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Kilnwood Vale

Engineering Design Statement for Phase 2.4-2.6

For

Crest Strategic Projects

Project Number: 11950

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1.0 INTRODUCTION

1.1. General

1.1.1. The enclosed document presents a non-technical summary of the ground treatment and onward design constraints following the remedial earthworks at Kilnwood Vale, Phase 2.4-2.6 for consideration by subsequent developers.

1.1.2. This document does not form a full description of the design or completed works: reference should be made to the detailed design information and associated technical specifications and validation reports in order to fully consider the ground conditions and onward design requirements on any given parcel.

1.1.3. It should be recognised that the site has been split into various sub-sections / parcels in order to allow incremental site development and so the provisions noted herein will necessarily encompass a degree of generalisation.

1.2. Current Development Agreements

1.2.1. The earthworks are currently consented under Application No.s DC/10/1612 (Outline approval for the development of approximately 2500 dwellings) and consents (DC/13/1437, DC/15/2813 and DC/16/0108) ('engineering operations associated with landfill remediation and associated infrastructure including pumping station').

1.3. Scope of Works

1.3.1. The remedial earthworks comprise an operation to realign the former irregular landfill profile with a graded landform suitable for redevelopment. The earthworks are being controlled by a modified form of the Specification for Highways Work that primarily considers the control of the excavation, formation inspection, earthworks material selection, placement and compaction and a surcharge / pre-load operation where residual landfill material has been retained.

1.4. Constraints

1.4.1. The earthworks treatment will provide a remediated platform for subsequent development, in view of a proposed residential use, however there are a number of constraints to development that must be considered by the subsequent parcel developers. The site should not be regarded as a simple green field site for onward engineering purposes. It will be necessary to preserve the integrity of the earthworks treatment and consider ground conditions during the subsequent design phases.

1.5. Design and Validation Information

1.5.1. The detailed design has been split into phases: 2.1-2.6. CampbellReith has produced the following design documents for each phase:

- Geotechnical Design Report
- Environmental Review and Remedial Strategy
- Earthworks Specification
- Ground Gas Interpretation Report (where relevant)

- Surcharge Load/Unload Geotechnical Feedback Report (where relevant)
- Comment on Verification report

1.5.2. The design documents are accompanied by a Designers Risk Assessment that highlight the residual design risks including health and safety considerations (e.g. ground gas).

1.5.3. The earthworks have been implemented by Dunton Environmental Limited and upon completion of works a Verification Report is prepared. It is essential that the verification reports are fully reviewed in case there is any deviation from the specified requirements.

1.5.4. It should be recognised that the subsequent development plots may cross the design phases used for remedial design and verification and several reports may need to be consulted with differing design provisions.

1.5.5. It is noted that as works have progressed a more refined understanding of soil behaviour has been possible and a number of Value Engineering (VE) sessions have been held with the client. This report considers VE matters discussed and agreed and hence incorporated into Version E of the Earthworks Specification, dated 10 April 2019. Consequently this this Engineering Design Statement (EDS) relates to areas referred to as Phase 2.4, Phase 2.5 and Phase 2.6. For Phases 2.1, 2.2 and 2.3 reference should be made to earlier versions of this EDS.

1.6. Untreated Areas

1.6.1. Surcharge treatment has been omitted from specific areas of the site as agreed with the Client, which include an area of Public Open Space (POS) located in Phase 2.6C, the Pavilion Area (also located in Phase 2.6C) and the Central Green Area (CGA). It is also noted that in the POS and CGA the base of engineered fill is limited to 0.50m below proposed bulk earthworks level or the 2016 ground level (after 200mm topsoil strip) whichever gives the lower level.

1.6.2. In an area between the POS and the eastern site boundary to Phase 2.6C no development is intended. This area will surcharge treatment has been omitted. In this area it is anticipated that earthworks will be limited to simple regrading, resulting in a 'feathering out' of the engineered fill. In this area number of investigation points will be formed so as to inspect for significant contamination and to confirm the design of any measures required in relation to a proposed drainage route.

2.0 GEOTECHNICAL (GROUND TREATMENT)

2.1. Objective of Treatment

2.1.1. The earthworks treatment is designed to control subsequent ground settlement to: 75mm total settlement; and, 1/100 differential movement, over a 60 year design life. Outside the areas receiving treatment these ground settlement criteria may not be met.

2.2. Design Provisions

2.2.1. Two fundamental approaches to ground treatment have been adopted: wholesale removal of material to competent natural ground (Weald Clay) and controlled construction of earthworks to the required site level; or, partial excavation to provide a layer of engineered fill material above residual made ground, combined with a preload/surcharge operation.

2.2.2. The engineered fill layer is at least 1.75m thickness with a minimum 1m excavation into the existing landfill and locally deeper (for example where compressible or organic material has been found). The exceptions to this are the POS and GCA where the thickness of engineered fill is a minimum of 0.50m thick.

2.2.3. The placement of earthworks has utilised the SHW template and an End Product approach with the principle requirements typically comprising of placement of a compacted material at 95% or more of maximum dry desnity, with a corresponding Air Voids Ratio of no more than 10%, an undrained shear strength of 50 kN/m2 or more, a CBR value of 3% or more and permeability of not more than 1x10-7 m/s. The exceptions to the area the POS and CGA where a permeability is to be not more than 1x10-8m/s. The engineering fill layer has been formed using Class 2 materials sourced form either reworked natural clay or other processed site won materials.

2.3. Principal Design Constraints in Surcharge Treated Areas

2.3.1. Potential settlement from creep, consolidation and inundation have been considered in the design. The removal of locally compressible materials, placement of an engineered fill layer (of a lower permeability) to prevent water inundation and the pre-loading and surcharge of residual landfill soils at depth have been employed.

2.3.2. The calculations of the surcharge design assume a future loading constraint (Uniformly Distributed Load, UDL) of no more than 20kN/m2 . This allows, for example:

2.3.3. the final site level to be raised 0.50m from the completed earthworks formation level (for example to allow for a 0.50m of road construction), resulting in additional load of 10kN/m2, and a notional in service load of 10kN/m2 (e.g. HA traffic loading); or,

2.3.4. could be considered in the context of site levels being not more than 1m above the completed earthworks formation level (but without any other source of load).

2.3.5. Any load applied to the final earthworks formation level that is greater than the additional 20kN/m2 will induce additional settlement potentially and require specific consideration.

2.3.6. The above relates to areas where surcharge has been applied as part of the works undertaken and where ‘historic surcharge’ is considered to apply. ‘Historic Surcharge’ relates to areas where the 2015 ground levels exceed or are within 1m of the calculated surcharge design height

(thereby indicating that material to be removed as part of net cut operations should have acted as a historic surcharge that has been in place for a number of years).

2.4. Constraints

2.4.1. There is the potential to damage the earthworks formation via weathering and trafficking. It is necessary to protect the completed formation by the placement of suitable temporary roads, surfaces and working platforms.

2.4.2. It is anticipated that sub-structures, roads, services and most drainage (outside the strategic road network) will be placed in the upper 1.5m of the engineering fill layer which is at least 1.75m thick and will preserve the lower portion of this layer. Where excavation proceeds beneath this level it will be necessary to reinstate a layer of engineered fill that is at least 0.5m in thickness and has a similarly low permeability.

2.4.3. Piles, deep drains and, if later found to be required, [land based] gas protection/venting measures will potentially bridge between the engineering fill layer and landfill material below and will require individual consideration; drainage is discussed below. It is unlikely that piles beneath a structure would present a significant pathway with respect to inundation settlement as the floor slab would act to reduce water infiltration.

2.4.4. No form of soak-away is permissible in the surcharge area of the site and the creation of barriers that may create localised flooding or ponding are to be avoided.

3.0 DRAINAGE

3.1. Objective of Treatment

3.1.1. The drainage in landfill areas needs to accommodate the enhanced or localised settlement that could lead to back falls or opening at pipe joints and also minimise water ingress into the landfill. In addition consideration is required for the accumulation of residual ground gas within the drainage corridor material.

3.2. Design Provisions

3.2.1. The strategic drainage network in residual landfill / surcharge areas has incorporated:

3.2.2. Steepened pipe gradients to tolerate the anticipated residual settlement so as to avoid back-falls. Minimum design falls of 1:75 have been generally specified.

3.2.3. Mattress beds for the drainage to mitigate localised settlement. A 'mattress' pipe bedding comprising a 100mm cushion of granular material wrapped in a geotextile or similar.

3.2.4. Low permeability membranes around the pipe beds to mitigate water leakage or gas ingress.

3.2.5. Provision to seal the drainage trench when it passes through the lower portion of the engineered fill.

3.2.6. Inspections for unforeseen soft spots or poor material during excavation.

3.2.7. The associated detail currently being employed is shown on Drawing: 11950-CD-155 (enclosed).

3.2.8. Suitable rocker pipes will be required at the transition zone between the surcharged and non-surcharged areas. The range of differential settlement anticipated should be tolerable in view of normal flexible capping provisions and normal pipe work / bedding details. Angular deflection limits for joints are tabulated in BS EN 295.1.1991 and range from 80mm/m for up to 200mm diameter, 30mm/m for up to 500mm diameter and 20mm/m for 600mm diameter.

3.2.9. The design provisions for non landfill areas should reflect the post treatment ground conditions described in the earthworks verification report.

3.2.10. Where drainage is to be placed in Untreated Areas additional assessment and provisions to control settlement will be required.

3.3. Constraints

3.3.1. The design of any subsequent drainage networks will need to similarly consider such risks and include associated design provisions.

3.3.2. The design will also need to consider pipe capacity, regulatory stipulations, clashes with other services and [tie in] outfall levels.

3.3.3. The design of shallow drainage will need to be flexible and constructed in such a way as to withstand the post treatment anticipated settlement.

4.0 ROADS AND PAVING

4.1. Objective of Treatment

4.1.1. The design of the roads should recognise the anticipated residual on landfill / surcharge areas and the transitions to different levels of settlement in areas of treated landfill, fill on natural ground and roads placed directly on natural ground.

4.2. Design Provisions

4.2.1. In order to mitigate these risks the design of the strategic roads by CampbellReith has incorporated:

- Flexible road surfaces (comprising either bituminous products or block paving).
- Minimum longitudinal gradients of 1:75 to consider settlements*.
- Geo-grids at the underside of capping layers*.
- Appropriate make ups considering the underlying CBR values.
- Consideration of WSCC standard details and comments.

(*surcharge \ landfill areas only)

4.3. Constraints

4.3.1. The design of any subsequent road networks will need to similarly consider such risks and include associated design provisions. If this is not done there is a risk of extended maintenance periods being required for adoptable roads.

4.3.2. The design provisions for non landfill areas should reflect the post treatment ground conditions described in the earthworks verification report.

4.3.3. It is noted the earthworks treatment assumes a traffic loading of 10kN/m2 equivalent to HA loading. The roads should not exceed this or the overall ground loading of 20kN/m2 without enhanced treatment to mitigate induced settlements.

4.3.4. Where road pavements are to be constructed in Untreated Areas additional assessment and provisions to control settlement will be required.

5.0 LAND QUALITY

5.1. Objective of Treatment

5.1.1. The landform is being remediated to provide a 1.75m minimum validated layer that is suitable for residential use from the perspective of contamination and current planning definitions. The exceptions to this area the POS and the CGA where the validated layer will be at least 0.50m, which is suitable for a public open space end use.

5.1.2. Controlled waters risk assessments do not indicate a risk to the surface water receptors and specific remedial treatment is not proposed (e.g. lining of the realigned book).

5.2. Design

5.2.1. The remediation has incorporated:

- The placement of a 1.75m layer of engineered fill with Limiting Values reflective of a low risk for a residential end use.
- Provisions to exclude Unacceptable Material from the engineered fill.
- Inspections for Unforeseen contamination at the formation level and assessment and appropriate action if required.
- Earthworks themselves fall under the control of the Construction Environment Management Plan (CEMP) and related documents that have associated planning requirements.

5.3. Constraints

5.3.1. The integrity of the engineered fill layer will need to be retained and it should be recognised that residual landfill material beneath the engineered fill will have a variable quality (which is informed by the Ground Investigation information). Both contamination and asbestos in soils may exist at depth and any associated arising's must be assessed for suitability for reuse.

5.3.2. Any subsequent landscape areas will require the placement of validated and suitable sub soils and topsoil in accordance with relevant standards and it is assumed 500mm would be placed in this regard. The Limiting Values for engineered fill are currently at a level which renders them suitable for use in this regard but it is noted that the associated assessment criteria may change over time.

5.3.3. Any waste soils removed from site will require classification in accordance with current guidance and it should be recognised that this is an assessment based upon a different assessment process to that of land contamination and uses different terminology. It is likely that the soils from the engineered fill layer would be generally either inert (where of natural origin) or non-hazardous. No made ground soils processed fills should be assumed to be either 'inert waste' by default and an appropriate waste classification exercise should be undertaken to assess the classification of any waste soils. All surplus soil arisings [not reincorporated into the site as part of the materials management plan] will comprise waste and will require off-site removal.

6.0 GROUND GAS

6.1. Objective of Treatment

6.1.1. The landfill contains a portion of organic clay and inclusions such as such as wood and timber that present a source of elevated levels of methane and carbon dioxide in pockets within the landfill.

6.1.2. The earthworks process is seeking to establish a maximum CIRIA Characteristic Situation 3 / NHBC Amber 2 classification for the treated earthworks, however, the final gas classification will determined following the completion of the earthworks; if it is considered that conditions exceed CS3/Amber 2 additional land based gas protection will be required.

6.2. Design

6.2.1. In order to mitigate these risks the design of the earthworks incorporates:

Controlled material inspection/screening, forensic total organic carbon testing (fTOC)[1] and drum testing to demonstrate the low gas emission[2] potential of the engineering fill.

Surface emission and flux box monitoring at and inspection of [3] the earthworks formation for unforeseen areas of higher risk.

Validation borehole monitoring post earthworks.

6.3. Constraints

6.3.1. All structures on the landfill (and in some cases the areas of placed fill on natural material) should presume the need for passive gas protection. The design of any subsequent structures must consider the findings of the relevant gas assessment and verification reports and provide an associated detailed design and verification in accordance with current guidance.

6.3.2. Where there is the requirement for discrete land based provisions under the development footprint these will require a process of detailed design and protection during onward construction. The application of ground gas mitigation measures is subject to consideration of the final design layout, gas concentrations following the earthworks treatment and detailed design / gas modelling; as such, the provisions in this regard have not been finalised or agreed with regulatory bodies necessarily.

6.3.3. Though not an 'air tight' gas barrier, the engineering fill layers are primarily cohesive and will inhibit gas movement to a degree; as such it is anticipated that gas pockets will exist at depth under pressure. The integrity of the engineered fill layer should be maintained during construction to prevent the generation of a preferential pathway in any given location. H piles are not considerate a suitable foundation type due to gas migration risk.

6.3.4. The short term migration of gas to surface should be considered during all forms of ground works, piling and maintenance of drainage systems that penetrate the Made Ground and associated precautions adopted

[1] In accordance with the method detailed in CI:aire Research Bulletin – A Pragmatic Approach to Ground Gas Risk Assessment (RB17, November 2012, ref: ISSN 2047-6450) and BS8485; forensic TOC of >4% will be excluded and close inspection will be made to remove Unacceptable Material classes
[2] via laser diode surveys
[3] Including trial pts on an approximate 50 x 50 m gird

7.0 SOIL AND WASTE RECYCLING

7.1. Objective of Treatment

7.1.1. It is intended to reuse the soils at the site where ever possible within the framework of the earthworks and remedation so as to maximise sustainability and minimise waste and accord with the objectives of the Design and Access and Environmental Statements.

7.2. Design Provisions

7.2.1. A Materials Management Plan (MMP) exists for Phase 2.1-2.6 to control the placement of the soils generated as part of the earthworks and reused within the site. Soils generated from the upper 2m of engineered fill have already been validated and should in general be suitable for reuse in the same zone within the auspices of the MMP.

7.2.2. The development will generate Unacceptable Material that is not suitable for reincorporation into the works due to a failure to achieve the pre-requisite performance criteria for geotechnical properties or because they comprise Unacceptable Materials (including those which are contaminated or have unacceptable gas potential). Such soils will either be treated and reused at the site in accordance with the MMP (requiring a 'mobile' Environmental Permit for certain treatments) or removed from the site.

7.3. Constraints

7.3.1. Any soils generated from the construction works of a development which are proposed for re-use elsewhere on the development area or across the wider Kilnwood site will require assessment to confirm suitability for use such that they can be re-used in accordance with the MMP or removed from site.

7.3.2. Prior to commencement of works the individual developer should consider the constraints of material reuse in conjunction with the associated review of their proposed levels and other limitations presented herein.

7.3.3. The finished earthworks levels have been deliberately set 0.5m low to allow the subsequent construction by others and accommodate displaced arising's from foundations and substructure and importation of topsoil / sub soil.

8.0 OTHER DEVELOPMENT CONSTRAINTS

8.1. General

8.1.1. The subsequent level of the surcharged site will be constrained by the surcharge loading calculations. If additional loads are applied additional geotechnical treatments may be required.

8.1.2. All foundations, roads, drainage and other infrastructure, designed by others, must be designed with due consideration to the performance parameters and constraints noted above. It is noted that this list is not exhaustive and a full considered design is required in view of the proposed earthworks treatment process and verification records.

8.1.3. As a general note, any excavation from the future development should consider the constraints associated with any excavated material as reflected in the current specification. For example environmental constraints (Limiting Values), risk of gassing (TOC constraints) and geotechnical constraints.

8.1.4. It is noted that each phase of development will be subject to a detailed planning permission and design phase where these and other matters should be considered.

8.2. Foundations

8.2.1. It is assumed that no structures are to be built in Untreated Areas without additional specific engineering consideration.

8.2.2. It is assumed all buildings will be constructed on piled foundations and suspended floor slabs will be required. Ground beams and piles caps are to be constructed above the lower 0.5m of the engineered fill layer to maintain a largely undisturbed layer that will restrict downward infiltration that could exacerbate collapse settlement due to water ingress.

8.2.3. There is a potential for obstructions to remain at depth which constrain deep foundations or require probing. The adoption of driven piles may be preferred as an option to reduce waste arisings although it is noted that obstructions present at depth could present a constraint in this regard. Other techniques likely to be viable include CFA and rotary bored piles with suitable casing; it will be necessary for the developer to design the foundations appropriate for the development, considering the earthworks treatment and residual potential settlements.

8.2.4. It is anticipated that structures will be piled in areas of deeper fill. However other alternatives may exist subject to detailed and specific consideration (and provided that these recognise the earthworks treatment constraints): for example it may be possible to found lightly loaded structures, such as low rise housing or secondary structures, on semi raft foundations with associated ground improvement in some cases. Such provisions would require substantive consideration outside these current proposals.

8.2.5. An appropriate formulation of concrete will be required in light of current guidance, considering the potentially aggressive ground conditions.

8.2.6. In areas of shallow fill there are likely to be options for shallow foundations.

8.3. Basements

8.3.1. The construction of basements should be avoided in landfill areas to prevent inundation settlement, gas risk and to avoid working in untreated made ground.

8.4. Paving Around Buildings

8.4.1. The transition between piled structures and non piled structures should be considered and an appropriate arrangement will be required to address threshold settlement at the edge of proposed buildings. This can be achieved in a number of ways, such as paving at access/perimeter being supported on piles with articulated/flexible paving thereafter in view of the potential performance settlements.

8.4.2. The subsequent design must consider the potential maximum access gradients which are permissible for sensitive users (e.g. 1:21 for wheel chair access) and accommodate the agreed earthworks settlement.

8.5. Connections to Buildings

8.5.1. Walls / gates and such like that are attached to the static (piled) structures should be designed to accommodate the agreed earthworks settlement. Fixings to the piled structure (e.g. gates / walls) should have adequate alignment tolerances in view of these.

8.5.2. Trombone or 'rocker' connections to utility services will be required and these be suspended as they pass under the ground beam.

8.6. Garden Walls

8.6.1. Garden walls and such like should consider the potential performance settlements and it may be preferable to use mastic jointed or non brick garden walls.

8.6.2. Drainage and Service Routes

8.6.3. Sustainable Urban Drainage, where water is discharged into the ground, will not be suitable. Shallow services can be locally placed within the upper engineered fill provided that the residual thickness and integrity of the lower permeability layer is preserved.

8.6.4. If there is an opportunity to minimise cross over areas between natural and filled ground this is likely to economise the design.

8.6.5. Detailed design will be required for roads, service corridors and drainage arrangements. It will be necessary to provide engineered service corridors and potentially pipework with resistance to residual levels of contaminants.

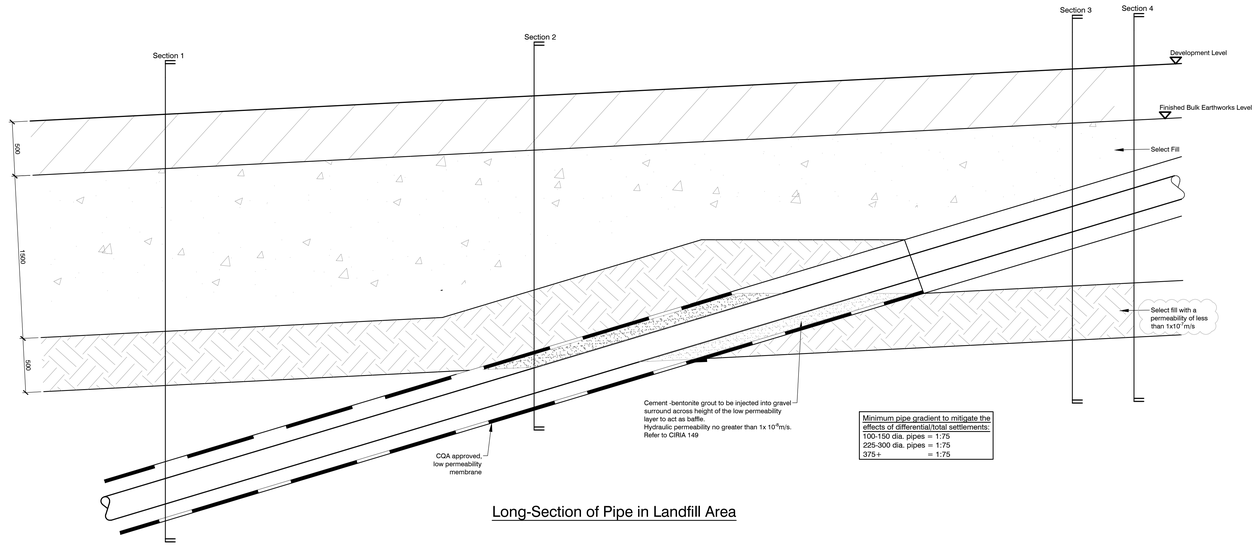
8.7. Pipe Joints and Falls

8.7.1. Flexible joints will be required to ensure the pipe joints perform satisfactorily and these will need to be laid considering the earthwork treatment design parameters: any pipe fall shallower than 1:100 would not be viable due to the potential for differential settlement within the treated ground as they could become flat / back fall.

8.8. Detailed Permissions

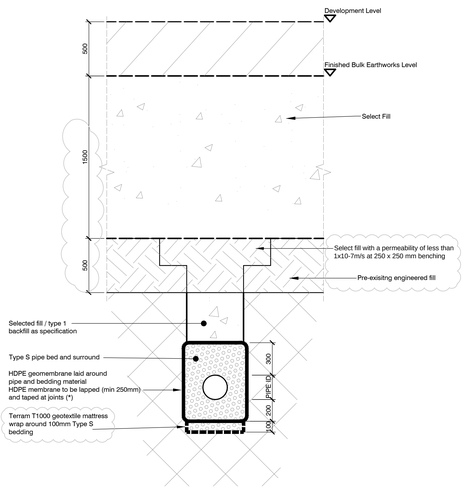
8.8.1. During the design process discussions have been held with the regulatory authorities with an interest in the scheme: this comprises West Sussex County Council (road design), Thames Water (drainage design), Horsham District Council (Land Quality) and the NHBC (building construction and warranty). However residual requirements will exist for the detailed design on any given parcel. It should be anticipated that planning and NHBC warranty conditions will be required to consider the phase specific design in view of the residual risk items noted above.

Appendix 1: Drawings



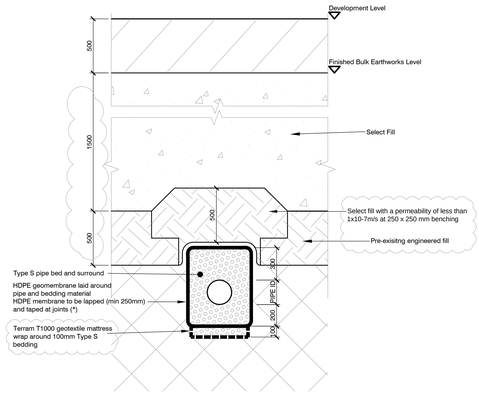
Minimum pipe gradient to mitigate the effects of differential/total settlements:
100-150 dia. pipes = 1:75
225-300 dia. pipes = 1:75
375+ = 1:75

Long-Section of Pipe in Landfill Area



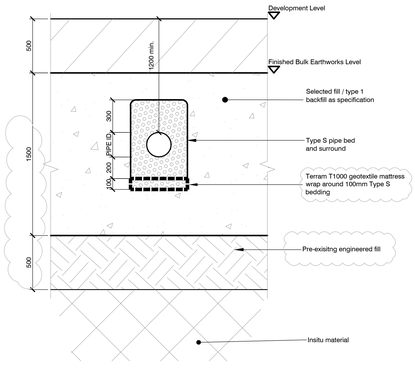
(*) CQA approved installation

Section 1

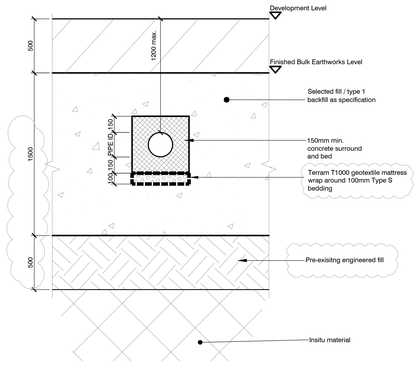


(*) CQA approved installation

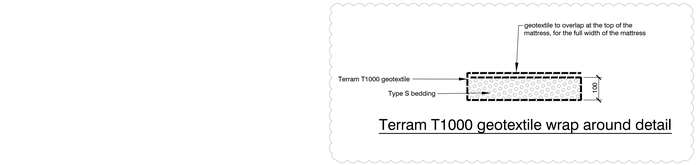
Section 2



Section 3



Section 4



Terram T1000 geotextile wrap around detail

NOTES

1 DO NOT SCALE THIS DRAWING ON PRINT OR ELECTRONICALLY. WORK FROM FIGURED DIMENSIONS ONLY.

2 No deviation from the details shown on this drawing is allowed without CampbellReith's prior permission in writing.

3 Read this drawing with all Architects, Service Engineers and CampbellReith's relevant details and drawings.

4 All work is to be in accordance with the relevant specifications issued by CampbellReith, British Standard Codes of Practice, Statutory requirements and the Contract Documents.

5 DRAWING STATUS

P : **PRELIMINARY** - Evolving drawings for approvals,Tenders, Billings, etc.

C : **CONSTRUCTION** - Fully developed drawings issued under instruction for construction.

ONLY STATUS C DRAWINGS TO BE USED FOR CONSTRUCTION.

6 SUITABILITY CODE

WORK IN PROGRESS:

S0 - Work in progress

SHARED (NON-CONTRACTUAL):

S1 - For coordination, **S2** - For information, **S3** - For internal review and comment, **S4** - For construction approval.

DOCUMENTATION (FOR CONTRACTOR PURPOSES):

D1 - For costing, **D2** - For Tender, **D3** - For contractor design, **D4** - For manufacture / procurement.

7 X — Denotes Section Number. Y — Denotes Drawing Number

8 The CQA approved low permeability membrane shall comprise a lapped and taped HDPE membrane. The form and method of installation of the membrane shall be agreed with Engineer and shall be in compliance with the manufacturers guidance for installation and validation.

10 Design of land based gas protection system subject to separate design and installation post earthworks.

11 The select fill layer is to be reinstated with clay materials and compacted in accordance with the prevailing earthworks specifications to provide permeability of not more than 1x10-7m/s. Notwithstanding the requirements of the prevailing earthworks specification the permeability of this material shall be demonstrated by laboratory permeability tests that are to be undertaken on remoulded samples, compacted using a compaction apparatus appropriate to the material type as given in appendix 6/1 of the earthworks specification and to be compacted to 95% maximum dry density. Testing is to be undertaken using triaxial equipment in accordance with bs1377 part 6: 6. The fill shall be placed and compacted in a prepared benched excavation. The height of the benches shall be as per the layer thickness required by the compaction method utilised and shall not exceed 250mm. The width of the bench is to be 1x layer thickness.

13 Significantly elevated levels of carbon dioxide, methane and other gases (hydrogen sulphide and volatile compounds) have been recorded in the ground. As with other ground risks the Contractor shall review the existing Ground Investigation and associated information to inform their methods of work and risk assessments.

Status/Rev	Description	Date	By
C3	MINOR AMENDMENTS CLOUDED	11.12.17	NEJ
C2	SECTION 4 ADDED	19.07.2017	TA
C1	ISSUED FOR CONSTRUCTION	28.04.2016	HM
S4	REVISED AS CLOUDED	01.04.2016	AL
S3	REVISED AS SHOWN	29/01/2016	HM
S2	GCL REMOVED, CAP THICKNESS REVISED	17/07/2015	HM
S1	ISSUED FOR INFORMATION	15/06/2015	HM
P1	First Issue	24/04/2015	MC

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Job Title: KILNWOOD VALE

Client: CREST NICHOLSON

Drainage Details Landfill Area Pipe Bedding

drawn	date	scale @ A0	C1 checked	CR Project No.
MC	April '15	1:20	BSF	11950

Drg No.	Suitability	Status/Revision
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