Authority under the approved conditions, shall be displayed at the site office during working hours, and the terms and conditions of the permission shall be known to any person(s) given the responsibility for the management and control of operations on site.

Reason: To ensure that the site operators are fully aware of the scope of the planning permission and the requirements of these conditions throughout the period of the development in order to ensure that it is carried out as approved in the interests of the amenity of the area.

6) No development shall be carried out within 10m of the River Trent embankment until the applicant/operator has commissioned a further survey to determine the presence of otter activity. The report of the survey shall be submitted for the approval in writing of the Mineral Planning Authority. The report shall, where necessary, make provision for measurers to protect otters from the development and shall be implemented as approved.

Reason: In order to provide appropriate protection of an important wildlife species to ensure their continued presence along this part of the River Trent.

Notifications

7) The applicant/operator shall notify the Mineral Planning Authority within seven days of the commencement and completion of each phase of the development and give at least seven days' notice of the intention to undertake soil stripping in each phase. The applicant/operator shall also maintain production and output records which shall be made available to the Mineral Planning Authority on an annual basis.

Reason: The Mineral Planning Authority requires appropriate notification of these dates to establish the base dates for the duration of

the operations and to ensure that it has sufficient time to make arrangements for monitoring of the development in the interests of maintaining the amenity of the area. The maintenance and provision of the annual production figures are required to ensure that the quarry operates within the approved limits.

Site Access Location and Form

8) The sole means of passage access for all vehicles entering and exiting the site shall be via the existing entrance to Swarkestone Quarry onto the A5132 road. All existing visibility splays and road markings at the entrance shall be retained and maintained to the approved standard and form for the duration of the approved development. The entrance, including screen bunds, landscaping and vegetation, shall be maintained throughout the development in accordance with the following drawings and associated details:

- Drawing no: S6/P3/7a(R) which accompanied the applicant's letter dated 3 December 1991.
- Drawing no's: 246B/1/A and accompanying letter from TPA dated 16 March 1992 and 246B/2 and S46/B/4A.

Reason: To control access to the site in the interests of maintaining local amenity, highway safety and the existing environment.

Highway Safety

9) No loaded lorries shall leave the site unsheeted.

Reason: In the interests of highway safety and local amenity.

10) No mud or other dirt shall be carried from the site on to the public highway.

Reason: In the interests of highway safety and local amenity.

Removal of Plant and Equipment

11) Within one year of the completion of mineral extraction, all plant, buildings, structures, foundations associated with the mineral extraction and processing plant and operations shall be removed from the site. The site access and road through the site including the Bailey bridge, gates and all signage shall be removed on completion of the 15 year management programme set out in condition 58.

Date 29 March 2019 Signed

Authorised Officer of the Council

Reason: Required in conjunction with site restoration and landscaping in order to ensure comprehensive assimilation of the site into the surrounding landscape.

Protection of Existing Vegetation

12) No operations required or authorised by this permission, including the stripping and storage of soils, shall take place within 6m of the centre line of any hedgerow and not within 10m of the trunk of any tree which is to be retained on the site.

Reason: To ensure the protection and retention of existing vegetation that is to be retained in the interests of the visual appearance and amenity of the site in the context of the surrounding landscape.

13) The screen mounds between the A5132 and the processing plant site, as shown on drawing no. S6/EXT/02, and all tree planting including existing copses, soil mounds and riverside planting, including provisions for protection and maintenance of the trees, shall be maintained for the duration of the approved development.

Reason: In the interests of visual amenity and to provide protection to existing planting.

Processing Plant/Silt Lagoons

14) The processing plant, silt lagoons, heights and extent of mineral stocks, artificial lighting and security arrangements shall, for the duration of the approved development, be maintained in accordance with the schemes set out in:

- drawing nos. QS002921A, 2939, 2940 and S46B/6D, C/SWAR1/;
- letter to Derbyshire County Council dated 25 September 1995; and
- letter and accompanying plan dated 7 April 2005 to vary the height and extent of stockpile grounds.

For the avoidance of doubt, the height of the material stockpiles shall not exceed 7m in height (as measured from adjacent ground levels), with the exception of the surge stock piles which, between 1 October and 31 March, shall not exceed 10m in height (as measured from adjacent ground level).

Reason: For the avoidance of doubt and in the interests of visual amenity.

Date 29 March 2019 Signed (MA) David Arnold
Authorised Officer of the Council

Hours of Operation

15) No operations authorised or required by the terms of this planning permission, other than pumping operations to remove water from excavations and the servicing, maintenance and testing of plant and other similar work of an essential nature, shall be carried out on the site except between the following times:

0700 hours - 1900 hours Mondays to Fridays; and
0700 hours - 1300 hours Saturdays.

Within these times, the stripping of topsoils, subsoils and overburden, the formation of storage mounds and their subsequent re-use for restoration, shall only be carried out between the following times:

0800 hours - 1800 hours Monday to Friday;
0800 hours - 1300 hours Saturday.

Servicing, maintenance and testing of plant and other similar work of an essential nature shall not be carried out except between the normal working hours specified above and the following extended times, unless alternative hours are approved in writing by the Mineral Planning Authority:

1300 hours – 1600 hours Saturday;
0900 hours – 1600 hours Sunday.

No operations shall be carried out on Saturday afternoons, Sundays, Bank Holidays, or other Public Holidays, without the prior written approval of the Mineral Planning Authority.

Reason: To control the hours of operation in the interests of local amenity.

Noise

16) Except as provided at Condition 17 below, the free field noise generation from the site, expressed as a 1 hour LAeq as measured at all the noise sensitive locations identified in Chapter 5.7 of the Environmental Statement dated December 2015, shall not exceed the 'preferred' daytime operational limit (expressed as dB for any one-hour) between the operational hours set out in Condition 15 above.

Reason: To control the impact of noise generated by the development and to provide for the monitoring of the impact in the interests of protecting local amenity.

Date 29 March 2019 Signed (MA David Arnold
Authorised Officer of the Council

17) The noise limits referred to in Condition 16 above may be exceeded for noise emitted from temporary operations related to the stripping of soils and overburden, formation of soil storage and flood protection bunds and their subsequent re-use for restoration, and received at any of the noise sensitive properties for a total period not exceeding eight weeks in any calendar year, provided that at no time shall noise exceed 70 dBLAeq, 1 hour, free field.

Reason: To control the impact of noise generated by the development and to provide for the monitoring of the impact in the interests of protecting local amenity.

Noise Monitoring Scheme

18) With the exception of the installation of the Bailey bridge over the River Trent, no operations shall be commenced within the approved extension area until a scheme for monitoring noise levels arising from those operations, including noise levels generated from within the overall quarry complex, has been submitted to and approved in writing by the Mineral Planning Authority. The scheme shall make provision for noise monitoring to be undertaken on a three month basis for the first year of operations and, thereafter, the frequency of further monitoring may be reduced by the written authorisation of the Mineral Planning Authority, based on an assessment of the level of compliance with the limits set out in conditions 14 and 15 above. In the event that any operation gives rise to noise levels exceeding those limits, the operation shall be suspended temporarily until such remedial measures have been introduced that will reduce noise levels to within the permitted maximum levels.

Reason: To control the impact of noise generated by the development and to provide for the monitoring of the impact in the interests of protecting local amenity.

19) Prior to the commencement of the stripping of topsoil, subsoil and overburden, the formation of storage mounds and their subsequent reuse for restoration in the phases near to the identified noise sensitive properties the operator shall notify the respective occupants at least seven days in advance about the date of commencement, the duration of these operations and the proposed hours of daily working and inform the Mineral Planning Authority, in writing, about the details of the notification within seven days of the date of the notification.

Reason: To control the impact of noise generated by the development and to provide for the monitoring of the impact in the interests of protecting local amenity.

Date 29 March 2019 Signed David Arnold

Authorised Officer of the Council

20) Efficient silencers shall be fitted to, used and maintained in accordance with manufacturers' instructions, on all vehicles, plant and machinery used on the site. Save for the purposes of maintenance, no machinery shall be operated with the covers open and removed.

Reason: To control the impact of noise generated by the development and to provide for the monitoring of the impact in the interests of protecting local amenity.

21) The reversing warning system on all vehicles on the site and those using the site shall not emit a noise that would have an adverse impact on local or residential amenity. Reversing warning devices shall be non-audible, ambient-related or low tone devices.

Reason: To control the impact of noise generated by the development and to provide for the monitoring of the impact in the interests of protecting local amenity.

Dust

22) At all times during the carrying out of operations authorised or required by this permission, water bowsers, sprayers, whether mobile or fixed, or similar equipment and measures shall be used to minimise the emission of dust from the site. No vehicles used for the movement of materials on site shall be equipped with downward pointing exhaust pipes. At such times as the prevention of dust nuisance by these means is not possible, the movements of soils and overburden, infilling materials and any other dust generating activity shall temporarily cease until such time as weather conditions improve and the emission of dust from the site has been abated.

Reason: To control dust resulting from site operations and to provide for the monitoring of the impact of dust emissions in the interests of protecting the local amenity and the environment.

Dust Monitoring Scheme

23) With the exception of the installation of the Bailey bridge over the River Trent, no operations shall be commenced within the approved extension area until a scheme for monitoring dust levels arising from those operations, including dust emitted from within the overall quarry complex, has been submitted to and approved in writing by the Mineral Planning Authority. The scheme shall specify the method of dust monitoring to be adopted, the location points and frequency of monitoring, and the reports on such monitoring shall submitted to the Mineral Planning Authority within 14 days of the monitoring dates.

Date 29 March 2019 Signed (MH) David Arnold
Authorised Officer of the Council

Reason: To control dust resulting from site operations and to provide for the monitoring of the impact of dust emissions in the interests of protecting the local amenity and the environment.

Lighting

24) No additional outdoor lighting shall be installed at the processing plant site without the prior written approval of the Mineral Planning Authority.

Reason: To ensure that lighting is appropriate in the interests of protecting local amenity and the environment.

Permitted Development Rights

25) Notwithstanding the provisions of Article 3 and Part 17A of Schedule 2 of the Town and Country Planning (General Permitted Development) Order 2015, as amended, no fixed plant or machinery, buildings, structures or erections, or private ways shall be erected, installed, replaced, repaired or altered, except within the area identified on drawing number S6/EXT/02 dated October 2009 or as authorised or required by this permission, or as otherwise authorised by the prior written approval of the Mineral Planning Authority.

Reason: To enable the Mineral Planning Authority to consider any proposed further development in those parts of the site, other than the area on the drawing referred to, where any such development might have an unacceptable impact upon amenity and the environment.

Water Protection, Drainage and Pollution Prevention

26) The development shall only be carried out in accordance with the provisions and requirements of the Flood Risk Assessment in chapter 5.6 of the Environmental Statement dated December 2015, as amended by the report Swarkestone Quarry Western Extension (north) Flood Risk Assessment (2D flood modelling update) dated 21 December 2015, as further amended by the report Swarkestone Southern Quarry Extension, Hydrogeological Impact Assessment and Flood Risk Assessment for proposed extraction of sand and gravel by Golder Associates (UK) Ltd dated September 2018.

Reason: To ensure that the approved development does not give rise to an increased risk of flooding on and off-site, to maintain or improve the flood storage capacity of the site and to avoid interference with the direction and quantity of flood water flows.

Date 29 March 2019 Signed

Authorised Officer of the Council

27) There shall be no interruption of the surface water drainage system of surrounding land as a result of operations on this site. Provision shall be made to ensure that all drainage systems continue to operate effectively.

Reason: To ensure the site and surrounding land continue to drain efficiently in the interests of protecting the water environment and maintaining the quality and use of the land.

28) The final levels of the restored land shall not exceed existing ground levels as shown on drawing no. S346/000004, Site Plan dated 14 December 2015.

Reason: To ensure that levels are not restored to the detriment of the flood plain in terms of both storage and flood flow.

29) Any facilities for the storage of oils, fuels or chemicals shall be sited on impervious bases and surrounded by impervious bund walls. The volume of the bunded compound shall be at least equivalent to the capacity of the tank plus 10%. If there is multiple tankage, the compound shall be at least equivalent to the capacity of the largest tank, vessel or the combined capacity of interconnected tanks or vessels plus 10%. All filling points, associated pipework, vents, gauges and sight glasses shall be located within the bund or have separate secondary containment. The drainage system of the bund shall be sealed with no discharge to any watercourse, land or underground strata. Associated pipework shall be located above ground and protected from accidental damage. All filling points and tank/vessels overflow pipe outlets shall be detailed to discharge downwards into the bund.

Reason: To prevent pollution of the water environment.

30) No foul or contaminated drainage from the site shall be discharged into groundwater or any surface water either directly or via soakaways.

Reason: To prevent pollution of the water environment.

31) Only inert materials shall be used to infill the site.

Reason: To prevent pollution of the water environment.

Water Pumping Scheme

32) With the exception of the installation of the Bailey bridge over the River Trent, no other operations shall be commenced until a scheme providing details of the water pumping regime has been submitted to and approved

Date 29 March 2019 Signed (MA) David Arnold

Authorised Officer of the Council

in writing by the Mineral Planning Authority. Thereafter, the pumping of water from the site shall be carried out in accordance with the approved scheme.

Reason: To ensure that before any pumping operations are undertaken on the site, the nature of the operations and their potential impact have been fully considered in the interests of local amenity and the environment.

Ground and Surface Water Monitoring

33) With exception of the installation of the Bailey bridge, no other operations shall be commenced until a scheme setting out the programme and methods to be employed to monitor ground and surface waters during the approved development has been submitted to and approved in writing by the Mineral Planning Authority. Thereafter, the monitoring programme shall be undertaken in accordance with approved details.

Reason: To ensure that changes in ground and surface water levels arising from the development are monitored and remedial measures are identified to prevent any adverse impact on the water environment of the area and any consequential adverse impacts arising from such changes.

Soil Stripping, Handling and Storage

34) The Mineral Planning Authority shall be given at least seven days' notice in writing of the commencement of soil stripping operations.

Reason: To ensure these operations are carried out in the specified appropriate physical conditions and that monitoring arrangements are in place.

35) No plant or vehicles shall cross any area of unstripped topsoil or subsoil except where such trafficking is essential and unavoidable for undertaking permitted operations. Essential trafficking routes shall be clearly marked on the ground by stakes or other means. No part of the site shall be excavated, traversed, used for a road, for the stationing of plant or buildings, storage of subsoil or overburden, waste or mineral deposit, until all available topsoil and subsoil have been stripped from that part.

Reason: To prevent unnecessary trafficking of soil by heavy equipment and vehicles that could damage the soil.

36) No topsoil and subsoil shall be stripped unless they are in a dry and friable condition. No soils shall be moved:

i. during the months of November to March inclusive, except when approved in advance in writing by the Mineral Planning Authority following soil assessment carried out by an appropriately qualified person;
ii. when the soil to be moved or trafficked upon has a moisture content that is equal to, or greater than that at which the soils become plastic. (Tested in accordance with the 'worm test' as set out in BS 1377:1975 "British Standards Methods Test for Soils for Civil Engineering Purposes"); or
iii. when there are pools of water on the soil surface.

Reason: To prevent damage to soils by avoiding movement whilst soils are wet or excessively moist and which, therefore, do not meet the defined criteria.

37) All topsoil and subsoil shall be stored in separate mounds. Topsoil storage mounds shall not exceed 3m in height and subsoil mounds 5m in height. The mounds shall be constructed with the minimum amount of compaction. They shall not be traversed by heavy plant or machinery except where essential for purposes of mound construction or maintenance. They shall not subsequently be moved until required for restoration. If continuous mounds are used, dissimilar soils shall be separated by a third material previously approved in writing by the Mineral Planning Authority.

Reason: To prevent the loss of soil and minimise damage to soil structure during storage.

38) All storage mounds to remain in situ for more than three months shall be grass seeded and managed in accordance with a scheme which has been submitted to and approved in writing prior to the commencement of soil stripping operations.

Reason: To prevent the loss of soil and minimise damage to soil structure during storage.

39) All topsoil and subsoil shall be retained on site. No later than three months from the stripping and formation of storage mounds in each calendar year, the quantities shall be measured and recorded on a plan showing the area of stripped topsoil and subsoil; the location of each storage mound and the quantity and nature of the stored materials.

Date 29 March 2019 Signed (MA) David Arnold
Authorised Officer of the Council

Reason: To facilitate soil stock-tacking and monitoring of resources.

Soil Replacement

40) Infilling material and soils shall be levelled and graded in accordance with the approved restoration contour plan(s) required by other conditions to this permission.

Reason: To ensure adequate surface drainage and to enable an effective under-drainage system to be installed. Excessive slopes increase the risk of soil erosion and hinder use of agricultural machinery.

41) No large areas of subsoil shall be left without topsoil and crop cover over the winter. Subsoil shall only be replaced when it and the ground are in a dry and friable condition. No movement, respreading, levelling, ripping or loosening of topsoil or subsoil shall occur:

i. during the months November to March inclusive, unless otherwise approved in writing by the Mineral Planning Authority;
ii. when rain affects soil conditions;
iii. when there are pools of water on the surface of the storage mound or receiving area.

Reason: To avoid land being without a vegetation/crop cover and becoming waterlogged over winter, and to control soil erosion. Also, to prevent trafficking of the soils during wet periods and to ensure that restoration is completed sufficiently early in the year as to enable vegetation to be established to protect soil over winter.

42) During replacement of the subsoil, it shall be subsoiled (rooted) with a heavy subsoiler to ensure that within a total depth of 1m below the surface of the subsoil there is:

i. no fill material or other sterile material injurious to plant life;
ii. no rock, stone, boulder or other materials capable of preventing or impeding normal agricultural or land drainage operations, including mole ploughing or subsoiling;
iii. no wore rope, cable or other foreign objects;
iv. a reasonable level surface suitable to receive subsoil; and
v. stone or other unwanted material at the surface of the subsoiled material, which will not pass through a 230mm diameter ring in any dimension, shall be removed from the site or buried not less than 2m below the final surface contours.

Reason: To ensure the site is restored successfully.

Date 29 March 2019 Signed (MA) David Arnold
Authorised Officer of the Council

43) All available subsoil shall be re-spread evenly over the worked area. The subsoil shall be so treated to comply the requirements of condition 40. No layer of replaced soil shall exceed 450mm thickness before it is subsoiled. The subsoiling operation must penetrate at least 150mm into the underlying layer to relieve compaction at the surface.

Reason: To ensure the site is restored successfully.

44) Subsoil upon which other soils have been stored shall be subsoiled (rooted), as set out in Condition 43. Stones or other unwanted material at the surface of subsoiled (rooted) subsoil, which will not pass through a 150mm diameter ring in any dimension, shall be removed from the site or buried on site not less than 2m below final ground surface contours.

Reason: To ensure the site is restored successfully.

45) After satisfactory replacement and treatment of the subsoil, all available topsoil shall be re-spread evenly over the site. The topsoil shall be cultivated and so left as to comply with the requirements of Condition 44 above. Stones greater than 100mm in any one direction shall be removed. Topsoil upon which other topsoil has been stored shall be subsoiled (rooted) and cultivated as above.

Reason: To ensure the site is restored successfully.

46) No plant or vehicles shall cross any area of replaced and loosened ground, replaced subsoil, or topsoil except where essential and unavoidable for the purposes of carrying out ripping and stone-picking or otherwise treating such areas. Only low ground pressure machines shall work on prepared ground. Soils shall be lifted into position and levelled by equipment that is not standing on re-laid topsoil or subsoil.

Reason: To avoid soil smearing and compaction.

Archaeology

47) No soil stripping shall be undertaken in the approved extension area until the applicant/operator has submitted a Written Scheme of Investigation (WSI) for archaeological investigation work has been submitted to and approved in writing by the Mineral Planning Authority. Thereafter, the scheme, including any requirements to be carried out prior to the commencement of soil stripping, shall be implemented as approved. The scheme shall include an assessment of significance and research questions; and

Date 29 March 2019 Signed (MA) David Arnold
Authorised Officer of the Council

1. The programme and methodology of site investigation and recording.
2. The programme for post investigation assessment.
3. Provision to be made for analysis of the site investigation and recording.
4. Provision to be made for publication and dissemination of the analysis and records of the site investigation.
5. Provision to be made for archive deposition of the analysis and records of the site investigation.
6. Nomination of a competent person or persons/organisation to undertake the work set out within the WSI.

For the avoidance of doubt, the archaeological recording condition will normally only be discharged when all elements of the WSI, including on site works, analysis, report, publication (where applicable) and archive work has been completed.

Reason: To ensure that procedures are in place for identifying, excavating and recording any archaeological features that may be uncovered during the development.

Bird Hazard Management Plan

48) With the exception of the installation of the Bailey bridge over the River Trent, no other operations shall be commenced until the applicant/ operator has submitted to, and obtained the approval in writing of the Mineral Planning Authority, of a Bird Hazard Management for the approved extension area. Thereafter, all operations shall be undertaken in accordance with the provisions of the approved scheme.

Reason: To ensure appropriate steps are taken to control the creation of any water bodies on the site in order to discourage birds that may be a hazard to aircraft operating in the area.

Management of Land Prior To Extraction and In Those Areas Where No Extraction Will Take Place

49) All land in the extraction areas within the approved extension area, shall be managed in accordance with good agricultural practise (including weed control) until such time as they are required for mineral extraction. The land comprising the stand-off to the River Trent and other areas of the site that will not be disturbed by mineral extraction, shall be managed in accordance with good agricultural practise (including weed control) throughout the period of development, restoration and aftercare.

Date 29 March 2019 Signed David Arnold

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Reason: To ensure that all land to remain undisturbed throughout the development and land that will not be worked until later in the extraction programme is properly maintained for the current usage and in the interests of local amenity and the environment.

Restoration

50) Within six months of the date of this decision notice, the applicant shall submit a scheme for the restoration of the site for the approval in writing of the Mineral Planning Authority. The form of restoration shall be based on the landform indicated on drawing no. L10888-LD-01 Rev C dated January 2018 and LD10888-LD-02 Rev C dated January 2018. The scheme shall provide details of the post-restoration land levels across the whole of the restored site. The site be restored in accordance with the approved scheme within the time frame set out in Condition 2 above.

Reason: To ensure that the restored land and the features on it assimilates into the surrounding landscape and that the land levels do not give rise to any adverse impacts on flood storage capacity or flow water flows.

Landscaping

51) Within six months of the date of this permission the applicant/operator shall submit a scheme for the landscaping of the site, including all advanced planting, for the approval in writing of the Mineral Planning Authority. Thereafter, the scheme shall be based on the indicative scheme on drawing no. L10888-LD-01 Rev C and shall be implemented on a progressive basis (as approved) and shall be completed within two years of the date of the completion of mineral extraction activities, unless otherwise approved in writing by the Mineral Planning Authority.

The scheme shall also make provision for the following elements:

a) details of the location, species, size and spacing of trees, shrubs and hedgerow plants;
b) measures to protect newly planted stock and provision for the removal of tree guards;
c) fencing and gates when no longer required;
d) replacement planting for any trees, shrubs and plants which die, become diseased or otherwise removed;
e) seed mixture, fertilisers and weedkillers to be used and their rates of application;
f) management and maintenance; and
g) a programme of implementation.

Date 29 March 2019 Signed David Arnold

Authorised Officer of the Council

Reason: To ensure that the overall quarry complex site is landscaped after being restored in the interests of assimilating it into the surrounding landscape.

52) For the first five years following new planting of any trees, shrubs and hedgerows, the planting shall be maintained in accordance with the principles of good forestry and land husbandry, and any stock which die or become seriously damaged, diseased or are missing, shall be replaced with new plants of the same species or such alternative species as have been approved in writing by the Mineral Planning Authority. For the avoidance of doubt, the replacement level shall be %100 throughout this period.

Reason: To ensure the successful establishment of landscaping at the site in the interests of assimilating it into the surrounding landscape and the visual amenity of the area.

Aftercare of Agricultural Land and Woodland

53) The land to be restored to agricultural use and woodland shall be subject to a programme of aftercare in accordance with a scheme that has been submitted to and approved in writing by the Mineral Planning Authority. The scheme shall be submitted within 12 months of the date of this permission and thereafter the scheme shall be implemented as approved. The submitted scheme shall provide for such steps as may be necessary to bring the land to the standard required for agricultural use and woodland during a five year aftercare period, and shall include details of:

In the case of land restored for agriculture:

i. the removal of any stone exceeding 100mm in any dimension, any wire or other object which would impede the cultivation of the land;
ii. fertiliser applications based on soil analysis;
iii. cultivations, seeding and crop management;
iv. pruning regimes of hedgerows;
v. weed control;
vi. field drainage;
vii. field water supplies;
viii. grazing management;
ix. protection from poaching by grazing animals; and
x. maintenance of fencing.

In the case of land restored for use for woodland, tree and shrub planting:

Date 29 March 2019 Signed (MA) David Arnold
Authorised Officer of the Council

i. fertiliser applications based on soil analysis;
ii. drainage;
iii. weed control;
iv. removal of tree guards; and
v. maintenance of fencing.

The scheme shall be implemented as approved by the Mineral Planning Authority.

Reason: To ensure a suitable regime of agricultural husbandry is pursued to comply with the requirements of Schedule 5 of the Town and Country Planning Act 1990 in order to bring each phase of restored land to the required standard for agriculture.

54) The five year aftercare period shall commence on the date of the written notification by the Mineral Planning Authority that the land concerned has been satisfactorily restored. For each year that the site remains in aftercare, a detailed annual aftercare programme shall be submitted to the Mineral Planning Authority for approval setting out (a) proposals for managing the land in accordance with the rules of good husbandry, including planting, cultivating, seeding, fertilising, weed control, draining, watering or otherwise treating the land for the forthcoming 12 months; and (b) a record of aftercare operations carried out on the land during the previous 12 months. The annual programme, which shall be implemented as approved by the Mineral Planning Authority, shall be submitted in writing three months prior to any part of the site being restored, and every subsequent year during the aftercare period.

Reason: To ensure a suitable regime of agricultural husbandry is pursued to comply with the requirements of Schedule 5 of the Town and Country Planning Act 1990 in order to bring each phase of restored land to the required standard for agriculture.

55) The mineral operator shall arrange an aftercare meeting on site before March of every year during the aftercare period unless otherwise approved in writing by the Mineral Planning Authority. The Meeting shall include representatives from the operators and Mineral Planning Authority.

Reason: To ensure a suitable regime of agricultural husbandry is pursued to comply with the requirements of Schedule 5 of the Town and Country Planning Act 1990 in order to bring each phase of restored land to the required standard for agriculture.

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56) For the first five years following the implementation of each phase or phases, planting shall be maintained in accordance with the principles of good forestry and husbandry, and any hedgerow plant and trees which die or become seriously diseased or are missing shall be replaced with plants of the same species or such alternative species as may be approved in writing by the Mineral Planning Authority.

Reason: To ensure a suitable regime of agricultural husbandry is pursued to comply with the requirements of Schedule 5 of the Town and Country Planning Act 1990 in order to bring each phase of restored land to the required standard for agriculture.

Nature Conservation Aftercare and Long-Term Management

57) The land and water areas to be restored to nature conservation shall be subject to a programme of aftercare in accordance with a scheme that has been submitted to and approved in writing by the Mineral Planning Authority. The scheme shall be submitted within 12 months of the date of this permission and thereafter the scheme shall be implemented as approved. The submitted scheme shall provide for such steps as may be necessary to bring the land and water areas to the standard required for nature conservation during a five year aftercare period, and shall make provision for the following:

i. monitoring and maintaining water quality, plant establishment and vegetation composition;
ii. removal of undesirable invasive species (reeds/weeds etc);
iii. maintenance of newly planted trees and shrubs;
iv. establishment of planting in reed beds;
v. mowing/grazing or other appropriate treatments of bankside vegetation; and
vi. a programme of implementation.

The scheme shall be implemented as approved by the Mineral Planning Authority.

Reason: To ensure that the restored land and new water features develop to deliver the nature conservation benefits set out in the application documents.

58) In addition to the aftercare requirements set out in Condition 57 above, the applicant shall submit a scheme for the approval in writing by the Mineral Planning Authority setting out details of a 15 year programme for the long-term management of the nature conservation interests of the restored site. The scheme shall be submitted at the same time as the

aftercare scheme required by condition 55 and shall be implemented as approved, subject to any variation as may be agreed in writing by the Mineral Planning Authority.

Reason: To ensure that the nature conservation benefits are fully established in the long-term interests of the ecological value of the site.

Statement of Compliance with Article 35 of the Town and Country Development Management Procedure Order 2015

The Mineral Planning Authority engaged with the applicant in a positive and pro-active manner based on seeking solutions to problems and issues arising in the processing of this planning application in full compliance with this Article. The applicant has engaged in pre-application discussions with the Authority prior to the submission of the application. The applicant was given clear advice as to what information would be required. The Authority also responded to a formal Scoping Opinion request concerning the issues addressed in the Environment Statement that accompanied the application.

The Environmental Statement, as submitted, covered all the necessary topics but did not fully address all the relevant aspects and issues of each topic and contained some assessments where the presentation was not satisfactory. In accordance with the EIA regulations, the applicant was given clear advice as to the form and content of the supplementary survey work required to enable an appropriate assessment of the proposed development to be made.

The requested information related to the need to complete the range of survey work submitted with the application and the need for further assessment of the impacts on heritage and archaeological interests, flood risk management and landscape and visual amenity issues. These issues arose from the comments from the respective consultees to the original planning application documentation. The applicant also agreed to extend the timescale for the determination of the application.

Due to the information provided by the applicant and the phasing of the proposed development, it was not necessary to include any pre-commencement conditions and, therefore, the provisions of Section 100ZA of the Town and Country Planning (Pre-Commencement Conditions) Regulations 2018 do not apply.

Date 29 March 2019 Signed (MA) David Arnold

Authorised Officer of the Council

Footnote

1. Attention is drawn to the advice to the applicant/operator in the letters dated 23 May 2016 and 26 October 2018 from the Environment Agency and letter from Severn Trent Water Ltd dated 4 February 2016.

Date 29 March 2019 Signed

Authorised Officer of the Council

NOTES

The following notes are included as a requirement of the Town and Country Planning (Development Management Procedure) (England) Order 2015.

Appeals to the Secretary of State

- If you are aggrieved by the decision of your local planning authority to refuse permission for the proposed development or to grant it subject to conditions, then you can appeal to the Secretary of State under Section 78 of the Town and Country Planning Act 1990.

- If you want to appeal against your local planning authority's decision, then you must do so within six months of the date of this notice. Appeals must be made using a form which you can get from the Secretary of State at Temple Quay House, 2 The Square, Temple Quay, Bristol BS1 6PN or online at www.planningportal.gov.uk/pcs.

- The Secretary of State can allow a longer period for giving notice of an appeal, but will not normally be prepared to use this power unless there are special circumstances which excuse the delay in giving notice of appeal.

- The Secretary of State need not consider an appeal if it seems to the Secretary of State that the local planning authority could not have granted planning permission for the proposed development or could not have granted it without the conditions they imposed, having regard to the statutory requirements, to the provisions of any development order and to any directions given under a development order.

- In practice, the Secretary of State does not refuse to consider appeals solely because the local planning authority based its decision on a direction given by the Secretary of State.

Purchase Notices

- If either the local planning authority or the Secretary of State refuses permission to develop land or grants it subject to conditions, the owner may claim that the owner can neither put the land to a reasonably beneficial use in its existing state nor render the land capable of a reasonably beneficial use by the carrying out of any development which has been or would be permitted.

- In these circumstances, the owner may serve a purchase notice on the County Council in whose area the land is situated. This notice will require the Council to purchase the owner's interest in the land in accordance with the provisions of Chapter 1 of Part VI of the Town and Country Planning Act 1990.

The following notes are the further advice of the County Council.

- This permission relates to planning control only. Any other statutory consent necessary to enable the proposed development to commence must be obtained from the appropriate authority or regulator.

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LET7251

Date 29 March 2019 Signed

Authorised Officer of the Council

APPENDIX ESSD B

A COPY OF THE TOPOGRAPHICAL SURVEY CARRIED OUT AT THE SITE ON 21 JANAURY 2021

APPENDIX ESSD C

ENVIROCHECK REPORT (REFERENCE 282769828_1_1)

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
Electricity Transmission Line
Pole
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
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

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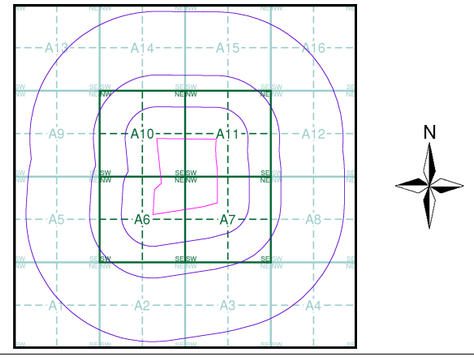
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Derbyshire	1:10,560	1884 - 1885	2
Derbyshire	1:10,560	1901	3
Derbyshire	1:10,560	1923 - 1924	4
Derbyshire	1:10,560	1938	5
Ordnance Survey Plan	1:10,000	1955	6
Ordnance Survey Plan	1:10,000	1978	7
10K Raster Mapping	1:10,000	2000	8
Street View	Variable		9

Historical Map - Slice A



Order Details

Order Number: 282769828_1_1
Customer Ref: TAR/SW/AW/5655/01
National Grid Reference: 433590, 327480
Slice: A
Site Area (Ha): 25.91
Search Buffer (m): 1000

Site Details

Site at, Foremark, Derbyshire

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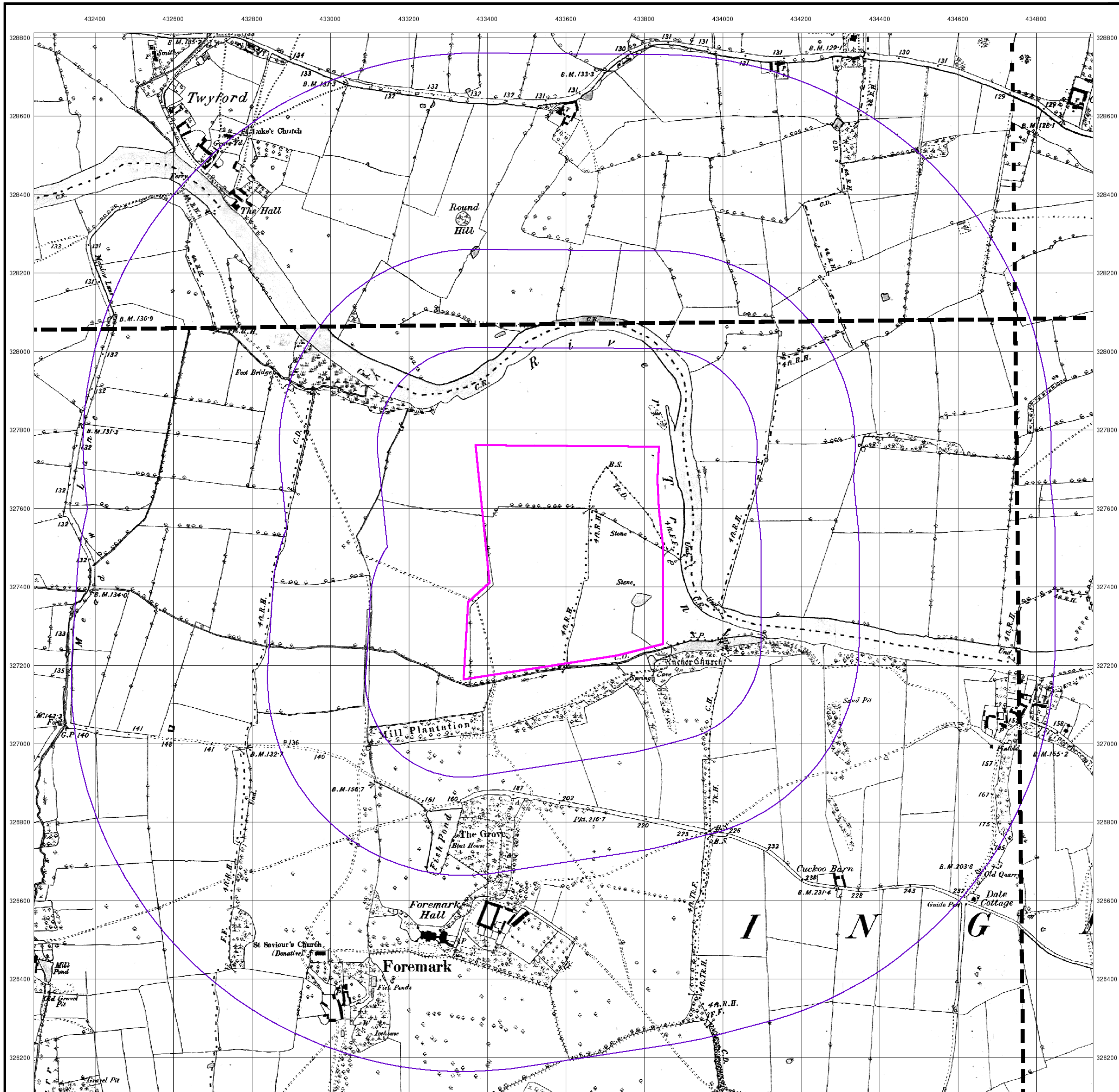
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Derbyshire

Published 1884 - 1885

Source map scale - 1:10,560

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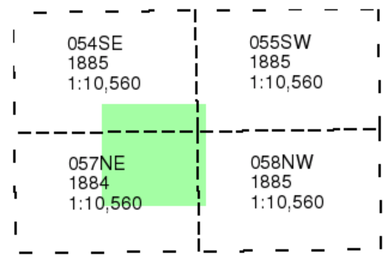
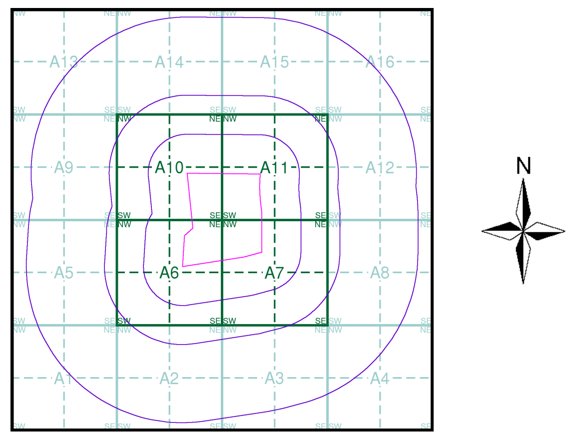
Map Name(s) and Date(s)



Historical Map - Slice A



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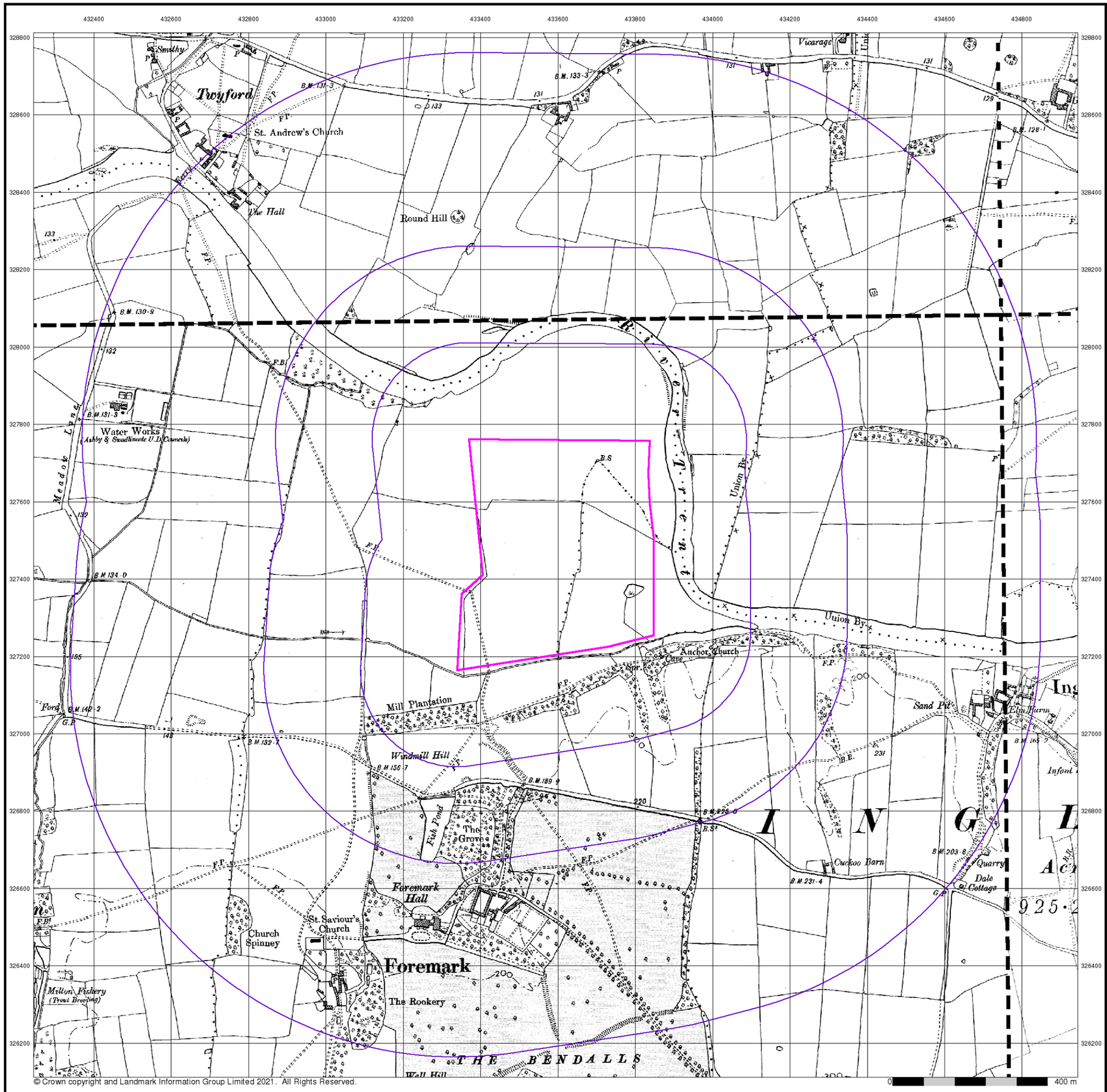

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Derbyshire

Published 1901

Source map scale - 1:10,560

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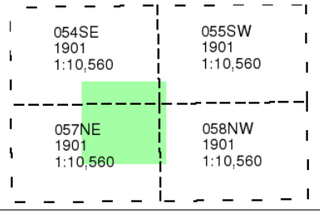

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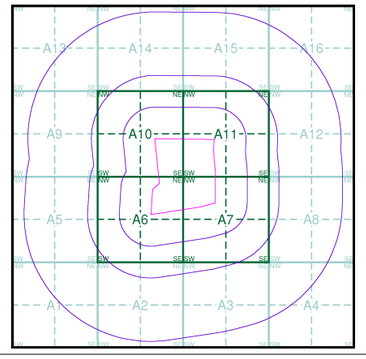

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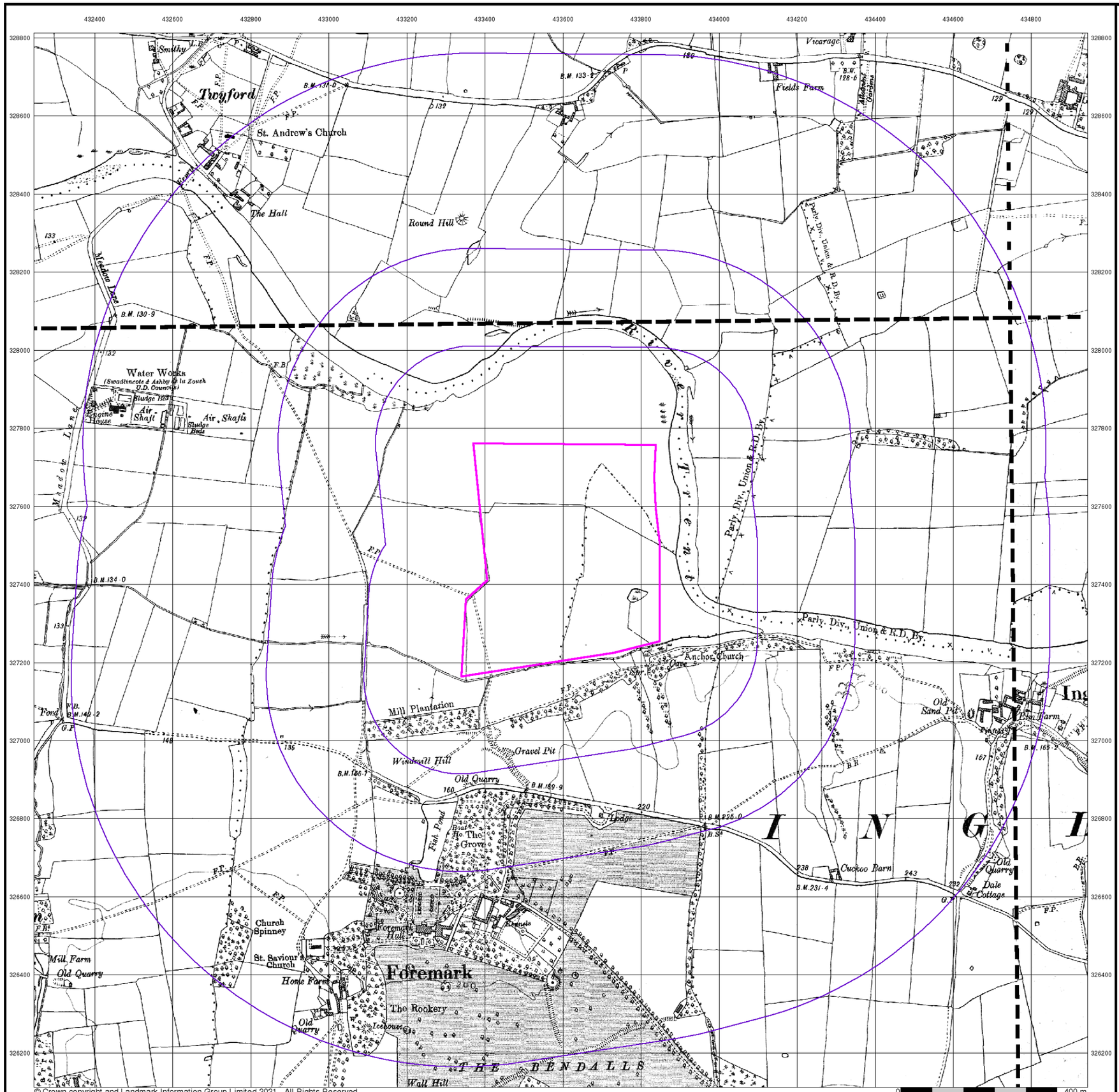

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Published 1923 - 1924

Source map scale - 1:10,560

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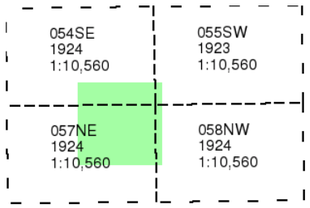

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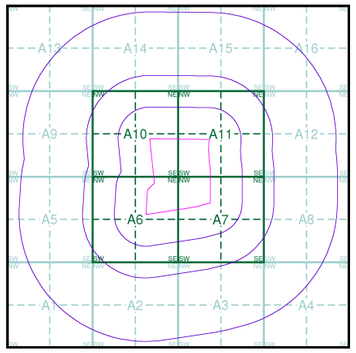

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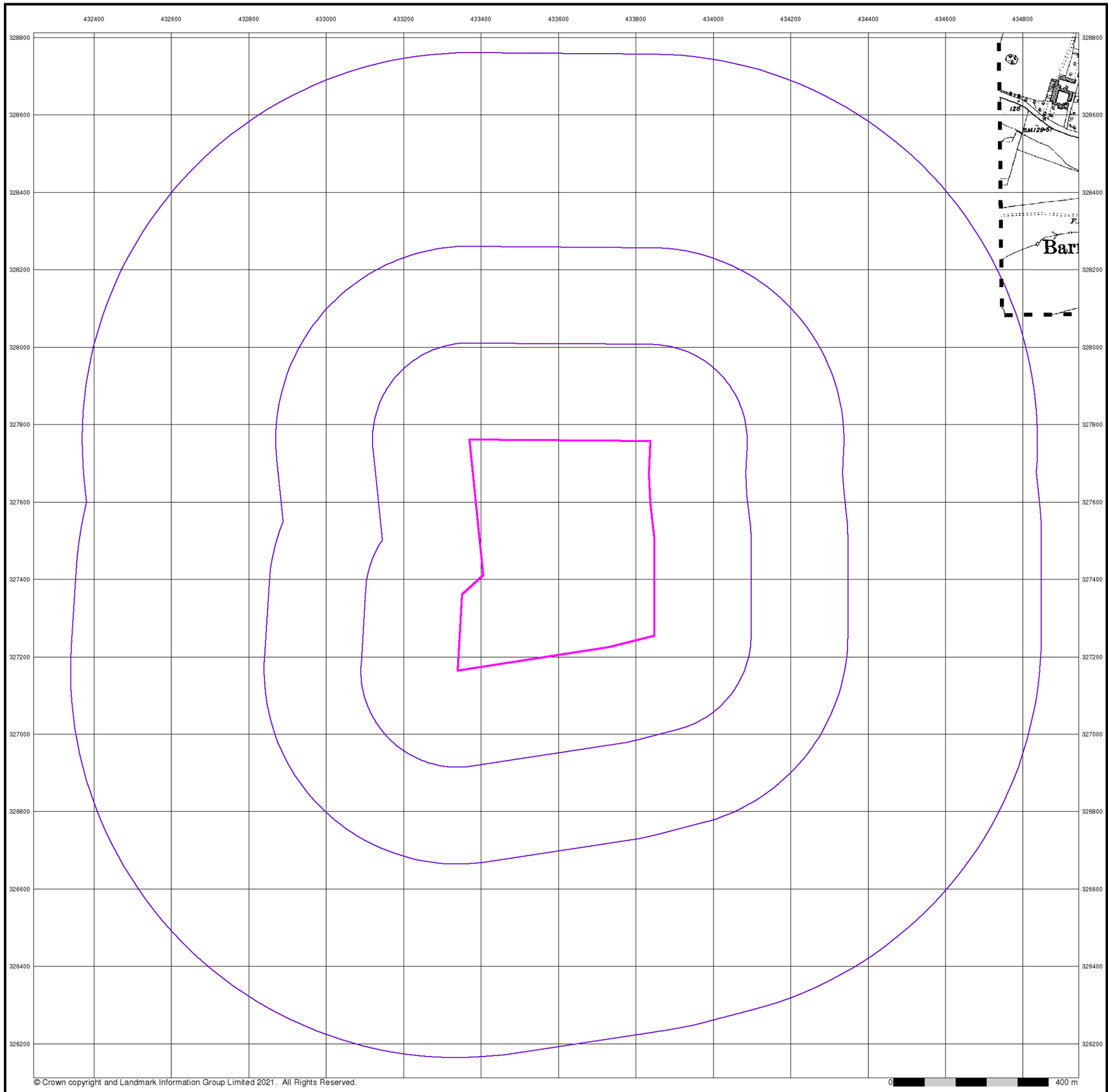

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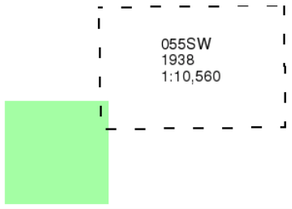
Derbyshire

Published 1938

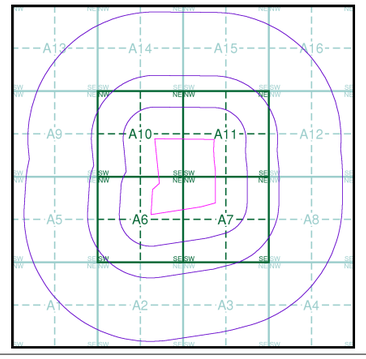
Source map scale - 1:10,560

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)



Historical Map - Slice A



Order Details

Order Number:	282769828_1_1
Customer Ref:	TAR/SW/AW/5655/01
National Grid Reference:	433590, 327480
Slice:	A
Site Area (Ha):	25.91
Search Buffer (m):	1000

Site Details

Site at, Foremark, Derbyshire

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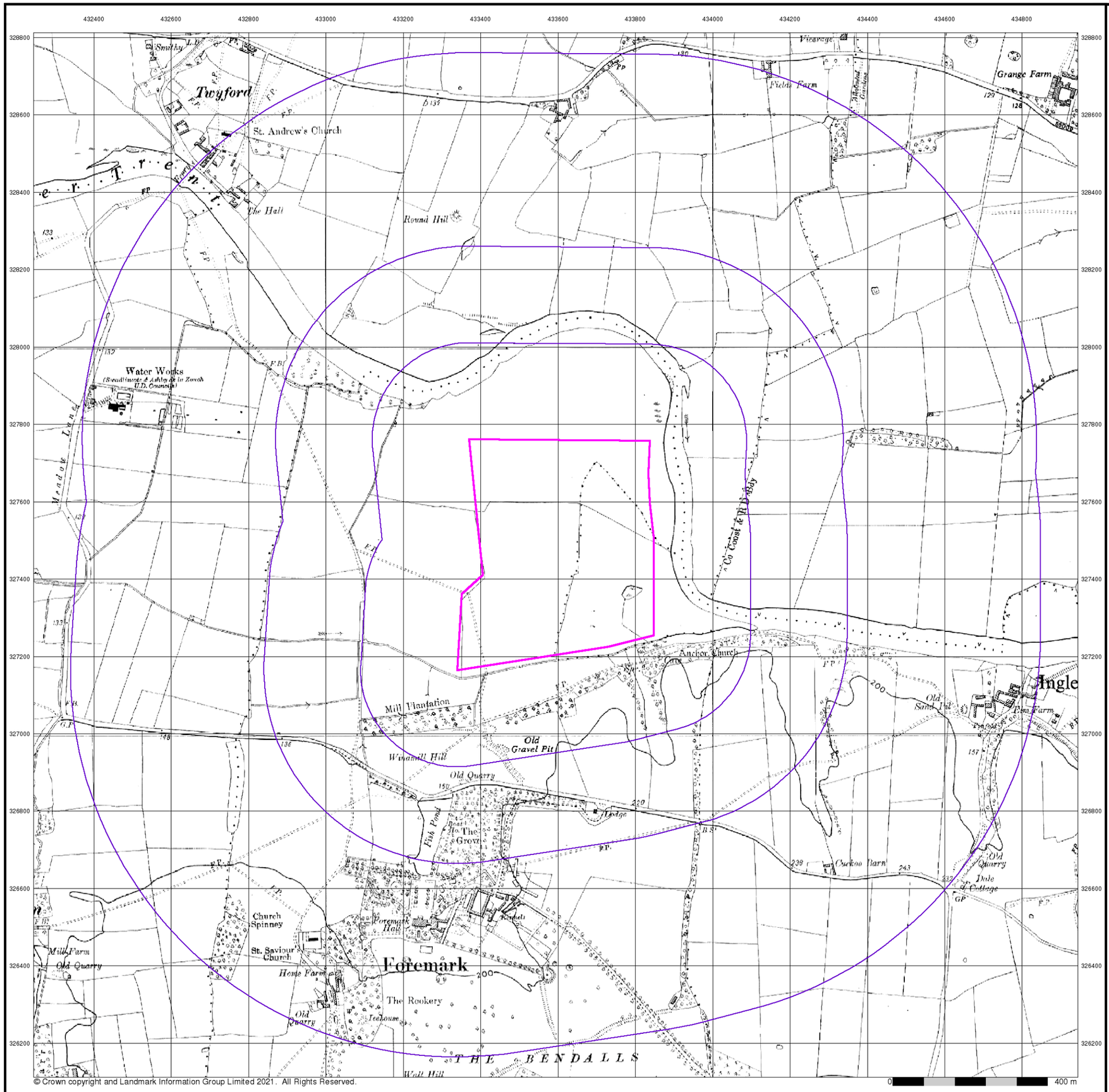

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Ordnance Survey Plan

Published 1955

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.

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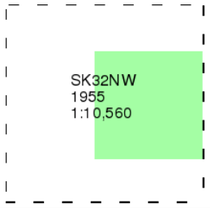
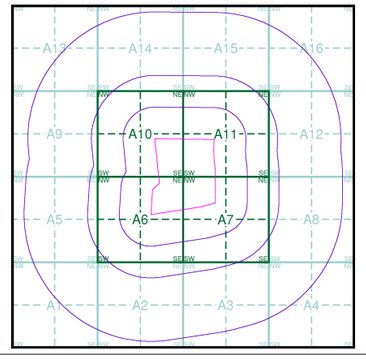


Historical Map - Slice A



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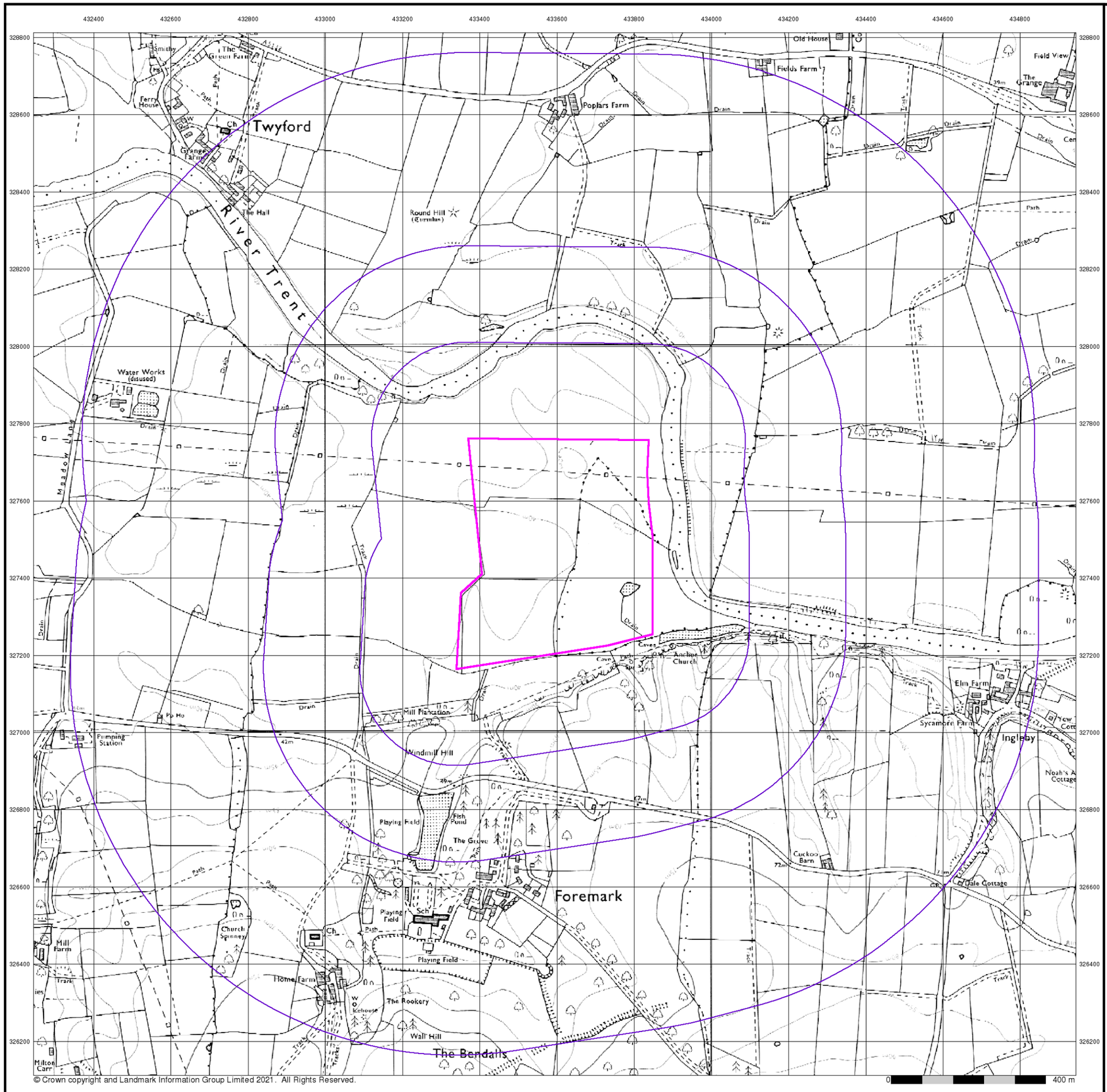

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Ordnance Survey Plan

Published 1978

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.

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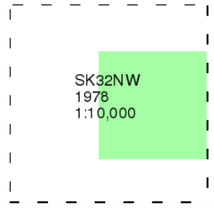
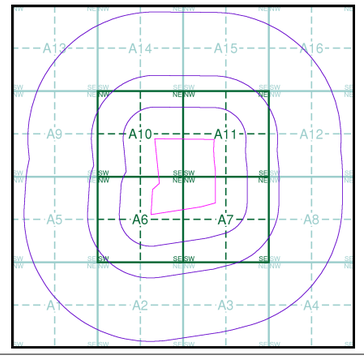


Historical Map - Slice A



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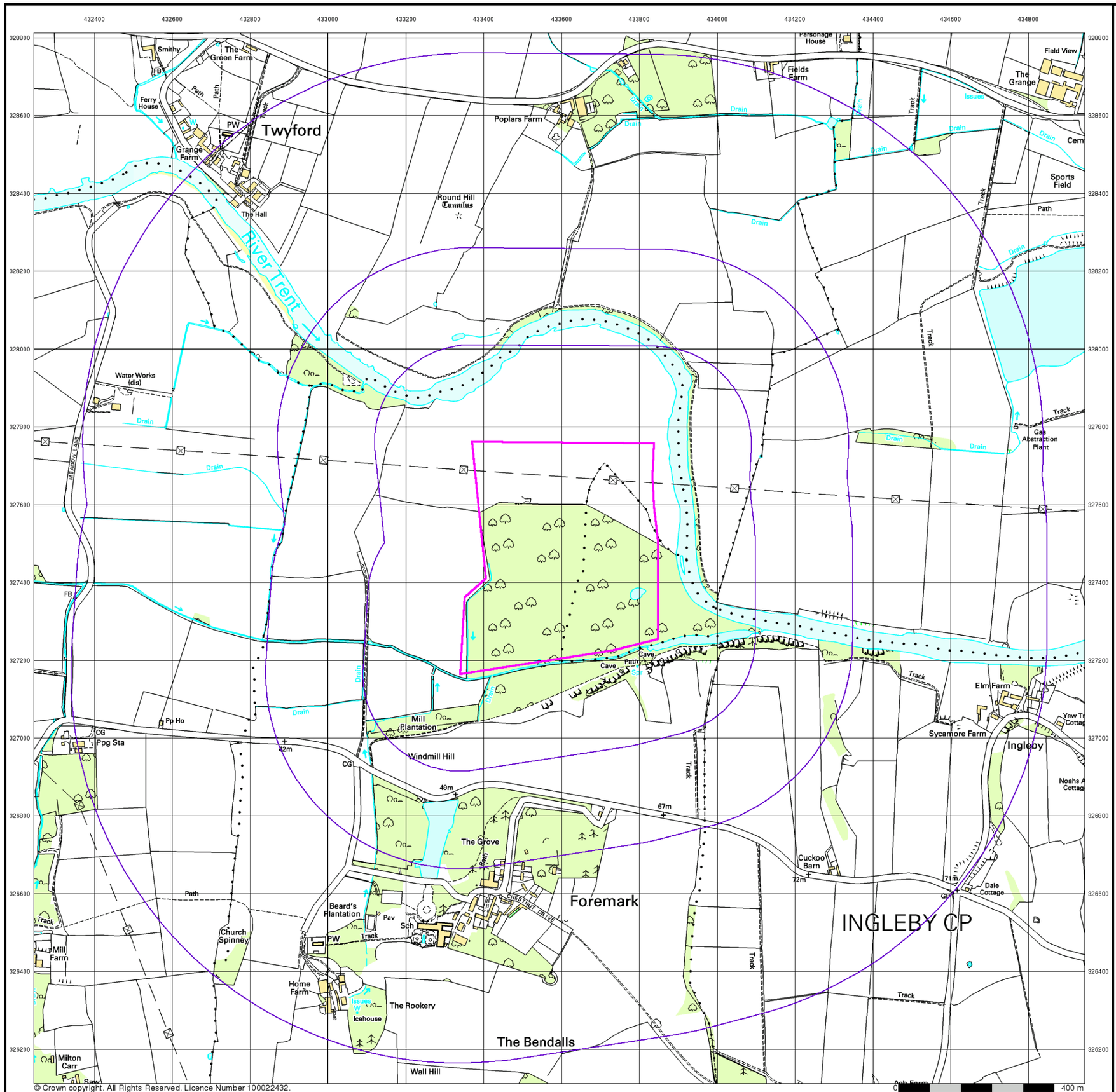

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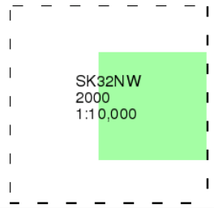
10k Raster Mapping

Published 2000

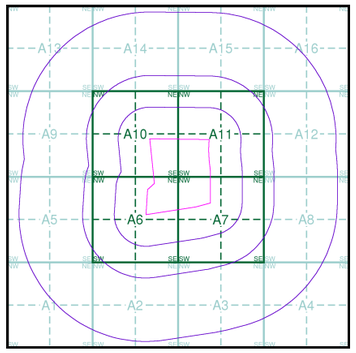
Source map scale - 1:10,000

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

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Customer Ref:	TAR/SW/AW/5655/01
National Grid Reference:	433590, 327480
Slice:	A
Site Area (Ha):	25.91
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Site Details

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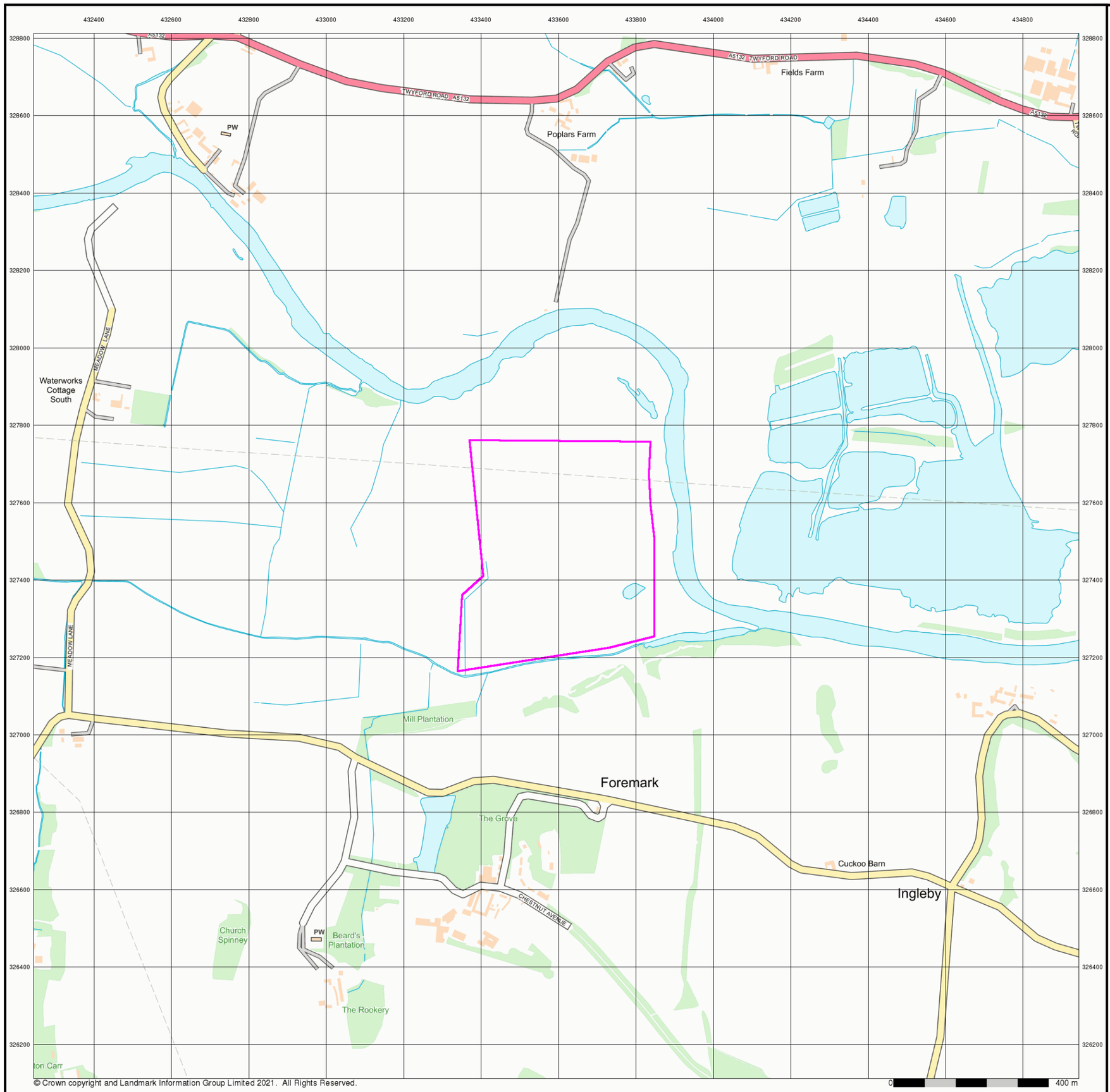

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Street View

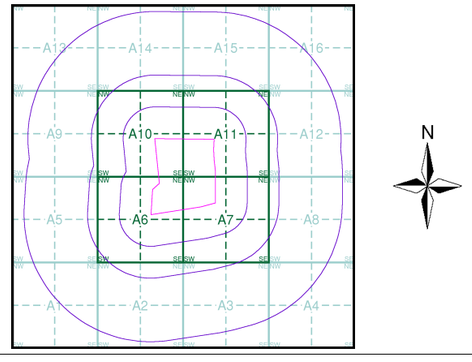
Published 2021

Source map scale - 1:10,000

Street View is a street-level map for the whole of Great Britain produced by the Ordnance Survey. These maps are provided at a nominal scale of 1:10,000

Map Name(s) and Date(s)

Street View Map - Slice A



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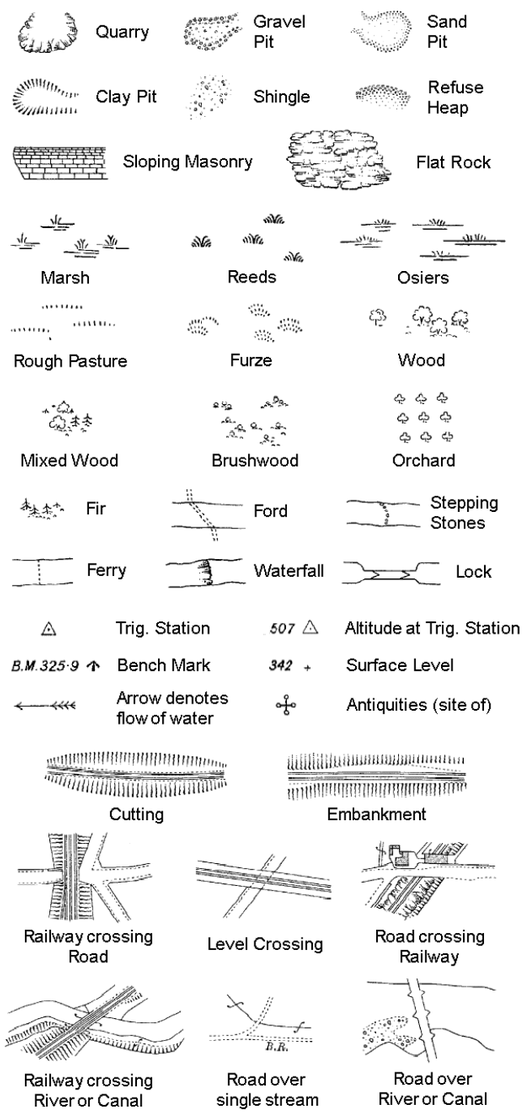
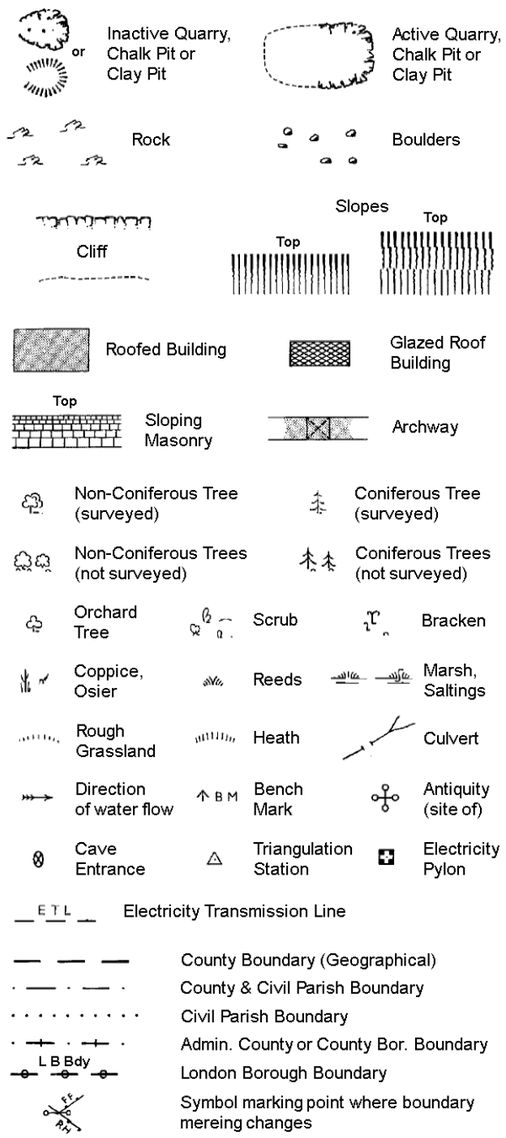
Historical Mapping Legends

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



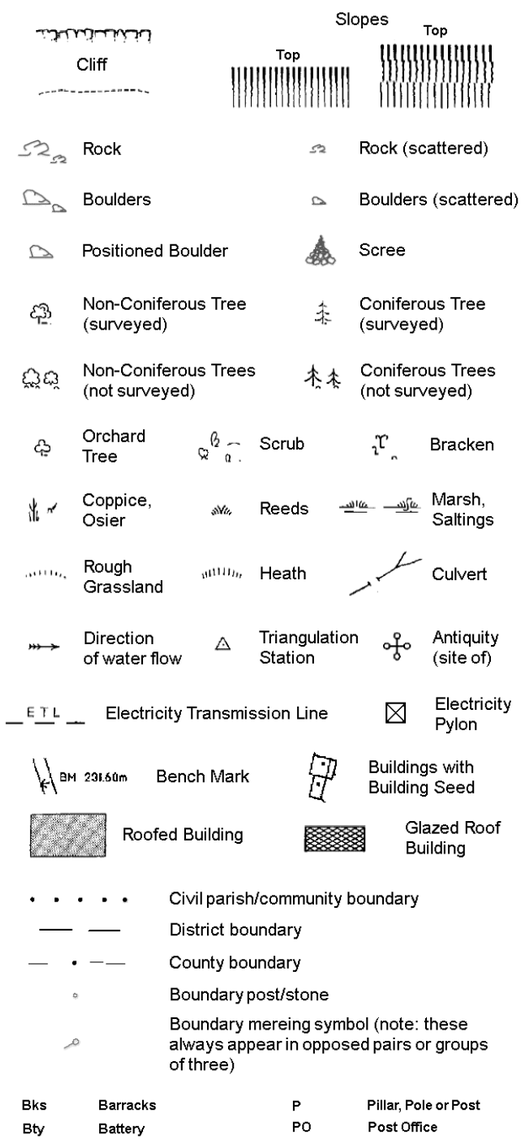
B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

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



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



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

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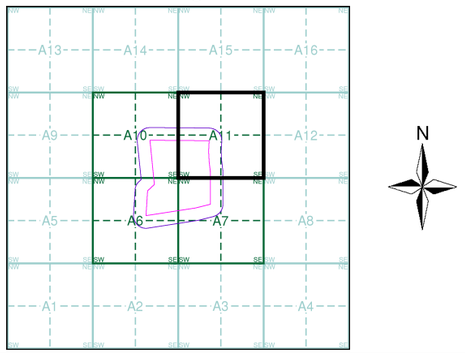
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Derbyshire	1:2,500	1879 - 1882	2
Derbyshire	1:2,500	1901	3
Derbyshire	1:2,500	1923	4
Ordnance Survey Plan	1:2,500	1968 - 1970	5
Large-Scale National Grid Data	1:2,500	1994	6
Large-Scale National Grid Data	1:2,500	1996	7

Historical Map - Segment A11



Order Details

Order Number: 282769828_1_1
Customer Ref: TAR/SW/AW/5655/01
National Grid Reference: 433590, 327480
Slice: A
Site Area (Ha): 25.91
Search Buffer (m): 100

Site Details

Site at, Foremark, Derbyshire

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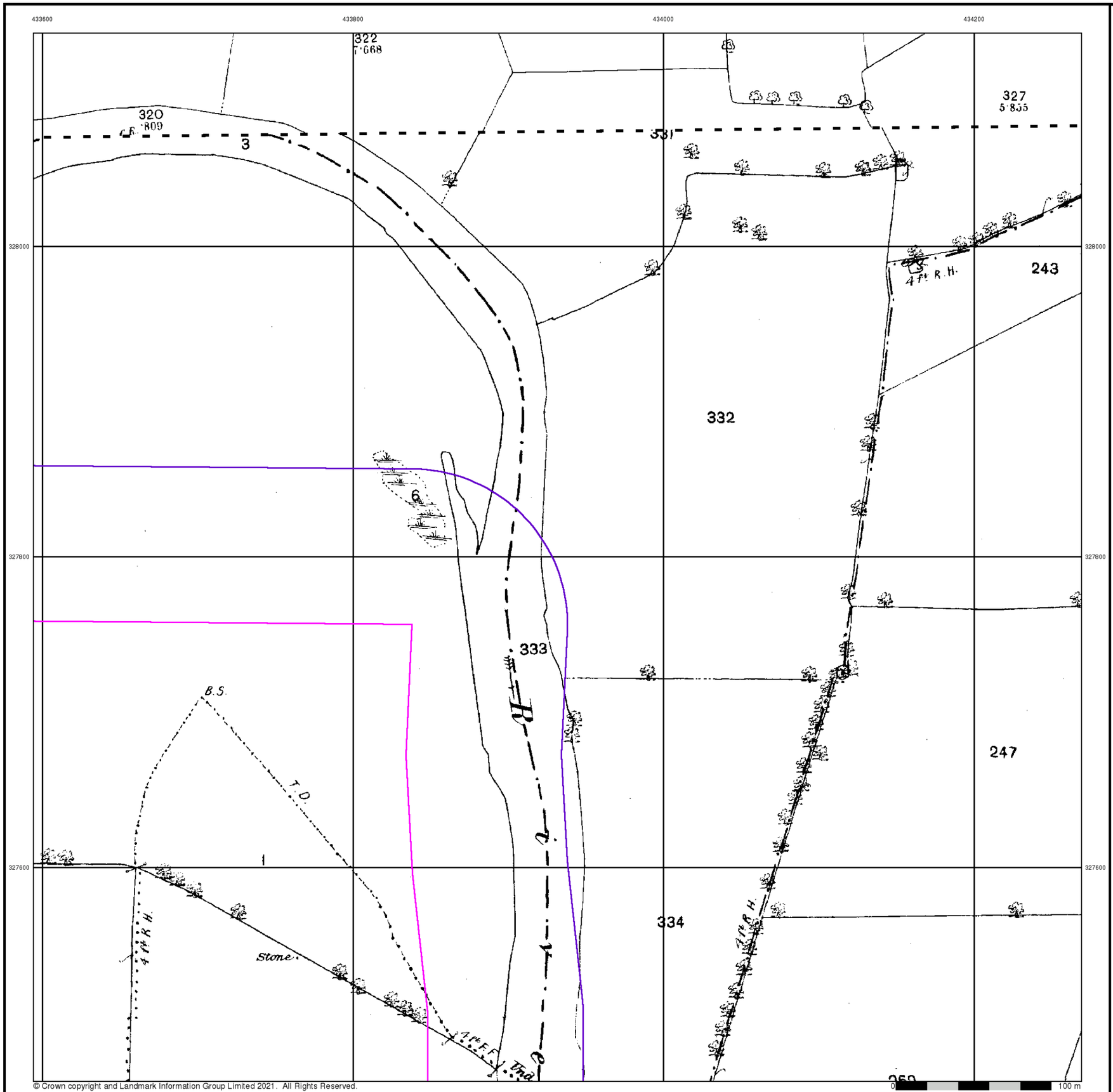

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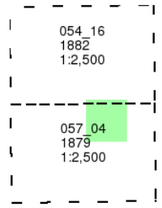
Derbyshire

Published 1879 - 1882

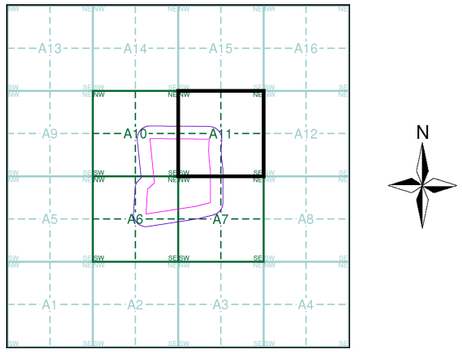
Source map scale - 1:2,500

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 A11



Order Details

Order Number:	282769828_1_1
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National Grid Reference:	433590, 327480
Slice:	A
Site Area (Ha):	25.91
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Site Details

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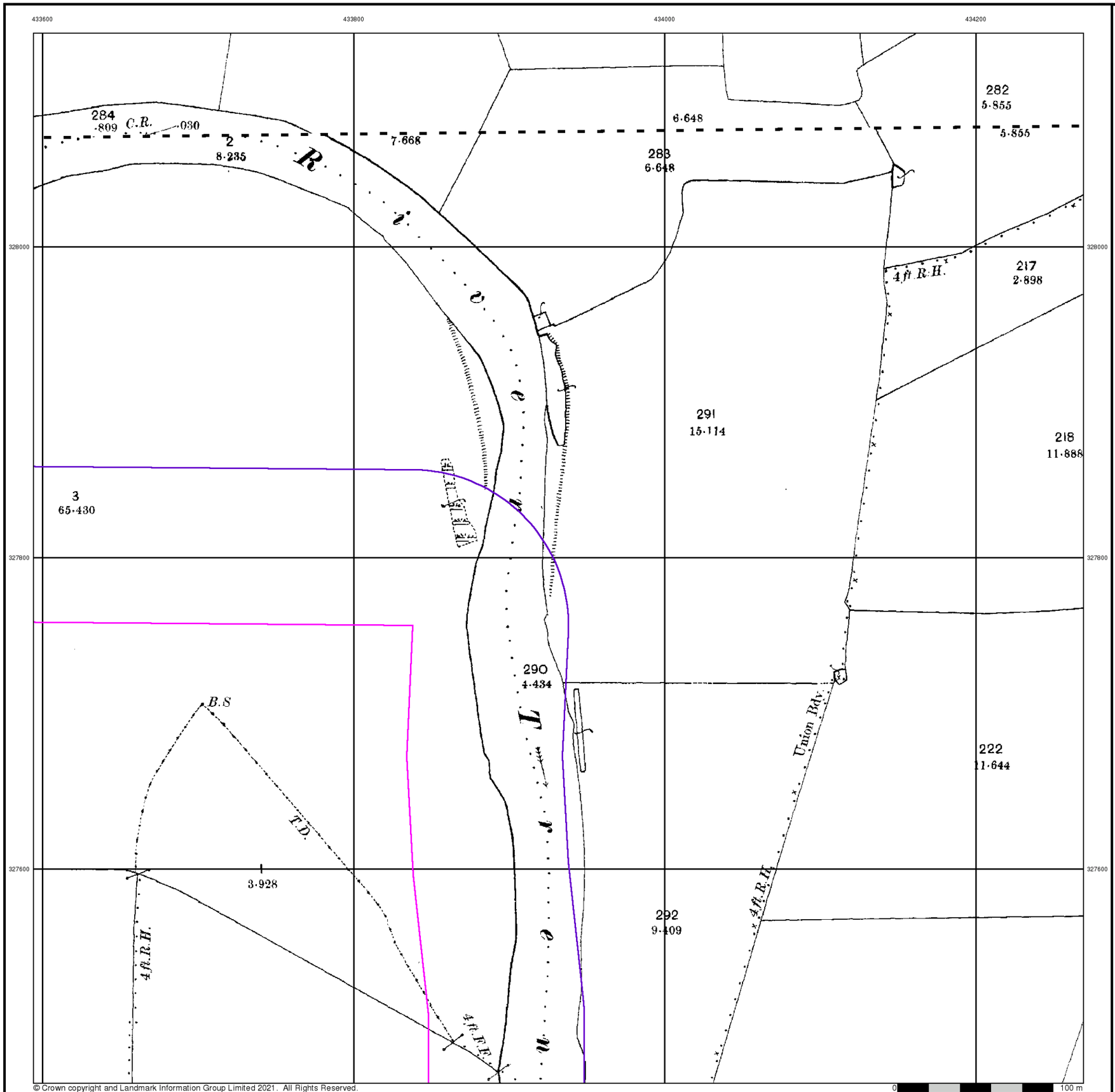

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Derbyshire

Published 1901

Source map scale - 1:2,500

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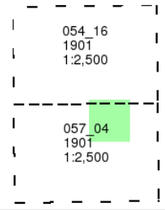
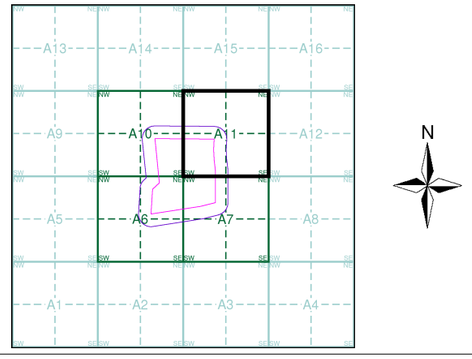
Map Name(s) and Date(s)



Historical Map - Segment A11



Order Details

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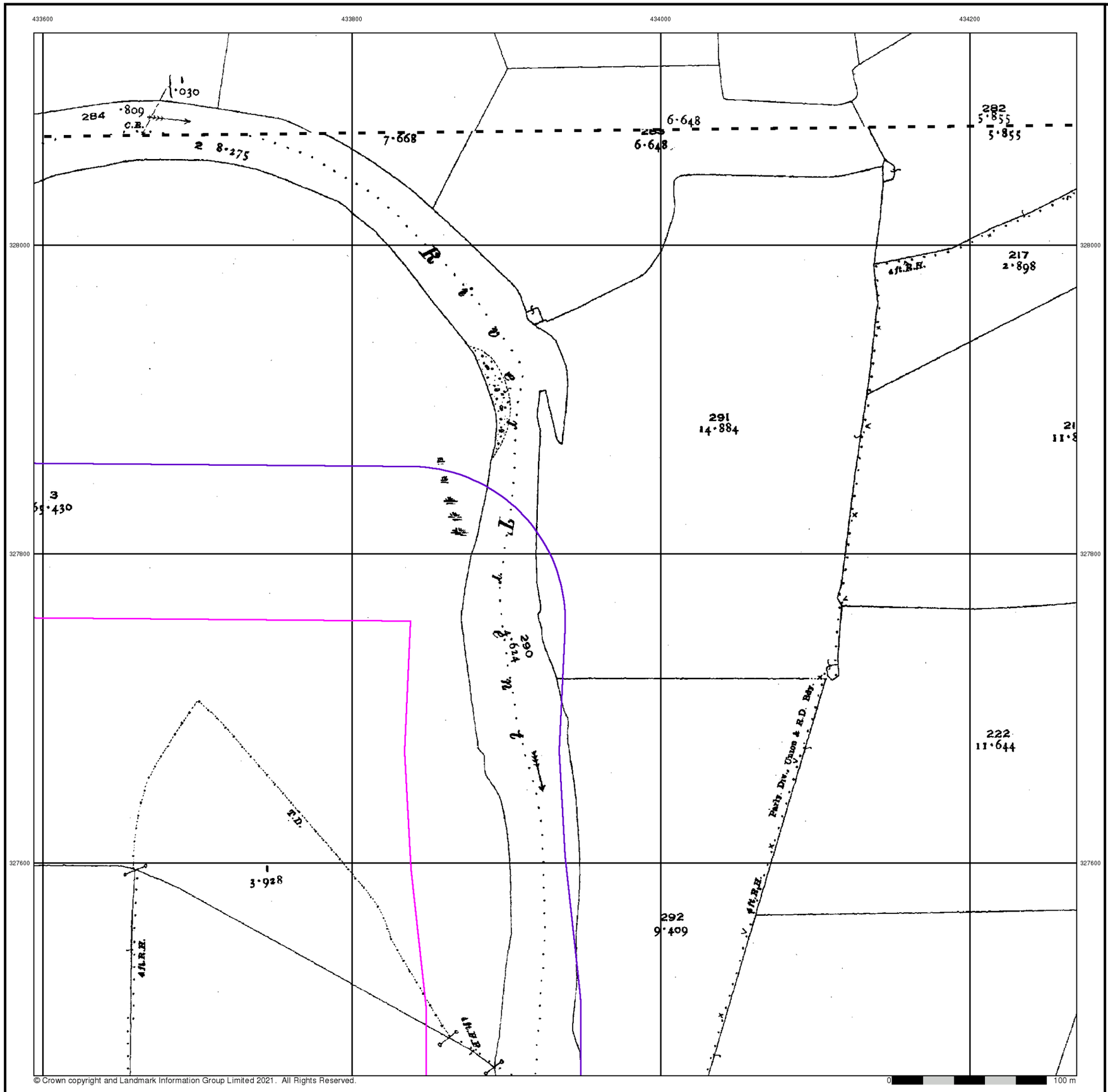

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Derbyshire

Published 1923

Source map scale - 1:2,500

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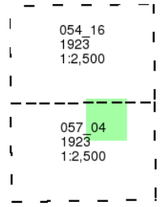
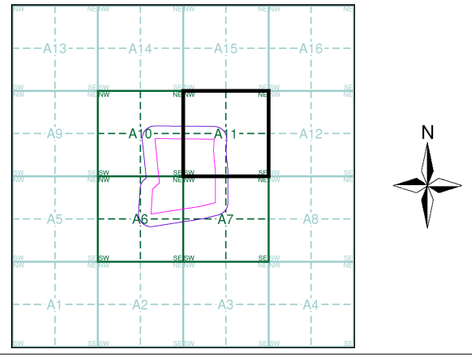


Historical Map - Segment A11



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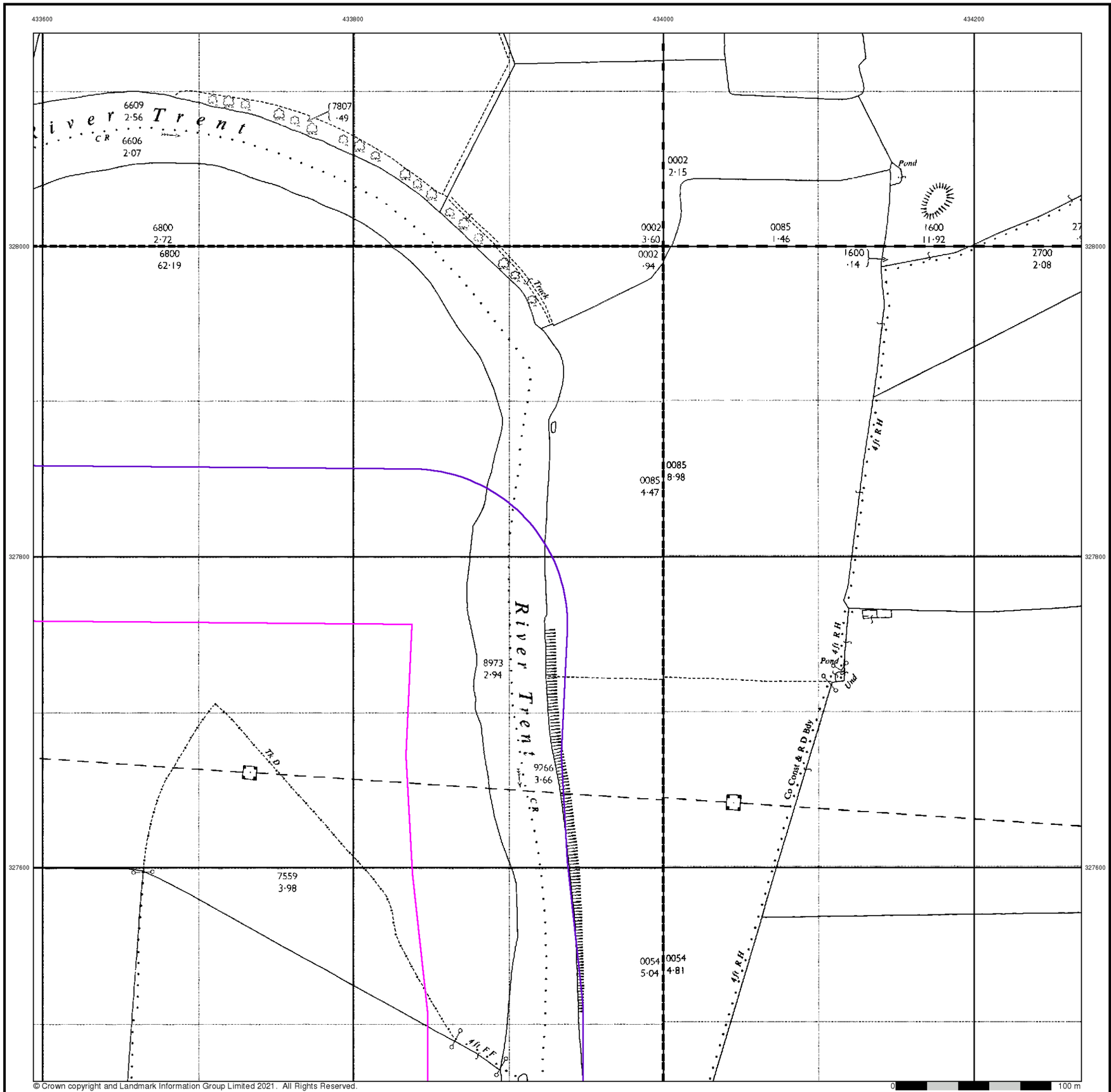

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Ordnance Survey Plan

Published 1968 - 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.

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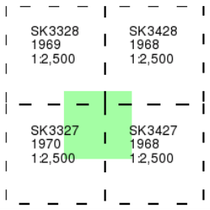
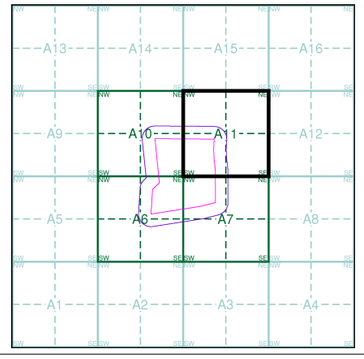


Historical Map - Segment A11



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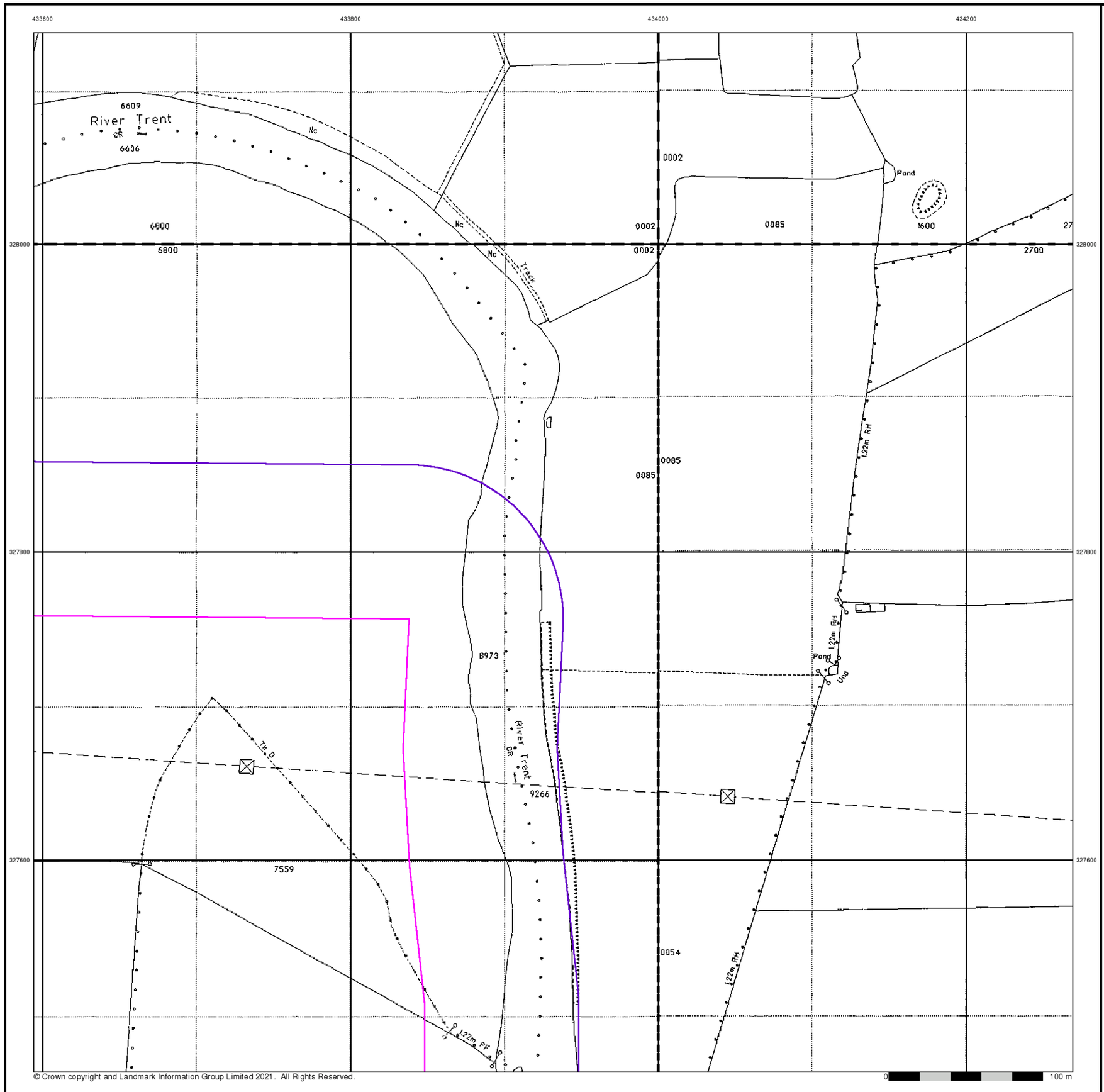

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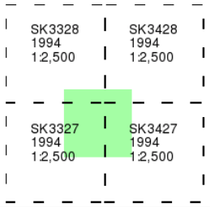
Large-Scale National Grid Data

Published 1994

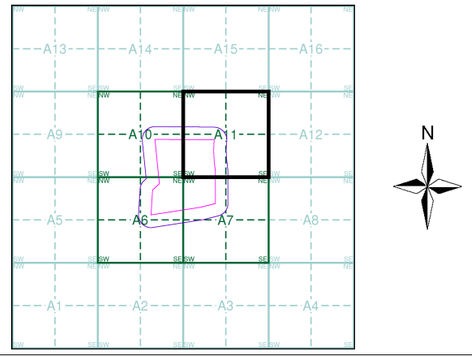
Source map scale - 1:2,500

'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 A11



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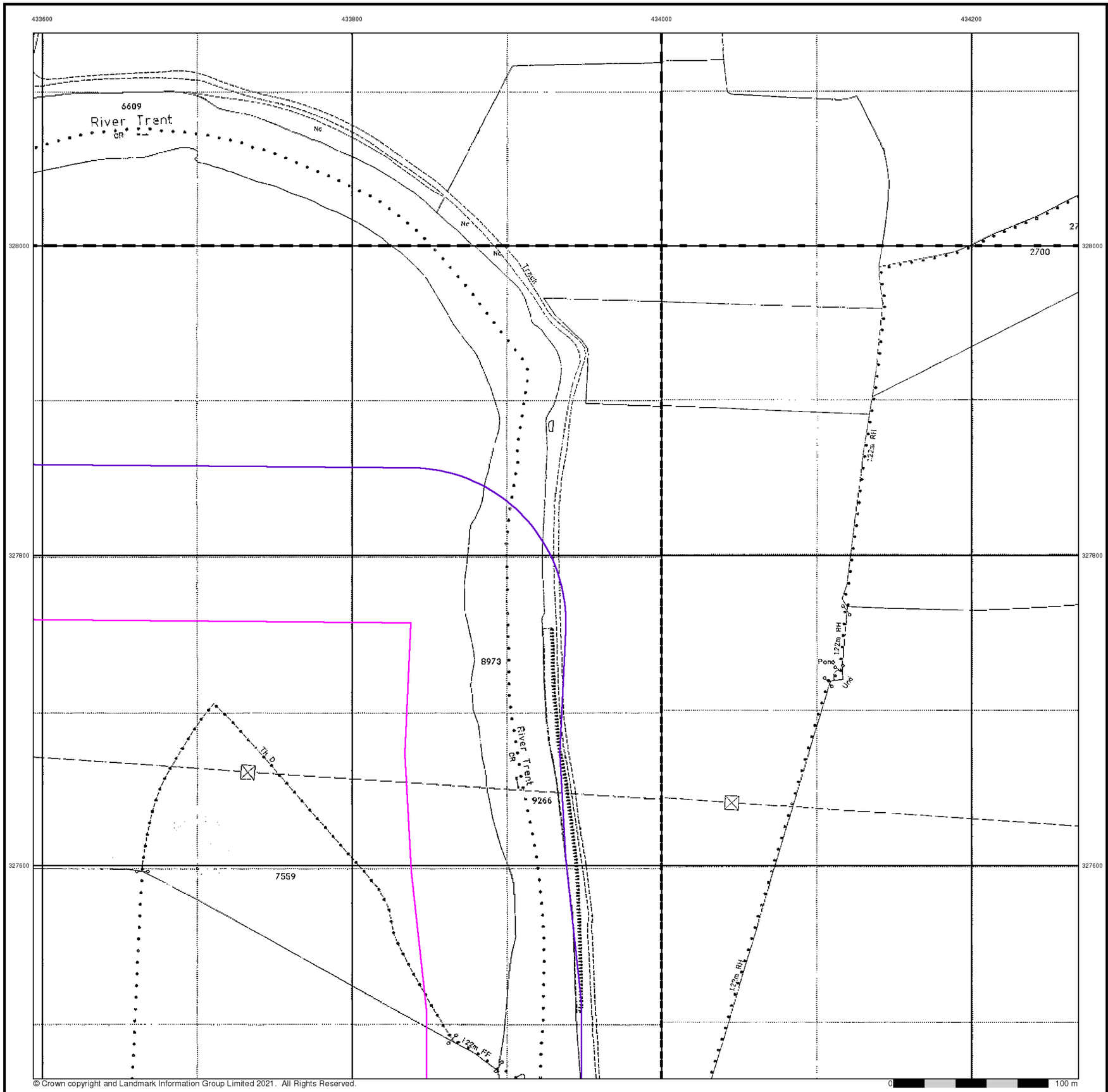
Customer Ref:	TAR/SW/AW/5655/01
National Grid Reference:	433590, 327480
Slice:	A
Site Area (Ha):	25.91
Search Buffer (m):	100

Site Details

Site at, Foremark, Derbyshire

Landmark® INFORMATION GROUP

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



Envirocheck®

LANDMARK INFORMATION GROUP®

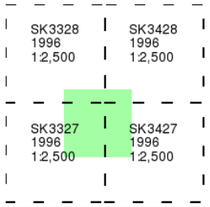
Large-Scale National Grid Data

Published 1996

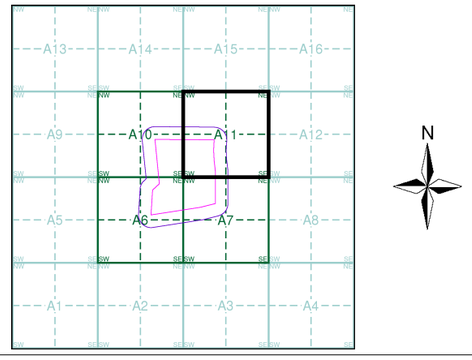
Source map scale - 1:2,500

'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 A11



Order Details

Order Number:	282769828_1_1
Customer Ref:	TAR/SW/AW/5655/01
National Grid Reference:	433590, 327480
Slice:	A
Site Area (Ha):	25.91
Search Buffer (m):	100

Site Details

Site at, Foremark, Derbyshire

Landmark INFORMATION GROUP®

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

APPENDIX ESSD D

COPIES OF DRAWING NUMBERS S346.00053A, 54A, 55A, 56A, 57A, 58A, 59A, 63, 64, 65, 66, 67, 68, 69 AND 70 IN RESPECT OF THE PHASING OF THE OPERATIONS AT THE SOUTHERN EXTENSION TO SWARKESTONE QUARRY

PHASE 4

PHASE 3

PHASE 1 &
SOIL STORE

PHASE 5

PHASE 2

Legend

- Other Land Under Applicants Control
- Application Area
- Proposed Revised Phasing

TARMAC
A CRH COMPANY

Site Name:

S346 - Swarkestone

Drawing Name:

Southern Extension
Proposed Revised Phasing and Soil Storage

Drawn By:	Scale @ A3:
G.Burdell	1:5,000
Date:	**Drawing Number:**
13/07/2018	S346.00053a

N

PHASE 3

PHASE 4

PHASE 1 & SOIL STORE

2

2

1

1

1

PHASE 2

BRIDGE

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. *22,500m³ topsoil @ 300mm from Phase 1 footprint to southern screening mound.*
2. *65,000m³ overburden from Phase 1a to temporary store on Phase 1b.*

TARMAC
A CRH COMPANY

Site Name:

S346 - Swarkestone

Drawing Name:

Southern Extension
Soil Handling Scheme
Phase 1a

Drawn By:	***Scale @ A3:***
G.Burdell	1:2,500
Date:	***Drawing Number:***
13/07/18	S346.00054a

PHASE 4

PHASE 3

PHASE 1 & SOIL STORE

PHASE 2

1

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BRIDGE

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. *120,000m³ of stored and in-situ overburden from footprint of Phase 1b placed into Phase 1a to create a material storage pad below ground level.*

TARMAC
A CRH COMPANY

Site Name:
S346 - Swarkestone

Drawing Name:
Southern Extension
Soil Handling Scheme
Phase 1b

Drawn By:	Scale @ A3:
G.Burdell	1:2,500
Date:	**Drawing Number:**
13/07/18	S346.00055a

PHASE 4

PHASE 3

PHASE 1 & SOIL STORE

PHASE 2

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3

BRIDGE

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. 16,000m³ topsoil excavated from store south of Phase 2, within extraction footprint and placed into store below ground level on overburden pad in Phase 1a.
2. 19,000m³ topsoil stripped from Phase 2 footprint and placed into store below ground level on overburden pad in Phase 1a.
3. 86,500m³ overburden stripped from footprint of Phase 2 and placed into Phase 1b to create material storage pad below ground level.

TARMAC
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Site Name:
S346 - Swarkestone

Drawing Name:
Southern Extension
Soil Handling Scheme
Phase 2

Drawn By:	Scale @ A3:
G.Burdell	1:2,500
Date:	**Drawing Number:**
13/07/18	S346.00056a

PHASE 3

PHASE 4

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PHASE 1 & SOIL STORE

PHASE 2

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. *35,000m³ topsoil stripped from footprint of Phase 3 and placed into storage below ground level on overburden pad in Phase 1a.*
2. *98,000m³ overburden stripped from footprint of Phase 3a and placed into storage below ground level on overburden pad in Phase 1b.*
3. *133,000m³ imported fill placed into Phase 2 excavation to pre-soil formation profile.*

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Site Name:

S346 - Swarkestone

Drawing Name:

Southern Extension
Soil Handling Scheme
Phase 3a

Drawn By:	***Scale @ A3:***
G.Burdell	1:2,500
Date:	***Drawing Number:***
13/07/18	S346.00057a

N

PHASE 4

PHASE 3

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PHASE 1 &
SOIL STORE

2

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. *107,000m³ overburden stripped from footprint of Phase 3b and direct placed into restoration landform in Phase 3a*
2. *133,000m³ imported fill placed into Phase 2 excavation to complete pre-soil formation profile*

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Site Name:
S346 - Swarkestone

Drawing Name:
Southern Extension
Soil Handling Scheme
Phase 3b

Drawn By:	***Scale @ A3:***
G.Burdell	1:2,500
Date:	***Drawing Number:***
13/07/18	S346.00058a

PHASE 4

PHASE 3

PHASE 1 & SOIL STORE

PHASE 2

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Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. *57,000m³ overburden stripped from store in Phase 1 and placed as subsoil to cap infill cell in Phase 2*
2. *7,000m³ excavated from soil store south of Phase 2 and placed into restoration of Phase 2 to final level*
3. *12,000m³ excavated from Phase 1 store and placed into restoration of Phase 2 to final level*

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Site Name:
S346 - Swarkestone

Drawing Name:
Southern Extension
Soil Handling Scheme
Completed Restoration of Phase 2

Drawn By:	***Scale @ A3:***
G.Burdell	1:2,500
Date:	***Drawing Number:***
13/07/18	S346.00059a

N

PHASE 4

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PHASE 3

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PHASE 1 &
SOIL STORE

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. *14,000m³ topsoil stripped from Phase 4a and direct placed into restoration of Phase 3a*
2. *119,000m³ overburden excavated from Phase 4a and direct placed into restoration of Phase 3b to restoration profile*

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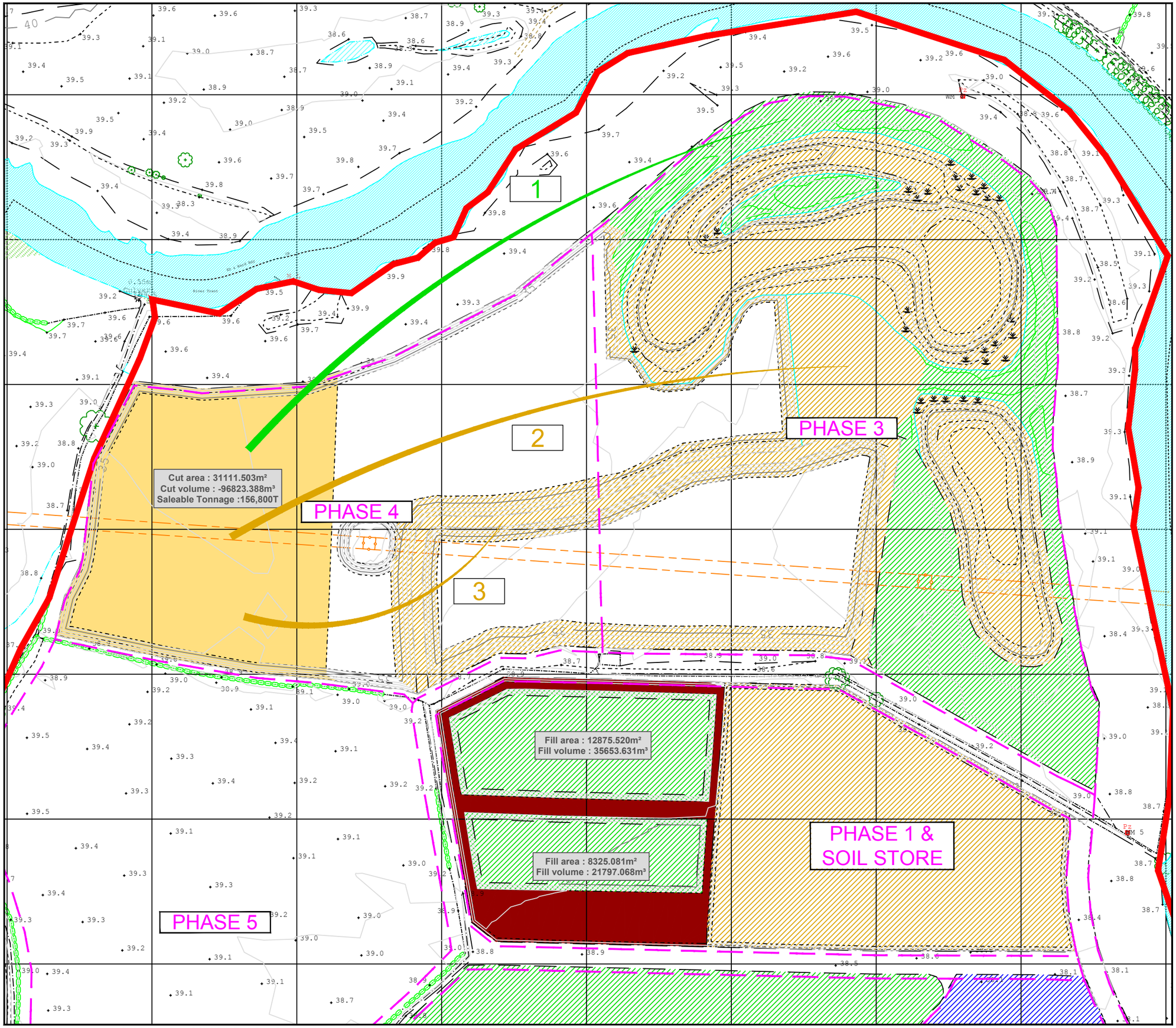
A CRH COMPANY

Site Name:
S346 - Swarkestone

Drawing Name:
Southern Extension
Soil Handling Scheme
Phase 4a

Drawn By:	***Scale @ A3:***
G.Burdell	1:2,500
Date:	***Drawing Number:***
13/07/18	S346.00063

N



Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. 9,000m³ topsoil stripped from Phase 4b and direct placed into restoration of Phase 3b
2. 28,000m³ overburden excavated from Phase 4b and direct placed into restoration of Phase 3b to restoration profile
3. 26,000m³ overburden excavated from Phase 4b and direct placed into restoration of Phase 3a to complete the Phase 3 inert fill cell

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Site Name:
S346 - Swarkestone

Drawing Name:
Southern Extension
Soil Handling Scheme
Phase 4b

Drawn By:	Scale @ A3:
G.Burdell	1:2,500
Date:	**Drawing Number:**
13/07/18	S346.00064

PHASE 3

PHASE 4

PHASE 1 & SOIL STORE

PHASE 5

PHASE 2

1

2

3

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. *16,000m³ topsoil stripped from Phase 5a and direct placed into restoration of Phase 3b with remainder into store in Phase 1*
2. *91,000m³ overburden excavated from Phase 5a and direct placed into restoration of Phase 4a to restoration profile*
3. *78,000m³ imported fill to restore part of Phase 3 cell to formation level*

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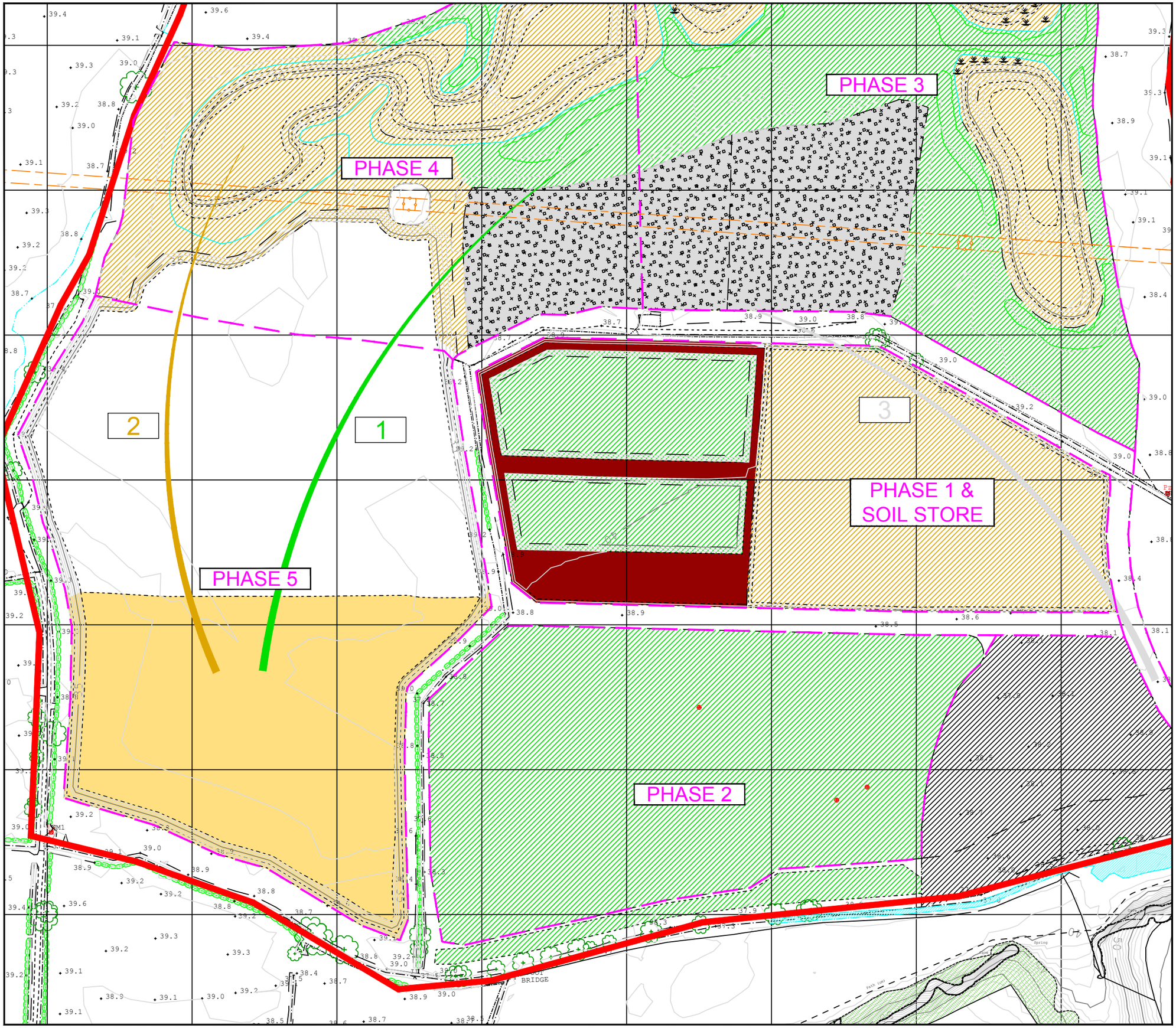
Site Name:
S346 - Swarkestone

Drawing Name:
Southern Extension
Soil Handling Scheme
Phase 5a

Drawn By:	Scale @ A3:
G.Burdell	1:2,500
Date:	**Drawing Number:**
13/07/18	S346.00065



Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. *13,000m³ topsoil stripped from Phase 5b and direct placed into restoration of Phase 4a*
2. *67,000m³ overburden excavated from Phase 5b and direct placed into restoration of Phase 4b to restoration profile*
3. *76,000m³ imported fill to restore Phase 3 cell to formation level*

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Site Name:

S346 - Swarkestone

Drawing Name:

Southern Extension
Soil Handling Scheme
Phase 5b

Drawn By:	***Scale @ A3:***
G.Burdell	1:2,500
Date:	***Drawing Number:***
13/07/18	S346.00066

PHASE 3

PHASE 4

1

3

3

2

Cut area : 67542.401m²
Cut volume : -304036.036m³

PHASE 1 &
SOIL STORE

Fill area : 95260.404m²
Fill volume : 355250.924m³

PHASE 5

4

PHASE 2

3

BRIDGE

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. 29,000m³ stored topsoil excavated from Phase 1 and placed into temporary store in Phase 3
2. 250,000m³ of stored overburden excavated from Phase 1 and placed into restoration of Phase 5b to formation level
3. 50,000m³ of basal material to be excavated from base of lakes to complete restoration of Phase 5b to formation level
4. 28,000m³ stored topsoil excavated from Phase 1 and placed into restoration of Phase 5b

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Site Name:
S346 - Swarkestone

Drawing Name:
Southern Extension
Soil Handling Scheme
Phase 5b Restoration

Drawn By:	Scale @ A3:
G.Burdell	1:2,500
Date:	**Drawing Number:**
13/07/18	S346.00067

PHASE 3

PHASE 4

PHASE 1 & SOIL STORE

PHASE 2

BRIDGE

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. *388,000m³ imported fill to restore Phase 1 to formation level*

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Site Name:
S346 - Swarkestone

Drawing Name:
Southern Extension
Soil Handling Scheme
Phase 1 Imported □ill

Drawn By:	Scale @ A3:
G.Burdell	1:2,500
Date:	**Drawing Number:**
13/07/18	S346.00068

PHASE 3

PHASE 4

1

PHASE 1 &
SOIL STORE

PHASE 2

BRIDGE

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Store / Placement
- 1 — Topsoil Movement
- Overburden Store / Placement
- 2 — Overburden Movement
- Mineral Excavation
- Imported Fill
- Anchor Church archaeological stand off area

Schedule of Soil Movements

1. *29,000m³ topsoil excavated from store to restore Phase 1, Haul Road and Bridge Abutment to final restoration profile*

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Site Name:

S346 - Swarkestone

Drawing Name:

Southern Extension
Soil Handling Scheme
Phase 1 ☐ Access ☐ Bridge Restoration

Drawn By:	***Scale @ A3:***
G.Burdell	1:2,500
Date:	***Drawing Number:***
13/07/18	S346.00069

PHASE 3

PHASE 4

PHASE 1 &
SOIL STORE

PHASE 5

PHASE 2

Legend

- Other Land under Applicants Control
- Planning Application Boundary
- Proposed Revised Phasing
- Topsoil Placement

TARMAC
A CRH COMPANY

Site Name:
S346 - Swarkestone

Drawing Name:
Southern Extension
Soil Handling Scheme
Completed Restoration

Drawn By:	Scale @ A3:
G.Burdell	1:2,500
Date:	**Drawing Number:**
13/07/18	S346.00070

N

APPENDIX ESSD E

COPIES OF DRAWING NUMBERS L10888_LD-01 REV C AND L10888_LD-02 REV C IN RESPECT OF THE RESTORATION OF THE SOUTHERN EXTENSION TO SWARKESTONE QUARRY

LANDSCAPE STRATEGY

The site lies within the Trent Valley Washlands Landscape Character Area (LCA) and the Riverside Meadows Landscape Character Type (LCT).

The landscape restoration scheme will part restore the landscape to agriculture and flood meadow characteristic of this LCT. Where the quarry voids of the final working phases are restored to lakes, where feasible blocks of new woodland planting are proposed to visually integrate and "ground" these lakes in the landscape setting and positively contribute to the objectives of the wider Trent Valley Strategy.

The south part of the site is to be restored to agriculture with ground levels to match existing to restore the landscape setting and vistas to Anchor Church listed heritage asset.

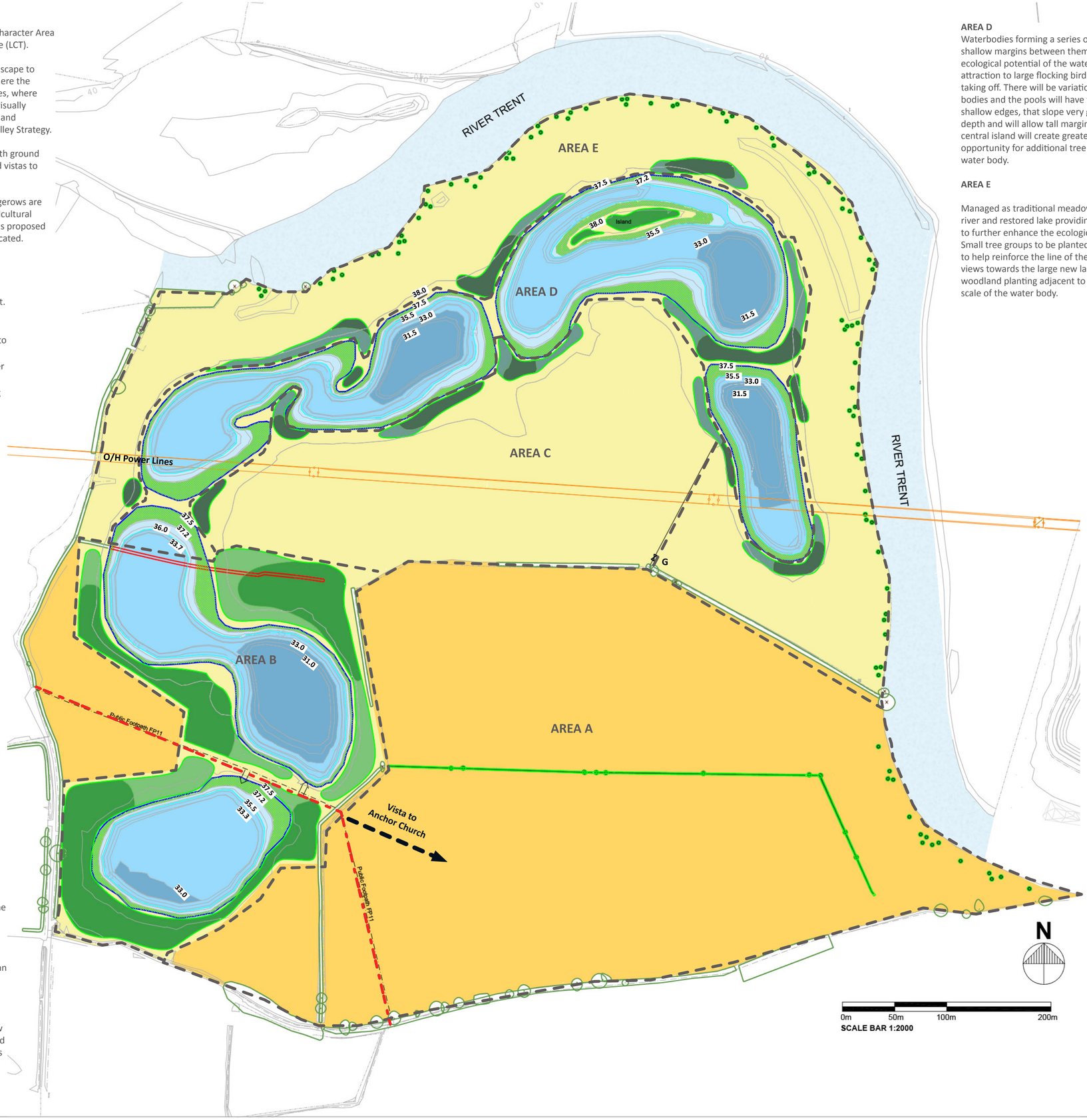
A large proportion of existing trees and field boundary hedgerows are retained and will be protected in accordance with an Arboricultural Method Statement. A new hedgerow with hedgerow trees is proposed through the arable area where a previous hedgerow was located.

This concept has been designed in line with the following principles to avoid attracting particular bird species or high numbers of that would pose a birdstrike risk. This is important due to the site proximity to East Midlands Airport.

- Create a series of smaller waterbodies of varied shape and margins to present a constraint for large flocking birds to land and take off.
- Allow an increase in vegetation height around the water bodies through design and management.
- Limit the extent of reedbeds to deter large and flocking waterfowl and waders.

Public footpaths will be retained to their original alignment or replaced where temporary diversion may be required.

Long-term management regime to include pollarding of riverside willow standards to maintain the traditional riparian character of the landscape.



The following restoration scheme is proposed for each character area:

Area A
Area A is to be restored to arable or pastoral agriculture. Field enclosures are defined by hedgerows which will be retained as part of the development with new planting to reinstate gaps within the hedge lines. New hedgerow with scattered hedgerow trees within the centre of Area A will restore a previous hedge. This will link to the established character of the surrounding landscape and allow for long vistas towards the river. The public footpath to the west of Area A will be restored.

AREA B
Robust woodland planting to visually contain the water bodies and mitigate their adverse visual impacts from local roads and footpaths since the open water habitats in this area are visually and functionally detached from the river. This will tie in with the Trent Valley Vision to improve the environmental capacity to absorb these new landscape features. New woodland creation in this area will also develop new and contrasting habitats as well as reducing the opportunities for large flocking birds to access these water bodies.

AREA C
The restoration of Area C will be ecologically led as part of an agricultural management system. The wetland margins will extend into this area with the development of restoration levels at or just above the water level which could provide for a range of wetland habitats including reedbeds, marsh, shingle beds, wet grassland and rush pasture. This will allow for periods of seasonal grazing. Small areas of wet woodland will further enhance this habitat matrix and provide pockets of visual relief to the extensive water body.

AREA D
Waterbodies forming a series of interconnected pools with shallow margins between them to enhance the overall ecological potential of the water body and minimise the attraction to large flocking birds as constraints to landing and taking off. There will be variation to the shape of the water bodies and the pools will have fluctuating marginal wide shallow edges, that slope very gradually to around 300mm depth and will allow tall marginal plants to colonise. The central island will create greater diversity and provides an opportunity for additional tree planting to help break up the water body.

AREA E

Managed as traditional meadow grassland between the river and restored lake providing an appropriate context and to further enhance the ecological value of the restoration. Small tree groups to be planted along the banks to the river to help reinforce the line of the River Trent and mitigate views towards the large new lake from the north. Additional woodland planting adjacent to the lake will again reduce the scale of the water body.

ecus
ENVIRONMENTAL CONSULTANTS

KEY

Soft Works

- Tree-To be Retained *Refer to Ecus Ltd Tree Survey ref. 10888 BS5837 (2012) Tree Survey, Arboricultural Impact Assessment and Arboricultural Method Statement.*
- Proposed Tree-Feathered
- Existing Hedgerow to be Retained
- Proposed Native Hedgerow
- Existing Hedgerow Removed
- Proposed Native Woodland
- Proposed Native Wet Woodland
- Proposed Native Woodland Edge
- Proposed Native Woodland Wet Edge
- Flood Meadow
- Arable and Pastoral Agriculture
- Reedbed margins - located within the shallows (up to 300mm depth)
- Shallow Margins
- Main waterbody with sloping lake sides
- Deepest pools within the waterbody. 33m AOD and below.
- River Trent
- Gated Access (G)
- Public Footpath
- Landscape Management Areas
- Overhead Powerlines
- Key View

TARMAC
A CRH COMPANY

Tarmac

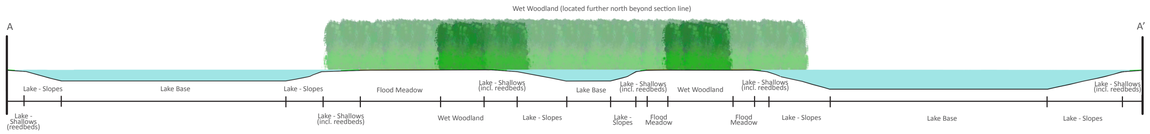
Swarkstone Quarry Restoration Scheme

Concept Plan - Landscape Strategy

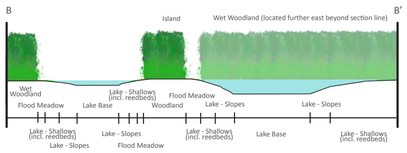
■ Brook Holt ■ Blackburn Road ■ Sheffield ■ S61 2DW
■ tel: 0114 266 9292 ■ www.ecusltd.co.uk

Paper size: A1	Scale: 1:2000	Drawing Status: Preliminary	Drawn by: KM/HT	Date: Jan 2018	Drawing Number: L10888_LD-01 REV C

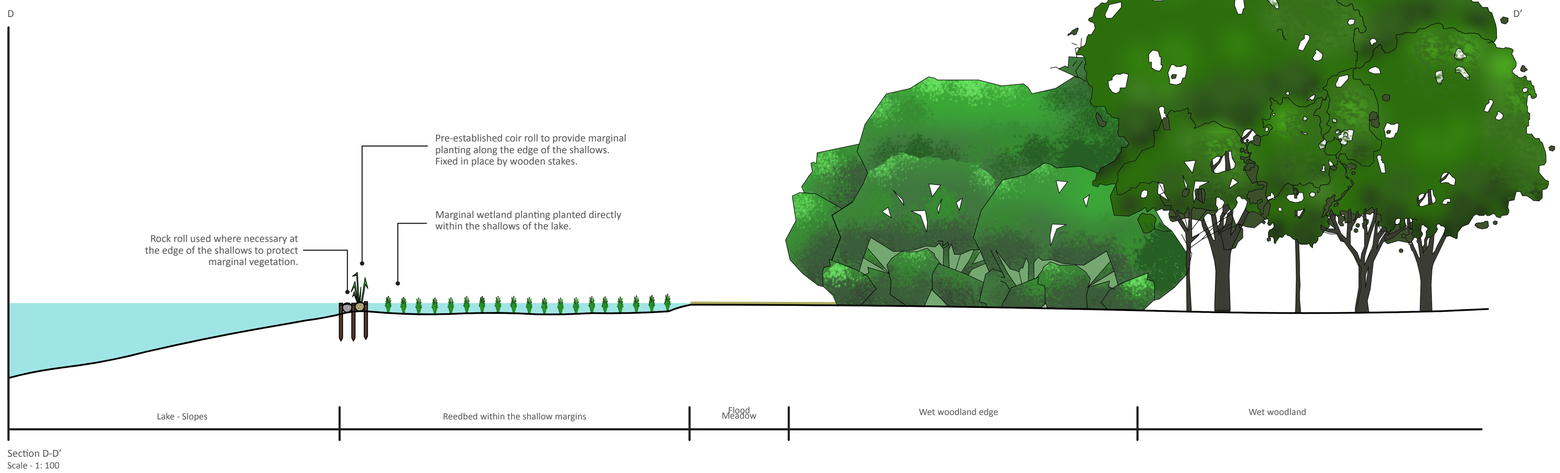
TYPICAL SECTIONS



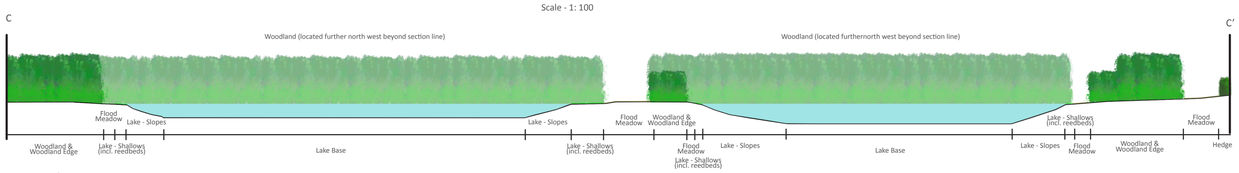
Section A-A'
Scale - 1: 1000



Section B-B'
Scale - 1: 1000



Section D-D'
Scale - 1: 100



Section C-C'
Scale - 1: 1000

OUTLINE MANAGEMENT AND MAINTENANCE PRESCRIPTIONS

Flood meadow:
Managed to promote species diversity and prevent scrub encroachment.
Autumn sown 1st year: 3 cuts to 70mm remove clippings.
Spring sown 1st year: 3 cuts - 6 weeks after sowing then late Spring and Autumn, to 70mm, remove clippings.
Maintenance Year 2+: 2 cuts per annum, March/April to remove excess grass, September/October after flowering, cut to 70mm, remove clippings.
Or manage by sheep grazing.

Vegetation clearence and trimming/ pruning: undertaken outside of the bird nesting season (March-August inclusive).

New woodland/ woodland edge planting:
Establishment maintenance (Year 1-5): watering to ensure continued thriving, re-firming, maintaining weed-free planting stations, replacement planting of dead/ dying/damaged plants.
Year 5+: Annual inspection of condition, annual formative prune in winter if necessary, thinning as necessary every 10 years to remove poorer specimens / allow space for plants to thrive, control of invasive species. Periodic pollarding of standard willows to riverbank.

Hedgerows:
New: Formative hard prune Year 1&2 twice a year to form shape, Year 3-5 trim twice a year.
Year 5+: trim once every 3 years to encourage nectar/ berrying.

Existing: trim once every 3 years to encourage nectar/ berrying.

Reeds:
Encourage tall marginal vegetation.

Typical Plant Mixes
The following plant species are locally appropriate to the Riverside Meadows LCT:
* Primary/ dominant species in mixes
** Minor secondary species in mixes
*** Occasional species

Feathered trees (watercourse)
Crack willow (*Salix fragilis*), alder (*Alnus glutinosa*).

Feathered trees (field boundaries)
Oak* (*Quercus robur),* crack willow* (*Salix fragilis*), field maple** (*Acer campestre*), small-leaved lime** (*Tilia cordata*).

Native Hedgerow (transplants)
Hawthorn* (*Crataegus monogyna*), field maple** (*Acer campestre*), hazel** (*Corylus avellana*), blackthorn** (*Prunus spinosa*), purging buckthorn*** (*Rhamnus cathartica*).

Native Woodland (transplants, whips and feathers)
Trees: oak*, alder*, crack willow**, downy birch** (*Betula pubescens*), goat willow** (*Salix caprea*).

Shrubs: elder* (*Sambucus nigra*), hawthorn*, alder buckthorn** (*Frangula cathartica*), purging buckthorn**.

Native Wet Woodland (transplants, whips and feathers)
Trees: alder*, crack willow*, downy birch**, goat willow**.

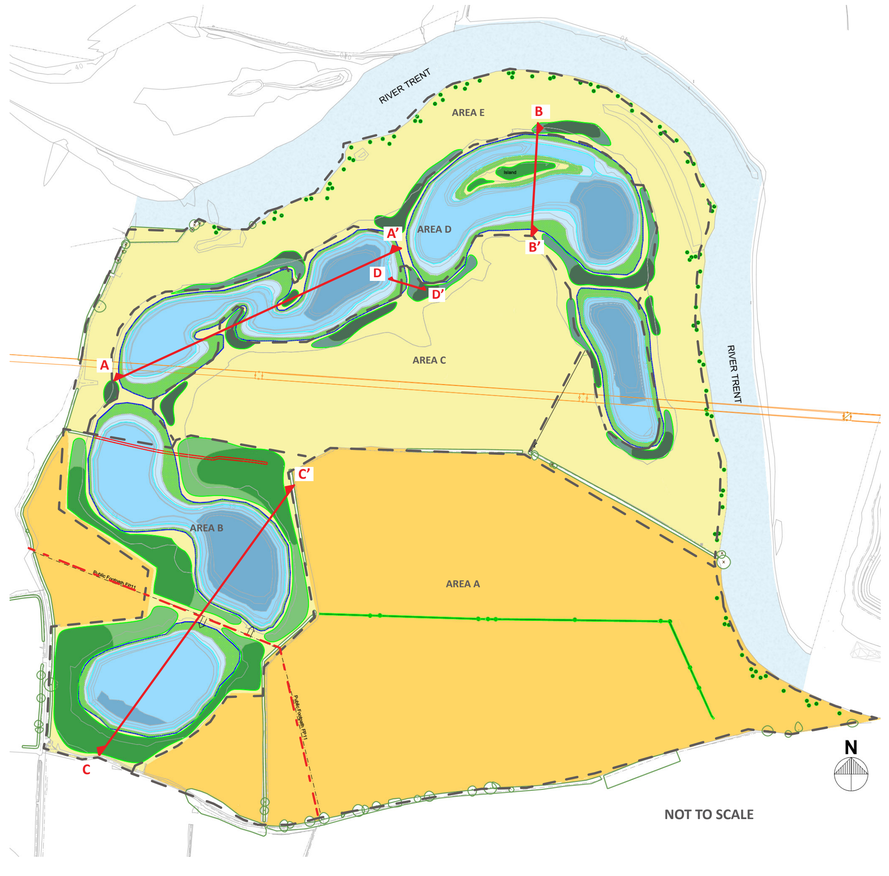
Shrubs: grey willow* (*Salix cinerea*), elder* (*Sambucus nigra*), hawthorn**, alder buckthorn**, purging buckthorn**, osier** (*Salix viminalis*), purple willow (*Salix purpurea*), almond leaved willow (*Salix trianda*).

Native woodland edge mixes: to consist of the shrubs above for native woodland or wet woodland mixes in the same proportion.

Riverside flood meadow: species typical of MG8 River floodplain/meadow grassland.

Grasses*: slender creeping red fescue, crested dogstail, meadow fescue, rough-stalked meadow grass, creeping bent, sweet vernal.

Wildflowers**: small-leaved Timothy, Ribwort plantain, meadow buttercup, common knapweed, ox-eye daisy, creeping buttercup, white clover, meadow sweet, marsh marigold, greater burnet.



ecus
ENVIRONMENTAL CONSULTANTS

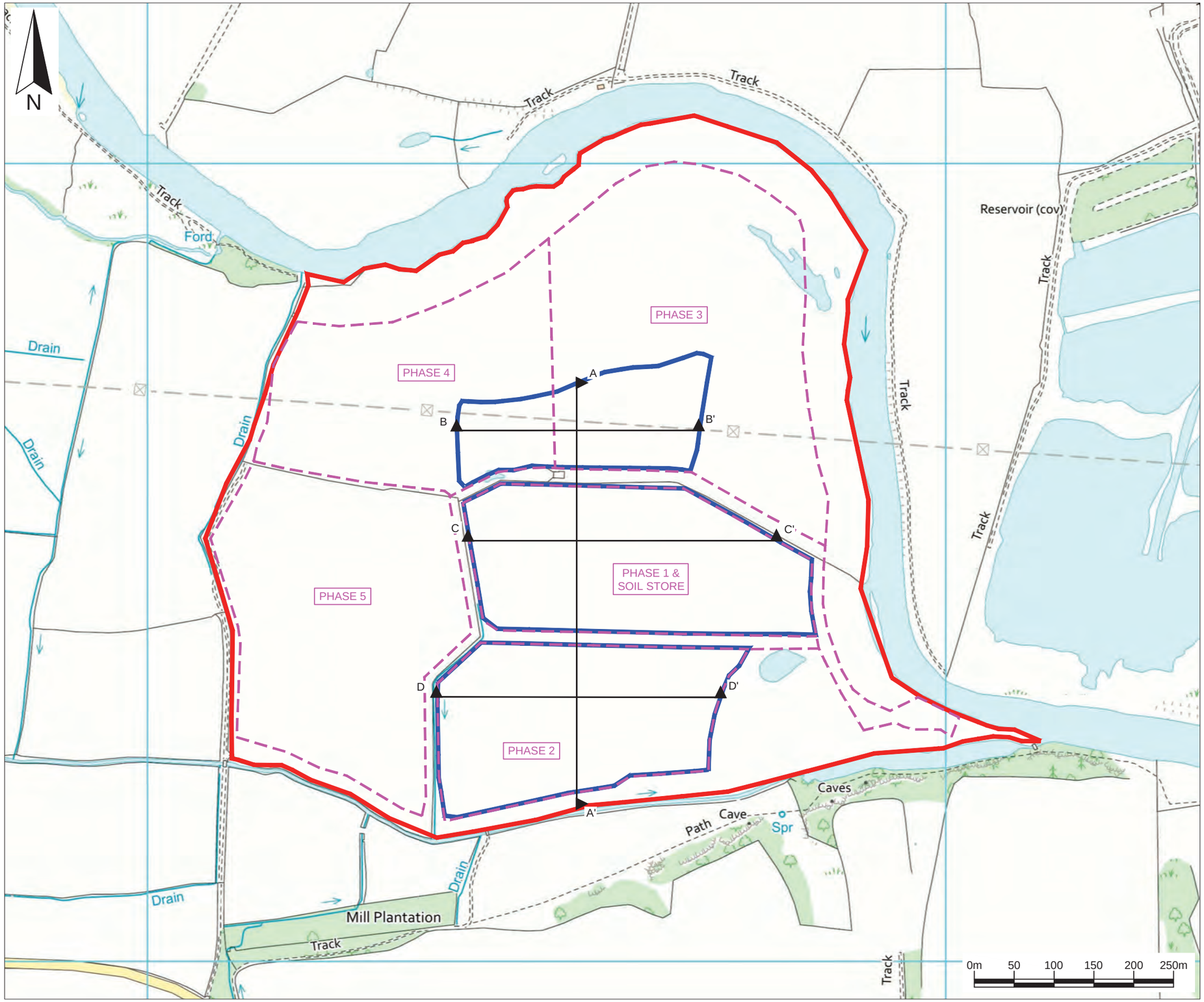
TARMAC
A CRH COMPANY

Tarmac
Swarkstone Quarry Restoration Scheme
Concept Plan - Landscape Strategy - Typical Sections

■ Brook Holt ■ Blackburn Road ■ Sheffield ■ S61 2DW
■ tel: 0114 266 9292 ■ www.ecusltd.co.uk

APPENDIX ESSD F

COPIES OF DRAWING REFERENCES TAR/SW/01-21/22220 AND TAR/SW/01-21/22221



Key / Notes

- Boundary of planning permission reference CM9/1215/122
- Area the subject of the Waste Recovery Plan and the boundary of the anticipated Environmental Permit application
- Phase boundries
- Location of cross sections shown on drawing reference TAR/SW/01-21/22221

Rev	Status	Drn	App	Chk	Date
	Final	KR	AKM	GT	19/10/21

Site
SWARKESTONE QUARRY

Client
TARMAC
A CRH COMPANY

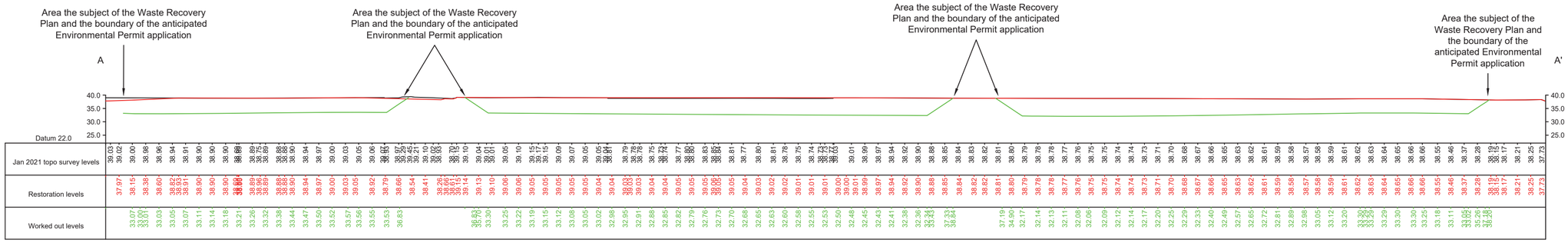
Title
The area the subject of the Waste Recovery Plan and the boundary of the anticipated Environmental Permit application

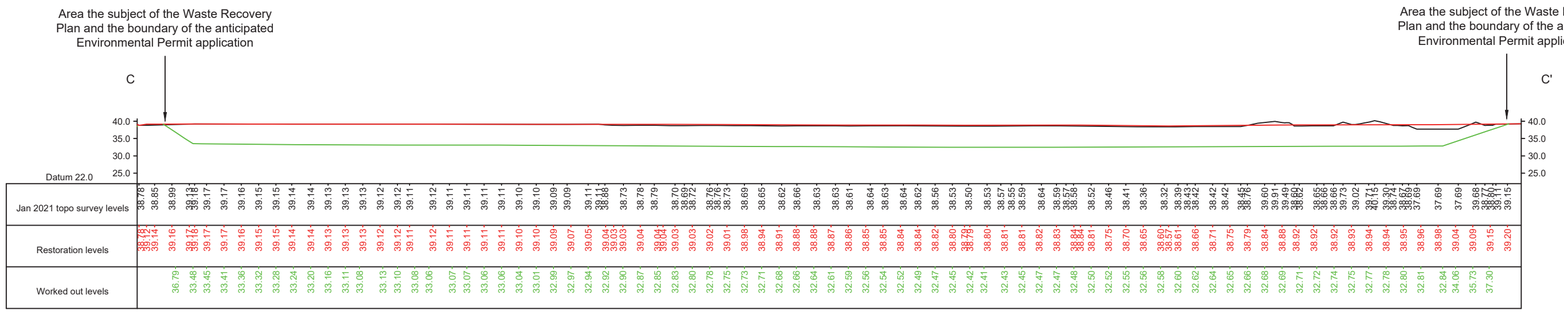
Figure 2

Scale
1:5,000@A3

Drawing Ref
TAR/SW/01-21/22220

MJCA
Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road, Baxterley, Atherstone,
Warwickshire, CV9 2LE.
Telephone : 01827 717891
Fax : 01827 718507





Key / Notes

Note:
Based on LSS models references
S346 SWARKESTONE 2021-01-21 QU.lss, S346 SWARKESTONE - RESTORATION AMENDED DESIGN - VERSION 1.lss, 00 - WORKED OUT BASE OF MINERAL.lss

Rev	Status	Drn	App	Chk	Date
	Final	KR	AKM	GT	19/10/21

Site: SWARKESTONE QUARRY

Client: TARMAC, A CRH COMPANY

Title: Restoration cross sections

Figure 3

Scale: 1:1,250@A2

Drawing Ref: TAR/SW/01-21/22221

MJCA
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APPENDIX ESSD G

LOGS OF MINERAL PROVING AND GROUNDWATER MONITORING BOREHOLES

Direct Drilling

BDA accredited

LANDFILL
SOAKAWAYS
SITE INVESTIGATION

106 High Street
Colney Heath
Herts AL4 0NP

Tel / Fax : (01727) 823866
Tel : (01795) 666221
Mobile : (07831) 239668

Depth	Strata Description
G/L	FIRM BROWN TOP SOIL
0-10	TYPE ONE, ROAD ROCK.
0-40	SOFT TO FIRM MOTTLED BROWN SILTY CLAY.
1-70	GREENISH BROWN MEDIUM SAND, WITH FINE-MEDIUM AND LARGE SEMI-ROUNDED GRAVELS AND LARGE COBBLES
6-00	DENSE, PINKISH-GREY ROUNDED GRAVELS IN A SAND STONE MATRIX.
	DRILLED TO 7-70

Penetration Testing and Samples

Type	From	To	75	150	225	300	375	450	Blows
B	1-70	2-00							
B	3-50	4-00							
B	5-50	6-00							

DAY WORKS.

COLLECTED MARKER POSTS AND PAINTED = 1½ HRS.
COLLECTED CEMENT FROM BURTON = 1½ HRS
FILLED BOWZER TO ASSIST DRILLING = 1HR.
COLLECTED SHINGLE-BALLIST AND INSTALLATION EQUIPMENT FROM PIT = 1HR.
CLEARED SPOILS. = ½ HR.
TRANSPORTED RIG TO PIT FOR SAFETY 14-12-04 AND RETURNED 15-12-04 = 1½ HR.

Remarks INSTALLED 8-00 x 50 mm LINER, DETAILS ON SEPARATE SHEET.

Driller M-S-Claxton

Water Levels

	Depth	Casing	Time
Morning			
Evening			
Other			

Depth at end of day

Diameter (mm)	Borehole	Casing
150	7-70	7-70

Hard Strata / Chiselling

From (M)	To (M)	From (Hrs)	To (Hrs)
6-00 to 7-00	SLOW DRILLING	1-30 to 3pm	= 1½
7-00 " 7-70	"	8AM to 9AM	15-12-04 = 1HR

Total number of samples

SPT	B	U100	D	H²O	P
	3				

H² O	Strike 1	Strike 2	Strike 3
Depth	1-70		
Depth 5 mins			
Depth 10 mins			
Depth 15 mins			
Depth 20 mins			
Casing			
Cut off at			

Move	Drill	Stand	Break	Work
1	7-70			7 HRS.

Site SWARKESTONE

Job No.

B / H No. W/M 1

Day TUESDAY.

Date 14-12-04

Direct Drilling

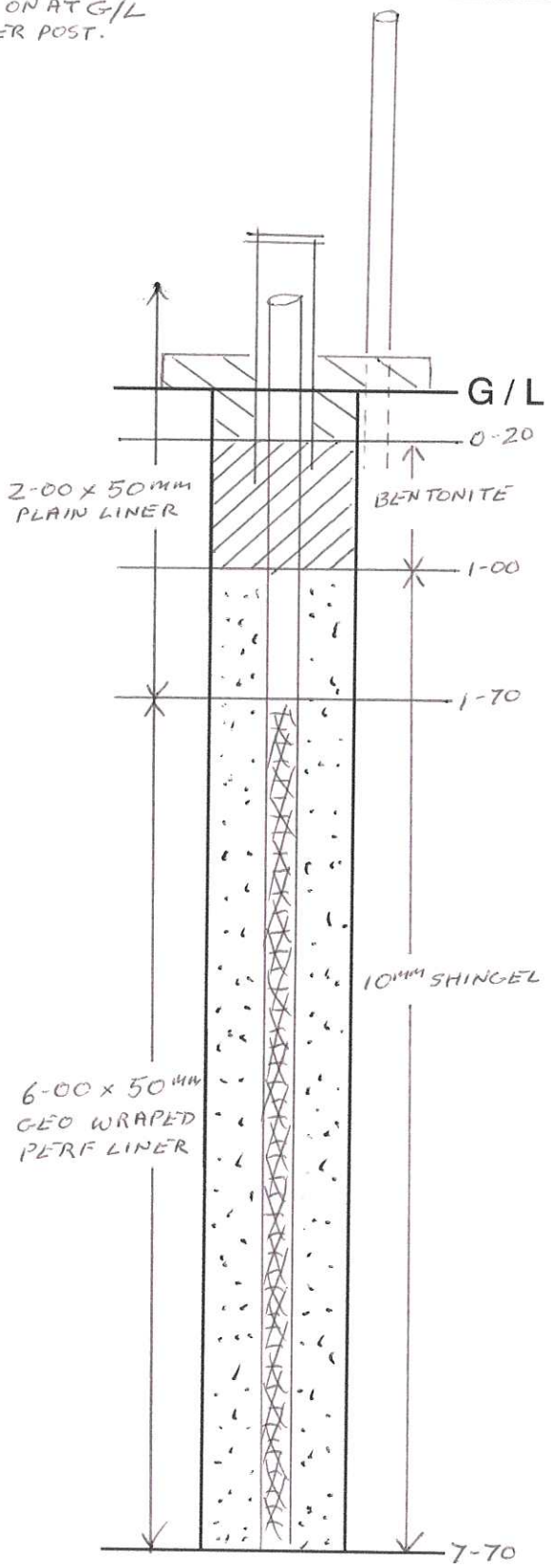
BDA accredited

LANDFILL
SOAKAWAYS
SITE INVESTIGATION

106 High Street
Colney Heath
Herts AL4 0NP

Tel / Fax : (01727) 823866
Tel : (01795) 666221
Mobile : (07831) 239668

HEAD WORKS CONCRETED ON AT G/L
WITH PLINTH AND MARKER POST.



Installation of B / H. W/M1

Site : SWARKESTONE

Job No :

Date : 15-12-09

NOT TO SCALE

Daily Site Report

date: m | t | w | th | f | s | su — 22 / 9 / 04

site: FORSMARK.

borehole: MW2

ground conditions

from	to	consistency or density/colour/type
GL	0.3	DARK BROWN TOP SOIL.
0.3	1.1	FIRM BROWN MOTTLED CLAY.
1.1	1.6	BROWN MOTTLED VERY SANDY SILT, WITH GRAVEL.
1.6	6.2	BROWN MOTTLED GRAVEL AND SAND.
6.2	6.5	HARD BROWN MOTTLED SANDSTONE

disturbed samples

no.	depth	no.	depth
D 1		D 16	
D 2		D 17	
D 3		D 18	
D 4		D 19	
D 5		D 20	
D 6		D 21	
D 7		D 22	
D 8		D 23	
D 9		D 24	
D 10		D 25	
D 11		D 26	
D 12		D 27	
D 13		D 28	
D 14		D 29	
D 15		D 30	

undisturbed samples

no.	depth	casing depth	length	blows
U 1				
U 2				
U 3				
U 4				
U 5				
U 6				
U 7				
U 8				
U 9				
U 10				
U 11				
U 12				
U 13				
U 14				
U 15				

penetration tests

type/no	depth	casing depth	water level	150 seating	75	75	75	75
S/C 1								
S/C 2								
S/C 3								
S/C 4		1.6						
S/C 5		4.6						
S/C 6								
S/C 7								
S/C 8								
S/C 9								
S/C 10								
S/C 11								
S/C 12								
S/C 13								
S/C 14								
S/C 15								

bulk samples

no.	from	to	no.	from	to
B 1			B 11		
B 2			B 12		
B 3			B 13		
B 4			B 14		
B 5			B 15		
B 6			B 16		
B 7			B 17		
B 8			B 18		
B 9			B 19		
B 10			B 20		

ground water

depth struck	1.6		
casing depth	1.5		
inflow rate	Slow		
rose to 5 min.	1.5		
rose to 10 min.			
rose to 15 min.			
sealed out at			
sample no.	W	W	W
sample depth			
water level at start of boring			DRY
water level at finish of boring			3.6
water level when casing removed	S. PIPE		

water added

from			
to			
litres			

chisel or pits

depth	from			
	to			
time	from			
	to			
	hours			

borehole complete?	Yes / No
depth of borehole cased	6.3
standpipe depth	6.5
piezotip · gastap · cover	

remarks

driller: R W

Direct Drilling

BDA accredited

LANDFILL
SOAKAWAYS
SITE INVESTIGATION

106 High Street
Colney Heath
Herts AL4 0NP

Tel / Fax : (01727) 823866
Tel : (01795) 666221
Mobile : (07831) 239668

Depth	Strata Description
G/L	FIRM BROWN TOP SOIL
0-20	STIFF RUST - BROWN SILTY CLAY.
2-00	SOFT RUST - BROWN 'CLAY BOUND' SILT.
2-70	VERY SOFT GREY SILT.
4-00	GREY - BROWN FINE SAND, WITH FINE - MEDIUM AND LARGE SEMI ROUNDED GRAVELS AND LARGE COBBLES.
5-00	STIFF MAUVE - GREY MOTTLED SILT
	DRILLED TO 5-50

Penetration Testing and Samples

Type	From	To	75	150	225	300	375	450	Blows
B	4-00	4-50							

DAY WORKS.

TRANSPORTED RIG - BOWZER AND EQUIPMENT TO B/H POSITION = ½ HR.

COLLECTED SHINGEL - BALLAST AND INSTALLATION EQUIPMENT FROM PIT = 1 HR.

CLEARED SPOILS = ½ HR.

RETURNED BOWZER TO PIT AND OFF HIRED = ½ HR.

Remarks INSTALLED 5-80 x 50 MM LINER, DETAILS ON SEPARATE SHEET.

Driller M. S. Claxton

Water Levels

	Depth	Casing	Time
Morning			
Evening			
Other			

Depth at end of day

Diameter (mm)	Borehole	Casing
150	5-50	5-30

Hard Strata / Chiselling

From (M)	To (M)	From (Hrs)	To (Hrs)

Total number of samples

SPT	B	U100	D	H^2O	P
	1				

H^2O	Strike 1	Strike 2	Strike 3
Depth	4-00		
Depth 5 mins			
Depth 10 mins			
Depth 15 mins			
Depth 20 mins			
Casing			
Cut off at			

Move	Drill	Stand	Break	Work
1	5-50			2½ HRS.

Site SWARKESTONE

Job No.

B / H No. W/M 3

Day THURSDAY

Date 16-12-04

Direct Drilling

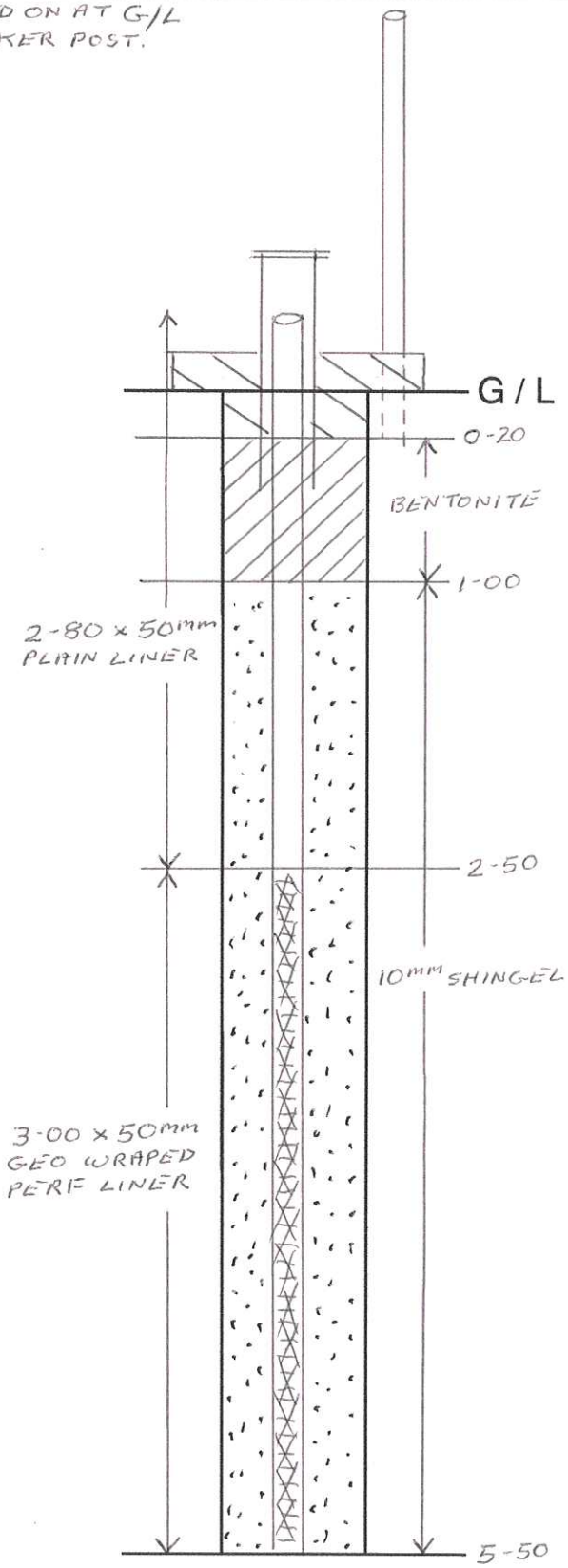
BDA accredited

LANDFILL
SOAKAWAYS
SITE INVESTIGATION

106 High Street
Colney Heath
Herts AL4 0NP

Tel / Fax : (01727) 823866
Tel : (01795) 666221
Mobile : (07831) 239668

HEAD WORKS CONCRETED ON AT G/L
WITH PLINTH AND MARKER POST.



Installation of B / H. W/M 3

Site : SWARKESTONE

Job No :

Date : 16-12-04.

NOT TO SCALE

Direct Drilling

BDA accredited

LANDFILL
SOAKAWAYS
SITE INVESTIGATION

106 High Street
Colney Heath
Herts AL4 0NP

Tel / Fax : (01727) 823866
Tel : (01795) 666221
Mobile : (07831) 239668

Depth	Strata Description
G/L	FIRM BROWN TOP SOIL.
0·30	STIFF RUST - BROWN SILTY CLAY.
1-20	LIGHT ORANGE BROWN FINE SAND.
1-50	MAUVE - BROWN FINE TO MEDIUM SAND, WITH FINE - MEDIUM AND LARGE SEMI ROUNDED GRAVELS AND LARGE COBBLES.
5-00	FIRM MAUVE - GREY MOTTLED SILT (MAULE)
	DRILLED TO 5-50

Penetration Testing and Samples

Type	From	To	75	150	225	300	375	450	Blows
B	1-50	2-00							
B	3-50	4-00							

DAY WORKS.

TRANSPORTED RIG - BOWZER AND EQUIPMENT TO B/H POSITION = 1HR.

FILLED BOWZER TO ASSIST DRILLING = 1HR.

COLLECTED SHINGEL - BALLIST AND INSTALLATION EQUIPMENT FROM PIT. = 1HR.

CLEARED SPOILS - = ½HR.

TRANSPORTED RIG TO PIT FOR SAFETY 15-12-04 AND RETURNED 16-12-04 = 1½HRS

Remarks INSTALLED 5-80 × 50 MM LINER, DETAILS ON SEPARATE SHEET.

Driller M. S. Claxton

Water Levels

	Depth	Casing	Time
Morning			
Evening			
Other			

Depth at end of day

Diameter (mm)	Borehole	Casing
150	5-50	5-30

Hard Strata / Chiselling

From (M)	To (M)	From (Hrs)	To (Hrs)

Total number of samples

SPT	B	U100	D	H²O	P
	2				

H²O	Strike 1	Strike 2	Strike 3
Depth	1-30		
Depth 5 mins			
Depth 10 mins			
Depth 15 mins			
Depth 20 mins			
Casing			
Cut off at			

Move	Drill	Stand	Break	Work
1	5-50			5 HRS.

Site SWARKESTONE

Job No. | B / H No. W/M 4

Day WEDNESDAY | Date 15-12-04

Direct Drilling

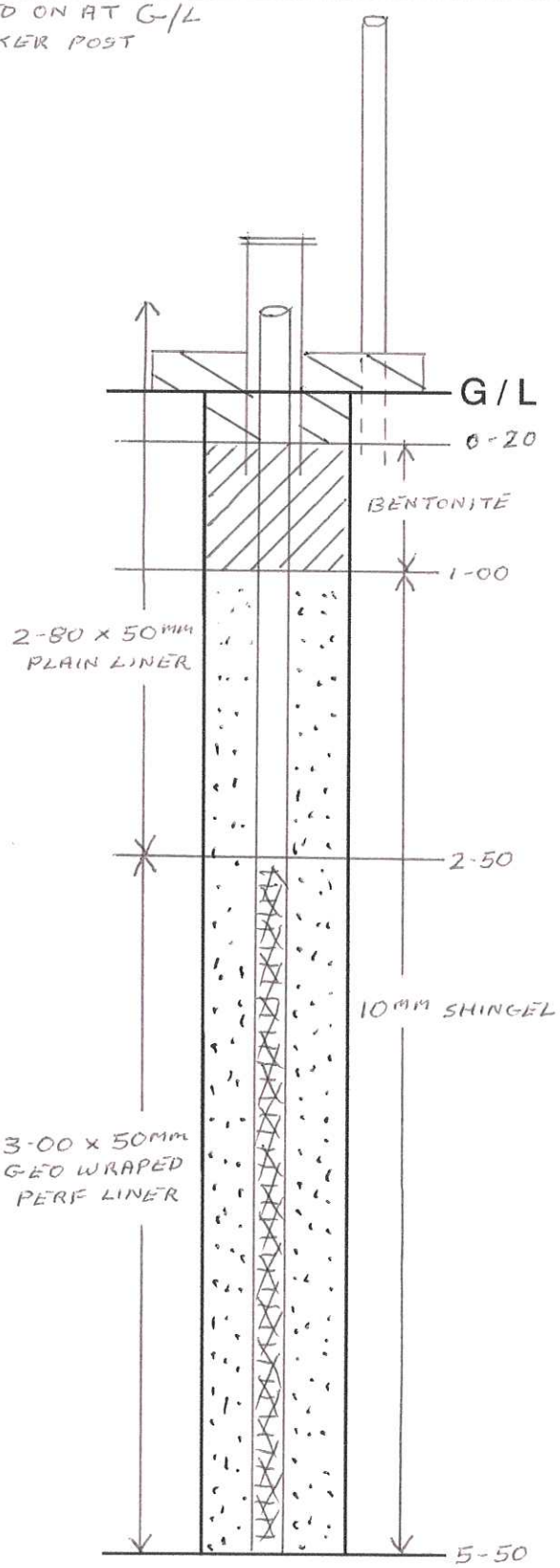
BDA accredited

LANDFILL
SOAKAWAYS
SITE INVESTIGATION

106 High Street
Colney Heath
Herts AL4 0NP

Tel / Fax : (01727) 823866
Tel : (01795) 666221
Mobile : (07831) 239668

HEAD WORKS CONCRETED ON AT G/L
WITH PLINTH AND MARKER POST



Installation of B / H. W/M 4

Site : SWARKESTONE

Job No :

Date : 15-12-04

NOT TO SCALE

Direct Drilling

BDA accredited

LANDFILL
SOAKAWAYS
SITE INVESTIGATION

106 High Street
Colney Heath
Herts AL4 0NP

Tel / Fax : (01727) 823866
Tel : (01795) 666221
Mobile : (07831) 239668

Depth	Strata Description
G/L	FIRM BROWN TOP SOIL.
0.40	FIRM MOTTLED BROWN SILTY CLAY
1-30	SOFT DARK GREY SILT. (ALLUVIUM)
2-00	DARK GREY - BROWN FINE SAND WITH FINE - MEDIUM AND LARGE SEMI ROUNDED GRAVELS AND LARGE COBBLES.
4-00	AS ABOVE, BECOMING PINKISH-BROWN
5-80	DENSE SAND STONE IMPREGNATED WITH SCATTERD FINE GRAVELS.
	DRILLED TO 6-00

Penetration Testing and Samples

Type	From	To	75	150	225	300	375	450	Blows
B	2-00	2-50							
B	4-00	4-50							

DAY WORKS.

TRANSPORTED RIG - BOWZER AND EQUIPMENT TO B/H POSITION = ½ HR.

COLLECTED SHINGEL - BALLIST AND INSTALLATION EQUIPMENT FROM PIT. = 1HR.

CLEARED SPOILS. = ½ HR.

Remarks INSTALLED 6-30 × 50 mm LINER, DETAILS ON SEPARATE SHEET.

Driller M. S. Claxton

Water Levels

	Depth	Casing	Time
Morning			
Evening			
Other			

Depth at end of day

Diameter (mm)	Borehole	Casing
150	6-00	6-00

Hard Strata / Chiselling

From (M)	To (M)	From (Hrs)	To (Hrs)
5-80 TO	6-00 SLOW	DRILLING -	= ½ HR.

Total number of samples

SPT	B	U100	D	H²O	P
	2				

H²O	Strike 1	Strike 2	Strike 3
Depth	2-00		
Depth 5 mins			
Depth 10 mins			
Depth 15 mins			
Depth 20 mins			
Casing			
Cut off at			

Move	Drill	Stand	Break	Work
1	6-00			2 HRS

Site SWARKESTONE

Job No. | B / H No. W/M 5

Day WEDNESDAY | Date 15-12-04

Direct Drilling

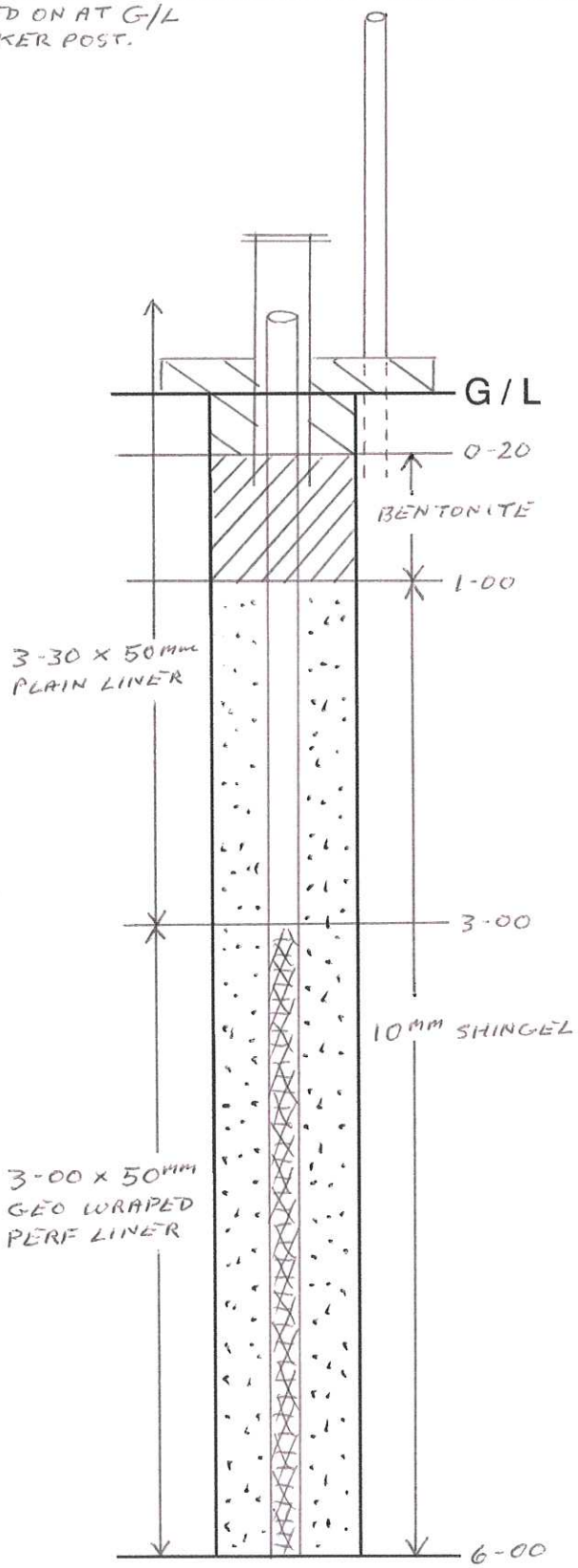
BDA accredited

LANDFILL
SOAKAWAYS
SITE INVESTIGATION

106 High Street
Colney Heath
Herts AL4 0NP

Tel / Fax : (01727) 823866
Tel : (01795) 666221
Mobile : (07831) 239668

HEAD WORKS CONCRETED ON AT G/L WITH PLINTH AND MARKER POST.



Installation of B / H. w/m 5

Site : SWARKESTONE

Job No :

Date : 15-12-04

NOT TO SCALE

MJCA
Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road,
Baxterley, Atherstone,
Warwickshire, CV9 2LE
Telephone: 01827 717891
Facsimile: 01827 718507

BOREHOLE LOG

Project	Client	Date Completed
Swarkestone Quarry SI	Tarmac	17/05/2022

Project No.	Ground Level (mAOD)	Co-ordinates ()	Borehole No.
TAR/SW/ML/20053/01	39.21	E 433 104.3 N 327 269.4	FOR_WMP1A

Contractor	Location	Sheet
Direct Drilling Ltd	Swarkestone Quarry	1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Result	Reduced Level (mAOD)	Depth (Thick-ness)	DESCRIPTION	Legend	Water	Instrument/ Backfill
				(1.60)	Firm dark brown CLAY with frequent roots and rootlets			
			37.61	1.60				
			37.41	1.80	Soft mottled dark brown and dark grey sandy and gravelly CLAY. Gravels were generally subangular to rounded fine to coarse of various lithologies. Sand was medium.			
				(4.90)	Brown sandy GRAVEL. Gravels were variably well rounded to subrounded fine to coarse and up to cobble size. Gravel comprised mainly quartzose, chert/flint, granite and sandstone clasts. Sand was fine to medium. 5.50 - 6.00 Thin beds of gravelly SANDS.			
			32.51	6.70				
			32.41	6.80	Light brown fine grained SANDSTONE [SHERWOOD SANDSTONE GROUP]			
					END OF BOREHOLE			

Scale (m): 1, 2, 3, 4, 5, 6, 7

GROUNDWATER

Date	Depth of hole	Depth of casing	Depth to water	Depth struck	Depth after 20 mins	Depth sealed
24/05/22	6.80m		1.92m			

REMARKS / INSTALLATIONS

Slotted HDPE pipe with georap installed between 6.8mbgl and 1.5mbgl and plain pipe installed from 1.5mbgl to just above ground level. Borehole backfilled with gravel to 1.3mbgl and bentonite pellets to 0.1mbgl. Headworks comprise a locakable steel riser pipe set on a concrete plinth with red marker post. Monitoring standpipe is fitted with a removable gas tight cap with a gas tap.

LOGGED BY: Mike Leeds

DRILLING

Plant:

Crew: D. Watts

Type and Diameter	Depth m
Cable percussion 150mm	6.80

MJCA
Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road,
Baxterley, Atherstone,
Warwickshire, CV9 2LE
Telephone: 01827 717891
Facsimile: 01827 718507

BOREHOLE LOG

Project	Client	Date Completed
Swarkestone Quarry SI	Tarmac	24/05/2022

Project No.	Ground Level (mAOD)	Co-ordinates ()	Borehole No.
TAR/SW/ML/20053/01	38.17	E 433 741.8 N 327 221.6	FOR_WMP6

Contractor	Location	Sheet
Direct Drilling Ltd	Swarkestone Quarry	1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Result	Reduced Level (mAOD)	Depth (Thick-ness)	DESCRIPTION	Legend	Water	Instrument/ Backfill
			37.82	0.35	Very soft to soft dark brown organic CLAY with frequent roots and rootlets (vegetated).			
			37.07	(0.75) 1.10	Very soft to soft mottled dark brown and dark grey slightly gravelly CLAY with rootlets. Damp below 0.8m.			
			34.17	(2.90) 4.00	Very soft dark grey CLAY. Low recovery.		▼	
			33.37	(0.80) 4.80	Brown slightly gravelly medium SAND. Gravels were generally well rounded to subrounded medium to coarse of various lithologies. Recovered as sands and gravels in water.			
			31.82	(1.55) 6.35	Brown sandy GRAVEL. Gravels were mainly well rounded to rounded medium to coarse and up to cobble size. Gravel comprised mainly quartzose, chert/flint and sandstone clasts. Occasional thin bands of fine to medium, sub-angular to rounded gravels.			
			31.77	6.40	Yellowish brown, medium to coarse SANDSTONE [SHERWOOD SANDSTONE GROUP]			
					END OF BOREHOLE			

Scale (m): 1, 2, 3, 4, 5, 6, 7

GROUNDWATER

Date	Depth of hole	Depth of casing	Depth to water	Depth struck	Depth after 20 mins	Depth sealed
24/05/22	6.40m		1.88m			

REMARKS / INSTALLATIONS

Slotted HDPE pipe with georap installed between 6.4mbgl and 3.7mbgl and plain pipe installed from 3.7mbgl to just below ground level. Borehole backfilled with gravel to 3.4mbgl, bentonite pellets to 1.0mbgl and gravel to 0.55mbgl. Headworks comprise a lockable steel riser pipe set in concrete with a cover level just above ground level. Monitoring standpipe is fitted with a removable gas tight cap with a gas tap.

LOGGED BY: Ethan Brown

DRILLING

Plant:

Crew: D. Watts

Type and Diameter	Depth m
Cable percussion 150mm	6.40

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWANWICK STONE QUARRY

CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	~		5.00		
Depth Cased	~		5.00		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
Depth Water Added	1.00			15 MIN.	
				20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	~	5.00
BH Dia		
250 mm		
200 mm		
150 mm	~	5.00

Crew: P. BORRETT, N. MINTO — Hrs.

Contract No. 317

Rig No. SM4

Date 12.7.00

BH No. 11C81

Sheet No. 1 of

Weather Conditions DRY

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
0	0.30	TOP SOIL	1.50	2.00	1	B	~								
			2.50	3.00	2	B									
0.30	1.00	FIRM BROWN SANDY CLAY													
1.00	4.60	SMALL MEDIUM, LARGE GRAVEL COBBLE BROWN SAND + CLAY													
4.60	5.00	MUDSTONE + MARL				1.0 / 3.6		5.46							
		BH COMPLETE													

QUANTITIES: Boring 5.00 m Bulks 2 Jars ..... U100 ..... CPT/SPT .....

Hours on Site		Hrs
	Boring and Sampling from GL to 5.00	Hrs
	Moves Between 2EF SET UP BH HK81	Hrs
	Delays WATER BH	Hrs
	Total	Hrs

Standing Time of Day Works

Reason	Hrs.

Chiselling

From	To	Hrs.

Drillers Signature

Supervisors Signature

Clients Representatives Signature

Remarks

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWANSTON QUARRY | CLIENT ZEOLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		4.50		
Depth Cased	—		4.00		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
				15 MIN.	
Depth Water Added	1.00			20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	4.00
BH Dia		
250 mm		
200 mm		
150 mm	—	4.50

Crew: D. ROBERTS, W. MILNE — Hrs.

Contract No. 317

Rig No. SAY

Date 12.9.00

BH No. HC82

Sheet No. 1 of

Weather Conditions: DRY

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
GL	0.30	TOP SOIL	1.00	1.40	1	B									
			3.00	3.40	2	B									
0.30	0.90	FIRM BROWN SANDY CLAY													
0.90	3.80	SMALL, MEDIUM, LARGE GRAVEL COARSE BROWN SAND & GRIT													
3.80	4.50	MARL & MUDSTONE		0.9 / 2.9											
		BH COMPLETE													

QUANTITIES: Boring ... 4.50 m Bulks ... 2 ... Jars ..... U100 ..... CPT/SPT .....

Hours on Site

Boring and Sampling from GL to 4.50	Hrs	
Moves Between RIG SET UP BH HC82	Hrs	
Delays RIG FOR BH	Hrs	
Total	Hrs	

Standing Time of Day Works

Reason	Hrs.

Drillers Signature

Supervisors Signature

Chiselling

From	To	Hrs.

Clients Representatives Signature

Remarks

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWARKESTONE QUARRY | CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		5.00		
Depth Cased	—		4.50		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
				15 MIN.	
Depth Water Added	2.00			20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	4.50
BH Dia		
250 mm		
200 mm		
150 mm	—	5.00

Crew: P ROBERTS, N. MONTO — Hrs.

Contract No. 3117
Rig No. SA4
Date 12.7.00
BH No. HC83
Sheet No. 1 of
Weather Conditions DRY

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
GL	0.40	TOP SOIL	1.10	1.50	1	B									
			2.10	2.50	2	B									
0.40	1.00	FIRM BROWN SANDY CLAY													
1.00	2.00	CLAYEY BROWN SAND WITH SMALL, MEDIUM, LARGE GRAVEL													
2.00	4.00	SMALL, MEDIUM, LARGE GRAVEL COBBLE BROWN SAND & GRIT													
4.00	5.00	READY BROWN MARL & MUDSTONE		2.0 / 2.0		J+G									
		BH COMPLETE													

QUANTITIES: Boring 5.00 m Bulks 2 Jars ..... U100 ..... CPT/SPT .....

Hours on Site

Boring and Sampling from	GL to 5.00	Hrs
Moves Between	ASC SET UP BH HC83	Hrs
Delays	BACKFILL BH	Hrs
Total		Hrs

Standing Time of Day Works

Reason	Hrs.

Chiselling

From	To	Hrs.

Drillers Signature

Supervisors Signature

Clients Representatives Signature

Remarks

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWARKESTONE QUARRY | CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	4.50		4.50		
Depth Cased	—		4.50		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
Depth Water Added	1.30			15 MIN.	
				20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	4.50
BH Dia		
250 mm		
200 mm		
150 mm	—	4.50

Crew: P. ROBERTS, N. MINTO — Hrs.

Contract No. 3117
Rig No. SA4
Date 12.9.00
BH No. HC84
Sheet No. 1 of
Weather Conditions DRY

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
0	0.30	TOP SOIL	1.40	1.80	1	B									
			2.60	3.00	2	B									
0.30	1.30	FIRM TO SOFT BROWN SANDY CLAY													
1.30	2.40	COARSE BROWN SAND WITH SHOT, SMALL, MEDIUM LARGE GRAVEL													
2.40	4.00	SMALL, MEDIUM, LARGE GRAVEL COARSE BROWN SAND + GREY		1.3 / 2.7	3+6										
4.00	4.50	GREY SANDSTONE													
		BH COMPLETE													

QUANTITIES: Boring 4.50 m Bulks 2 Jars ..... U100 ..... CPT/SPT .....

Hours on Site		
	Boring and Sampling from GL to 4.50	Hrs
	Moves Between HC SET UP BH HC84	Hrs
	Delays BACK FILL BH	Hrs
	Total	Hrs

Standing Time of Day Works

Reason	Hrs.

Drillers Signature P. Roberts

Supervisors Signature

Chiselling

From	To	Hrs.

Clients Representatives Signature

Remarks

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWARKESTONE QUARRY | CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		3.50		
Depth Cased	—		3.50		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
Depth Water Added	1.10			15 MIN.	
				20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	3.50
BH Dia		
250 mm		
200 mm		
150 mm	—	3.50

Crew: P. Bofat / J. Minto — Hrs.

Contract No. 317
Rig No. SM4
Date 12.7.00
BH No. HC 85
Sheet No. 1 of
Weather Conditions: Dry

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Re-covered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
0	0.40	TOPSOIL	1.60	2.00	1	B									
0.40	1.10	FIRM BROWN SANDY CLAY													
1.10	3.00	SMALL, MEDIUM, LARGE GRAVEL COBBLE. BROWN SAND MATRIX													
3.00	3.50	GREY SANDSTONE		1.1											
				1.95 +C											
		All COMPLETE													

QUANTITIES: Boring 3.50 m Bulks 1 Jars ..... U100 ..... CPT/SPT .....

Hours on Site

Boring and Sampling from	0.2 to 3.50	Hrs
Moves Between	RIG SET UP TO BH HC85	Hrs
Delays	BACK FILL BH.	Hrs
Total		Hrs

Standing Time of Day Works

Reason	Hrs.

Drillers Signature

Supervisors Signature

Remarks

Chiselling

From	To	Hrs.
3.30	3.50	½

Clients Representatives Signature

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWINNESTONE QUARRY | CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		5.00		
Depth Cased	—		5.00		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
Depth Water Added	1.20			15 MIN.	
				20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	5.00
BH Dia		
250 mm		
200 mm		
150 mm	—	5.00

Crew: P. MORTON, N. ALINTO — Hrs.

Contract No. 317
Rig No. SM4
Date 12.9.00
BH No. HC 86
Sheet No. 1 of
Weather Conditions DRY

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
0	0.40	TOP SOIL	1.60	2.00	1	B									
			3.60	4.00	2	B									
0.40	1.20	FIRM TO SOFT BROWN													
		SANDY CLAY													
1.20	4.40	SMALL, MEDIUM, LARGE GRAVEL													
		COARSE BROWN SAND & GRIT													
4.40	5.00	MARL					1.2								
							3.2								
		BH COMPLETE													

QUANTITIES: Boring 5.00 m Bulks 2 Jars ..... U100 ..... CPT/SPT .....

Hours on Site

Boring and Sampling from GL	to 5.00	Hrs
Moves Between Rig SET UP BH HC86		Hrs
Delays BACK FILL BH		Hrs
Total		Hrs

Standing Time of Day Works

Reason	Hrs.

Chiselling

From	To	Hrs.

Drillers Signature

Supervisors Signature

Clients Representatives Signature

Remarks

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWARKESTONE QUARRY | CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		5.50		
Depth Cased	—		5.00		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
Depth Water Added	1.60			15 MIN.	
				20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	5.00
BH Dia		
250 mm		
200 mm		
150 mm	—	5.50

Crew P. Corbett W. Minto Hrs.

Contract No. 5117

Rig No. SA4

Date 13.7.00

BH No. HC87

Sheet No. 1 of

Weather Conditions DRY

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
GL	0.30	TOP SOIL	1.60	2.00	1	B									
			3.60	4.00	2	B									
0.30	1.60	FIRM TO SOFT BROWN SANDY CLAY													
1.60	4.80	SMALL, NARROW, LARGE GRAVEL COBBLE BROWN SAND + GRIT													
4.80	5.50	BROWN SANDSTONE		1.6 / 3.2						5+5					
		BH COMPLETE													

QUANTITIES: Boring 5.50 m Bulks 2 Jars ..... U100 ..... CPT/SPT .....

Hours on Site

Boring and Sampling from	GL to 5.50	Hrs
Moves Between	RED SET UP BH HC87	Hrs
Delays	BROKEN BIT	Hrs
Total		Hrs

Standing Time of Day Works

Reason	Hrs.

Chiselling

From	To	Hrs.
5.30	5.50	½

Drillers Signature

Supervisors Signature

Clients Representatives Signature

Remarks

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWARKESTONE QUARRY | CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		6.00		
Depth Cased	—		6.00		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
				15 MIN.	
Depth Water Added	1.10			20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	6.00
BH Dia		
250 mm		
200 mm		
150 mm	—	6.00

Crew D MOGFORT A MENTO — Hrs.

Contract No. 3317
Rig No. SA4
Date 13.9.00
BH No. HC88
Sheet No. 1 of
Weather Conditions DRY

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
0	0.30	TOP SOIL	1.10	1.60	1	B									
			3.20	3.60	2	B									
0.30	1.10	FIRM BROWN SANDY CLAY	4.00	4.40	3	B									
1.10	3.80	SMALL, MEDIUM, LARGE GRAVEL													
		COARSE BROWN SAND + GRAVEL													
3.80	5.70	COARSE BROWN SAND + GRAVEL													
		WITH SMALL GRAVEL CONTENT				1.1									
						4.6	5+6								
5.70	6.00	GREY + RED/BROWN MARL													
		BH COMPLETE													

QUANTITIES: Boring 6.00 m Bulks 3 Jars ..... U100 ..... CPT/SPT .....

Hours on Site

Boring and Sampling from GL	to 6.00	Hrs
Moves Between RECET OP BH HC88		Hrs
Delays BACKFILL BH.		Hrs
Total		Hrs

Standing Time of Day Works

Reason	Hrs.

Drillers Signature

Supervisors Signature

Remarks

Chiselling

From	To	Hrs.

Clients Representatives Signature

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWANNESTONE QUARRY

CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		5.00		
Depth Cased	—		4.60		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
Depth Water Added	1.30			15 MIN.	
				20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	4.60
BH Dia		
250 mm		
200 mm		
150 mm	—	5.00

Crew Hrs.

ROBERT

N. MENTO

Contract No. 317

Rig No. SAG

Date 13.9.00

BH No. HC89

Sheet No. 1 of

Weather Conditions DRY

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
G	0.60	TOP SOIL	1.40	1.80	1	B									
			3.40	3.80	2	B									
0.60	1.30	FIRM TO SOFT BROWN													
		SANDY CLAY													
1.30	4.50	SAND, MEDIUM, LARGE GRAVEL													
		COBBLE BROWN SAND & GRIT													
4.50	5.00	GREY SANDSTONE					1-3								
							3.2 SH6								
		B/H COMPLETE													

QUANTITIES: Boring 5.00 m Bulks 2 Jars ..... U100 ..... CPT/SPT .....

Hours on Site		
	Boring and Sampling from 0.2 to 5.00	Hrs
	Moves Between RIG SET UP B/H HC89	Hrs
	Delays BACKFILL B/H	Hrs
	Total	Hrs

Standing Time of Day Works

Reason	Hrs.

Drillers Signature

Supervisors Signature

Remarks

Chiselling

From	To	Hrs.

Clients Representatives Signature

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWARKESTONE QUARRY | CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		6.00		
Depth Cased	—		6.00		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
Depth Water Added	1.30			15 MIN.	
				20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	6.00
BH Dia		
250 mm		
200 mm		
150 mm	—	6.00

Crew: P. BRYANT, N. MINTO — Hrs.

Contract No. 3117
Rig No. SA4
Date 13.9.00
BH No. HC 90
Sheet No. 1 of
Weather Conditions DRY

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
GL	0.30	TOP SOIL	1.40	1.80	1	B									
			2.60	3.00	2	B									
0.30	1.30	FIRM TO SOFT BROWN SANDY CLAY	4.60	5.00	3	B									
1.30	2.40	COARSE BROWN GRAVELLY SAND													
2.40	5.50	SAND, MEDIUM, LARGE GRAVEL													
3.0		COARSE BROWN SAND + GRAVEL		2.4											
W.3				3.1	S+C										
5.50	6.00	GREY + RUSTY BROWN MARL													
		BH COMPLETE													

QUANTITIES: Boring 6.00 m Bulks 3 Jars ..... U100 ..... CPT/SPT .....

Hours on Site

Boring and Sampling from	GL to 6.00	Hrs
Moves Between	RIG SET UP BH HC 90	Hrs
Delays	BACK FILL BH.	Hrs
Total		Hrs

Standing Time of Day Works

Reason	Hrs.

Chiselling

From	To	Hrs.

Drillers Signature

Supervisors Signature

Clients Representatives Signature

Remarks

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWANSTONE QUARRY | CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		5.50		
Depth Cased	—		5.50		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
				15 MIN.	
Depth Water Added	1.60			20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	5.50
BH Dia		
250 mm		
200 mm		
150 mm	—	5.50

Crew P ROBERTS N MENTO Hrs.

Contract No. 8717
Rig No. SM 4
Date 13.9.00
BH No. HC 91
Sheet No. 1 of
Weather Conditions DRY

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
GL	0.30	TOP SOIL	1.70	2.10	1	B									
			3.60	4.00	2	B									
0.30	1.60	FIRM TO SOFT BROWN SANDY CLAY													
1.60	5.10	SAND, MEDIUM, LARGE GRAVEL COARSE BROWN SAND + GRAVEL													
5.10	5.50	MARL													
				1.6 / 3.5	S+C										
		B/H COMPLETE													

QUANTITIES: Boring 5.50 m Bulks 2 Jars ..... U100 ..... CPT/SPT .....

Hours on Site		
	Boring and Sampling from GL to 5.50	Hrs
	Moves Between RIG SET UP B/H HC 91	Hrs
	Delays BACKFILL B/H	Hrs
	Total	Hrs

Standing Time of Day Works

Reason	Hrs.

Drillers Signature

Supervisors Signature

Chiselling

From	To	Hrs.

Clients Representatives Signature

Remarks

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWARKESTONE QUARRY

CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		5.80		
Depth Cased	—		5.50		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
				15 MIN.	
Depth Water Added	0.70			20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	5.50
BH Dia		
250 mm		
200 mm		
150 mm	—	5.80

Crew P ROBERTS D. MANTO Hrs.

Contract No. 317

Rig No. SA4

Date 14.9.00

BH No. HC92

Sheet No. 1 of

Weather Conditions WET

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
GL	0.30	TOP SOIL	1.00	1.40	1	B									
			3.00	3.40	2	B									
0.30	0.70	FIRM BROWN SANDY CLAY													
0.70	5.30	SAND, MEDIUM, LARGE GRAVEL COARSE BROWN SAND + GRIT													
5.30	5.80	MARL													
				0.7 4.6 S+C											
		BH COMPLETE													

QUANTITIES: Boring . 5.80 . . m Bulks . . . 2 . . . Jars . . . . . U100 . . . . . CPT/SPT . . . . . .

Hours on Site

Boring and Sampling from	GL to 5.80	Hrs
Moves Between	RIG SET UP BH HC92	Hrs
Delays	FROZEN BH	Hrs
Total		Hrs

Standing Time of Day Works

Reason	Hrs.

Drillers Signature

Supervisors Signature

Chiselling

From	To	Hrs.

Clients Representatives Signature

Remarks

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWANSTON QUARRY

CLIENT ZEALAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole			5.50		
Depth Cased			5.00		
Water Strike				Movement in the water level after strike. Level in Metres BGL	
Depth Cased				5 MIN.	
Depth Sealed				10 MIN.	
Depth Water Added	1.00			15 MIN.	
				20 MIN.	

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm		5.00
BH Dia		
250 mm		
200 mm		
150 mm		5.50

Crew P ROBERTS N. MINTO Hrs.

Contract No. 317

Rig No. SM4

Date 14.9.00

BH No. HC 93

Sheet No. 1 of

Weather Conditions WET

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
GL	0.30	TOP SOIL	1.20	1.60	1	B									
			3.20	3.60	2	B									
0.30	1.00	FIRM BROWN SANDY CLAY													
1.00	5.00	SMALL, MEDIUM, LARGE GRAVEL COARSE BROWN SAND + CLAY													
5.00	5.50	ROCK		1.0											
		BH COMPLETE		4.05.0											

QUANTITIES: Boring 5.50 m Bulks 2 Jars ..... U100 ..... CPT/SPT .....

Hours on Site		
	Boring and Sampling from GL to 5.50	Hrs
	Moves Between RC SET UP BH HC93	Hrs
	Delays BACK FOR BH	Hrs
	Total	Hrs

Standing Time of Day Works

Reason	Hrs.

Drillers Signature

Supervisors Signature

Remarks

Chiselling

From	To	Hrs.
4.50	5.00	1

Clients Representatives Signature

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

Allied Exploration & Geotechnics Ltd.

DAILY REPORT

LOCATION SWANKESTONE QUARRY | CLIENT REDLAND

Water Levels	Start of Day	Mid-day	End of Day	On Pulling Casing	24 Hrs After Pulling Casing
Depth to Water					
Depth of Borehole	—		5.00		
Depth Cased	—		4.50		
Water Strike					
Depth Cased					
Depth Sealed					
Depth Water Added	1.00				

Movement in the water level after strike. Level in Metres BGL

5 MIN.			
10 MIN.			
15 MIN.			
20 MIN.			

Casing Diameter	Depth Start of Day	Depth End of Day
250 mm		
200 mm		
150 mm	—	4.50
BH Dia		
250 mm		
200 mm		
150 mm	—	5.00

Crew: P ROBERTS, N. MENTO — Hrs.

Contract No. 3117
Rig No. SA4
Date 14.9.00
BH No. HC94
Sheet No. 1 of
Weather Conditions WET

Thickness of Strata Change From	To	DESCRIPTION OF STRATA Consistency - Colour - Soil Type	DEPTH TAKEN/DRIVEN From	To	SAMPLES No.	Type	Jar Tube No	U100 Length Recovered	Blows	SPT/CPT BLOWS 150 mm	75 mm	75 mm	75 mm	75 mm	S/C
GL	0.30	TOP SOIL	1.10	1.50	1	B									
			3.10	3.50	2	B									
0.30	0.90	FIRM BROWN SANDY CLAY													
0.90	4.40	SAND, MEDIUM, LARGE GRAVEL, COBBLES BROWN SAND + GRIT													
4.40	5.00	GRIT & ROCK - BROWN MARL													
		BH COMPLETE		0.9											
				3.5 S+U											

QUANTITIES: Boring 5.00 m Bulks 2 Jars ..... U100 ..... CPT/SPT .....

Hours on Site

Boring and Sampling from	GL to 5.00	Hrs
Moves Between	RIG SET UP ON HC94	Hrs
Delays	BACK FOR BH	Hrs
Total		Hrs

Standing Time of Day Works

Reason	Hrs.

Chiselling

From	To	Hrs.

Drillers Signature

Supervisors Signature

Clients Representatives Signature

Remarks

Key: W = Water Sample. SPT CPT = Insitu Penetration Test. S = Spoon. C = Cone.
U100 = Undisturbed. J = Small Disturbed (jar) Sample. B = Bulk Disturbed Sample.

BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-2
Elevation mAOD: NOT SURVEYED		SCALE: 1:40
Borehole Easting: 32465	Borehole Northing: 28089	
Drilling Rig\Method: HE50 - 8" CONTINUOUS FLIGHT AUGERING		
Logged by: CRAIG ARDITTO		Date: 22/9/97

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		0.00		0.80	TOPSOIL	Brown, clayey to fim and stiff clay.
0.80		-0.80		0.90	CLAY	Grey, very stiff. Damp.
1.70		-1.70		0.70	SILT	Dark grey, clayey silt, passing into wet sandy gravelly silt.
2.40		-2.40	WL	0.60	SAND & GRAVEL	Dark grey, very silty, medium fine, grained sand. Approx 15% gravel increasing to 30% from 2.7m. Max size 60mm. Wet 2.4m.
3.00		-3.00		1.30	SAND & GRAVEL	Grey, very silty, fine grained, slightly gritty, sand. Approx. 50% fine to medium gravel up to 35mm. Saturated.
4.30		-4.30		0.20	CLAY	Brown/grey stiff clay with organic peaty layers at base.
4.50		-4.50		1.50	SILTSTONE	Brown, mottled grey in places, becoming red very stiff clay/siltstone?
6.00		-6.00			End of hole at 6.00 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-3	
Elevation mAOD: NOT SURVEYED		SCALE: 1:40
Borehole Easting: 32473	Borehole Northing: 28357	
Drilling Rig\Method: HE50 - 8" CONTINUOUS FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 22/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		0.00		0.50	TOPSOIL	Brown, clayey, Topsoil.
0.50		-0.50		1.20	CLAY	Brown mottled grey, firm to stiff, clay.
1.70		-1.70		1.10	CLAY	Grey, very stiff, organic rich, clay (Alluvium).
2.80		-2.80	WL	0.20	CLAY	Grey, stiff and gravelly clay, interbedded with brown clay.
3.00		-3.00		0.70	SAND WITH GRAVEL	Grey, very silty and clayey, medium/fine, sand with gravel.
3.70		-3.70		0.50	GRAVELLY CLAY	Brown and grey, very stiff, claybound sandy gravel.
4.20		-4.20		0.30	GRAVELLY CLAY	Reddish brown, gravelly, clay.
4.50		-4.50		0.70	CLAY	Brown, firm to stiff, clay.
5.20		-5.20		0.80	SILT	Pale bluish Grey, very stiff, silt.
6.00		-6.00			End of hole at 6.00 metres.	

Add. Comments :

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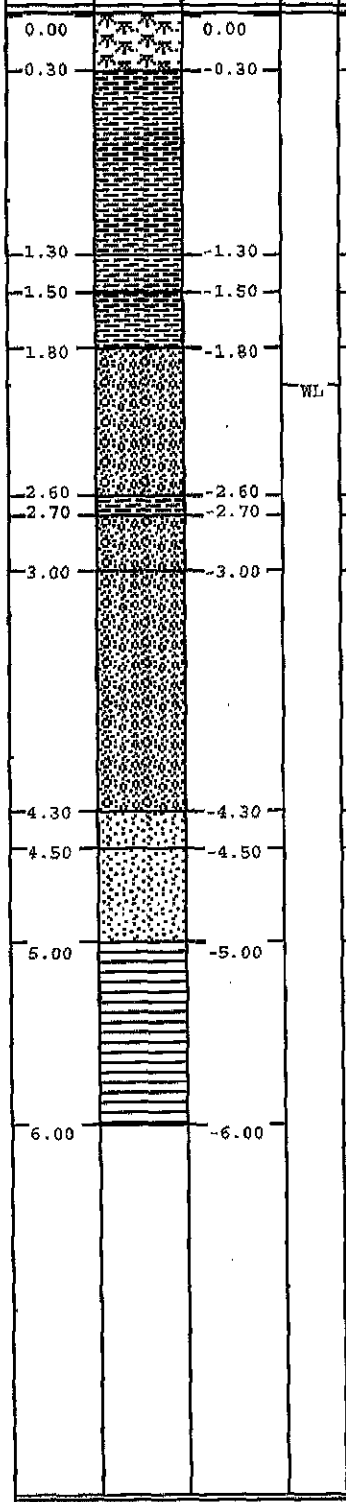
BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-4	
Elevation mAOD: NOT SURVEYED	SCALE: 1:40	
Borehole Easting: 32612	Borehole Northing: 28251	
Drilling Rig\Method: HE50 - 8" CONTINUOUS FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 23/9/97	



Depth m	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00	0.00		0.30	TOPSOIL	Brown, clayey to ploughed depth.
-0.30	-0.30		1.00	CLAY	Orangish brown, very firm.
-1.30	-1.30		0.20	CLAY	Grey, slightly sandy.
-1.50	-1.50		0.30	CLAY	Brown, gravelly.
-1.80	-1.80	WL	0.80	SAND & GRAVEL	Orangish brown, silty and slightly clayey, fine to fine medium grained sand with some grit. Approx 50% fine to coarse quartzitic, rounded gravel. Wet from approx. 2m.
-2.60	-2.60		0.10	CLAY	Brown, stiff.
-2.70	-2.70		0.30	SAND & GRAVEL	Brown, slightly silty, fine medium to medium grained sand with some grit. Approx 50 to 60% fine to coarse rounded gravel. Some oversize. Wet.
-3.00	-3.00		1.30	SAND & GRAVEL	Brown/grey brown, slightly silty, medium gritty sand. Approx 50% fine to coarse, rounded gravel up to 60mm. Predominantly -20mm. Saturated.
-4.30	-4.30		0.20	SAND	Brown, slightly silty, fine to medium grained sand with some grit.. (Difficult to assess sample due to vast volumes of water).
-4.50	-4.50		0.50	SAND	Brown, silty sand with possible gravel? (Due to large volumes of water and clay winding up auger - most of sample lost).
-5.00	-5.00		1.00	CLAY/MUDSTONE	Reddish brown, mottled grey clayey, mudstone.
-6.00	-6.00			End of hole at 6.00 metres.	

Add. Comments :

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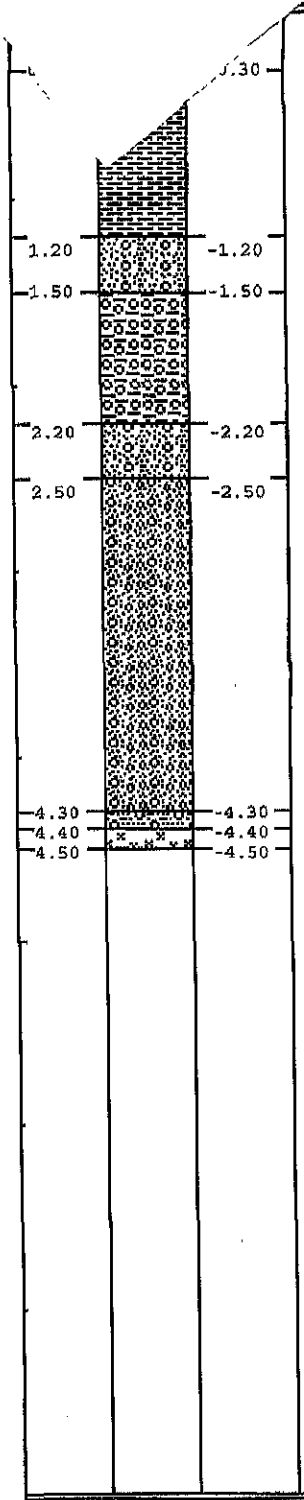
BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site:-REPTON	Borehole No: REP97-5	
		SCALE: 1:40
	Borehole Northing: 28103	
	HE50 - 8" CONTINUOUS FLIGHT AUGERING	
	RDITTO	Date: 23/9/97



nick m	CLASS.	FIELD DESCRIPTION
0.30	TOPSOIL	Brown, clayey.
0.90	CLAY	Orangish brown, firm, silty, clay.
		Grey at first, clayey + organic rich becoming greyish brown silty + slightly clayey, fine to fine medium, sand. 20-30% fine to medium, rounded, gravel.
0.30	SAND WITH GRAVEL	
0.70	HOGGIN	Brown, firm, claybound gravel.
0.30	SAND WITH GRAVEL	Greyish brown, silty and clayey, fine to fine medium, gritty, sand. 20% rounded, gravel.
1.80	SAND & GRAVEL	Brown, slightly silty, fine to medium and gritty, rounded sand. Approx 50-60% fine to coarse rounded gravel with some oversize.
	SILTY SAND AND GRAVEL	Grey, silty becoming clayey, sand and gravel. (Dubious material).
0.10	SILT	Grey mottled, greyish green, very stiff, sandy silt. (Drilling becomes stiff).
0.10	End of hole at 4.50 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-6	
Elevation mAOD: NOT SURVEYED		SCALE: 1:40
Borehole Easting: 32649	Borehole Northing: 27975	
Drilling Rig\Method: HE50 - 8" CONTINUOUS FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 23/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		0.00		0.30	TOPSOIL	Brown, clayey topsoil.
-0.30		-0.30		1.90	CLAY	Brown mottled grey, very stiff, clay.Lignite present.
2.20		-2.20		0.30	CLAY	Grey, firm, pure clay. Damp.
2.50		-2.50	WL	0.40	SAND WITH GRAVEL	Grey, very silty and slightly clayey, fine to fine medium, gritty, sand. 10-20% fine to medium, gravel. Wet.
-2.90		-2.90		0.40	CLAY	Red brown, very stiff, clay.
3.30		-3.30		0.90	SAND & GRAVEL	Grey, silty, fine to fine medium, sand. 50% rounded, gravel.
-4.20		-4.20		0.30	SILT	Red brown, stiff clay, passing into pale grey, firm clayey, silt.
-4.50		-4.50			End of hole at 4.50 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-7	
Elevation mAOD: NOT SURVEYED	SCALE: 1:40	
Borehole Easting: 32772	Borehole Northing: 27779	
Drilling Rig\Method: HE50 - 8" CONTINUOUS FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 23/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		0.00		0.30	TOPSOIL	Brown, clayey, topsoil. (Ploughed).
0.30		-0.30		0.80	CLAY	Orangish brown, firm silty, clay.
1.10		-1.10		0.40	CLAY	Greyish brown, firm sandy, slightly gravelly, clay.
1.50		-1.50		0.60	SAND AND GRAVEL	Reddish brown, clayey, sand. 30% gravel.
2.10		-2.10		2.10	SAND AND GRAVEL	Brown, slightly silty to silty, medium fine to medium grained sand with some grit. Approx 40-60% rounded gravel predominantly -20mm, up to 60mm returned. Some +25mm lost during drilling.
4.20		-4.20		0.30	CLAY	Reddish brown mottled grey, firm, clay.
4.50		-4.50			End of hole at 4.50 metres.	

Add. Comments :

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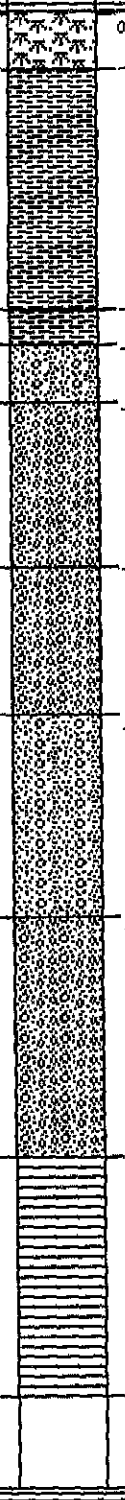
BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-8	
Elevation mAOD: NOT SURVEYED		SCALE: 1:40
Borehole Easting: 32375	Borehole Northing: 27708	
Drilling Rig\Method: HE50 - 8" CONTINUOUS FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 23/9/97	



Depth m	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00	0.00		0.30	TOPSOIL	Brown, clayey.
-0.30	-0.30		1.30	CLAY	Reddish brown, very stiff, clay.
-1.60	-1.60	WL	0.20	CLAY	Brown, stiff, clay. Wet from 1.6m.
-1.80	-1.80		0.30	SAND WITH GRAVEL	Grey, very clayey, sand with some gravel.
-2.10	-2.10		0.90	SAND AND GRAVEL	Grey, silty/clayey, fine to fine medium, sand. 20-30% fine to medium, gravel.
-3.00	-3.00		0.80	SAND AND GRAVEL	Grey, silty, fine to fine medium, gritty, sand. Approx 40% fine to medium, gravel.
-3.80	-3.80		1.10	SAND WITH GRAVEL	Reddish brown, claybound, fine to fine medium grained sand. Some gravel with depth.
-4.90	-4.90		1.30	SAND & GRAVEL	Brown, slightly silty to silty, fine to fine medium, grained sand with some grit. Approx 50% fine to coarse, rounded, gravel predominantly -20mm. Up to 35mm returned. (Large % of fines being washed off augers).
-6.20	-6.20		1.30	MUDSTONE	Brown, mottled grey, very stiff, Mudstone. (+grey silt).
-7.50	-7.50			End of hole at 7.50 metres.	

Add. Comments :

Tarmac Quarry Products - Geology & Land Survey Dept (Midland Division)

BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-9	
Elevation mAOD: NOT SURVEYED	SCALE: 1:40	
Borehole Easting: 32562	Borehole Northing: 27589	
Drilling Rig\Method: HE50 - 8" CONTINUOUS FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 23/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		0.00		0.30	TOPSOIL	Brown, clayey, ploughed, topsoil.
-0.30		-0.30		0.90	CLAY	Orange brown, firm, sandy, clay.
1.20		-1.20		0.50	CLAY	Brown, mottled grey and black, soft, sandy clay. Lignite present. Damp.
-1.70		-1.70	WL	0.60	CLAY	Grey, firm, sandy, clay. Wet from 1.9m.
2.30		-2.30		3.60	SAND AND GRAVEL	Brown, slightly silty, medium fine to medium, gritty, sand. Approx 50% fine to coarse, rounded, gravel predominantly 20-25mm. Up to 50mm returned.
5.90		-5.90		0.10	MUDSTONE	Reddish brown, stiff, mudstone.
6.00		-6.00			End of hole at 6.00 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-10	
Elevation mAOD: NOT SURVEYED	SCALE: 1:40	
Borehole Easting: 32749	Borehole Northing: 27575	
Drilling Rig\Method: HE50 - 8" CONTINUOUS FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 23/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		0.00	WL	0.30	TOPSOIL	Brown, clayey.
-0.30		-0.30		0.50	CLAY	Brown, sandy, clay.
-0.80		-0.80		0.70	SAND	Brown, clean, medium fine to fine medium, sand. Some gravel near base.
-1.50		-1.50		0.20	CLAY	Brown, sandy, clay.
-1.70		-1.70		0.80	SAND & GRAVEL	Brown, slightly silty, medium fine to fine medium, slightly gritty, sand. Approx 50-60% fine to coarse, rounded, gravel predominantly <20mm. Up to 40mm returned.
					CLAY	Grey, clay band ?
-2.50		-2.50		0.10	SAND & GRAVEL	Dark grey, slightly silty, medium fine to fine medium, grained sand. Approx 50% fine to coarse + o/s, rounded, gravel predominantly -20mm. Some oversize , up to 70mm returned .
-4.50		-4.50		1.90	SAND & GRAVEL	Greyish brown, slightly silty, medium fine to fine medium, grained sand. Approx 50% fine to coarse rounded, gravel predominantly -15mm. Up to 30mm returned.
-6.00		-6.00		1.50	CLAY	Redish brown, firm, sandy, clay.
-6.50		-6.50		0.50	CLAY	Reddish brown, mottled grey, stiff, clay.
-7.50		-7.50		1.00	End of hole at 7.50 metres.	

Add. Comments :

Tarmac Quarry Products - Geology & Land Survey Dept (Midland Division)

BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-11	
Elevation mAOD: NOT SURVEYED		SCALE: 1:40
Borehole Easting: 32683	Borehole Northing: 27359	
Drilling Rig\Method: HE50 - 8" CONTINUOUS FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 23/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		0.00	WL	0.30	TOPSOIL	Brown, clayey.
-0.30		-0.30		1.10	CLAY	Brown/Orange brown, firm, slightly sandy clay. Becoming gravelly in last 20cm.
-1.40		-1.40			SAND & GRAVEL	Brown, slightly clayey to clayey, fine medium to medium, grained sand. Approx 50%, fine to coarse rounded, gravel with some oversize. Up to 50mm returned.
-1.50		-1.50		0.10		
				0.20	HOGGIN	Brown, claybound gravel.
-1.70		-1.70		0.50	SAND & GRAVEL	Brown, clayey (to very clayey?), medium fine to fine medium, grained sand. Approx 50% fine to coarse rounded, gravel predominantly -20mm. Some cobbles up to 70mm returned.
-2.20		-2.20		3.70	SAND & GRAVEL	Greyish brown, clean to slightly silty, medium fine to fine medium, gritty, sand. Approx 50% fine to coarse rounded, gravel. Numerous large cobbles upto 70mm.
-5.90		-5.90		0.10	SAND	Brown, clean, medium fine to fine medium, sand.
-6.00		-6.00		0.90	SAND AND GRAVEL	Brown, silty, medium fine to fine medium, grained sand. Approx 20-40%, fine gravel.
-6.90		-6.90		0.60	MUDSTONE	Red brown, claybound gravel, quickly (20cm) passing into very stiff, red, mottled grey, mudstone, and grey sandy silt.
-7.50		-7.50			End of hole at 7.50 metres.	

Add. Comments :

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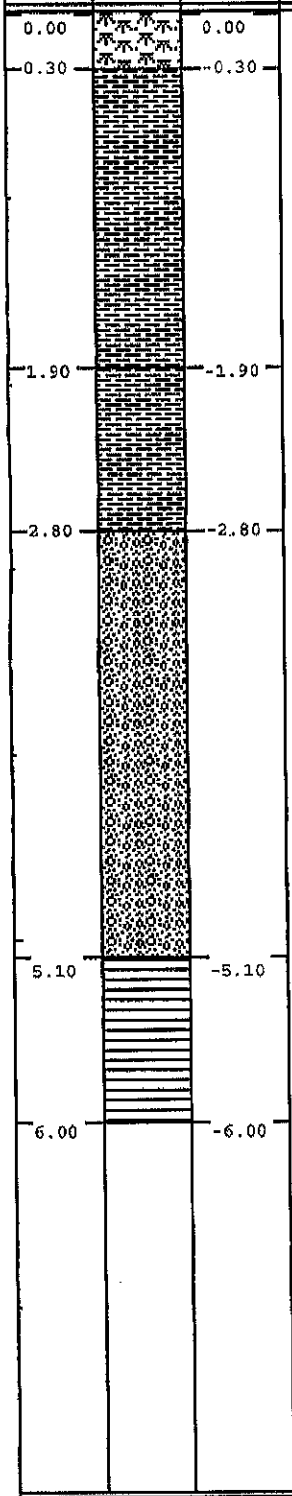
BOREHOLE LOG	Region: YORKS.& EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-12	
Elevation mAOD: NOT SURVEYED	SCALE: 1:40	
Borehole Easting: 32411	Borehole Northing: 27416	
Drilling Rig\Method: HE50 - 8" CONTINUOUS FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 23/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		0.00	WL	0.30	TOPSOIL	Brown, clayey.
0.30		-0.30		1.00	CLAY	Orange brown, stiff, clay.
1.30		-1.30		0.90	CLAY	Grey, firm, damp clay becoming sandy and gravelly in last 40cm. Wet.
2.20		-2.20		2.30	SAND AND GRAVEL	Brown, slightly silty, medium fine to fine medium, gritty, sand. Approx 50% fine to coarse, rounded, gravel.
4.50		-4.50		2.50	SAND AND GRAVEL	Brown, slightly silty, medium fine to fine medium, gritty, sand. Approx 40% fine to coarse, rounded, gravel.
7.00		-7.00		0.30	HOGGIN	Reddish brown, soft, clayey gravel.
7.30		-7.30		0.20	MUDSTONE	Red brown, mottled grey, stiff, mudstone.
7.50		-7.50			End of hole at 7.50 metres.	

Add. Comments :

Tarmac Quarry Products - Geology & Land Survey Dept (Midland Division)

BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-36	
Elevation mAOD: NOT SURVEYED	SCALE: 1:40	
Borehole Easting: 31782	Borehole Northing: 28402	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 26/9/97	



Depth m	Legend	Level m	WL m	CLASS.	FIELD DESCRIPTION
0.00		0.00		TOPSOIL	
0.30		0.30		CLAY	Red mottled grey and black, stiff, clay.
1.90		1.90		CLAY	Grey, firm, sandy clay with gravel in places.
2.80		2.80		SAND & GRAVEL	Grey, slightly silty, medium, gritty, sand. Approx 40%, fine to medium rounded, gravel.
5.10		5.10		MUDSTONE	
6.00		6.00		End of hole at 6.00 metres.	

Add. Comments :

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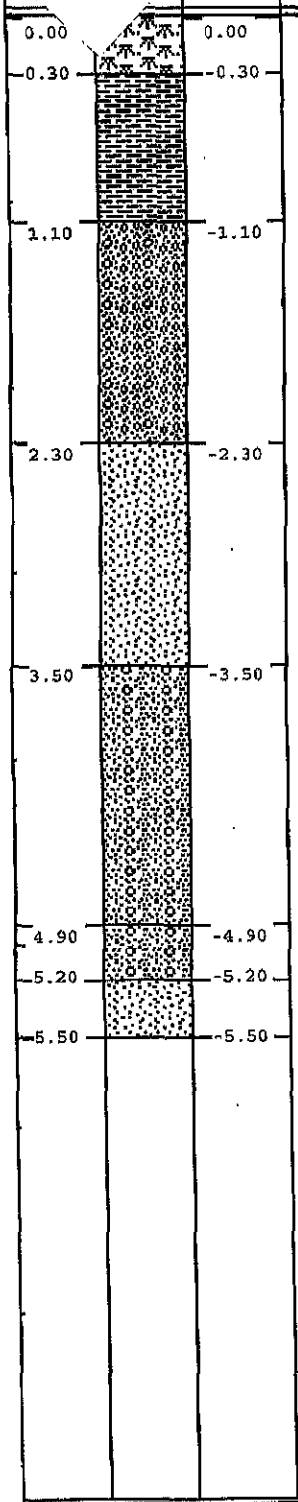
BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
		Borehole No: REP97-37
D: NOT SURVEYED		SCALE: 1:40
ting: 32833	Borehole Northing: 27085	
g\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
CRAIG ARDITTO		Date: 29/9/97



Level m	WL m	CLASS.	FIELD DESCRIPTION
0.00	0.00	TOPSOIL	
-0.30	-0.30	CLAY.	Brown, sandy, gravelly, clay
1.10	-1.10	SAND AND GRAVEL	Brown, slightly silty to silty, fine medium, sand. Approx 25-40%, fine to coarse, sub rounded to rounded, gravel. Average 10-15mm, up to 30mm max.
2.30	-2.30	SAND	Brown, clean to slightly silty, fine medium and medium, gritty, sand.
3.50	-3.50	SAND WITH GRAVEL	Brown, clean to slightly silty, fine medium to medium, gritty, sand. Approx 20%, fine to coarse rounded, gravel with some cobbles. Fines washed out of sample - unrepresentative.
4.90	-4.90	SAND WITH GRAVEL	Grey, silty, fine medium, sand with gravel.
5.20	-5.20	SAND?	Grey, medium fine, silty, sand.
5.50	-5.50	End of hole at 5.50 metres.	

Add. Comments :

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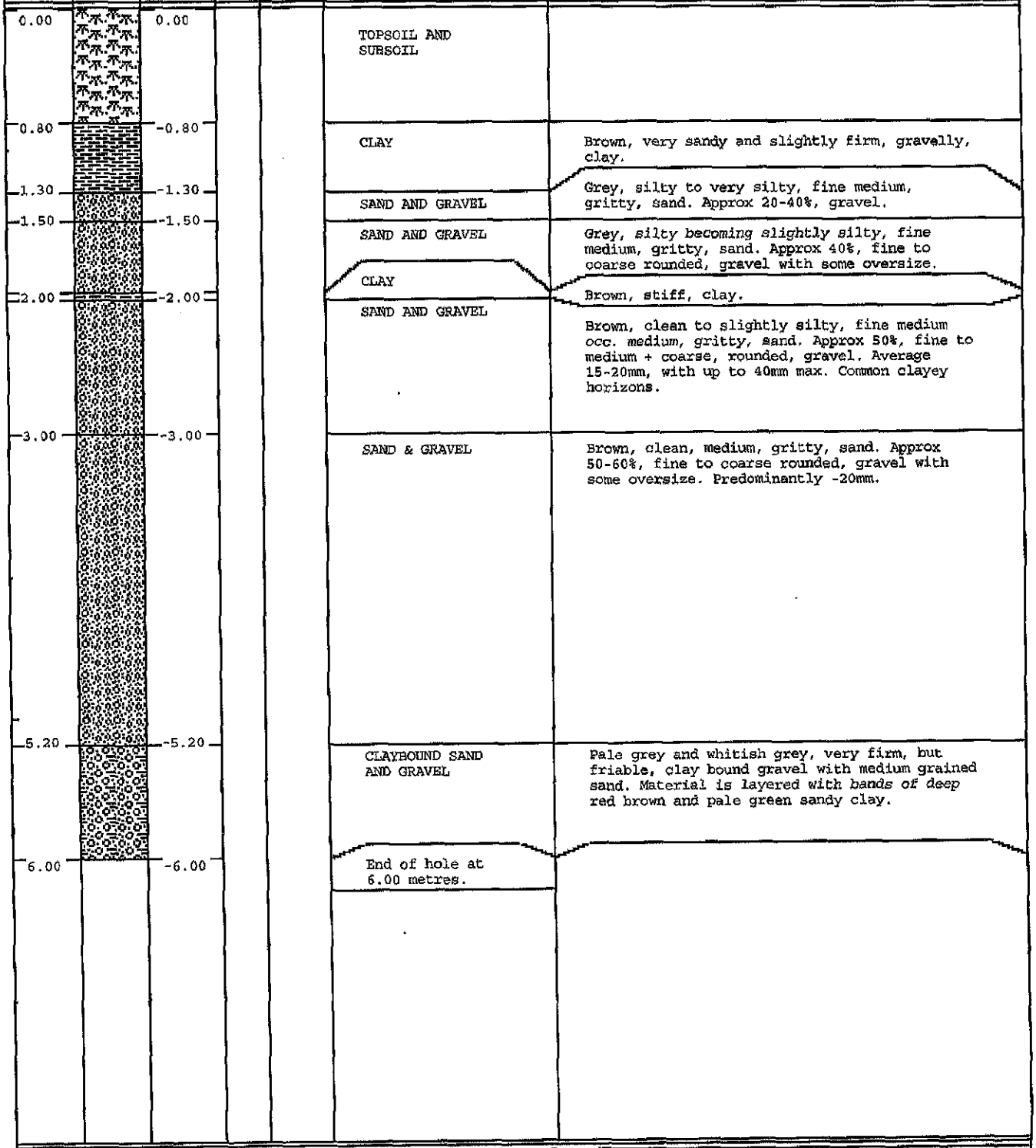
BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-38
Elevation mAOD: NOT SURVEYED		SCALE: 1:40
Borehole Easting: 33075	Borehole Northing: 27107	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 29/9/97	



Depth m	Legend	Level m	WL m	CLASS.	FIELD DESCRIPTION
0.00		0.00		TOPSOIL AND SUBSOIL	
0.80		-0.80		CLAY	Brown, very sandy and slightly firm, gravelly, clay.
1.30		-1.30		SAND AND GRAVEL	Grey, silty to very silty, fine medium, gritty, sand. Approx 20-40%, gravel.
1.50		-1.50		SAND AND GRAVEL	Grey, silty becoming slightly silty, fine medium, gritty, sand. Approx 40%, fine to coarse rounded, gravel with some oversize.
				CLAY	Brown, stiff, clay.
2.00		-2.00		SAND AND GRAVEL	Brown, clean to slightly silty, fine medium occ. medium, gritty, sand. Approx 50%, fine to medium + coarse, rounded, gravel. Average 15-20mm, with up to 40mm max. Common clayey horizons.
3.00		-3.00		SAND & GRAVEL	Brown, clean, medium, gritty, sand. Approx 50-60%, fine to coarse rounded, gravel with some oversize. Predominantly -20mm.
5.20		-5.20		CLAYBOUND SAND AND GRAVEL	Pale grey and whitish grey, very firm, but friable, clay bound gravel with medium grained sand. Material is layered with bands of deep red brown and pale green sandy clay.
6.00		-6.00		End of hole at 6.00 metres.	

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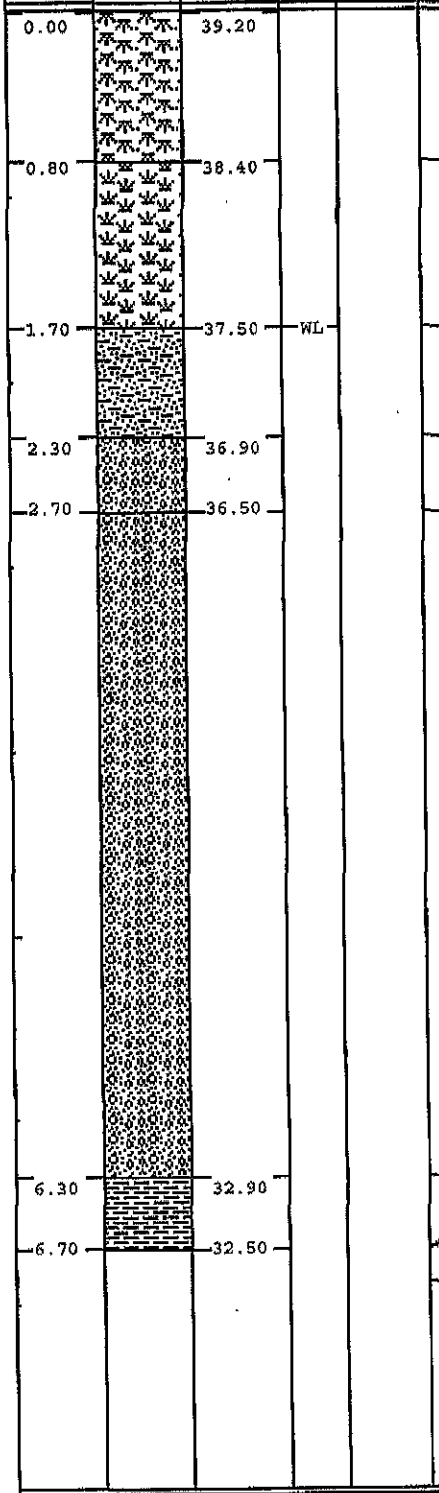
BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-39
Elevation mAOD: 39.20		SCALE: 1:40
Borehole Easting: 33095	Borehole Northing: 27348	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 29/9/97	



Depth m	Level m	WL m	CLASS.	FIELD DESCRIPTION
0.00	39.20		TOPSOIL AND SUBSOIL	
0.80	38.40		PEAT	Grey peat, with abundant wood bits.
1.70	37.50	WL	CLAYBOUND SAND	Grey, claybound sand, becoming sand and gravel. W.T 1.7m
2.30	36.90		SAND & GRAVEL	Grey, slightly silty to silty, medium, gritty, sand. Approx 40-50%, gravel.
2.70	36.50		SAND & GRAVEL	Thin brown, firm, clay to 3.0m followed by brown to grey, clean, medium, gritty, sand. Approx 50-60%, fine to coarse, rounded, gravel. Average approx. 15mm, up to 60mm max.
6.30	32.90		CLAY	Pale grey, finely banded sandy, occ. gravelly, stiff, clay.
6.70	32.50		End of hole at 6.70 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-40
Elevation mAOD: 39.66		SCALE: 1:40
Borehole Easting: 32860	Borehole Northing: 27414	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO		Date: 29/9/97

Depth m	Legend	Level m	WL m	CLASS.	FIELD DESCRIPTION
0.00		39.66		TOPSOIL	Brown, gravelly, sandy, clayey, topsoil.
0.30		39.36		SUBSOIL	Brown, stiff, sandy, subsoil.
1.20		38.46		CLAY	Brown, mottled grey, very stiff, clay.
2.20		37.46		CLAY	Dark grey, very stiff becoming firm, peaty and wood rich, clay.
2.50		37.16		PEAT	Dark grey, peat. Damp.
2.70		36.96	WL	CLAY	Brown, very stiff, plastic clay. Damp.
2.80		36.86		SAND & GRAVEL	Grey, silty, fine medium, gritty, sand. Apprx 40-50% fine to coarse rounded, gravel with some oversize. Cobbles from 4.0-4.5m. Sample badly contaminated by overlying clay.
5.70		33.96		SILTSTONE	Pale grey, stiff sandy silt, becoming sandy silt and very hard bands of red siltstone.
6.00		33.66		End of hole at 6.00 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-41	
Elevation mAOD: 39.36		SCALE: 1:40
Borehole Easting: 32905	Borehole Northing: 27607	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 29/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		39.36		0.50	TOPSOIL AND SUBSOIL	Orange brown. Dry.
0.50		38.86		0.90	CLAY	Brown, mottled grey, stiff, occassional sandy, clay.
1.40		37.96		0.60	CLAY	Light grey, firm sandy clay becoming slightly gravelly from 1.5m. Damp.
2.00		37.36		0.20	CLAY	Grey, gravelly, clay.
2.20		37.16	WL	4.00	GRAVEL WITH SAND	Grey, medium sand. Approx 80% ? fine to coarse rounded gravel predominantly -20mm. Up to 45mm returned. Possibly some sand washed off auger as very wet. Some clay contamination.
6.20		33.16		0.30	MUDSTONE	Red brown and grey, stiff, mudstone.
6.50		32.86			End of hole at 6.50 metres.	

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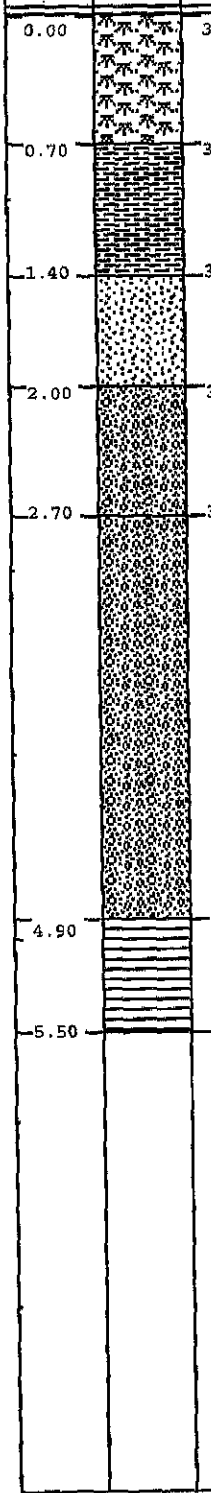
BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-42
Elevation mAOD: 39.46		SCALE: 1:40
Borehole Easting: 32980	Borehole Northing: 27747	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 29/9/97	



Depth m	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00	39.46		0.70	TOPSOIL AND SUBSOIL	Orange brown.
0.70	38.76		0.70	CLAY	Brown, firm, clay.
1.40	38.06		0.60	SAND	Brown, silty medium fine, sand with some clay.
2.00	37.46		0.70	SAND & GRAVEL	Brown, slightly silty to silty, fine medium becoming medium, slightly gritty, sand. Approx 50-60 % fine to coarse rounded, gravel with some oversize.
2.70	36.76		2.20	SAND & GRAVEL	Grey, slightly silty, fine medium to medium from 3.0, gritty, sand. Approx 60% rounded, gravel. Some fines washed out off sample and clay contamination from above.
4.90	34.56		0.60	MUDSTONE	Layered grey, green and brown, stiff, mudstone.
5.50	33.96			End of hole at 5.50 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-43	
Elevation mAOD: 38.86	SCALE: 1:40	
Borehole Easting: 33748	Borehole Northing: 27681	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 30/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		38.86			TOPSOIL AND SUBSOIL	Brown clayey subsoil. Dry and crumbly.
				1.30		
1.30		37.56			CLAY	Brown, becoming grey firm, clay. Damp.
				0.50		
1.80		37.06			CLAY	Grey, firm, sandy gravelly clay, becoming clayey sand and gravel.
				0.40		
2.20		36.66			SAND AND GRAVEL	Grey, clean to slightly silty, medium, gritty, sand. Approx 60% fine to coarse, rounded, gravel. Predominantly -40mm.
				3.70		
5.90		32.96		0.10	SANDSTONE	Very pale, whitish grey, soft becoming very stiff, fine to medium fine, slightly clayey, sandstone.
6.00		32.86			End of hole at 6.00 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-44	
Elevation mAOD: 39.42		SCALE: 1:40
Borehole Easting: 33729	Borehole Northing: 27882	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 30/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		39.42		1.30	TOPSOIL AND SUBSOIL	Orangish brown, sandy, topsoil and subsoil
1.30		38.12		0.90	SAND	Orangish brown, slightly clayey, medium fine to coarse fine, sand, becoming increasingly gravelly from 1.6m.
2.20		37.22		3.40	SAND & GRAVEL	Grey brown, clean to slightly silty, medium, gritty, sand. Approx. 50%, fine to coarse a rounded, gravel. predominantly -20mm, with up to 50mm returned.
5.60		33.82		0.40	CONGLOMERATE	Whitish grey, slightly clayey, fine sandy conglmorerate with 20-30%, fine to coarse rounded, gravel. Hard to drill.
6.00		33.42			End of hole at 6.00 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-45
Elevation mAOD: 39.39		SCALE: 1:40
Borehole Easting: 33538	Borehole Northing: 27878	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 30/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		39.39				
				0.30	TOPSOIL	
-0.30		39.09				
					CLAY	Orange brown, sandy, clay.
				0.90		
1.20		38.19		0.20	SAND	Orange brown, slightly silty, medium fine to coarse fine, sand.
-1.40		37.99				
-1.50		37.89		0.10	SAND	Grey, clayey, silty, sand.
				0.40	CLAY	Brown, sandy, gravelly, clay, becoming claybound sand and gravel.
1.90		37.49				
					SAND & GRAVEL	Orange brown, slightly silty, medium, gritty, sand. Approx 40-50%, fine to coarse, rounded, gravel.
				0.70		
2.60		36.79				
					SAND & GRAVEL	Grey, clean to slightly silty, medium, very gritty, sand. Approx 50%, fine to coarse rounded, gravel. predominantly -20mm up to 60mm max.
				2.20		
4.80		34.59				
					CONGLOMERATE	Greenish grey becoming very pale grey, silty and slightly clayey gritty, conglomerate. Stiff drilling.
				1.20		
6.00		33.39			End of hole at 6.00 metres.	

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-46
Elevation mAOD: 39.18		SCALE: 1:40
Borehole Easting: 33517	Borehole Northing: 27739	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO		Date: 30/9/97

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		39.18		1.00	TOPSOIL AND SUBSOIL	Brown and clayey subsoil.
1.00		38.18		0.40	CLAY	Brown, stiff, clay. Damp.
1.40		37.78			SAND	Grey, slightly silty, medium, sand. Damp to wet.
1.50		37.68	WL	0.10	CLAY	Brown, sandy, gravelly, clay, becoming claybound sand & gravel.
2.00		37.18		3.10	SAND & GRAVEL	Brown/Orangish brown, slightly silty, medium, gritty, sand. Approx 40-50%, rounded, gravel.
5.10		34.08		1.20	CONGLOMERATE ?	Pale grey, slightly clayey, coarse fine, sand. Approx 20-40% fine to coarse, gravel. Very hard drilling possibly reworked bedrock.
6.30		32.88			End of hole at 6.30 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-47
Elevation mAOD: 39.53		SCALE: 1:40
Borehole Easting: 33358	Borehole Northing: 27839	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO		Date: 30/9/97

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		39.53		0.30	TOPSOIL	
0.30		39.23		0.90	CLAY	Brown, firm, slightly sandy, clay.
1.20		38.33	WL	0.80	CLAY	Brown, sandy, clay. Damp, wet from 1.5m.
2.00		37.53		0.30	CLAY	Brown, sandy, gravelly, clay becoming a claybound sand & gravel.
2.30		37.23		3.10	SAND & GRAVEL	Brown, slightly silty, fine medium, (medium from 3.8), slightly gritty, sand. Approx 50%, fine to coarse, rounded, gravel. Average 10mm-15mm, up to 30-35mm. From 3.0 contamination of silts from above.
5.40		34.13		0.40	CONGLOMERATE	Reddish and grey, extremely stiff, claybound, sand and gravel.
5.80		33.73			End of hole at 5.80 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-48
Elevation mAOD: 39.38		SCALE: 1:40
Borehole Easting: 33189.	Borehole Northing: 27739	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 30/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		39.38		0.30	TOPSOIL	
0.30		39.08		1.80	CLAY	Brown, mottled grey black, stiff, clay. Damp-1.5-very plastic.
2.10		37.28		0.20	CLAY	Mid grey, very firm, sandy, clay.
2.30		37.08		0.60	CLAY	Very dark blueish grey to black, "peaty", organic rich, soft to firm clay becoming gravelly towards 2.9m.
2.90		36.48			SAND & GRAVEL	Dark grey, clayey, sand and gravel.
3.00		36.38		2.00	SAND AND GRAVEL	Grey, gritty, sand. Approx 50%, gravel. Majority of sample washed off auger and contaminated from above.
5.00		34.38		0.40	CLAYEY SAND & GRAVEL	Possible base of deposit as very drilling.
5.40		33.98		0.30	SILTSTONE	Grey and red, extremely stiff, siltstone.
5.70		33.68			End of hole at 5.70 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-49
Elevation mAOD: 39.17		SCALE: 1:40
Borehole Easting: 33244	Borehole Northing: 27588	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO		Date: 30/9/97

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		39.17				
				0.30	TOPSOIL	
0.30		38.87				
					CLAY	Brown, mottled grey and black, plastic clay. Damp.
				1.20		
1.50		37.67				
				0.20	CLAY	Grey, stiff, pure clay.
1.70		37.47				
					CLAY.	Grey, firm to soft, woody and peaty, clay.
				1.10		
2.80		36.37			CLAY	Grey, sand and gravelly, clay.
2.90		36.27		0.10		
					SAND & GRAVEL	Grey, becoming brown, clean, medium, gritty, sand. Approx 40-50% fine to coarse rounded, gravel predominantly -20mm, up to 40mm max. Wet.
				2.30		
5.20		33.97				
					CONGLOMERATE	Pale grey, firm becoming extremely stiff, clayey sand and gravel.
				0.50		
5.70		33.47			End of hole at 5.70 metres.	

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-50
Elevation mAOD: 39.55		SCALE: 1:40
Borehole Easting: 33075	Borehole Northing: 27524	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO		Date: 30/9/97

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		39.55		0.80	TOPSOIL AND SUBSOIL	Red, clayey subsoil.
0.80		38.75		1.20	CLAY	Brown, mottled grey and black, stiff, plastic clay becoming slightly gravelly and sandy from 1.5m.
2.00		37.55		0.40	CLAY	Grey, sandy, gravelly, clay.
2.40		37.15		0.20	SAND	Brown, slightly silty, fine medium, sand.
2.60		36.95		3.60	SAND AND GRAVEL	Brown, clean to slightly silty, medium, gritty, sand. Approx 30-40%, fine to coarse gravel averaging 15mm with up to 70mm.
6.20		33.35		0.30	SILTSTONE AND SANDSTONE	Pale grey, stiff to extremely stiff, siltstone, and fine sandstone.
6.50		33.05			End of hole at 6.50 metres.	

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-51
Elevation mAOD: 39.11		SCALE: 1:40
Borehole Easting: 33358	Borehole Northing: 27412	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO		Date: 30/9/97

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		39.11				
				0.80	TOPSOIL AND SUBSOIL	Brown clayey subsoil.
0.80		38.31				
				0.60	CLAY	Brown, stiff, plastic clay.
1.40		37.71				
				1.00	CLAY	Grey, stiff, clay.
2.40		36.71		0.10	SAND	Grey, clean, coarse fine to fine medium, sand.
2.50		36.61				
				0.30	CLAY	Grey, firm, sandy, clay, becoming clayey sand and gravel.
2.80		36.31				
				3.40	SAND & GRAVEL	Grey, clean to slightly silty, medium, gritty, sand. Approx 60% fine to coarse rounded, gravel.
6.20		32.91				
				0.60	SILTSTONE	Grey, extremely stiff, siltstone.
6.80		32.31			End of hole at 6.80 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-52
Elevation mAOD: 39.05		SCALE: 1:40
Borehole Easting: 33273	Borehole Northing: 27258	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO		Date: 30/9/97

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		39.05		0.80	TOPSOIL	Orange brown, clayey topsoil and subsoil.
0.80		38.25		0.40	CLAY	Orange brown, stiff, plastic, clay.
1.20		37.85		1.10	CLAY	Grey, stiff to firm clay, with gravel from 1.5m. Becoming claybound sand and gravel from 2.1m.
2.30		36.75		3.70	SAND AND GRAVEL	Grey, slightly silty, medium, gritty, sand. Approx 50-60%, fine to coarse rounded, gravel averaging 10mm with some cobbles up 50mm. Wet.
6.00		33.05		0.90	SAND & GRAVEL	Brown clean to slightly silty medium, gritty, sand. Approx 60%, fine to coarse gravel with cobbles +40mm, gravel. Predominantly -20mm. Some clay contamination from above.
6.90	× × × × × × × × × × × ×	32.15		0.40	SILTSTONE	Pale grey, siltstone.
7.30		31.75			End of hole at 7.30 metres.	

Add. Comments :

Tarmac Quarry Products - Geology & Land Survey Dept (Midland Division)

BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-53
Elevation mAOD: 38.50		SCALE: 1:40
Borehole Easting: 33466	Borehole Northing: 27176	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 30/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		38.50				
				0.30	TOPSOIL	
0.30		38.20			CLAY	Brown, very firm, plastic, clay.
				0.50		
0.80		37.70			CLAY	Grey, firm to soft, clay.
				0.70		
1.50		37.00			CLAY	Dark grey, very soft, organic rich, clay.
				1.20		
2.70		35.80			SAND & GRAVEL	Brown, slightly silty, medium, gritty, sand. Fine to coarse rounded, gravel. Very little sample returned contaminated overlying grey peaty clays.
				2.90		
5.60		32.90			CONGLOMERATE & SANDSTONE	Pale brown, slightly clayey, medium, gritty, sand, with common fine to coarse, rounded quartzite, gravel.
				0.40		
6.00		32.50			End of hole at 6.00 metres.	

Add. Comments :

Tarmac Quarry Products - Geology & Land Survey Dept (Midland Division)

BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-54
Elevation mAOD: 38.25		SCALE: 1:40
Borehole Easting: 33743	Borehole Northing: 27212	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO		Date: 30/9/97

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		38.25		0.40	TOPSOIL	
0.40		37.85		2.20	SAND & GRAVEL	Brown, clayey, sand & gravel.
2.60		35.65	WL	1.60	SAND	Brown, clean to slightly silty, coarse fine to fine medium, sand. Wet.
4.20		34.05		2.30	SAND WITH GRAVEL	Brown, slightly silty, coarse fine to fine medium, sand becoming gritty from 4.5m. Approx 20%, fine to coarse, rounded, gravel.
6.50		31.75		0.40	SAND WITH GRAVEL	Pale brown, silty, medium, gritty, sand. Approx 20%, fine to medium, rounded, gravel.
6.90		31.35		0.40	SILTSTONE AND SANDSTONE	Pale grey, very hard, stiff, siltstone and sandstone.
7.30		30.95			End of hole at 7.30 metres.	

Add. Comments :

Tarmac Quarry Products - Geology & Land Survey Dept (Midland Division)

BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-55
Elevation mAOD: 38.82		SCALE: 1:40
Borehole Easting: 33788	Borehole Northing: 27398	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO		Date: 30/9/97

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		38.82		0.70	TOPSOIL AND SUBSOIL	Brown, clayey subsoil, and topsoil.
0.70		38.12		0.60	CLAY	Brown and grey, firm to stiff, clay.
1.30		37.52		1.70	SAND AND GRAVEL	Brown, clean, medium, gritty, sand. Approx 20 to 40%(from 1.5m) fine to coarse, rounded, gravel. Average <20mm, up to 50mm. Band of stiff brown clay at 1.8m.
3.00		35.82		4.10	SAND AND GRAVEL	Brown, clean, medium, gritty, sand. Approx 50-60%, fine to coarse, rounded, gravel. Av.35mm with a high % of +40mm up to 70mm. (From 4.5-7.1 water resulted in bulk of sample being lost).
7.10		31.72		0.30	SILTSTONE AND SANDSTONE	
7.40		31.42			End of hole at 7.40 metres.	

Add. Comments :

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BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON		Borehole No: REP97-56
Elevation mAOD: 38.90		SCALE: 1:40
Borehole Easting: 33604	Borehole Northing: 27397	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 30/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		38.90		0.50	TOPSOIL AND SUBSOIL	Dry brown, clayey, topsoil and subsoil.
0.50		38.40		1.50	CLAY	Brown, stiff to very firm, clay.
2.00		36.90		0.30	CLAY	Greyish brown, firm, clay.
2.30		36.60		2.40	SAND & GRAVEL	Brownish grey, clean to slightly silty, medium, gritty, sand. Approx 50-60% fine to coarse rounded, gravel. Average 15-20mm, to 75mm max. High % of +20mm and cobbles.
4.70		34.20		1.60	SAND & GRAVEL	Reddish brown, slightly silty, fine medium to medium, slightly gritty, sand. Approx 50-60%, fine to coarse rounded, gravel. Average 15-20mm, to 75mm max. High % of+20mm & cobbles. Some washing off sample from 3.0 to 4.7m.
6.30		32.60		0.70	SANDSTONE / CONGLOMERATE	Pale cream, slightly silty, fine medium, gritty, weathered, sandstone/conglomerate.
7.00		31.90			End of hole at 7.00 metres.	

Add. Comments :

Tarmac Quarry Products - Geology & Land Survey Dept (Midland Division)

BOREHOLE LOG	Region: YORKS. & EAST MIDS	Page 1 of 1.
Site: REPTON	Borehole No: REP97-57	
Elevation mAOD: 38.95	SCALE: 1:40	
Borehole Easting: 33663	Borehole Northing: 27571	
Drilling Rig\Method: HE90 - 8" INTERMITTENT FLIGHT AUGERING		
Logged by: CRAIG ARDITTO	Date: 30/9/97	

Depth m	Legend	Level m	WL m	Thick m	CLASS.	FIELD DESCRIPTION
0.00		38.95			TOPSOIL	Topsoil to subsoil, to brown, stiff, clay.
				1.70		
1.70		37.25		0.05	SAND	Band of clean sand. (<10cm thick).
1.75		37.20		0.15		
1.90		37.05		0.10	SANDY CLAY	Grey, soft, to firm, sandy clay.
2.00		36.95			SANDY GRAVELLY CLAY	Grey, soft, sandy gravelly clay.
					SAND AND GRAVEL	Grey, clean to slightly silty, medium to coarse, gritty, sand. Approx 50-60% rounded, gravel.
				1.80		
3.80		35.15			SAND AND GRAVEL	Brown, slightly silty, fine medium to medium, sand. Approx 40-60%, fine to coarse, rounded, gravel. Predominantly -40mm with some large cobbles up to 110mm.
				2.00		
5.80		33.15			SAND AND GRAVEL	Pale grey, slightly silty, fine medium, sand. Approx 20-35%, fine to coarse, rounded, gravel. (Hard drilling indicating base of deposit).
				0.50		
6.30		32.65			End of hole at 6.30 metres.	

Add. Comments :

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ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHSGORE.

Borehole 42

Date 04/10/99 - 04/10/99

O.D. Level

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	TOPSOIL. (0.30)						
04			0.30	Brown SANDY CLAY. (1.00)						
			1.30	Soft grey SILTY CLAY. (1.10)						
	▼		2.40	Very slightly silty very SANDY rounded GRAVEL. (6.20)				B1	2.50 - 3.00	
								B2	4.00 - 4.50	
								B3	5.50 - 6.00	
								B4	7.00 - 7.50	

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ▽ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.40	slow	30	2.40					

Remarks

ROTARY TEST DRILLING

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Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHSGORE.

Borehole 42

Date 04/10/99 - 04/10/99

O.D. Level

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			8.00	(Continued) Very slightly silty very SANDY rounded GRAVEL. (6.20)						
			8.60	Weathered MARL. (0.30)						
04		8.70	8.90	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ▽ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open

Remarks

ROTARY TEST DRILLING

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Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHSGORE.

Borehole 43

Date 05/10/99 - 05/10/99

O.D. Level

Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
05				TOPSOIL. (0.40)						
			0.40	Firm brown SANDY CLAY. (1.90)						
	▲		2.30	Very slightly silty very SANDY rounded GRAVEL. (5.10)				B1	2.50 - 3.00	
								B2	4.00 - 4.50	
								B3	7.00 - 7.50	
05		7.50	7.40							
			7.60	Weathered MARL. (0.20) Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ▽ - Water entry ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.50	med	30	2.40					

Remarks

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Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHGORE.

Borehole 44

Date 06/10/99 - 06/10/99

O.D. Level

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	TOPSOIL. (0.40)						
06			0.40	Firm brown SANDY CLAY. (2.10)				B1	2.00 - 2.50	
			2.50	Soft grey SILTY CLAY. (0.80)						
	▼		3.30	Slightly silty SANDY rounded GRAVEL. (5.00)				B2	3.50 - 4.00	
								B3	5.00 - 5.50	
								B4	6.50 - 7.00	
06		7.60								

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test △ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
3.30	med	30	3.30					

Remarks

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Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHGORE.

Borehole 44

Date 06/10/99 - 06/10/99

O.D. Level

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			8.00	(Continued) Slightly silty SANDY rounded GRAVEL.						
			8.30	(5.00)						
			8.50	Weathered MARL. (0.20)						
				Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ⧖ - Water entry ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open

Remarks

ROTARY TEST DRILLING

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Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHSGORE

Borehole 45

Date 06/10/99 - 06/10/99

O.D. Level

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	TOPSOIL. (0.30)						
06			0.30	Firm brown CLAY. (1.30)						
			1.60	Soft grey SILTY CLAY. (0.80)						
	▼		2.40	Very slightly silty SANDY rounded GRAVEL. (5.20)				B1	2.50 - 3.00	
								B2	4.00 - 4.50	
								B3	5.50 - 6.00	
								B4	7.00 - 7.50	
06		7.60	7.60	Weathered MARL. (0.20)						
			7.80	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ⧖ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.40	med	30	2.40					

Remarks

ROTARY TEST DRILLING

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Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHGORE

Borehole 46

Date 07/10/99 - 07/10/99

O.D. Level

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	TOPSOIL. (0.20)						
07			0.20	Firm brown CLAY. (1.40)						
	▼		1.60	Very slightly silty very SANDY rounded GRAVEL. (6.00)				B1	2.00 - 2.50	
								B2	3.50 - 4.00	
								B3	5.00 - 5.50	
								B4	6.50 - 7.00	
07		7.60	7.60	Weathered MARL. (0.20)						
			7.80	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ⧖ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Ope
1.60	v slow	30	1.60					

Remarks

ROTARY TEST DRILLING

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Hart Common, West Houghton, Bolton BL5 2BT
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Site FOREMARKE ESTATE		Job No. 199/98
Client SMITHSGORE		Borehole 48
Date 11/10/99 - 11/10/99	O.D. Level	Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
11				TOPSOIL. (0.40)						
			0.40	Firm brown SANDY CLAY. (0.60)						
			1.00	Soft grey SILTY CLAY. (0.60)						
	▲		1.60	Very slightly silty very SANDY rounded GRAVEL. (5.80)				B1	2.00 - 2.50	
								B2	3.50 - 4.00	
								B3	5.00 - 5.50	
								B4	6.00 - 6.50	
11		7.40	7.40	Weathered MARL. (0.30)						
			7.70	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ▽ - Water entry ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.60	slow	30	1.60					

Remarks

ROTARY TEST DRILLING

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Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHSGORE.

Borehole 49

Date 12/10/99 - 12/10/99

O.D. Level

Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	TOPSOIL. (0.50)						
12			0.50	Soft to firm brown SANDY CLAY. (1.00)						
	▲		1.50	Slightly sandy predominantly medium course rounded GRAVEL. (4.90)				B1	1.50 - 2.00	
								B2	3.00 - 3.50	
								B3	4.50 - 5.00	
								B4	6.00 - 6.50	
12		6.50	6.40	Weathered red MARL. (0.30)						
			6.70	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ⧖ - Water entry ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Ope
1.60	slow	30	1.60					

Remarks

ROTARY TEST DRILLING

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Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHSGORE.

Borehole **50**

Date 12/10/99 - 12/10/99

O.D. Level

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	TOPSOIL. (0.50)						
12			0.50	Firm brown SANDY CLAY. (1.40)						
	▲		1.90	Very slightly silty SANDY rounded GRAVEL. (4.20)				B1	2.00 - 2.50	
								B2	3.50 - 4.00	
								B3	5.00 - 5.50	
12		6.10	6.10	Hard brown SANDSTONE. (0.20)						
			6.30	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ▽ - Water entry ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.90	slow	30	1.80					

Remarks

ROTARY TEST DRILLING

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Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHSGORE.

Borehole 51

Date 12/10/99 - 12/10/99

O.D. Level

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	TOPSOIL. (0.30)						
12			0.30	Soft brown SANDY CLAY. (2.10)				B1	2.00 - 2.50	
	▼		2.40	Very slightly silty sandy rounded GRAVEL. (2.90)				B2	3.50 - 4.00	
								B3	5.00 - 5.50	
			5.30	Weathered red MARL. (0.20)						
			5.50	Base of Borehole						
12		6.00								

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ▽ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.40	slow	30	2.30					

Remarks

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE. | Borehole 52

Date 13/10/99 - 13/10/99 | O.D. Level | Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	TOPSOIL. (0.50)						
13			0.50	Soft brown SANDY CLAY. (0.70)						
			1.20	Soft grey SILTY CALY. (1.50)						
	▲		2.70	Slightly silty SANDY rounded GRAVEL. (2.30)				B1	3.00 - 3.50	
								B2	4.50 - 5.00	
			5.00	Weathered MARL. (0.20)						
13		5.00	5.20	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ⧖ - Water entry ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.70	slow	30	2.70					

Remarks

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE		Job No. 199/98
Client SMITHSGORE.		Borehole 53
Date 15/10/99 - 15/10/99	O.D. Level	Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
15				TOPSOIL. (0.50)						
			0.50	Soft brown SANDY CLAY. (1.40)						
			1.90	Very slightly silty sandy rounded GRAVEL. (3.40)				B1	3.00	
								B2	4.50 - 5.00	
15	▼	5.30	5.30							
			5.50	Weathered red MARL. (0.20) Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ⧖ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.80	slow	30	2.80					

Remarks

ROTARY TEST DRILLING

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Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE. | Borehole 54

Date 14/10/99 - 14/10/99 | O.D. Level | Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
14				TOPSOIL. (0.50)						
			0.50	Firm brown CLAY. (1.90)						
			2.40	Soft grey SILTY SANDY CLAY. (1.00)						
	▼		3.40	Slightly silty sandy predominantly medium course rounded gRAVEL. (1.60)				B1	3.50 - 4.00	
								B2	4.50 - 5.00	
			5.00							
14		5.00	5.20	Weathered red MARL. (0.20) Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ▽ - Water entry; ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
3.40	slow	30	3.40					

Remarks

RTD

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE.

Date 14/10/99 - 14/10/99 | O.D. Level

Borehole 55

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
14				TOPSOIL. (0.50)						
			0.50	Firm brown CLAY. (1.70)						
			2.20	Soft grey SILTY CLAY. (1.40)						
	▼		3.60	Slightly silty SANDY rounded GRAVEL. (1.50)				B1	4.00 - 4.50	
14		5.10	5.10	Weathered MARL. (0.20)						
			5.30	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ▽ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
3.60	slow	30	3.50					

Remarks

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHSGORE.

Borehole 56

Date 18/10/99 - 18/10/99

O.D. Level

Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
18			G.L.	TOPSOIL. (0.30)						
			0.30	Firm brown SANDY CLAY. (0.80)						
	▼		1.10	Very slightly silty SANDY rounded GRAVEL. (4.90)				B1	1.50 - 2.00	
								B2	3.00 - 3.50	
								B3	4.50 - 5.00	
18		6.00	6.00	Hard brown SANDSTONE. (0.30)						
			6.30	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ▽ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.10	v slow	30	1.10					

Remarks

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE. | Borehole 57

Date 21/10/99 - 21/10/99 | O.D. Level | Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
22				TOPSOIL. (0.40)						
			0.40	Firm brown SANDY CLAY. (1.10)						
	▼		1.50	Sandy rounded GRAVEL. (5.00)				B1	1.50 - 2.00	
								B2	3.00 - 3.50	
								B3	4.50 - 5.00	
								B4	6.00 - 6.50	
22		6.50	6.50							
			6.70	Hard brown SANDSTONE. (0.20)						
				Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ▽ - Water entry; ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.50	slow	30	1.50					

Remarks

ROTARY TEST DRILLING

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Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE.

Date 21/10/99 - 21/10/99 | O.D. Level

Borehole 58

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
21				TOPSOIL. (0.40)						
			0.40	Firm brown SANDY CLAY. (1.10)						
			1.50	Very slightly silty very SANDY rounded GRAVEL. (5.80)				B1	1.50 - 2.00	
								B2	3.00 - 3.50	
								B3	4.50 - 5.00	
								B4	6.00 - 6.50	
21		6.50								
			7.30							
			7.50	Hard brown SANDSTONE. (0.20) Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ⊼ - Water entry; ⧗ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.80	slow	30	1.70					

Remarks

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE.

Date 19/10/99 - 19/10/99 | O.D. Level

Borehole 59

Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
19				TOPSOIL. (0.40)						
			0.40	Firm brown SANDY CLAY. (1.60)						
			2.00	Soft grey SILTY CLAY. (0.50)						
	▲		2.50	Slightly SANDY rounded GRAVEL. (3.00)				B1	2.50 - 3.00	
								B2	4.00 - 4.50	
								B3	5.00 - 5.50	
19		5.50	5.50	Hard SANDSTONE. (0.20)						
			5.70	Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; Z - Water entry; ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.50	slow	30	2.40					

Remarks

ROTARY TEST DRILLING

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Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE.

Date 20/10/99 - 20/10/99 | O.D. Level

Borehole 60

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
20				TOPSOIL. (0.40)						
			0.40	Firm brown SANDY CLAY. (1.20)						
	▼		1.60	Slightly silty very SANDY presominantly fine to medium rounded GRAVEL. (5.60)				B1	3.50 - 4.00	
								B2	5.00 - 5.50	
								B3	6.00 - 6.50	
			7.20							
20		7.20	7.50	Weathered red MARL. (0.30)						
				Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ▽ - Water entry; ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.70	slow	30	1.60					

Remarks

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE.

Date 21/10/99 - 21/10/99 | O.D. Level

Borehole **61**

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
21				TOPSOIL. (0.40)						
			0.40	Firm brown SANDY CLAY. (1.00)						
	▲		1.40	Very slightly silty SAND and rounded GRAVEL. (4.30)				B1	1.50 - 2.00	
								B2	3.00 - 3.50	
								B3	4.50 - 5.00	
			5.70							
21		5.70	6.00	Hard SANDSTONE. (0.30)						
				Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ▽ - Water entry; ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.50	slow	30	1.50					

Remarks

ROTARY TEST DRILLING

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Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE.

Date 26/10/99 - 26/10/99 | O.D. Level

Borehole 62

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
26				TOPSOIL. (0.50)						
			0.50	Soft brown SILTY CLAY. (1.50)						
	▼		2.00	Very slightly silty very SANDY rounded GRAVEL. (3.20)				B1	2.00 - 2.50	
								B2	3.50 - 4.00	
								B3	4.50 - 5.00	
			5.20	Light grey MARL. (0.30)						
26		5.20	5.50	Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ⧖ - Water entry; ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.00	slow	30	2.00					

Remarks

ROTARY TEST DRILLING

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Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE.

Date 26/10/99 - 26/10/99 | O.D. Level

Borehole 63

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
26				TOPSOIL. (0.40)						
			0.40	Soft to firm brown CLAY. (1.70)						
	▽		2.10	Very slightly silty very SANDY rounded GRAVEL with occasional cobbles. (3.10)				B1	2.50 - 3.00	
								B2	4.00 - 4.50	
26		5.20	5.20	Grey MARL. (0.20)						
			5.40	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test ▽ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.20	slow	2.2						

Remarks

ROTARY TEST DRILLING

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Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE.

Date 27/10/99 - 27/10/99 | O.D. Level

Borehole 64

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
27				TOPSOIL. (0.30)						
			0.30	Brown SANDY CLAY. (0.90)						
	▼		1.20	SANDY predominantly medium coarse rounded GRAVEL. (5.00)				B1	1.50 - 2.00	
								B2	3.00 - 3.50	
								B3	4.50 - 5.00	
								B4	5.50 - 6.00	
			6.20							
27		6.20	6.50	hard SANDSTONE. (0.30)						
				Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ▽ - Water entry; ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.40	slow	30	1.30					

Remarks

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
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Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE. | Borehole 65

Date 28/10/99 - 28/10/99 | O.D. Level | Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
28				TOPSOIL. (0.50)						
			0.50	Firm brown SANDY CLAY. (0.90)						
	▲		1.40	Vrey slightly silty very SANDY rounded GRAVEL. (4.70)				B1	2.00 - 2.50	
								B2	3.50 - 4.00	
								B3	5.00 - 5.50	
28		6.10	6.10	Hard SANDSTONE. (0.20)						
			6.30	Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ⊼ - Water entry; ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.50	slow	30	1.50					

Remarks

ROTARY TEST DRILLING

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Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE. | Borehole 66

Date 28/10/99 - 28/10/99 | O.D. Level | Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
28			0.30	TOPSOIL. (0.30)						
	▼		1.70	Firm brown SANDY CLAY. (1.40)						
				Very slightly silty very SANDY rounded GRAVEL. (3.30)				B1	2.00 - 2.50	
								B2	3.50 - 4.00	
								B3	4.50 - 5.00	
28		5.00	5.00	Hard SANDSTONE. (0.20)						
			5.20	Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ▽ - Water entry; ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.80	slow	30	1.80					

Remarks

ROTARY TEST DRILLING

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Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE. | Borehole 67

Date 29/10/99 - 29/10/99 | O.D. Level | Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
29				TOPSOIL. (0.50)						
			0.50	Soft brown SILTY SANDY CLAY. (1.60)						
	⧗		2.10	Slightly silty very SANDY rounded GRAVEL. (3.40)				B1	2.50 - 3.00	
								B2	4.00 - 4.50	
								B3	5.00 - 5.50	
			5.50							
29		5.50	5.70	Hard SANDSTONE. (0.20)						
				Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ⧖ - Water entry; ⧗ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.20	slow	30	2.20					

Remarks

ROTARY TEST DRILLING

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Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHGORE. | Borehole 68

Date 01/11/99 - 01/11/99 | O.D. Level | Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
01				TOPSOIL. (0.30)						
			0.30	Firm brown SAANDY CLAY. (1.20)						
	▼		1.50	Slightly silty very SANDY rounded GRAVEL. (1.00)				B1	1.50 - 2.00	
			2.50	SANDY rounded GRAVEL. (4.00)				B2	3.00 - 3.50	
								B3	4.50 - 5.00	
			6.50	Hard SANDSTONE. (0.30)						
01		6.50	6.80	Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ⧖ - Water entry; ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.50	slow	30	1.40					

Remarks

ROTARY TEST DRILLING

Marshes Farm, Coach Road, off Wigan Road,
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Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE

Job No. 199/98

Client SMITHSGORE.

Borehole 69

Date 02/11/99 - 02/11/99

O.D. Level

Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
02				TOPSOIL. (0.30)						
			0.30	Brown SILTY CLAY. (1.10)						
	▼		1.40							
			1.60	Soft grey SILTY CLAY. (0.20)						
				SANDY rounded GRAVEL. (6.00)				B1	1.60 - 2.00	
								B2	3.00 - 3.50	
								B3	4.50 - 5.00	
								B4	6.00 - 6.50	
			7.60	Hard SANDSTONE. (0.30)						
02		7.60	7.90	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
N - Standard Penetration Test Δ - Water entry ▼ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.60	slow	30	1.50					

Remarks

RTD

ROTARY TEST DRILLING

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Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE.

Date 02/11/99 - 02/11/99 | O.D. Level

Borehole 70

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
02			0.20	TOPSOIL. (0.20)						
				Firm brown SILTY CALY. (0.60)						
			0.80							
	▲ ▽			Slightly silty very SANDY rounded GRAVEL. (5.90)				B1	1.00 - 1.50	
								B2	2.50 - 3.00	
								B3	4.00 - 4.50	
								B4	5.50 - 6.00	
			6.70							
02		6.70	7.00	Hard SANDSTONE. (0.30)						
				Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ▽ - Water entry; ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.20	slow	30	1.00					

Remarks

ROTARY TEST DRILLING

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Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE.

Date 03/11/99 - 03/11/99 | O.D. Level

Borehole 71

Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
03			0.30	TOPSOIL. (0.30)						
				Firm brown SANDY CLAY. (0.80)						
			1.10	Brown CLAYEY SAND AND GRAVEL. (0.70)						
	▲		1.80	Very slightly silty very SANDY rounded GRAVEL. (4.60)				B1	2.00 - 2.50	
								B2	3.50 - 4.00	
								B3	5.00 - 5.50	
03		6.40	6.40							
			6.70	Hard SANDSTONE. (0.30)						
				Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ⧖ - Water entry; ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.80	v slow	30	1.70					

Remarks

ROTARY TEST DRILLING

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Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Site FOREMARKE ESTATE | Job No. 199/98

Client SMITHSGORE. | Borehole 72

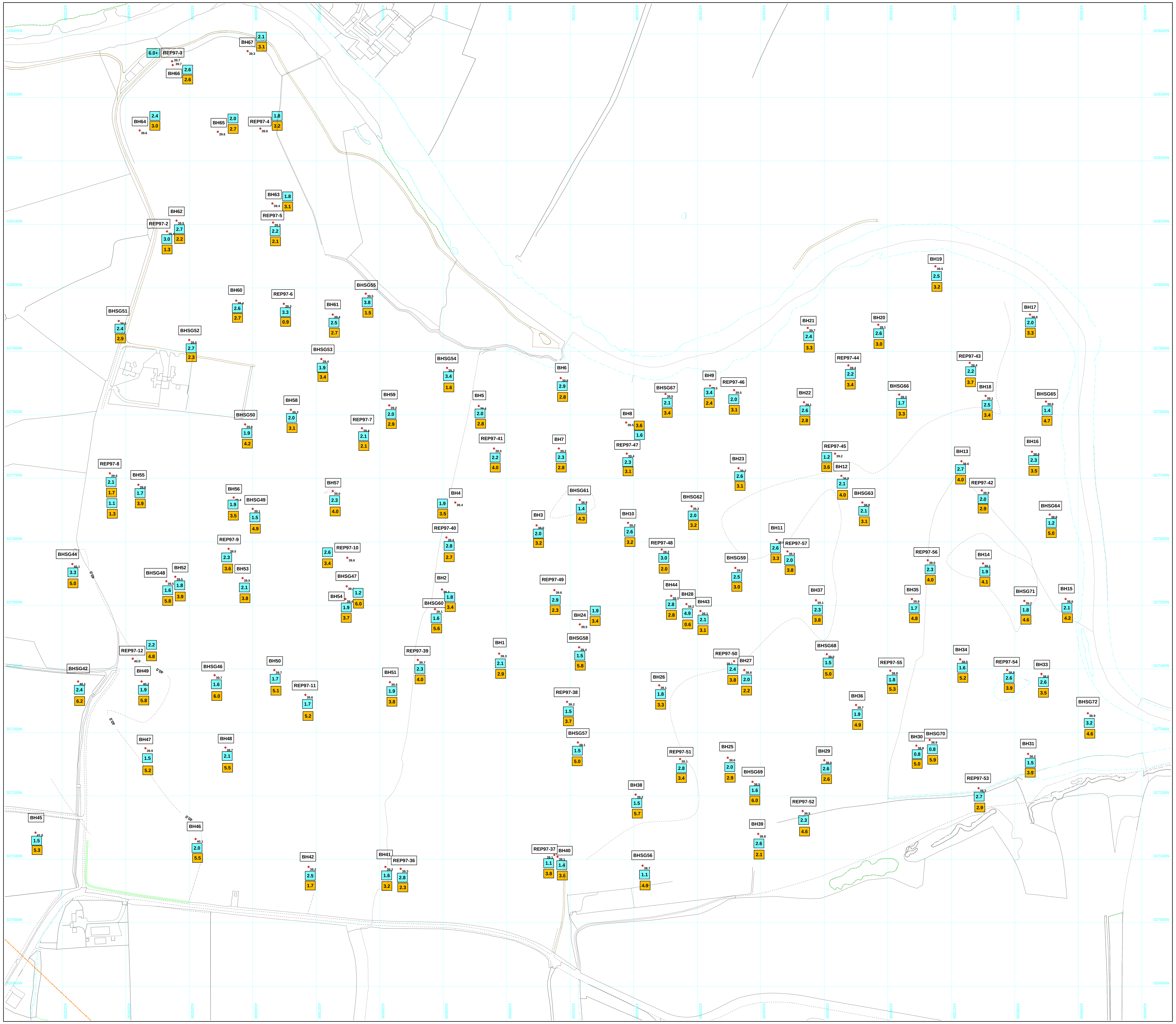
Date 04/11/99 - 04/11/99 | O.D. Level | Page 1 of 1

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
04			0.30	TOPSOIL. (0.30)						
				Firm brown SILTY CLAY. (1.20)						
			1.50	Soft grey SILTY CLAY. (1.70)						
	▲									
	▽		3.20	Very slightly silty very SANDY rounded GRAVEL. (1.10)				B1	3.50 - 4.00	
			4.30	SANDY rounded GRAVEL. (3.50)				B2	5.00 - 5.50	
								B3	6.50 - 7.00	
04		7.80	7.80 8.00	Hard SANDSTONE. (0.20) Base of Borehole						

Symbols: U - undisturbed sample; J - jar sample; B - bulk sample; W - water sample; N - Standard Penetration Test; ▽ - Water entry; ▲ - Water level

Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
3.30	v slow	30	3.00					

Remarks



LEGEND

BH38 — **Exploration borehole location and number**

1.5 — Thickness in metres of soils and overburden

5.7 — Thickness in metres of workable sand and gravel

Site Name:
Swarkestone Quarry

Drawing Name:
Southern Area Summary Borehole Data

Drawn By:	Scale:
N.G.Jones	1 : 3000
Date:	Drawing No:
16/06/2015	S346BHS115.PDF

N

LAFARGE TARMAC

APPENDIX ESSD H

INFORMATION PROVIDED BY THE ENVIRONMENT AGENCY WITH RESPECT TO SURFACE WATER AND GROUNDWATER QUALITY

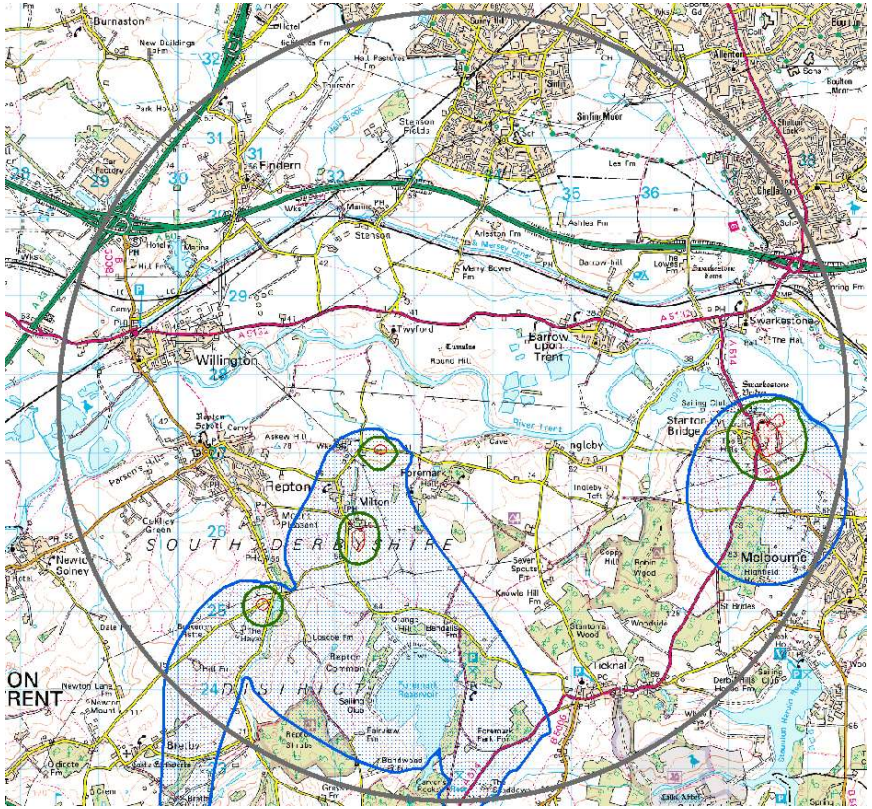
List of consented discharges within 2km of the site proivided by the Environment Agency

FID	Shape	AG_APL_NUM	AG_VERSION	AG_PR_PERM	AG_ISSUED	AG_EFFECTV	AG_REVOCED	AG_COMMENT	DS_SNAME	DS_LNAME	DS_ADD1	DS_ADD2	DS_ADD3	DS_ADD4	DS_PCODE	DS_NGR	EASTING	NORTHING	DS_TYPE	REGION	DISTANCE FROM THE AREA IN WHICH WASTE WILL BE DEPOSITED (m)	DISTANCE TO SOUTHERN EXTENSION BOUNDARY (m)
11956	Point ZM	T/36/46073/T	1	T/36/45087/T	26/11/2004	26/11/2004	22/05/2019		SWARKESTONE	SWARKESTONE QUARRY	TWYFORD ROAD	BARROW ON TRENT	DERBY	DERBYSHIRE	DE73 7HA	SK3399027350	433990	327350	Mineral/Gravel Extraction/Quarrying	MI	158.3462585	26.06490671
11962	Point ZM	T/36/46073/T	2	T/36/45087/T	23/05/2019	23/05/2019	<Null>	ADDING SECOND OUTLET RANGE	SWARKESTONE	SWARKESTONE QUARRY	TWYFORD ROAD	BARROW ON TRENT	DERBY	DERBYSHIRE	DE73 7HA	SK3399027350	433990	327350	Mineral/Gravel Extraction/Quarrying	MI	158.3462585	26.06490671
11960	Point ZM	T/36/46046/T	1		22/09/2004	22/09/2004	<Null>		SWARKESTONE	SWARKESTONE QUARRY	TWYFORD ROAD	BARROW ON TRENT		DERBYSHIRE	DE7 1JB	SK3422028380	434220	328380	Mineral/Gravel Extraction/Quarrying	MI	822.8897205	548.7277772
11949	Point ZM	EPRGB3791VU	1		24/08/2017	24/08/2017	<Null>		POPLARS	POPLARS COTTAGE	TWYFORD ROAD	BARROW-ON-TRENT	DERBY	DERBYSHIRE	DE73 7HA	SK3373428734	433734	328734	Domestic property (single) (incl farm house)	MI	992.5197999	675.6524823
11961	Point ZM	EPRYP3328GF	1		05/11/2012	05/11/2012	<Null>		6 PROPERTIES	ELM FARM, THE BYRE, 2 ELM FARM,	THE GRANARY & THE OLD STABLES	INGLEBY	DERBY	DERBYSHIRE	DE73 7HW	SK3478027071	434780	327071	Domestic property (multiple) (incl farm houses)	MI	995.9541328	690.9116286
11969	Point ZM	T/36/45121/S	1		28/02/1997	28/02/1997	<Null>	Was T36451215. MULTIPLE OWNERS CONSENT - REFER TO CONSENT DOCUMENT	THE BARNS	BARNS/FARMHOUSE/COTTAGE	TWYFORD	DERBYSHIRE				SK3415028700	434150	328700	WwTW (not water co) (not STP at a private premises)	MI	1058.921171	764.2769392
11950	Point ZM	3/28/36/2471	1		06/12/1973	06/12/1973	01/04/2012	REFER TO PUBLIC REGISTER DOCUMENT	ELM FARM	ELM FARM	INGLEBY			LEICESTERSHIRE		SK3490027100	434900	327100	Domestic property (single) (incl farm house)	MI	1102.046978	799.4444124
11963	Point ZM	3/28/36/2471	2		02/04/2012	02/04/2012	<Null>	EPR GW REVIEW - END DATE REMOVED	ELM FARM	ELM FARM	INGLEBY			LEICESTERSHIRE		SK3490027100	434900	327100	Domestic property (single) (incl farm house)	MI	1102.046978	799.4444124
11909	Point ZM	T/36/45730/R	1	T/36/12059/R	31/03/2003	31/03/2003	31/12/2009	UWWTD & PROFORMA REVIEW; UWWTR LIMITS INCLUDED	MILTON WWTW	MILTON WASTE WATER TREATMENT WORKS	MILTON WWTW	MEADOW LANE	MILTON	NR BURTON ON TRENT		SK3215027170	432150	327170	WwTW/Sewage Treatment Works (water company)	MI	1221.831755	959.1027419
11910	Point ZM	T/36/12059/R	1		21/12/1987	21/12/1987	25/07/2001	RENUMBERED FROM COPA/10689	MILTON WWTW	MILTON WASTE WATER TREATMENT WORKS	MILTON WWTW	MEADOW LANE	MILTON	NR BURTON ON TRENT		SK3215027170	432150	327170	WwTW/Sewage Treatment Works (water company)	MI	1221.831755	959.1027419
11911	Point ZM	T/36/12059/R	2		21/12/1987	26/07/2001	30/03/2003	RENUMBERED FROM COPA/10689	MILTON WWTW	MILTON WASTE WATER TREATMENT WORKS	MILTON WWTW	MEADOW LANE	MILTON	NR BURTON ON TRENT		SK3215027170	432150	327170	WwTW/Sewage Treatment Works (water company)	MI	1221.831755	959.1027419
11912	Point ZM	T/36/45730/R	2	T/36/12059/R	14/10/2008	01/01/2010	30/03/2010	OSM MOD	MILTON WWTW	MILTON WASTE WATER TREATMENT WORKS	MILTON WWTW	MEADOW LANE	MILTON	NR BURTON ON TRENT		SK3215027170	432150	327170	WwTW/Sewage Treatment Works (water company)	MI	1221.831755	959.1027419
11913	Point ZM	T/36/45730/R	3	T/36/12059/R	31/03/2010	31/03/2010	25/06/2010	DWF CHANGE MOD	MILTON WWTW	MILTON WASTE WATER TREATMENT WORKS	MILTON WWTW	MEADOW LANE	MILTON	NR BURTON ON TRENT		SK3215027170	432150	327170	WwTW/Sewage Treatment Works (water company)	MI	1221.831755	959.1027419
11914	Point ZM	T/36/45730/R	4	T/36/12059/R	26/03/2010	26/06/2010	02/06/2011	EARLY AMP5 MOD (DUE 30-SEP-2014, NEVER LIVE) DWF STILL IN EFFECT	MILTON WWTW	MILTON WASTE WATER TREATMENT WORKS	MILTON WWTW	MEADOW LANE	MILTON	NR BURTON ON TRENT		SK3215027170	432150	327170	WwTW/Sewage Treatment Works (water company)	MI	1221.831755	959.1027419
11915	Point ZM	T/36/45730/R	5	T/36/12059/R	03/06/2011	03/06/2011	30/03/2014	ALUMINIUM DOSING VARIATION	MILTON WWTW	MILTON WASTE WATER TREATMENT WORKS	MILTON WWTW	MEADOW LANE	MILTON	NR BURTON ON TRENT		SK3215027170	432150	327170	WwTW/Sewage Treatment Works (water company)	MI	1221.831755	959.1027419
11918	Point ZM	T/36/45730/R	6	T/36/12059/R	14/11/2013	31/03/2014	<Null>	IRON UT ADDED & UWWTD P COMPLIANCE (ADMIN VARIATION 07/03/14 FOR NGRS)	MILTON WWTW	MILTON WASTE WATER TREATMENT WORKS	MILTON WWTW	MEADOW LANE	MILTON	NR BURTON ON TRENT		SK3215027170	432150	327170	WwTW/Sewage Treatment Works (water company)	MI	1221.831755	959.1027419
11902	Point ZM	T/36/22053/T	1	T/36/20759/T	28/01/1993	28/01/1993	31/12/2009	Revoked because discharge no longer exists.	MILTON WTW	MILTON WATER TREATMENT WORKS	NR MILTON	DERBYSHIRE				SK3235028380	432350	328380	WTW/Water Collection/Treatment/Supply	MI	1261.758266	995.6890373
11903	Point ZM	T/36/22053/T	2	T/36/20759/T	24/09/2009	01/01/2010	22/01/2010	OSM MOD	MILTON WTW	MILTON WATER TREATMENT WORKS	NR MILTON	DERBYSHIRE				SK3235028380	432350	328380	WTW/Water Collection/Treatment/Supply	MI	1261.758266	995.6890373
11951	Point ZM	3/28/36/0361	1		23/06/1966	23/06/1966	01/04/2012	REFER TO THE PUBIC REGISTER DOCUMENT	THE COTTAGE	MAIN STREET	INGLEBY			DERBYSHIRE		SK3500026900	435000	326900	Domestic property (single) (incl farm house)	MI	1262.77927	956.7360214
11965	Point ZM	3/28/36/0361	2		02/04/2012	02/04/2012	<Null>	EPR GW REVIEW - END DATE REMOVED	THE COTTAGE	MAIN STREET	INGLEBY			DERBYSHIRE		SK3500026900	435000	326900	Domestic property (single) (incl farm house)	MI	1262.77927	956.7360214
11908	Point ZM	T/36/03354/O	1		14/09/1972	14/09/1972	02/04/2000	RENUMBERED FROM T3354	MILTON VILL	MILTON VILLAGE - SURFACE WATER S	MILTON			MILTON		SK3220026700	432200	326700	Pumping Station on Sewerage Network (water company)	MI	1263.624554	1061.308396
11952	Point ZM	T/36/40261/T	1		20/12/1995	20/12/1995	03/12/2009	Was T3640261T.	SWARKESTONE	SWARKESTONE QUARRY	TWYFORD ROAD	BARROW-UPON-TRENT	DERBYSHIRE	DERBYSHIRE		SK3554027870	435540	327870	Mineral/Gravel Extraction/Quarrying	MI	1748.255724	1539.299404
11966	Point ZM	T/36/40261/T	2		04/12/2009	04/12/2009	<Null>	Was T3640261T.	SWARKESTONE	SWARKESTONE QUARRY	TWYFORD ROAD	BARROW-UPON-TRENT	DERBYSHIRE	DERBYSHIRE		SK3554027870	435540	327870	Mineral/Gravel Extraction/Quarrying	MI	1748.255724	1539.299404
11905	Point ZM	3/28/36/1695	1		14/07/1971	14/07/1971	<Null>	REFER TO PUBLIC REGISTER DOCUMENT	MERRYBOWER	MERRYBOWER COTTAGES	BARROW ON TRENT	ARLESTON		DERBYSHIRE		SK3350029500	433500	329500	Domestic property (multiple) (incl farm houses)	MI	1769.070917	1451.851162
11953	Point ZM	T/36/45087/T	1		18/02/1997	18/02/1997	03/11/2002	Was T3645087T.	SWARKESTONEQ	QUARRY WATER FROM SWARKESTONE	SWARKESTONE QUARRY	TWYFORD ROAD	BARROW UPON TRENT	DERBYSHIRE		SK3560027900	435600	327900	Undefined or Other	MI	1813.421385	1606.236306
11954	Point ZM	T/36/45087/T	2		04/11/2002	04/11/2002	25/11/2004	Was T3645087T.	SWARKESTONEQ	QUARRY WATER FROM SWARKESTONE	SWARKESTONE QUARRY	TWYFORD ROAD	BARROW UPON TRENT	DERBYSHIRE		SK3560027900	435600	327900	Undefined or Other	MI	1813.421385	1606.236306
11955	Point ZM	T/36/40101/SG	1		17/02/1995	17/02/1995	01/04/2012	Was T3640101SG.	RAGLEY BOAT	RAGLEY BOAT STOP	SUNFIN LANE	BARROW UPON TRENT	DERBYSHIRE	DERBYSHIRE		SK3452029450	434520	329450	WwTW (not water co) (not STP at a private premises)	MI	1895.147545	1600.357818
11968	Point ZM	T/36/40101/SG	2		02/04/2012	02/04/2012	<Null>	EPR GW REVIEW - END DATE REMOVED	RAGLEY BOAT	RAGLEY BOAT STOP	SUNFIN LANE	BARROW UPON TRENT	DERBYSHIRE	DERBYSHIRE		SK3452029450	434520	329450	WwTW (not water co) (not STP at a private premises)	MI	1895.147545	1600.357818
11901	Point ZM	T/36/09020/T	1		30454	30454	33368	RENUMBERED FROM WQ/7/2020. RECORDED AS REVOKED DURING WIMS AUDIT	WILLINGTON P	WILLINGTON POWER STATION	WILLINGTON	DERBY	DERBYSHIRE	DERBYSHIRE	DE6 6DF	SK3145028530	431450	328530	Sub-station/Electricity/Gas/Air Conditioning Supply	MI	1882.652116	1873.349209
11964	Point ZM	3/28/36/5354	1		27240	27240	<Null>	REFER TO PUBLIC REGISTER DOCUMENT	WOODLAND	WOODLAND COTTAGE	STANTON BY BRIDGE	NEAR TICKNALL		DERBYSHIRE		SK3590026400	435900	326400	Domestic property (single) (incl farm house)	MI	1997.687379	1983.636741

List of pollution incidents within 2km of the site proivided by the Environment Agency

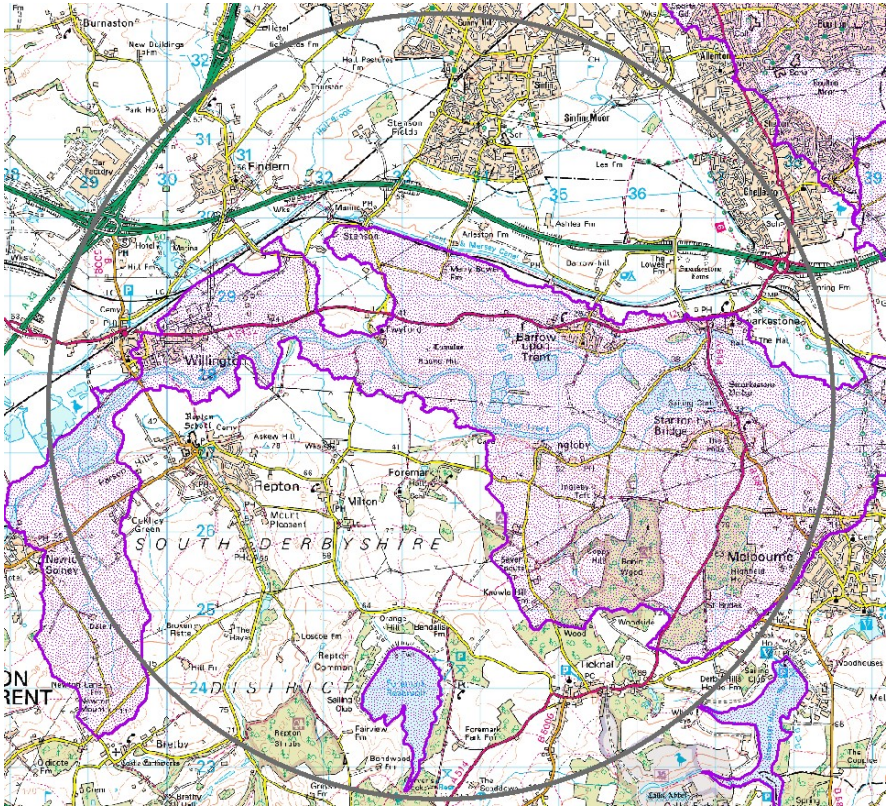
FID	Shape	NOT_ID	NOT_DATE	REGION_WM	AREA_WM	REGION_PF	AREA_PF	LOCATION	DISTANCE FROM THE SITE BOUNDARY (M)	COUNTY	UNITARY	DISTRICT	NGR	EASTING	NORTHING	EP_INC	SUB	STATUS	EIL_AIR	EIL_LAND	EIL_WATER	CAUSE_TYPE	CAUSE	PREM_TYPE	PREMISES	PREM_AGRI	POLL_TYPE	POLLUTANT
52678	Point ZM	1557686	26/09/2017	Midlands Region	East Midlands	Midlands Region	East Midlands	Foremark	527	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 33276 26641	433276	326641	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Containment and Control Failure	Pipe Failure below ground	Service Sector	Education and Research		Oils and Fuel	Gas and Fuel Oils
53119	Point ZM	128745	02/01/2003	Midlands Region	East Midlands	Midlands Region	East Midlands	Milton (Derbyshire)	529	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 33280 26638	433280	326638	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 3 (Minor)	Containment and Control Failure	Pipe Failure below ground	Service Sector	Education and Research		Oils and Fuel	Gas and Fuel Oils
53191	Point ZM	964141	23/02/2012	Midlands Region	East Midlands	Midlands Region	East Midlands	Foremark	664	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34180 26752	434180	326752	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Other Unauthorised Activity	Agriculture	Dairy	Field Heap	Agricultural Materials and Wastes	Other Agricultural Material or Waste
53516	Point ZM	1269247	18/08/2014	Midlands Region	East Midlands	Midlands Region	East Midlands	Ingleby	752	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34577 27257	434577	327257	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Authorised Activity	Other Authorised Activity	Manufacturing	Mining and Quarrying		Contaminated Water	Suspended Solids
36820	Point ZM	338907	17/08/2005	Midlands Region	East Midlands	Midlands Region	East Midlands	Meadow Lane, Milton, Derby	886	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 32533 27879	432533	327879	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Unauthorised Discharge or Disposal	Service Sector	Construction and Demolition		Inert Materials and Wastes	Construction and Demolition Materials and Wastes
36827	Point ZM	1548125	15/08/2017	Midlands Region	East Midlands	Midlands Region	East Midlands	Milton	953	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 32423 27112	432423	327112	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Illegal Waste Site	Agriculture	Arable	Land/Fields	Sewage Materials	Other Sewage Material
36831	Point ZM	1548125	15/08/2017	Midlands Region	East Midlands	Midlands Region	East Midlands	Milton	953	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 32423 27112	432423	327112	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Illegal Waste Site	Agriculture	Arable	Land/Fields	Specific Waste Materials	Household Waste
36841	Point ZM	1548125	15/08/2017	Midlands Region	East Midlands	Midlands Region	East Midlands	Milton	953	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 32423 27112	432423	327112	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Illegal Waste Site	Agriculture	Arable	Land/Fields	Agricultural Materials and Wastes	Solid Manure
52856	Point ZM	1532205	19/06/2017	Midlands Region	East Midlands	Midlands Region	East Midlands	Round Hill	967	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 33720 28709	433720	328709	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 4 (No Impact)	Unauthorised Activity	Unauthorised Discharge or Disposal	Domestic and Residential	Private Dwellings		Sewage Materials	Final Effluent
36839	Point ZM	758338	03/03/2010	Midlands Region	East Midlands	Midlands Region	East Midlands	Askew Hill	1246	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 32126 27163	432126	327163	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Containment and Control Failure	Accidental Spillage	Retail Sector	Food		Organic Chemicals/Products	Dyes and Inks
36824	Point ZM	102815	23/08/2002	Midlands Region	East Midlands	Midlands Region	East Midlands	Twyford (Derbyshire)	1362	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 3237 2857	432370	328570	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Natural Causes	Algal Activity				Other Pollutant	Microbiological
53344	Point ZM	35673	08/10/2001	Midlands Region	East Midlands	Midlands Region	East Midlands	Barrow upon Trent	1379	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34722 28671	434722	328671	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				General Biodegradable Materials and Wastes	Vegetable Cuttings and Deposits
52866	Point ZM	158253	14/05/2003	Midlands Region	East Midlands	Midlands Region	East Midlands	Barrow upon Trent (Derbyshire)	1396	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34760 28653	434760	328653	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Specific Waste Materials	Other Specific Waste Material
36819	Point ZM	1196362	20/01/2014	Midlands Region	East Midlands	Midlands Region	East Midlands	Milton	1404	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 32219 26365	432219	326365	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Containment and Control Failure	Pipe Failure above ground	Domestic and Residential	Private Dwellings		Oils and Fuel	Gas and Fuel Oils
53505	Point ZM	184981	26/08/2003	Midlands Region	East Midlands	Midlands Region	East Midlands	Willington (Derbyshire)	1408	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34786 28641	434786	328641	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Inert Materials and Wastes	Construction and Demolition Materials and Wastes
53506	Point ZM	184981	26/08/2003	Midlands Region	East Midlands	Midlands Region	East Midlands	Willington (Derbyshire)	1408	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34786 28641	434786	328641	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Specific Waste Materials	Household Waste
53255	Point ZM	97918	06/08/2002	Midlands Region	East Midlands	Midlands Region	East Midlands	Swarkestone Road, Swarkestone, Barrow-on-Trent, De	1471	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34960 26443	434960	326443	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Specific Waste Materials	Household Waste
53023	Point ZM	422298	27/07/2006	Midlands Region	East Midlands	Midlands Region	East Midlands	Ingleby Toft	1484	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34963 26426	434963	326426	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping	Domestic and Residential	Private Dwellings		General Biodegradable Materials and Wastes	Other General Biodegradable Material or Waste
53243	Point ZM	1128063	02/07/2013	Midlands Region	East Midlands	Midlands Region	East Midlands	Ingleby Toft	1512	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 35307 27037	435307	327037	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Unauthorised Activity	Unauthorised Discharge or Disposal	Service Sector	Catering and Accommodation		Sewage Materials	Other Sewage Material
53071	Point ZM	362471	17/11/2005	Midlands Region	East Midlands	Midlands Region	East Midlands	Barrow upon Trent	1636	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 35032 28697	435032	328697	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 4 (No Impact)	Unauthorised Activity	Unauthorised Waste Management Activity	Transport	Road		Inert Materials and Wastes	Construction and Demolition Materials and Wastes
53221	Point ZM	1588315	15/02/2018	Midlands Region	East Midlands	Midlands Region	East Midlands	Knowle Hill Farm	1734	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34093 25525	434093	325525	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 4 (No Impact)	Authorised Activity	Other Authorised Activity	Waste Management	Other Waste Management Source		General Biodegradable Materials and Wastes	Food and Drink
52976	Point ZM	1333695	30/04/2015	Midlands Region	East Midlands	Midlands Region	East Midlands	Barrow upon Trent	1815	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 35310 28589	435310	328589	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Fires	Other Fire	Transport	Road		Oils and Fuel	Diesel
52601	Point ZM	1709778	12/06/2019	Midlands Region	East Midlands	Midlands Region	East Midlands	Barrow upon Trent	1842	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 35487 28301	435487	328301	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 4 (No Impact)	Containment and Control Failure	Pipe Failure above ground	Water Industry	Pumping Station		Sewage Materials	Crude Sewage
78702	Point ZM	276192	05/11/2004	Midlands Region	East Midlands	Midlands Region	East Midlands	Arleston Lane	1854	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 33622 29595	433622	329595	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Cause Not Identified	Not Identified				Oils and Fuel	Diesel
52619	Point ZM	1799832	20/04/2020	Midlands Region	East Midlands	Midlands Region	East Midlands	Ingleby Toft	1878	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 35700 27150	435700	327150	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Specific Waste Materials	Asbestos
53224	Point ZM	1858651	23/10/2020	Midlands Region	East Midlands	Midlands Region	East Midlands	Ingleby Toft	1881	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 35694 27089	435694	327089	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Specific Waste Materials	Asbestos
52656	Point ZM	1332848	28/04/2015	Midlands Region	East Midlands	Midlands Region	East Midlands	Ingleby Toft	1882	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 35695 27089	435695	327089	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Specific Waste Materials	Asbestos
79363	Point ZM	65422	20/03/2002	Midlands Region	East Midlands	Midlands Region	East Midlands	Deep Dale Lane, Barrow-on-Trent, Derby	1891	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34880 29220	434880	329220	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Unauthorised Activity	Fly-Tipping				General Biodegradable Materials and Wastes	Other General Biodegradable Material or Waste
78736	Point ZM	65106	19/03/2002	Midlands Region	East Midlands	Midlands Region	East Midlands	Barrow upon Trent (Derbyshire)	1923	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34902 29243	434902	329243	Yes	Yes	Closed	Category 3 (Minor)	Category 4 (No Impact)	Category 3 (Minor)	Cause Not Identified	Not Identified				Oils and Fuel	Gas and Fuel Oils
79264	Point ZM	252360	20/07/2004	Midlands Region	East Midlands	Midlands Region	East Midlands	Stenson	1927	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 32681 29464	432681	329464	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Specific Waste Materials	Household Waste
79078	Point ZM	300456	21/03/2005	Midlands Region	East Midlands	Midlands Region	East Midlands	Swarkestone (Derbyshire)	1929	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 3489 2926	434890	329260	Yes	Yes	Closed	Category 3 (Minor)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Specific Waste Materials	Household Waste
52498	Point ZM	799556	09/07/2010	Midlands Region	East Midlands	Midlands Region	East Midlands	Barrow upon Trent	1949	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 35549 28415	435549	328415	Yes	Yes	Closed	Category 3 (Minor)	Category 3 (Minor)	Category 4 (No Impact)	Fires	Burning of Waste	Agriculture	Other Agricultural Source	Outdoor Livestock	Atmospheric Pollutants and Effects	Smoke
78594	Point ZM	581104	23/04/2008	Midlands Region	East Midlands	Midlands Region	East Midlands	Barrow-hill	1950	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 35014 29184	435014	329184	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Containment and Control Failure	Road Traffic Accident (RTA)				Oils and Fuel	Lubricating Oils
78897	Point ZM	1342408	04/06/2015	Midlands Region	East Midlands	Midlands Region	East Midlands	Arleston Farm	1956	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34550 29503	434550	329503	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 4 (No Impact)	Fires	Other Fire	Transport	Road		Oils and Fuel	Diesel
79456	Point ZM	1342408	04/06/2015	Midlands Region	East Midlands	Midlands Region	East Midlands	Arleston Farm	1956	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34550 29503	434550	329503	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 4 (No Impact)	Fires	Other Fire	Transport	Road		Contaminated Water	Firefighting Run-Off
52517	Point ZM	234862	06/05/2004	Midlands Region	East Midlands	Midlands Region	East Midlands	Ingleby Lane, Ingleby, Ticknall, Derby	1973	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34806 25579	434806	325579	Yes	Yes	Closed	Category 4 (No Impact)	Category 4 (No Impact)	Category 3 (Minor)	Unauthorised Activity	Unauthorised Discharge or Disposal	Domestic and Residential	Private Dwellings		Sewage Materials	Other Sewage Material
53397	Point ZM	169442	27/06/2003	Midlands Region	East Midlands	Midlands Region	East Midlands	Ingleby Toft	1981	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 35441 26231	435441	326231	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Pollutant Not Identified	Not Identified
47114	Point ZM	84331	12/06/2002	Midlands Region	East Midlands	Midlands Region	East Midlands	Swarkestone Road, Ingleby, Barrow-on-Trent, Derby	1987	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 3582 2754	435820	327540	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Specific Waste Materials	Household Waste
47121	Point ZM	84331	12/06/2002	Midlands Region	East Midlands	Midlands Region	East Midlands	Swarkestone Road, Ingleby, Barrow-on-Trent, Derby	1987	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 3582 2754	435820	327540	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				General Biodegradable Materials and Wastes	Vegetable Cuttings and Deposits
47122	Point ZM	84331	12/06/2002	Midlands Region	East Midlands	Midlands Region	East Midlands	Swarkestone Road, Ingleby, Barrow-on-Trent, Derby	1987	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 3582 2754	435820	327540	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping				Inert Materials and Wastes	Construction and Demolition Materials and Wastes
52890	Point ZM	163574	02/06/2003	Midlands Region	East Midlands	Midlands Region	East Midlands	ingleby toft, derbyshire	1988	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 3545 2623	435450	326230	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Fly-Tipping	Service Sector	Other Service Sector Premises		Specific Waste Materials	Commercial Waste
53319	Point ZM	895332	20/06/2011	Midlands Region	East Midlands	Midlands Region	East Midlands	Knowle Hill Farm	1994	DERBYSHIRE COUNTY		SOUTH DERBYSHIRE DISTRICT	SK 34974 25678	434974	325678	Yes	Yes	Closed	Category 4 (No Impact)	Category 3 (Minor)	Category 4 (No Impact)	Unauthorised Activity	Unauthorised Discharge or Disposal				Inert Materials and Wastes	Other Inert Material or Waste

Source Protection Zones



Map provided by EA in a response to a FOI data request in February 2021 (EMD-200515)

Drinking Water Protected Areas (Surface Water)



Map provided by EA in a response to a FOI data request in February 2021 (EMD-200515)

Drinking Water Safeguard Zones (Surface Water)

Map provided by EA in a response to a FOI data request in February 2021 (EMD-200515)

Nitrate Vulnerable Zone for groundwater

Map provided by EA in a response to a FOI data request in February 2021 (EMD-200515)

APPENDIX ESSD I

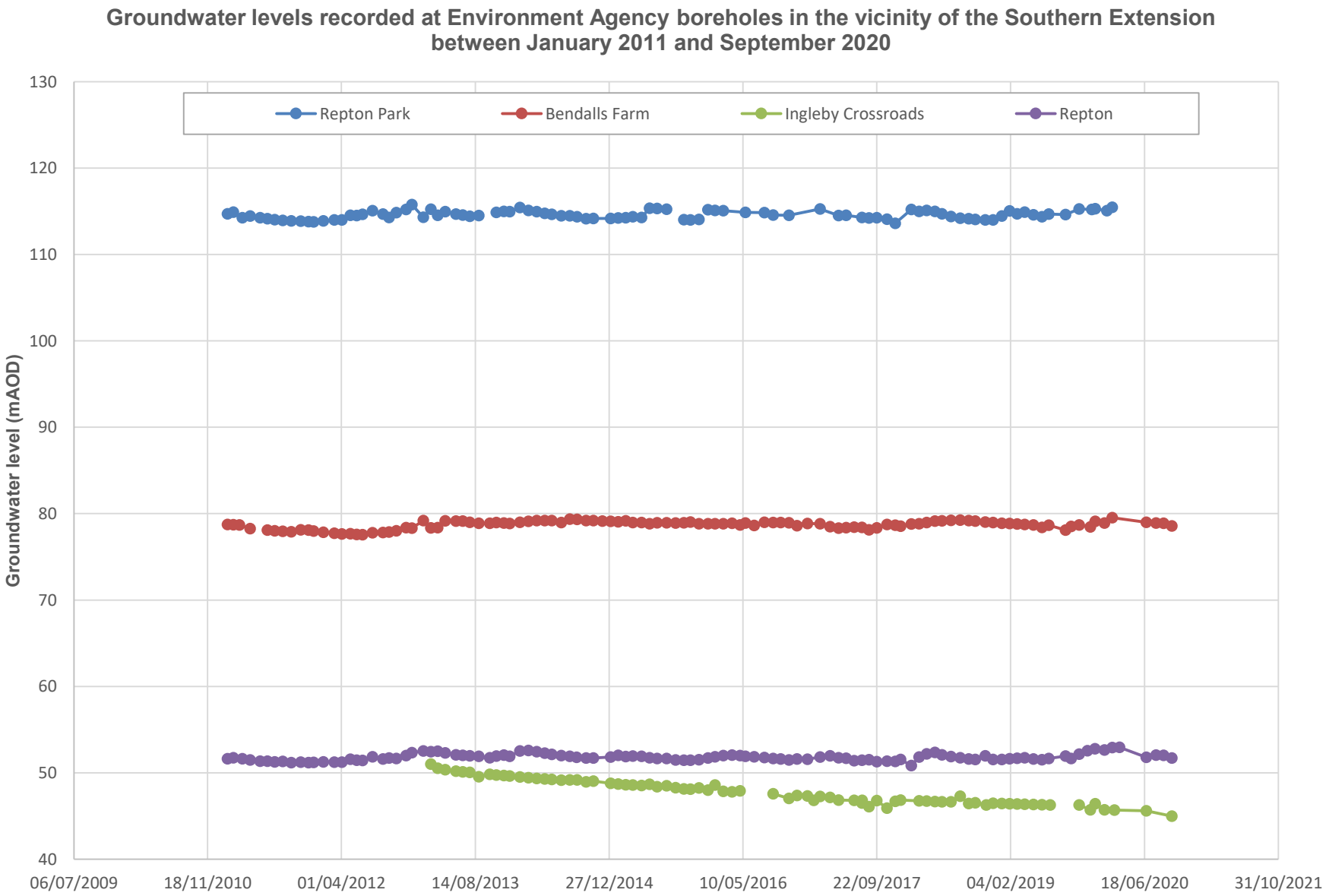
DETAILS OF SURFACE WATER AND GROUNDWATER ABSTRACTIONS WITHIN 2KM OF THE SITE

List of groundwater and surface water abstraction licences within 2km of the site

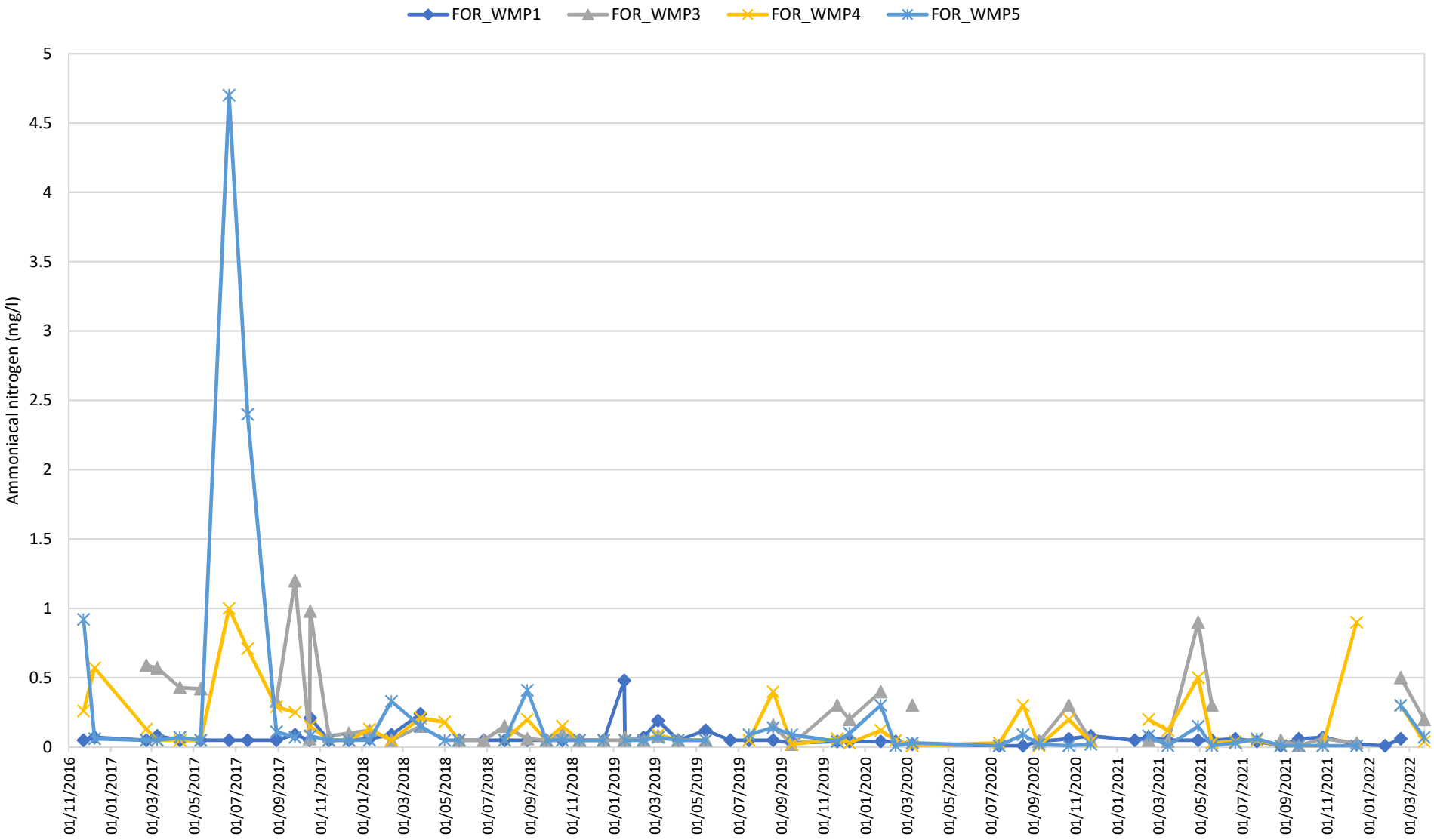
Fig ESID11 Ref	Type	Source of information	Licence No.	Max Annual Quantity (m^3)	Latitude	Longitude	X	Y	Location (NGR)	Distance to Southern Extension boundary	Point/Address	Decription	Source
1	Licensed surface water abstraction	Environmnent Agency	MD/028/0036/006	30,000	52.848829	-1.5114383	433000	328037	SK3300028037	284.4929559		Spray irrigation	River Trent at Twyford, Derby
2a	Licensed surface water abstraction	Environmnent Agency	MD/028/0036/005	10,000	52.848947	-1.5115113	432995	328050	SK3299528050	297.0427142		Spray irrigation	River Trent at Twyford, Derby
2b	Licensed surface water abstraction	Environmnent Agency	MD/028/0036/005	10,000	52.848872	-1.5042808	433482	328045	SK3348228045	88.1918825		Spray irrigation	River Trent at Twyford, Derby
2c	Licensed surface water abstraction	Environmnent Agency	MD/028/0036/005	10,000	52.849124	-1.5000460	433767	328075	SK3376728075	48.87754847		Spray irrigation	River Trent at Twyford, Derby
2d	Licensed surface water abstraction	Environmnent Agency	MD/028/0036/005	10,000	52.848669	-1.4987445	433855	328025	SK3385528025	49.52569048		Spray irrigation	River Trent at Twyford, Derby
2e	Licensed surface water abstraction	Environmnent Agency	MD/028/0036/005	10,000	52.845833	-1.4977378	433925	327710	SK3392527710	45.57961447		Spray irrigation	River Trent at Twyford, Derby
3	Licensed surface water abstraction	Environmnent Agency	03/28/36/0154	250,000	52.8432	-1.4711182	435720	327430	SK35722743	1618.077734		Transfer between sources	surface water
4	Deregulated surface water abstraction	Environmnent Agency	03/28/36/0185		52.860401	-1.5208142	432360	329320	SK32362932	1702.665737	Twyford Pistol Club	Fish Farm/Cress Pond Throughflow	Twyford Brook
5	Unlicensed surface water or groundwater abstraction	Environmnent Agency			52.8403	-1.4862961	434700	327100	SK3470027100	619.4195255	Elm Farm, Ingleby, Derbys	no description	Unknown source - possible surface water abstraction
6	Unlicensed surface water or groundwater abstraction	Environmnent Agency			52.840294	-1.4848116	434800	327100	SK3480027100	715.5244481	1&2 Elm Cottage, Ingleby, Derbys	no description	Unknown source - possible surface water abstraction
7	Unlicensed surface water or groundwater abstraction	Environmnent Agency			52.840287	-1.4833271	434900	327100	SK3490027100	812.5699496	Yew Tree Cottage, Ingleby, Derbys	no description	Unknown source - possible surface water abstraction
8	Licensed groundwater abstraction	Environmnent Agency	03/28/36/0032	330,000,000 gallons	52.8394571	-1.521029766	432361	326990	SK3236126990	790.4620178	Milton waterworks	no description	Groundwater - borehole(s)
9	Deregulated groundwater abstraction	Environmnent Agency	03/28/36/0112		52.853853	-1.5024717	433600	328600	SK336286	566.9919377	Poplars Farm	General farming and domestic	Groundwater - borehole
10	Deregulated groundwater abstraction	Environmnent Agency	03/28/36/0101		52.852105	-1.5143716	432800	328400	SK328284	690.1765811	Hall Farm	General farming and domestic	Groundwater - borehole
11	Deregulated groundwater abstraction	Environmnent Agency	03/28/36/0110		52.853016	-1.5173314	432600	328500	SK326285	847.7230461	Grange Farm	General farming and domestic	Groundwater - borehole
12	Private groundwater abstraction	South Derbyshire District Council			52.853118	-1.5160383	432687	328512	SK3268728512	895.0922501	Grange Farm, Ferry Lane, Twyford, Derbys	no description	Groundwater - borehole
13	Deregulated groundwater abstraction	Environmnent Agency	03/28/36/0098		52.855700	-1.5143314	432800	328800	SK328288	1039.688487	Green Farm	General farming and domestic	Groundwater - borehole
14	Deregulated groundwater abstraction	Environmnent Agency	03/28/36/0094		52.835061	-1.5234680	432200	326500	SK322265	1173.056951	Milton	General farming and domestic	Groundwater - catchpit
15	Deregulated groundwater abstraction	Environmnent Agency	03/28/36/0109		52.861045	-1.5023895	433600	329400	SK336294	1362.903241	Merrybower Farm	General farming and domestic	Groundwater - borehole
16	Deregulated groundwater abstraction	Environmnent Agency	03/28/36/0099		52.863735	-1.5008733	433700	329700	SK337297	1660.054542	Arleston House Farm	General farming and domestic	Groundwater - borehole
17	Deregulated groundwater abstraction	Environmnent Agency	03/28/36/0096		52.826539	-1.484529	434830	325570	SK34832557	1859.61509	Seven Sprouts Farm	General farming and domestic	Groundwater - spring
18	Private groundwater abstraction	South Derbyshire District Council			52.854014	-1.4831791	434899	328627	SK3489928627	1239.55844	The Grange	no description	Groundwater - borehole
19	Private groundwater abstraction	South Derbyshire District Council			52.830805	-1.4898813	434466	326042	SK3446626042	1292.378187	Ingelby Supply (Stanton Farm)	no description	Groundwater - spring
20	Unlicensed surface water or groundwater abstraction	Environmnent Agency			52.834855	-1.4744852	435500	326500	SK3550026500	1597.117705	Ingleby Toft, Ingleby, Derbys	no description	Unknown source

APPENDIX ESSD J

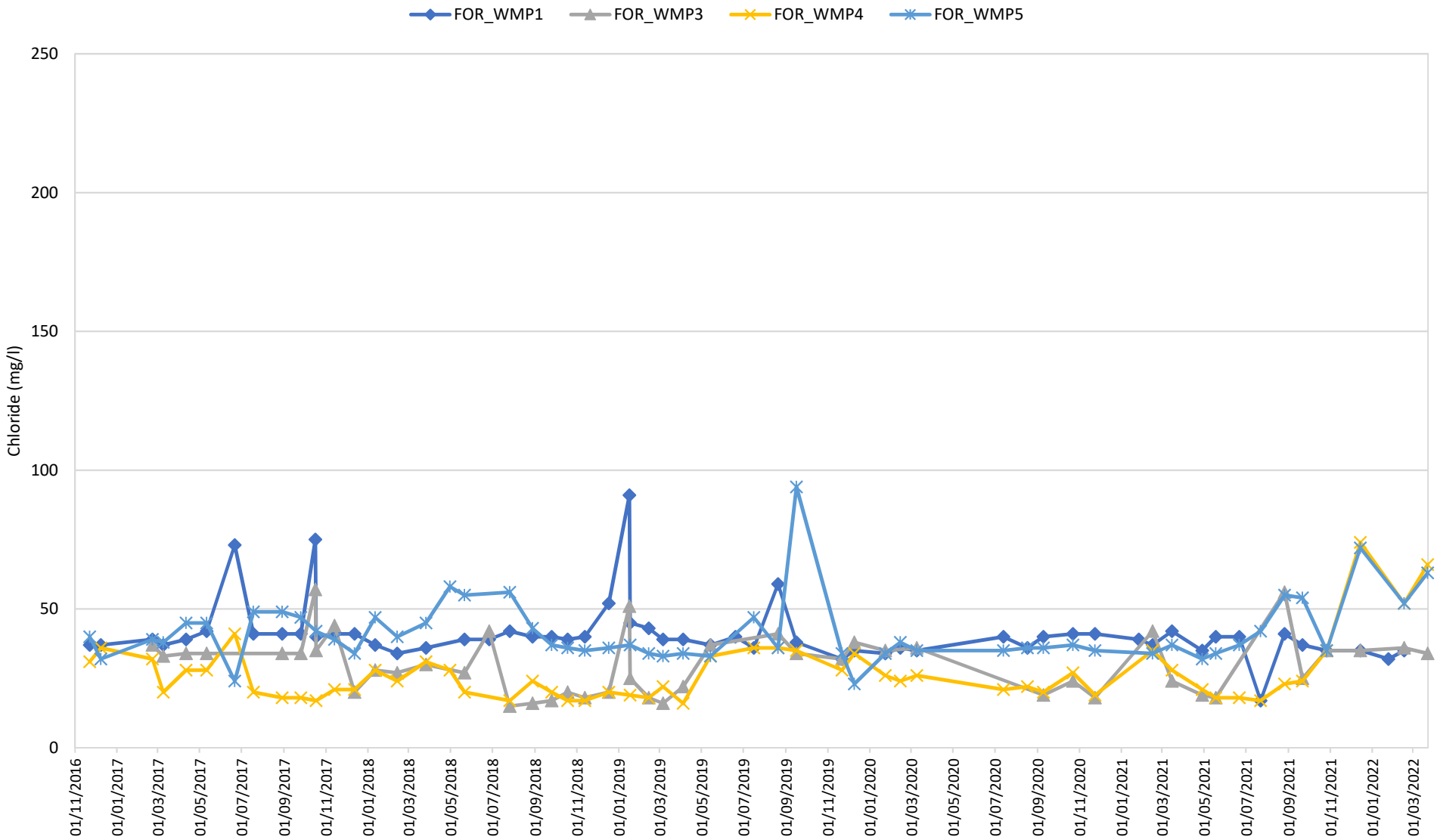
GROUNDWATER LEVEL HYDROGRAPHS AND GROUNDWATER QUALITY CHEMOGRAPHS


Groundwater levels recorded at Environment Agency boreholes in the vicinity of the Southern Extension between January 2011 and September 2020
Repton Park
Bendalls Farm
Ingleby Crossroads
Repton
Groundwater level (mAOD)
130
120
110
100
90
80
70
60
50
40
06/07/2009
18/11/2010
01/04/2012
14/08/2013
27/12/2014
10/05/2016
22/09/2017
04/02/2019
18/06/2020
31/10/2021

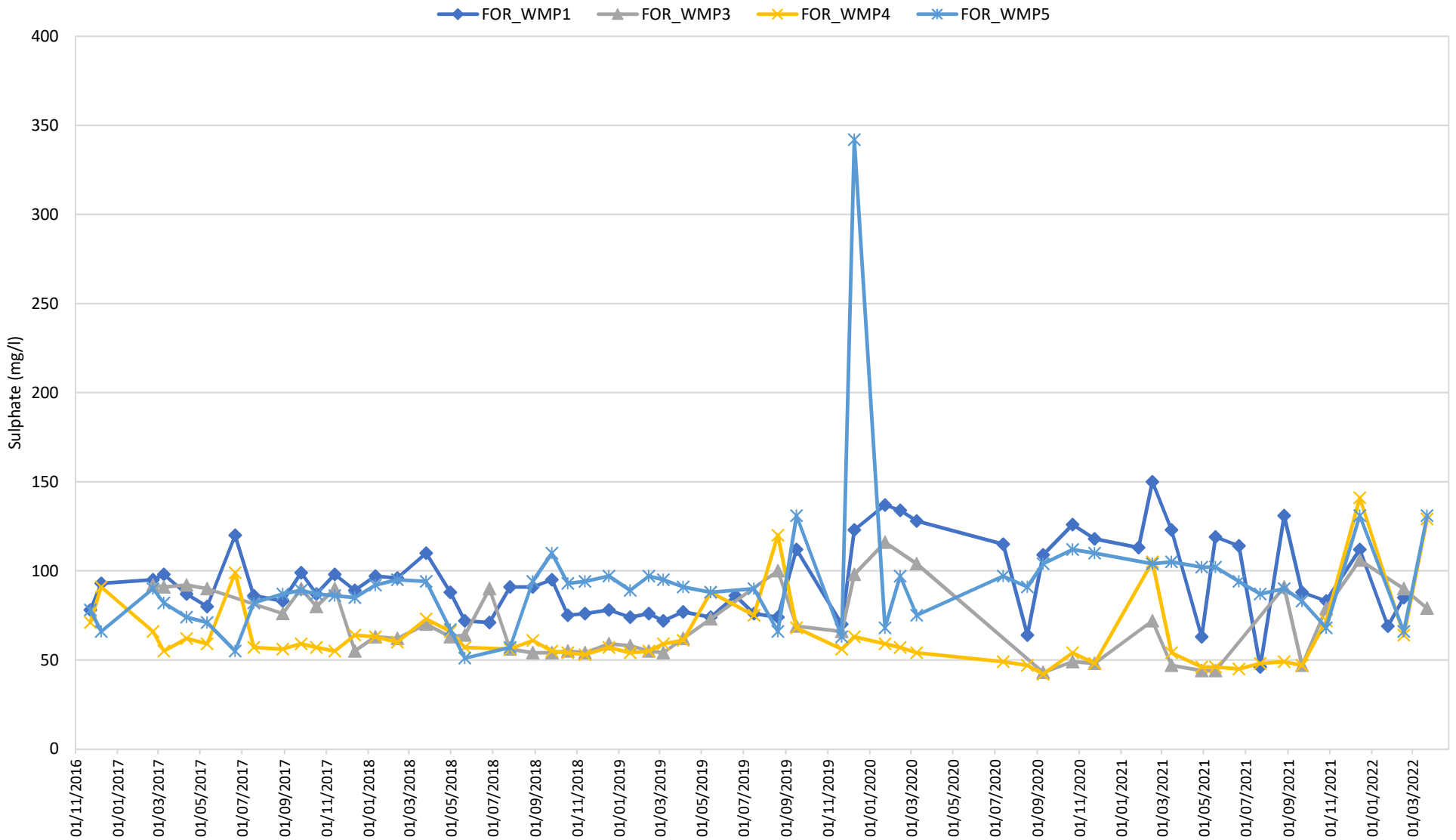
Chemograph of the concentrations of ammoniacal nitrogen recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension between November 2016 and March 2022



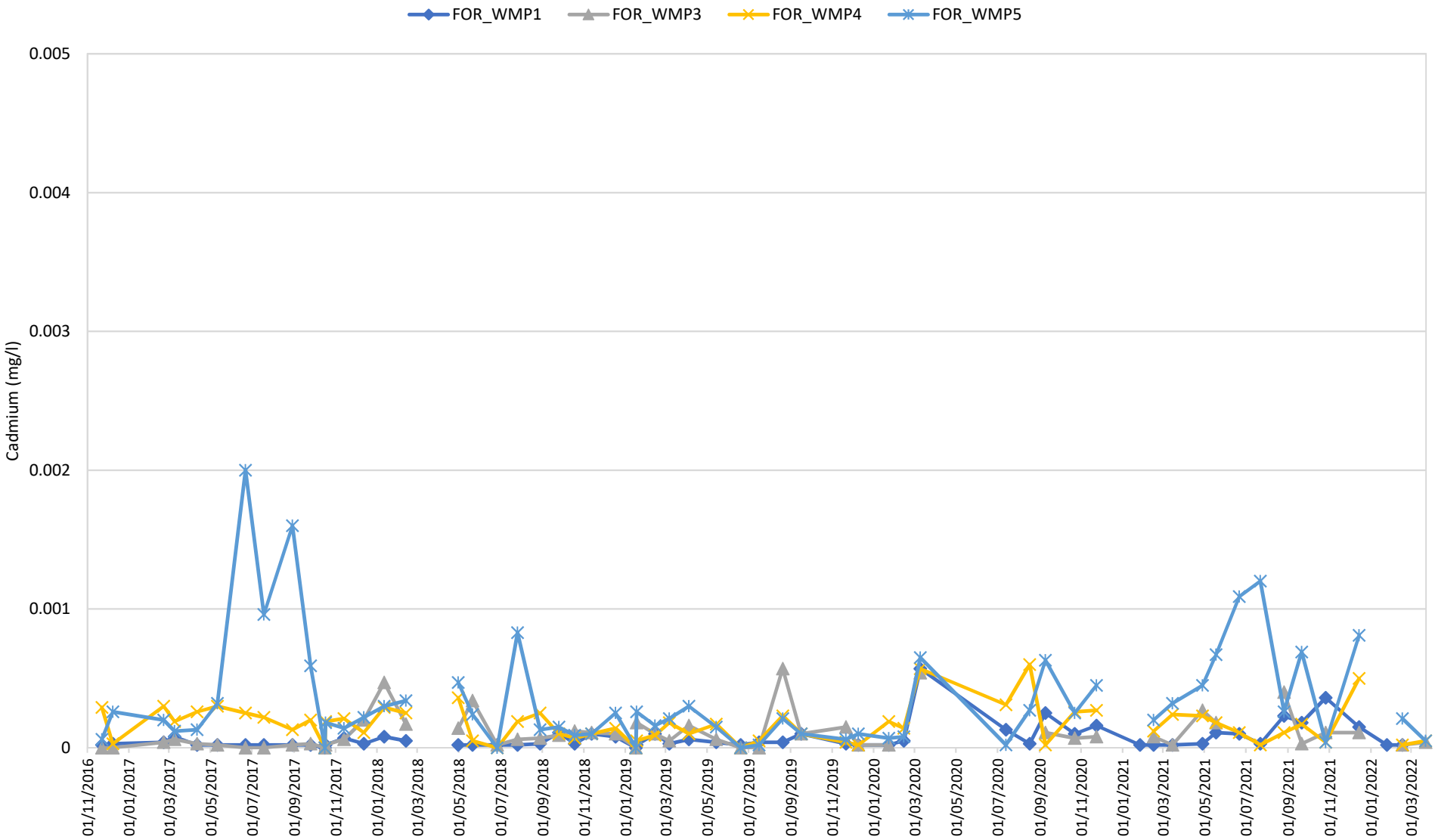
Chemograph of the concentrations of chloride recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension between November 2016 and March 2022



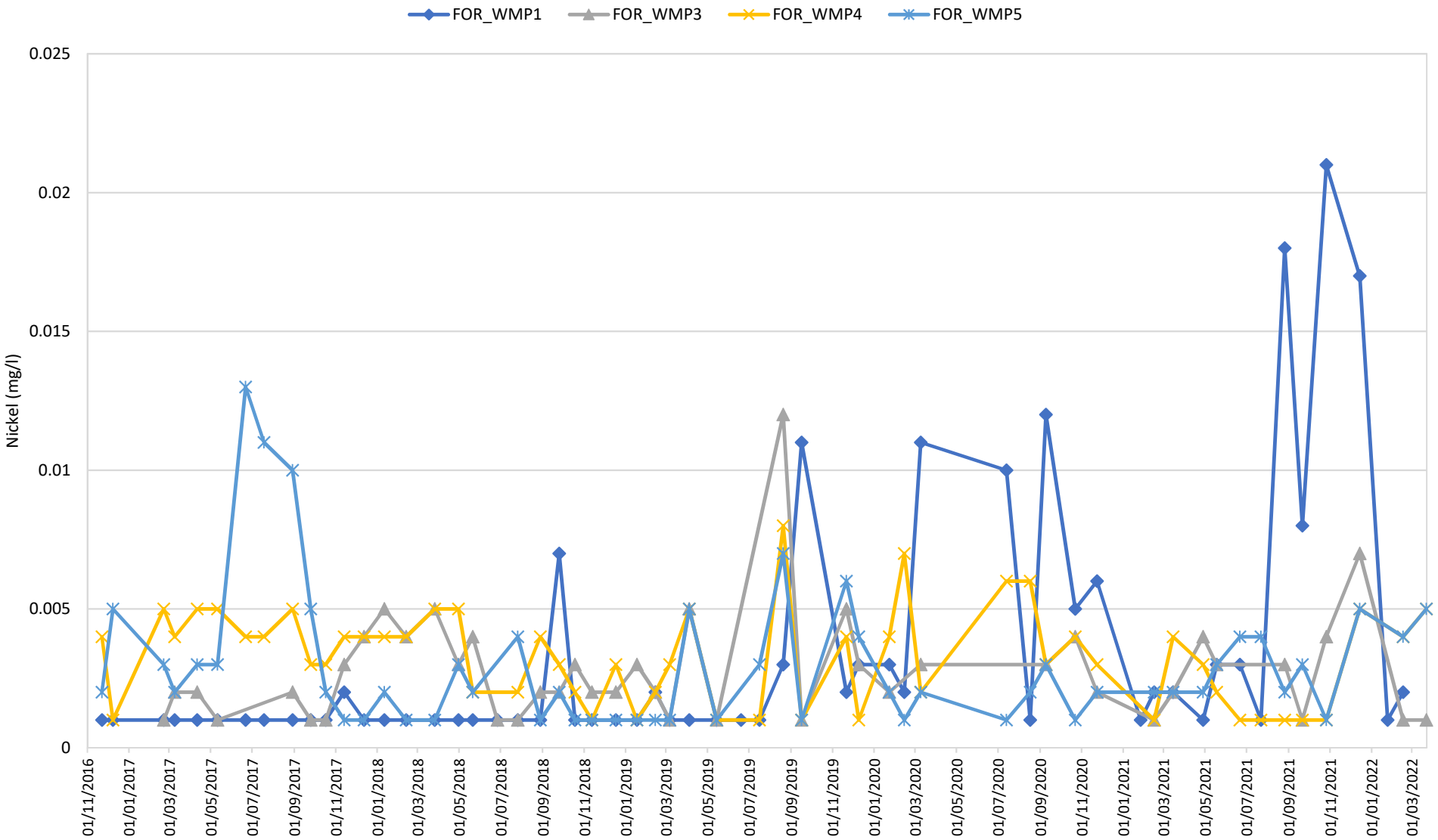
Chemograph of the concentrations of sulphate recorded in the groundwater at the monitoirng boreholes at and in the vicinity of the Southern Extension between November 2016 and March 2022



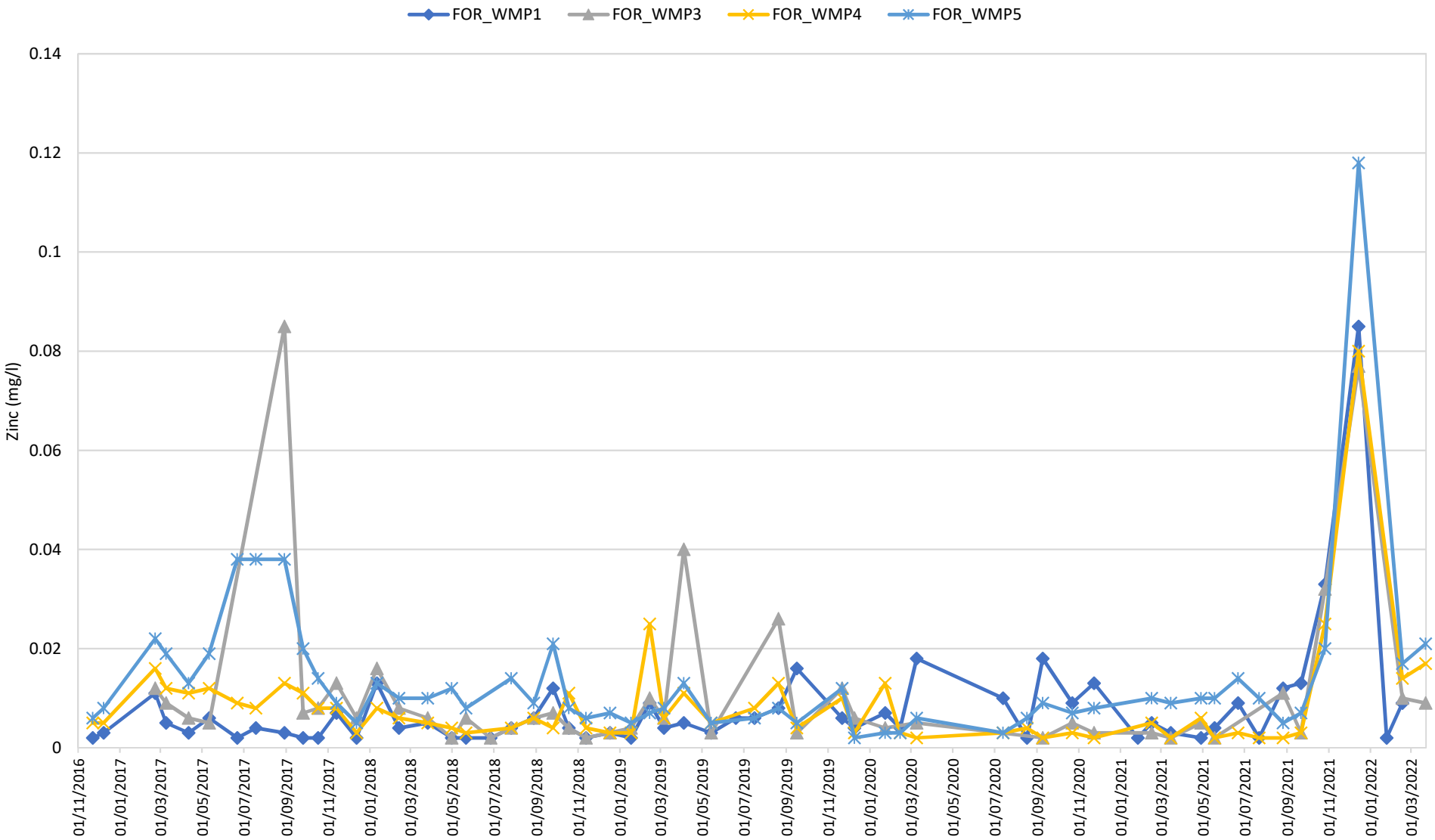
Chemograph of the concentrations of cadmium recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension between November 2016 and March 2022



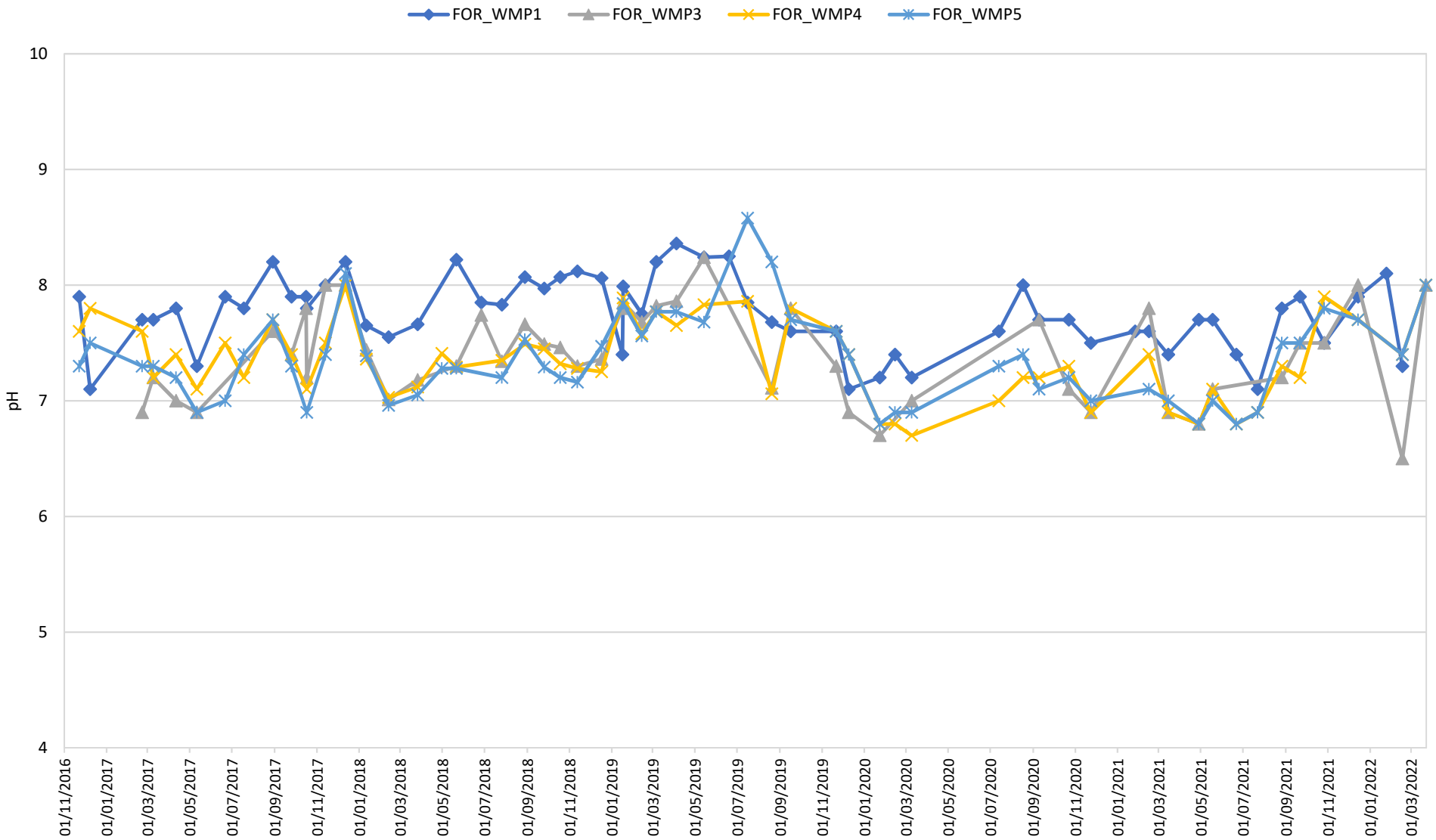
Chemograph of the concentrations of nickel recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension between November 2016 and March 2022



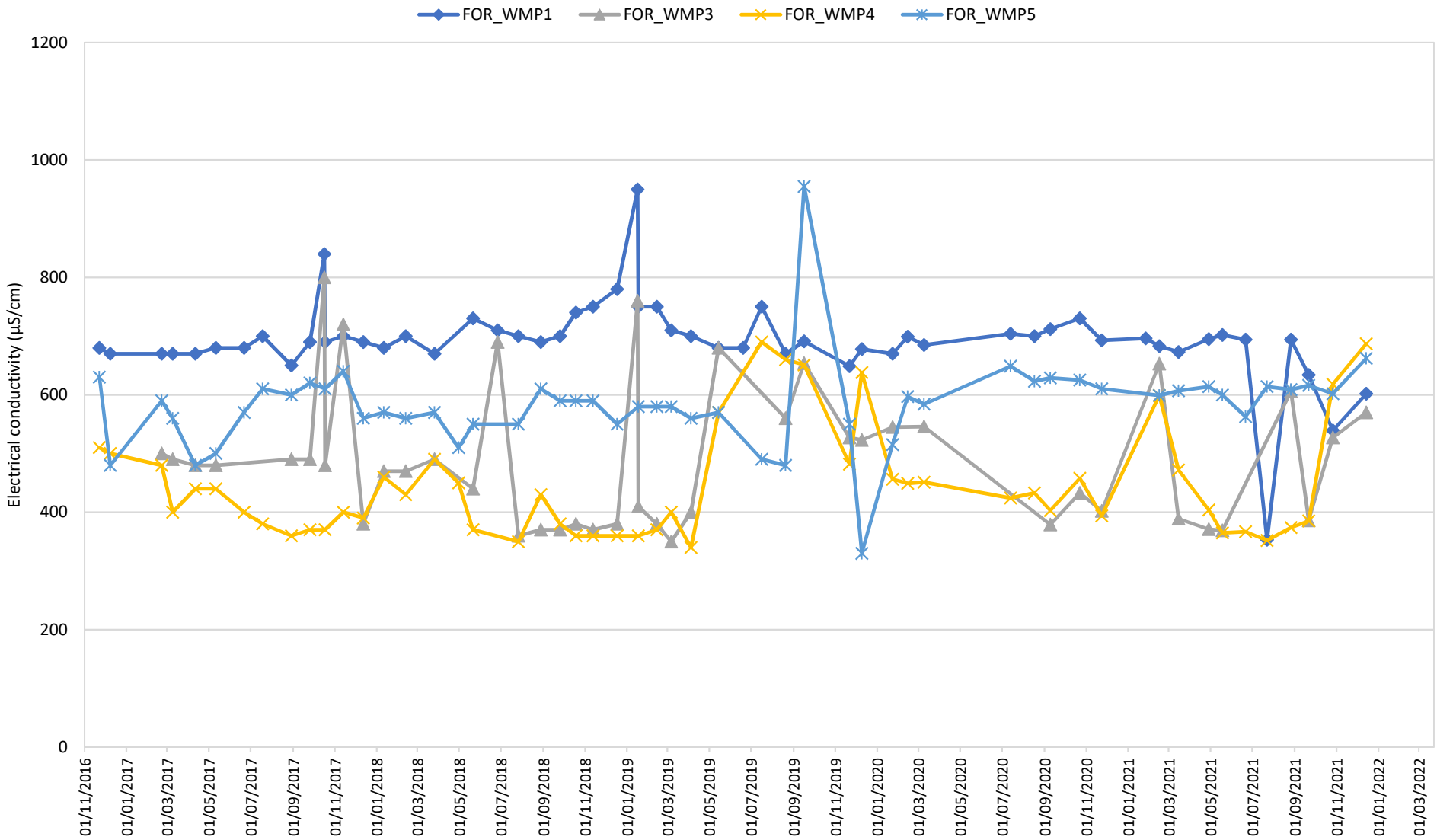
Chemograph of the concentrations of zinc recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension between November 2016 and March 2022



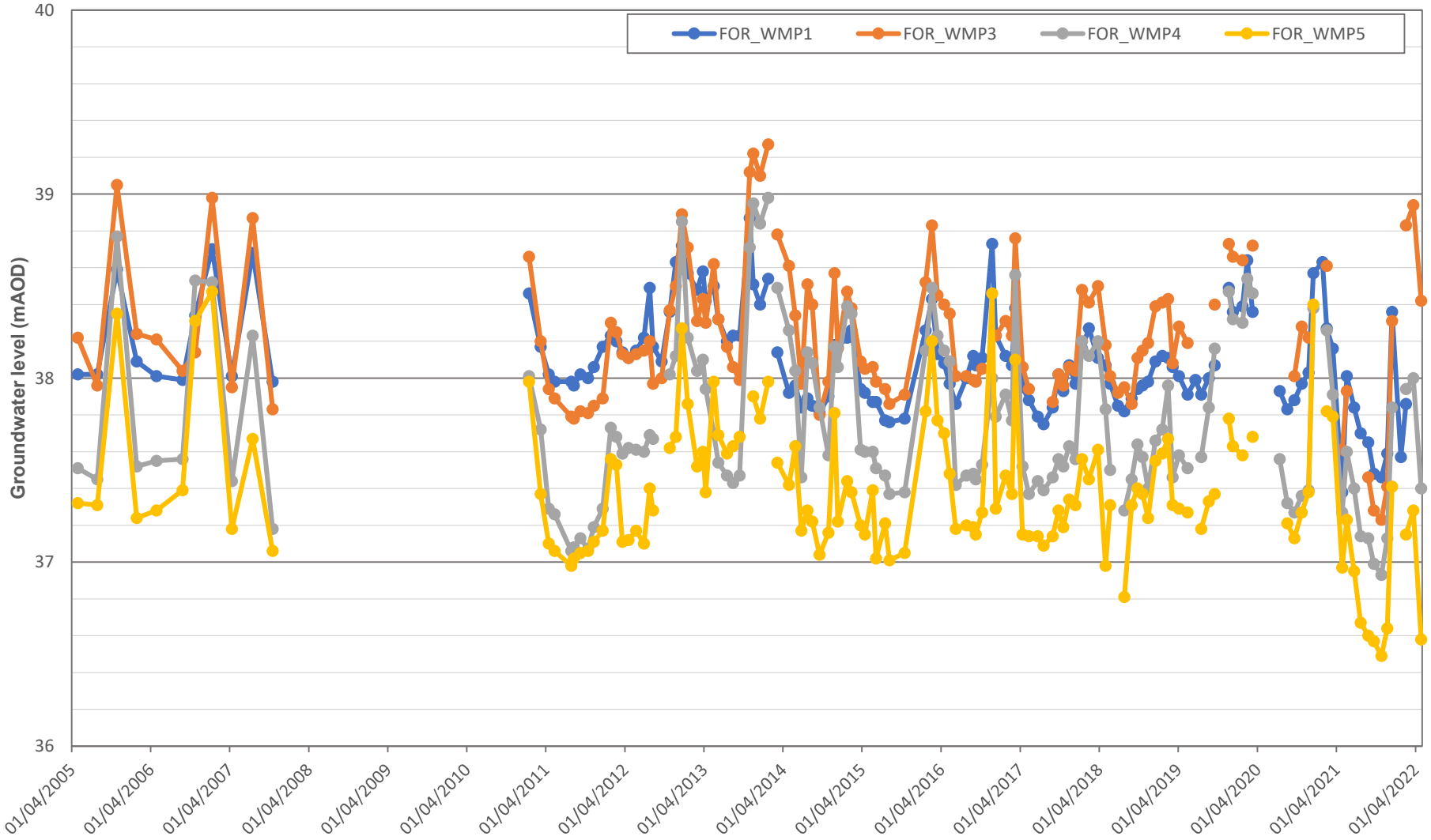
Chemograph of pH recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension between November 2016 and March 2022



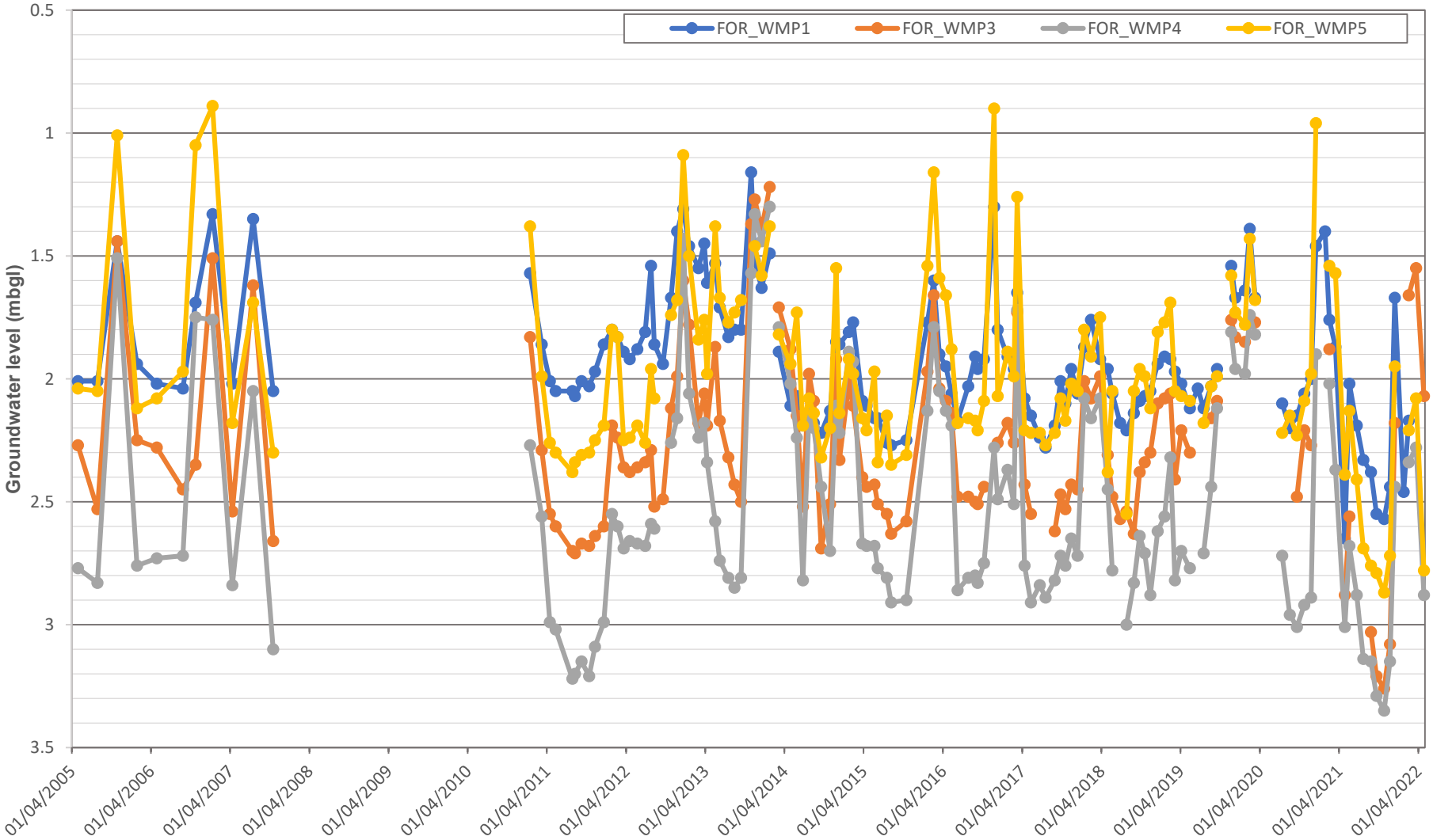
Chemograph of electrical conductivity values recorded in the groundwater at the monitoring boreholes at and in the vicinity of the Southern Extension between November 2016 and March 2022



Groundwater levels (m above Ordnance Datum) recorded in the Quaternary superficial deposits at the monitoring boreholes round the perimeter of the Southern Extension between April 2004 and April 2022

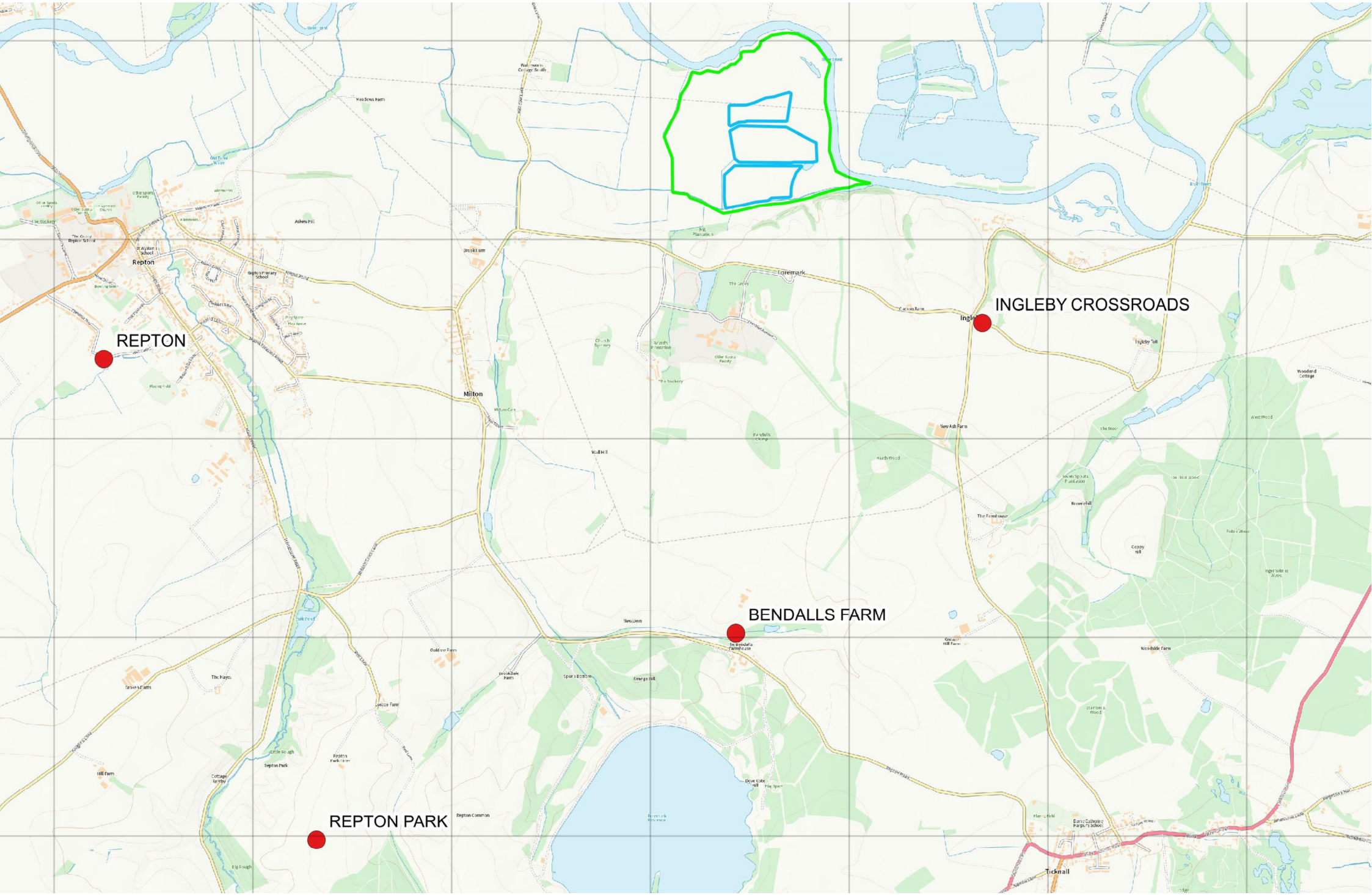


Groundwater levels (m below ground level) recorded in the Quaternary superficial deposits at the monitoring boreholes round the perimeter of the Southern Extension between April 2004 and April 2022



APPENDIX ESSD K

MAP SHOWING THE LOCATION OF ENVIRONMENT AGENCY GROUNDWATER MONITORING BOREHOLES


REPTON
INGLEBY CROSSROADS
BENDALLS FARM
REPTON PARK
Repton
Milton
Foremark
Ticknall

APPENDIX ESSD L

WATER MONITORING DATABASE

Sample Point	Date	Ammoniacal Nitrogen (mg/l)	Cadmium (mg/l)	Cadmium (low) (UG/L)	Nickel (mg/l)	Biological Oxygen Demand (mg/l)	Chloride (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Sulphate (mg/l)	Suspended Solids (mg/l)	Total Dissolved Nitrogen (mg/l)	Total Organic Carbon (mg/l)	Zinc (mg/l)	Electrical conductivity (us/cm)	pH (liquid)	TPH (ug/l)	Copper (mg/l)	Mercury (mg/l)	lead (mg/l)
FOR_WWP1	22/11/2016	<0.05	<0.02	0.03	<0.001	37	18	15	78	7	0.002	7	6.9	0.02	680	7.9				
FOR_WWP1	08/12/2016			0.03	0.001	37	20	16	93		0.003	6	6.9	0.03	670	7.1				
FOR_WWP1	21/02/2017			0.04	0.001	39	18	13	95		0.011	7	7.8	0.011	670	7.7				
FOR_WWP1	09/03/2017	0.08		0.08	0.001	37	16	9.5	98		0.004	6	7.7	0.005	670	7.7				
FOR_WWP1	11/04/2017		<0.02		0.001	39	17	11	87		0.001	8	7.8	0.003	670	7.8				
FOR_WWP1	11/05/2017	<0.05		0.02	0.001	42	21	20	80		0.002	9	6.8	0.006	680	7.3				
FOR_WWP1	21/06/2017	<0.05	<0.02		<0.001	73	16	12	120		<0.002	8	7.9		680	7.9				
FOR_WWP1	29/08/2017	<0.05	<0.02		<0.001	41	21	15	83			6	7.8	0.003	650	8.2				
FOR_WWP1	18/07/2017	<0.05	<0.02		<0.001	41	17	15	86			7	7.8	0.004	700	7.8				
FOR_WWP1	25/09/2017	0.09	<0.02		<0.001	41	20	18	99			8	7.9	<0.002	690	7.9				
FOR_WWP1	16/10/2017	<0.05				3	75				<10	0		8	840	7.9	<20			
FOR_WWP1	13/11/2017	<0.05		0.02	0.002	41	19	19	98			4	8	0.007	700	8				
FOR_WWP1	17/10/2017	<0.05	<0.02	0.21	<0.001	17	17	13	87			6	7.8	0.002	690	7.8				
FOR_WWP1	12/12/2017	<0.05		0.03	<0.001	41	17	17	89			7	8.2	<0.002	690	8.2				
FOR_WWP1	11/01/2018	<0.05		0.08	0.001	37	21	16	97			6	7.65	0.013	680	7.65				
FOR_WWP1	12/02/2018	0.09		0.05	0.001	34	23	15	96			4	7.55	0.004	700	7.55				
FOR_WWP1	26/03/2018	0.24	<0.02		<0.001	36	17	9	110	7			7.66	0.005	670	7.66				
FOR_WWP1	30/04/2018		<0.02		<0.001	19	13	88				9		<0.002						
FOR_WWP1	21/05/2018	<0.05	<0.02		<0.001	39	23	17	72			7	8.22	<0.002	730	8.22				
FOR_WWP1	26/06/2018	<0.05	<0.02		<0.001	39	22	17	71			7	7.85	<0.002	710	7.85				
FOR_WWP1	26/07/2018	<0.05	<0.02		<0.001	42	16	15	91			6	7.83	0.004	700	7.97				
FOR_WWP1	29/08/2018	<0.05	<0.02		<0.001	40	17	14	91			5	8.07	0.006	690	8.07				
FOR_WWP1	25/09/2018	<0.05		0.11	0.002	40	18	14	95		0.007	10	7.97	0.012	700	7.97				
FOR_WWP1	18/10/2018	<0.05	<0.03		<0.001	39	24	18	75			8	8.07	0.004	740	8.07				
FOR_WWP1	12/11/2018	<0.05	<0.1		<0.001	40	24	18	76			6	8.12	0.002	750	8.12				
FOR_WWP1	17/12/2018	<0.05			<0.001	52	23	25	78			11	8.06	0.003	780	8.06				
FOR_WWP1	16/01/2019	0.48				1	91			12			7.4	120	950	7.4				
FOR_WWP1	17/01/2019	<0.05	<0.02		<0.001	45	24	20	74			12	7.99	0.002	750	7.75				
FOR_WWP1	13/02/2019	0.07		0.1	0.002	43	25	17	76			26	7.75	0.009	750	7.75				
FOR_WWP1	06/03/2019	0.19		0.03	<0.001	39	22	19	72			9	7.83	0.004	700	7.83				
FOR_WWP1	04/04/2019	0.06		0.06	0.001	39	19	17	77			13	8.36	0.005	700	8.36				
FOR_WWP1	14/05/2019	0.12		0.04	0.001	37	19	18	74			4	8.34	0.003	680	8.34				
FOR_WWP1	19/06/2019	0.05		0.02	0.001	40	17	15	86			7	8.25	0.006	680	8.25				
FOR_WWP1	16/07/2019	0.04		0.04	0.001	36	20	31	76			5	7.85	0.006	750	7.85				
FOR_WWP1	20/08/2019	0.03		0.04	0.003	59	19	17	74			9	7.68	0.008	670	7.68				
FOR_WWP1	16/09/2019	0.03				38	17		112			1.1	7.6	0.016	691	7.6				
FOR_WWP1	21/11/2019	0.04		0.04	0.002	32	21	9	70			5.2	7.6	0.006	649	7.6				
FOR_WWP1	21/11/2019				0.002				18											
FOR_WWP1	09/12/2019	0.04	<0.0002		0.003	35	18	12	124			0.79	7.1	0.004	678	7.1				
FOR_WWP1	23/01/2020	0.04	<0.0002		0.003	34	18	10	137			0.97	7.2	0.007	670	7.2				
FOR_WWP1	14/02/2020	0.04	0.00005		0.002	36	18	10				1.3	7.4	0.004	699	7.4				
FOR_WWP1	09/03/2020	0.02	0.00057		0.011	35	17	10	128			0.88	7.2	0.018	685	7.2				
FOR_WWP1	13/07/2020	0.01	0.00013		0.01	40	17	14	115			0.77	7.04	0.01	704	7.6				
FOR_WWP1	17/08/2020	<0.01	0.00003		<0.001	36	22	15	64			2.5	7.12	0.002	700	8				
FOR_WWP1	22/10/2020	0.08	0.0001		0.005	41	18	13	126			0.83	7.7	0.009	730	7.7				
FOR_WWP1	23/11/2020	0.08	0.00015		0.006	41	17	13	118			0.84	7.5	0.013	693	7.5				
FOR_WWP1	26/01/2021	0.05	<0.00002		0.001	39	18	19	113			0.77	7.6	<0.002	696	7.6				
FOR_WWP1	15/02/2021	0.07	<0.00002		0.002	37	19	12	112			0.89	7.6	0.005	683	7.6				
FOR_WWP1	15/03/2021	0.05	<0.00002		0.002	42	17	12	129			0.97	7.3	0.003	673	7.4				
FOR_WWP1	23/04/2021	0.05	0.00003	<0.001	0.003	35	22	18	63			2	7.7	<0.002	695	7.7				
FOR_WWP1	21/06/2021	0.06	0.0001		0.003	40	17	12	119			0.77	7.02	0.004	702	7.7				
FOR_WWP1	18/05/2021	0.05	0.00011		0.003	40	17	12	119			0.69	6.94	0.009	694	7.4				
FOR_WWP1	22/07/2021	0.04	0.00003		0.001	17	8	10	46			2.1	7.1	<0.002	353	7.1				
FOR_WWP1	26/08/2021	0.01	0.00023		0.018	41	16	18	131			0.33	6.94	0.012	694	7.8				
FOR_WWP1	21/09/2021	0.06	0.00018		0.008	37	14	14	88			0.78	6.34	0.013	634	7.9				
FOR_WWP1	26/10/2021	0.07	0.00036		0.021	35	14	17	83			1.6	5.39	0.033	602	7.5				
FOR_WWP1	14/12/2021	0.02	0.00015		0.017	35	15	22	112			1.1	6.02	0.085	602	7.9				
FOR_WWP1	24/01/2022	<0.01	<0.00002	<0.001		32	20	17	69			2.8	8.1	0.002	690	7.3	<0.001	0.001	<0.0001	<0.001
FOR_WWP1	16/02/2022	0.06	<0.00002		0.002	35	13	17	85			1.5	7.3	0.009	690	7.4	<0.001	0.003	<0.00003	<0.001
FOR_WWP2	16/10/2017	<0.05				3	76				<10		7.9	<20	840	7.9	<20			
FOR_WWP2	21/02/2018	0.22				1	86				<10		7.4	200	910	7.4				
FOR_WWP2	21/03/2018	0.59			0.001		37	19	17		92		6.9		500	6.9				
FOR_WWP2	09/03/2017	0.57			0.002		33	17	13		92		7.2		490	7.2				
FOR_WWP2	11/04/2017	0.43			0.002		34	17	13		92		7		480	7				
FOR_WWP2	11/05/2017	0.42			<0.001		34	21	20		90		6.9	0.005	480	6.9				
FOR_WWP2	29/08/2017	0.33	<0.2		0.002		34	20	19		76		7.6	0.085	490	7.6				
FOR_WWP2	25/09/2017	1.2		0.03	0.001		34	22	22		90		7.4	0.007	490	7.4	<20			
FOR_WWP2	16/10/2017	<0.05				3	57				<10				800	7.8	<20			
FOR_WWP3	16/02/2022	<0.5	<0.00002		<0.001	36	14	17	90			2	6.5	<0.001	<0.0001	<0.00003	<0.001			
FOR_WWP3	22/03/2022	0.4	0.00004		0.001	34	21	17	79			3	8	0.001	<0.00003	<0.001				
FOR_WWP3	22/11/2019	0.26	<0.00002		0.004	31	12	19	71			0.29	7.6	0.03	510	7.6				
FOR_WWP3	08/12/2019	0.57		0.03	<0.001	36	19	15	91			5	7.8	0.005	500	7.8				
FOR_WWP3	21/02/2019	0.13		0.3	0.005	32	12	19	66			0.26	7.8	0.012	480	7.8				
FOR_WWP3	09/03/2018	0.4	<0.00002	0.02	0.001	20	8.8	15	70			0.24	7.4	0.004	480	7.4				
FOR_WWP3	28/03/2018	0.41		0.2	0.001	14	8.6	15	99			0.26	7.4	0.004	400	7.5				
FOR_WWP3	11/05/2017					28	14	22	59			0.3	7.1	0.005	440	7.1				
FOR_WWP3	14/06/2017					28	11	17	62			0.26	7.4	0.005	440	7.4				
FOR_WWP3	09/10/2017					20	8.8	15	55			0.19	7.2	0.004	400	7.2				
FOR_WWP3	21/02/2018	0.33			0.001	40	23	32	95			0.34	6.96	0.01	560	6.96				
FOR_WWP3	12/03/2018	0.15	0.41		0.001	45	15	19	94	6		0.01	7.05	0.01	570	7.05				
FOR_WWP3	26/03/2018					45	15	19	94			0.01	7.05	0.01	570	7.05				
FOR_WWP3	30/04/2018	0.48			0.001	58	14	32	67			0.47	7.28	0.012	510	7.28				
FOR_WWP3	21/05/2018	0.41			0.001	55	14	27	51			0.24	7.28	0.008	550	7.28				
FOR_WWP3	26/06/2018				0.001	56	14	31	57			0.83	7.2	0.014	550	7.2				
FOR_WWP3	28/08/2018	0.41			0.001	43	17	25	94			0.13	7.53	0.009	610	7.53				
FOR_WWP3	25/09/2018	0.41			0.001	37	20	16	110			0.15	7.29	0.021	590	7.29				
FOR_WWP3	18/10/2018	<0.05			0.001	36	16	17	93			0.09	7.2	0.008	590	7.2				
FOR_WWP3	21/11/2018	<0.05	<0.1		<0.001	35	18	15	94			0.03	7.16	0.006	590	7.16				
FOR_WWP3	13/12/2018	<0.05			<0.001	35	14	17	79			0.25	7.47	0.003	580	7.47				
FOR_WWP3	17/01/2019	<0.05			<0.001	37	16	15	89			0.26	7.84	0.005	580	7.84				
FOR_WWP3	13/02/2019	<0.05			0.001	34	15	14	97			0.16	7.56	0.007	580	7.56				
FOR_WWP3	06/03/2019	0.07			0.001	33	16	15	95			0.21	7.77	0.008	580	7.77				
FOR_WWP3	04/04/2019	<0.05			<0.005	34	15	13	91			0.3	7.77	0.013	560	7.77				
FOR_WWP3	14/05/2019	<0.05			<0.001	33	15	14	88			0.15	7.68	0.005	570	7.68				
FOR_WWP3	16/07/2019	0.09			0.003	47	12	36	90			0.02	8.58	0.006	490	8.58				
FOR_WWP3	20/08/2019	0.14			0.003	36	9.9	27	66			0.21	8.2	0.008	480	8.2				
FOR_WWP3	16/09/2019	<0.0001			<0.001	60														
FOR_WWP3	16/09/2019	0.09				94	20	27	131				7.7	0.005	955	7.7				
FOR_WWP3	21/11/2019	0.04				63														
FOR_WWP3	21/11/2019						15	23												
FOR_WWP3	23/01/2020	0.3	<0.0002		0.002	34	15	23	342			9.1	7.4	0.002	330	7.4				
FOR_WWP3	14/02/2020	0.01	0.00008	<0.001		38	18	18							597	6.9				
FOR_WWP3	14/02/2020								97											
FOR_WWP3	09/03/2020	0.03	0.00065		0.002	35	16	19	75			3.4	6.9	0.006	584	6.9				
FOR_WWP3	13/07/2020	<0.01	<0.00002		<0.001	35	17	16	97			1.2	6.49	0.003	597	6.9				
FOR_WWP3	17/08/2020	0.09	0.00027		0.002	36	16	15	91			1.3	6.23	0.006	629	7.4				
FOR_WWP3	09/09/2020	0.02	0.00063		0.003	36	18	18	104			1.1	6.29	0.009	629	7.1				
FOR_WWP3	22/10/2020	0.2	0.00026		0.004	27	12	17	95			0.91	6.25	0.007	625	7.2				
FOR_WWP3	23/11/2020	0.04	0.00027		0.003	19	10	15	48			2.3	6.02	0.002	394	6.9				
FOR_WWP3	15/02/2021	0.2	0.00012	<0.001	0.003	35	17	21	105			2.5	6.02	0.005	599	7.4				
FOR_WWP3	15/03/2021	0.12	0.00023		0.003	21	10	15	46			2.6	6.02	0.006	404	6.8				
FOR_WWP3	28/04/2021	0.5	0.00023		0.003	28	12	17	54			2.3	6.02	0.002	472	6.9				
FOR_WWP3	18/05/2021	0.03	0.00018		0.002	18	9	12	46			1.9	<0.002	0.002	365	7.1				
FOR_WWP3	21/06/2021	0.04	0.00011		0.001	18	9	15	45			2.1	6.03	0.003	367	6.8				
FOR_WWP3	22/07/2021	0.05	0.00002		0.001	17	8	10	48			2	<0.002	0.002	352	6.9				
FOR_WWP3	26/08/2021	0.01	0.00011		0.001	23	9	14	49			1.8	6.02	0.002	374	7.3				
FOR_WWP3	21/09/2021	0.01	0.00017		0.001	24	8	15	47			2.2	6.03	0.003	385	7.2				
FOR_WWP3	26/10/2021	<0.01	0.00004	<0.001		35	20	18	72			2.5	6.18	0.025	618	7.9				
FOR_WWP3	21/11/2021	0.9	0.0005		0.005	74	21	49	141			3.7	6.87	0.08	687	7.7				
FOR_WWP4	16/02/2022	0.3	<0.00002		0.004	52	12	32	64			7.3	7.4	0.014						
FOR_WWP4	22/03/2022	0.04	0.00005		0.005	66	22	40	129			6	8	0.017			<0.001	0.003	<0.00003	<0.001
FOR_WWP4	22/11/2016	0.92		0.06	0.002	40	19	24	78			5	7.3	0.006	630	7.3				
FOR_WWP4	08/12/2016	0.06		0.26	0.005	32	13	19	66			5	7.5	0.008	480	7.5				
FOR_WWP4	09/03/2017	0.07		0.2	0.005	32	13	19	66			5	7.5	0.008	480	7.5				
FOR_WWP4	11/04/2017	0.07		0.13	0.003	45	14	23	74			7	7.2	0.013	480	7.2				
FOR_WWP4	09/03/2017	<0.05		0.12	0.002	38	16	22	82			3	7.3	0.019	560	7.3				
FOR_WWP4	21/04/2017	<0.05		0.39	0.003	39	17	21	90			5	7.3	0.022	590	7.3				
FOR_WWP4	13/05/2017	<0.05		0.59	0.003	42	17	20	90			5	7.3	0.022	590	7.3				
FOR_WWP4	29/08/2017	0.11	1.6	0.01		49	18	31	87			6	7.7	0.038	600	7.7				
FOR_WWP4	18/07/2017	2.4	0.96	0.011		49	17	28	82			7	7.4	0.038	610	7.4				
FOR_WWP4	21/06/2017	4.7	2	0.013		24	15	25	55			10	5.7	0.038	570	7				
FOR_WWP4	11/05/2017	0.07	0.32	0.003		45	15	26	71			8	6.9	0.019	500	6.9				
FOR_WWP4	11/04/2017	0.07	0.13	0.003		45	14	23	74			7	7.2	0.013	480	7.2				
FOR_WWP4	09/03/2017	<0.05	0.12	0.002		38	15	22	82			3	7.3	0.019	560	7.3				
FOR_WWP4	23/01/2017	<0.05	0.2	0.003		39	17	21	89			5	7.3	0.022	590	7.3				
FOR_WWP4	25/09/2017	<0.05	0.2	0.003		39	17	21	90			5	7.3	0.022	590	7.3				
FOR_WWP4	09/12/2017	0.2	<0.00002	0.03	0.003	38	15	23	98			4.7	6.9	0.006	523	6.9				
FOR_WWP4	21/11/2019	0.3	<0.00002	0.03	0.003	32	15	20	66			8.9	7.3	0.012	527	7.3				
FOR_WWP4	21/11/2019							20												
FOR_WWP4	16/09/2019	<0.0001			0.001	34	18	15	69			3.2	6.54	0.003	654	7.8				
FOR_WWP4	16/09/2019	0.02				35	18	14	68			3.4	6.51	0.004	651	7.8				
FOR_WWP4	20/08/2019	0.4		0.23	0.008	36	18	18	120			16	7.06	0.013	660	7.86				
FOR_WWP4	16/07/2019	<0.05		0.05	0.001	36	20	24	75			5	7.86	0.008	690	7.86				
FOR_WWP4	14/05/2019	<0.05		0.17	<0.001	33	15	14	88			2	7.83	0.005	570	7.83				
FOR_WWP4	04/04/2019	<0.05	<0.1		<0.005	16	6.8	11	61			12	7.65	0.011	340	7.65				
FOR_WWP4	06/03/2019	0.09		0.18	0.003	22	9.5	15	59			11	7.78	0.006	400	7.77				
FOR_WWP4	13/02/2019			0.09	0.002	18	7.8	13	55			15	7.58	0.025	370	7.58				
FOR_WWP4	17/01/2019	<0.05		0.05	0.001	19	8.2	13	63			17	7.89	0.003	360	7.89				
FOR_WWP4	17/12/2018	<0.05		0.14	0.003	20	8.6	13	57			10	7.25	0.003	360	7.25				
FOR_WWP4	12/11/2018	<0.05	<0.1		0.001	17	8	12	53			7	7.28	0.004	360	7.28				
FOR_WWP4	18/10/2018	0.15		0.07	0.002	17	7.7	11	54			7	7.32	0.011	360	7.32				
FOR_WWP4	25/09/2018	<0.05		0.1	0.003	20	8.7	14	55			11	7.45	0.004	380	7.45				
FOR_WWP4	28/08/2018	0.2		0.25	0.004	24	10	16	61			7	7.49	0.006	430	7.49				
FOR_WWP4	26/07/2018	<0.05		0.19	0.002	17	7.7	13	56			5	7.35	0.004	350	7.35				
FOR_WWP4	21/05/2018	<0.05		0.05	0.002	20	8.1	14	57			9	7.29	0.003	370	7.29				
FOR_WWP4	30/04/2018	0.18		0.36	0.005	28	11	17	66			8	7.41	0.004	450	7.41				
FOR_WWP4	26/03/2018	0.21	0.32		0.005	31	12	17	73	7			7.12	0.005	490	7.12				
FOR_WWP4	12/02/2018	0.13		0.25	0.004	24	15	21	60			5	7.03	0.006	430	7.03				
FOR_WWP4	09/03/2017	0.13		0.08	0.001	37	18	21	94			6	7.6	0.008	460	7.36				
FOR_WWP4	21/02/2017	0.12		0.04	0.001	39	18	13	95			6	7.6	0.011	670	7.7				
FOR_WWP4	08/12/2016	0.3		0.03	0.001	37	20	16	93			6	7.1	0.03	670	7.1				
FOR_WWP4	22/11/2016	0.07		0.03	0.001	37	20	16	94			6	7.1	0.03	670	7.1				

	Ground water level (mAOD)				Dipped water levels (mbgl)			
Date	FOR_WMP1	FOR_WMP3	FOR_WMP4	FOR_WMP5	FOR_WMP1	FOR_WMP3	FOR_WMP4	FOR_WMP5
29/04/2005	38.02	38.22	37.51	37.32	2.01	2.27	2.77	2.04
28/07/2005	38.02	37.96	37.45	37.31	2.01	2.53	2.83	2.05
27/10/2005	38.59	39.05	38.77	38.35	1.44	1.44	1.51	1.01
27/01/2006	38.09	38.24	37.52	37.24	1.94	2.25	2.76	2.12
28/04/2006	38.01	38.21	37.55	37.28	2.02	2.28	2.73	2.08
26/08/2006	37.99	38.04	37.56	37.39	2.04	2.45	2.72	1.97
24/10/2006	38.34	38.14	38.53	38.31	1.69	2.35	1.75	1.05
10/01/2007	38.7	38.98	38.52	38.47	1.33	1.51	1.76	0.89
11/04/2007	38.01	37.95	37.44	37.18	2.02	2.54	2.84	2.18
16/07/2007	38.68	38.87	38.23	37.67	1.35	1.62	2.05	1.69
16/10/2007	37.98	37.83	37.18	37.06	2.05	2.66	3.1	2.3
22/01/2008								
13/01/2011	38.46	38.66	38.01	37.98	1.57	1.83	2.27	1.38
08/03/2011	38.17	38.2	37.72	37.37	1.86	2.29	2.56	1.99
14/04/2011	38.02	37.94	37.29	37.1	2.01	2.55	2.99	2.26
11/05/2011	37.98	37.89	37.26	37.06	2.05	2.6	3.02	2.3
28/07/2011	37.98	37.79	37.06	36.98	2.05	2.7	3.22	2.38
08/08/2011	37.96	37.78	37.08	37.02	2.07	2.71	3.2	2.34
08/09/2011	38.02	37.82	37.13	37.05	2.01	2.67	3.15	2.31
13/10/2011	38	37.81	37.07	37.06	2.03	2.68	3.21	2.3
08/11/2011	38.06	37.85	37.19	37.11	1.97	2.64	3.09	2.25
20/12/2011	38.17	37.89	37.29	37.17	1.86	2.6	2.99	2.19
26/01/2012	38.23	38.3	37.73	37.56	1.8	2.19	2.55	1.8
21/02/2012	38.2	38.25	37.68	37.53	1.83	2.24	2.6	1.83
20/03/2012	38.14	38.13	37.59	37.11	1.89	2.36	2.69	2.25
17/04/2012	38.11	38.11	37.62	37.12	1.92	2.38	2.66	2.24
22/05/2012	38.15	38.13	37.61	37.17	1.88	2.36	2.67	2.19
27/06/2012	38.22	38.15	37.6	37.1	1.81	2.34	2.68	2.26
24/07/2012	38.49	38.2	37.69	37.4	1.54	2.29	2.59	1.96
08/08/2012	38.17	37.97	37.67	37.28	1.86	2.52	2.61	2.08
17/09/2012	38.09	38			1.94	2.49		
24/10/2012	38.36	38.37	38.02	37.62	1.67	2.12	2.26	1.74
21/11/2012	38.63	38.5	38.12	37.68	1.4	1.99	2.16	1.68
19/12/2012	38.72	38.89	38.85	38.27	1.31	1.6	1.43	1.09
15/01/2013	38.57	38.71	38.22	37.86	1.46	1.78	2.06	1.5
28/02/2013	38.48	38.31	38.04	37.52	1.55	2.18	2.24	1.84
26/03/2013	38.58	38.43	38.1	37.6	1.45	2.06	2.18	1.76
08/04/2013	38.42	38.3	37.94	37.38	1.61	2.19	2.34	1.98
16/05/2013	38.5	38.62	37.7	37.98	1.53	1.87	2.58	1.38
06/06/2013	38.32	38.32	37.54	37.69	1.71	2.17	2.74	1.67
16/07/2013	38.2	38.17	37.47	37.59	1.83	2.32	2.81	1.77
13/08/2013	38.23	38.06	37.43	37.63	1.8	2.43	2.85	1.73
12/09/2013	38.23	37.99	37.47	37.68	1.8	2.5	2.81	1.68
29/10/2013	38.87	39.12	38.71		1.16	1.37	1.57	
14/11/2013	38.51	39.22	38.95	37.9	1.52	1.27	1.33	1.46
16/12/2013	38.4	39.1	38.84	37.78	1.63	1.39	1.44	1.58
22/01/2014	38.54	39.27	38.98	37.98	1.49	1.22	1.3	1.38
13/02/2014								
05/03/2014	38.14	38.78	38.49	37.54	1.89	1.71	1.79	1.82
28/04/2014	37.92	38.61	38.26	37.42	2.11	1.88	2.02	1.94
27/05/2014	37.96	38.34	38.04	37.63	2.07	2.15	2.24	1.73
25/06/2014	37.84	37.97	37.46	37.17	2.19	2.52	2.82	2.19
22/07/2014	37.89	38.51	38.14	37.28	2.14	1.98	2.14	2.08
14/08/2014	37.85	38.4	38.08	37.22	2.18	2.09	2.2	2.14
17/09/2014	37.81	37.8	37.84	37.04	2.22	2.69	2.44	2.32
28/10/2014	37.9	37.98	37.58	37.16	2.13	2.51	2.7	2.2
25/11/2014	38.18	38.57	38.17	37.81	1.85	1.92	2.11	1.55
10/12/2014	38.17	38.16	38.06	37.22	1.86	2.33	2.22	2.14

22/01/2015	38.22	38.47	38.39	37.44	1.81	2.02	1.89	1.92
11/02/2015	38.26	38.38	38.35	37.38	1.77	2.11	1.93	1.98
25/03/2015	37.94	38.09	37.61	37.2	2.09	2.4	2.67	2.16
14/04/2015	37.92	38.05	37.6	37.15	2.11	2.44	2.68	2.21
20/05/2015	37.87	38.06	37.6	37.39	2.16	2.43	2.68	1.97
05/06/2015	37.87	37.98	37.51	37.02	2.16	2.51	2.77	2.34
16/07/2015	37.77	37.94	37.47	37.21	2.26	2.55	2.81	2.15
06/08/2015	37.76	37.86	37.37	37.01	2.27	2.63	2.91	2.35
15/10/2015	37.78	37.91	37.38	37.05	2.25	2.58	2.9	2.31
20/01/2016	38.26	38.52	38.15	37.82	1.77	1.97	2.13	1.54
18/02/2016	38.43	38.83	38.49	38.2	1.6	1.66	1.79	1.16
15/03/2016	38.13	38.45	38.23	37.77	1.9	2.04	2.05	1.59
14/04/2016	38.08	38.4	38.15	37.7	1.95	2.09	2.13	1.66
10/05/2016	37.97	38.35	38.09	37.48	2.06	2.14	2.19	1.88
07/06/2016	37.86	38.01	37.42	37.18	2.17	2.48	2.86	2.18
26/07/2016	38	38.01	37.47	37.2	2.03	2.48	2.81	2.16
26/08/2016	38.12	37.99	37.48	37.19	1.91	2.5	2.8	2.17
07/09/2016	38.07	37.98	37.45	37.15	1.96	2.51	2.83	2.21
06/10/2016	38.11	38.05	37.53	37.27	1.92	2.44	2.75	2.09
22/11/2016	38.73		38	38.46	1.3		2.28	0.9
08/12/2016	38.23	38.23	37.79	37.29	1.8	2.26	2.49	2.07
23/01/2017	38.12	38.31	37.91	37.47	1.91	2.18	2.37	1.89
21/02/2017	38.07	38.23	37.77	37.37	1.96	2.26	2.51	1.99
09/03/2017	38.38	38.76	38.56	38.1	1.65	1.73	1.72	1.26
11/04/2017	37.95	38.06	37.52	37.15	2.08	2.43	2.76	2.21
11/05/2017	37.88	37.94	37.37	37.14	2.15	2.55	2.91	2.22
21/06/2017	37.79		37.44	37.14	2.24		2.84	2.22
18/07/2017	37.75		37.39	37.09	2.28		2.89	2.27
29/08/2017	37.84	37.87	37.46	37.14	2.19	2.62	2.82	2.22
25/09/2017	38.02	38.02	37.56	37.28	2.01	2.47	2.72	2.08
17/10/2017	37.93	37.96	37.52	37.19	2.1	2.53	2.76	2.17
13/11/2017	38.07	38.06	37.63	37.34	1.96	2.43	2.65	2.02
12/12/2017	37.97	38.04	37.56	37.31	2.06	2.45	2.72	2.05
11/01/2018	38.16	38.48	38.2	37.56	1.87	2.01	2.08	1.8
12/02/2018	38.27	38.41	38.12	37.45	1.76	2.08	2.16	1.91
26/03/2018	38.11	38.5	38.2	37.61	1.92	1.99	2.08	1.75
30/04/2018	38.07	38.18	37.83	36.98	1.96	2.31	2.45	2.38
21/05/2018	37.97	38.01	37.5	37.31	2.06	2.48	2.78	2.05
26/06/2018	37.85	37.92			2.18	2.57		
26/07/2018	37.82	37.95	37.28	36.81	2.21	2.54	3	2.55
28/08/2018	37.89	37.86	37.45	37.31	2.14	2.63	2.83	2.05
25/09/2018	37.94	38.11	37.64	37.4	2.09	2.38	2.64	1.96
18/10/2018	37.96	38.15	37.57	37.37	2.07	2.34	2.71	1.99
12/11/2018	37.98	38.19	37.4	37.24	2.05	2.3	2.88	2.12
17/12/2018	38.09	38.39	37.66	37.55	1.94	2.1	2.62	1.81
17/01/2019	38.12	38.41	37.72	37.59	1.91	2.08	2.56	1.77
13/02/2019	38.11	38.43	37.96	37.67	1.92	2.06	2.32	1.69
06/03/2019	38.06	38.08	37.46	37.31	1.97	2.41	2.82	2.05
04/04/2019	38.01	38.28	37.58	37.29	2.02	2.21	2.7	2.07
14/05/2019	37.91	38.19	37.51	37.27	2.12	2.3	2.77	2.09
19/06/2019	37.99				2.04			
16/07/2019	37.91		37.57	37.18	2.12		2.71	2.18
20/08/2019	38		37.84	37.33	2.03	2.16	2.44	2.03
16/09/2019	38.07	38.4	38.16	37.37	1.96	2.09	2.12	1.99
26/10/2019								
21/11/2019	38.49	38.73	38.47	37.78	1.54	1.76	1.81	1.58
09/12/2019	38.36	38.66	38.32	37.63	1.67	1.83	1.96	1.73
23/01/2020	38.39	38.64	38.3	37.58	1.64	1.85	1.98	1.78
14/02/2020	38.64		38.54		1.39		1.74	1.43
09/03/2020	38.36	38.72	38.46	37.68	1.67	1.77	1.82	1.68

15/04/2020								
15/05/2020								
14/06/2020								
13/07/2020	37.93		37.56		2.1		2.72	2.22
17/08/2020	37.83		37.32	37.21	2.2		2.96	2.15
18/09/2020	37.88	38.01	37.27	37.13	2.15	2.48	3.01	2.23
22/10/2020	37.97	38.28	37.36	37.27	2.06	2.21	2.92	2.09
23/11/2020	38.03	38.22	37.39	37.38	2	2.27	2.89	1.98
15/12/2020	38.57		38.38	38.4	1.46		1.9	0.96
26/01/2021	38.63				1.4			
15/02/2021	38.27	38.61	38.26	37.82	1.76	1.88	2.02	1.54
15/03/2021	38.16		37.91	37.79	1.87		2.37	1.57
28/04/2021	37.38	37.61	37.27	36.97	2.65	2.88	3.01	2.39
18/05/2021	38.01	37.93	37.6	37.23	2.02	2.56	2.68	2.13
21/06/2021	37.84		37.4	36.95	2.19		2.88	2.41
22/07/2021	37.7		37.14	36.67	2.33		3.14	2.69
26/08/2021	37.65	37.46	37.13	36.6	2.38	3.03	3.15	2.76
21/09/2021	37.48	37.28	36.99	36.57	2.55	3.21	3.29	2.79
26/10/2021	37.46	37.23	36.93	36.49	2.57	3.26	3.35	2.87
22/11/2021	37.59	37.41	37.13	36.64	2.44	3.08	3.15	2.72
14/12/2021	38.36	38.31	37.84	37.41	1.67	2.18	2.44	1.95
24/01/2022	37.57				2.46			
16/02/2022	37.86	38.83	37.94	37.15	2.17	1.66	2.34	2.21
22/03/2022		38.94	38	37.28		1.55	2.28	2.08
27/04/2022		38.42	37.4	36.58		2.07	2.88	2.78