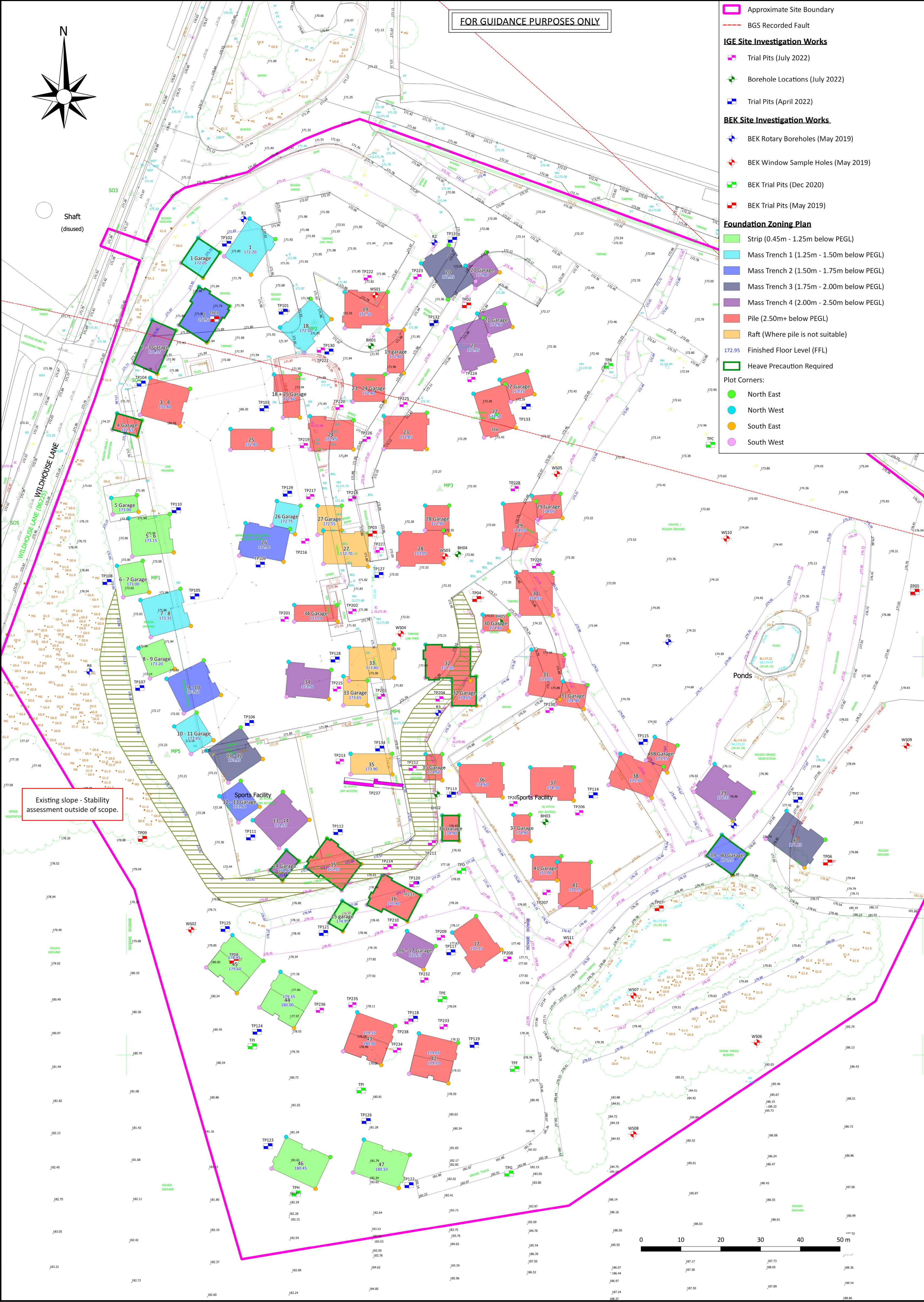


APPENDIX B – FOUNDATION ZONING PLAN



General Notes

- a) All dimensions and levels are in metres unless noted otherwise.
- b) This drawing is to be read in conjunction with all relevant Architects and Service Engineers drawings, including:
 - IGE Consulting Site Investigation Trial Pit and Borehole Logs (July 2022 and April 2022).
 - BEK Consulting Engineers, Site Investigation & Ground Assessment Rev B (Ref: BEK-19555-2 Rev B dated January 2021)
 - DB Remediation, Remediation Strategy Report Revision 1 (Ref: 394.06.21RS dated September 2021)
 - Survey Operations, Topographical Survey (Ref: 19E081 dated July 2019)
 - Bowland Tree Consultancy, Arboricultural Constraints Appraisal Report (Ref: BTC1808 dated June 2019)
 - Tempus Design and Build Proposed Drainage Overview Rev C (Ref: MILN_23_001 dated February 2022)
- c) The ground profile between exploratory holes is assumed to be linear but it must be recognised that natural strata may vary considerably from exploratory hole to exploratory hole and the groundwater regime may be influenced by seasonal or other factors including the construction of the proposed foundations. The foundation assessment and associated plan is indicative and is therefore for guidance purposes only and is not for construction purposes - the foundation types should be constantly reviewed and assessed against the actual ground conditions encountered during construction work.
- d) Where the ground conditions differ from those indicated on this drawing, the developer should contact IGE Consulting to confirm or recommend procedures for reappraisal prior to casting the foundations and may require further ground investigation.
- e) The assessment has been undertaken on the basis that any ground obstructions across the site have been removed and suitable engineering backfill has been utilised.
- f) The assessment makes no allowance for proposed plot drainage or utilities excavations. Should deep utilities excavations be proposed, the foundation formation depths should be re-appraised to determine if any localised deepening of foundations is necessary.
- g) Any placement of materials as part of regrading of site levels should be of approved materials and placed in accordance with contractors' specifications.
- h) Preparatory works such as reducing ground levels and deep excavations (which will be required) should be carefully considered and carried out in such a manner as to comply with the current CDM (2015) regulations with appropriate risk assessments, particularly for excavations close to the site boundary, existing structures and roads. **HIGH RISK ACTIVITY.**
- i) The contractor should be aware that due to the nature of the ground conditions there is potential for unstable trenches (particularly given the presence of Made Ground and sand bands encountered within the Glacial Till). The contractor should allow within their tender for temporary means of support and safe methods of working. Particularly reference is made to excavations immediately adjacent to existing road/footway/verge/ boundary features and structures.
- j) Garage foundation design should be undertaken in line with Premier Guidance.
- k) All design undertaken in accordance with Premier Guarantee Technical Guidance.
- l) This assessment does not assess foundation types for boundary wall treatments.

Surface and Subterranean Slopes

- Based on the findings of the site investigation works, surface (Existing) and inferred subterranean high wall rock slopes are shown on the foundation zoning plan.
- Slope assessment is outside of the scope of this foundation zoning plan.
- Given the presence of subterranean slopes in the central site section, consultation with a piling contractor in terms of 'kicking piles' off steep sided slopes or shallow bedrock will be required. A raft foundation solution has been proposed for plots 27, 27 garage, 33, 33 garage and 35. This is subject to change following consultation with a piling contractor.

Traditional Strip Foundations

- Proposed where founding levels are between 0.45m and 1.25m from PEGL.
- Minimum formation depth of 0.45m below PEGL in granular deposits and 0.90m below PEGL in cohesive deposits in-line with Premier Guarantee.
- Any transitions in formation depths to be stepped in accordance with Premier Guarantee.
- Strip foundations are not suitable where heave precautions are required.

Mass Concrete Trench Fill Foundations

- Proposed where founding levels are between 1.25m and 2.50m below PEGL.
- If poor trench stability anticipated (i.e. due to variable clays and sand bands with perched water) for excavations >1.50m alternative foundation types or approaches should be considered (e.g Piled or VSC).
- Any transitions in formation depths to be stepped in accordance with Premier Guarantee.
- Heave precaution required within areas of tree influence and a mass trench depth of >2.00m below PEGL in accordance with Premier Guarantee. For details, please refer to the Tree Influence / Heave notes above.

Piled Foundations

- Proposed where founding levels are greater than 2.50m below PEGL and/or ground is not suitable for VSC treatment.
- Pile design to be undertaken by specialist piling contractor, these are assumed to be precast, end bearing onto the weathered bedrock subject to consultation with a specialist piling contractor.
- Working / Piling Platform to be designed in accordance with BR470 / EC7 and subject to rig specifications.
- Ground beams reinforced in accordance with house type designs.
- Piling validity testing to be undertaken inline with Premier guidance.

Raft Foundations

- Proposed for plots 27, 27 garage, 33, 33 garage and 35 subject to consultation with piling contractors.
- Raft solution proposed due to subterranean slope being present beneath the plots. This has resulted varying depths of bedrock and the potential for piles to kick out if driven onto the slope.
- Reinforced raft will require digging out of material below the plot and replacement with suitable fill material to an engineered specification.
- Raft validity testing to be undertaken in line with Premier guidance.

Foundation Notes

- a) All natural strata to support strip / trench fill foundations to be capable of sustaining an applied bearing pressure of 100 kN/m². This may involve digging through significant depths of loose sands or conversely may be at higher levels than predicted. The anticipated bearing strata for the majority of plots is identified as *Weathered Bedrock or Firm to stiff, brown, slightly sandy CLAY* or for strip / trench foundations. However, a number of plots will require a piled or alternative foundation solution due to a lack of suitable founding strata within 2.50m of PEGL.
- b) Proposed foundation depths in the table and plan taken from the post earthworks ground level (PEGL). Given the variation of existing levels across the proposed plot envelopes, shallower / deeper foundation depths may be necessary at plot envelope extremities.
- c) The plot foundation must be founded entirely into a single strata, local deepening of foundations may be required. For detailed ground conditions, refer to the IGE Consulting Trial Pit and Borehole Logs and BEK Consulting Engineers Site Investigation & Ground Assessment.
- d) Bearing strata for strip / trench fill foundations to be identified and approved by the Engineer and Premier Guidance.
- e) Care needs to be taken where foundations clash with the positions of exploratory trial holes. Backfilled trial pits that extend below proposed foundation level will result in soft spots that need to be dug out or treated to avoid differential foundation movement.
- f) Where the foundation and slabs may be affected by trial pits, trees or former features (i.e. drains or ponds) the foundation and slab type indicated may need to be amended at the time of construction to suit local ground conditions. Any amendments should be agreed with the Premier Guarantee / Local Authority Inspectors.
- g) Foundation depths and associated precautions are in-line with Premier Guarantee Chapter 5.2 (Foundations, Trees and Clay) and Chapter 5.3 (Strip and Mass Fill Foundations). These have been assessed on PEGL (FFL-525mm), therefore, If proposed FFLs are amended a re-assessment will be required. A minimum foundation depth of 0.90m below PEGL in cohesive material has been utilised in line with Premier Guidance.

Ground Floor Slab Notes

- a) A suspended floor slab (i.e. In-situ concrete suspended ground floor slab) is assumed to be the client's preferred slab requirement for the proposed plots. Damp proof membrane, damp proof course and insulation will be in accordance with client details and specifications.
- b) Where slab levels differ between adjacent plots by 600mm or greater the provision of retaining walls between the plots is anticipated. To avoid imposing unnecessary loading on the wall, the foundation for the dwelling on the retained side may have to be deepened. This drawing does NOT take into consideration the potential influence of any retaining walls on the foundation level. Once retaining walls positions and levels have been finalised, the information may have to be reviewed and foundation depths amended to ensure footings are not subject to any additional loading.
- c) Ground floor slabs will need to incorporate ground gas protection measures in line with Characteristic 2 (CS2).

Tree Influence / Heave Notes

- a) The shrinkability of the cohesive soil strata on this site has been determined as **MODERATE** utilising the worst case BEK site investigation geotechnical testing results in accordance with Premier Guarantee Chapter 5.2
- b) On-site tree location, species and heights are noted in the *Bowland Tree Consultancy Arboricultural Constraints Appraisal (2019)*. Where tree influence contours are included, the contours indicate **minimum** foundation depths required within tree influence zones in accordance with Premier Guarantee Chapter 5.2.
- c) Foundation deepening is anticipated and heave precaution will be required within areas of tree influence where moderate or high plasticity clays are present and where mass trench fill foundations are proposed and foundation depth is greater than 2.00m below PEGL in accordance with Premier Guarantee. Where heave precaution is required, foundations are to be constructed with void former placed on all inside surfaces of the **peripheral foundations, underside of groundbeams or pile caps** to allow for lateral soil swelling. Floor slabs within heave zones are to be constructed with a sub floor void, the thickness of which is shown in the table below.
- d) All construction near trees to be undertaken in accordance with BS 5836 (2005) Trees in Relation to Construction.
- e) No consideration has been given to new planting within the foundation assessment, it has been assumed that any new planting is to be undertaken as to not affect the substructure construction. Planting proposals to be submitted to IGE Consulting for consideration.
- f) Given the proposed tree removal within areas of development, care should be taken not to disturb underlying ground conditions as this could result in foundation deepening.

Substructure Concrete Classification

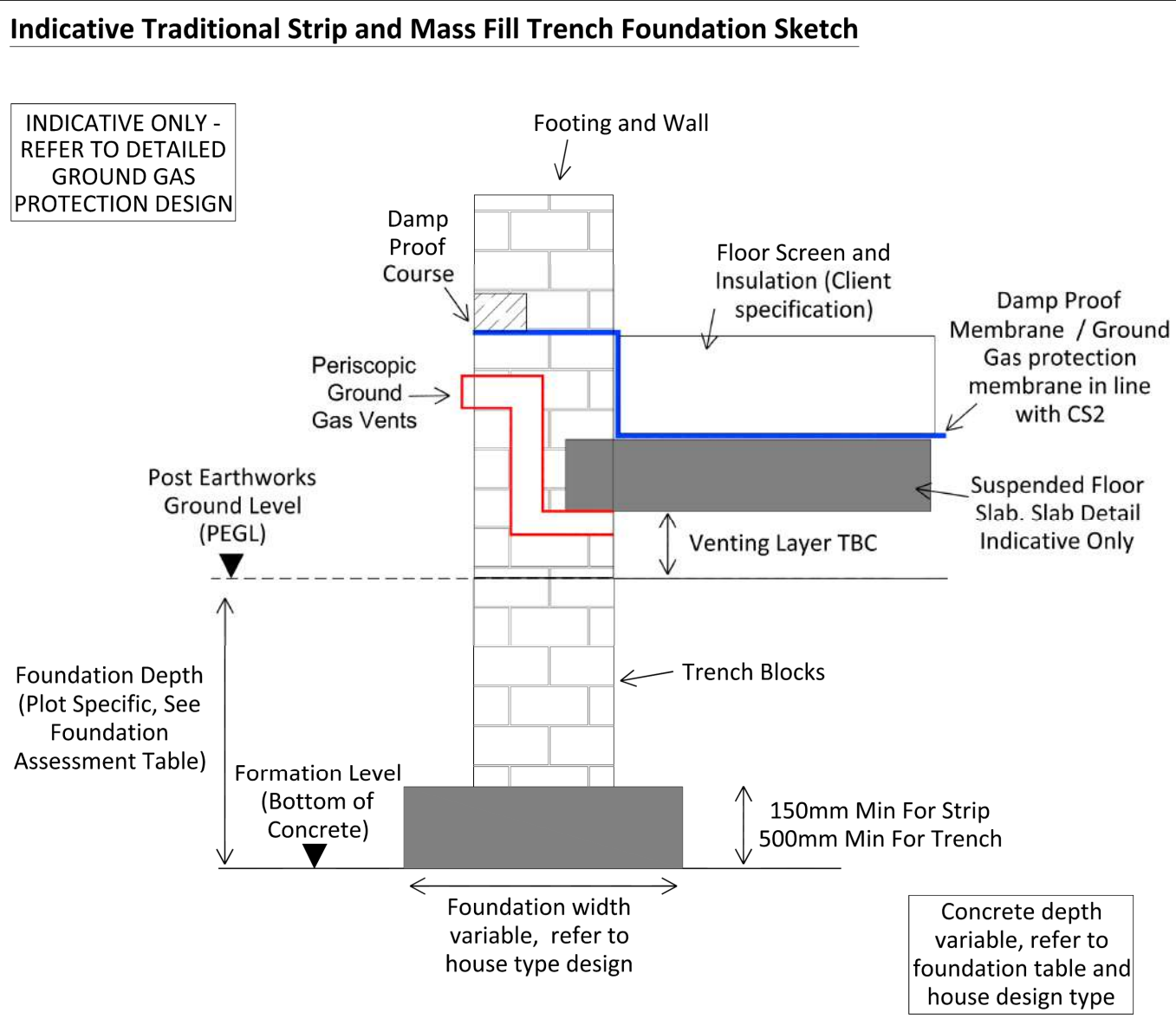
- Following initial testing undertaken by BEK, IGE undertook testing to determine the Design Sulphate (DS class) and ACEC class of site soils.
- 1 No. sample of reworked mudstone taken from TP103 gave a result of **DS4 AC4**. 1 No. sample of Glacial Till taken from TP101 gave a result of **DS1 AC2z**. All other results indicated a minimum design sulphate class of **DS-1 AC-1**.

Ground Gas Protection Measures

- The DB Remediation, Remediation Strategy (Ref: 394.06.21.RS dated September 2021) designates the site to be Characteristic Situation 2 (CS2) due to elevated CO₂ and methane recorded in the BEK ground gas monitoring wells.
- Ground gas protection measures will be required in line with CS2. The design and installation of ground gas protection measures should be carried out in accordance with BS8485 and should be verified and validated in accordance with CIRIA C735.

Plasticity Index of Soil	Required Foundation Depth (m)	Thickness of Void Against side of Foundation Ground Beam (mm)	Depth of Void Below Under-side of Edge Beam or Floor Construction (mm)
>40	>2.50	Engineer Design	
	2.00—2.50	35	100
	1.50—2.00	25	75
20 - 40	>2.50	Engineer Design	
	2.00 - 2.50	25	75
	1.50 - 2.00	25	50
<20	2.00 - 2.50	-	50
	<2.00	No Special Precautions	

Premier Guarantee Chapter 5.2 Foundations, Trees and Clay Table 2 Minimum Void Dimensions for Foundations, Ground Beams and Suspended Floor Slabs.
Note: Red text relates to site conditions.



B	AL	05/08/22	Additional Trial Pits and reassessment undertaken
A	AL	04/05/22	Additional Trial Pits and reassessment undertaken
Rev	Drawn	Date	Description

Drawing Status: Information

Contract: Wildhouse Lane, Milnrow

For: Lancet Homes Ltd

Drawing Title: Foundation Zoning Plan and Schedule



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Scale: 1:400 @ A0 Date: March 2022

Drawn: AL Checked: AE

Contract No. 3261 Drawing No. SI - 01 P1

Plot Number	Proposed Finished Floor Level (FFL)	Post Earthworks Ground Level (FFL - 525mm)	Existing Ground Level Average (m AOD)	Level Difference (m) Between Existing Ground Level (Average) and Finished Floor Level (FFL)	Existing Ground Level (m AOD)				Level Difference (m) Between Existing Ground Level and PEGL				SI Report Ref No. 1	Founding Level at SI Ref No. 1 (m AOD)	SI Report Ref No. 2	Founding Level at SI Ref No. 2 (m AOD)	Within Tree Influence	Interpolated Founding Level (m AOD) Inclusive of Tree Influence				Theoretical Foundation Level (Based on Proposed External Ground Level (PEGL) (FFL - 525mm) (m AOD))	Theoretical Foundation Depth from Proposed External Ground Level (PEGL) (FFL - 525mm) (m)				Theoretical Foundation Depth from Post Earthworks level (PEGL) (m)	Founding Strata (Min Bearing Capacity to be 100kN/m²)	Foundation Type (Based Upon Foundation Depth from FFL)	Heave Precaution Requirement	Ground Floor Slab Requirement	Concrete Classification	Ground Gas Protection Measures Requirements	Remarks	Plot Number					
					NW Corner	NE Corner	SW Corner	SE Corner	NW Corner	NE Corner	SW Corner	SE Corner						NW Corner	NE Corner	SW Corner	SE Corner		NW Corner	NE Corner	SW Corner	SE Corner														
1	172.20	171.68	171.90	0.52	172.00	171.95	171.85	171.80	-0.33	-0.28	-0.38	-0.13	TP102	171.25	TP101	171.17	NO	170.25	170.25	170.25	170.25	170.25	1.42	1.42	1.42	1.42	1.42	Weathered Bedrock	TRENCH 1	NO	Suspended Floor Slab	D5-1 AC-1	CS2 Measures		1					
1 Garage	172.05	171.53	172.41	-0.38	173.05	171.80	173.00	171.80	-1.53	-0.28	-1.47	-0.28	TP102	171.25	TP01	171.15	YES	170.25	171.25	171.20	171.15	170.25	1.28	0.28	0.33	0.38	1.28	Weathered Bedrock	TRENCH 1	NO	Suspended Floor Slab	D5-1 AC-1	CS2 Measures		1 Garage					
2	172.50	171.98	171.88	0.62	171.85	171.80	171.90	171.95	0.13	0.17	0.07	0.03	TP01	171.15	TP101	171.17	YES	170.35	170.35	170.35	170.35	170.35	1.63	1.63	1.63	1.63	1.63	Weathered Bedrock	TRENCH 2	NO	Suspended Floor Slab	DS1 AC-1	CS2 Measures		2					
2 - 3 Garage	172.35	171.83	171.85	0.52	171.90	171.90	171.80	171.80	0.08	-0.08	0.02	0.02	TP104	169.32	TP01	171.15	YES	170.10	170.35	169.50	169.50	169.50	1.72	1.47	2.32	2.32	2.32	Weathered Bedrock	TRENCH 4	YES	Suspended Floor Slab	D5-1 AC-1	CS2 Measures	Inspection on site to determine founding strata depth given suspected reworked deposits in TP104. Or reduce the level / FFL in this area to facilitate a trench solution. If piled, discussions with piling contractor required, given how close adjacent plots / garages are. Reinforcement recommended for plot 2 - 3 Garage due to fault.	2 - 3 Garage					
3 - 4	172.80	172.28	171.85	0.95	171.80	171.80	171.80	172.00	0.47	0.47	0.47	0.28	TP104	169.32	TP01	171.15	NO	169.50	169.50	169.50	169.50	169.50	2.78	2.78	2.78	2.78	2.78	Weathered Bedrock	PILE	NO	Suspended Floor Slab	DS1 AC-1	CS2 Measures		3 - 4					
4 Garage	172.65	172.13	173.21	-1.08	174.70	171.90	174.35	171.90	-2.57	0.22	-2.22	0.22	TP104	169.32	TP110	171.42	YES	169.50	169.50	169.50	169.50	169.50	2.63	2.63	2.63	2.63	2.63	Weathered Bedrock	PILE	YES	Suspended Floor Slab	DS1 AC-1	CS2 Measures		4 Garage					
5 - 6	173.15	172.63	172.01	1.14	172.10	171.95	172.00	172.00	0.53	0.68	0.63	0.63	TP110	171.42	TP108	171.84	NO	171.40	171.40	171.70	171.50	171.40	1.22	1.22	0.93	1.13	1.22	Weathered Bedrock	STRIP	NO	Suspended Floor Slab	DS1 AC-1	CS2 Measures		5 - 6					
5 Garage	173.00	172.48	171.96	1.04	171.95	171.95	172.00	171.95	0.53	0.53	0.47	0.53	TP110	171.42	TP108	171.84	NO	171.35	171.40	171.35	171.40	171.35	1.13	1.07	1.13	1.07	1.13	Weathered Bedrock	STRIP	NO	Suspended Floor Slab	DS1 AC-1	CS2 Measures		5 Garage					
6 - 7 Garage	173.00	172.48	172.00	1.00	172.00	172.00	172.00	172.00	0.47	0.47	0.47	0.47	TP108	171.84	TP105	171.40	NO	171.80	171.60	171.70	171.60	171.60	1.60	0.67	0.88	0.78	0.88	0.88	Weathered Bedrock	STRIP	NO	Suspended Floor Slab	DS1 AC-1	CS2 Measures		6 - 7 Garage				
7 - 8	173.35	172.83	173.98	1.13	172.00	171.95	172.00	171.95	0.62	0.88	0.82	0.88	TP105	171.40	TP108	171.84	NO	171.70	171.50	171.75	171.50	171.50	1.13	1.32	1.07	1.32	1.32	Weathered Bedrock	TRENCH 1	NO	Suspended Floor Slab	DS1 AC-1	CS2 Measures		7 - 8					
8 - 9 Garage	173.20	172.68	172.05	1.15	172.10	171.95	172.15	172.00	0.57	0.72	0.52	0.87	TP107	171.89	TP105	171.40	NO	171.78	171.65	171.78	171.65	171.65	0.90	1.02	0.90	1.02	1.02	Weathered Bedrock	STRIP	NO	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		8 - 9 Garage					
9 - 10	173.60	173.08	172.00	1.60	172.60	172.60	172.60	172.00	1.07	1.07	1.07	1.07	TP107	171.89	TP106	171.43	NO	171.75	171.50	171.80	171.50	171.50	1.32	1.57	1.27	1.57	1.57	Weathered Bedrock	TRENCH 2	NO	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		9 - 10					
10 - 11 Garage	173.45	172.93	172.05	1.42	172.10	172.00	172.10	172.00	0.82	0.92	0.82	0.92	TP106	171.43	TP107	171.89	NO	171.80	171.65	171.80	171.65	171.65	1.12	1.27	1.12	1.27	1.27	Weathered Bedrock	TRENCH 1	NO	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		10 - 11 Garage					
11 - 12	173.95	173.43	172.09	1.86	172.00	172.00	172.35	172.00	1.42	1.42	1.07	1.42	TP106	171.43	TP111	171.63	NO	171.70	171.45	171.70	171.50	171.50	1.74	1.97	1.72	1.92	1.92	Weathered Bedrock	TRENCH 3	NO	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		11 - 12					
12 - 13 Garage	173.80	173.28	172.35	1.45	172.25	172.35	172.40	172.40	1.03	0.93	0.88	0.88	TP111	171.63	TP106	171.43	NO	171.70	171.70	171.65	171.65	171.65	1.58	1.58	1.63	1.63	1.63	Weathered Bedrock	TRENCH 2	NO	Suspended Floor Slab	DS1 AC-1	CS2 Measures		12 - 13 Garage					
13 - 14	174.55	174.03	172.40	2.15	172.40	172.40	172.40	172.40	1.63	1.63	1.63	1.63	TP111	171.63	TP112	171.70	NO	171.65	171.65	171.65	171.65	171.65	2.38	2.38	2.38	2.38	2.38	Weathered Bedrock	TRENCH 4	NO	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		13 - 14					
14 Garage	174.40	173.88	172.60	1.80	173.60	172.60	172.60	172.60	1.28	1.28	1.28	1.28	TP111	171.63	TP112	171.70	YES	171.65	171.65	171.65	173.00	173.00	2.14	2.22	2.22	2.22	1.68	2.22	Weathered Bedrock	TRENCH 4	NO (Granular)	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		14 Garage				
15	175.10	174.58	173.75	1.32	172.60	172.60	176.90	172.90	1.97	1.97	-2.31	1.67	TP112	171.70	TP121	176.03	YES	171.70	171.70	171.70	173.00	173.00	2.88	2.88	2.88	1.57	2.88	2.88	2.88	1.57	2.88	2.88	Weathered Bedrock	PILE	NO (Granular)	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		15
15 Garage	174.95	174.43	177.75	-2.80	177.10	177.10	178.40	178.40	-2.68	-2.68	-3.98	-3.58	TP121	176.03	TP112	171.70	YES	173.98	173.98	173.98	173.98	173.98	0.45	0.45	0.45	0.45	0.45	0.45	Weathered Bedrock	STRIP	NO	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		15 Garage				
16	175.80	175.28	177.85	-2.57	176.85	176.20	178.00	178.35	-1.57	-2.92	-2.72	-3.07	TP231	172.60	TP210	174.48	YES	173.64	172.60	173.64	174.38	172.60	1.64	2.68	1.64	0.90	2.68	1.64	2.68	1.64	0.90	2.68	Weathered Bedrock	PILE	YES	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		16
16 - 17 Garage	175.65	175.13	177.90	-2.75	176.40	177.60	177.80	177.80	-3.28	-2.47	-2.68	-2.68	TP210	174.48	TP209	172.85	NO	174.48	172.85	174.40	175.08	172.85	0.65	2.28	0.72	0.04	2.28	0.65	2.28	0.72	0.04	2.28	Weathered Bedrock	TRENCH 4	NO	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		16 - 17 Garage
17	177.15	176.63	177.93	-1.52	176.15	176.25	177.85	177.45	-1.53	-1.63	-1.22	-0.82	TP209	172.85	TP208	173.46	NO	172.85	172.85	173.46	173.46	172.85	3.78	3.78	3.78	3.16	3.78	3.78	Weathered Bedrock	PILE	NO	Suspended Floor Slab	DS-1 AC-1	CS2 Measures		17				
18	172.50	171.98	171.96	0.52	172.05	171.90	171.90	172.00	-0.08	0.07	0.07	-0.03	TP101	171.17	TP221	170.57	NO	171.00	170.50	171.15	170.50	170.50	0.97	1.47	0.82	1.47	1.47	0.97	1.47	0.82	1.47	1.4								