

Validation Report

Site: Land at Greenbooth Road and Edenfield Road, Norden

Reference: 17-330-R1

Date: January 2025





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17-330-002 – Proposed Development Plan
17-330-003 – Historical Features Plan – Ponds, Reservoirs, Tanks and Landfill
17-330-031 – Remediation Sample Plan – Waters
17-330-032 – Remediation Sample Plan – Geotechnical
17-330-033 – Remediation Sample Plan – Chemical
17-330-034 – Remediation Sample Plan – In-Situ Testing
17-330-045 – Archaeological Trench Plan

Drawing List – Urban Regen

390-15-08-24-02 – Base of Dig, Edenfield Road, Norden
390-002-01 – As built topographic survey and constraints (Sheet 1 of 4)
390-002-02 – As built topographic survey and constraints (Sheet 2 of 4)
390-002-03A – As built topographic survey and constraints (Sheet 3 of 4)
390-002-04A – As built topographic survey and constraints (Sheet 4 of 4)

Drawing List – AJP

EDE-AJP-XX-00-DR-S-2000-P1 – Foundation Zone Plan.



1. INTRODUCTION

1.1. BACKGROUND

This report details the remediation and enabling works operations that Urban Regen undertook under the supervision of E3P to facilitate the preparation of the low-rise residential development on a parcel of land formerly occupied by Tack Lea Works (western sector) and Sheppard Mill (eastern sector), situated north of Greenbooth Road and Edenfield Road, Norden, Rochdale.; herein referred to as the site.

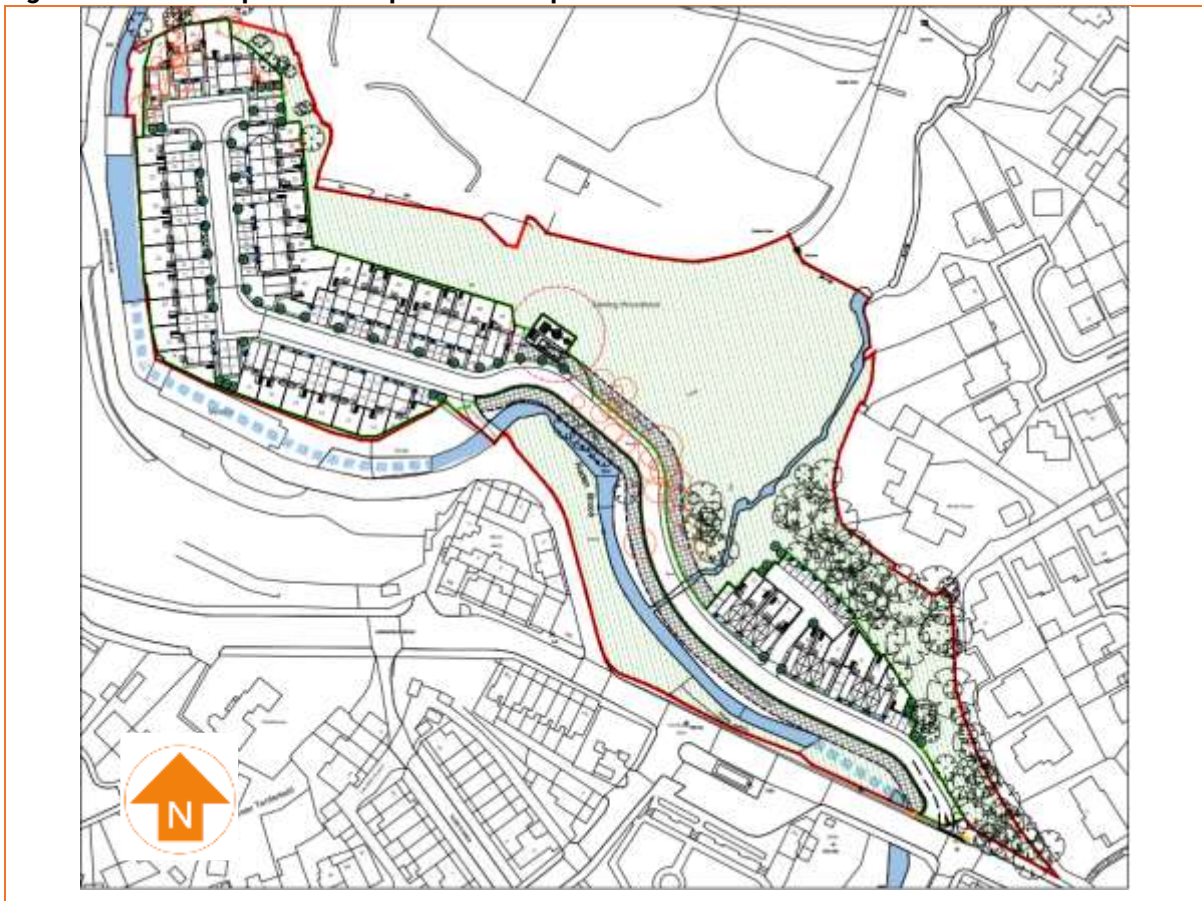
Urban Regen appointed E3P on behalf of Stonebond Properties Limited as an independent Geo-Environmental Consultant for the site remediation, preparation/enabling, and validation works and the subsequent production of a suitably detailed report to ensure the satisfaction of the relevant planning conditions and geotechnical engineering requirements for Building Control, warranty providers and the future adoption of infrastructure by the Highways Authority and statutory service providers.

1.2. PROPOSED DEVELOPMENT

Stonebond Properties Limited propose to construct 49 residential dwellings with associated gardens, estate roads, infrastructure, and a connecting bridge.

E3P has been provided with a detailed planning layout (ref: 20/01170/OUT) detailing the proposed construction, which is presented in Drawing 17-330-002 and included in APPENDIX III. A snapshot is presented below in Figure 1.

Figure 1 **Snapshot of Proposed Development**





1.3. SUMMARY OF PARTIES INVOLVED

Table 1 Summary of Parties Involved

FUNCTION/INTEREST	NAME OF PARTY
Local Planning Authority	Rochdale Borough Council
Developer	Stonebond Properties Limited
Geoenvironmental Consultant	E3P
Main Contractor	Urban Regen
Remediation/Enabling Works Contractor	Urban Regen
Human Health Regulator	Rochdale Borough Council
Controlled Waters and Waste Regulator	Environment Agency
Highways Adoption Authority	Rochdale Borough Council

1.4. PREVIOUS WORKS

The following previous phases of site investigation and assessment have been completed at the subject site.

Table 2 Previous Works

Encia Consulting Limited	Geoenvironmental Appraisal – Land at Greenbooth Road, Norden (Report Ref: 7112/1 June 2006)
LK Consult	Geoenvironmental Risk Assessment – Land at Greenbooth Road, Norden (Report Ref: CL602-LKC 20 1618-01, September 2020)
E3P	Phase I Geoenvironmental Site Assessment Land at Greenbooth Road and Edenfield Road, Norden (Report Ref: 16-465-R1-1, December 2022)
E3P	Phase II Geoenvironmental Site Assessment Land at Greenbooth Road and Edenfield, Road, Norden. (Report Ref 16-465-R2-3, August 2023).
E3P	Ground Gas Addendum Report (Report Ref: 16-465-R4-1, March 2023)
E3P	Surface Water Management During Construction Plan at Land at Greenbooth Road and Edenfield Road, Norden (Report Ref: 16-465-R5-1, August 2023)
E3P	Remediation and Enabling Works Strategy, Land at Greenbooth Road and Edenfield Road, Norden (Report Ref: 16-465-R4-1, September 2023)
E3P	Gas Protection Design Report (Report Ref: 16-465-R7-1 , September 2024)
E3P	Pile Design Contamination Risk Assessment (Report Ref: 16-465-R6 , January 2024)
E3P	Land At Greenbooth Road and Edenfield Road, Norden Waste Material Management Strategy - Briefing Note (Report Ref: 17-330-L1-1 , June 2024)
E3P	Letter Response to NHBC Comments (Letter Ref: 16-465-L1-1, September 2024)

1.5. REGULATORY CORRESPONDENCE

E3P consulted with the Environment Agency (EA) in November 2023 (ref: SO/2021/120949/05-L01) regarding initial comments received regarding the outline planning application.

Correspondence was undertaken with the local EHO, who approved the Remediation Strategy in February 2024.



Further correspondence with the EA was undertaken in April 2024 (ref: SO/2024/123964/01-L01) who discharged condition 10 of the planning application with regards to controlled waters following a technical review of the E3P Phase II Geoenvironmental Site Assessment and Remediation and Enabling Works Strategy.



2. SUMMARY OF REMEDIATION AND ENABLING WORKS OBJECTIVES

The proposed remediation activities were detailed within the E3P Remediation and Enabling Works Strategy (16-465-R4-1; dated September 2023) and supplementary supporting documents provided by E3P.

This report has been prepared to document the completion of all necessary land remediation and enabling works and to record the presence of any variation in ground conditions or previously unidentified sources of potential contamination, environmental impact or potential nuisance to the wider environ.

The Remediation and Enabling Works elements are summarised below:

- RE-1 – Watching Brief and Further Sampling
- RE-2 – Pre-commencement Regulatory Compliance
- RE-3 – Environment and Nuisance Control
- RE-4 – Monitoring of Surface Water
- RE-5 – Risk to Infrastructure and Main River
- RE-6 – Identification, Isolation and Treatment of Invasive Plants
- RE-7 – Site Clearance Operations
- RE-8 – Delineation, Excavation and Treatment of Identified Asbestos Impact
- RE-9 – Delineation, Excavation, Treatment and Disposal of Impacted Material- Hotspots
- RE-10 – Further Assessment of Mercury
- RE-11 – Excavation, Breaking and Processing of All Above- and Below-Ground Structures
- RE-12 – Delineation, Excavation and Treatment of Infilled Historical Ponds and Reservoirs
- RE-13 – Removal of Deleterious Material
- RE-14 – Investigation and Removal of Historic USTs
- RE-15 – Remediation of Historic Landfill Area
- RE-16 – Cut-And-Filling of Made Ground to Development Levels
- RE-17 – Placement and Compaction of Upfill Material to Facilitate Ground Improvement by VSC
- RE-18 – Construction of Temporary Working Platform
- RE-19 – Replacement of Materials, Geotechnical Engineering Requirements
- RE-20 – Preparation of Ground for Vibro-Stone Columns Within Tree Influence
- RE-21 – Importation of Bulk Fill



- RE-22 – Preparation of Garden for Cover System
- RE-23 – Provision of Subsoil
- RE-24 – Provision of Topsoil
- RE-25 – Independent Validation: Watching Brief
- RE-26 – Waste Soils Surplus to Requirements
- RE-27 – Validation of Materials for Potable Water Supply Infrastructure Space
- RE-28 – Investigation of Retaining Wall Footings
- RE-29 – Remedial Verification Report



3. SECOND PHASE MITIGATION AND MANAGEMENT – BUILD PHASE

A second post-demolition phase of works will be required to ensure the proposed development is constructed in a manner that incorporates the required mitigation measures to ensure the development is compliant with UK Building Regulations and the Local Authority Planning requirements.

These obligations are specified in more detail within Section 5.



4. DETAILED REMEDIATION AND ENABLING WORKS ACTIVITIES

The focus of the remediation and enabling works is to address the contaminant issues previously identified within the site investigations that presented an unacceptable risk to human health following the redevelopment of the site.

For completeness, each of these activities has been discussed below within the context of the actual remediation works that were undertaken on-site.

The Remediation & Site Enabling works commenced on the 6th March 2024 and were completed by the 6th November 2024.

RE-1 – WATCHING BRIEF AND FURTHER SAMPLING

Date of Works Undertaken	March - September 2024
Photographs	Plate 1-5
Chemical Testing	I2 Analytical Report: 24-009383 (ASB-SP 01 and SP02) I2 Analytical Report: 24-010774 (SP03 and SP01/3) Eurofins Report: 24-10129 (Veg-01 and Gate SP-01) Treatment of Materials Eurofins Report: 24-25653 (SP1A & SP2-101-104) Eurofins Report: 24-27828 (SP1B -101-104) Eurofins Report: 24-28864 (SP1B -105-112) Eurofins Report 24-20813 (Silt-NW Res 101-105)
Overview of Works	Background Further investigation and a watching brief were required post-demolition works to determine the chemical and geotechnical properties of the underlying ground. Overview of Works A watching brief was undertaken during a phase of archaeological trenching, which comprised several trenches transecting across the site. An Archaeological Trench Plan is presented as Drawing 17-330-045 in APPENDIX III. During the archaeological trenching in March 2024, trench eight, located in the eastern sector (former Sheppard Mill area) noted a hydrocarbon odour and sheen within the Made Ground deposits at 1.00 m bgl. The material was removed, stockpiled and sampled. Chemical analysis identified asbestos at quantified levels of <0.001% within sample ASB-SP01 alongside concentrations of SVOCs and VOCs above LOD. Chemical analysis for sample SP02 identified asbestos at <0.001% as well as elevated naphthalene. (6.2 mg/kg), non-volatile PAHs, lead (290 mg/kg), TPH C12-16(140 mg/kg), elevated VOCs and SVOCs.



Due to the indoor volatilisation risk associated with these exceedances, Urban Regen deployed an environmental permit (Ref: EPR/EB3704LN) to allow stockpiles of contaminated materials to undergo ex-situ bioremediation, in order to volatilise the contaminants before placement in low sensitivity areas (i.e. Public Open Space; POS). Ex-situ bioremediation techniques included windrowing and turning over the stockpiles on a regular basis. E3P returned to the site to monitor the stockpiles with the aid of a Photoionization Detector ((PID), with results presented in APPENDIX VI. The stockpiles were resampled in August and September 2024. Chemical analysis identified asbestos within all samples quantified between <0.001 and 0.003%. However, no further exceedances were noted when compared to the GAC values for POS, and as such, they were considered suitable for re-use with low sensitivity areas (i.e. POS). Due to the presence of asbestos, these materials were placed along the northern boundary of the eastern sector (former Sheppard Mill area) at depths >1.00 m bgl, in line with Asbestos Conceptual Site Model (CSM).

During the archaeological trenching in trench eight, asbestos cement was encountered that was later handpicked by a specialist contractor and removed from the site at a licensed waste facility. It was recommended to the archaeologists that RPE should be worn during the remainder of the works in case further asbestos containing materials (ACM) were encountered; no further ACM was encountered.

A sample was taken from the vegetation scrape and clearance across the site and submitted for chemical analysis (Veg-01); no exceedances were identified. However, material excavated from the tarmac hardcore Made Ground (Gate SP-01) identified minor exceedances of Dibenz(a,h)Anthracene (0.42 mg/kg) and VOCs above the LOD including Ethylbenzene, m & p-Xylene, o-Xylene, Isopropylbenzene, N-Propylbenzene, 1,3,5-Trimethylbenzene, Tert-Butylbenzene. This material was stockpiled in the east of the site before being disposed of off-site at a licensed waste facility.

A watching brief was undertaken by E3P during the archaeological trenching through the designated landfill area in the centre of the site (trench seven). Ground conditions encountered generally comprised of hardcore and brick (associated with the demolition of the former Woodhouse Mill buildings). Arisings were temporarily stockpiled in the eastern sector (former Sheppard Mill area) before being placed back within the Historic Landfill boundary. Chemical analysis from the archaeological trench seven (SP01/3 and SP03, both at 1.00 m bgl) did not identify any exceedances of the relevant GACs (Hardstanding and >600 m of Cover).

A Remediation Sample Plan denoting the location of chemical samples is presented as Drawing 17-330-033 in APPENDIX III.

Further investigation beneath the footprints of the buildings located in the western sector (former Tack Lea Works area) was undertaken as part of RE-12 - Delineation, Excavation and Treatment of Infilled Historical Ponds and Reservoirs, and is discussed further in RE-12.

Further investigation of the former landfill area was undertaken as part of RE-15 - Remediation of Historic Landfill Area, and is discussed further in RE-15.

A vapour risk assessment of the eastern sector (former Sheppard Mill area) was undertaken as part of RE-9 – Delineation, Excavation, Treatment and Disposal of Impacted Material – Hotspots, and is discussed further in RE-9.



RE-2 – PRE-COMMENCEMENT REGULATORY COMPLIANCE

Date of Works Undertaken	Prior to Commencement
Overview of Works	The site was granted planning permission, with conditions for residential development of up to 49 dwellings; with associated infrastructure, landscaping and access under outline application number 20/01170/OUT with a decision issued on the 18th December 2023. Submission of conditions including 6 (CEMP), 7 (badgers), 10 (site investigation) and 16 (pedestrian safety) decision issued on the 22nd March 2024 under application number 24/00022/DOC. Regulatory correspondence was obtained from Rochdale Borough Council confirming acceptance of the Remediation and Enabling Works Strategy. Urban Regen prepared a CL:AIRE DoW CoP MMP for the re-use of materials on Site of Origin; Report Ref: Edenfield Road v2.0; QP Declaration Ref: 2024-09-05 08:15:40. Urban Regen also prepared a RPS215 to treat small volumes of contaminated soils and groundwater on-site; Permit number - EPR/EB3704LN.

RE-3 – ENVIRONMENT AND NUISANCE CONTROL

Date of Works Undertaken	Throughout
Photographs	Plate 6-8
Overview of Works	During remediation, works were restricted to between 8.00 am and 5.30 pm. Heras fencing was erected around the site boundary with appropriate health and safety signage. A road sweeper was present to keep the access and Edenfield Road clean and clear of debris during the importation of materials to site. Dust monitoring was completed during the remediation and enabling works; dust monitoring records are available from Urban Regen on request. A power washer and bowser were present to dampen down materials throughout the works

RE-4 – MONITORING OF SURFACE WATER

Date of Works Undertaken	Throughout
Photographs	Plate 9-11
Chemical Testing	I2 Analytical Report: 24-010664 Eurofins Report: 24-10436 Eurofins Report: 24-12329 Eurofins Report: 24-14426 Eurofins Report: 24-16071 Eurofins Report: 24-17562



Overview of Works

Eurofins Report: 24-18969
Eurofins Report: 24-20944
Eurofins Report: 24-22415
Eurofins Report: 24-23573
Eurofins Report: 24-25622
Eurofins Report: 24-27174
Eurofins Report: 24-28875
Eurofins Report: 24-30560

Background

Surface water samples were obtained as part of the site investigation which did not identify any significant impact.

Additional surface water samples should be collected prior to commencement and throughout the duration of the Remediation & Enabling Works to demonstrate that the site poses no risk to surface waters associated with the development works.

Works Undertaken

Throughout the remediation and enabling works, bi-weekly water sampling was undertaken at locations along both Naden Brook and Woodhouse Lane Brook. Water sample locations are presented in Drawing 17-330-031 in APPENDIX III.

Sample locations are as follows:

-  NB UP- Naden Brook Upstream
-  NB- MID- Naden Brook Mid site
-  NB- DOWN- Naden Brook Downstream
-  WLB- UP- Woodhouse Lane Brook Upstream
-  WLB-DOWN- Woodhouse Lane Brook Downstream

Samples were scheduled for a full suite of analysis, including heavy metals, suspended solids, PAH, TPH SVOC and VOC.

Water samples taken from the watercourses recorded minor exceedances for heavy metals (copper, zinc, nickel and lead) in comparison with Environment Quality Standards (EQS). A summary of EQS exceedances is presented in APPENDIX VII.

Copper and nickel EQS exceedances were generally recorded within all sampling locations across the majority of the monitoring period including those upstream of the site. As such, these exceedances cannot be directly attributed to the site, and therefore indicate these concentrations are natural within the watercourse or the source is located further upstream.

Exceedances of phenols, chromium and cadmium have been identified with the upstream sample of Naden Brook on rare occasions, but exceedances have not been identified in the remaining midstream or downstream samples. As aforementioned, it can be considered that these exceedance cannot be directly attributed to the site and no further action was deemed necessary.



For the remaining exceedances of copper, nickel and zinc, a metal bioavailability assessment (M-BAT) was undertaken and updated following each monitoring visit; a copy of the M-BAT assessment is presented in APPENDIX VII. The M-BAT assessment has shown that copper, nickel and zinc are not considered bioavailable in either water course, due to the risk characteristic ratio (RCR) being below 1 in all locations throughout the monitoring period.

On the two occasions when exceedances of lead were identified (31st May 2024 and 21st August 2024), a Final Pb screening assessment was undertaken; a copy of the Final Pb screening assessment is presented in APPENDIX VII. The Final Pb screening assessment has shown that lead was not considered bioavailable in either water course due to the RCR being below 1 in all locations throughout the monitoring period.

Sampling has shown that the site works have not had a detrimental impact on the adjacent watercourses, and therefore, no further works are required.

RE-5 – RISK TO INFRASTRUCTURE AND MAIN RIVER

Date of Works Undertaken	Throughout
Photographs	Plate 12-13
Overview of Works	Background Site works should be completed in a manner that ensures no risk of disturbance to the adjacent infrastructure. All works to be completed within the main river channel will require the appropriate EA permit, this should be obtained prior to the commencement of any activities (including demolition). It should be noted that works to the main river channel may be restricted during certain times of the year. Overview of Works Works were conducted in such that surrounding infrastructure including roads and buildings were not impacted during the duration of the works. Woodhouse Lane Brook was diverted from March 2024 into a new purpose-built culvert for the site.

RE-6 – IDENTIFICATION, ISOLATION AND TREATMENT OF INVASIVE PLANTS

Date of Works Undertaken	March 2024
Overview of Works	Background Japanese knotweed was identified within vegetation on a banking area adjacent to the watercourse running through the site (Naden Brook). Himalayan Balsam was also noted on-site mainly located within the central and southern end of the site. Further invasive species including Rhododendron Variegated Yellow Archangel, Montbretia and Cotoneaster were recorded within the site boundary.



Overview of Works

The impacted areas were fenced off and isolated up until such a time it could be removed. The programme of remediation involved the excavation of the full lateral and vertical extent of soils contaminated with knotweed and other identified invasive species.

The removal and treatment of invasive species did not fall within Urban Regen's remit and therefore responsibility fell to Stonebond.

The contaminated soils were excavated and disposed of off-site at a licensed waste facility by a specialist waste contractor prior to the commencement of remediation works by Urban Regen. The specialist contractor subsequently validated the works and produced a Removal Report and Certificate which is available upon request from Stonebond.

RE-7 – SITE CLEARANCE OPERATIONS

Date of Works Undertaken	Throughout
Photographs	Plate 14-20
Overview of Works	Background General site clearance and provision of welfare, offices and site security are to be determined as per the contract requirements. Works undertaken Provision of welfare, offices and site security by Urban Regen throughout the works. Buildings were present on-site in the western sector (former Tack Lea Works area) prior to the remediation works; no buildings were present in the eastern sector (former Sheppard Mill area). Concrete slabs and asphalt hardstanding was present across both the eastern and western sectors. During the archaeology works undertaken between March and April 2024, below ground structures located in the northwest of the site were uncovered, including shower rooms and drainage which were associated with the former Woodhouse Mill buildings. Asphalt hardstanding present across the site was removed by Urban Regen in April 2024 and disposed of off-site at a licensed waste facility. The concrete slabs present across the site were removed by Urban Regen in April-May 2024. The above and below ground structures in the western sector (former Tack Lea Works area) of the site were demolished by Urban Regen in May 2024. The hardcore arisings from the demolition works and concrete slab removal were crushed and screened on-site for re-use within the development upfill and temporary works mats. Trees were removed by a specialist contractor, shredded and subsequently disposed of off-site at a licensed waste facility.



Throughout the enabling works, scrap metal and general waste was separated from demolition materials, and placed into allocated skips for subsequent disposal off-site at a licensed waste facility.

RE-8 – DELINEATION, EXCAVATION AND TREATMENT OF IDENTIFIED ASBESTOS IMPACT

Date of Works Undertaken	17th April 2024 – 6th November 2024
Photographs	Plate 21-23
Chemical Testing	Eurofins Report: 24-37011 (TP116-WS112 N, E, S, W, BASE, ARSINGS) Eurofins Report: 24-36407 (TP114 N, E, T S, W, BASE, ARSINGS) Eurofins Report: 24-18971 (LF Fill 101) Eurofins Report: 24-18974 (LF Fill 101) Eurofins Report: 24-22360 (LF-FT-101-102) Eurofins Report: 24-24501 (LF Fill 102-103) Eurofins Report: 24-12332 (Hotspot 2 N, E, S, W, BASE, ARISINGS)
Overview of Works	Background During the 2006 site investigation, Encia Consulting identified asbestos in the form of: - Chrysotile cement sheeting within WS10 at 0.00 m bgl (historical landfill area, eastern part of former Tack Lea Works area); and - Amosite fibres within WS18 at 0.60-0.70 m bgl (southeast part of former Sheppard Mill area). During the 2022 site investigation, E3P identified asbestos in the form of: - Chrysotile and amosite loose fibres within Made Ground in TP114 at 1.00 m bgl (0.011%) (centre of former Tack Lea Works area); - Chrysotile loose fibres within Made Ground in TP116 at 1.20 m bgl (0.002%) (centre of former Tack Lea Works area); - Chrysotile hard cement sheet boarding material within Made Ground in HP05 at 0.10 m bgl (0.036%) (historical landfill area, eastern part of former Tack Lea Works area); and - Chrysotile hard cement within Made Ground in WS124 at 3.40 m bgl (0.795%) (southeast part of former Sheppard Mill area). Overview of Works On the 6th November 2024, an area in the vicinity of TP114 and TP116 covering approximately 5.00 m by 5.00 m was excavated. Validation samples were obtained from the excavation sides (TP114 at 1.00 m bgl and TP116 at 1.20 m bgl), base (TP114 1.50 m bgl and TP116 at 2.00 m bgl) and arisings, and were submitted for further chemical analysis. Results of the chemical analysis did not identify any asbestos fibres within the samples submitted for analysis and therefore no further assessment was required within TP114. The arisings from the excavation were considered suitable for re-use with low sensitivity areas (i.e. beneath hardstanding) and were subsequently placed as upfill beneath roads and plots in the western sector (former Tack Lea Works area) of the site at depths >1.00 m bgl, in line with Asbestos CSM.



Chemical analysis from TP116 identified chrysotile fibres, quantified as <0.001% in the excavation's eastern face. The soils within this area were considered suitable for re-use within low sensitivity areas (i.e. beneath hardstanding) and were subsequently placed as upfill beneath roads and plots at depths > 1.00 m bgl, in line with the Asbestos CSM, which removed the future risk to the end user.

During the remediation and enabling works, ACM was identified on the surface within the historic landfill area and within the fabric of the buildings on-site located in the western sector (former Tack Lea Works area). The ACM was hand-picked by specialist contractors and taken off-site for disposal at a licensed waste facility prior to demolition commencing.

Hotspot delineation works for locations WS10 and HP05 were undertaken as part of the full depth turnover of the historical landfill area, with excavations extending down to the natural stratum. Validation samples were obtained from stockpiles of processed fines material, and submitted for further chemical analysis. Results of the chemical analysis did not identify any asbestos fibres within the samples submitted for analysis and therefore no further assessment was required. Excavated soils from the historical landfill area were segregated and screened for re-use, with chemical analysis confirming they were suitable for re-use in low sensitivity areas (i.e. beneath hardstanding). The arisings were subsequently placed back within the confines of the historical landfill area beneath the road at depths >1.00 m bgl in line with the Asbestos CSM, and in compliance with the E3P Geotechnical Engineering Specification. Further details pertaining to the historical landfill area are discussed in RE-15 – Remediation of Historic Landfill Area.

On the 17th April 2024, an area in the vicinity of WS18 and WS124 (Hotspot 2) covering approximately 5.00 m by 5.00 m was excavated. Validation samples were obtained from the excavation sides (3.40 m bgl), base (4.00 m bgl) and arisings, and were submitted for further chemical analysis. Results of the chemical analysis did not identify any asbestos fibres within the samples submitted for analysis and therefore no further assessment was required. The arisings from the excavation were considered suitable for re-use with low sensitivity areas (i.e. beneath hardstanding) and were subsequently placed as upfill beneath roads and plots in the eastern sector (former Sheppard Mill area) at depths >1.00 m bgl, in line with the Asbestos CSM.

All excavations were subsequently backfilled with chemically and geotechnically suitable material, in line with the E3P Geotechnical Engineering Specification.

A Remediation Sample Plan denoting the location of chemical samples is presented as Drawing 17-330-033 in APPENDIX III.

RE-9 – DELINEATION, EXCAVATION, TREATMENT AND DISPOSAL OF IMPACTED MATERIAL- HOTSPOTS

Date of Works Undertaken	March - August 2024
Photographs	Plate 24-29
Chemical Testing	Hotspots Eurofins Report 24-37011 (TP116-WS112 N, E, S, W, Base, Arisings)



Eastern Sector (Former Sheppard Mill Area)

Eurofins Report: 24-007913 (SP01)
Eurofins Report: 24-11633 (Hotspot 1 N, E, S, W, Base, Arisings)
Eurofins Report: 24-12332 (Hotspot 2, N, E, S, W, Base, Arisings)
Eurofins Report: 24-13331 (Hotspot 3 North, South, Base)
Eurofins Report: 24-13929 (Hotspot 3 North 2, West, East)
Eurofins Report: 24-10477 (NW RES Centre 1, Centre 2, Wall W, Wall SW, Wall NE)
Eurofins Report: 24-36409 (NW RES W)
Eurofins Report: 24-12153 (SE Res South 1, South 2)
Eurofins Report: 24-12327 (SE Res North 1, North 2, North 3, Base 1, Arisings)
Eurofins Report: 24-13376 (SE Res North 4, North 5)
Eurofins Report: 24-14479 (SE Res East 01, East 02, South 03, Base 02)
Eurofins Report: 24-15153 (SE Res Base 3, South 4)
Eurofins Report: 24-18978 (SE Res South 1A, South 2A)
Eurofins Report: 24-29415 (SE Res Base Sept 24)

Treatment of Materials

Eurofins Report 24-25653 (SP1A & SP2-101-104)
Eurofins Report 24-27828 (SP1B 101-104)
Eurofins Report 24-28864 (SP1B 104-112)
Eurofins Report 24-20813 (Silt-NW Res 101-105)

PID Screening

E3P-17-330 Edenfield Road, Norden - PID Readings Summary
E3P-17-330 Edenfield Road, Norden - Contam Stockpile PID Screening Sheet
21.08.24

Overview of Works

Background

Elevated concentrations of naphthalene, TPH, and trichloroethene (TCE) have previously been identified in TP116 and WS12 which are considered localised hotspots.

Elevated concentrations of naphthalene, TPH, VOCs and SVOCs have been identified throughout the Shepherd Mill area located in the west of the site. As such, a vapour risk assessment was required to assess the level of risk to the future site users by volatilisation to indoor air.

Overview of Works

On the 6th November 2024, an area in the vicinity of WS12 and TP116 covering approximately 10.00 m by 5.00 m was excavated. Validation samples were obtained from the excavation sides (1.20 m bgl), base (2.00 m bgl) and arisings, and were submitted for further chemical analysis. Chemical analysis did not identify any exceedances with the exception of asbestos within the eastern face of TP116 (discussed with RE-8 – Delineation, Excavation and Treatment of Identified Asbestos Impact). The arisings were considered suitable for re-use within low sensitivity areas (i.e. POS) and were subsequently placed behind the gabion basket retaining wall located along the northern boundary of the western sector (former Tack Lea Works area) at depths >1.00 m bgl, in line with Asbestos CSM. The excavation was subsequently backfilled with chemically and geotechnically suitable material, in line with the E3P Geotechnical Engineering Specification.



Between March and April 2024, a full-depth Made Ground turnover was undertaken in the eastern sector (former Sheppard Mill area), with excavations extending to a depth of approximately 2.50 m bgl (158.88 m AOD). Approximately 850 m³ of impacted material was excavated, stockpiled and treated on-site under a Mobile Treatment License (RPS215). Treatment comprised of ex-situ bioremediation in order to volatilise the contaminants before placement in low sensitivity areas (i.e. POS), which included windrowing and turning over the stockpile on a regular basis.

Validation samples were obtained from the sides and base of each excavation within the natural granular alluvium deposits. A vapour risk assessment, comprising the screening of on-site soils using a PID (within the excavations and treated stockpiles) and screening of chemical analysis against relevant GACs (Hardstanding and >600 m of Cover) was subsequently undertaken for the eastern sector (former Sheppard Mill area).

PID readings were taken throughout the works, and were seen to decrease as the excavation progressed. Results of the PID screening readings are presented in APPENDIX VI.

Validation samples identified residual concentrations of naphthalene (10 mg/kg) and petroleum hydrocarbon bands C6-C12 (3,040 mg/kg) in exceedance of the GACs within sample SE RES Base 1 (Eurofins Report 24-12327). The sample SE RES Base 1 was located beneath Plot 6 of the proposed development, and as such, presented a potential vapour risk to residential end users. E3P returned to site in September 2024 and extended the excavation depth by approximately 1.40 m bgl (157.43 m AOD), with a further validation sample (Eurofins Report 24-29415) recording naphthalene concentrations of 5.2 mg/kg.

It was noted that the residual naphthalene concentration fell below the C4SL screening value of 15 mg/kg (approved for use by Rochdale Borough Council). Furthermore, the finished floor level (FFL) for Plot six was noted to be 161.55 m AOD, meaning that the exceedance encountered at the base of the excavation was 4.12 m beneath the FFL. The potential for naphthalene to volatilise at this depth and diffuse to the surface and into the subsequent sub floor voids was considered to be significantly reduced. Structural design of properties within the eastern sector (former Sheppard Mill area) were also noted to comprise of a vapour resistant membrane, concrete slab and well-vented subfloor void with appropriate spacing of ventilation, all of which would provide sufficient air volume change over a 24 hour period to ensure no accumulation of potential vapours.

Considering all of the above, the C4SL screening value and vapour mitigation measures to be installed, it is concluded that there is no unacceptable risk to human health regarding the residual naphthalene exceedance beneath Plot 6, and no further works were deemed necessary.

Excavations within the eastern sector (former Sheppard Mill area) were subsequently backfilled with chemically and geotechnically suitable material, in line with the E3P Geotechnical Engineering Specification.



The treated stockpiles were submitted to extensive on-site PID screening and validation sampling. PID readings taken from the treated stockpiles showed a notable decrease throughout the treatment. Results of the PID screening readings are presented in APPENDIX VI. Chemical analysis of validation samples taken from the treated stockpiles did not identify any exceedances of the relevant GACs (Public Open Space >300 mm). As such, these materials were deemed suitable for re-use within low sensitivity areas (i.e. POS), and were subsequently placed behind the gabion basket retaining wall located along the northern boundary of the western sector (former Tack Lea Works area) at depths >300 mm bgl.

A Remediation Sample Plan denoting the location of chemical samples is presented as Drawing 17-330-033 in APPENDIX III.

RE-10 – FURTHER ASSESSMENT OF MERCURY

Date of Works Undertaken	April 2024
Photographs	Plate 30-31
Chemical Testing	Eurofins Report: 24-11928 (WS9 N, E, S, W, Base, Arisings and WS111 N, E, S, W, Base, Arisings) Element Report: 202106041601 (WS9 West – Mercury Speciation) Eurofins Report: 24-13934 (WS9 West 2) Eurofins Report: 24-12332 (Hotspot 2 N, E, S, W, Base, Arisings)
Overview of Works	Background During the 2006 site investigation, Encia Consulting identified elevated concentrations of mercury within Made Ground deposits in WS9 at 0.50 m bgl (northwest part of former Tack Lea Works area) and WS25 at 0.70 m bgl (southeast part of former Sheppard Mill area). During the 2022 site investigation, E3P identified elevated concentrations of total mercury within Made Ground deposits in WS111 at 0.60 m bgl (western part of former Tack Lea Works area). Overview of Works On the 11th April 2024, an area in the vicinity of WS9 covering approximately 5.00 m by 5.00 m was excavated. Validation samples were obtained from the excavation sides (0.50 m bgl), base (3.50 m bgl) and arisings, and were submitted for further chemical analysis. Results of the chemical analysis identified elevated mercury at 1.4 mg/kg when compared to relevant GACs (Hardstanding and >600 m of Cover) for human health within the sample WS9 West at 0.50 m bgl. No further exceedances were noted within the remaining samples. Due to elevated mercury identified within the excavations western face, mercury speciation was undertaken by Urban Regen (Element Report: 202106041601) on the sample WS9 West, which found elemental mercury to be at a concentration of 0.00261 mg/kg. Therefore, it was considered unlikely that the mercury encountered on-site was of an elemental origin. Results were then compared to inorganic and methyl screening values instead which determined the concentrations did not exceed the relevant GACs (Hardstanding and >600 m of Cover), and as such did not pose a risk to human health. E3P returned to site on the 26th April 2024 and excavated a further 5.00 m by 5.00 m in the vicinity of WS9 (inclusive of the western face from the previous excavation). An additional sample was taken from the extended western face (WS9 West 2 at 0.50 m bgl). The additional sample did not identify any further exceedances.



On the 11th April 2024, an area in the vicinity of WS111 covering approximately 5.00 m by 5.00 m was excavated. Validation samples were obtained from the excavation sides (0.60 m bgl), base (1.50 m bgl) and arisings, and were submitted for further chemical analysis. Results of the chemical analysis only identified an exceedance of lead within the arisings.

On the 17th April 2024, an area in the vicinity of WS25 (Hotspot 2) covering approximately 5.00 m by 5.00 m was excavated. Validation samples were obtained from the excavation sides (0.70 m bgl), base (4.00 m bgl) and arisings, and were submitted for further chemical analysis. Results of the chemical analysis did not identify any exceedances for mercury.

The arisings from these excavations were considered suitable for re-use with low sensitivity areas (i.e. POS) and were subsequently placed behind the gabion basket retaining wall located along the northern boundary of the western sector (former Tack Lea Works area) at depths >300 mm bgl.

All excavations were subsequently backfilled with chemically and geotechnically suitable material, in line with the E3P Geotechnical Engineering Specification.

A Remediation Sample Plan denoting the location of chemical samples is presented as Drawing 17-330-033 in APPENDIX III.

RE-11 – EXCAVATION, BREAKING AND PROCESSING OF ALL ABOVE- AND BELOW-GROUND STRUCTURE

Date of Works Undertaken	Throughout
Photographs	Plate 32-38, 40
Chemical Testing	Eurofins Report: 24-13332 (Crush 101) Eurofins Report: 24-18260 (Crush 201) Eurofins Report: 24-20812 (Crush 202-204) Eurofins Report: 24-21366 (Crush 205)
Geotechnical Testing	Murray Rix Report: MRN 24005-76 - Edenfield Road (Crush 101) Murray Rix Report: MRN 24005-101 - Edenfield Road (Crush 201) Murray Rix Report: MRN 24005-140 - Edenfield Road (Crush 202-204) Professional Soils Limited Report: PSL4798 Edenfield Road (Crush 205) Murray Rix Report: MRN 24005-172 - Edenfield Road (Crush 206-208)
Overview of Works	Background Obstructions, relict foundations and infrastructure (apart from live services) are to be removed from the areas of proposed residential development, to include plot footprints, rear gardens, private driveways, adopted highway and utilities infrastructure (road box) in their entirety. Works Undertaken Prior to E3Ps attendance, areas of hardstanding and concrete slabs were still in-situ. The removal of concrete slabs and oversized material started in the eastern sector (former Sheppard Mill area). All substructures were excavated using controlled mechanical techniques under the strict control of the Urban Regen Site Manager and under part-time supervision of E3P.



The site was subject to a full-depth Made Ground turnover to the top of the natural stratum to ensure the full removal and excavation of all below ground obstructions, relict foundations and slabs. This process allowed for the removal of any oversized materials and the identification of any previously unidentified areas of contamination.

Inert suitable oversized hardcore materials were stockpiled prior to crushing and processing to nominal 6F5 grading with chemical validation in accordance with the validation sampling protocol (1 per 1000 m³). Chemical analysis confirmed the materials suitability for re-use.

Particle size distribution testing showed the crushed material complied with 6F5 grading.

Any steel re-enforcements present within the concrete hardstanding, or waste in the form of wood, scrap metal and plastic were removed prior to the crushing of the demolition material stockpiles and were placed into allocated skips for subsequent disposal.

Urban Regen drawing 390-15-08-24-02 - Base of Dig denotes the full extent of the Made Ground turnover to confirm removal of foundation and slabs, and is presented in APPENDIX III.

RE-12 – DELINEATION, EXCAVATION AND TREATMENT OF INFILLED HISTORICAL PONDS AND RESERVOIRS

Date of Works Undertaken	March - August 2024
Photographs	Plate 39-45
Chemical Testing	Landfill Reservoir (Centre) Eurofins Report: 24-010774 (SP01/3 and SP03) Eastern Sector (Former Sheppard Mill Area) - Northwest Reservoir (NW Res) Eurofins Report: 24-007913 (SP01) Eurofins Report: 24-10477 (NW RES Centre 1, Centre 2, Wall W, Wall SW, Wall NE) Eurofins Report: 24-36409 (NW RES W) Eastern Sector (Former Sheppard Mill Area) - Southeast Reservoir (SE Res) Eurofins Report: 24-12153 (SE Res South 1, South 2) Eurofins Report: 24-12327 (SE Res North 1, North 2, North 3, Base 1, Arsings) Eurofins Report: 24-13376 (SE Res North 4, North 5) Eurofins Report: 24-14479 (SE Res East 01, East 02, South 03, Base 02) Eurofins Report: 24-15153 (SE Res Base 3, South 4) Eurofins Report: 24-18978 (SE Res South 1A, South 2A) Eurofins Report: 24-29415 (SE Res Base Sept 24)
Geotechnical Testing	Professional Soils Limited Report: PSL2387 (NW Res MG 101)



Overview of Works

Background

All known former infilled ponds and reservoirs, as illustrated on Drawing 17-330-003 in APPENDIX III, should be clearly identified and demarked and investigated to assess the nature of materials and extent of any deleterious elements. All materials that are deemed to be organic – and thus exhibiting unsatisfactory geotechnical properties – must be removed, with the resulting excavation to be backfilled with geotechnical suitable materials.

Overview of Works

In relation to the reservoirs located on-site, the majority of these were actually wash and filter tanks associated with the on-site historical industries, as such, the use of the term “reservoir” can be misconstrued.

During the remediation and enabling works, all historical “reservoirs” and ponds were delineated with a watching brief down to the natural strata with all materials demonstrating unsuitable geotechnical properties being removed and replaced with geotechnically suitable materials that were placed and compacted in accordance with the E3P Geotechnical Engineering Specification (E3P Report 16-465-R4-1 dated September 2023, Section 6).

E3P attended site on the 23rd July 2024 to investigate the former pond located in the northwest sector (former Tack Lea Works). A watching brief did not identify any soft or deleterious material, as excavations identified very shallow bedrock. Therefore, no further works were required.

E3P attended site on the 13th June 2024 to investigate the former reservoirs in the western sector (former Tack Lea Works area) located beneath the former buildings, which had been demolished in May 2024. Trail pits in this area did not identify any deleterious materials, and therefore, no further works were required.

Organic material arising from these excavations were stockpiled in the western sector (former Tack Lea Works area) before being disposed of off-site at a licensed waste facility.

The full extent of the former reservoir located in the centre of the historic landfill area was uncovered during the remediation of the historic landfill area in June-July 2024, and is discussed further in RE-15. The excavation was inspected by E3P, which did not identify any deleterious materials.

Excavations within the former reservoir identified within the east of the historic landfill area commenced in March 2024 under a watching brief by E3P. During the excavation works, unsuitable organic material contained within a concrete lined structure were identified, with approximately 1,600 m³ of material being removed and processed.

Organic material arising from these excavations were stockpiled and sealed in the eastern sector (former Sheppard Mill area) before being disposed of off-site at a licensed waste facility.



	During extensive excavations of the two reservoirs located in the eastern sector (former Sheppard Mill area - NW Res and SE Res), organic materials that were identified within the excavation were subsequently removed and stockpiled in the eastern sector. Due to the contaminated nature of the eastern sector (former Sheppard Mill area), extensive validation testing was also undertaken; further details pertaining to the excavations of the reservoirs within the eastern sector (former Sheppard Mill area) are discussed in RE-9 - Delineation, Excavation, Treatment and Disposal of Impacted Material-Hotspots. Organic material arising from these excavations formed part of the impacted materials which were treated on-site, and following validation testing, considered suitable for re-use within low sensitivity areas (i.e. POS). These materials were subsequently placed behind the gabion basket retaining wall located along the northern boundary of the western sector (former Tack Lea Works area) at depths >300 mm bgl. All excavations were subsequently backfilled with chemically and geotechnically suitable material, in line with the E3P Geotechnical Engineering Specification. A Remediation Sample Plan denoting the location of chemical samples is presented as Drawing 17-330-033 in APPENDIX III. The base of reservoirs is presented within Urban Regen Drawing 390-15-08-24-02 - Base of Dig, which is presented in APPENDIX III.
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RE-13 – REMOVAL OF DELETERIOUS MATERIAL

Date of Works Undertaken	Throughout
Photographs	Plate 46-50
Overview of Works	Background The E3P Ground Investigation identified plastic fabric softener bottles and other potentially deleterious wastes across the site. All potentially deleterious materials will be delineated, stockpiled and removed from the site by the Remediation Contractor to a licensed waste facility. Overview of Works E3P maintained part-time supervision during excavation and turnover works, and witnessed the separation, segregation and placement of deleterious materials into appropriate skips or stockpiles. Approximately 270 m³ of non-hazardous soil, 25 m³ of asbestos impacted material, and 15 m³ of contaminated groundwater was removed off-site to a licensed waste facility. Waste tickets are available upon request from Urban Regen. Following the screening of material, no further deleterious material was identified by E3P within placed materials. All potentially deleterious materials including wood, roots, metal, plastic and building waste was delineated, stockpiled and removed from the site by Urban Regen to a licensed waste facility.



RE-14 – INVESTIGATION AND REMOVAL OF HISTORIC USTS

Date of Works Undertaken	April - August 2024
Photographs	Plate 16 and 51-53
Chemical Testing	Eurofins Report: 24-13868 (Tank Area 1) Eurofins Report: 24-17814 (Tank Area 2) Eurofins Report: 24-23576 (Tank Area 3) Eurofins Report: 24-22360 (LF-FT-101-102) Eurofins Report: 24-13331 (Hotspot 3 – North, South and Base – SM Tank) Eurofins Report: 24-13929 (Hotspot 3 – North 1, West and East – SM Tank)
Overview of Works	Background Further investigation within the areas of historically mapped tanks, as illustrated on Drawing 17-330-003 in APPENDIX III, will be required to confirm the presence and the exact location of any underground storage tanks (USTs). The contents of any such tanks are unknown and no evidence is present to suggest decommissioning. Overview of Works Tank Area 1 was located within the footprint of the former Woodhouse Mill building in the northwest sector (former Tack Lea Works area). Evidence of former dye tanks was identified during the archaeology works. Under a watching brief from E3P, further excavations extending down to the natural stratum were undertaken on the 26th April 2024. Validation samples were obtained from the excavation sides (1.00 m bgl) and base (1.50 m bgl), and were submitted for further chemical analysis. Results of the chemical analysis did not identify any exceedances of the relevant GACs (Hardstanding and >600 m of Cover), and therefore, no further works were required. Tank Area 2 was uncovered during the demolition works of the former Woodhouse Mill building in the western sector (former Tack Lea works), with an above ground storage tank (AST) identified in the former basement. Prior to the tanks removal, the tank was checked for vapours using a Lower Explosive Limit (LEL) meter; no elevated readings were identified. Following the removal of the tank, and under a watching brief from E3P, further excavations extending down to the natural stratum were undertaken on the 31st May 2024. Validation samples were obtained from the excavation sides (0.50 m bgl) and base (1.00 m bgl), and were submitted for further chemical analysis. Results of the chemical analysis did not identify any exceedances of the relevant GACs (Hardstanding and >600 m of Cover), and therefore, no further works were required. Tank Area 3 was located to the east of Tank Area 1 in the northwest sector (former Tack Lea Works area), and was the former location of an AST, previously identified during Encia Consulting 2006 site investigation. Under a watching brief from E3P, excavations extending down to the natural stratum were undertaken on the 22nd July 2024. Validation samples were obtained from the excavation sides (1.00 m bgl) and base (1.50 m bgl), and were submitted for further chemical analysis. Results of the chemical analysis did not identify any exceedances of the relevant GACs (Hardstanding and >600 m of Cover), and therefore, no further works were required.



The arisings from these excavations were considered suitable for re-use with low sensitivity areas (i.e. beneath hardstanding) and were subsequently placed as upfill beneath roads and plots in the western sector (former Tack Lea Works area) at depths >600 mm.

Within the central part of site, a filter tank was present within the boundary of the historic landfill area. Under a watching brief from E3P, excavations extending down to the natural stratum were undertaken on the 11th July 2024, with no evidence of a UST being identified. Validation samples were obtained from the excavation base (1.00 m bgl), and were submitted for further chemical analysis. Results of the chemical analysis did not identify any exceedances of the relevant GACs (Hardstanding and >600 m of Cover), and therefore, no further works were required.

The arisings from this excavations were considered suitable for re-use with low sensitivity areas (i.e. beneath hardstanding) and were subsequently placed as upfill beneath the road in historical landfill area at depths >600 mm.

A further filter tank was located in the central northern part of site (north of the historic landfill area). This feature ultimately was located outside of the proposed development boundary, and therefore did require to be remediated.

Within the eastern sector (former Sheppard Mill area), a former tank (denoted as SM Tank) was previously identified during the Encia Consulting 2006 site investigation. Under a watching brief from E3P, excavations extending down to the natural stratum were undertaken between the 23rd-25th April 2024 (as part of Hotspot 3 delineation works), with no evidence of a UST being identified. Validation samples were obtained from the excavation sides (1.50 m bgl) and base (2.50 m bgl), and were submitted for further chemical analysis. Results of the chemical analysis did not identify any exceedances of the relevant GACs (Hardstanding and >600 m of Cover), and therefore, no further works were required.

The arisings from this excavation were considered suitable for re-use with low sensitivity areas (i.e. beneath hardstanding) and were subsequently placed as upfill beneath roads and plots in the eastern sector (former Sheppard Mill area) at depths >600 mm.

All excavations were subsequently backfilled with chemically and geotechnically suitable material, in line with the E3P Geotechnical Engineering Specification.

A Remediation Sample Plan denoting the location of chemical samples is presented as Drawing 17-330-033 in APPENDIX III.

RE-15 – REMEDIATION OF HISTORIC LANDFILL AREA

Date of Works Undertaken	June - August 2024
Photographs	Plate 54-58
Chemical Testing	Eurofins Report: 24-18971 (LF Fill 101) Eurofins Report: 24-18974 (LF Fill 101) Eurofins Report: 24-22360 (LF-FT-101-102) Eurofins Report: 24-24501 (LF Fill 102-103)



Geotechnical Testing	Murray Rix Report: MRN 24005/122 (LF Fines 101) Murray Rix Report: MRN 24005/171 (LF Fines 102-103)
Forensic Analysis Reports	Material Forensic Constituent Certificate - LF-FILL-101, 13th June 2024 Material Forensic Constituent Certificate - LF-FILL-102, 30th July 2024 Material Forensic Constituent Certificate - LF-FILL-103, 30th July 2024
Overview of Works	Background A historic landfill area, as illustrated on Drawing 17-330-003 in APPENDIX III was located on-site in the eastern part of the former Tack Lea Works area, and formerly received inert and industrial wastes between 1987 and 1991. Given the potential for unknown sources of yet unidentified contamination and the unproven and unquantifiable geotechnical properties of this material, site remediation works were required with a complete / full depth 'turn over' within this sector. Overview of Works A full depth turnover extending down to the natural stratum was undertaken within the boundary of the historic landfill area between June and August 2024, with E3P maintaining a part-time watching brief throughout these works. Excavated soils from the historical landfill area generally comprised of hardcore and brick (associated with the demolition of the former Woodhouse Mill buildings). These soils were segregated and screened for re-use, with treated fine soils (<20 mm) being temporarily stockpiled in the western sector (former Tack Lea Works area) due to space constraints; these materials were kept separate from other stockpiles on-site. The treated fines stockpiles were chemically, geotechnically, and forensically tested to ensure treatment was suitability completed in order to meet 'end of waste' criteria. Validation samples were obtained from the stockpiles of processed fines materials, and were submitted for further chemical analysis. Results of the chemical analysis from the fines material did not identify any exceedances of the relevant GACs (Public Open Space >300 mm). A Remediation Sample Plan denoting the location of chemical samples is presented as Drawing 17-330-033 in APPENDIX III. Geotechnical analysis classified the material as 1A the soils were reengineered in line with the E3P geotechnical engineering specification. A Remediation Sample Plan denoting the location of geotechnical samples is presented as Drawing 17-330-032 in APPENDIX III. E3P undertook forensic analysis at one per 1000 m³ to assess the volume of undesirables. E3P obtained forensic samples across the stockpiles from a minimum of 10 random locations to obtain a representative sample. Samples were screened with a 10 mm sieve with oversized materials remaining on the sieve split based on waste type. Furthermore, E3P undertook a visual inspection of each stockpile prior to sampling to ensure soils were visually clear of waste streams. For all stockpiles, unacceptable materials were confirmed to comprise <1% of the total volume of the sample, and therefore was considered suitable to achieve "end of waste" status. Material forensic constituents' certificates confirming suitability for each stockpile are presented in APPENDIX X.



Excavated soils >20 mm were crushed and screened on-site for re-use as upfill beneath the road within the confines of the historical landfill boundary.

Deleterious waste materials were removed and placed into appropriate skips for off-site disposal at a licensed waste facility.

It is noted that during the full depth turnover of the historic landfill area, E3P did not identify any potential sources of ground gas. The landfill materials generally comprised of hardcore and brick (associated with the demolition of the former Woodhouse Mill buildings), and organic materials identified within the two reservoirs located within the historic landfill boundary were removed and disposed of off-site at a licensed waste facility. Given that no potential source of ground gas remains within the historic landfill area, no development is being undertaken within the boundary of the historical landfill area (other than the construction of a road and pumping station), and gas protection measures are currently proposed for the residential properties located to the west (CS2) and east (vapour resistant membrane), E3P does not consider further gas assessment of the historical landfill area to be necessary.

Material originating from the former landfill, which was historically subject to a Waste Management Licence, are legally defined as waste under the Waste Framework Directive. As a result, it cannot be recovered or re-used under the CL:AIRE DoW CoP.

Materials from this sector were categorised as follows:

Hard materials: Processed and recovered under the WRAP protocol.

Class 1 and 2 engineering soils: Subjected to forensic analysis, confirmed to be free from defined waste constituents, and therefore deemed suitable for recovery and re-use, meaning they no longer qualified as waste.

All other materials: Defined as waste and remained classified as such. These materials were subsequently removed from the site and disposed of at a licensed waste facility.

RE-16 – CUT-AND-FILLING OF MADE GROUND TO DEVELOPMENT LEVELS

Date of Works Undertaken	Throughout
Photographs	Plate 59-66
Chemical Testing	Eurofins Report: 24-13332- Crush 101 Eurofins Report: 24-18260- Crush 201 Eurofins Report: 24-20812- Crush 202-204 Eurofins Report: 24-21366- Crush 205 Eurofins Report: 24-25898- Crush 301-303 Eurofins Report: 24-26207-Crush 304-306 Eurofins Report: 24-13931- SW-Fill-101 Eurofins Report: 24-14455 SW-Fill-102-103 Eurofins Report: 24-15153 – SW-Fill-104



Overview of Works

In order to provide the final development platforms, there was a requirement to undertake a significant cut and filling process of Made Ground across the site. Excavated materials and imported materials were used to build final development levels. The area was subject to a process of enabling earthworks completed by the appointed contractor (Urban Regen), under the part-time supervision of E3P.

All unsuitable materials were removed in their entirety to ensure the removal of relict hardstanding, foundations and infrastructure. Soils from within areas of reduced level excavation underwent careful selection prior to placement in a manner that accords with the geotechnical engineering specification & contamination compliance criteria in areas of upfill.

Where the proposed enabling works levels required the current landform to be cut, extreme care was taken so as not to disturb the underlying stratum prior to the placement of the appropriate platform, in compliance with the E3P Geotechnical Engineering Specification. Where the development levels required material to be filled, site-derived Made Ground, natural clays and crush material generated from the excavation of the quarry high wall and former structures on-site were utilised. Where there was a shortfall of material, natural material was utilised to build up levels. Upfill materials were sorted in a controlled manner prior to replacement, in accordance with the requirements of the specification for the intended land use.

All soils were tested at 1 per 1000 m³ in accordance with the agreed specification. Across the site, upfill recorded minor exceedances against relevant GACs (Hardstanding and >600 mm of Cover) for non-volatile PAH (Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Benzo(a)anthracene and Benzo(a)pyrene). All identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion. Soils were used as upfill and therefore any risk to human health is mitigated by the installation of a chemically suitable cover systems within all proposed garden areas and areas of soft standing, additionally, where hardstanding is present (plots, driveways and roads) the pathway is cut. Therefore, no risk will be present, and the soils are suitable for use.

Chemical analysis from Crush 204 identified asbestos chrysotile fibres, quantified as <0.001%. This material was subsequently used as upfill and placed beneath roads and plots at depths > 1.00 m bgl, in line with the Asbestos CSM. Therefore, there is no future risk to the end user.

Fill materials were placed and nominally compacted in a manner that accords with the geotechnical engineering specification & contamination compliance criteria, in order to prepare the site for a piled foundation solution and achieve a 5% CBR. The results of the CBR tests confirm that all locations met the compaction specification and are presented within APPENDIX IX.

Tracking records from Urban Regen are presented within APPENDIX XI.

Urban Regen has produced as built drawings for the site (Drawings 390-002-01 to 04A), which are presented in APPENDIX III.

A Remediation Sample Plan denoting the location of chemical samples is presented as Drawing 17-330-033 in APPENDIX III.

A Remediation Sample Plan denoting the locating of the in-situ tests is presented as Drawing 17-330-034 in APPENDIX III.



RE-17 – PLACEMENT AND COMPACTION OF UPFILL MATERIAL TO FACILITATE GROUND IMPROVEMENT BY VSC

Date of Works Undertaken	Throughout
Photographs	Plate 67-70
Geotechnical Testing	Murray Rix Report: MRN 24005-76 - Edenfield Road - Crush 101 Murray Rix Report: MRN 24005-101 - Edenfield Road - Crush 201 Murray Rix Report: MRN 24005-140 - Edenfield Road - Crush 202-204 Murray Rix Report: MRN 24005-172 - Edenfield Road - Crush 206-208 Murray Rix Report: MRN 24005-173 - Edenfield Road - Crush 301-303 Murray Rix Report: MRN 24005-212 - Edenfield Road - Crush 304-305 Professional Soils Limited Report: PSL4798 Edenfield Road - Crush 205
Overview of Works	Background Where plots are to be prepared in a manner that will facilitate ground improvement by Vibro Stone Columns (VSC), materials must be either compliant with the specified grading requirements for a nominally placed and tracked granular aggregate, or alternatively, they should be engineered to a defined geotechnical standard. Works Undertaken Where the proposed enabling works levels required the current landform to be cut, extreme care was taken so as not to disturb the underlying stratum prior to the placement of the appropriate platform, in compliance with the E3P Geotechnical Engineering Specification. Where the development levels required material to be filled, site-derived Made Ground and imported 6F5 materials were sorted in a controlled manner prior to replacement, in accordance with the requirements of the specification for the intended land use. During the remediation and enabling works, shallow bedrock and a high wall associated with the former sandstone quarry were encountered behind a retaining wall of the former Woodhouse Mill building located in the northwest sector (former Tack Lea Works area). As this shallow bedrock and quarry high wall were located within the footprint of Plots 31-35, a cut and fill exercise was undertaken in this area, with shallow bedrock broken out and excavated down to the natural stratum (superficial deposits or bedrock) to depths ranging between 4.00 m and 7.00 m bgl (165 m AOD to 162 m AOD). Arisings from this cut and fill exercise were processed as site generated crush and used as suitably engineered materials to upfill this area. The remaining highwalls are now located outside of the site boundary and will be segregated from the future development via the installation of gabion basket walls. The base of the cut and fill exercise in the northwest sector is presented within Urban Regen Drawing 390-15-08-24-02 - Base of Dig, which is presented in APPENDIX III. Grading from site generated crush was shown to be 6F2 or Class 1A, which is suitable for VSC. Given the granular nature of the upfill, no requirement for in-situ density testing was required as per the E3P upfill specification. Plots that were due to have VSC / driven piled foundations were left 450 mm below the finished level, whilst gardens were finished to 600 mm below finished level.



RE-18 – CONSTRUCTION OF TEMPORARY WORKING PLATFORM

Date of Works Undertaken	Throughout
Photographs	Plate 71-73
Chemical Testing	Eurofins Report: 24-13332- Crush 101 Eurofins Report: 24-18260- Crush 201 Eurofins Report: 24-20812- Crush 202-204 Eurofins Report: 24-21366- Crush 205 Eurofins Report: 24-25898- Crush 301-303 Eurofins Report: 24-26207- Crush 304-306
Geotechnical Testing	Murray Rix Report: MRN 24005-76 - Edenfield Road - Crush 101 Murray Rix Report: MRN 24005-101 - Edenfield Road - Crush 201 Murray Rix Report: MRN 24005-140 - Edenfield Road - Crush 202-204 Murray Rix Report: MRN 24005-172 - Edenfield Road - Crush 206-208 Murray Rix Report: MRN 24005-173 - Edenfield Road - Crush 301-303 Murray Rix Report: MRN 24005-212 - Edenfield Road - Crush 304-305 Professional Soils Limited Report: PSL4798 Edenfield Road - Crush 205
Overview of Works	Background Plots were prepared in a manner to facilitate a combination of VSC and driven piles, as such, a temporary working platform was required. Works Undertaken A temporary working platform was constructed comprising 300 mm of 6F5 from site won and imported crush material. 6F5 was tested to confirm chemical suitability. Particle size distribution testing of crush confirmed compliance with 6F5. Urban Regen had full-time supervision with E3P providing part-time supervision of the following:  CBR plate load tests to be completed on roads and piling mats;  Geotechnical testing of the site won material was undertaken for PSD; and  CBR tests were undertaken beneath roads and plots to ensure compaction of 5%. The results of the CBR tests confirm that all locations met the compaction specification, with certificates presented in APPENDIX IX. A Remediation Sample Plan denoting the location of geotechnical samples is presented as Drawing 17-330-032 in APPENDIX III. A Remediation Sample Plan denoting the location of chemical samples is presented as Drawing 17-330-033 in APPENDIX III. A Remediation Sample Plan denoting the locating of the in-situ tests is presented as Drawing 17-330-034 in APPENDIX III.



RE-19 – REPLACEMENT OF MATERIALS, GEOTECHNICAL ENGINEERING REQUIREMENTS

Date of Works Undertaken	Throughout
Photographs	Plate 66-69
In situ Testing	CBR Murray Rix Report: MRN 24078/152 (1-6 and 1A-6A) Murray Rix Report: MRN 24078/167 (1-6) Murray Rix Report: MRN 24078/219 (Plot 11-12, 15-17, 20-21, 24-26, 35, 41-49, and Turning Head- Turning Head 180 m) Murray Rix Report: MRN 24078/59 R1-R3 Capping (Test 1-Test 3) Murray Rix Report: MRN 24078/186 (R5-R8) NNDG Murray Rix Report: MRN 24078/152 (Plot 1-10) SRD Murray Rix Report: MRN 24078/152 (SRD1-SRD2)
Overview of Works	To achieve the proposed Enabling Works Levels (EWLs), Urban Regen undertook a process of cut/fill works including the careful selection of materials from within areas of reduced level excavation (cut) prior to placement in a manner that accords with the geotechnical engineering specification & contamination compliance criteria. A general Made Ground turnover to 3.00 m bgl was required as part of these works to remove constraints to construction. Where applicable, all voids were backfilled with materials in accordance with the E3P Geotechnical Engineering Specification. When re-engineering Made Ground to fill voids or after turnover, the general fill was placed and compacted in 200-250 mm layers and tracked/rolled back in using earth moving plant to compact under the full-time supervision of Urban Regen and part-time supervision of E3P. Initial DCP and NNDG testing was completed across the upfill layers in the western sector (former Tack Lea Works area), however due to granular fill being used rather than cohesive, large void spaces were created which resulted in inaccurate results that did not truly represent the ground conditions. These results have therefore not been included within this report. Subsequent CBR testing was carried out by Murray Rix via plate load. CBR tests were undertaken by Murray Rix beneath roads and plots at 20 m intervals to ensure compaction of >5%. The results of the CBR tests confirm that all locations met the compaction specification. Results are presented within APPENDIX IX. A Remediation Sample Plan denoting the location of geotechnical samples is presented as Drawing 17-330-032 in APPENDIX III. A Remediation Sample Plan denoting the locating of the in-situ tests is presented as Drawing 17-330-034 in APPENDIX III.



RE-20 – PREPARATION OF GROUND FOR VIBRO-STONE COLUMNS WITHIN TREE INFLUENCE

Date of Works Undertaken	Throughout
Overview of Works	Background Where trees are present, or within their total zone of influence, the contractor must ensure that all cohesive soils are removed to the required depth with the subsequent replacement with a granular blanket to fully mitigate the potential for volumetric instability in the clay soils. Works Undertaken AJP has completed the FZP for the site (Drawing EDE-AJP-XX-00-DR-S-2000, P1, dated Sept 2023, presented in APPENDIX III), which should be read in conjunction with this validation report. The AJP FZP denotes that all tree influence is to be ignored as the site will be fully turned over and remediated to remove all existing/relic obstructions along with any cohesive material (to be replaced with suitable granular material in line with NHBC guidance and recommendations. Furthermore, for Vibro plots in the northwest sector (former Tack Lea Works area), shallow bedrock was encountered, associated with the historical sandstone quarry. A cut and fill exercise was undertaken in this area, with the shallow bedrock excavated down to depths ranging between 4.00 m and 7.00 m bgl (165 m AOD to 162 m AOD) in order to remove the quarry high wall to outside the development boundary. Arisings from this cut and fill exercise were processed as site generated crush and used as upfill material within this area.

RE-21 – IMPORTATION OF BULK FILL

Date of Works Undertaken	September 2024
Photographs	Plate 74-75
Chemical Testing	Eurofins Report: 24-29414 Import 101-103
Geotechnical Testing	MRN 24005-239 Import 101-103
Overview of Works	Background Where there is a net shortfall of material required to achieve the proposed ground levels, it will be necessary to import natural inert soils and aggregate as per the engineering requirements. Imported material must be certified as suitable for use in strict accordance with the E3P chemical and geotechnical performance criteria. Works Undertaken Up-filling with imported bulk fill was undertaken within the eastern sector (former Sheppard Mill area). Approximately 550 m³ of processed weathered bedrock material was imported by Urban Regen from Waldmers Wood Bury under a direct transfer MMP. Invoices related to this material are available upon request from Urban Regen.



E3P undertook chemical sampling of the imported bulk fill (IMP-FILL 101-103) in line with E3Ps sampling frequency for confirmation of suitability for re-use on-site. Imported samples did not record any exceedances of relevant GACs (Hardstanding and >600 mm of Cover) and therefore were considered suitable for re-use as upfill. Grading certificates (MRN 24005-239) classified the material as Class 2C. No further import of bulk fill was required across the wider site.

A Remediation Sample Plan denoting the location of geotechnical samples is presented as Drawing 17-330-032 in APPENDIX III.

A Remediation Sample Plan denoting the location of chemical samples is presented as Drawing 17-330-033 in APPENDIX III.

RE-22 – PREPARATION OF GARDEN FOR COVER SYSTEM

Date of Works Undertaken	Throughout
Photographs	Plate 76-77
Overview of Works	Background As part of the land remediation works, garden areas will be prepared in a manner that will facilitate the placement of the clean cover system during the development phase of the works. Works Undertaken Across the site, all gardens were prepared to 600 mm below finished level to allow the placement of a clean cover system. Levels of the gardens to regrade level will be brought to the intended elevation via the importation of subsoil and topsoil. Urban Regen has produced as built drawings for the site (Drawings 390-002-01 to 04A), which are presented in APPENDIX III. Interim validation letter reports pertaining to cover system validations will be reported under separate covers.

RE-23 – PROVISION OF SUBSOIL

Overview of Works	Background No suitable source of subsoil has been identified on-site, therefore, imported subsoil will be required for the cover systems. Further Works The provision of subsoil is currently outstanding. Sampling of imported subsoil will be required in line with sampling frequencies detailed within Section 5.1. All gardens and areas of public open space where a cover system is required will be subject to plot specific independent validation. The subsoil source and associated chemical testing for soils used within plots will be issued as part of the garden validation letters for these plots; to be issued under separate covers.
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RE-24 – PROVISION OF TOPSOIL

Overview of Works	Background No suitable source of topsoil has been identified on-site, therefore, imported subsoil will be required for the cover systems. Further Works The provision of topsoil is currently outstanding. Sampling of imported topsoil will be required in line with sampling frequencies detailed within Section 5.1. All gardens and areas of public open space where a cover system is required will be subject to plot specific independent validation. The topsoil source and associated chemical testing for soils used within plots will be issued as part of the garden validation letters for these plots; to be issued under separate covers.
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RE-25 – INDEPENDENT VALIDATION: WATCHING BRIEF

Date of Works Undertaken	Throughout
Overview of Works	Background Given the site history and potential contamination sources identified within the Initial Conceptual Site Model (ICSM), a degree of uncertainty remains with regard to the potential for as yet unidentified contamination impact within the near-surface soils and groundwater. It will therefore be necessary to instigate the site-wide remediation and enabling works under the supervision of a suitably qualified and independent specialist. Works Undertaken Throughout the remediation and enabling works completed by Urban Regen, E3P maintained a part-time watching brief in which site visits were undertaken to monitor works, record ground conditions and fully investigate all potential sources of as yet unidentified contamination. No previously unidentified contamination was encountered during works conducted up till November 2024. An E3P engineer attended site on the following dates:  Visits 1 to 2: 06/03/2024 – 07/03/2024  Visit 3 to 5: 11/03/2024 – 13/03/2024  Visit 6 to 7: 19/03/2024 – 20/03/2024  Visit 8 to 9: 27/03/2024 – 28/03/2024  Visit 10: 03/04/2024  Visits 11 to 13: 09/04/2024 – 11/04/2024  Visit 14: 17/04/2024



- Visit 15: 23/04/2024
- Visit 16 to 17: 25/04/2024 – 26/04/2024
- Visit 18: 03/05/2024
- Visit 19: 10/05/2024
- Visit 20: 17/05/2024
- Visit 21: 22/05/2024
- Visit 22: 31/05/2024
- Visit 23: 06/06/2024
- Visit 24: 13/06/2024
- Visit 25: 27/06/2024
- Visit 26: 04/07/2024
- Visit 27: 11/07/2024
- Visit 28: 18/07/2024
- Visit 29: 23/07/2024
- Visit 30: 30/07/2024
- Visit 31: 08/08/2024
- Visit 32: 14/08/2024
- Visit 33: 21/08/2024
- Visit 34: 28/08/2024
- Visit 35: 05/09/2024
- Visit 36: 11/09/2024
- Visit 37: 19/09/2024
- Visit 38: 06/11/2024



RE-26 – WASTE SOILS SURPLUS TO REQUIREMENTS

Date of Works Undertaken	Throughout
Overview of Works	Background In the event that a surplus of excavation material is present on-site, this, in most cases, will be deemed to be a waste in accordance with the Waste Framework Directive (Article 3(1) Waste Framework Directive 2008/98/EE). The waste producer – but ultimately, the landowner – is responsible for the compliant disposal of such materials. Works Undertaken Across the development, the earthworks have been designed to be in balance, as such, soils generated from excavation activities (cut) have been re-used on-site within the earthworks balance in areas requiring upfill, as such, no surplus soil generation was created. The exception to the above is where hotspot arisings have been deemed unsuitable for use within the development and soils in areas affected by knotweed. In relation to hotspot arisings resulting from RE-1, RE-8, RE-9 and RE-10, Urban Regen have used the chemical analysis results of the arisings obtained by E3P to either dispose of the unsuitable materials off-site at a licensed waste facility, or submit materials for treatment (ex-situ bioremediation) in order to allow for the retention and re-use of materials on-site in low sensitivity areas (i.e. Hardstanding and > 600 mm of Cover, or POS > 300 mm). Approximately 270 m³ of non-hazardous soil, 25 m³ of asbestos impacted material, and 15 m³ of contaminated groundwater was removed off-site to a licensed waste facility. Waste tickets are available upon request from Urban Regen. Tracking records from Urban Regen are presented within APPENDIX XI. Waste consignment notes are available upon request to Urban Regen.

RE-27 – VALIDATION OF MATERIALS FOR POTABLE WATER SUPPLY INFRASTRUCTURE SPACE

Date of Works Undertaken	Throughout
Overview of Works	A Post Remediation UKWIR risk assessment has been completed using Made Ground samples used during the upfill works across the site in which the pipe will be laid. Exceedances for EC5 – EC40 were noted within CRUSH 201, with further exceedances for EC10-EC16 within CRUSH 202, CRUSH 204, CRUSH 304, and CRUSH 306. It is recommended that Barrier Pipe is utilised across the site. The Post Remediation UKWIR risk assessment is presented in APPENDIX XII



RE-28 – INVESTIGATION OF RETAINING WALL FOOTINGS

Date of Works Undertaken	May - September 2024
Photographs	Plate 70, 78-80
Overview of Works	Background It is recommended that investigation into the footings of the existing retaining wall be carried out to identify how far footings encroach onto site, which may affect any proposed foundations of the residential development. It is also recommended that a structural defects survey is undertaken on retaining structures to ensure that the remediation and enabling works do not negatively impact the structure. Overview of Works A review of the existing retaining walls by a structural engineer, appointed by Stonebond, confirmed that the proposed development and subsequent remediation and enabling works would have no detrimental impact upon the existing retaining walls or footings. Details of this inspection can be obtained from Stonebond upon request. During the remediation and enabling works, shallow bedrock and a high wall associated with the former sandstone quarry were encountered behind a retaining wall of the former Woodhouse Mill building located in the northwest sector (former Tack Lea Works area). As this shallow bedrock and quarry high wall were located within the footprint of Plots 31-35, a cut and fill exercise was undertaken in this area, with shallow bedrock broken out and excavated down to the natural stratum (superficial deposits or bedrock) to depths ranging between 4.00 m and 7.00 m bgl (165 m AOD to 162 m AOD). Arisings from this cut and fill exercise were processed as site generated crush and used as suitably engineered materials to upfill this area. The remaining highwalls are now located outside of the site boundary and will be segregated from the future development via the installation of gabion basket walls. The base of the cut and fill exercise in the northwest sector is presented within Urban Regen Drawing 390-15-08-24-02 - Base of Dig, which is presented in APPENDIX III.

RE-29 – REMEDIAL VERIFICATION REPORT

Date of Works Undertaken	Throughout
Overview of Works	This validation report covers all remediation and enabling works completed up to November 2024. Supplementary interim validation letters pertaining to any outstanding remediation and enabling works, as well as the validation of garden plots and gas membrane installations post-November 2024 will be provided under separate covers.



5. POST REMEDIATION BUILD PHASE REQUIREMENTS

This document details the construction works that are required to ensure full compliance with the remediation Strategy, Regulatory Authorities, Building Control & Warranty Providers;

The following should be implemented during the build phase of the development:

- ☉ Chemical validation of imported topsoil for use within cover systems;
- ☉ Chemical validation of imported subsoil for use within cover systems;
- ☉ Placement and depth validation of imported subsoil within all cover systems;
- ☉ Placement and depth validation of imported topsoil within all cover systems; and
- ☉ Installation and validation of ground gas protection measures.

The validation protocols are presented within the E3P Remediation and Enabling Works Strategy and are presented below.

5.1. PLACEMENT OF COVER SYSTEM

The remediation and enabling works strategy for the site, concerning the health of the future site users, includes the provision of a chemically suitable clean material to be installed in all soft landscaped areas. The construction of the clean cover/placement of clean material shall be in accordance with Table 3.

Table 3 Construction and Validation of Cover System

SOFTSCAPE TYPE	DEPTH (MM)		BREAK LAYER Y/N/TYPE	VALIDATION FREQUENCY	TESTING SUITE	VALIDATION DOCUMENTATION
	TOPSOIL	SUBSOIL				
Back garden	150	450	Yes (Geotextile Membrane)	1 per plot	A/B/C/D	Depth validation certificate
Front garden	150	150	N	1 per 4 plots	A/B/C/D	Depth validation certificate
LEAP (parkland)	Minimum 300 mm clean cover		N	1 per 625 m ²	A/B/C/D	Depth validation certificate
Functional POS	Minimum 300 mm clean cover		N	1 per 2000 m ²	A/B/C/D	Depth validation certificate
None Functional POS	N/A		N	N/A	N/A	N/A

In accordance with the current requirements of the regulatory authorities, validation samples will be collected from all materials that are to be imported or re-used on-site.

Subsoil and topsoil shall be free of any deleterious materials, such as building materials, timber, plastics etc and conform to the requirements of BS 3882:2007.

No suitable source of subsoil or topsoil has been identified on-site, therefore, imported subsoil and topsoil will be required for the cover systems.



Analysis of subsoil and topsoil will be required to achieve testing frequencies outlined within the remediation strategy and in the event of importation of additional material during construction

Testing requirements for topsoil and subsoil are presented in Table 4.

Table 4 Specification for Soil Testing

MATERIAL USE	TESTING FREQUENCY	SUITE OF ANALYSIS
Subsoil Greenfield Source	1 Sample per 200 m ³ (minimum 3 from source)	A/B/C/D
Subsoil Brownfield Source	1 Sample per 50 m ³ (minimum 6 from source)	A/B/C/D
Topsoil Greenfield Source	1 Sample per 200 m ³ (minimum 3 from source)	A/B/C/D
Topsoil Brownfield Source	1 Sample per 50 m ³ (minimum 6 from source)	A/B/C/D
General Engineering Fill (Class 1 and 2 Soil)	1 Sample per 1000 m ³	A/B/C/D

Notes

Suites of Analysis:

- A. Speciated PAH.
- B. Speciated TPH (C5-C35).
- C. Asbestos (ID).
- D. CLEA Inorganic Heavy Metals.

5.1.1. PROCEDURE FOR PLACEMENT OF CHEMICALLY SUITABLE COVER SYSTEM

Rear gardens will require the placement of a geotextile membrane before been backfilled with 450 mm chemically validated subsoil, with 150 mm topsoil overlaying this.

Front gardens, soft landscaping and areas of POS need to be backfilled with 150 mm chemically validated subsoil, with 150 mm topsoil overlying this.

Topsoil and subsoil is required to be confirmed as chemically suitable prior to placement. Where subsoil is not placed during Remediation & Enabling works, E3P will be required to return to site and undertake independent validation of the correct placement of subsoil.

The placement of 600 mm of clean material and geotextile membrane in rear gardens, and 300 mm of clean material in front gardens, soft landscaping and areas of POS will be undertaken during the build phase works of the project.

The placement of subsoil and corresponding validation will be documented within the Garden Validation Letters (to be issued on completion of the contractor's works).

If proposed utilities are to be placed within the cover system, the clean cover should be placed prior to installation of these utilities.

If natural superficial deposits are encountered, excavation can cease here.

E3P will collect photographic evidence of the placement of 150 mm of certified topsoil, 450 mm of subsoil and geotextile membrane in rear gardens, and the placement of 150 mm of certified topsoil and 150 mm of subsoil in front gardens, soft landscaping and areas of POS on completion of construction works. This element will also be checked by the Building Control Officer as part of the site completion prior to issuing of a CML certificate.



The garden validation procedure is detailed in Table 5.

Table 5 Garden Validation Procedure

PROCEDURE	METHOD
Chemical Validation	Imported subsoil and topsoil will need to be chemically analysed to confirm suitability for use with the proposed cover system prior to installation and completion of the garden systems. E3P will issue an email to the appropriate party with an assessment of the chemical suitability of both subsoils and topsoil. If acceptable the materials can be installed to the required depth at which time the plot will be deemed complete following a validation procedure by a suitability qualified E3P engineer.
Trial Holes	Trial holes are deemed necessary for all plots given that the 600 mm cover system will need to be placed on each plot rear garden during the build phase. Photographs should reveal the underlying geotextile membrane. Trial holes within front garden areas will be undertaken at 1 every four plots, given that these are deemed as functional landscaping, to validate the correct installation of 300 mm cover. Areas of soft landscaping and POS will have a minimum of 1 trial hole per landscaped area, with additional trial holes undertaken every 1 per 50 m², given that 300 mm cover systems are required in these areas.
Validation	Photographic evidence will be taken by E3P of the topsoil placement demonstrating the depth of topsoil and practical completion of works are required for each and every plot. For plots where subsoil depths require validation by E3P during the build phase, photographs will be taken and collated by E3P.
Validation Certificate	Once the photographs of the placement of topsoil (over the clean material) have been provided, E3P will issue a plot specific validation certificate to demonstrate that the required subsoil and topsoil has been placed in the required garden plots along with the chemical analysis.
Completion Report	Upon completion of all gardens and landscaped areas within the development, a Completion Report will be issued providing the confirmation that all remediation requirements have been achieved.

Figure 2 provides an example of a garden validation photographs that will be required for each plot.



Figure 2 **Example of Plot Cover System Validation**

Plot Validation		20 / 20 (100%)
Plot Validation 1		5 / 5 (100%)
Plot Number	117	
Is Plot Ready	Yes	
Installation Standard	Pass	
Depth of Cover System Materials (record the depth and support with Photo down the hole)	1000	
  Photo 1 Photo 2		
Depth of Topsoil (mm)	150	
Depth of Subsoil (mm)	850	
Depth of Cover System at Ground Level (Photo)	☒	
 Photo 3		
Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo)	☒	
 Photo 4		
Soil suitable	Yes	
Geotextile membrane present	N/A	



5.2. POTABLE WATER SUPPLY – CONTAMINANT ASSESSMENT CRITERIA

CONTAMINANT GROUP	PE-THRESHOLD ^A	MAXIMUM PERMISSIBLE CONCENTRATION AT PROPOSED PIPELINE DEPTH ^A	MAXIMUM PERMISSIBLE SITE CONCENTRATION ^A
Total VOC	0.5	N/A	N/A
Total BTEX And MTBE	0.1	N/A	N/A
Total SVOCs (Excluding PAH and those substances marked with an *)	2	N/A	< 0.3
EC5-EC10 Aliphatic and Aromatic Hydrocarbons	2	< 0.1	< 0.1
EC10-EC16- Aliphatic and Aromatic Hydrocarbons	10	5.7	5.7
EC16-EC40 Aliphatic and Aromatic Hydrocarbons	500	49	149
Phenols (From SVOC Analysis)*	2	< 0.3	< 0.3
Cresols and Chlorinated Phenols (From SVOC Analysis)	2	< 0.3	< 0.3

Notes

A. All concentrations in mg/kg.

5.3. GROUND GAS PROTECTION MEASURES

The Ground Gas Risk Assessment suggests the site will fall into the bracket for Characteristic Situation 2 which will require specialist mitigation measures to be constructed in accordance with BS8485 (2015)+A1(2019).

In addition, vapour resistant membranes will be required to be installed for Plots 1-10, located within the eastern sector (former Sheppard Mill area), due to elevated concentrations of volatile contaminants.

No radon protection measures will be required in any new dwellings or extensions, as the site is not located with a radon-affected area.

The validation inspection is to include the items that are detailed in Table 6.

Table 6 Ground Gas Mitigation Validation Items – CS2

INSPECTION	METHOD
Product Verification	Confirmation that suitable products have been procured for installation to consist of photographs of product types, labels on packaging and delivery tickets.
Passively Ventilated Sub-floor Cavity	A qualified engineer/consultant will be required to attend the site and validate the compliant construction of the sub-structure with a minimum 150 mm sub-floor void. Due to the nature of the construction process and construction using precast suspended segmental floors, it is considered appropriate to check and verify 1 in 10 of the dwellings constructed with the minimum 150 mm sub-floor void.



INSPECTION	METHOD
Wall Cavity Inspection	Confirmation that the gas membrane spans the external wall cavity above the periscopic vents. If membrane installed over the thermalite coursing block, ensure double-sided butyl tape placed under the membrane to seal any sole plate fixing penetrations.
General Condition	The membrane is to be inspected to ensure there are no tears, punctures or rips.
Structural reinforcement	Here, structural reinforcement is used over a membrane, which must either be supported by a physical barrier or inspected after placement over a membrane to ensure no damage.
Jointing	The engineer is to check the overlaps between membranes are correctly sealed with sufficient overlaps. The membrane is to be jointed and sealed in accordance with the pre-agreed CQA plan and design requirements.
Service Entry Points	Verification of the presence of pre-formed top hats sealed to the pipe and membrane as per the construction detail.
Remedial Action	Any damage or requirement for remedial action must be recorded and notified in writing. Once repaired, the verifier will undertake the necessary reinspection's.
Passive Venting Systems	The engineer should verify the presence of vents at 1.5 m centres on at least three of the external walls.
CQA / Audit	The verifier must use a ISO approved system to ensure CQA. This will include electronic data capture with time and location stamps to ensure auditability if required.

Examples of gas membrane verification photographs are provided in Figure 3.

It should be noted that these are for illustrative purposes only, as each site will have a site-specific gas membrane specification.



Figure 3 Example Gas Membrane Verification

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Plots 1-10 will require VOC vapour mitigation measures.

A qualified person will validate all VOC vapour mitigation measures in accordance with the requirements of CIRIA 748 and CIRIA 735.

The validation of ground gas mitigations should be completed in line with the items specified in Table 7.

Table 7 Ventilation and Membrane Mitigation Measures Validation Items (VOC Membranes)

INSPECTION	METHOD
Product Verification	Confirmation that suitable products have been procured for installation to consist of photographs of product types, labels on packaging and delivery tickets.
Passively Ventilated Sub-floor Cavity	A qualified engineer/consultant will be required to attend the site and validate the compliant construction of the sub-structure with a minimum 150 mm sub-floor void. Due to the nature of the construction process and construction using pre-cast suspended segmental floors, it is considered appropriate to check and verify 50% of the dwellings constructed with the minimum 150 mm sub-floor void.
Wall Cavity Inspection	Confirmation that the gas membrane spans the external wall cavity above the periscopic vents.
General Condition	The membrane is to be inspected to ensure there are no tears, punctures or rips.
Structural reinforcement	Here structural reinforcement is used over a membrane, and this must either be supported by a physical barrier or be inspected after placement over a membrane to ensure no damage.
Jointing	The engineer is to check the overlaps between membranes are correctly sealed with sufficient overlaps. The membrane is to be jointed and sealed in accordance with the pre-agreed CQA plan and design requirements.
Service Entry Points	Verification of the presence of preformed top hats sealed to the pipe and membrane as per the construction detail.
Remedial Action	Any damage or requirement for remedial action must be recorded and notified in writing. Once repaired, the verifier will undertake the necessary reinspection's.
Passive Venting Systems	The engineer should verify the presence of vents at 1.5 m centres on at least three of the external walls.
CQA / Audit	The verifier must use a ISO approved system to ensure CQA. This will include electronic data capture with time and location stamps to ensure auditability if required.

Examples of vapour membrane verification photographs are provided in Figure 4.



It should be noted that these are for illustrative purposes only, as each site will have a site-specific gas membrane specification.

Figure 4 Example VOC Membrane Verification

Plot Inspection 4	
Plot Number	80
Type of Development: Other add note	House
Foundation Type: Other add note	Suspended Floor
Gas Membrane Type: Manufacturer, gauge, and colour.	Powerbase VOC blue
Gas Membrane Condition: Open punctures, tears, rips, stretching, Presence of debris, Repairs, Signs of weakness such as raised or sunken indentations, Protection plan in place to restrict access to lain gas membrane? IF FAIL DESCRIPTION IN ACTIONS AND PHOTOS REQUIRED	Pass
    	
Laps, welds, and joints seals: Joints lapped and sealed in accordance with manufacturer's requirements/ specification? Minimum overlap insured? Sections taped twice? Are welds complete? Appropriate joining/double-sided tape used, Folds running in line with joints? (no joints cutting across folds)	Pass
  	
Service entries seals: Top hats seal arrangements fixed around service entries? Use of Jubilee clips?	Yes
   	
Type of joints/ Lapping	Horizontal
Corners / Internal joints: Check all corners are correctly formed or contractor has used preformed corners.	Pass
      	
Extent of Coverage: Is the membrane covering the entire plot? Does membrane span over outside walls?	Yes
  	
Condition of sub-grade and underside of gas membrane: Check that the subgrade does not contain rough/uneven surfaces, is appropriately clean and that there are no hard/sharp objects. That protective sand blinding or geotextile (if specified) is present and meets the design criteria.	Pass
	
Slab / membrane condition (is membrane clear of debris or insulation): Can membrane be fully seen and photographed – ask contractor to remove any debris so membrane can be fully seen as inspected – this is a requirement of NHBC and local authorities.	Pass
	
External Wall Air bricks: Numbers, size, positions as design drawing? (Minimum of 3 walls)	Pass
  	
Passive Venting	
Sub-floor Void: Is a check possible on future plots (insert Plot number or NO in text box)	No

E3P has determined that it will be necessary to undertake integrity testing on every second plot constructed in the eastern sector (former Sheppard Mill area).

The plots to be subject to integrity testing will be determined within the specialist contractor's CQA plan. However, it must be recognised that the actual plots inspected may vary throughout the installation works due to programme and operational constraints.

It should be noted that these are for illustrative purposes only as each Site will have a site-specific gas membrane specification. The site-specific gas membrane specification is presented in the E3P Gas Protection Design Report (Report Ref: 16-465-R7-1, dated September 2024).



6. CONCLUSION

The remediation elements identified within the approved Remediation and Enabling Works Strategy have been completed with validation testing confirming that the works have been completed to the required standard.

As part of the on-going construction works, the developer will be required to construct and validate the items listed below in strict accordance with the requirements of the regulatory authorities as documented in detail within this report.

- ✿ Chemical validation of imported topsoil and imported subsoil for use within all gardens, soft landscaping and areas of POS;
- ✿ Placement and validation of a geotextile membrane and subsoil (clean material) in a 450 mm layer within the rear garden of each plot;
- ✿ Placement and validation of subsoil (clean material) in a 150 mm layer within front gardens, soft landscaping and areas of POS;
- ✿ Placement and validation of imported topsoil (clean material) in a 150 mm layer within all gardens, soft landscaping and areas of POS;
- ✿ Independent validation of the cover system by a suitably qualified E3P engineer; and
- ✿ Installation and validation of CS2 ground gas protection measures within Plots 11-49, and vapour resistant membranes within Plots 1-10.

END OF REPORT

APPENDIX I

LIMITATIONS





GENERAL

1. This report and any associated works (together comprising the "Services") were compiled and carried out by E3P for the client (as present in Section 1) under the E3P "Terms of Business" or with those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.
2. Unless explicitly agreed otherwise, in writing, this report has been prepared under E3P Standard Terms and Business as included within our proposal to the Client.
3. Project-specific appointment documents may be agreed upon at our discretion and a charge may be levied for both the time to review and finalise appointment documents and also for associated changes to the appointment terms. E3P reserves the right to amend the fee should any changes to the appointment terms create an increased risk to E3P.
4. The report needs to be considered in light of the proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

PHASE 1 GEOENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

5. Coverage: This section covers reports with the following titles or combination of titles: Phase 1; Desktop Study; Geoenvironmental Assessment; Development Appraisal; Preliminary Environmental Risk Assessment; Constraints Report; Due Diligence Report; Geotechnical Development Review; Environmental Statement; Environmental Chapter; Baseline Environmental Assessment; Project Scope Summary Report (PSSR), Program Environmental Impact Report (PEIR), Geotechnical Development Risk Register; Agricultural Land Assessment; Mineral Safeguarding Assessment; Desk Top Coal Mining Risk Assessment; Hydrogeological Appraisal; Construction Environmental Management Plan; and Site Water Management Plan.
6. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walkover inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. E3P cannot be held responsible for any disclosures that are provided post-production of our report and will not automatically update our report.
7. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, E3P reserves the right to review such information and, if warranted, to modify the opinions accordingly.
8. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.



9. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and does not constitute or replace full and proper surveys completed by suitably qualified and experienced specialists in these fields.
10. E3P does not warrant work/data undertaken/provided by others.

INTRUSIVE INVESTIGATION REPORTS

11. Coverage: The following report titles (or combination) may cover this category of work: Geoenvironmental Site Investigation; Geotechnical Assessment; GIR (Ground Investigation Reports); Preliminary Environmental And Geotechnical Risk Assessment; Preliminary Summary; Coal Mining Risk Assessment, Ground Gas Addendum; and, Geotechnical Risk Register.
12. The investigation has been undertaken to provide information concerning either:
 - I. The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or
 - II. Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.
13. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.
14. Unless otherwise specified in the scope of works, any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.
15. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.
16. For geotechnical investigations, the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.
17. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.



18. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.
19. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, E3P has used reasonable skill and care to extrapolate conditions between these points based on assumptions to develop our interpretation and conclusions.
20. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation and at the time of the investigation.
21. Conditions can change between investigation points both spatially and over time and these interpretations should therefore be considered indicative. The assessment of extreme weather events and their impact on ground conditions is not within the scope of E3P's work.
22. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated with the risk assessment process have been outlined within the body or associated appendix of the report.
23. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.
24. Where soil contamination concentrations recorded as part of this investigation are used for commentary on the potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed and the waste classification and any subsequent disposal option agreed upon with licenced subcontractors and/or the relevant regulators.
25. The results of the asbestos testing are factually reported and interpretation is given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and/or trace loose asbestos fibres within the soil matrix at the site.
26. If costs have been included in relation to additional site works, and/or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.



EUROCODE 7: GEOTECHNICAL DESIGN

27. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.
28. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIATION AND ENABLING WORK STRATEGY REPORTS

29. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected based on the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.
30. The outputs of the Detailed Quantitative Risk Assessments are based upon the manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.
31. Before adoption on-site, assessment criteria will need to be discussed and agreed upon with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatory Authority engagement are not within the control of E3P. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.
32. E3P does not accept liability for any subcontract work that has not been completed in strict accordance with an approved E3P Remediation and Enabling Works Strategy.

GEOTECHNICAL DESIGN REPORT (GDR)

33. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.



MONITORING (INCLUDING REMEDIATION MONITORING REPORTS AND BUILD PHASE MITIGATION)

34. These reports are factual and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of earthworks or remedial works.
35. The data is presented and will be compared with assessment criteria.

APPENDIX II

GLOSSARY





TERMS

ACM	Asbestos-containing material	MMP	Materials management plan
ADS	Acoustic design statement	ND	Not detected
AST	Above-ground storage tank	NDP	Nuclear density probe
BGS	British Geological Survey	NMP	Noise management plan
BSI	British Standards Institute	NPSE	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	NR	Not recorded
CA	Coal Authority	PAH	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	PCB	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	PI	Plasticity index
CIRIA	Construction Industry Research Association	PID	Photo ionisation detector
CLEA	Contaminated land exposure assessment	POS	Public open space
CML	Council of Mortgage Lenders	PPE	Personnel protective equipment
CoC	Contaminants of concern	ProPG	Professional practice guidance
CSM	Conceptual site model	QA	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	SGV	Soil guideline value
DWS	Drinking water standard	SPH	Separate-phase hydrocarbon
EA	Environment Agency	SPT	Standard penetration test
EQS	Environmental quality standard	SVOC	Semi-volatile organic compound
FFL	Finished floor level	TPH	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	UKWIR	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	UST	Underground storage tank
HCV	Health criteria value	VCC	Vibro-concrete column
ICSM	Initial conceptual site model	VOC	Volatile organic compound
LEL	Lower explosive limit	VRSC	Vibro-replacement stone columns
LMRL	Lower method reporting limit	VSC	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	WHO	World Health Organisation
MCV	Moisture condition value	WRAP	Waste and Resources Action Programme
MIBK	Methyl isobutyl ketone	WTE	Water table elevation

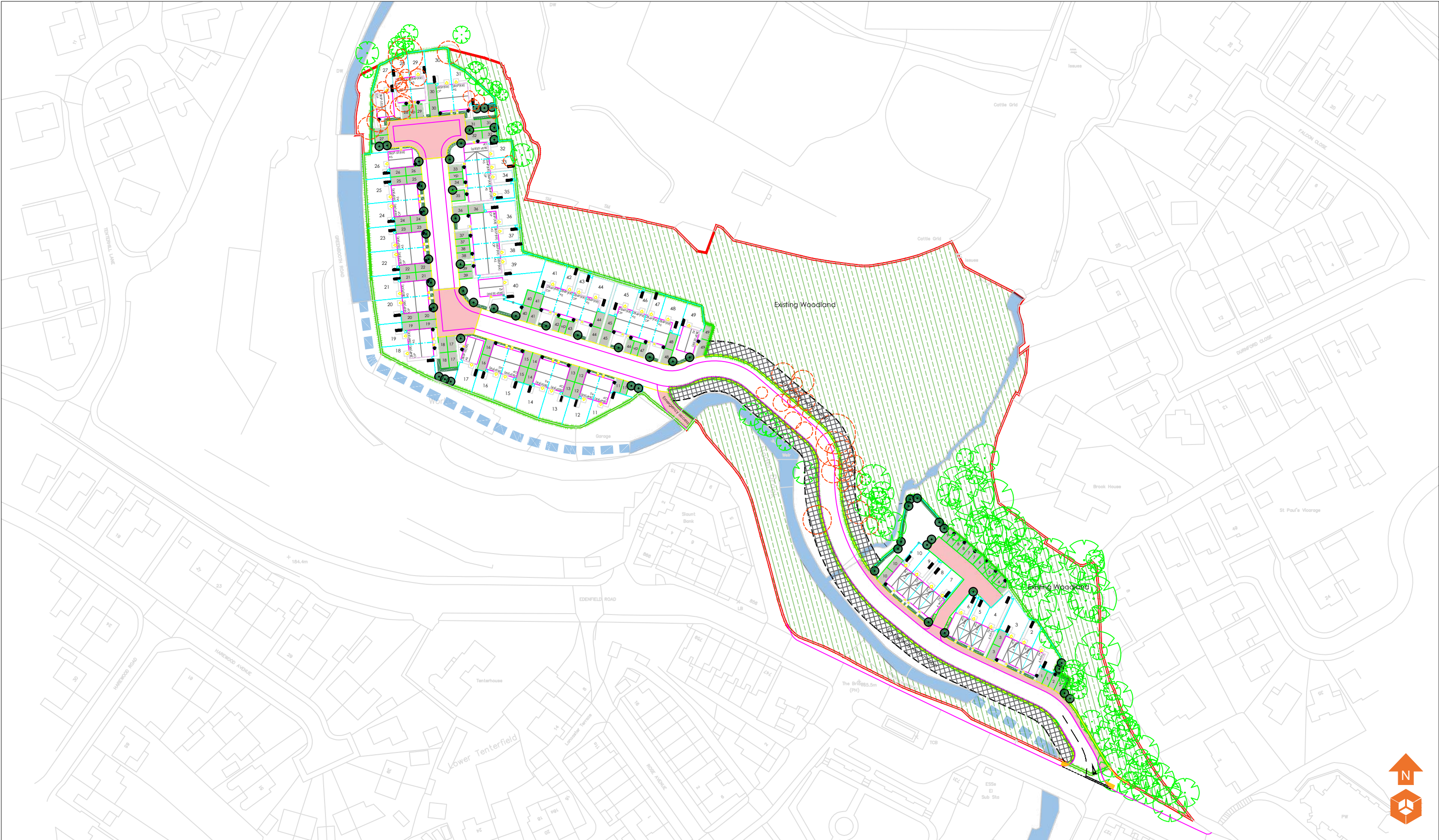


m	Metres	ppm	Parts per million
km	Kilometres	mg/m³	Milligram per metre cubed
% v/v	Percent volume in air	m bgl	Metres below ground level
mb	Millibars (atmospheric pressure)	m bcl	Metre below cover level
l/hr	Litres per hour	m AOD	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	kN/m²	Kilonewtons per metre squared
ppb	Parts per billion	µm	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	SSRT	Site Specific Remediation Target
PSD	Particle Size Distribution	DD	Dry Density
CL:AIRE	Contaminated Land: Applications in Real Environments	Mc	Moisture Content
ρ	Bulk Density	GPR	Ground Penetrating Radar
NDP	Nuclear Density Probe	FFL	Finished Floor Level
LEL	Lower Explosive Limit	UKWIR	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	LOD	Limit of Detection

APPENDIX III

DRAWINGS





	Notes:					Client: Urban Regen	Job No: 17-330	Date: 21.01.2025	 Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk	
							Drawing No: 002	Scale: NTS@ A3		
						Job Title: Land at Greenbooth Road and Edenfield Road, Norden	Drawing Title: Proposed Development Plan			The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.
	P1	REVA	21.01.2025	OW	MW					
	Phase	Issue	Date	Drawn	Checked					



- Historical Features
- Former Ponds
 - Former Reservoir
 - Former Tanks
 - Former Filter Tanks
 - Former Historical Landfill Area

Notes:				
P1	REVA	21.01.2025	OW	MW
Phase	Issue	Date	Drawn	Checked

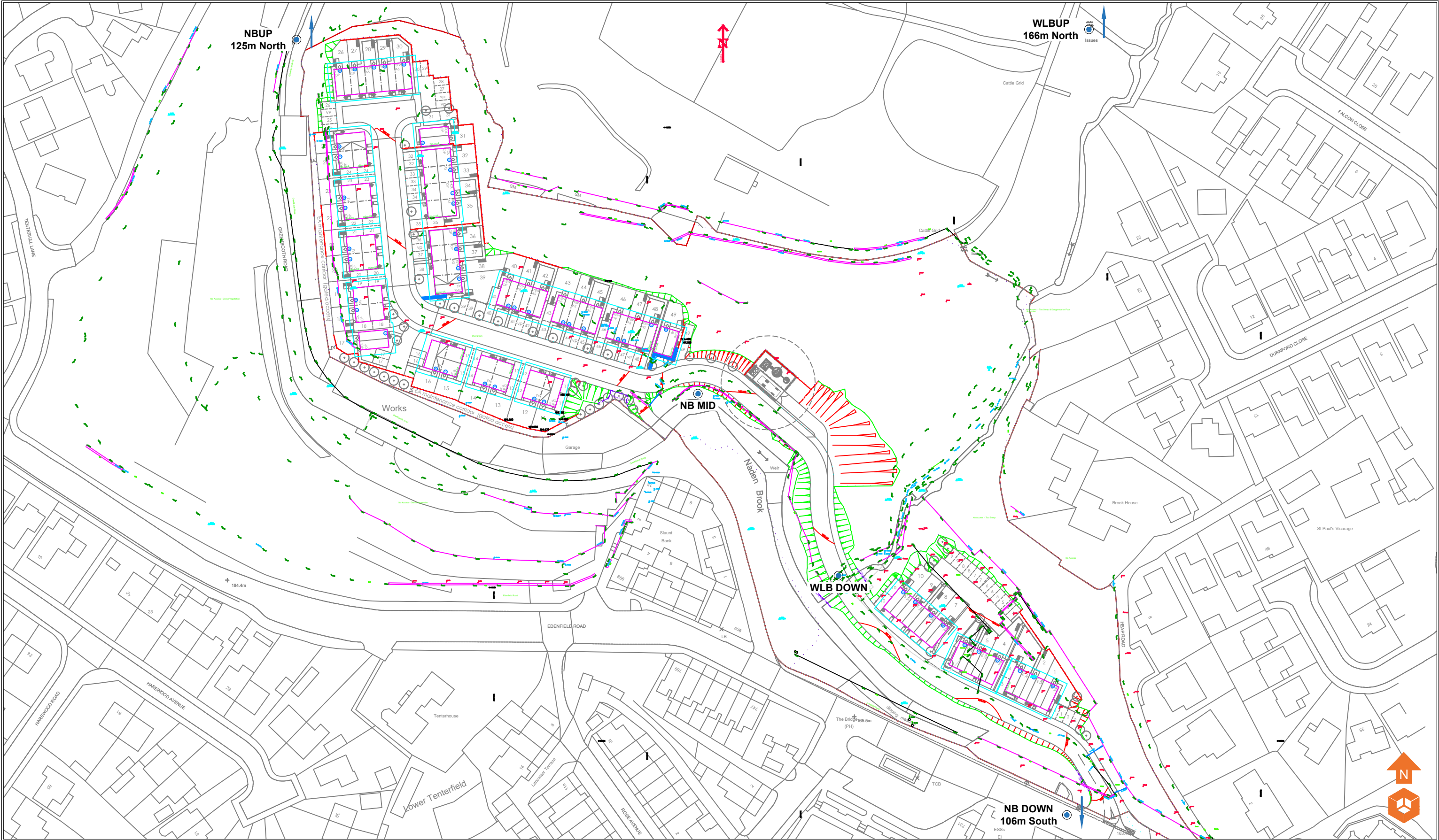
Client:		Urban Regen	
Job Title:		Land at Greenbooth Road and Edensfield Road, Norden	

Job No:	17-330	Date:	21.01.2025
Drawing No:	003	Scale:	NTS @ A3
Drawing Title:		Historical Features Plan - Ponds, Reservoirs, Tanks and Landfill	



Environmental Engineering Partnership Ltd
Taylor Road, Trafford Park
Urmston, Manchester, M41 7JQ
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

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Location Symbols

Approximate Sample Location

Notes:

Client:

Urban Regen

Job No:

17-330

Date:

21.01.2025

Drawing No:

031

Scale:

NTS



Environmental Engineering
Partnership Ltd
Taylor Road, Trafford Park
Urmston, Manchester, M41 7JQ
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

P1	REVB	21.01.2025	TG	GC	MW
P1	REVA	15.01.2025	TG	GC	MW
Phase	Issue	Date	Drawn	Checked	PM

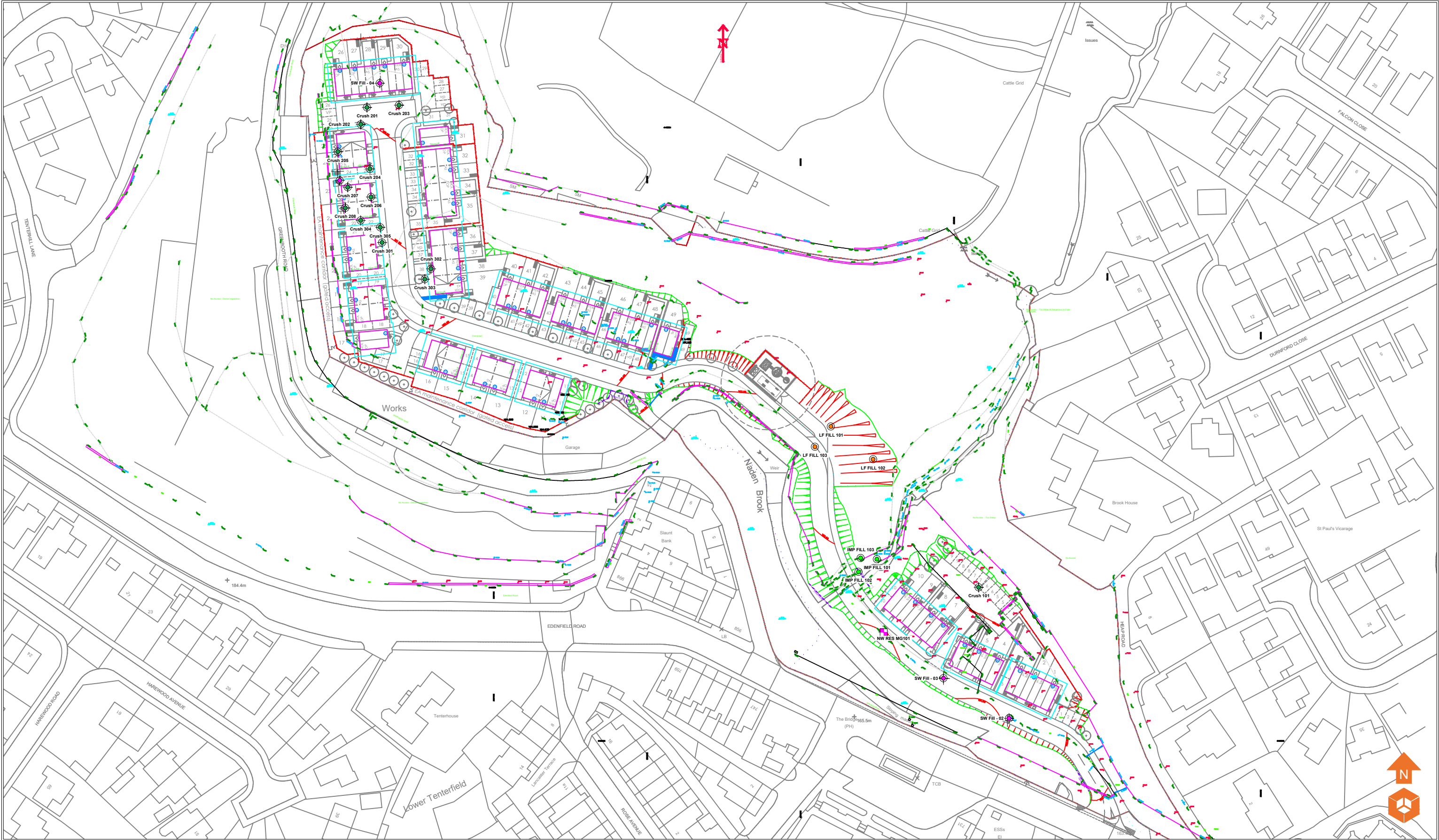
Job Title:

Land at Greenbooth Road
and Edenfield Road, Norden

Drawing Title:

Remediation Sample Location
Plan - Waters

The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.



Location Symbols

Approximate Sample Location

Notes:

Client:

Urban Regen

Job No:

17-330

Date:

21.01.2025

Drawing No:

031

Scale:

NTS



Environmental Engineering
Partnership Ltd
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Tel: 0161 707 9612
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Website: www.e3p.co.uk

P1	REVB	21.01.2025	TG	GC	MW
P1	REVA	15.01.2025	TG	GC	MW
Phase	Issue	Date	Drawn	Checked	PM

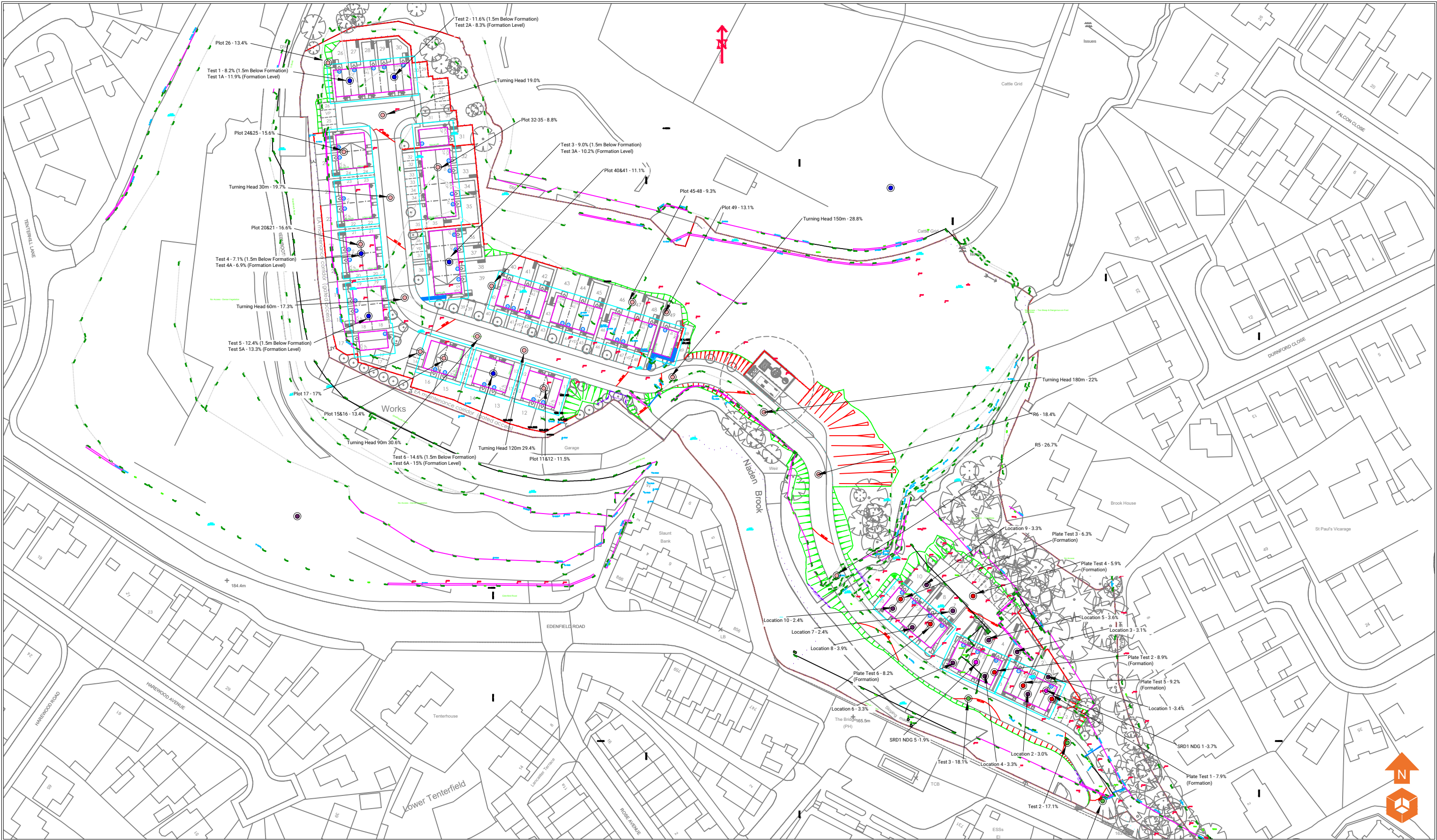
Job Title:

Land at Greenbooth Road
and Edenfield Road, Norden

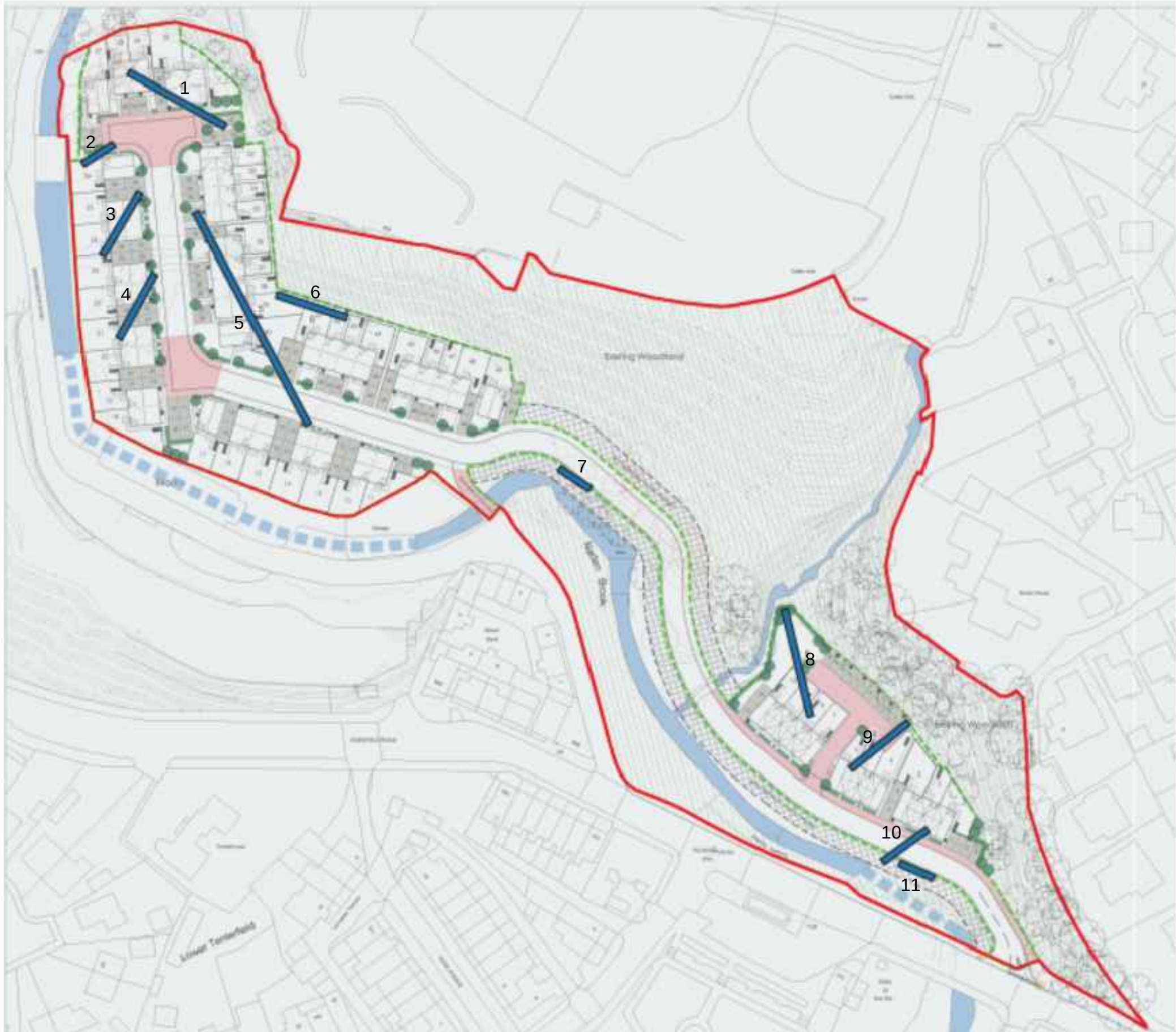
Drawing Title:

Remediation Sample Location
Plan - Geotechnical

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Key CBR By Plate Load Test - 6th June 2024 CBR By Plate Load Test - 17th September 2024 CBR By Plate Load Test - 3rd September 2024 CBR By Plate Load Test - 3rd December 2024 NDGs Undertaken 9th September SRDs Undertaken 9th September	Notes:						Client: Stonebond		Job No: 17-330	Date: 21.01.2025	e3p Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk
									Drawing No: 034	Scale: NTS	
	P1 P1 Phase REVB REVA Issue 21.01.2025 15.01.2025 Date TG TG Drawn GC GC Checked MW MW PM						Job Title: Edenfield Road		Drawing Title: Remediation Sample Location Plan - In Situ Testing		



Notes:					

P1	REVA	23.01.2025	OW	MW	MW
Phase	Issue	Date	Drawn	Checked	PM

Client:
Urban Regen

Job Title:
Land at Greenbooth Road and Edenfield Road, Norden

Job No:
17-330
Drawing No:
045

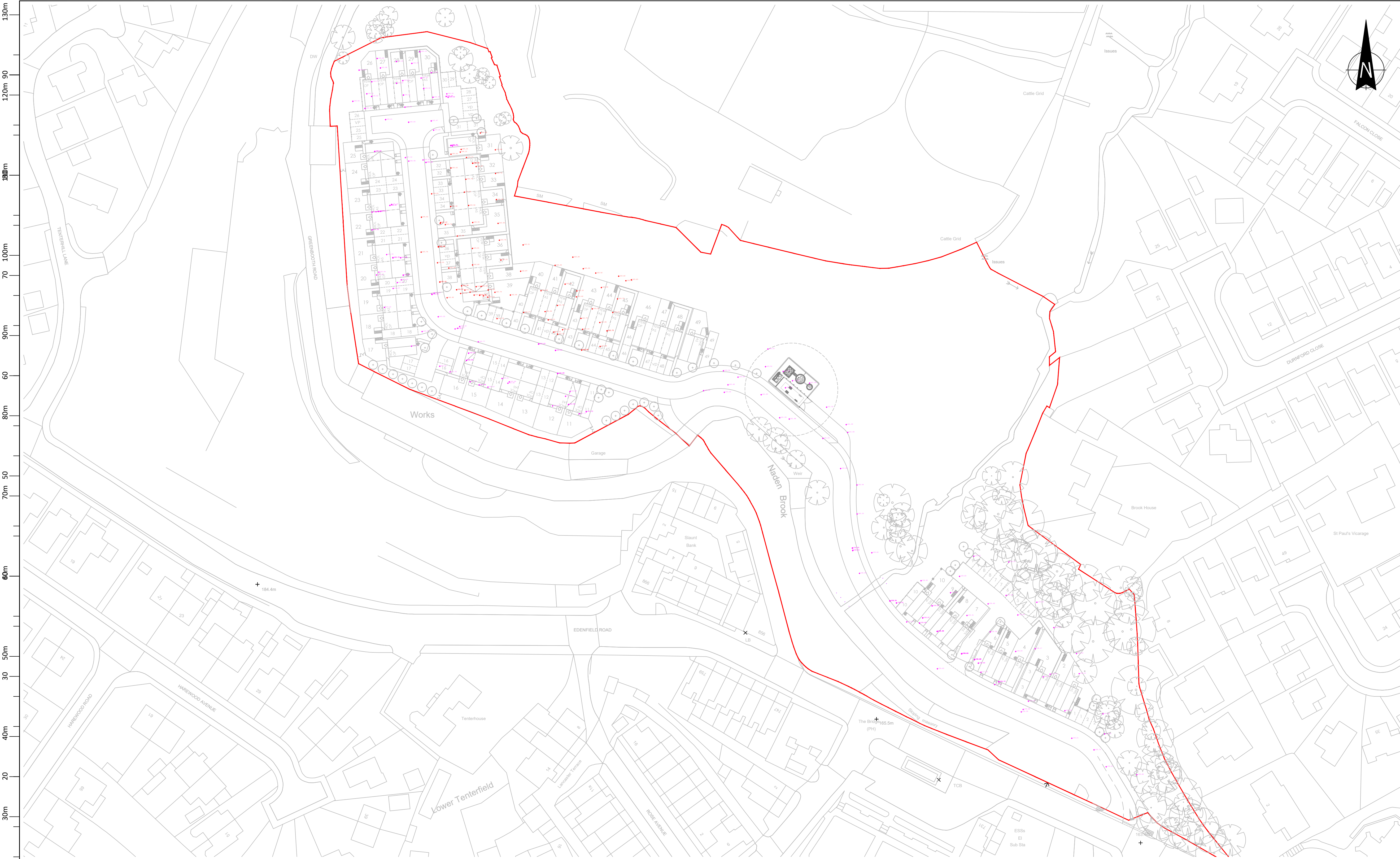
Date:
23.01.2025
Scale:
NTS

Drawing Title:
Archaeological Trench Plan



Environmental Engineering
Partnership Ltd
Taylor Road, Trafford Park
Urmston, Manchester, M41 7JQ
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.



Legend

Site boundary

Natural Ground - Purple(Machine) / Yellow & Dark Green(Made Up)

Rock - Light Green(Machine) / Blue(Made Up)

10.00

10.00

Notes

1. This plan is to be read in conjunction with all other associated reports/drawings/information .

2. The development layout depicted on this drawing was extracted from drawing '102 Road Levels & Contours.dwg' supplied digitally by the Client.

3. The required foundation solution is as detailed on drawing '7980/FD/01 REV D' provided digitally by the Client.

4. The site trim specification is as specified/agreed by/with the Client; and as detailed.

5. Due to the potential for live services and issues associated with withdrawal of support; remediation works have been carried out to within circa 1m of the site boundary (unless otherwise stated).

6. No Services were encountered.

7. No piles were encountered.

Client responsibilities post handover

To minimise any impact to the constructed landform, the site is to be suitably managed with the following recommendations considered prior to/during construction activities:

• Up-fill/made-ground/GF2/GF5 materials will degrade if trafficked when saturated, or during wet weather conditions. Any degradation of the materials is likely to require maintenance.

• Due to the potential degradation of materials from trafficking/wet weather, pile mats should be re-assessed to inform temporary works requirements, prior to use.

• When trafficking the site, vehicle movements should be restricted to designated haul routes i.e., site roads.

• To facilitate drainage/drying of the site, any standing water is to be pumped to non-construction areas, or discharged to surface water/drain. Any discharge into surface waters is to be in accordance with Regulatory Position Statement 261 'Temporary de-watering from excavations to surface water', or an associated discharge permit.

• When ponding waters have been removed, the site is to be left for a suitable period of time to allow residual moistures to drain through the materials.

• Excavated materials should be well managed, with different materials stored separately on areas not prone to ponding; the materials being sealed to minimise moisture ingress.

Survey Information:

Co-ord System:OSGB36(15)

Co-ord Type:Grid

Primary Survey Control:SmartNet

Secondary Survey Control:Site

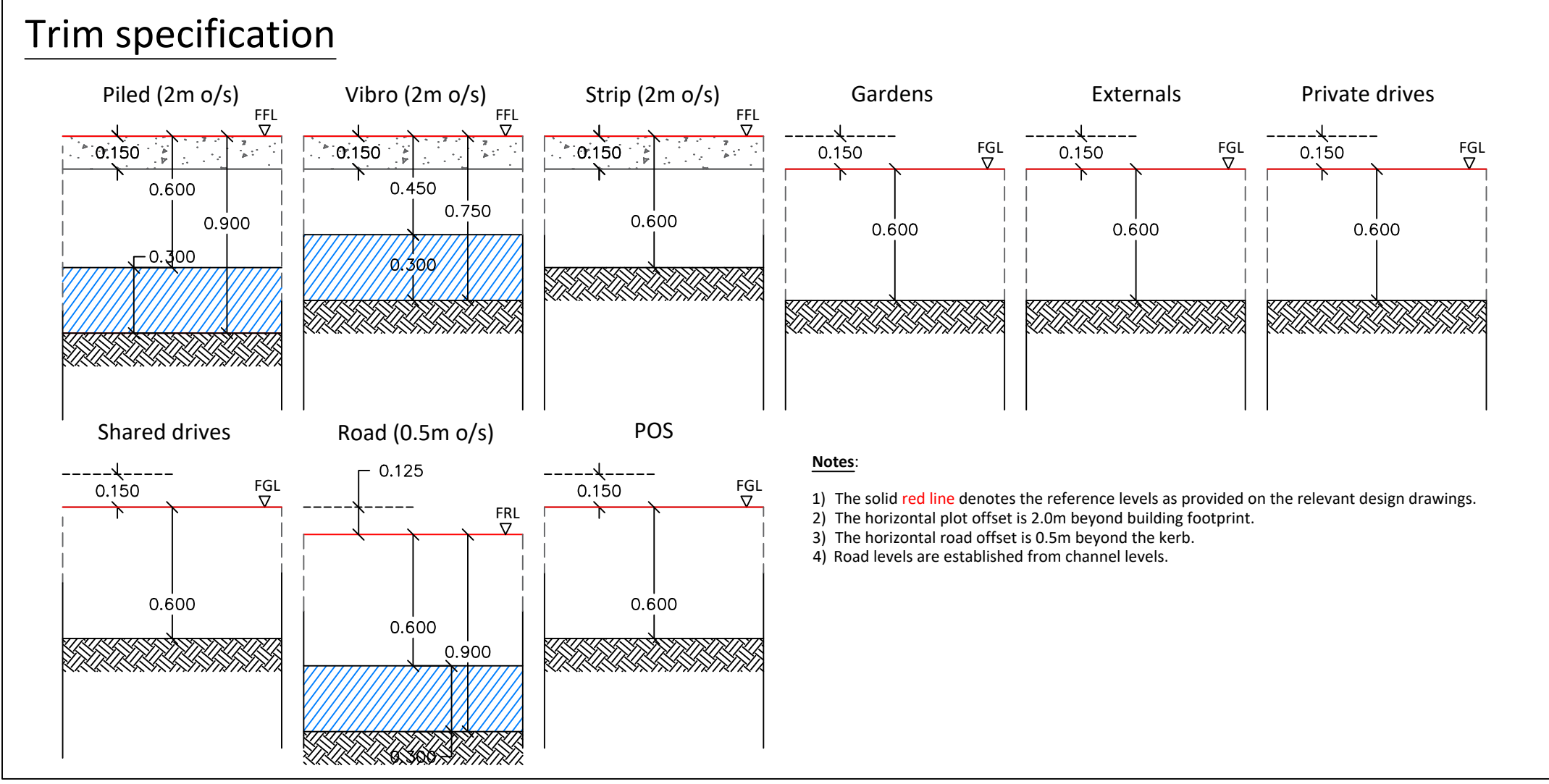
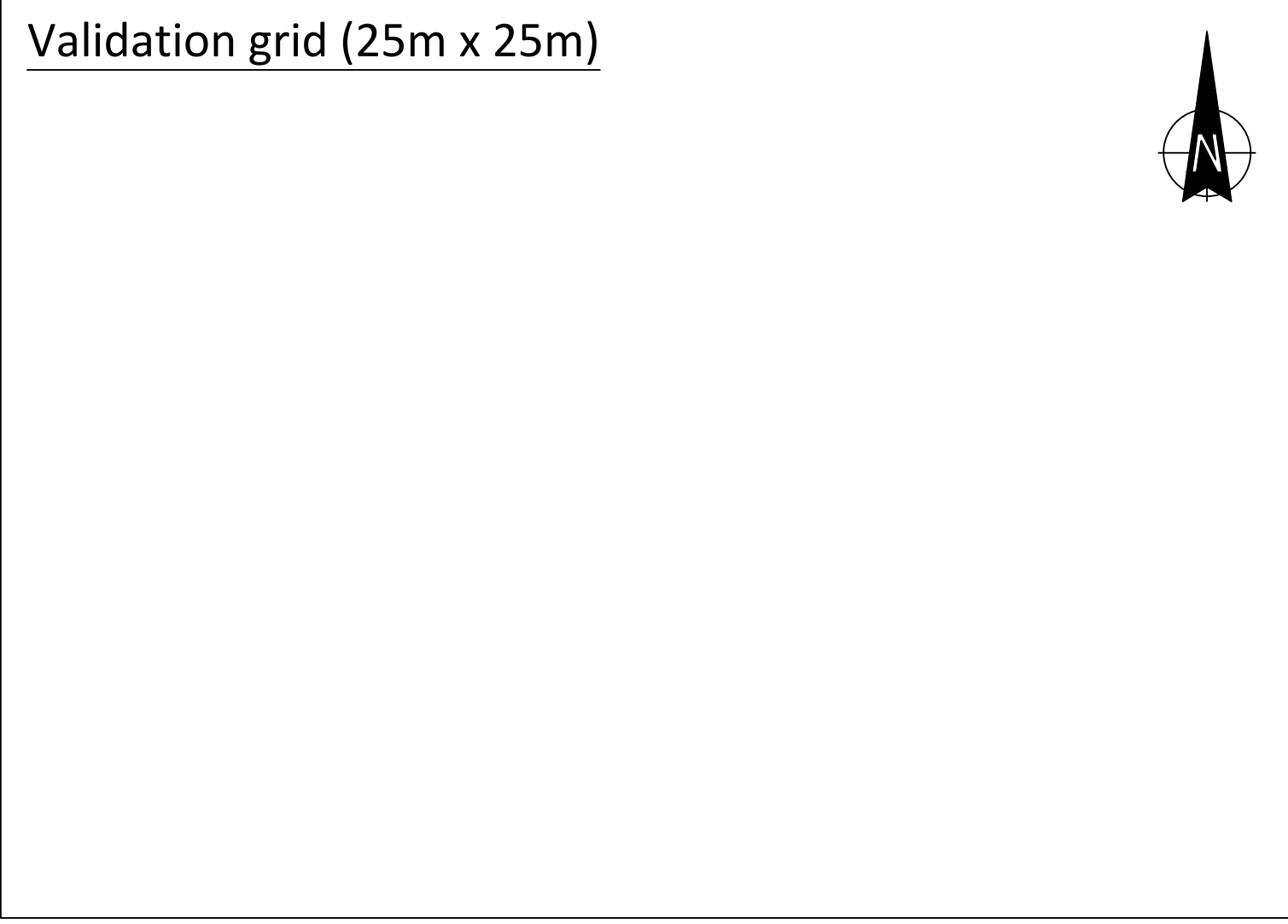
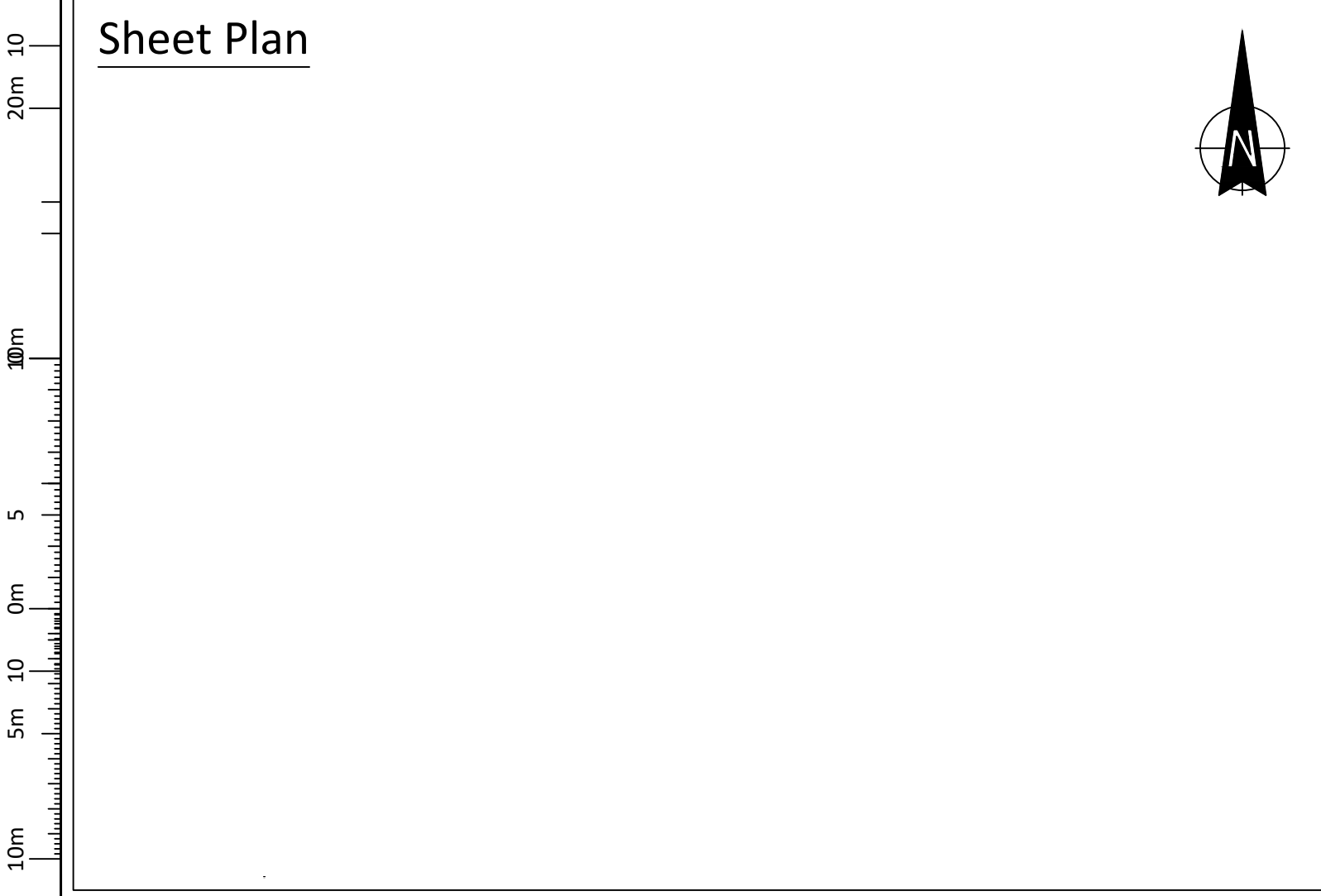
Rev

Date

Amendment

Drawn

Checked



Client:

Stonebond

Project:

Edenfield Road Norden

Title:

Base Of Dig

Scale:1:250 @ A1

First Issue:15th August 2024

Drawn:R.Corrigan

Checked:D. Cross

Drawing No:

390-15-08-24

Revision:



Legend

Site boundary
Survey stations

Remediation
Spot level - As built
Spot level - Base of excavation
Spot level - Base of excavation (depth reached by mtgeoservices)
Top/bottom of bank/break of slope
Minor contour - As built (0.1m interval)
6F2/6F5 piling mats/road box (approximate extent only)
CBR location, reference, and value
Gabion wall
Wall

Civils
Spot level - Edge of binder
Edge of binder
Spot level - Back of kerb
Back of kerb
Minor contour - As built road (0.1m interval)
Major contour - As built road (0.5m interval)

- Notes**
- This plan is to be read in conjunction with all other associated reports/drawings/information.
 - The development layout depicted on this drawing was extracted from drawing 'EDE-AJP-XX-00-DR-C-1400-P03 FINISHED LEVELS AND RETAINING WALLS (xref bound).DWG.dwg' supplied digitally by the Client.
 - The required foundation solution is as detailed on drawing 'EDE-AJP-XX-00-DR-S-2000-P2 FOUNDATION ZONING PLAN.pdf' provided digitally by the Client.
 - The site trim specification is as specified/agreed by/with the Client; and as detailed.
 - Due to the potential for live services and issues associated with withdrawal of support; remediation works have been carried out to within circa 1m of the site boundary (unless otherwise stated).
 - The location of services as detailed are approximate only (unless otherwise stated).
 - As agreed with the Client, the initial length of road (to the bend), has been constructed circa 1.0m to the east to accommodating existing site features near the entrance.

- Client responsibilities post handover**
- To minimise any impact to the constructed landform, the site is to be suitably managed with the following recommendations considered prior to/during construction activities:
- Up-fill/made-ground/6F2/6F5 materials will degrade if trafficked when saturated, or during wet weather conditions. Any degradation of the materials is likely to require maintenance.
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 - Excavated materials should be well managed, with different materials stored separately on areas not prone to ponding; the materials being sealed to minimise moisture ingress.

Survey control

The survey control stations as detailed have been extracted from historic topographic survey information as detailed on drawing '48590_MCLS-01C-3D.dwg' provided digitally by the Client, with intermediate survey stations established as necessary using total station.

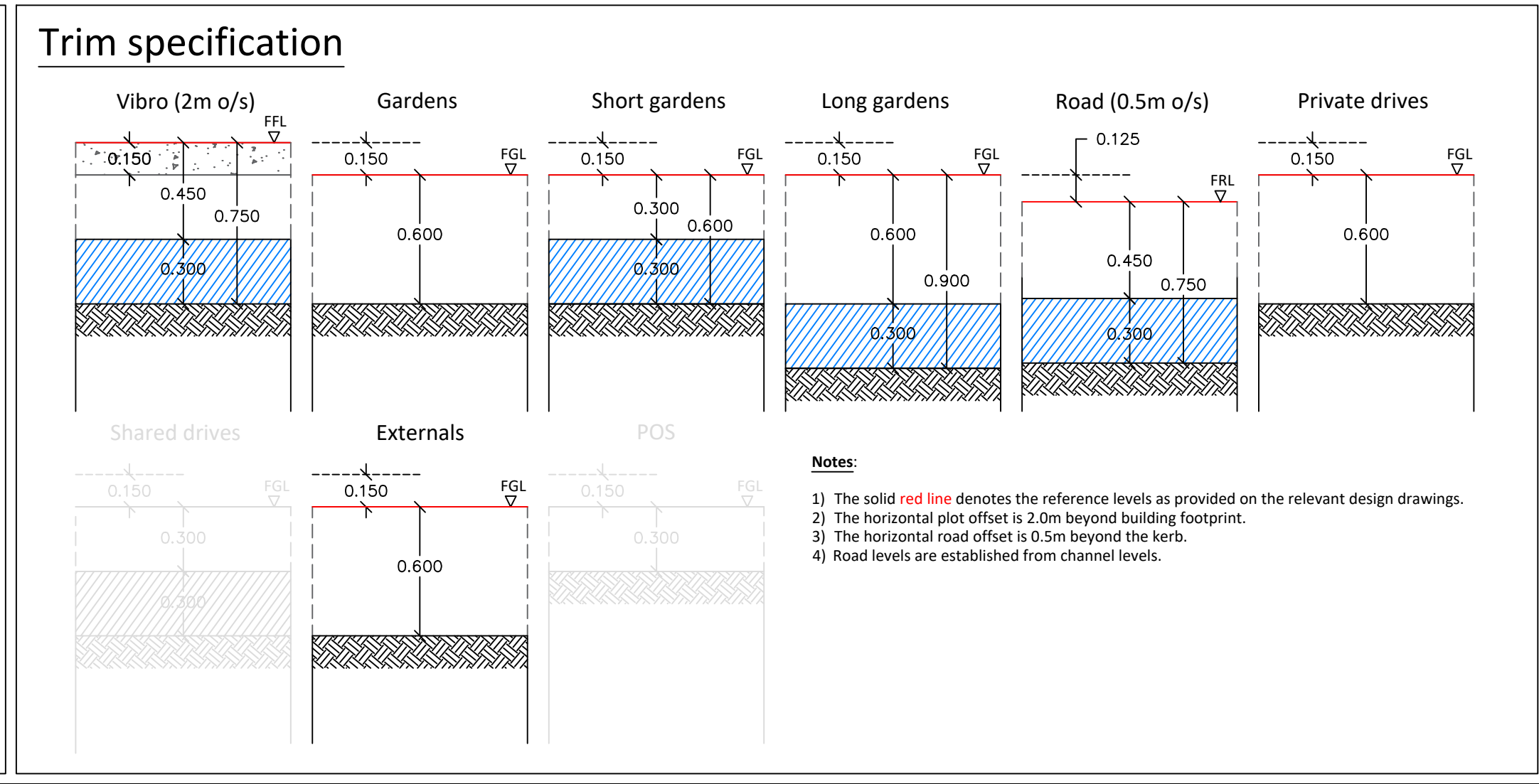
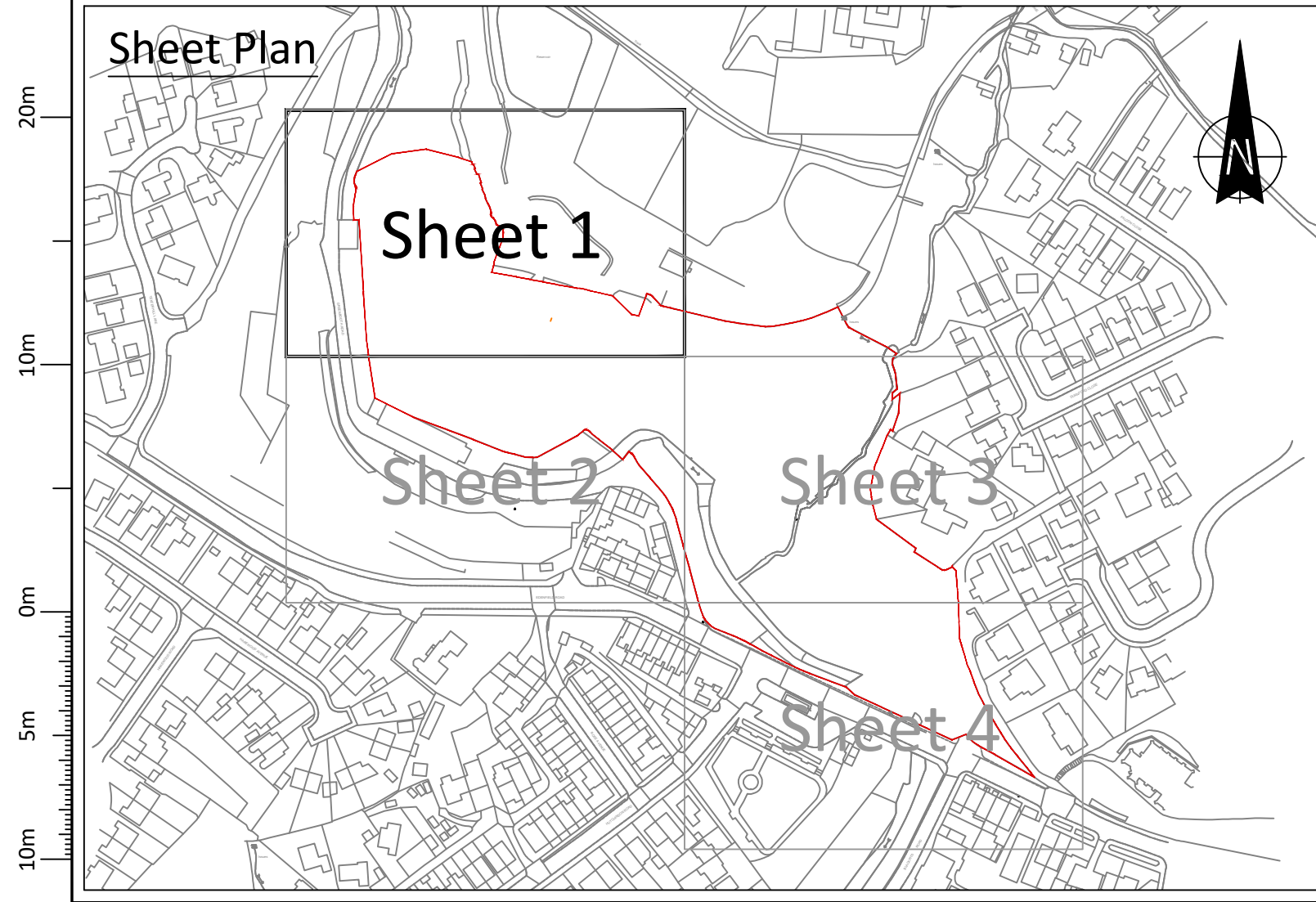
Station	Easting	Northing	Height
AL02	385929.033	414557.739	165.650
AL20	385711.746	414681.615	164.580
DW1	385792.835	414632.804	167.084

All survey control must be checked prior to use.

Survey Information:

Co-ord System:	Co-ord Type:	Primary Survey Control:	Secondary Survey Control:
OSGB36(15)	Grid	SmartNet	Site

Rev	Date	Amendment	Drawn	Checked



Urban Regen
ESTABLISHED 2001

Client: Stonebond Properties Limited

Project: Edenfield Road, Norden

Title: As built topographic survey and constraints (Sheet 1 of 4)

Scale:	First Issue:	Drawn:	Checked:
1:250 @ A1	10th Dec 2024	R.B.Woodrow	M.Hamed

Drawing No: 390-002-01

Revision:



Legend

Site boundary

Survey stations

Remediation

Spot level - As built

Spot level - Base of excavation

Spot level - Base of excavation (depth reached by mtgeoservices)

Top/bottom of bank/break of slope

Minor contour - As built (0.1m interval)

6F2/6F5 piling mats/road box (approximate extent only)

CBR location, reference, and value

Gabion wall

Wall

Civils

Spot level - Edge of binder

Edge of binder

Spot level - Back of kerb

Back of kerb

Minor contour - As built road (0.1m interval)

Major contour - As built road (0.5m interval)

▲UR1

X 11.48

X 11.48

X 11.48

22 PF

1000

X 11.48

X 11.48

X 11.48

X 11.48

- Notes**
1. This plan is to be read in conjunction with all other associated reports/drawings/information .

2. The development layout depicted on this drawing was extracted from drawing 'EDE-AJP-XX-00-DR-C-1400-P03 FINISHED LEVELS AND RETAINING WALLS (xref bound).DWG.dwg' supplied digitally by the Client.

3. The required foundation solution is as detailed on drawing 'EDE-AJP-XX-00-DR-S-2000-P2 FOUNDATION ZONING PLAN.pdf' provided digitally by the Client.

4. The site trim specification is as specified/agreed by/with the Client; and as detailed.

5. Due to the potential for live services and issues associated with withdrawal of support; remediation works have been carried out to within circa 1m of the site boundary (unless otherwise stated);

6. The location of services as detailed are approximate only (unless otherwise stated);

7. As agreed with the Client, the initial length of road (to the bend), has been constructed circa 1.0m to the east to accommodating existing site features near the entrance.

- Client responsibilities post handover**
- To minimise any impact to the constructed landform, the site is to be suitably managed with the following recommendations considered prior to/during construction activities:

• Up-fill/made-ground/6F2/6F5 materials will degrade if trafficked when saturated, or during wet weather conditions. Any degradation of the materials is likely to require maintenance.

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• When trafficking the site, vehicle movements should be restricted to designated haul routes i.e., site roads.

• To facilitate drainage/drying of the site, any standing water is to be pumped to non-construction areas, or discharged to surface water/drain. Any discharge into surface waters is to be in accordance with Regulatory Position Statement 261 'Temporary de-watering from excavations to surface water', or an associated discharge permit.

• When ponding waters have been removed, the site is to be left for a suitable period of time to allow residual moistures to drain through the materials.

• Excavated materials should be well managed, with different materials stored separately on areas not prone to ponding; the materials being sealed to minimise moisture ingress.

Survey control

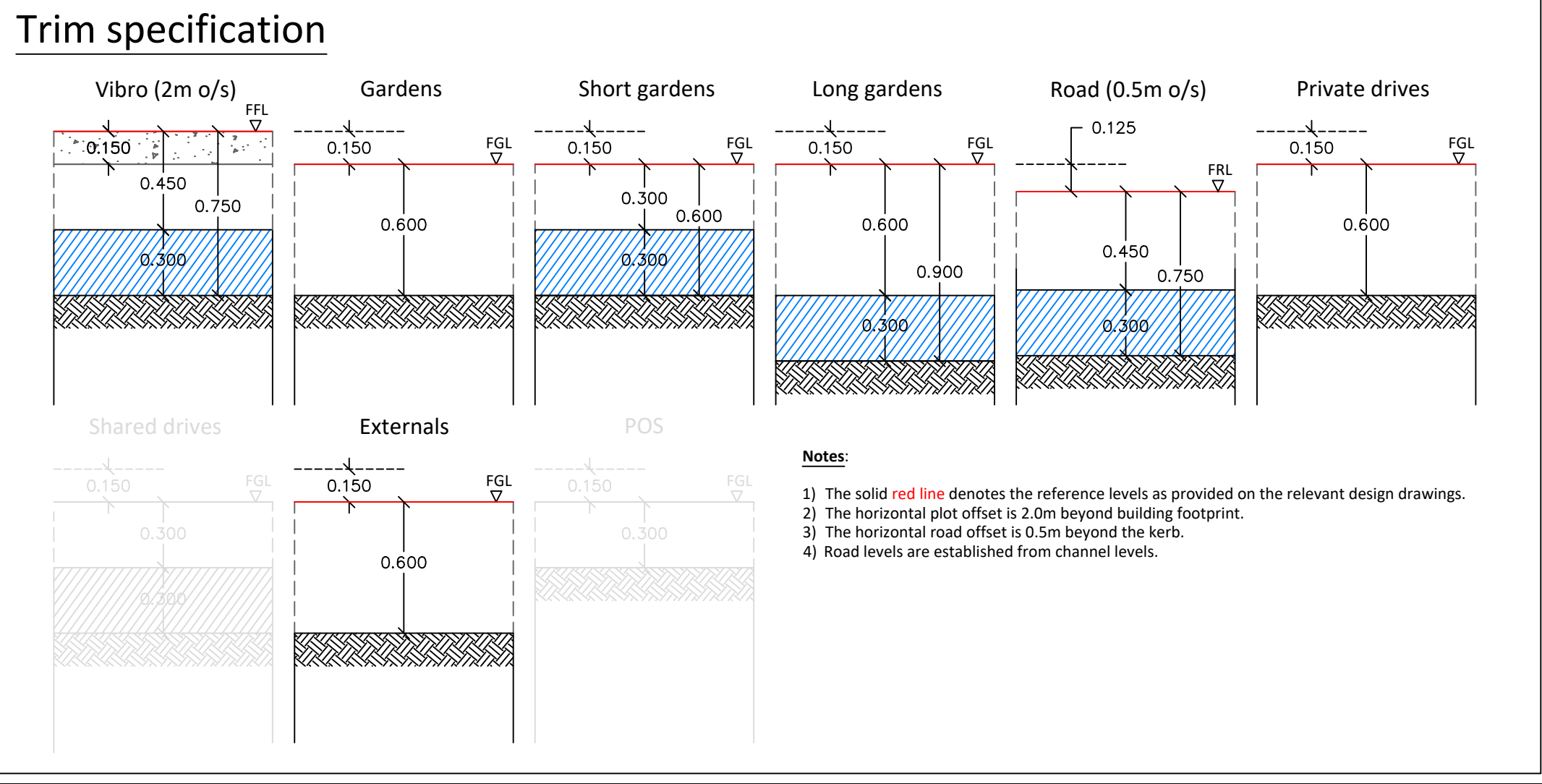
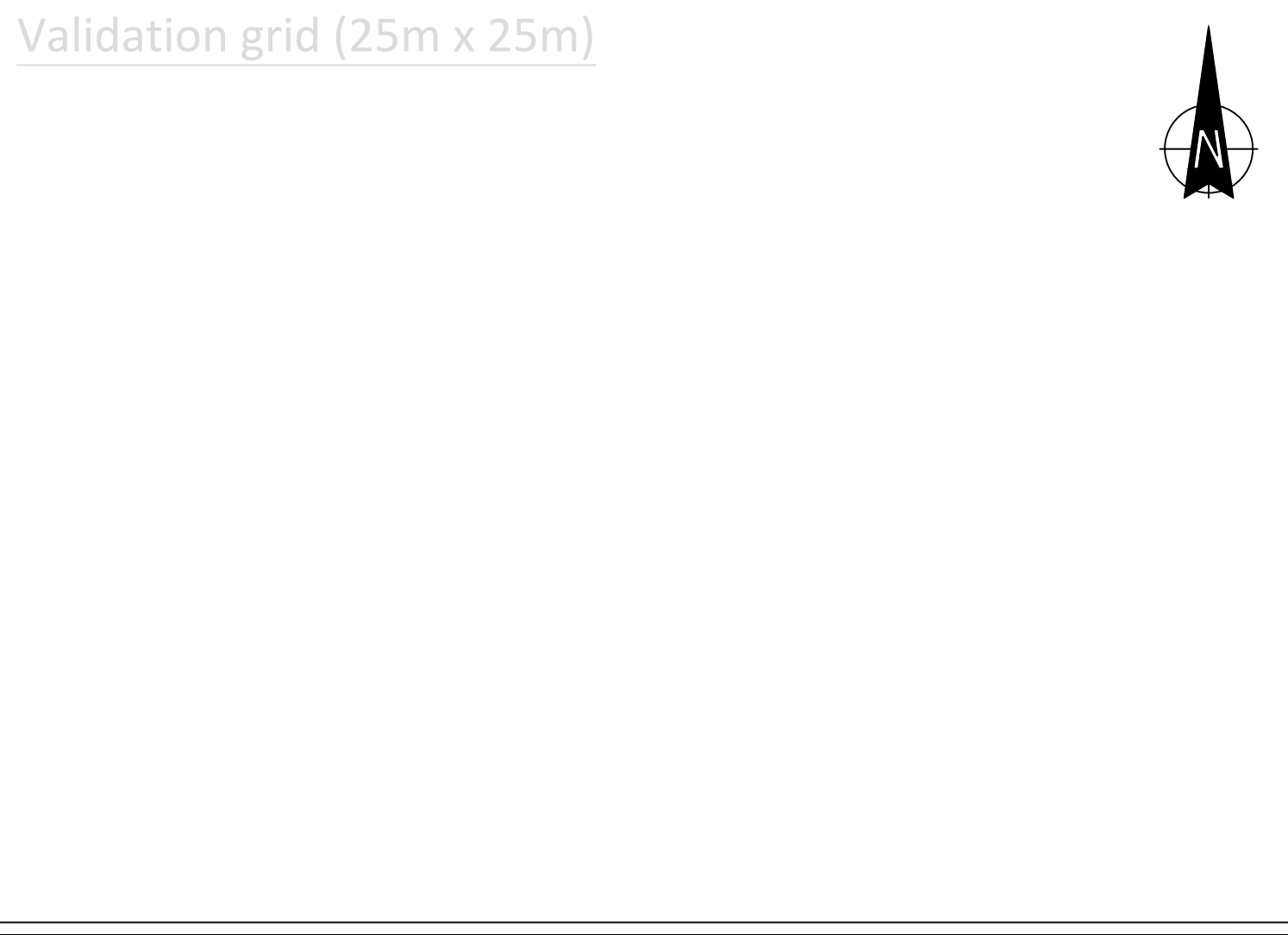
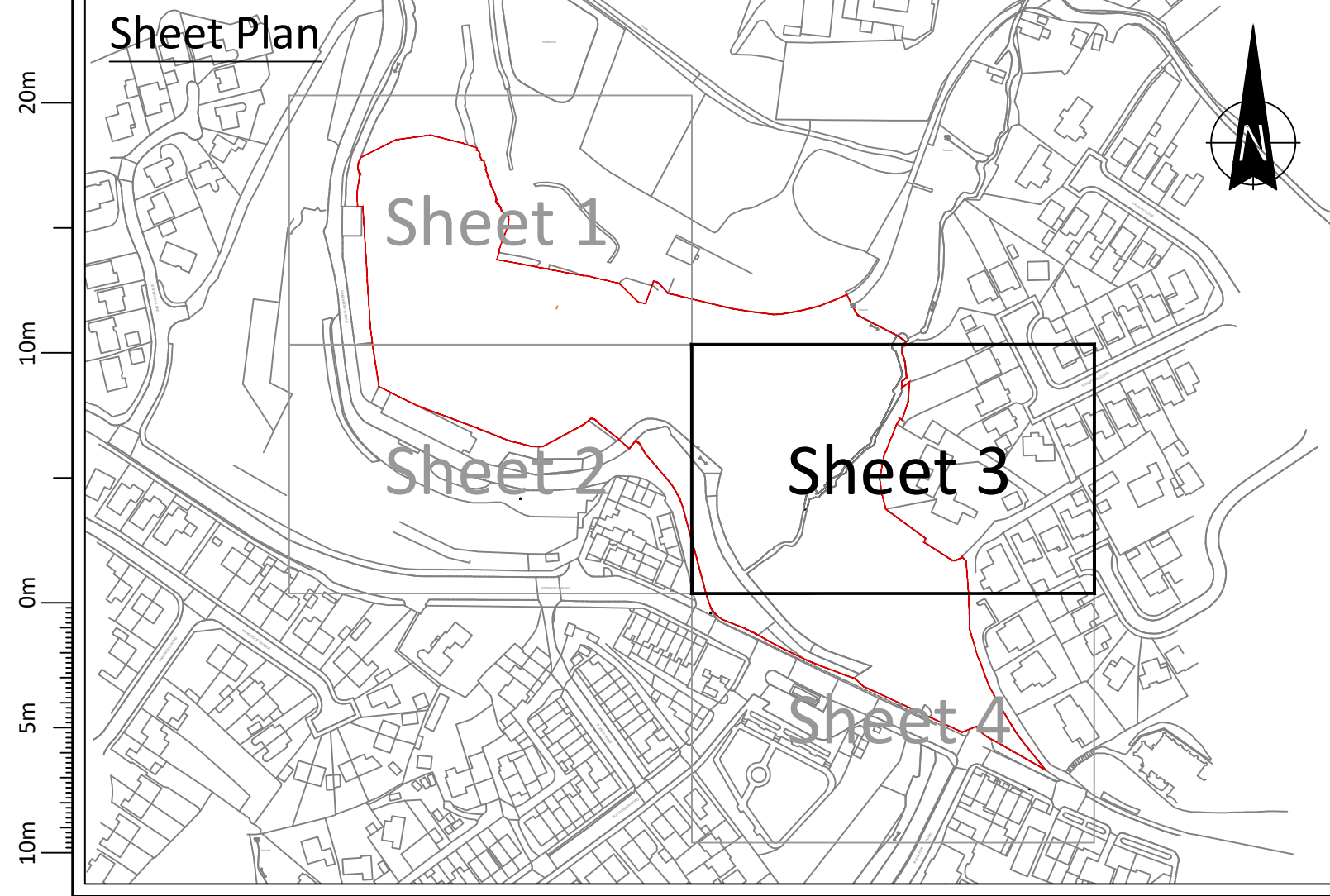
The survey control stations as detailed have been extracted from historic topographic survey information as detailed on drawing '48590_MCLS-01C-3D.dwg' provided digitally by the Client, with intermediate survey stations established as necessary using total station.

Station	Easting	Northing	Height
AL02	385929.033	414557.739	165.650
AL20	385711.746	414681.615	164.580
DW1	385792.835	414632.804	167.084

All survey control must be checked prior to use.

Survey Information:

Co-ord System: OSGB36(15)	Co-ord Type: Grid	Primary Survey Control: SmartNet	Secondary Survey Control: Site
A	19/12/24	As built updated	R.W M.H
Rev	Date	Amendment	Drawn Checked



Urban Regen

ESTABLISHED 2001

Client:

Stonebond Properties Limited

Project:

Edenfield Road, Norden

Title:

As built topographic survey and constraints (Sheet 3 of 4)

Scale:

1:250 @ A1

First Issue:

20th Sept 2024

Drawn:

D.J.Woodrow

Checked:

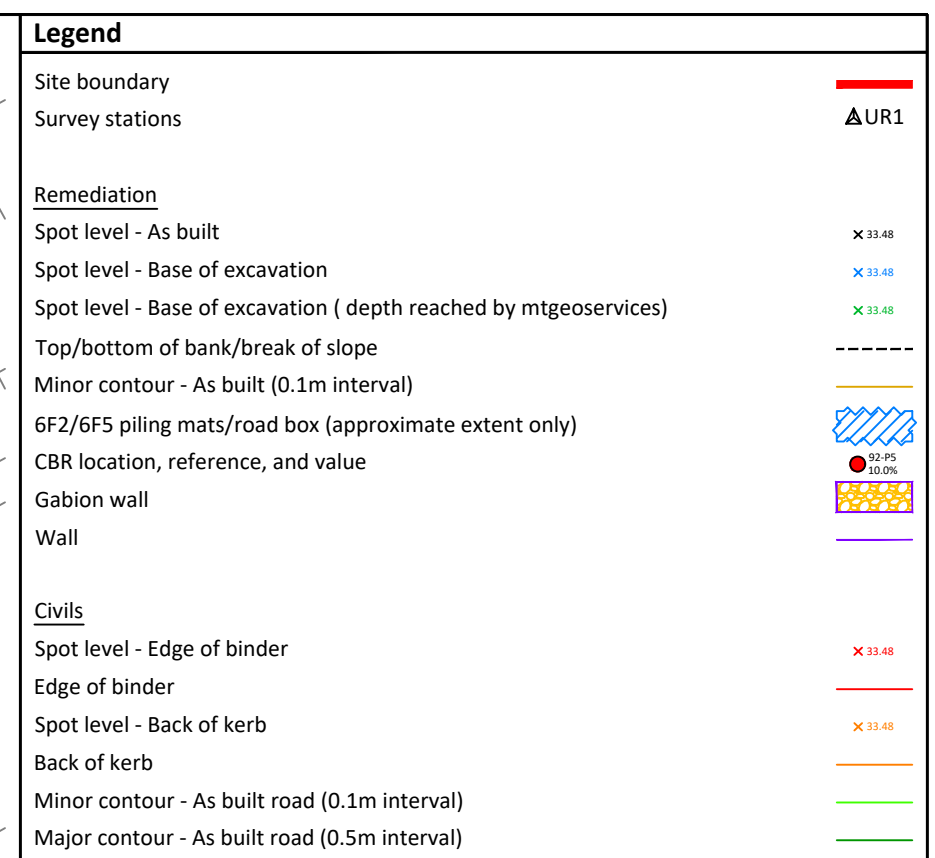
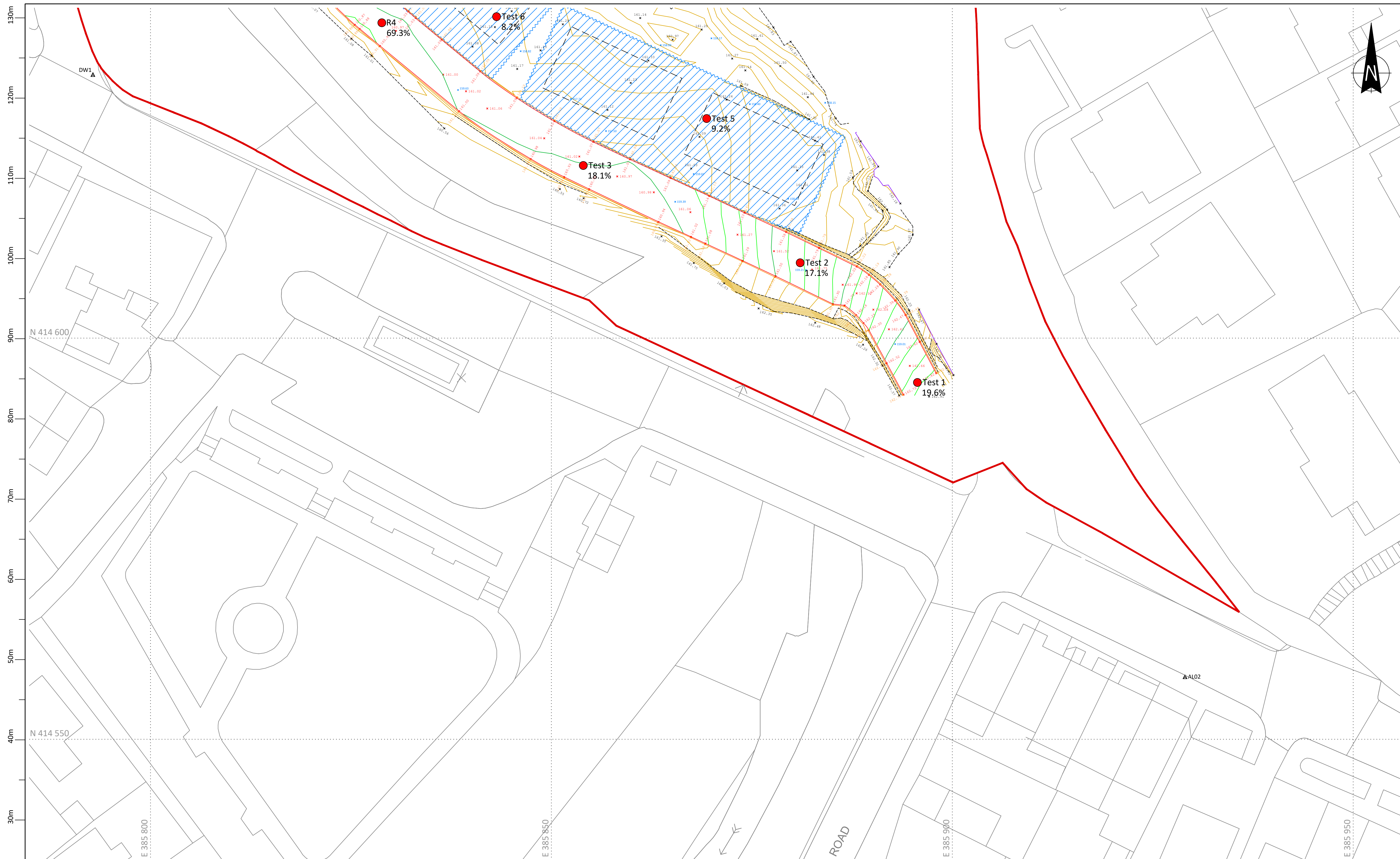
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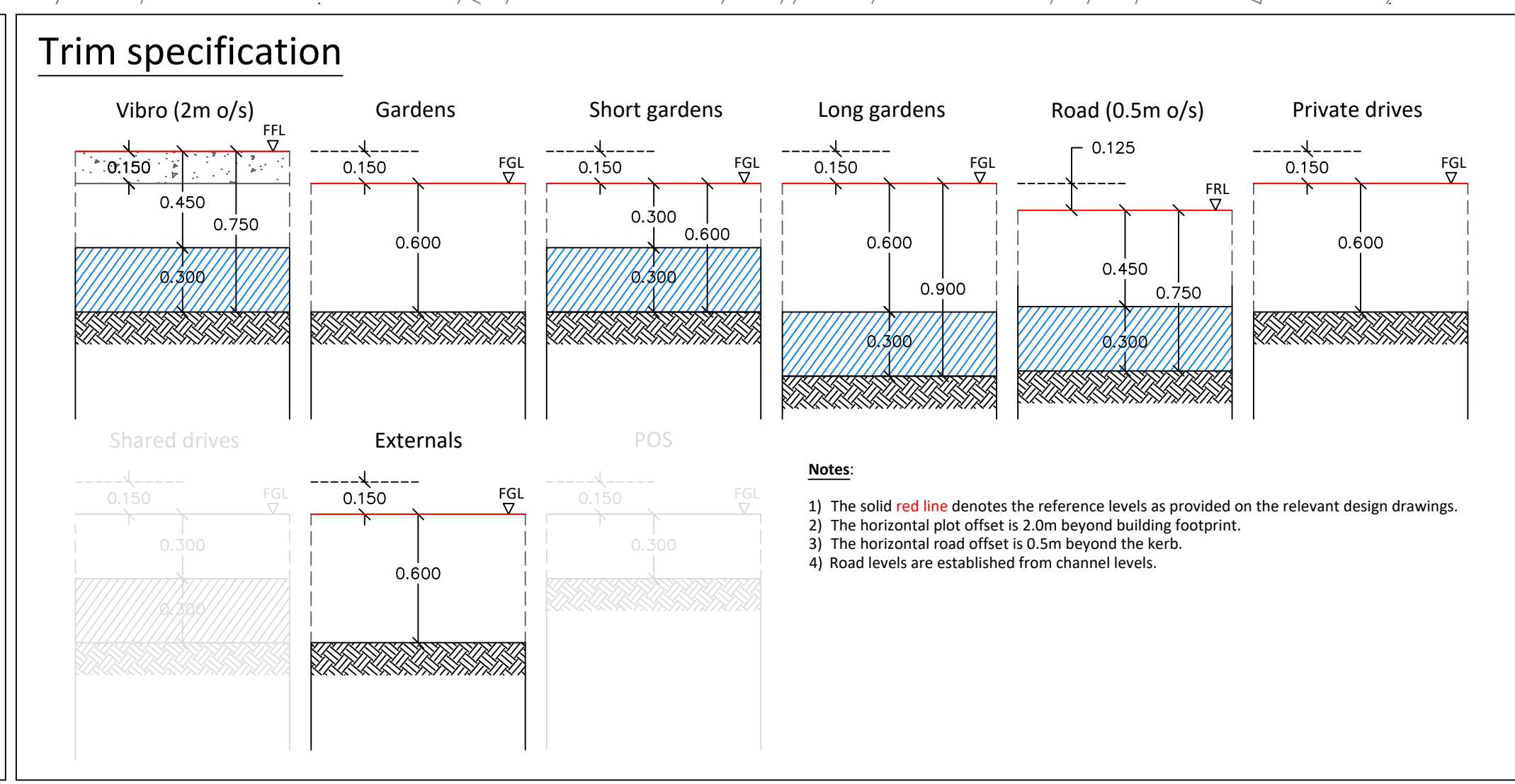
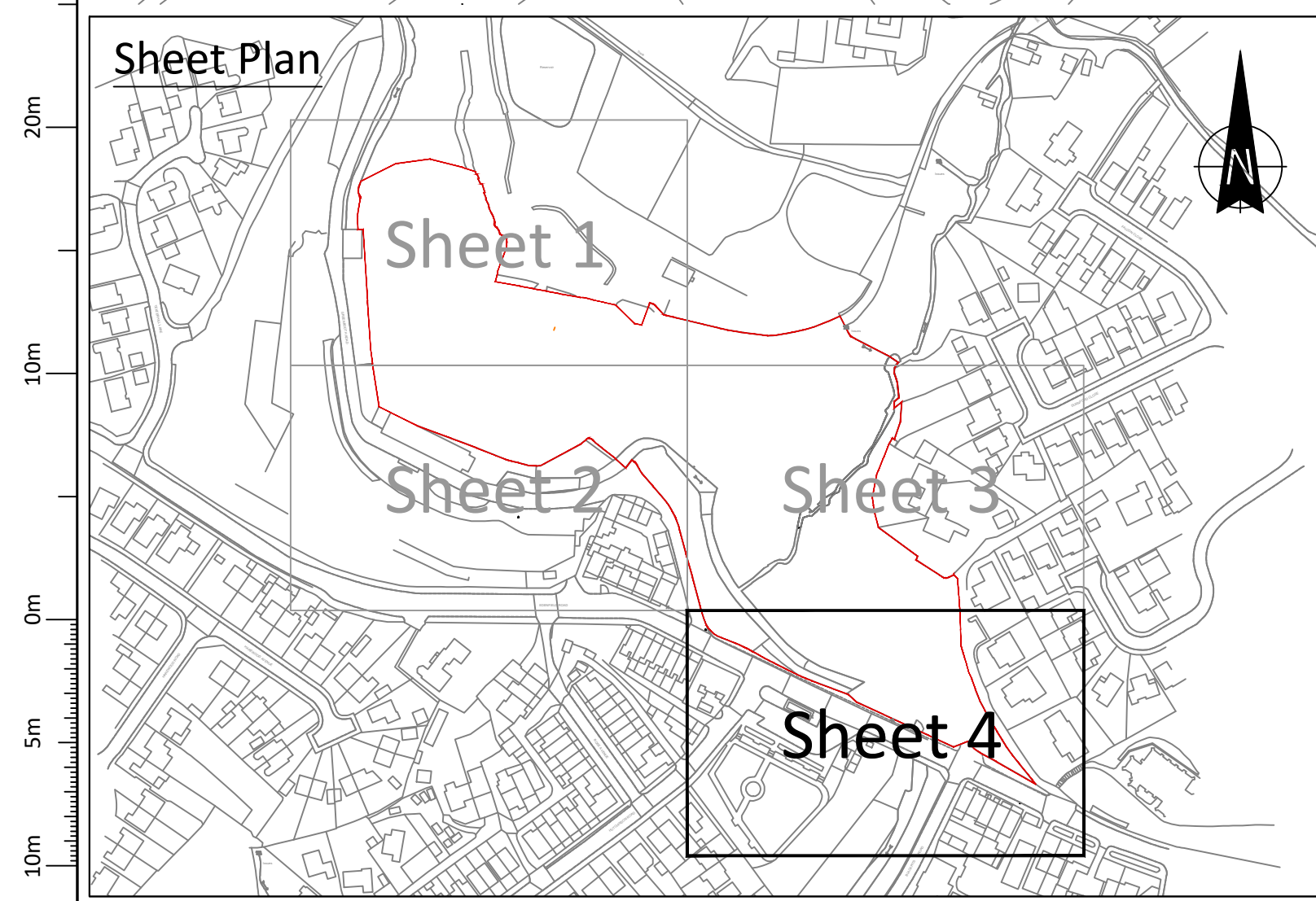
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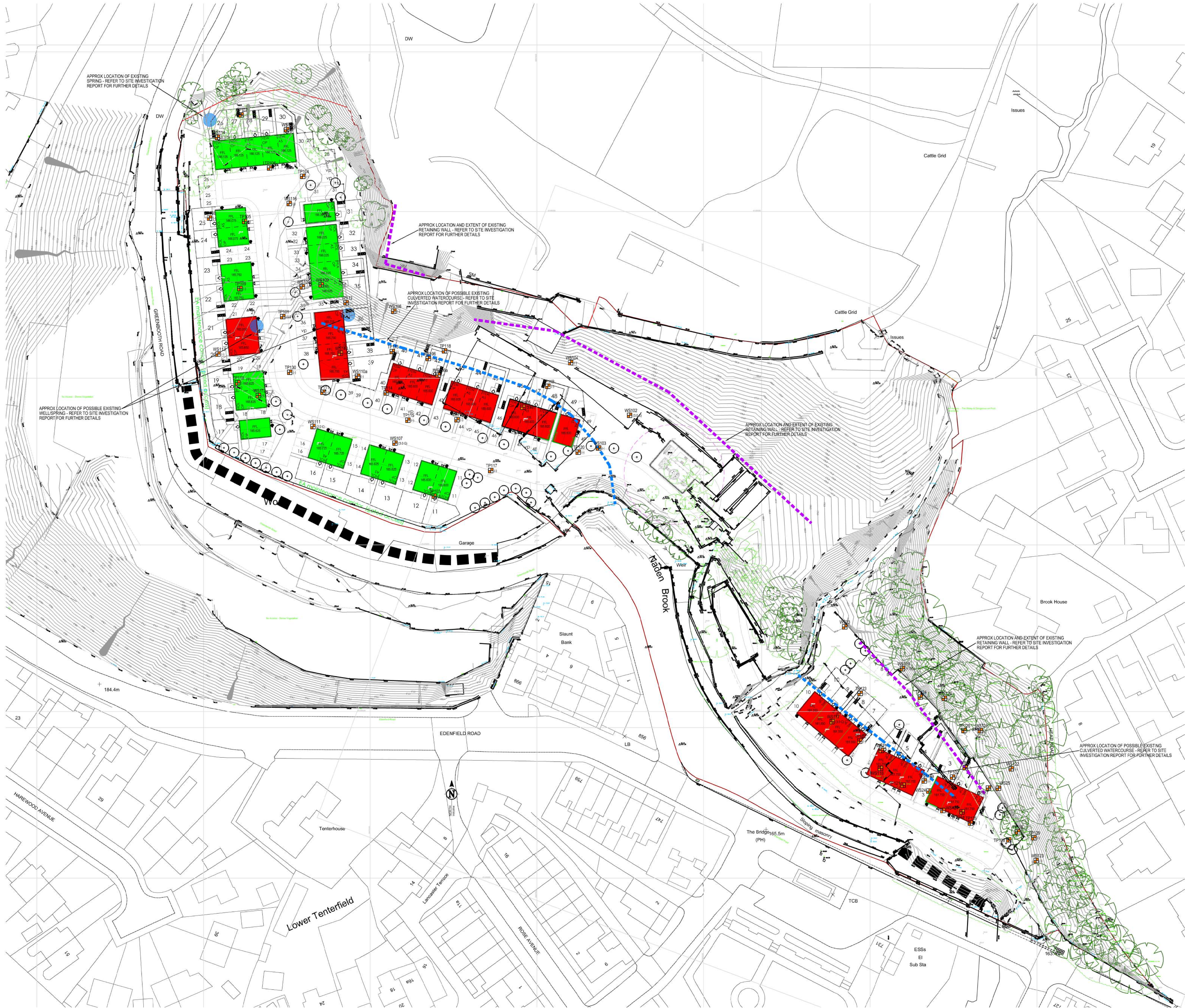
Revision:

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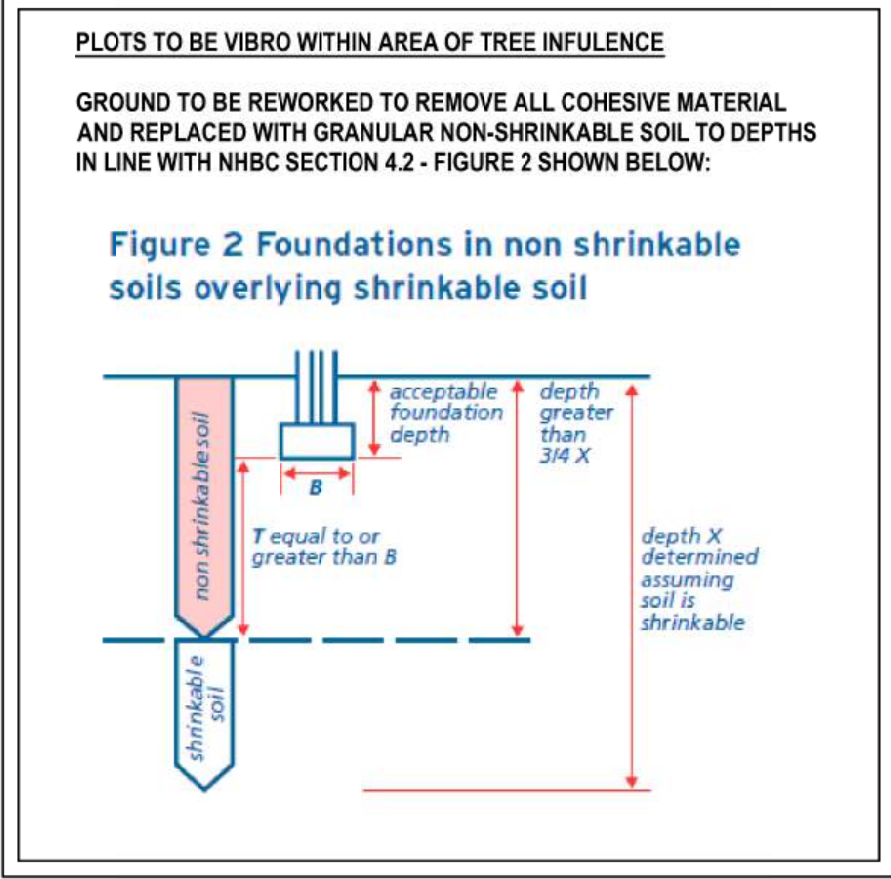
1. This plan is to be read in conjunction with all other associated reports/drawings/information.
2. The development layout depicted on this drawing was extracted from drawing 'EDE-APP-XX-00-DR-C-1400-PDF FINISHED LEVELS AND RETAINING WALLS (dref bound).DWG.dwg' supplied digitally by the Client.
3. The required foundation solution is as detailed on drawing 'EDE-APP-XX-00-DR-S-2000-P2 FOUNDATION ZONING PLAN.pdf' provided digitally by the Client.
4. The site trim specification is as specified/agreed by with the Client; and as detailed.
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6. The location of services as detailed are approximate only (unless otherwise stated).
7. As agreed with the Client, the initial length of road (to the bend), has been constructed circa 1.0m to the east to accommodating existing site features near the entrance.





NOTE
ALL HEAVE/TREE INFLUENCING IS TO BE IGNORED AS THE SITE WILL BE FULLY TURNED OVER AND REMEDIATED TO REMOVE ALL EXISTING/RELIC OBSTRUCTIONS etc ALONG WITH ANY COHESIVE MATERIAL (TO BE REPLACED WITH SUITABLE GRANULAR MATERIAL IN LINE WITH NHBC GUIDANCE AND RECOMMENDATIONS)

Plot	Proposed Slab Level	Existing Ground Level	Foundation Type	Foundation Formation Level (corner)				DEPTH OF CONCRETE			
				Front Left	Front Right	Rear Left	Rear Right	Front Left	Front Right	Rear Left	Rear Right
1-3	161.750	161.810	PILED	160.200	160.500	160.200	160.500	0.500	0.500	0.500	0.500
4-6	161.700	160.780	PILED	160.450	160.450	160.450	160.450	0.500	0.500	0.500	0.500
7-10	161.550	160.940	PILED	160.300	160.300	160.300	160.300	0.500	0.500	0.500	0.500
11-12	165.600	163.530	VIBRO	164.550	164.550	164.550	164.550	0.300	0.300	0.300	0.300
13-14	165.625	163.660	VIBRO	164.575	164.575	164.575	164.575	0.300	0.300	0.300	0.300
15-16	165.725	164.000	VIBRO	164.675	164.675	164.675	164.675	0.300	0.300	0.300	0.300
17	165.625	164.330	VIBRO	164.575	164.575	164.575	164.575	0.300	0.300	0.300	0.300
18-19	165.625	164.600	VIBRO	164.575	164.575	164.575	164.575	0.300	0.300	0.300	0.300
20-21	165.650	164.900	PILED	164.400	164.400	164.400	164.400	0.500	0.500	0.500	0.500
22-23	165.750	166.000	VIBRO	164.700	164.700	164.700	164.700	0.300	0.300	0.300	0.300
24-25	166.075	167.500	VIBRO	164.875	165.025	164.875	165.025	0.300	0.300	0.300	0.300
26-30	166.125	168.270	VIBRO	165.075	165.075	165.075	165.075	0.300	0.300	0.300	0.300
31	166.025	168.270	VIBRO	164.975	164.975	164.975	164.975	0.300	0.300	0.300	0.300
32-35	166.025	169.000	VIBRO	164.975	164.825	164.975	164.825	0.300	0.300	0.300	0.300
36-39	165.700	169.300	PILED	164.450	164.450	164.450	164.450	0.500	0.500	0.500	0.500
40-42	165.600	164.100	PILED	164.350	164.350	164.350	164.350	0.500	0.500	0.500	0.500
43-45	165.600	164.200	PILED	164.350	164.350	164.350	164.350	0.500	0.500	0.500	0.500
46-48	165.600	163.930	PILED	164.350	164.350	164.350	164.350	0.500	0.500	0.500	0.500
49	165.600	164.150	PILED	163.675	164.050	163.675	164.350	0.500	0.500	0.500	0.500



GROUND INVESTIGATION SUMMARY

Ground Conditions

Made Ground deposits were encountered within all exploratory hole locations to depths ranging between 0.0m and 5.0m bgl. However, in 34 locations, the full thickness of Made Ground could not be proven due to significant concrete and brick obstructions and basement features, which are indicative of relic foundations from the former buildings. Drift deposits were encountered within twenty-four exploratory hole locations between depths of 6.0m and 15.0m bgl. The drift deposits varied, with the majority comprising a brown gravelly CLAY with gravels of mudstone and sandstone. The strength of CLAY varied from soft to very stiff. The solid bedrock geology was not encountered during this phase of the investigation. In the Enca Consulting 2006 Report, shallow bedrock of SANDSTONE was encountered in the central and western sections of the Tack Lea Works area at depths typically <2.0m bgl. To the north of the Tack Lea Works area bedrock can be seen outcropping in the valley and hillside. To the east of the former Tack Lea Mill Buildings and in the Sheppard Mill area, bedrock was found to be deeper and was encountered at depths ranging between 4.5m and 5.0m bgl.

Contamination

The Tier 1 human health risk assessment identified site-wide concentrations of heavy metals, asbestos, non-volatile PAHs, naphthalene, petroleum hydrocarbons, VOCs and SVOCs that would present unacceptable degrees of theoretical risk to the identified receptors associated with direct exposure pathways.

Ground Gas

Characteristic Situation 1 (pending completion of gas monitoring). CS2 measure recommended for the whole site due to the presence of the historical landfill (eastern section of the Tack Lea Works area). Further assessment, in the form of a Tier II vapour risk assessment is required across the site to assess the level of risk to the future site users by volatilisation to indoor air. Subject to the findings of the vapour risk assessment, vapour resistant membranes may be required.

Underground Obstructions

Significant concrete and brick obstructions and basement features, which are indicative of relic foundations from former buildings have been encountered within the Made Ground. As such, the full thickness of the Made Ground could not be proven across the vast majority of the site. Further investigations will be required to prove the depth to Made Ground across the site. During a phase of cut-and-fill enabling works to create a developable platform, all below-ground obstructions will require grubbing out to the base of the Made Ground to enable the construction of proposed plots.

Coal Mining

A coal mining assessment has indicated that the site is located within a CA reporting area but not within a high-risk development zone. Coal Authority mining report for the site concluded that no mine entries are located within 100m of the site, no outcrops are recorded within close proximity of the site, and the site is not in a surface coal resource area. Therefore, no risk from coal mining is present and no further measures are required.

Flood Risk

Predominantly located within a currently defined "Flood Risk Zone 1". However, sections of the western and southern boundaries of the site are located within "Flood Risk Zones 2 and 3" and as such are considered to be affected by river flooding. There is a high potential for surface water flooding to occur at the site, with the highest risk areas being located in the southern sections of the site. The site is at risk of flooding from reservoirs in the area (i.e., from Greenbooth Reservoir located approximately 43m to the north). There is a low to negligible potential for groundwater flooding to occur at the site.

Soil Plasticity

Low volume change potential.

Tree Influence

See layout.

Sulphate Assessment

EIP categorised the concrete requirements as DS-1 AC-1s. The UK Consult 2002 Report categorised the concrete requirement as DS-2 AC-3s in the Made Ground and DS-1 AC-1s in the natural strata.

Groundwater

Groundwater was encountered between 1.40-2.50m bgl during the ground investigation with monitoring recording groundwater levels between 1.30-2.0m bgl.

Foundation Options

Following the removal of obstructions and subsequent engineering of soils to a specific performance specification, proposed plots could be constructed utilising vibro stone columns to support a suitably reinforced spread footing. Where tree influence is present and clays prone to volumetric instability, an alternative foundation solution may need to be adopted to deepen the foundation or the cohesive stratum may be removed and replaced with a granular material. The depth of the granular infill will be plot specific and require calculation on receipt of development levels. The use of vibro stone columns will also be dependent on the removal of clays that have a shear strength of <30kN/m2. Where plots are in close proximity to slopes or the existing retaining walls, the proposed loadings may need to be transferred beneath the influencing depth of the retaining or slope to ensure no unacceptable loading is induced that would cause a geotechnical failure. Consideration should also be given to the historical landfill located in the eastern section of Tack Lea Works, as well as the potential presence of a quarry high wall associated with the historical sandstone quarry in the north of Tack Lea Works area. Where plots span such a feature, socketed piles into the bedrock will be required to reduce the risk of differential settlement. Therefore, upon completion of these enabling works, it is anticipated that the final foundation solution could be a combination of:

- Vibro Stone Columns.
- Shallow strip foundations.
- Mass trench fill.
- Piled foundations.
- Raft foundations.

The above is a brief overview used to highlight the main issues surrounding the site. Refer to the full site investigation report for a comprehensive site description.

MINIMUM FOUNDATION DEPTHS

SOIL PLASTICITY	MINIMUM FOUNDATION DEPTH TO ALLOW FOR NEW TREE PLANTING
High	• 1.50m
Medium	• 1.25m
Low	• 1.0m

MINIMUM VOID DIMENSION TO ALLOW FOR POTENTIAL GROUND MOVEMENT

SOIL PLASTICITY	VOID DIMENSION AGAINST SIDE OF FOUNDATION AND GROUND BEAM	VOID DIMENSION UNDER GROUND BEAMS & IN-SITU CONCRETE FLOOR SLABS	VOID DIMENSION BENEATH PRE-CAST CONCRETE & TIMBER FLOORS
High	35mm	150mm	300mm
Medium	25mm	100mm	250mm
Low	0mm	50mm	200mm

GENERAL NOTES

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.

ALL RELEVANT DIMENSIONS TO BE OBTAINED/CHECKED AGAINST ARCHITECT'S DRAWINGS AND BY SITE MEASUREMENT PRIOR TO THE COMMENCEMENT OF WORKS OR ORDERING OF MATERIALS. DISCREPANCIES BETWEEN THE DRAWINGS AND SITE CONDITIONS TO BE NOTIFIED TO THE ENGINEER.

DO NOT SCALE FROM THIS DRAWING.

FOUNDATION DESIGN TYPICAL

ALL PLOTS TO BE FOUNDATION ON VIBRO STONE REPLACEMENT COLUMNS TO PROVIDE A MINIMUM GROUND BEARING CAPACITY OF 150kN/M2.

FOUNDATION DEPTH CHART

2.00m Min	1.75m Min
2.50m Min	1.50m Min
2.25m Min	1.25m Min
2.00m Min	
VIBRO	PILED

FOUNDATION DEPTH HATCHING HAS BEEN BASED ON EXISTING GROUND LEVELS ONLY. FOUNDATION DEPTHS SHOWN ON EACH PLOT ALLOWS FOR FILL MATERIAL TO FORM PROPOSED FINAL GROUND LEVELS. REFER TO CHART BELOW.

WHERE FOUNDATIONS ARE TAKEN DOWN TO INVERT OF DEEP DRAINS, FOOTINGS MAY BE STEPPED BACK UP IN 450mm STEPS IF FIRM GROUND IS ENCOUNTERED EITHER SIDE OF DRAIN TRENCH - DEPTHS OF FOOTINGS SHOWN TO PLOTS AFFECTED BY EXISTING DRAIN RUNS ARE WORST CASE DEPTH TO INVERT THROUGHOUT.

PRELIMINARY

CLIENT: STONEBOND PROPERTIES LIMITED

ARCHITECT: STONEBOND PROPERTIES LIMITED

PROJECT: EDENFIELD ROAD NORDEN, ROCHDALE

TITLE: FOUNDATION ZONING PLAN

STATUS: S2 PROJECT NO: 223-100 PROJECT ORIGINATOR: EDE - AJP - XX - 00 - DR - S - 2000 REV: P1

SCALE & NO: 1:500 DESIGNED: EG DRAWN: EG CHECKED: KOB APPROVED: KOB DATE: SEPT 2023

ATP consulting engineers

APPENDIX IV

PHOTOGRAPHS

