

1b) ANTICIPATED FOUNDATION TYPES

- Tf** MASS CONCRETE TRENCHFILL FOUNDATION
- Bearing Strata medium dense SAND.
 - Minimum depth: 1250mm below proposed ground level.
 - To be used where the depth from existing ground level to formation level is less than 1.2m but from slab level, due to land raising, is greater than 1.2m but less than 3.0m.
 - Refer to specific house type footing drawings by the structural engineer.
- Rn** NORMALLY REINFORCED STRIP FOUNDATION
- Bearing Strata medium dense SAND.
 - Minimum depth below proposed ground level: 600mm in SAND.
 - Maximum safe bearing pressure limited to 125kN/m².
 - Refer to specific house type footing drawings by the structural engineer.
- DRn** DEEP NORMALLY REINFORCED STRIP FOUNDATION
- Bearing Strata medium dense SAND.
 - Minimum depth below proposed ground level: 600mm in SAND.
 - Maximum safe bearing pressure limited to 125kN/m².
 - To be used where the depth from existing ground level to formation level is less than 1.2m but from slab level, due to land raising, is greater than 1.2m but less than 3.0m.
 - Refer to specific house type footing drawings by the structural engineer.
- P** PILED FOUNDATIONS WITH ASSOCIATED REINFORCED CONCRETE GROUND BEAMS
- Where the maximum foundation depth exceeds 3.0m a piled foundation option rather than trenchfill/deep reinforced strips or raft foundations are to be adopted especially if site levels are raised prior to construction work commencing on the plots in question.
 - H designates where heavy precautions are required to ground beams due to the presence of trees and cohesive strata.
 - Column or line loads supported by ground beams.
 - Piles anticipated to be friction bearing within the sand strata at lengths in excess of 10.0 metres, subject to confirmation by a specialist contractor.
 - Discussions should be held with the Local Authority to confirm that there are no noise and vibration issues due to the presence of residential properties.
 - The working platform for the rig installing the piles will need to be assessed and if required designed in accordance with BR470.
- V** DOUBLY REINFORCED STRIP FOUNDATIONS ON VIBRO STONE COLUMNS
- Founded on vibro stone columns within areas of land raising or deeper macroground.
 - The upper 0.6m of the vibro stone columns are typically sacrificial.
 - Bearing capacity limited to 125kN/m².
 - The suitability of the site for vibro stone columns must be determined by the specialist contractor undertaking the vibro stone columns, and it is advisable to invite the contractors to witness the ground conditions prior to commencing construction.
 - Further cable percussive boreholes may be required by the specialist contractors to determine the deeper lying ground conditions.
 - Remnant substructures should be broken out to prevent obstructions to vibro stone column installation.
 - Technique not to be used in areas with cohesive strata influenced by trees unless such strata are removed and replaced with approved material.
 - Technique not suitable where peat strata and soft clays with shear strength less than 30kN/m² are present unless such strata are removed and replaced with approved material.
 - Any reprofiling of the areas of proposed treatment must be undertaken with approved strata to E3P specifications and subject to the specialist contractors approval.
 - Confirmation should be sought with the local authority regarding any vibration issues associated with vibro stone column foundations.
 - Confirmation of the suitability of the site for treatment should be provided to the NHBC for approval, with information supplied in accordance with NHBC Standards Chapter 4.5 (4).
 - The working platform for the rig installing the vibro stone columns will need to be assessed and if required designed in accordance with BR470.
 - The stone column layout should be designed by the specialist contractor and submitted to the NHBC for approval.
 - The installed stone columns will require verification testing in accordance with NHBC Standards, Chapter 4.5 (12) which are likely to comprise of 600mm diameter plate tests and dummy footing test/mini zone tests. The testing methods and frequency should be agreed with the NHBC in advance of commencing construction.
 - A typical design of doubly reinforced strip footings assumes the stone columns diameter are between 450mm to 600mm, maximum centre misalignment of isolated columns of 150mm, with a maximum spacing between columns of 1800mm to span between stone columns in accordance with NHBC Standards. The NHBC also specifies the columns should be spaced at a maximum of 2000mm, and misaligned by less than 150mm.
 - In the event of unforeseen circumstances which influence the efficiency of the treatment and require remedial measures these should be immediately reported to the NHBC.
 - The installation contractor will be required to record and provide all works, including information concerning the treatment, the depth of fill, volume of stone used, on-site changes, and any other relevant information relating to the works.
 - Upon completion of the treatment the designers should provide confirmation of the suitability of the installation, including review of the test results.
 - Refer to specific house type footing drawings by the structural engineer.
- ★** FOUNDATION ANOMALIES
- Indicates foundations and slabs which may be affected by trial pits, trees / hedges or former features. The foundation and slab type indicated may have to be amended and appropriate foundations and slabs adopted to suit local ground conditions exposed at the time of construction and agreed with NHBC/Local Authority Inspectors.

LEGEND

(All positions are approximate unless otherwise stated)

(All references refer to those stated within General Notes)

KEY TO CURRENT SITE FEATURES

(All positions are approximate unless otherwise stated)

- Surveyed buildings (taken from ref. d)
- River / lake and associated water extents (taken from ref. d)
- Surveyed tank locations (taken from ref. d)
- Reservoir (taken from ref. d)
- ESP conjectured area of peat (taken from ref. k)
- KEY TO FORMER FEATURES
- (All positions are approximate unless otherwise stated)
- Environment Agency Historic Landfill site (taken from ref. j)
- Former buildings/structures (taken from ref. a)
- Former River / lake route (taken from ref. a)
- Former pond extents (taken from ref. a)
- Former footpath positions (taken from ref. a)
- Former hedgerow (taken from ref. a)
- Former tanks (taken from ref. a)
- Former Chimney (taken from ref. a)
- Former wells (taken from ref. a)
- Trench containing asbestos lagged steam pipes and associated fuel pumps (taken from ref. e)
- Conjectured positions of pumps
- Former suspected refuse heap (taken from ref. a)
- Extent of former brick / clay pit (taken from ref. a)
- Historical slopes (taken from ref. a)

2b) SITE PLAN

(Scale 1:500)

The original of this drawing contained coloured contours and/or features. Any black and white reproductions should not be used.

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KEY TO PROPOSED FEATURES

(All positions are approximate unless otherwise stated)

- Proposed plot locations (taken from ref. h)
- Stab levels (taken from ref. j)
- Underbuild locations and depth (taken from ref. j)
- Gravel board and height (taken from ref. j)
- Flag on end and height (taken from ref. j)
- Retaining wall and height (taken from ref. j)
- Split slab location and height (taken from ref. j)
- Site boundary (taken from ref. h)

KEY TO TREE CONTOURS

(All positions are approximate unless otherwise stated)

- Surveyed group of trees (taken from ref. i)
- Surveyed individual tree (taken from ref. i)
- Surveyed hedges (taken from ref. i)
- Indicates minimum depth of foundation required in areas affected by existing trees/hedges with a CLAY subsoil (TREES RETAINED). Not applicable to foundations in a granular subsoil. Dashed lines indicates tree proposed to be removed. (NHBC Standards Chapter 4.2)
- Denotes 1.5m foundation depth contour of existing tree height - for heavy precautions. Dashed lines indicates tree proposed to be removed. (NHBC Standards Chapter 4.2)

Note: These tree contours and heavy line will require amendment should LABC be utilised as Building Control.

KEY TO COOPERS EXPLORATORY HOLES

(All positions are approximate unless otherwise stated)

- Trial pits TP1 - TP54 excavated by Coopers between 11 and 15 March 2013.
- Hand dug trial pit HDT1 dug by Coopers on 15 March 2013.
- Rotary open hole boreholes R1 - R15 drilled for Coopers between 12 and 16 March 2013.
- Window sample boreholes WS1 - WS19 drilled for Coopers between 11 and 15 March 2013.
- Cable percussive boreholes BH1 - BH6 drilled for Coopers between 11 and 15 March 2013.
- Water samples Water 1 - Water 3 obtained by Coopers from River / lake on 1 May 2022.

KEY TO EXPLORATORY HOLES BY OTHERS

(All positions are approximate unless otherwise stated)

- Trial pits excavated by E3P: TP101 - TP123 between 08 & 09 February 2022 (taken from ref. m)
- TP201 - TP211 between 27 January - 30 March 2021
- TP281 - TP288 between 11 - 24 March 2021
- TP401 - TP428 between 13 - 16 January 2021
- TP601 - TP625 on 08 - 09 February 2022
- TP601 - TP612 on 08 March 2022
- TP701 - TP704 on 10 May 2022 (taken from ref. k & l)
- Window sample boreholes drilled for E3P: WS201 - WS209 on 30 March 2021
- WS301 - WS323 between 11 - 24 March 2021
- WS401 - WS411 on 14 January 2021
- WS501 - WS506 on 05 May 2022 (taken from ref. k & l)
- Rotary boreholes drilled for E3P: RB101 - RB108 between October & November 2014
- RB201 - RB208 between 27 January - 04 February 2021
- RB301 - RB312 between 25 - 28 March 2021
- RB401 - RB409 on 08 - 21 March 2021 (taken from ref. k)
- Cable percussive boreholes drilled for E3P: CP301 - CP303 between 23 - 25 March 2021
- CP401 - CP404 on 05 - 11 May 2022 (taken from ref. k & l)
- Light cable boreholes BH1 - BH54 drilled by REFA Design Consultants between 13 and 20 June 2006 (taken from ref. c)
- Rotary boreholes R1 - R3 drilled by REFA Design Consultants on 13 June 2006 (taken from ref. c)
- Cable percussive boreholes BH21 - BH34 drilled by Norwest Holes Soil Engineers between 23 and 28 February 1983 (taken from ref. g)
- Borehole drilled for Soudan Mills between 27 November 1913 and 10 March 1914 (taken from ref. g)
- Borehole drilled for Soudan Mills between 28 March and 16 April 1984 (taken from ref. g)

3b) SUB STRUCTURE READY MIX CONCRETE DESIGNATIONS BY END USE

Use as substructure and ground floors

- General Use:
- Rough blinding (non-structural)
- Infill
- Unreinforced oversite concrete below timber floors
- Structural blinding and overbreak
- In situ external concrete for drives and paths
- In situ external concrete foundations for precast concrete paving slabs
- Fill to wall cavity
- Solid filling under steps
- Floor Slabs:
- House or garage with reinforced concrete floor slab, either suspended or precast.
- House with non-reinforced slab (ground bearing) with either:
- a) Permanent finish to be added, e.g. screed or floating floor.
- b) No permanent finish to be added, e.g. carpet.
- Garage with non-reinforced slab (ground bearing)

Foundations:

- Strip foundations
- Trench fill
- Other mass concrete foundations
- Reinforced concrete footing

Notes:

- 1) Worst case sulphate conditions over the entire site are Design Sulphate Class DS-1, ACEC Class AC-1, and Design Chemical Class DC-1.
- 2) Classification and designation in accordance with NHBC guidance, Section 3.1.1, Table 6, and BS8500-1, 2006.
- 3) The above conditions represent the worst case conditions identified within the testing of soils on the site.
- 4) Any fill material to be imported onto the site should be tested and should not exceed the classifications given above.

FOR TENDER PURPOSES ONLY

4b) SUB-STRUCTURE BRICKWORK / BLOCKWORK AND MORTAR REQUIREMENTS

Brickwork or blockwork below DPC to be in accordance with BS5628 (Part3), Table 13 (Section A), assuming Design Sulphate Class, DS-1, sulfate and acid conditions and Aggressive Chemical Environment for Concrete, AC-1, in accordance with BRE Special Digest 1.

Quality of Masonry Units and appropriate Mortar Designations

Type / Strength	Clay Fired Special quality	Calcium Silicate Classes 3 to 7	Concrete Bricks Compressive strength >20 N/mm ²	Concrete Blocks Compressive strength >7 N/mm ² Density exceeding 1500 kg/m ³ Dense aggregate to BS882 or BS1177
(i) or (ii)	(i) or (ii)	(iii)	(i) or (ii)	(i)

Footnotes:

- (1) Some autoclaved aerated concrete blocks of a lower compressive strength and density than that quoted above may be suitable for foundations for two storey dwellings where the height of blockwork is less than 1250mm below finished ground level. Subject to the prior approval of the NHBC or submission of a valid Agreement Certificate from the manufacturer.
- (2) The developer must obtain written approval from the NHBC before using lower strength and lower density concrete blocks in foundations deeper than 1250mm below finished ground level.

The following autoclaved aerated blocks are suitable for use on this site:-

Proprietary Name	Manufacturer	Agreement Certificate No.
Trenchblock	Thermalite	003720
Or similar approved in accordance with notes (1) and (2) above		
Mortar Designation BS5628 (Part 1) & Table 1		

Drainage Pipework Requirements

Drainage Pipework to be in accordance with BS5911, assuming Design Sulphate Class, DS-1.

9) SCHEDULE OF ACCOMMODATION

Ref	Type	House Type	Depth	No.	Total Sqft
HA Units					
ROT	Roth	2 bed semi/news	755	31	23405
ADWHS	KDU HSS	2 bed adaptable unit	835	4	3340
KAT	Katrine	3 bed semi/news	852	37	31524
LDY	Lynne	3 bed semi CT	856	22	18832
HAL	Halden	3 bed semi	911	14	12754
ADWHS	KDU HSS	3 bed adaptable unit	1009	6	5018
EME	Emerson	4 bed semi	1053	10	10530
		HA Total	120	120	102403
PRS Units					
BD	Bion	2 bed semi/news	649	50	32450
KAT	Katrine	3 bed semi/news	852	14	11928
LDY	Lynne	3 bed semi/news	852	10	8520
LDY	Lynne	3 bed semi CT	856	20	17120
YAY	Yay	4 bed semi	1041	2	2082
		PRS Total	96	72100	
		Total number of units and square footage		328	286403

Total number of units and square footage

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GENERAL NOTES

1. This drawing is to be read in conjunction with the following:-

- a) GroundSure Environmental/Geospatial/Historical Ordnance Survey Maps, Don Street, Middleton, North Manchester ref. CHAPS-AB-205545-13877-050213EDR/GEO/HIS, dated 05 February 2023.
 - b) British Geological Survey, 1:50,000 Geological Map Sheet Lancashire 96NE.
 - c) REFA Consulting Engineers, Proposed Industrial Development, Rex Mill, Don Street, Middleton, Manchester, report ref. 05122, dated September 2006.
 - d) Survey Systems Ltd. Topographical Survey, Don Street, Middleton, drawing ref. SSL13898A2501-1-8, dated March 2012.
 - e) Obtained from records held by Vitaform, unreferenceed.
 - f) Coopers Site Investigation Report, reference 5639a.
 - g) British Geological Survey, onshore borehole records.
 - h) Kellen Homes, Site Planning Layout, Don Street, Middleton, ref. KHDS/PS/L01, rev. AQ, dated 26 May 2022.
 - i) Urban Green, Land Off Don Street, Arboricultural Impact Assessment, ref. U0956, dated May 2021.
 - j) RSK, External works, Don Street, Middleton, ref. 88233/40-22-01, rev. P6, dated 31 May 2022.
 - k) E3P, Phase 1 & II environmental Site Assessment, Land Off Don Street, Middleton, ref. 14-554-R1-1, dated May 2021.
 - l) E3P, Supplementary Site Assessment Letter Don Street, Middleton, ref. 14-554-L1-1, dated 8 June 2022.
 - m) Email from Kellen Homes Limited dated 16 February 2022 containing E3P trial pit logs and location plan.
2. The foundation types indicated are based upon the facts established from observations and fact tests during the trial pit investigations. It should be recognised that natural strata may vary considerably from point to point and the groundwater regime may be influenced by seasonal or other factors. The foundation types indicated are therefore for GUIDANCE PURPOSES ONLY and should be considered in the light of the actual conditions exposed on site during the construction work.
 3. The tree contours show the minimum depth required for foundations below ground level in clay soils within influencing distance of trees/hedges - i.e. trees to be retained and trees to be removed. The ground level shall be determined in accordance with the NHBC Standards Chapter 4.2 Building New Trees.
 4. Trees or hedges which are to be planted must be considered. No allowance has been made for them in this drawing as it is assumed that any proposed trees and/or hedges will be sited to avoid affecting any proposed dwelling foundation.
 5. The shrinkability of the cohesive soil strata on this site has been determined as LOW in accordance with NHBC Standards Chapter 4.2.
 6. Where necessary foundations should be stepped in accordance with current NHBC recommendations.

BASIS OF ASSESSMENT AND GUIDANCE ON FOUNDATION CONSTRUCTION

General

The foundations are based upon inferring ground conditions from exploratory holes by third parties. In areas where variable ground conditions occur the precise locations of the exploratory holes would be required to allow accurate assessments of the ground conditions for plot specific assessments. No information has been provided to indicate the location of the exploratory holes have been surveyed. The foundation types have been proposed based upon the developer's commercial preferences for foundation types with depths. It is acknowledged that trench stability can influence the suitability of foundation construction and we would advocate trial excavations with the developer and contractors to appraise the influence, limitations and changes/measures that can be adopted.

Investigation Areas

Specific features from the Historical Ordnance Survey maps have been accurately overlaid to disclose potential abnormal ground conditions. Specific targeting and delineation of these features are required to enable an accurate assessment. The remarks section of the foundation schedule details plot specific features likely to be encountered and may include recommendations for further investigation. It is acknowledged that trench stability can influence the suitability of foundation construction and we would advocate trial excavations with the developer and contractors to appraise the influence, limitations and changes/measures that can be adopted. Where the ground conditions differ from those indicated in this drawing we would advocate the developer and Coopers to confirm or recommend procedures for reappraisals prior to casting the foundations, and may require further ground investigation.

External Works

The foundation schedule includes specific designs to account for the proposed slab levels and underbuild. Where retaining walls are proposed in close proximity to plots, the foundations may need to be constructed at the same time as the plot/retaining foundations, and specific discussions with Coopers structural engineers are recommended should potential conflicts be considered. The assessments make no account of proposed utilities excavations and should deep excavations be proposed the formation depths should be appraised to determine if these need to be set a lower level. This site will require cutting and filling to achieve the necessary development platform. In areas where plots have significant underbuild brickwork and/or adjacent retaining walls, the relationship between plot foundation and retaining wall will need to be considered by a structural engineer. Where necessary the foundation option presented here may need to be amended or adapted. The final grade levels of the earthworks contract will also need to be considered in these areas.

Tree Influence and Formation Depths

The tree survey (as referenced in General Note 1) was current at the time of the original revision of this drawing. The developer should be aware that trees which are <1 mature height may be subject to substantial changes in growth over time and therefore reappraisals of tree heights and foundation depths at the time of construction/filling may be required. This site is comprised of granular macroground over sand strata over the majority of the site. Therefore trees do not influence foundation depths, the tree contour depths have been included on the plan for information only.

8b) DRILL & GROUT INVESTIGATION

E3P are to undertake the above investigations to determine the influence of potential shallow mine works across the site. Should shallow coal seams or mine workings be encountered these may have an impact on the foundation recommendations provided on this plan and table.

NOTE: This site will be extensively regraded. The final cut and fill levels have not been produced. Therefore for preliminary assessment it has been assumed that these levels will be sat at 0.45m below FFL. All foundation assessments on the accompanying table are relevant to this datum reference level. This note excludes working platform levels for piling or vibro replacement techniques which will be set relevant to ground beam and vibro footing designs.

REVISION BOX

Rev.	Date	Revision	By	Appd
B	05.08.22	Plots 246 - 249 & 252 updated	OS	PRS

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KELLEN
HOMES

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FOUNDATION PLAN
SHEET 2 OF 4