

ATLANTIC WASTE ECOPARK PAVING PROJECT

CQA VALIDATION REPORT

Report Number 1379r4v1d0815

Commissioned by
Atlantic Waste
Ty-To-Maen Farm
Newton Road
Rumney
Cardiff
CF3 2EJ



Prepared by
Geotechnology Ltd
Ty Coed
Cefn yr Allt
Aberdulais
SA10 8HE

August 2015

Table of Contents

1	INTRODUCTION	1
1.1	Project Organisation	1
1.2	CQA Plan and Specification	2
2	SUMMARY OF WORKS COMPLETED	3
2.1	Delays and Timescales	3
2.2	Design Changes	3
2.3	Preparatory Earthworks	3
2.4	Concrete Works	4
2.5	Drainage	4
3	EARTHWORKS	5
3.1	Existing Ground	5
3.2	Formation Preparation	5
3.3	Unbound Sub-Base (200mm) Layer	6
3.4	Bound (300mm) Layer	7
4	DRAINAGE CHANNEL CONSTRUCTION	8
4.1	Sub-base	8
4.2	Construction Detail	8
4.3	Strength testing	8
4.4	Wall Return	9
5	SLAB CONSTRUCTION	10
5.1	Visual Inspection	10
5.2	Particle Size Distributions	11
5.3	Strength testing	11
5.3.1	Cube Testing	11
5.3.2	Core Testing	12
5.4	Finished Surface Topographic Survey	13
5.5	Temporary Bund	13
6	OUTLET, SHUT-OFF VALVE AND INTERCEPTORS	14
6.1	Headwall and Shut off Valve	14
6.2	Silt trap and Redundant Chamber	14
6.3	Oil interceptor	14
7	NON CONFORMANCES AND RECTIFYING ACTION	15
7.1	Outlet Pipe	15
7.2	Cube & Core Failures	15
8	VALIDATION STATEMENT	16
8.1	Earthworks	16
8.2	Slab Construction	16
8.3	Drainage	16
8.4	Impermeable Surface with Sealed Drainage System	16

List of Tables

Table 3-1	CBR Testing Results	6
Table 4-1	TVC Concrete Cube Testing Results	9
Table 5-1	Summary of DLS Cube Compressive Strength Test Results	12
Table 5-2	Summary of Core Compressive Strength Test Results	13

List of Figures

Figure 1	Site Location Plan
Figure 2	Detailed Site Plan
Figure 3	Formation Survey with CBR Testing Positions
Figure 4	Unbound Layer Survey with Testing Positions
Figure 5	Unbound Layer Isopachyte Plan
Figure 6	Bound Layer Isopachyte Plan
Figure 7	Final Topographic Survey of Slab with Bound Layer Testing Positions

List of Appendices

Appendix 1	CBR Test Certificates
Appendix 2	Particle Size Distribution Laboratory Test Certificates
Appendix 3	Photographic Record
Appendix 4	TVC Concrete Cube Laboratory Test Certificates
Appendix 5	DLS Concrete Cube Laboratory Test Certificates
Appendix 6	Slab Coring Laboratory Test Certificates
Appendix 7	Oil Interceptor Delivery Note

1 INTRODUCTION

Atlantic Recycling Ltd (Atlantic) operates a waste transfer station on land at Newton Farm, Rhymney, Cardiff (Figure 1). Its associated company Neal Soil Suppliers operates a waste soil processing facility on adjacent land. Both activities require significant areas of land to be provided with infrastructure in order to reduce the risk of pollution to the protected watercourses that run through the sites. Environmental Permits require that areas used for storing non-hazardous and hazardous waste should be provided with an impermeable surface with a sealed drainage system. Until recently, small areas of the site met this requirement whilst large areas remained in need of paving.

This report describes the construction work and quality assurance monitoring carried out during the placement of a large cement bound aggregate pad measuring 130m x 100m with associated drainage. This new impermeable surface with enclosed drainage system is located on the northern side of the Atlantic Waste site in an area known as Field 1 (Figure 2). This report details the first phase of the works which cover an area of approximately 13,500m². It is anticipated that a second phase of works will commence shortly to cover the remaining 15,500m² of the Field 1 area. The second phase will tie-in to the existing phase in order to create a completely sealed drainage system and utilise the outlet and interceptors now in place.

1.1 Project Organisation

The client for the contract is Atlantic Recycling Ltd.

The Principal Designer for the works is Geotechnology Ltd.

The Principal Contractor for the works is Neal Soil Suppliers Ltd.

The CQA Inspector for the works is Keir Thomas of Geotechnology Ltd.

Other Contractors involved in the project are:

- Construction of the Impermeable Slab – Darlow Lloyd and Sons Ltd.
- Construction of the Impermeable Slab – DCM Roadways
- Construction of Drainage Channel - Thames Valley Construction Ltd.
- Concrete Kerb Detail on Impermeable Slab – Thames Valley Construction Ltd.
- Outlet, valve, and interceptor installation – Thames Valley Construction Ltd.
- CBR Testing of Formation – Southern Ground Testing
- Coring for Testing of Impermeable Slab – Apex Testing Solutions

Laboratories used for validation testing were:

- Concrete Cube and PSD Testing - Apex Testing Solutions
- PSD Testing – Amey OW Ltd.

1.2 CQA Plan and Specification

The construction of the impermeable surface and sealed drainage system was carried out in accordance with the Design and Specification (Geotechnology Report Ref: 1379r1v1d1114) and the Construction Quality Assurance (CQA) Plan (Geotechnology Ref: 1379r3v1d0615). This report should be read in conjunction with these two documents.

These reports provide the approach to be adopted for the approval of material suppliers, conformance testing of the materials supplied, and monitoring of all processes involved with the construction of the impermeable pad and sealed drainage system.

The CQA Plan was formally submitted to Natural Resources Wales for review and approval on 22 June 2015.

2 SUMMARY OF WORKS COMPLETED

2.1 Delays and Timescales

Works on formation preparation began in May 2015. A phased approach was taken to the ground preparation working from northeast to southwest in strips running with the slope of the pad. The progressive preparation of the formation was carried out concurrently with the placement of aggregate for the bound and unbound layers. This work slowed on several occasions due to the lack of aggregate supply; however it was completed on 29 June 2015 which allowed DLS to begin concreting of the slab on 06 July 2015. Due to delays in the arrival of equipment on site the construction of the slab actually commenced on 07 July 2015. Progress on the construction of the slab was slower than expected with the first 3 days achieving approximately half of the expected coverage. This, coupled with a lack of concrete powder deliveries on the weekend, meant that the slab was not completed until 20 July 2015.

2.2 Design Changes

A number of minor modifications to the design were made during the site works in order to allow work to progress smoothly. The position of the eastern end of the slab was extended outwards in order to tie-in with the area prepared during the earthworks. As part of this extension, the alignment of the return wall and kerb detail have also been altered. The position of this new alignment was agreed between Geotechnology, Atlantic and TVC.

During the construction of the slab it became evident that the method of construction would not allow the slab to be placed as close to the edge of the previously constructed concrete drainage channel as originally thought. Furthermore, the very edge of the prepared slab area was only loosely bound and did not present an impermeable surface. To remedy this, the edge material was cut away with a disk cutter and the excess material removed by a small rubber tracked excavator. TVC then pumped concrete to connect the slab edge to the concrete culvert. This resulted in a longer slope between the edge of the slab and the culvert than originally anticipated.

During the installation of the pipe outfall and interceptors, a delay in the delivery of the shut-off valve and associated steel flanged pipework resulted in incorrect placement of the silt trap and valve chamber. To remedy this, additional cutting of the steel flanged pipework was required, together with the placement of an additional chamber to protect the shut-off valve. As a result, a redundant chamber is now located on the pipeline down-flow of the silt trap.

2.3 Preparatory Earthworks

Preparatory earthworks for the project consisted of the preparation of 3 distinct layers. The first layer is referred to as formation. The formation has been formed from cut and fill of the pre-existing ground at the site. The majority of the cut was at the southern edge of the slab footprint whilst the north was mostly filled. In order to meet the required surface, some additional material was also imported.

The second layer of preparatory earthworks was the placement of an unbound sub-base layer comprising a 200mm thick layer of aggregate. This aggregate was placed and compacted using method compaction.

The final layer was a 300mm thick aggregate layer, incorporated into the cement bound slab. The aggregate used for construction of both the unbound and bound layers needed to be either primary or secondary source aggregate.

All earthworks were completed by 29 June 2015.

2.4 Concrete Works

The concrete works were carried out in three main stages. The first of these was the construction of a 1m wide concrete drainage culvert and headwall by TVC. The height of the headwall is variable along the culvert in order to reach a level of 6.8mAOD. This work was carried out between 11 June 2015 and 06 July 2015, using traditional method of shuttering construction for a concrete pour.

The second stage of concrete works was the construction of the cement bound pad, which was carried out by DLS between 07 July 2015 and 20 July 2015. For this work to commence it was first necessary for TVC to complete the concrete culvert so that DLS could follow the alignment.

The third phase of concrete works was the construction of the concrete kerb at the edge of the pad. To facilitate the construction of the kerb, DLS first laid a strip of concrete along the northern and eastern edges of the slab. It was then possible for TVC to continue with the construction of the kerb at the edges of the slab whilst placement of the remaining slab was ongoing. This work commenced on 13 July 2015 and was completed by 22 July 2015.

2.5 Drainage

In order to connect the sealed drainage system of the slab to the discharge point it was necessary to lay pipework between the lowest point in the drainage culvert and the outlet. Along the alignment of this pipe, a number of chambers and interceptors have also been installed in order to improve the quality of the surface water runoff. This work was carried out by TVC and took place between 13 July 2015 and 22 July 2015.

3 EARTHWORKS

All earthworks for the site were carried out by the principle contractor working to levels and positions set out by Geotechnology. Geotechnology attended site at the beginning of most days during the earthworks phase to check levels and setting out positions. Several methods of setting out were used during construction.

Initially, a combination of level and alignment pegs were installed to set up a grading laser which was then used by the contractor to check cut and fill levels. These were replaced and moved as necessary as the works progressed. For more complex parts of the site, or where increased accuracy was required (such as the drainage culvert), Geotechnology set out specific points with a dGPS system and worked directly with an excavator driver to ensure correct levels were met. Finally, once the majority of the site had been brought up to approximate levels, a GPS enabled Dozer was utilised to grade the surface to finished levels using a digital terrain model (DTM) provided by Geotechnology.

All setting out and survey work was carried out to national ordnance datum and coordinates. For equipment without GPS, the principal survey station was STN1 located in the concrete pad surrounding the main office.

3.1 Existing Ground

Prior to the commencement of works, much of the site was occupied by a number of soil and aggregate stockpiles which were removed before work started. The natural ground beneath the site comprises clay and silt based tidal flat deposits. However, due to the nature of site use prior to the works, these have been largely covered by made ground comprising natural clay dominated materials mixed with construction/demolition rubble.

3.2 Formation Preparation

Preparation of the formation commenced as soon as the Design and Specification had been accepted and the site had been cleared of material stockpiles. Initial cutting was carried out by excavators and dozers working to a grading laser set up on pegs installed by Geotechnology. As none of the equipment on site was set up for receiving a grading laser, a banksman carrying a staff with receiver, worked alongside excavators and dozers to reach design levels. The material cut from the southern side of the works area was then deposited to the north in order to build up levels. This material was placed using method compaction, and rolled repeatedly to provide a suitable formation surface.

The initial cut was overextended by a significant distance towards the treeline south of the pad footprint. This provided space for the construction of a new haul road to the south of the pad, which has allowed the continuation of other site activities during the construction of the pad.

A check survey has been carried out by Geotechnology using a dGPS system to confirm that levels are within tolerance of the design. This survey was carried out on a piecemeal basis as much of the formation was covered by the unbound stone layer before the formation was complete. This survey can be seen in Figure 3.

At two locations within the footprint of the pad, localised regions of soft natural ground were encountered. The first of these soft spots was located in the region surrounding the surface

water outlet. This soft material was excavated and removed from site and replaced with granular fill which was placed in layers and compacted. The second soft spot was located towards the northwest corner of the pad, and was also removed and replaced with granular fill material.

Following completion of the unbound and bound layer aggregate placement, a series of trial pits were excavated through the stone to expose the formation layer. Additional survey points were then collected during the trial pitting. Fifteen trial pits were excavated across the site and California Bearing Ratio (CBR) Tests were carried out on the formation in the base of each pit. The location of each of these tests can be seen in Figure 3. The results of the testing are summarised in the Table 3-1 below and the test certificates are included in Appendix 1.

Table 3-1 CBR Testing Results

CBR Number	Test Depth	CBR Value (%)
1	0.55	28.80
2	0.65	16.30
3	0.00	42.10
4	0.57	12.60
5	0.67	29.50
6	0.62	38.20
7	0.70	41.00
8	0.53	39.30
9	0.45	30.30
10	0.50	18.00
11	0.59	30.30
12	0.53	19.00
13	0.60	22.50
14	0.58	16.40
15	0.51	39.50

The “Thickness Design & Specification for Paving Using HBM” report produced by John Kennedy and included as Appendix 2 of the CQA Plan states that the subgrade should have a CBR result not less than 8%. As can be seen from the table above, all of the results exceed 8%.

3.3 Unbound Sub-Base (200mm) Layer

Above the formation a 200mm thick layer of sub-base was placed in accordance with the John Kennedy design assumptions described in Appendix 2 of the CQA Plan. The same methods of setting out and supervision were used for the unbound sub-base layer as for formation, although some areas towards the western edge of the slab were graded using a GPS enabled dozer and DTM.

A topographic survey of the unbound layer is presented in Figure 4. This survey was carried out by Geotechnology during placement and then supplemented during the trial pitting exercise. Using the specialist survey software LSS it is possible to subtract one survey from another to generate an Isopachyte plan of thickness. An Isopachyte of the unbound layer

has therefore been generated by subtracting the formation surface from the surface of the unbound layer, as shown in Figure 5. As illustrated by this figure, in the eastern corner of the pad this layer falls short of the required 200mm. To compensate for this shortfall, the 'bound' layer placed on top was thickened in this area.

All the material used in the placement of the unbound layer came from a single aggregate source, five samples of which were collected and sent for particle size distribution testing at the Amey OW Limited Laboratory in Penrith. The test certificates for this testing can be seen in Appendix 2. It was required that these samples meet a 6F2 grading as specified in the Specification for Highways Works. As can be seen from the certificates, 4 of the 5 samples tested meet the specification. The 5th sample, taken from TP14, fails the grading by 1% over the specified percentage passing the 0.063mm sieve.

3.4 Bound (300mm) Layer

The bound 300mm thick layer of Aggregate was placed above the finalised 200mm layer to raise levels to the finished level of the slab. It is this material which is incorporated into the finished cement bound surface so it is important that final levels on the placement of this material match the finished design levels as closely as possible. The grading of this aggregate was not determined to be important at the time of placement as it would be crushed as part of the cement mixing process.

Initial placement of the 300mm layer was carried out using a dozer in conjunction with a spinning laser and banksman with a staff and receiver. However, to achieve a finished surface as close to the design as possible, a GPS enabled dozer was employed which worked off the Geotechnology Base Station set at primary survey point STN1.

The material used for the 300mm layer consisted largely of demolition rubble comprising crushed concrete and bricks of highly variable sizes. In order to achieve the finished surface, a more finely graded material was brought in for the upper layer which allowed the GPS dozer to grade a smoother finish. This finished surface was then repeatedly tracked over by the dozer to provide compaction.

A visual inspection of the placed 300mm layer identified a generally uniformly graded material comprising crushed concrete and brick. However, contraries were also present including rebar, wood, plastic, and ceramic.

A full survey of the 300mm layer was not carried out at this time as it was expected that levels would change during crushing and mixing of the cement. A limited survey of the top of the 300mm layer was carried out during the trial pitting exercise and has been used to generate an Isopachyte plan shown in Figure 6.

As identified in this figure the thickness of this layer is variable, and in most locations exceeds the specified 300mm thickness. This exceedance was necessary to even out variability in the thickness of the unbound layer and retain the required falls on the final surface.

4 DRAINAGE CHANNEL CONSTRUCTION

4.1 Sub-base

Following preparation of the 200mm sub-base layer, a blinding layer of fine grained material was placed and compacted to provide a suitable working surface for the construction of the drainage channel and headwall. The dust was placed by a tracked excavator with a grading bucket following alignment and levels set out by a Geotechnology Engineer using a dGPS survey system. Following compaction by a vibrating roller, further levels checks were carried out and material was added or removed as necessary to meet survey tolerances.

Alignment pegs were driven into the sub-base by Geotechnology to mark the alignment of the drainage channel. These alignment pegs were also marked with levels for the top of the shuttering. During placement of the shuttering, in order to form the base of the drainage channel, a string line was run between the alignment pegs. The shuttering was then placed and localised high points were removed by hand as necessary by TVC in order to maintain falls.

4.2 Construction Detail

A polythene membrane was placed over the top of the dust binding before the concrete was poured to avoid water loss prior to curing. The culvert base incorporated an A393 mesh with 50mm cover and 12mm kinked dowels at 300mm centres. These dowels protruded vertically upwards on the southern side of the culvert and at a near horizontal angle from the northern side of the base.

During construction, Geotechnology staff made regular visits in order to set out the alignment of the channel and insure placement of the specified components. All visits found that TVC were compliant with the specification. Photographic evidence of the inclusion of reinforcement mesh and dowelling can be seen in Appendix 3.

4.3 Strength testing

In order to validate the strength of the concrete drainage channel and headwall a number of 150mm cubes were produced. The cubes were made by TVC using moulds provided by Atlantic Recycling. A cube was collected for each of the concrete pours required to form the drainage detail. The cubes were broken out of the moulds by TVC and taken by Geotechnology to Apex Testing Solutions for compressive strength testing after 7 and 28 day curing periods.

Table 4-1 summarises the results of the testing whilst the full laboratory certificates can be found in Appendix 4.

Table 4-1 TVC Concrete Cube Testing Results

Cube ID	Date Sampled	Date Tested	Maximum Load at Failure	Compressive Strength
TVC1	17/06/2015	15/07/2015	569	25.3
TVC2A	22/06/2015	20/07/2015	669	29.7
TVC2B	25/06/2015	23/07/2015	553	24.6
TVC3	30/06/2015	08/07/2015	583	25.9
TVC4	30/06/2015	28/07/2015	697	31
TVC5A	02/07/2015	09/07/2015	461	20.5
TVC5B	02/07/2015	30/07/2015	625	27.8
TVC6A	06/07/2015	13/07/2015	376	16.7
TVC6B	06/07/2015	03/08/2015	584	26

4.4 Wall Return

On the eastern edge of the slab it was necessary for the drainage channel detail and headwall to return approximately 40m up the eastern edge of the slab in order to maintain a level of 6.8mAOD on the top of the headwall. The method of setting out construction details for this section remained the same as the main drainage channel. However, the falls on this section were at 1:100 in order to tie-in with the slab. Furthermore, the hand poured infill has a continuous thickness on this section rather than the thinning wedge seen along the rest of the profile.

5 SLAB CONSTRUCTION

Slab construction took place between 07 July 2015 and 30 July 2015. There were several elements to this work which were carried out by DLS and subcontractors in conjunction with TVC. Firstly, the slab was laid by DLS utilising an in-situ mixing method which lifted and crushed the upper part of the 300mm thick recycled aggregate layer whilst mixing-in cement powder and reinforcing fibres which had been placed on the surface of the aggregate. This mixture was then compacted and power floated in order to achieve a suitable finished surface.

Work commenced in the northwestern area of the slab by completing a single strip along the edge. A further strip was then constructed down the northeastern edge. Following the construction of the northeastern edge, construction of the strips returned to a southwest-northeast orientation, progressing from the top of the slab towards the drainage channel. On 20 July 2015, a final strip was constructed along the southwestern edge of the slab to provide a straight edge for future phases.

Once the strips on the northwestern and northeastern edges of the slab had been completed a kerb detail was constructed by TVC. This kerb was constructed using shuttering and traditional concrete pouring techniques. The kerb was tied into the slab using dowels drilled at 300mm intervals. Construction of the kerb commenced in the northern corner of the slab and progressed along the northwestern edge. Work then continued from the northern corner down the northeastern edge of the slab to meet the return of the headwall.

Following completion of the slab, work was carried out to connect the slab to the drainage channel and wall return. This work was carried out by TVC with assistance from the principle contractor. In order to provide a continuous impermeable surface, it was first necessary to cut away a section of the slab which was only loosely bound in order to create a clean edge. This was achieved by first cutting a line with a disk cutter and then cleaning out the material between the newly cut edge and the drainage channel. All loose and excess material was removed by a small rubber tracked excavator and then the ground beneath was compacted to provide a firm surface. Once this preparation work was complete the reinforcement bars protruding from the edge of the drainage channel were adjusted to the correct angle and concrete was poured into the gap. The concrete was then formed by TVC into a slope running from the edge of the slab into the drainage channel. This detail is shown in Figure 7.

5.1 Visual Inspection

Following completion of the first strip of the slab on the northwestern edge, a visual inspection was carried out to determine the quality and acceptability of the finished surface. This inspection was carried out by Stuart Manfred (Atlantic), Keir Thomas (Geotechnology), Matthew Wilson (DLS). The inspection found that the surface was hard, unyielding and impermeable.

Further inspections of subsequent slabs were carried out throughout the project and found the surface to be in a similar condition to the first strip.

During several days of rainfall during construction, water was seen to run off the surface of the pad towards the drainage channel. Following the rainfall however, shallow puddles of water were seen to hold in elongated low points along the joints between slabs. This is indicative of a minor backfall on some of the slab sections and the impermeability of the surface. Photographs of the finished surface can be seen in Appendix 3.

5.2 Particle Size Distributions

As part of the validation of the crushing process 4 samples of crushed material were collected prior to mixing with cement powder. These samples were then tested for particle size distribution. When checked against the Grading Requirements for Acceptable Earthworks Materials as set out by the Specification for Highways Works, all four samples meet the required grading for Type 1A. The positions of each of the samples are identified on Figure 7, while the laboratory testing certificates can be seen in Appendix 2.

5.3 Strength testing

In order to determine the long term durability of the slab it was necessary to carry out compressive strength testing on the finished product. In standard concrete design this is achieved by making a series of concrete cubes for testing. These cubes are generally created by pouring a small amount of the concrete from each pour into a standard sized steel mould. Once set and having been given time to cure, these cubes are broken out of the mould and taken to a laboratory for testing.

As the method of slab construction involves in-situ mixing of the aggregate and cement it was necessary to retrieve some of this premixed material in order to create cubes. As this mix is much drier than standard concrete and loose due to the lack of rolling at this stage, it was also necessary to replicate the compaction of the roller. To achieve this, the mix was placed into the cubes in relatively thin layers and compacted using a bespoke compaction plate and sledge hammer.

The results for cube compressive strengths at 7 days showed highly variable values which could possibly indicate that the method of compacting the mix into the cubes was not entirely representative of in-situ compaction with a roller. In order to gain more reliable indication of in-situ slab strengths, the decision was made to core the slab at 15 locations to obtain cores for compressive strength testing.

5.3.1 Cube Testing

In total, 17 cubes were made during the construction, the locations of which can be seen in Figure 7. A table summarising the compressive strength testing results is presented below and the laboratory test certificates are presented in Appendix 5. At present, five of the 28 day testing results are still pending, however it is not anticipated that these results will show greater consistency than the 7 day testing. At present, 8 of the 12 cubes tested have passed, with 4 cubes failing to meet the required 6MPa.

Table 5-1 Summary of DLS Cube Compressive Strength Test Results

Cube ID	Date Sampled	Date Tested	Maximum Load at Failure (KN)	Compressive Strength (MPa)	Pass/Fail
DLS 1	09/07/2015	06/08/2015	499	22.2	Pass
DLS 2A	10/07/2015	17/07/2015	354	15.7	Pass
DLS 2B	10/07/2015	07/08/2015	530	23.6	Pass
DLS 2C	10/07/2015	07/08/2015	459	20.4	Pass
DLS3A	13/07/2015	20/07/2015	88	3.9	Fail
DLS3B	13/07/2015	Pending			
DLS4A	14/07/2015	21/07/2015	45	2	Fail
DLS4B	14/07/2015	Pending			
DLS5A	16/07/2015	23/07/2015	102	4.5	Fail
DLS5B	16/07/2015	23/07/2015	83	3.7	Fail
DLS5C	16/07/2015	Pending			
DLS6A	17/07/2015	24/07/2015	299	13.3	Pass
DLS6B	17/07/2015	24/07/2015	395	17.6	Pass
DLS6C	17/07/2015	Pending			
DLS7A	20/07/2015	27/07/2015	172	7.6	Pass
DLS7B	20/07/2015	27/07/2015	403	17.9	Pass
DLS7C	20/07/2015	Pending			

5.3.2 Core Testing

On 29 July 2015 Geotechnology set out 15 positions on the slab where Apex Testing Solutions drilled to obtain cores for testing of the in-situ bound material. These positions are presented on Figure 7. These cores were drilled to a nominal depth of 250mm in order to determine the full depth of the bound material. All core holes were then backfilled with poured concrete when the slab was connected to the drainage channel.

The cores retrieved by the exercise were then taken to Apex Testing Solutions laboratory and tested for compressive strength on 05 August 2015. The results of this testing are summarised in Table 5-2 and the laboratory test certificates can be found in Appendix 6. Prior to testing, the maximum and minimum lengths of the core are measurements before the core was cut to the correct size for the test. No test was possible for the core obtained from BH1 as the core fell apart during preparation.

As can be seen from the results, 2 of the 14 cores tested failed to meet the required 6MPa strength.

Table 5-2 Summary of Core Compressive Strength Test Results

Cube ID	Date Sampled	Date Tested	Maximum Length (mm)	Minimum Length (mm)	Compressive Strength (N/mm ²)	Saturated Density (kg/m ³)	Pass/Fail
BH1	29/07/2015	05/08/2015	Damaged during preparation				
BH2	29/07/2015	05/08/2015	198	170	6.5	2030	Pass
BH3	29/07/2015	05/08/2015	192	160	12.5	2190	Pass
BH4	29/07/2015	05/08/2015	152	110	6.5	2140	Pass
BH5	29/07/2015	05/08/2015	244	196	10	2130	Pass
BH6	29/07/2015	05/08/2015	190	136	10	2210	Pass
BH7	29/07/2015	05/08/2015	192	149	6.5	2150	Pass
BH8	29/07/2015	05/08/2015	260	212	17	2190	Pass
BH9	29/07/2015	05/08/2015	148	111	5	2110	Fail
BH10	29/07/2015	05/08/2015	210	173	6.5	2110	Pass
BH11	29/07/2015	05/08/2015	184	149	8.5	2190	Pass
BH12	29/07/2015	05/08/2015	300	282	15.5	2220	Pass
BH13	29/07/2015	05/08/2015	292	229	8.5	2130	Pass
BH14	29/07/2015	05/08/2015	232	195	4.5	2090	Fail
BH15	29/07/2015	05/08/2015	244	218	17	2190	Pass

5.4 Finished Surface Topographic Survey

A final topographic survey of the slab and associated drainage details was completed on 31 July 2015 and is presented in Figure 7. In this figure it can be seen that the final surface meets the designed fall of 1:600 on the northern section with 1:100 fall down to the drainage channel in the south. The headwall on the drainage channel and return has a nominal elevation of 6.8mAOD allowing the slab to flood to that level when the shut off valve is closed. The remainder of the northern and eastern edges of the slab are enclosed by a concrete kerb 200mm high and 300mm wide.

5.5 Temporary Bund

As the slab is the first phase of a larger slab, no permanent detail has been constructed to hold water on the western edge. In order to prevent surface water runoff from this edge of the slab in the short term, a clay bund has been constructed from a suitably impermeable locally sourced clay. This bund is nominally 0.5m high and 2m wide and runs the length of the western slab.

The position of the temporary bund can be seen on the final topographic survey in Figure 7. Visual inspection of the bund during the survey has shown that it is successfully preventing runoff on the southwest edge of the slab. Photographs of the bund can be seen in Appendix 3.

6 OUTLET, SHUT-OFF VALVE AND INTERCEPTORS

The outlet which takes captured water from the slab through the headwall to the outfall comprises several components designed to control the flow of water and improve water quality before discharge to the ditch. A survey has been carried out of the positions of each of these components and the falls from the headwall to the outfall. This is presented in Figure 7. There is a total fall of 1m from the headwall to the discharge point which gives a nominal fall of 1:90 along the pipe. Photographs of the installation of each of these components can be seen in Appendix 3.

6.1 Headwall and Shut off Valve

A steel flanged pipe has been cast in place into the headwall to accept surface water drained off the slab into the drainage channel. The steel flanged pipe is then connected to a steel shut off valve which is located approximately 1.5m back from the headwall. This valve can be closed to retain surface water when necessary. A second steel flanged pipe is joined to the downstream side of the valve which is in turn connected to the silt trap by a short section of 225mm diameter HDPE twin-wall pipe.

6.2 Silt trap and Redundant Chamber

Approximately 5m back from the headwall a silt trap has been installed in the pipeline. The silt trap consists of a 2.5m diameter 1m deep concrete ring set into the ground below the level of the pipe. The inlet and outlets of this chamber are at the same level allowing the chamber to flood and it is envisaged that the slowing of water as it enters this chamber will allow suspended solids to fall out. The top of the chamber is covered with a concrete lid and inspection cover to allow access for periodic clearing out of the trapped contents.

On the downstream side of the silt trap an additional chamber was put in place which was originally intended for the shut off valve. This chamber is currently redundant although it could be utilised for water sampling or the installation of additional equipment in the pipeline.

6.3 Oil interceptor

An oil interceptor has been installed in the pipeline approximately 50m from the headwall beneath the existing office car park. The depth of installation of this interceptor was determined by Geotechnology in order to provide adequate falls from the headwall to the interceptor and from the interceptor to the discharge point. The manufacturer's specification for the oil interceptor can be seen in Appendix 7.

The installation works were carried out by TVC and observed by a member of Geotechnology staff. An excavation was required to a depth of 4.0-4.5m. A reinforced concrete pad was then placed in the base of this excavation and allowed to set before the interceptor was installed. The interceptor was then filled partially with water to maintain internal pressure and negative buoyancy before the excavation was half backfilled with poured concrete. The Interceptor was then filled to capacity with water before a further concrete pour brought the concrete back to near ground level. A slab was then cast with an in-situ manhole cover to protect and allow access to the interceptor for maintenance.

7 NON CONFORMANCES AND RECTIFYING ACTION

7.1 Outlet Pipe

As discussed in Section 6, the outlet pipe in place to carry water from the drainage channel through the headwall was designed to sit flush to the base of the drainage channel. However, the pipe has been installed at a level approximately 25mm above the drainage channel. No rectifying action has been taken for this non-conformance, though it is not anticipated that this will have a major impact on the overall effectiveness of the system.

7.2 Cube & Core Failures

Laboratory testing for both cube and core samples taken from the slab area show considerable variability in the compressive strength of the material with a number of the tests failing to meet the 6MPa set by the designer. There are reasonable grounds for dismissing the results of the cube tests as the preparation of the samples required compactive effort which would never truly represent the in-situ slab. A better method of establishing actual in-situ strength is the recovery of core samples. Of the 14 core samples tested, two failed to meet the 6 MPa strength requirement.

It has been shown that the slab is constructed over ground that provides more than adequate support (minimum CBR value 12.6% against a requirement of 8%). The fill materials meet the grading requirements of 6F2 and Type 1 and the full thickness has been confirmed by survey. Accordingly, the load bearing capacity of the slab is not in doubt. The two core samples failing to meet the required strength may indicate a less durable slab, and therefore in small parts the slab may not be as durable as desired. Whilst there is no doubt that the slab is currently fit for purpose as an impermeable surface, regular inspection over the coming years will be needed to confirm it remains so in the future.

It is recommended that once the slab comes into use it should be subject to regular (6 monthly) inspections focussing on the integrity of the slab and aiming to identify any significant cracking which could lead to increased permeability and a failure of the sealed system. Should such a problem be identified, then the requirement would arise for a new surface to be placed on top of the existing slab to maintain the effectiveness of the system.

8 VALIDATION STATEMENT

8.1 Earthworks

It is confirmed on the basis of the inspection and the testing reported that the earthworks were completed in accordance with the Specification.

8.2 Slab Construction

It is confirmed on the basis of site records and inspection that the slab construction has created an impermeable surface across the area.

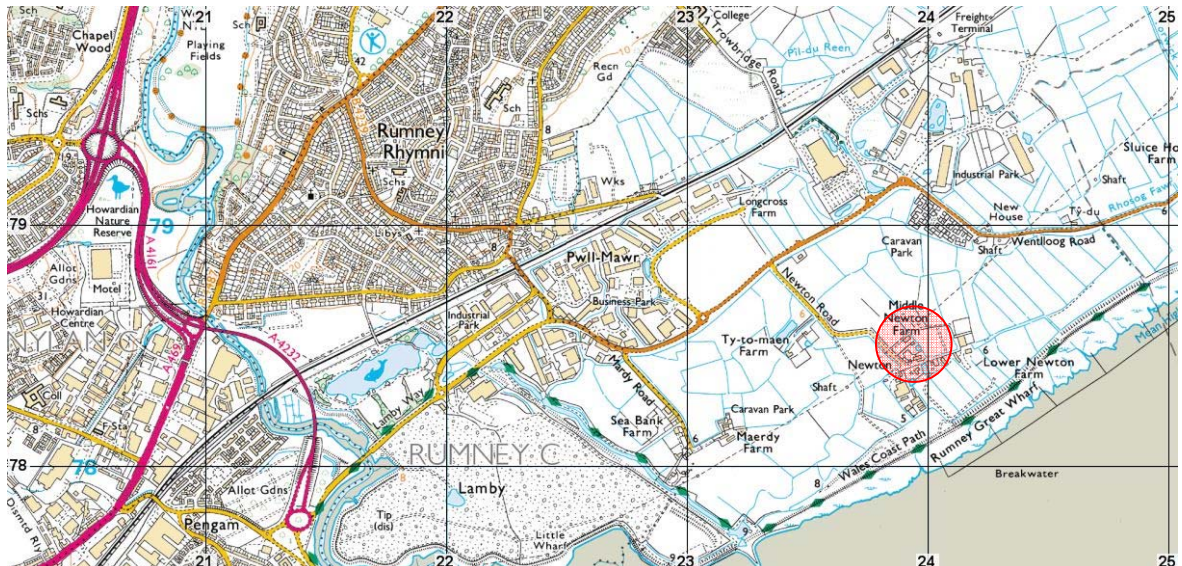
8.3 Drainage

It is confirmed on the basis of the inspection reported that all components of the drainage system were installed in accordance with the general principles of the Specification.

8.4 Impermeable Surface with Sealed Drainage System

It is confirmed that the scheme constructed at Atlantic Recycling constitutes an impermeable surface with a sealed drainage system.

Figure 1 Site Location Plan



Reproduced from the Ordnance Survey Land Ranger Map
with the permission of The Controller of Her Majesty's Stationery Office
© Crown Copyright. Geotechnology SA10 8HE Licence No AL50598A

Figure 2 Detailed Site Plan

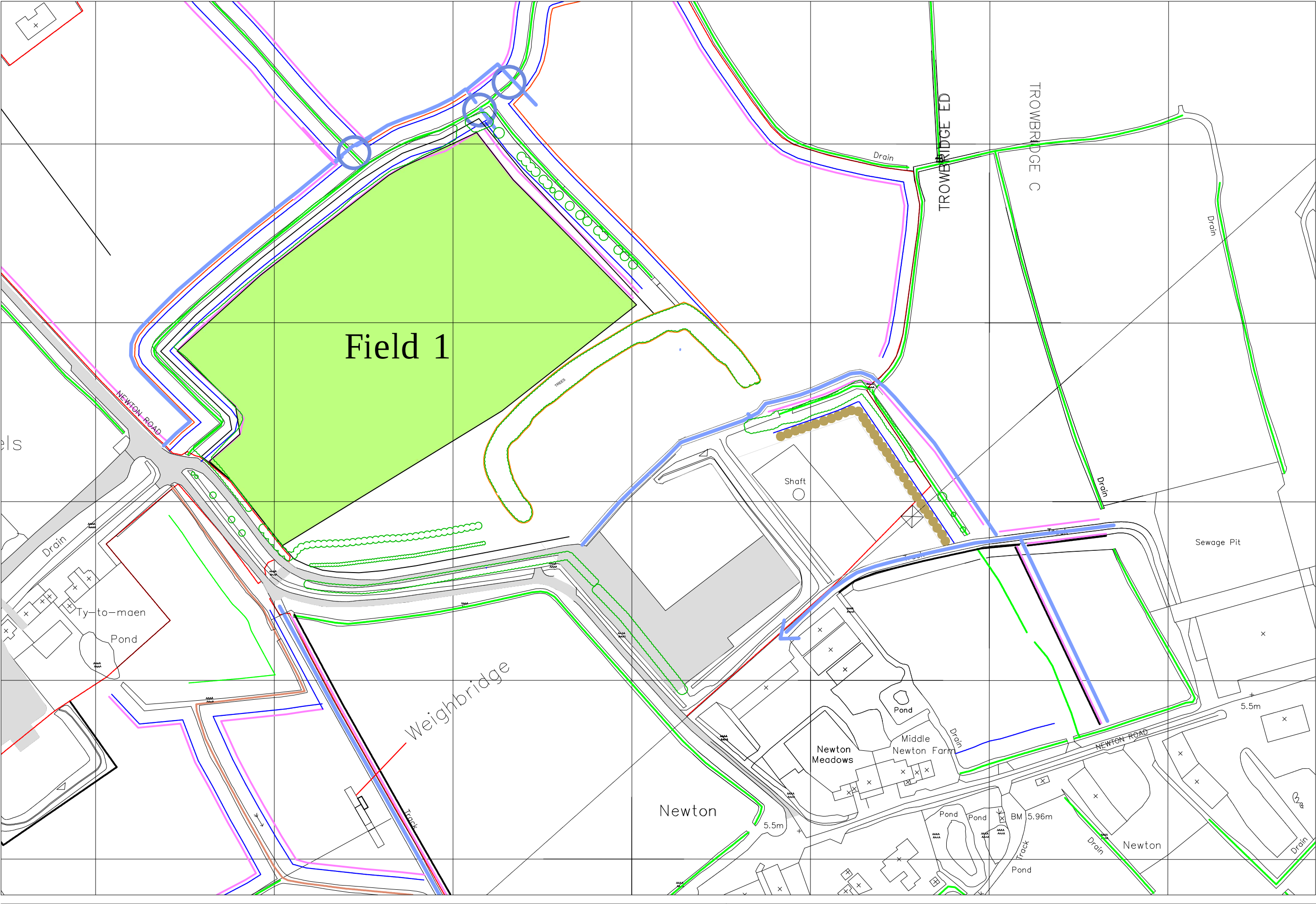


Figure 3 Formation Survey with CBR Testing Positions



Figure 4 Unbound Layer Survey with Testing Positions

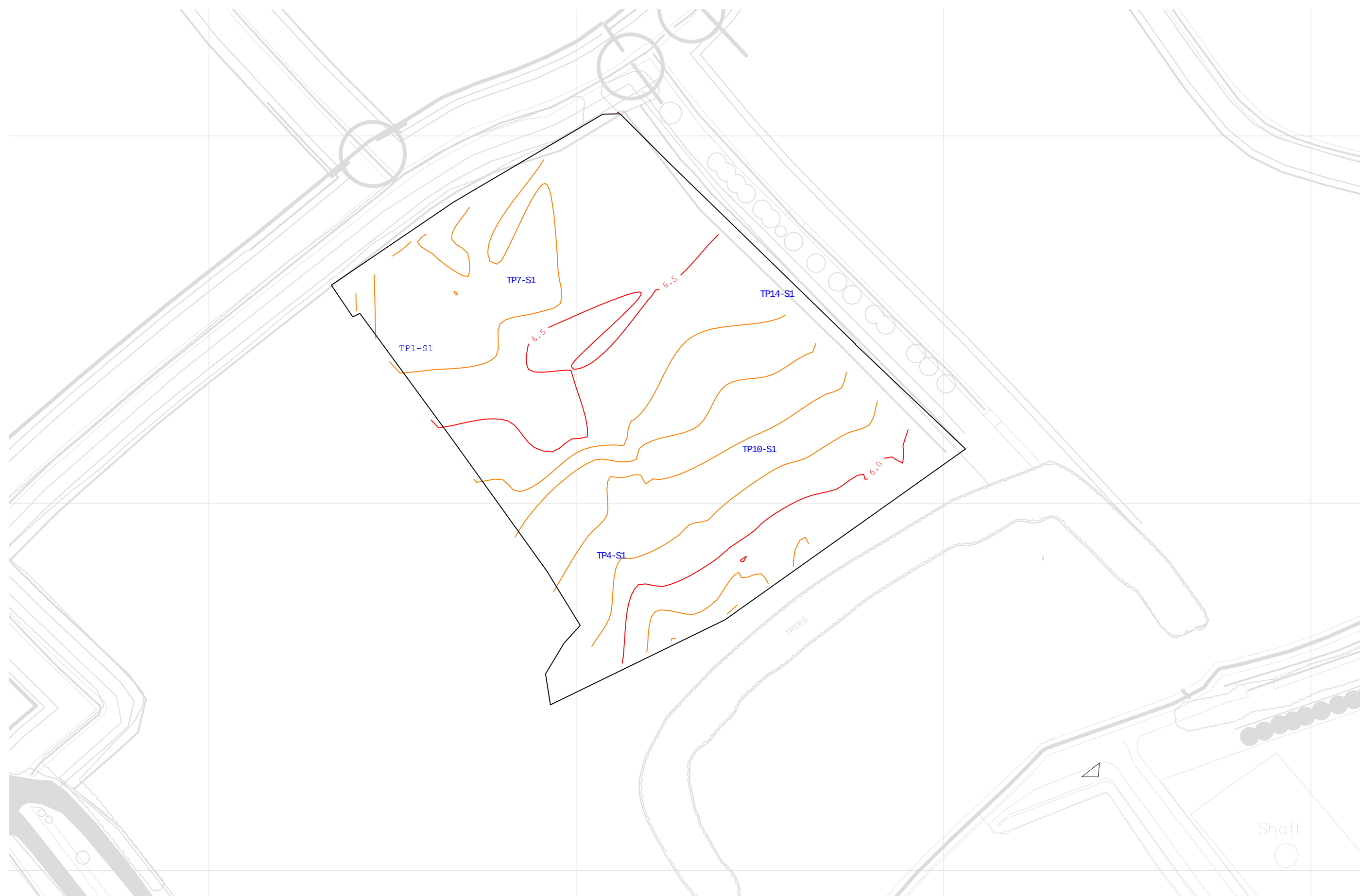
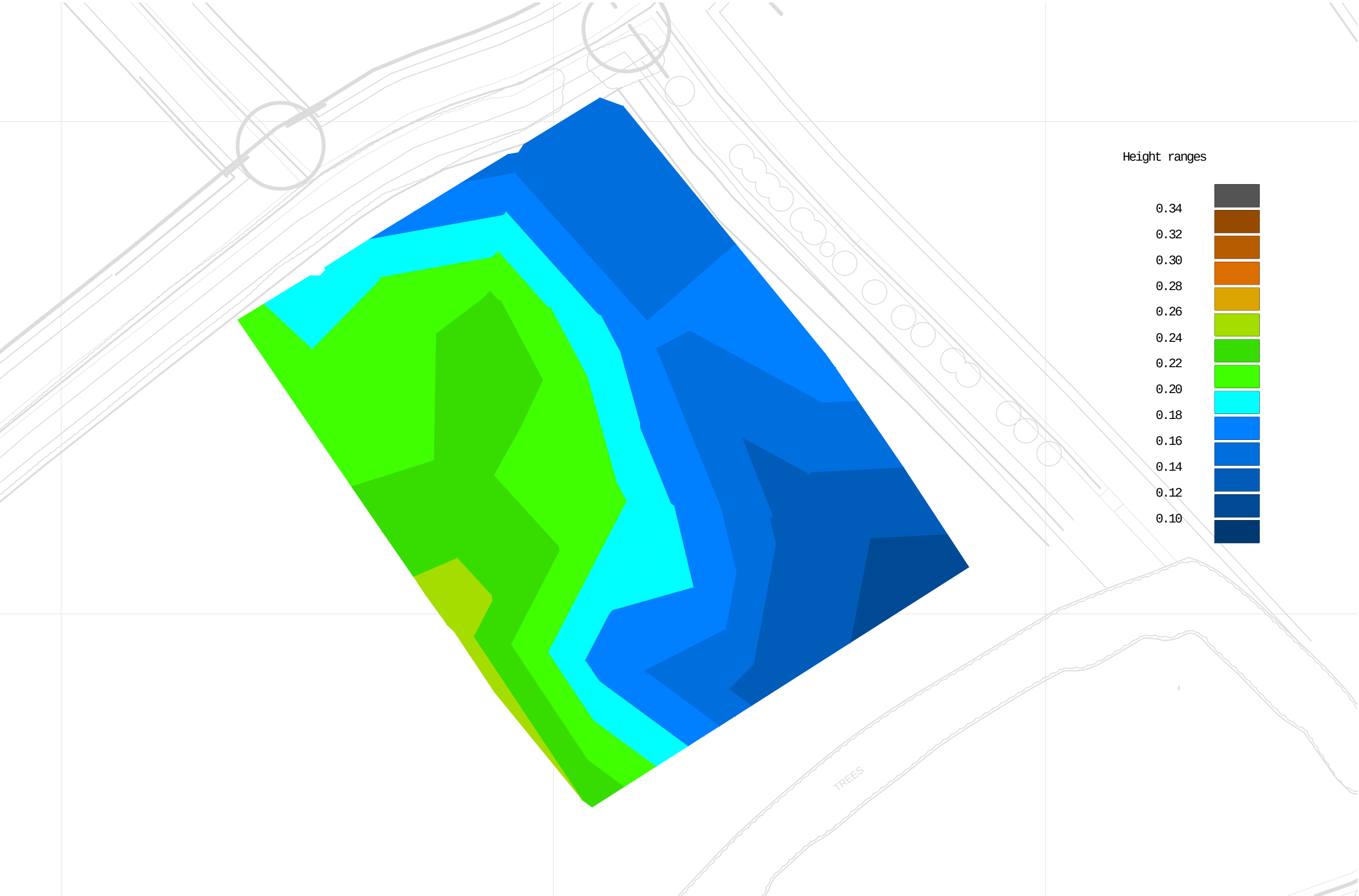


Figure 5 Unbound Layer Isopachyte Plan



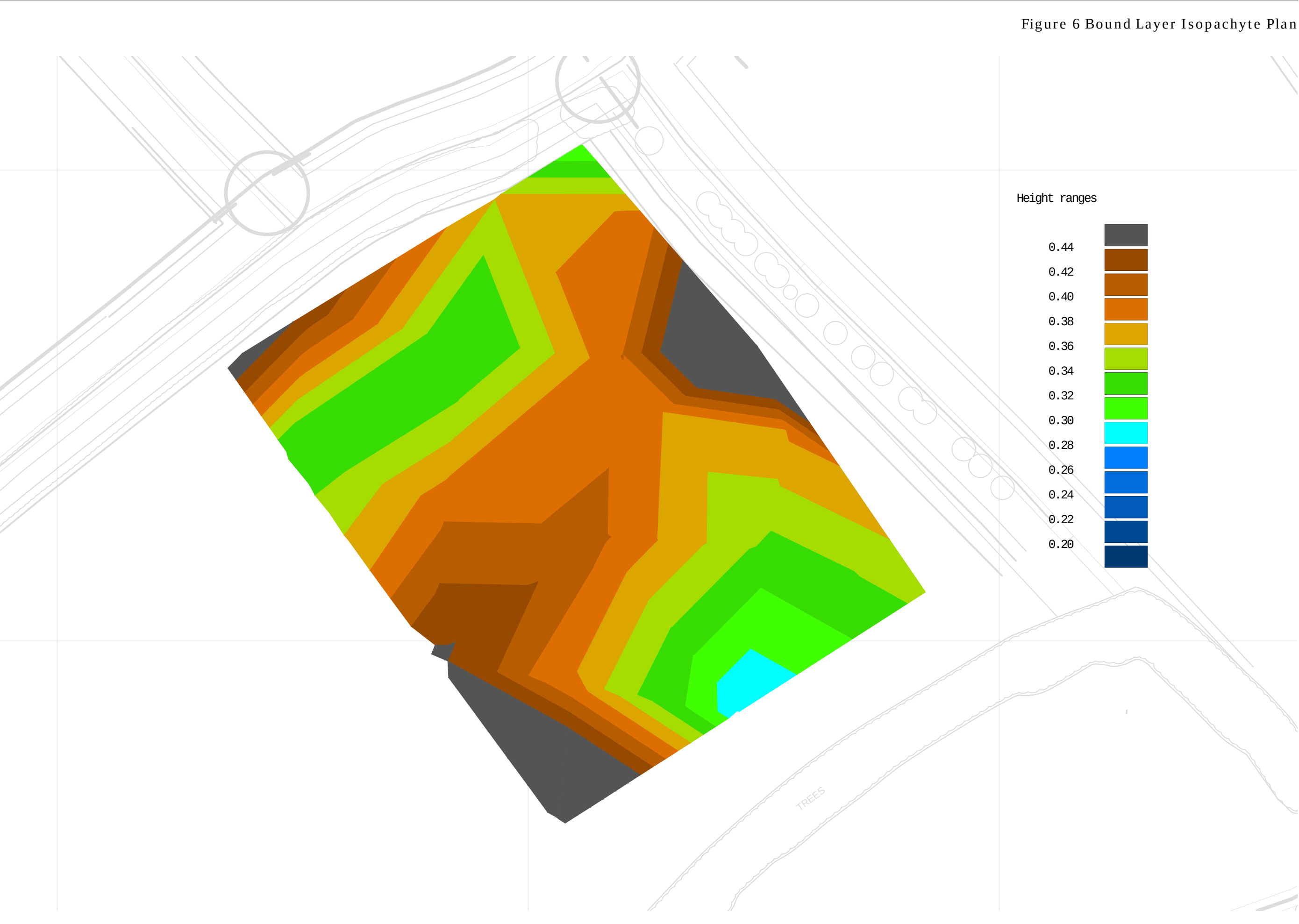
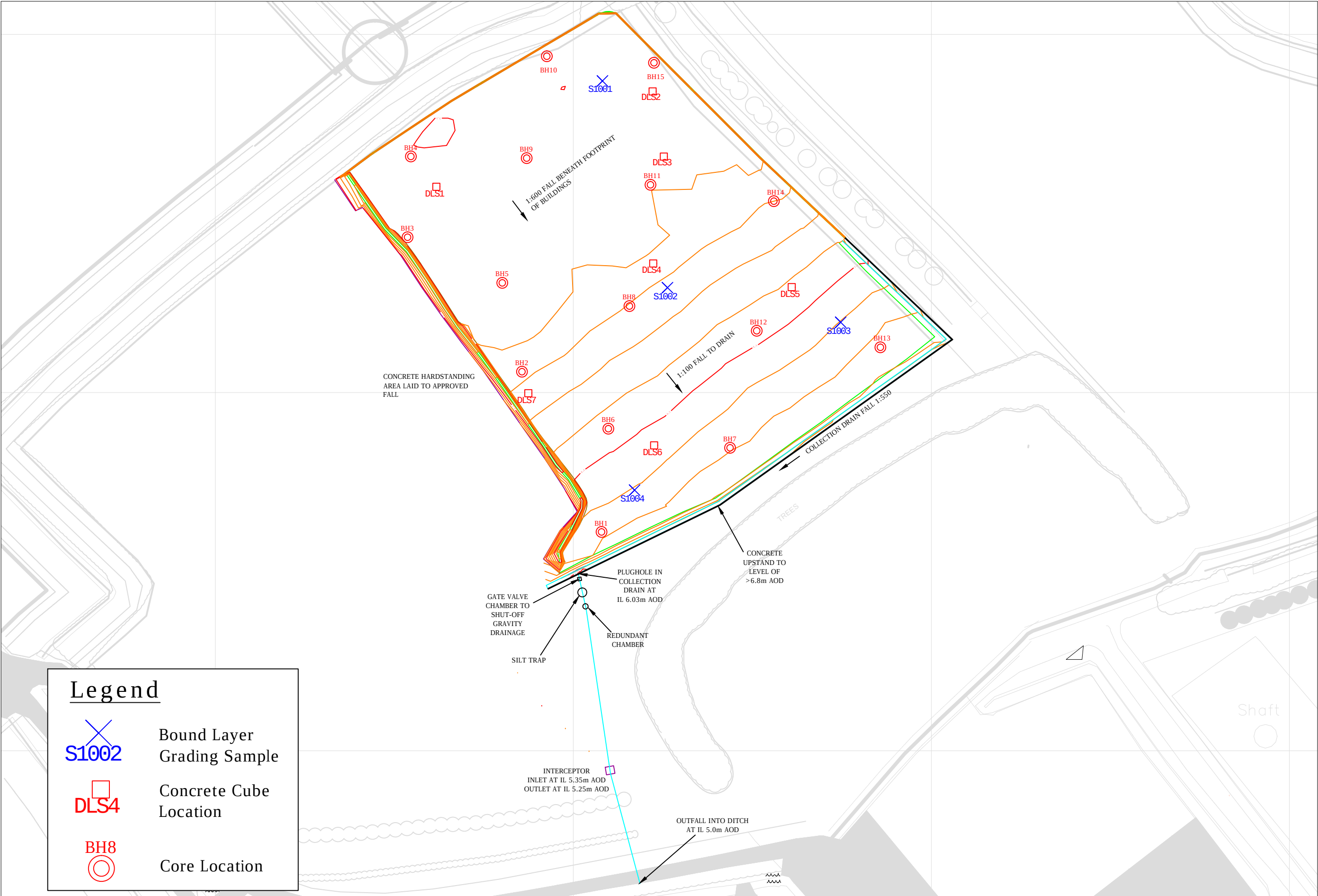


Figure 7 Final Topographic Survey of Slab with Bound Layer Testing Positions



**ATLANTIC WASTE
ECOPARK PAVING
PROJECT**

CQA VALIDATION REPORT

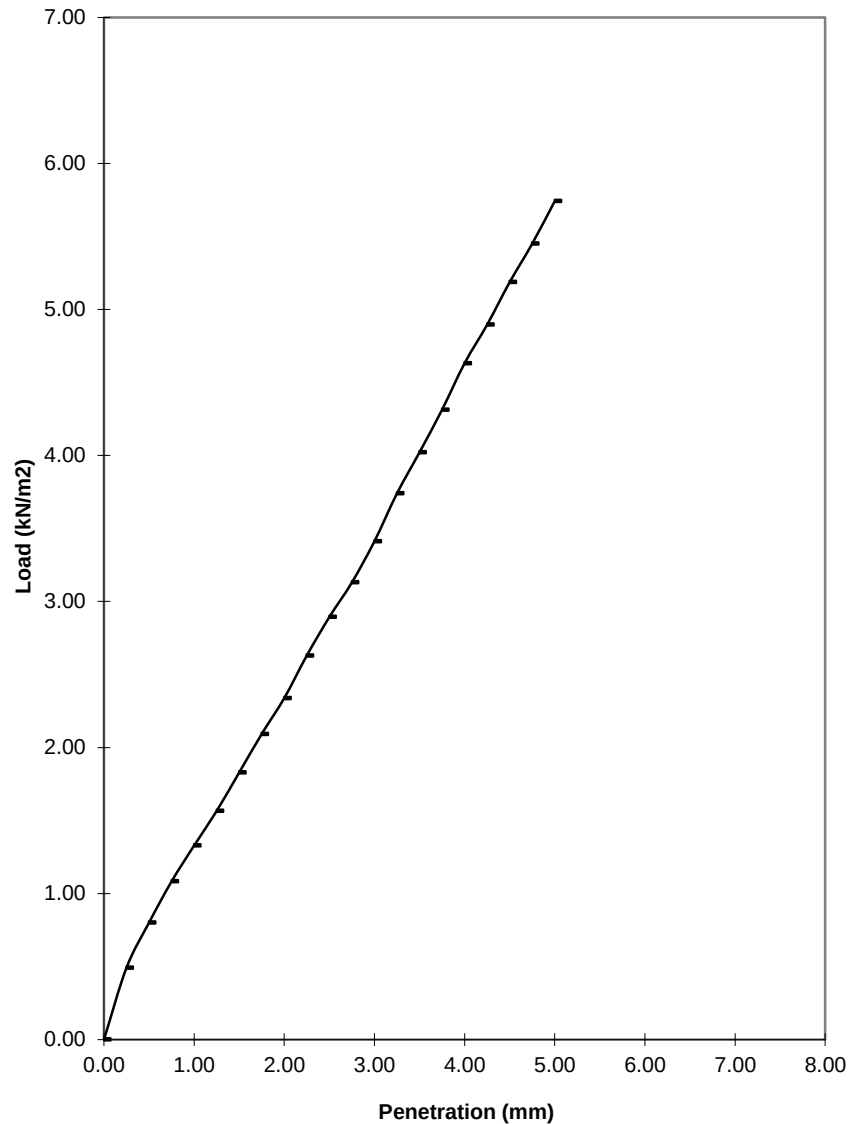
Appendix 1
CBR Test Certificates
Report Number 1379r4v1d0815

SOUTHERN GROUND TESTING

IN SITU CBR TEST



PENETRATION (mm)	PR READING (divs)	LOAD (KN)
0.00	0	0.00
0.25	54	0.49
0.50	88	0.80
0.75	119	1.08
1.00	146	1.33
1.25	172	1.57
1.50	201	1.83
1.75	230	2.09
2.00	257	2.34
2.25	289	2.63
2.50	318	2.89
2.75	344	3.13
3.00	375	3.41
3.25	411	3.74
3.50	442	4.02
3.75	474	4.31
4.00	509	4.63
4.25	538	4.90
4.50	570	5.19
4.75	599	5.45
5.00	631	5.74
5.25		
5.50		
5.75		
6.00		
6.25		
6.50		
6.75		
7.00		
7.25		
7.50		



Test Depth: 0.55m.

Mass of Split Rings: 5Kg

PR Factor: 9.1 N/Div

Soil Description: Demolition Rubble.

CBR at 2.50mm 21.86 %

CBR at 5.00mm 28.77 %

CBR Value: 28.8 %

Checked By: NPJ

REMARKS: 1. Test terminated early due to overstress on load cell.

Carried out in accordance
with BS1377: Part 9: 1990, Test 4.3

CONTRACT: Atlantic Recycling, Cardiff.

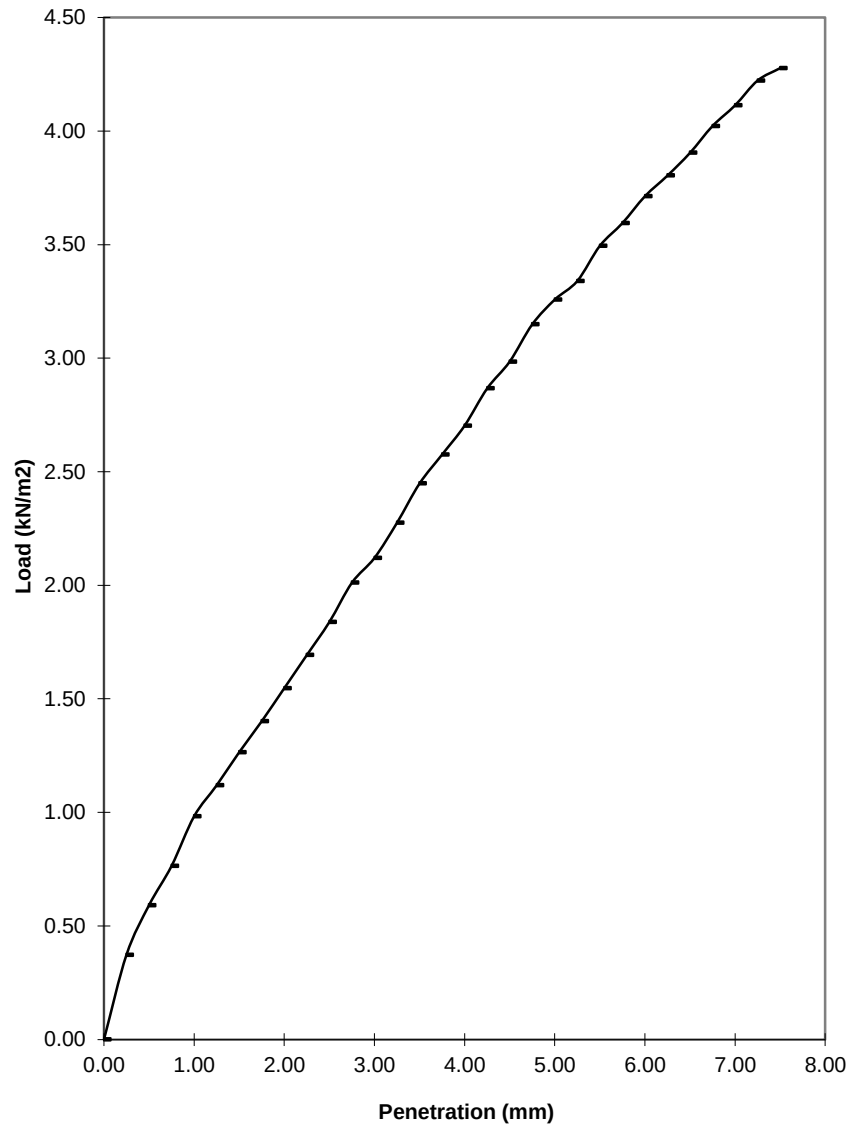
DATE: 30.06.15
TEST REFERENCE: 1

SOUTHERN GROUND TESTING

IN SITU CBR TEST



PENETRATION (mm)	PR READING (divs)	LOAD (KN)
0.00	0	0.00
0.25	41	0.37
0.50	65	0.59
0.75	84	0.76
1.00	108	0.98
1.25	123	1.12
1.50	139	1.26
1.75	154	1.40
2.00	170	1.55
2.25	186	1.69
2.50	202	1.84
2.75	221	2.01
3.00	233	2.12
3.25	250	2.28
3.50	269	2.45
3.75	283	2.58
4.00	297	2.70
4.25	315	2.87
4.50	328	2.98
4.75	346	3.15
5.00	358	3.26
5.25	367	3.34
5.50	384	3.49
5.75	395	3.59
6.00	408	3.71
6.25	418	3.80
6.50	429	3.90
6.75	442	4.02
7.00	452	4.11
7.25	464	4.22
7.50	470	4.28



Test Depth: 0.65m.

Mass of Split Rings: 5Kg

PR Factor: 9.1 N/Div

Soil Description: Demolition Rubble.

CBR at 2.50mm 13.88 %

CBR at 5.00mm 16.32 %

CBR Value: 16.3 %

Checked By: NPJ

REMARKS:

Carried out in accordance
with BS1377: Part 9: 1990, Test 4.3

CONTRACT: Atlantic Recycling, Cardiff.

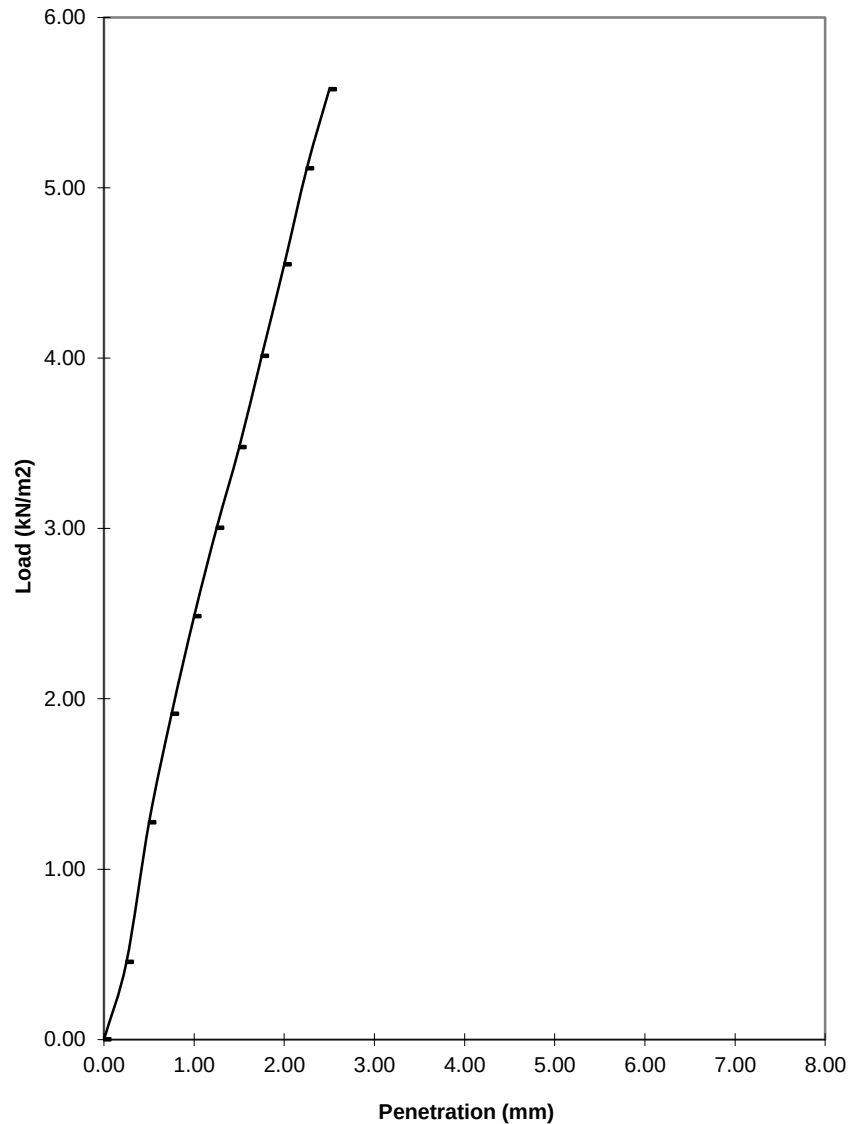
DATE: 30.06.15
TEST REFERENCE: 2

SOUTHERN GROUND TESTING

IN SITU CBR TEST



PENETRATION (mm)	PR READING (divs)	LOAD (KN)
0.00	0	0.00
0.25	50	0.46
0.50	140	1.27
0.75	210	1.91
1.00	273	2.48
1.25	330	3.00
1.50	382	3.48
1.75	441	4.01
2.00	500	4.55
2.25	562	5.11
2.50	613	5.58
2.75		
3.00		
3.25		
3.50		
3.75		
4.00		
4.25		
4.50		
4.75		
5.00		
5.25		
5.50		
5.75		
6.00		
6.25		
6.50		
6.75		
7.00		
7.25		
7.50		



Test Depth: 0.00m.

Mass of Split Rings: 5Kg

PR Factor: 9.1 N/Div

Soil Description: Demolition Rubble.

CBR at 2.50mm 42.13 %

CBR at 5.00mm 0.00 %

CBR Value: 42.1 %

Checked By: NPJ

REMARKS: 1.Test terminated early due to overstress on load cell.

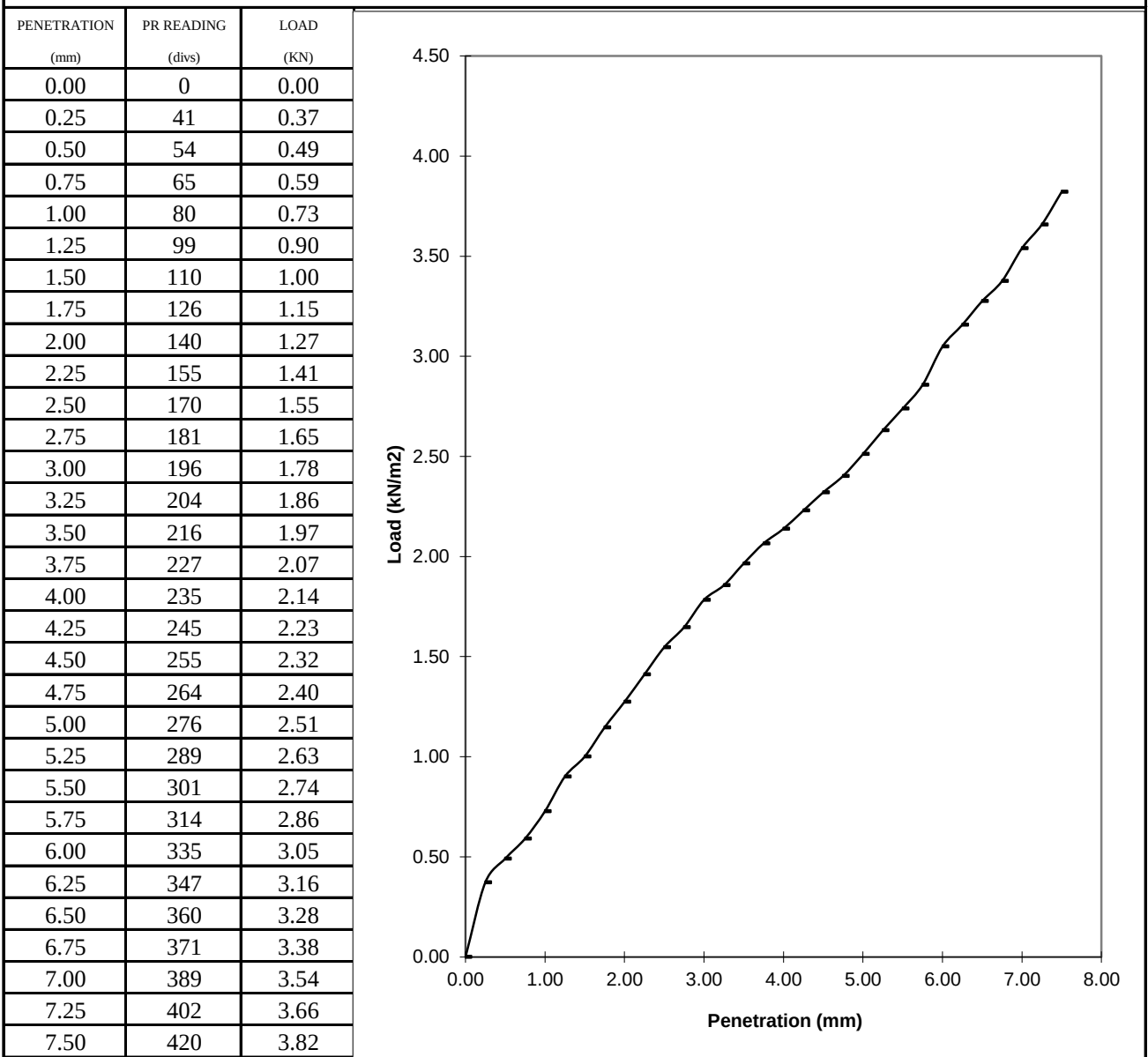
Carried out in accordance
with BS1377: Part 9: 1990, Test 4.3

CONTRACT: Atlantic Recycling, Cardiff.

DATE: 30.06.15
TEST REFERENCE: 3

SOUTHERN GROUND TESTING

IN SITU CBR TEST



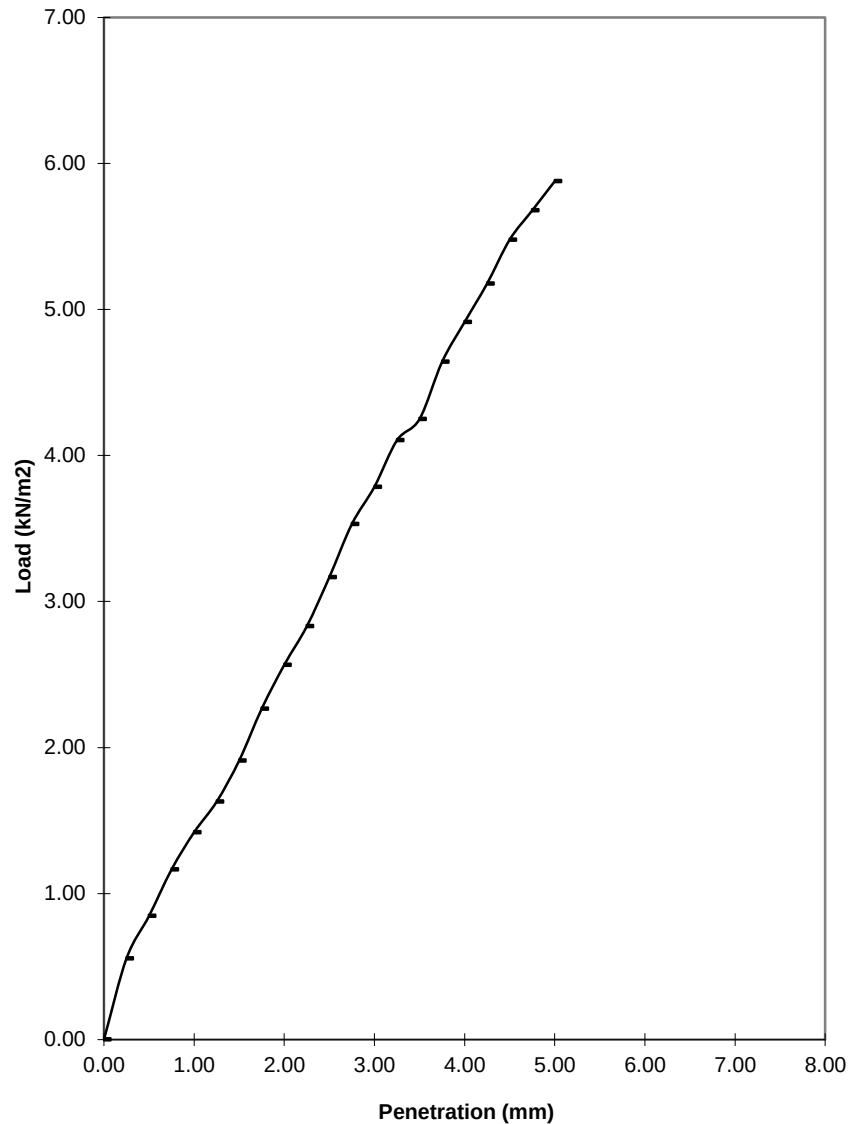
Test Depth: 0.57m.	Soil Description: Demolition Rubble.	CBR at 2.50mm	11.68 %
Mass of Split Rings: 5Kg		CBR at 5.00mm	12.58 %
PR Factor: 9.1 N/Div		CBR Value:	12.6 %
		Checked By: NPJ	
REMARKS:			
		Carried out in accordance with BS1377: Part 9: 1990, Test 4.3	
CONTRACT: Atlantic Recycling, Cardiff.		DATE: 30.06.15 TEST REFERENCE: 4	

SOUTHERN GROUND TESTING

IN SITU CBR TEST



PENETRATION (mm)	PR READING (divs)	LOAD (KN)
0.00	0	0.00
0.25	61	0.56
0.50	93	0.85
0.75	128	1.16
1.00	156	1.42
1.25	179	1.63
1.50	210	1.91
1.75	249	2.27
2.00	282	2.57
2.25	311	2.83
2.50	348	3.17
2.75	388	3.53
3.00	416	3.79
3.25	451	4.10
3.50	467	4.25
3.75	510	4.64
4.00	540	4.91
4.25	569	5.18
4.50	602	5.48
4.75	624	5.68
5.00	646	5.88
5.25		
5.50		
5.75		
6.00		
6.25		
6.50		
6.75		
7.00		
7.25		
7.50		



Test Depth: 0.67m.

Mass of Split Rings: 5Kg

PR Factor: 9.1 N/Div

Soil Description: Demolition Rubble.

CBR at 2.50mm 23.92 %

CBR at 5.00mm 29.45 %

CBR Value: 29.5 %

Checked By: NPJ

REMARKS: 1. Test terminated early due to overstress on load cell.

Carried out in accordance
with BS1377: Part 9: 1990, Test 4.3

CONTRACT: Atlantic Recycling, Cardiff.

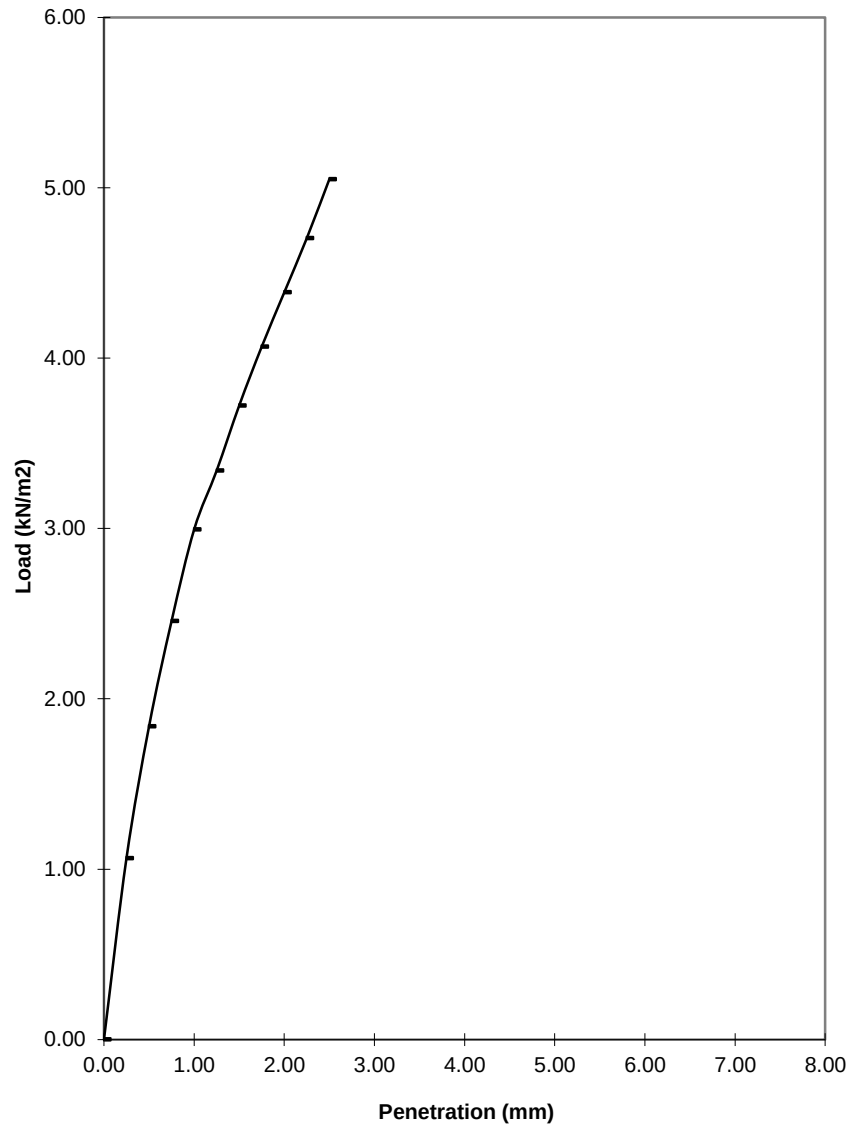
DATE: 30.06.15
TEST REFERENCE: 5

SOUTHERN GROUND TESTING

IN SITU CBR TEST



PENETRATION (mm)	PR READING (divs)	LOAD (KN)
0.00	0	0.00
0.25	117	1.06
0.50	202	1.84
0.75	270	2.46
1.00	329	2.99
1.25	367	3.34
1.50	409	3.72
1.75	447	4.07
2.00	482	4.39
2.25	517	4.70
2.50	555	5.05
2.75		
3.00		
3.25		
3.50		
3.75		
4.00		
4.25		
4.50		
4.75		
5.00		
5.25		
5.50		
5.75		
6.00		
6.25		
6.50		
6.75		
7.00		
7.25		
7.50		



Test Depth: 0.62m.

Mass of Split Rings: 5Kg

PR Factor: 9.1 N/Div

Soil Description: Demolition Rubble.

CBR at 2.50mm 38.15 %

CBR at 5.00mm 0.00 %

CBR Value: 38.2 %

Checked By: NPJ

REMARKS: 1. Test terminated early due to overstress on load cell.

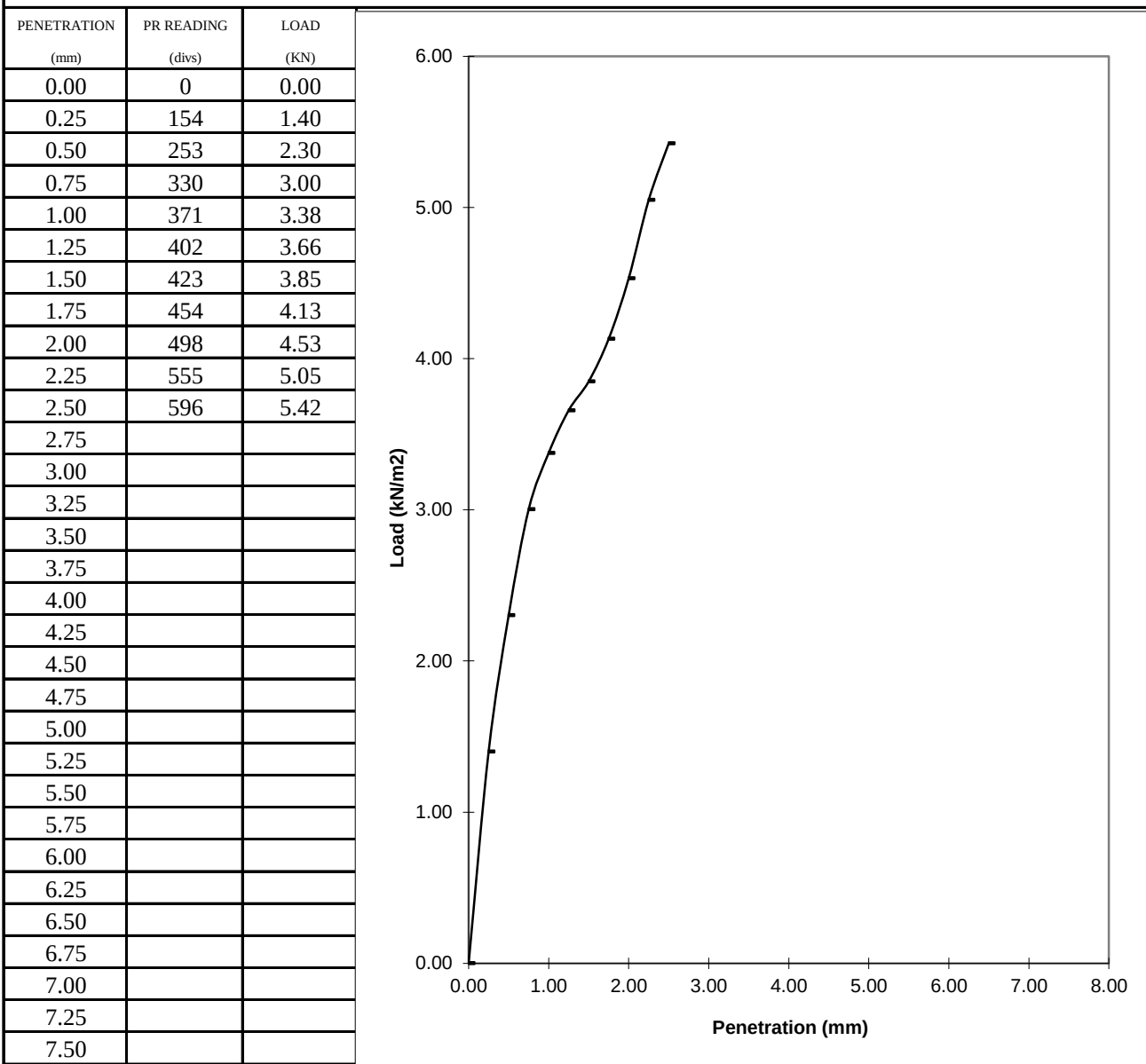
Carried out in accordance
with BS1377: Part 9: 1990, Test 4.3

CONTRACT: Atlantic Recycling, Cardiff.

DATE: 30.06.15
TEST REFERENCE: 6

SOUTHERN GROUND TESTING

IN SITU CBR TEST



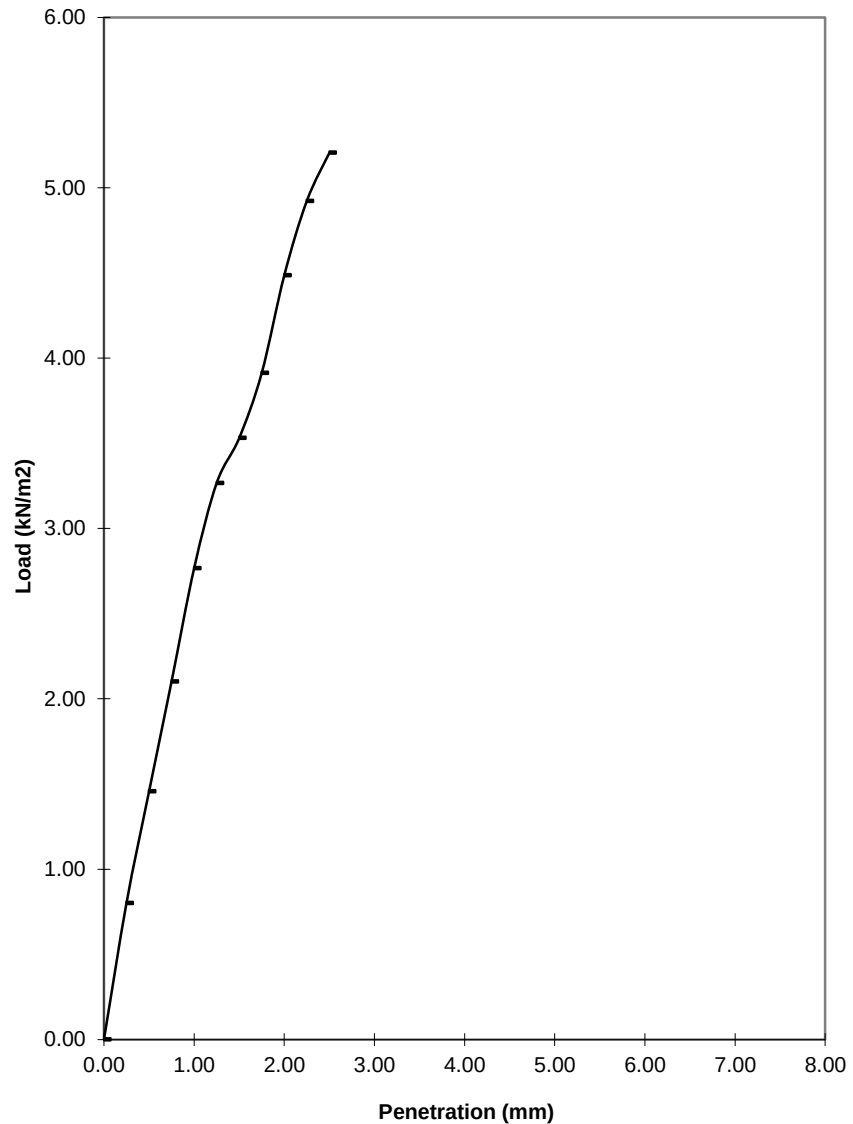
Test Depth: 0.70m.	Soil Description: Demolition Rubble.	CBR at 2.50mm	40.96 %
Mass of Split Rings: 5Kg		CBR at 5.00mm	0.00 %
PR Factor: 9.1 N/Div		CBR Value:	41.0 %
		Checked By:	NPJ
REMARKS: 1.Test terminated early due to overstress on load cell.		Carried out in accordance with BS1377: Part 9: 1990, Test 4.3	
CONTRACT: Atlantic Recycling, Cardiff.		DATE: 30.06.15 TEST REFERENCE: 7	

SOUTHERN GROUND TESTING

IN SITU CBR TEST



PENETRATION (mm)	PR READING (divs)	LOAD (KN)
0.00	0	0.00
0.25	88	0.80
0.50	160	1.46
0.75	231	2.10
1.00	304	2.77
1.25	359	3.27
1.50	388	3.53
1.75	430	3.91
2.00	493	4.49
2.25	541	4.92
2.50	572	5.21
2.75		
3.00		
3.25		
3.50		
3.75		
4.00		
4.25		
4.50		
4.75		
5.00		
5.25		
5.50		
5.75		
6.00		
6.25		
6.50		
6.75		
7.00		
7.25		
7.50		



Test Depth: 0.53m.

Mass of Split Rings: 5Kg

PR Factor: 9.1 N/Div

Soil Description: Demolition Rubble.

CBR at 2.50mm 39.31 %

CBR at 5.00mm 0.00 %

CBR Value: 39.3 %

Checked By: NPJ

REMARKS: 1. Test terminated early due to overstress on load cell.

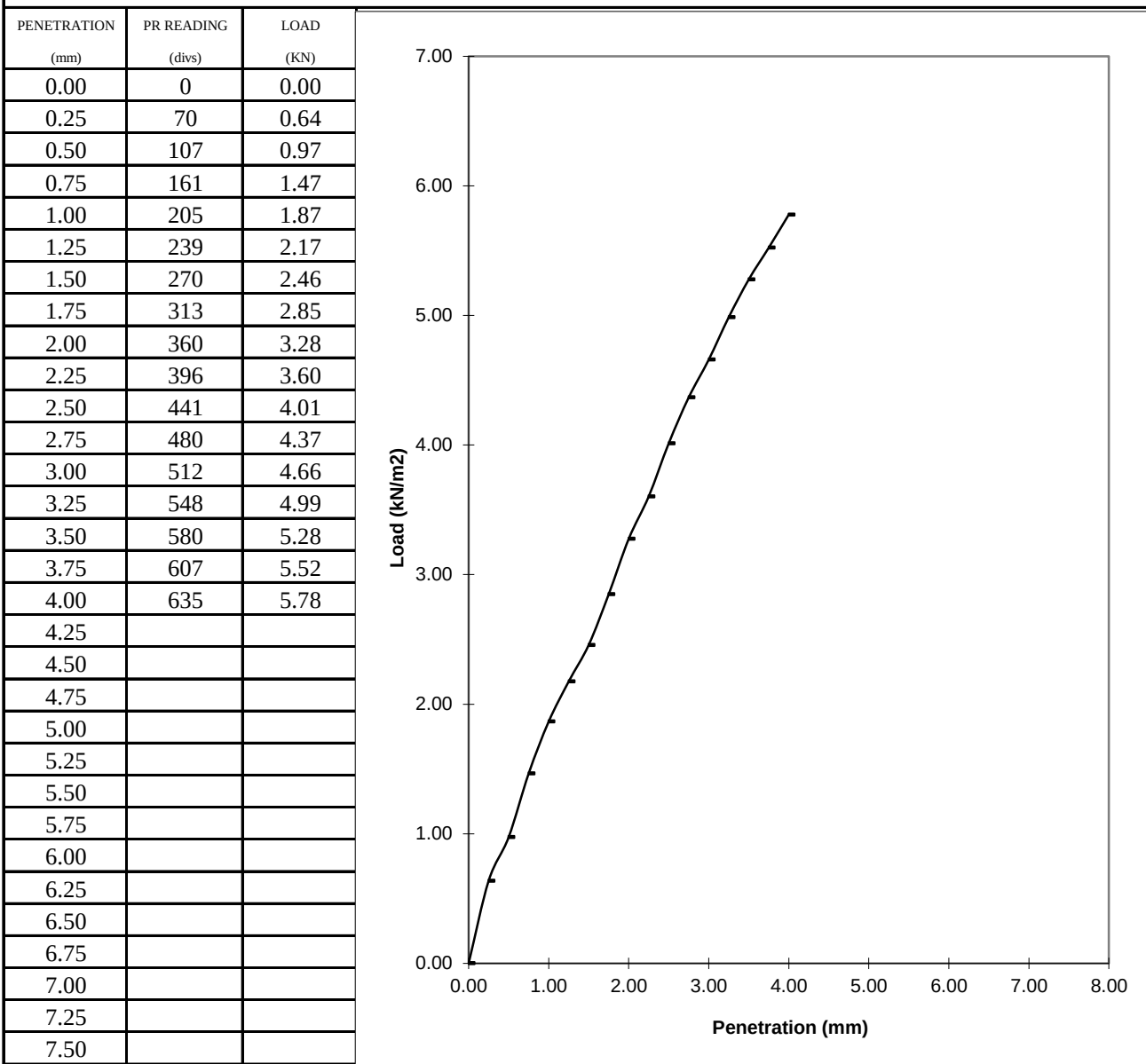
Carried out in accordance
with BS1377: Part 9: 1990, Test 4.3

CONTRACT: Atlantic Recycling, Cardiff.

DATE: 30.06.15
TEST REFERENCE: 8

SOUTHERN GROUND TESTING

IN SITU CBR TEST



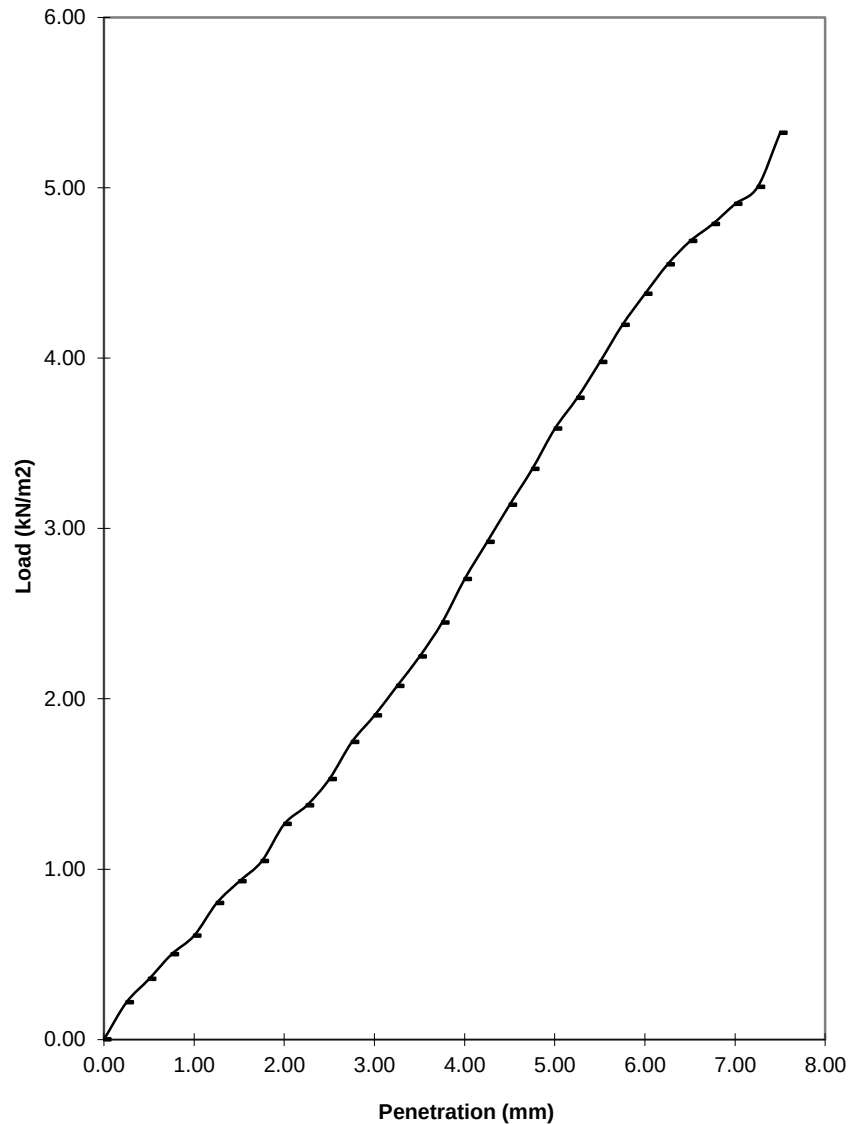
Test Depth: 0.45m.	Soil Description: Demolition Rubble.	CBR at 2.50mm	30.31 %
Mass of Split Rings: 5Kg		CBR at 5.00mm	0.00 %
PR Factor: 9.1 N/Div		CBR Value:	30.3 %
		Checked By:	NPJ
REMARKS: 1.Test terminated early due to overstress on load cell.		Carried out in accordance with BS1377: Part 9: 1990, Test 4.3	
CONTRACT: Atlantic Recycling, Cardiff.		DATE: 30.06.15 TEST REFERENCE: 9	

SOUTHERN GROUND TESTING

IN SITU CBR TEST



PENETRATION (mm)	PR READING (divs)	LOAD (KN)
0.00	0	0.00
0.25	24	0.22
0.50	39	0.35
0.75	55	0.50
1.00	67	0.61
1.25	88	0.80
1.50	102	0.93
1.75	115	1.05
2.00	139	1.26
2.25	151	1.37
2.50	168	1.53
2.75	192	1.75
3.00	209	1.90
3.25	228	2.07
3.50	247	2.25
3.75	269	2.45
4.00	297	2.70
4.25	321	2.92
4.50	345	3.14
4.75	368	3.35
5.00	394	3.59
5.25	414	3.77
5.50	437	3.98
5.75	461	4.20
6.00	481	4.38
6.25	500	4.55
6.50	515	4.69
6.75	526	4.79
7.00	539	4.90
7.25	550	5.01
7.50	585	5.32



Test Depth: 0.50m.

Mass of Split Rings: 5Kg

PR Factor: 9.1 N/Div

Soil Description: Demolition Rubble.

CBR at 2.50mm 11.55 %

CBR at 5.00mm 17.96 %

CBR Value: 18.0 %

Checked By: NPJ

REMARKS:

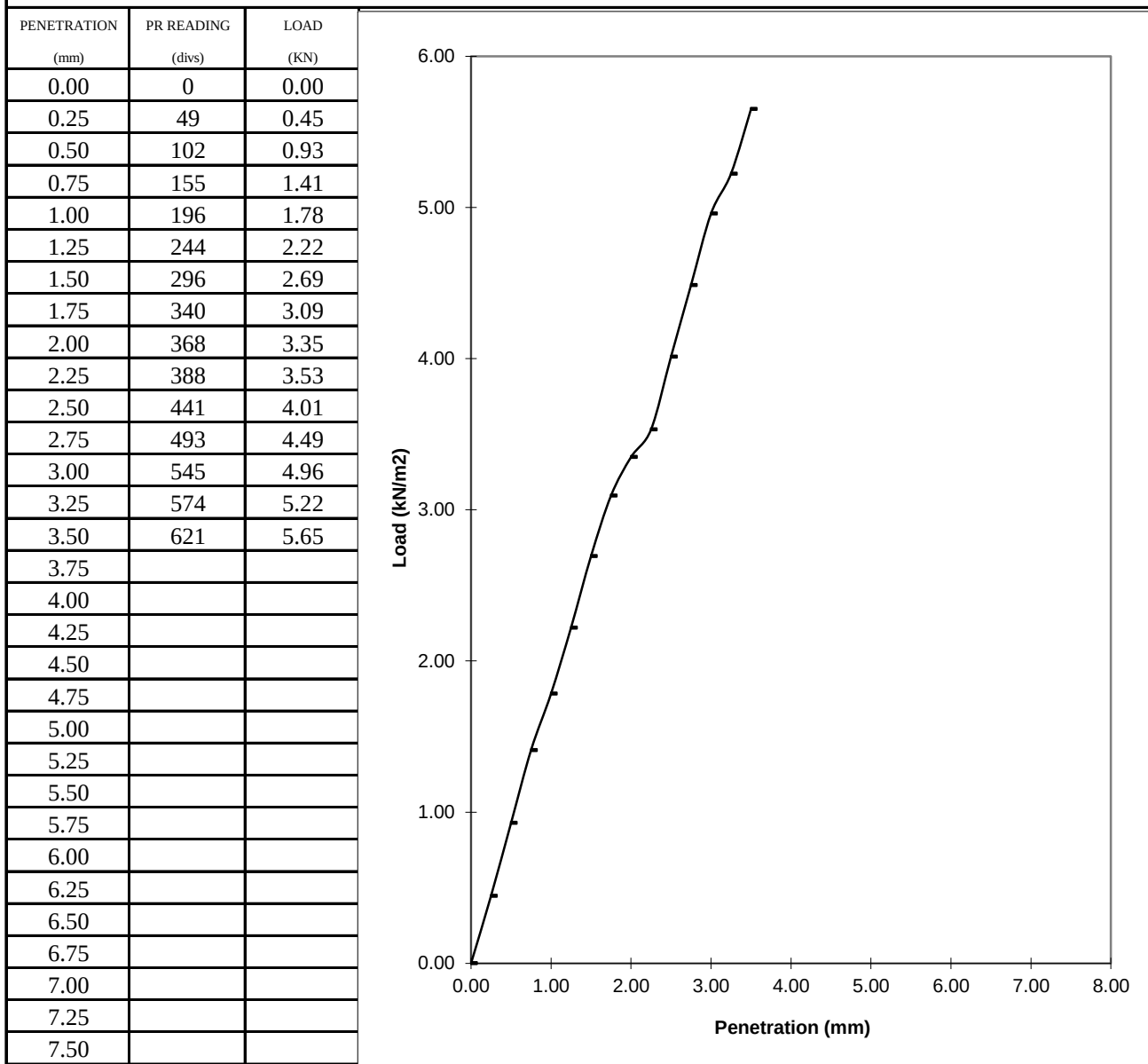
Carried out in accordance
with BS1377: Part 9: 1990, Test 4.3

CONTRACT: Atlantic Recycling, Cardiff.

DATE: 30.06.15
TEST REFERENCE: 10

SOUTHERN GROUND TESTING

IN SITU CBR TEST



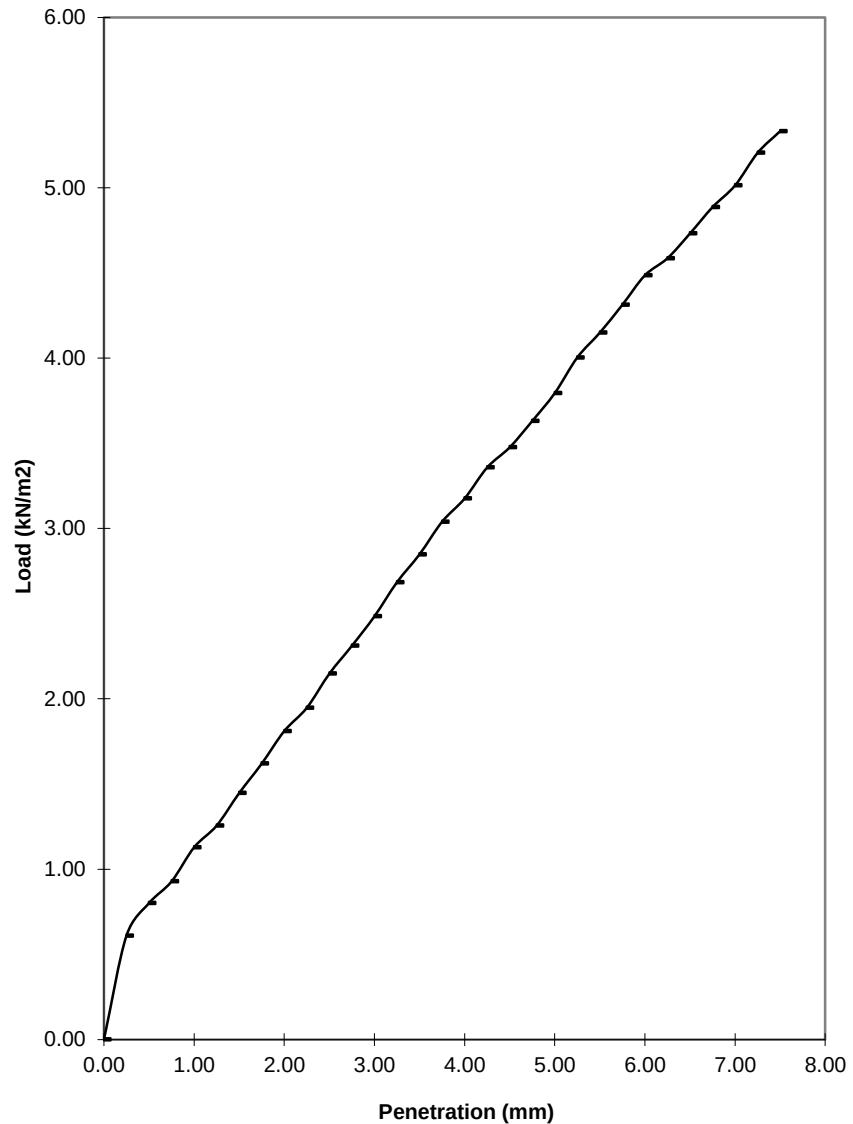
Test Depth: 0.59m.	Soil Description: Demolition Rubble.	CBR at 2.50mm	30.31 %
Mass of Split Rings: 5Kg		CBR at 5.00mm	0.00 %
PR Factor: 9.1 N/Div		CBR Value:	30.3 %
		Checked By:	NPJ
REMARKS: 1.Test terminated early due to overstress on load cell.		Carried out in accordance with BS1377: Part 9: 1990, Test 4.3	
CONTRACT: Atlantic Recycling, Cardiff.		DATE: 30.06.15 TEST REFERENCE: 11	

SOUTHERN GROUND TESTING

IN SITU CBR TEST



PENETRATION (mm)	PR READING (divs)	LOAD (KN)
0.00	0	0.00
0.25	67	0.61
0.50	88	0.80
0.75	102	0.93
1.00	124	1.13
1.25	138	1.26
1.50	159	1.45
1.75	178	1.62
2.00	199	1.81
2.25	214	1.95
2.50	236	2.15
2.75	254	2.31
3.00	273	2.48
3.25	295	2.68
3.50	313	2.85
3.75	334	3.04
4.00	349	3.18
4.25	369	3.36
4.50	382	3.48
4.75	399	3.63
5.00	417	3.79
5.25	440	4.00
5.50	456	4.15
5.75	474	4.31
6.00	493	4.49
6.25	504	4.59
6.50	520	4.73
6.75	537	4.89
7.00	551	5.01
7.25	572	5.21
7.50	586	5.33



Test Depth: 0.53m.

Mass of Split Rings: 5Kg

PR Factor: 9.1 N/Div

Soil Description: Demolition Rubble.

CBR at 2.50mm 16.22 %

CBR at 5.00mm 19.01 %

CBR Value: 19.0 %

Checked By: NPJ

REMARKS:

Carried out in accordance
with BS1377: Part 9: 1990, Test 4.3

CONTRACT: Atlantic Recycling, Cardiff.

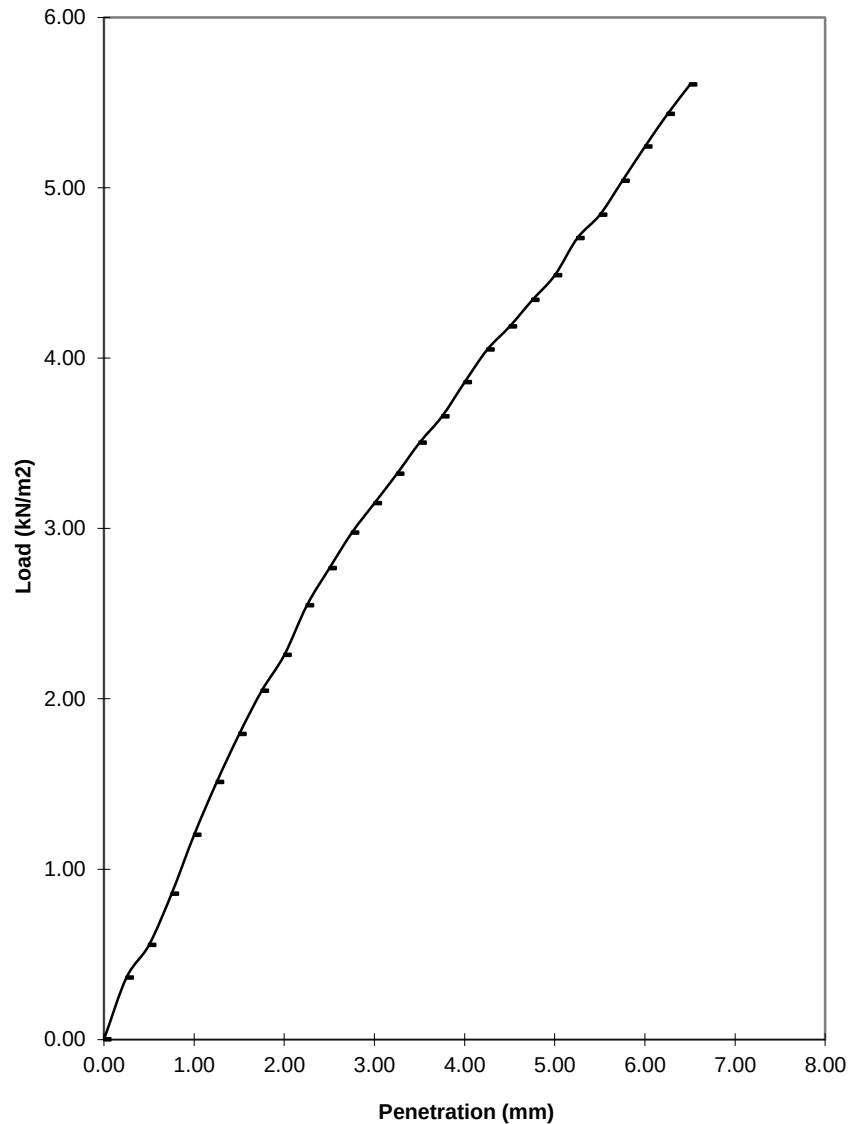
DATE: 30.06.15
TEST REFERENCE: 12

SOUTHERN GROUND TESTING

IN SITU CBR TEST



PENETRATION (mm)	PR READING (divs)	LOAD (KN)
0.00	0	0.00
0.25	40	0.36
0.50	61	0.56
0.75	94	0.86
1.00	132	1.20
1.25	166	1.51
1.50	197	1.79
1.75	225	2.05
2.00	248	2.26
2.25	280	2.55
2.50	304	2.77
2.75	327	2.98
3.00	346	3.15
3.25	365	3.32
3.50	385	3.50
3.75	402	3.66
4.00	424	3.86
4.25	445	4.05
4.50	460	4.19
4.75	477	4.34
5.00	493	4.49
5.25	517	4.70
5.50	532	4.84
5.75	554	5.04
6.00	576	5.24
6.25	597	5.43
6.50	616	5.61
6.75		
7.00		
7.25		
7.50		



Test Depth: 0.60m.

Mass of Split Rings: 5Kg

PR Factor: 9.1 N/Div

Soil Description: Demolition Rubble.

CBR at 2.50mm 20.89 %

CBR at 5.00mm 22.48 %

CBR Value: 22.5 %

Checked By: NPJ

REMARKS: 1. Test terminated early due to overstress on load cell.

Carried out in accordance
with BS1377: Part 9: 1990, Test 4.3

CONTRACT: Atlantic Recycling, Cardiff.

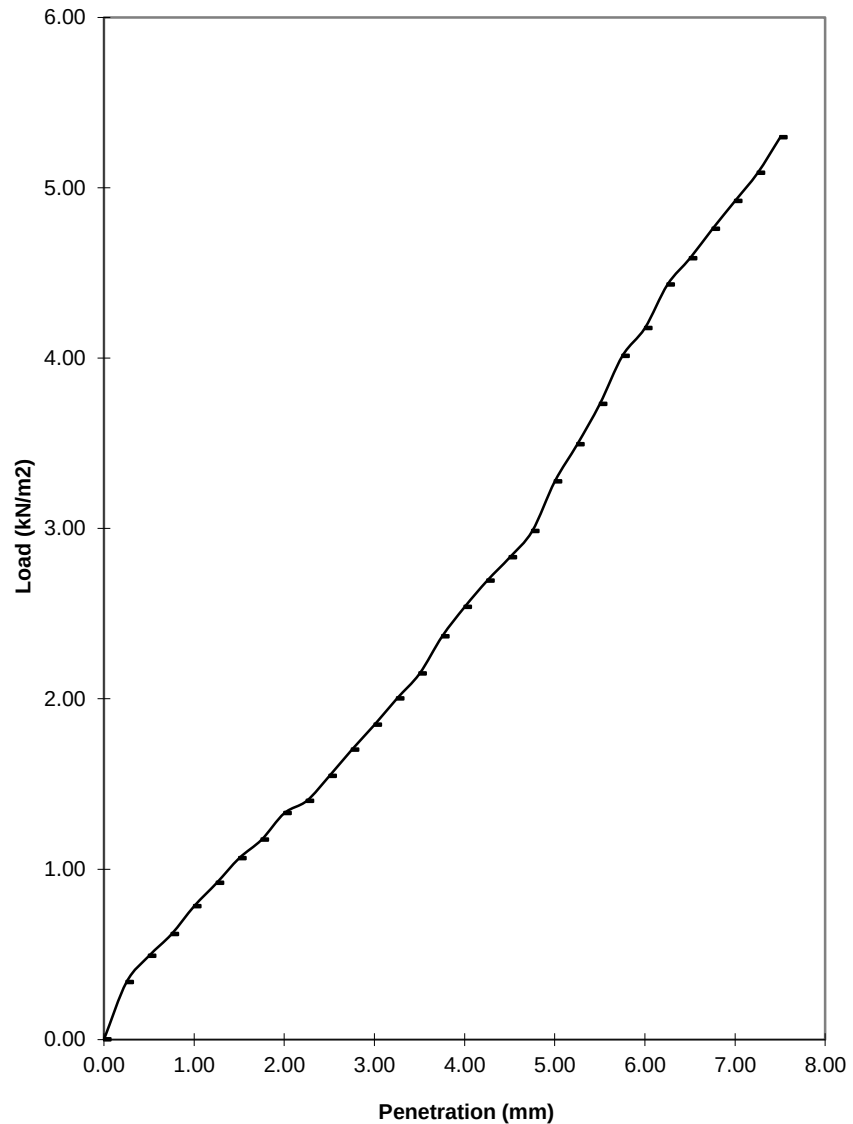
DATE: 30.06.15
TEST REFERENCE: 13

SOUTHERN GROUND TESTING

IN SITU CBR TEST



PENETRATION (mm)	PR READING (divs)	LOAD (KN)
0.00	0	0.00
0.25	37	0.34
0.50	54	0.49
0.75	68	0.62
1.00	86	0.78
1.25	101	0.92
1.50	117	1.06
1.75	129	1.17
2.00	146	1.33
2.25	154	1.40
2.50	170	1.55
2.75	187	1.70
3.00	203	1.85
3.25	220	2.00
3.50	236	2.15
3.75	260	2.37
4.00	279	2.54
4.25	296	2.69
4.50	311	2.83
4.75	328	2.98
5.00	360	3.28
5.25	384	3.49
5.50	410	3.73
5.75	441	4.01
6.00	459	4.18
6.25	487	4.43
6.50	504	4.59
6.75	523	4.76
7.00	541	4.92
7.25	559	5.09
7.50	582	5.30



Test Depth: 0.58m.

Mass of Split Rings: 5Kg

PR Factor: 9.1 N/Div

Soil Description: Demolition Rubble.

CBR at 2.50mm 11.68 %

CBR at 5.00mm 16.41 %

CBR Value: 16.4 %

Checked By: NPJ

REMARKS:

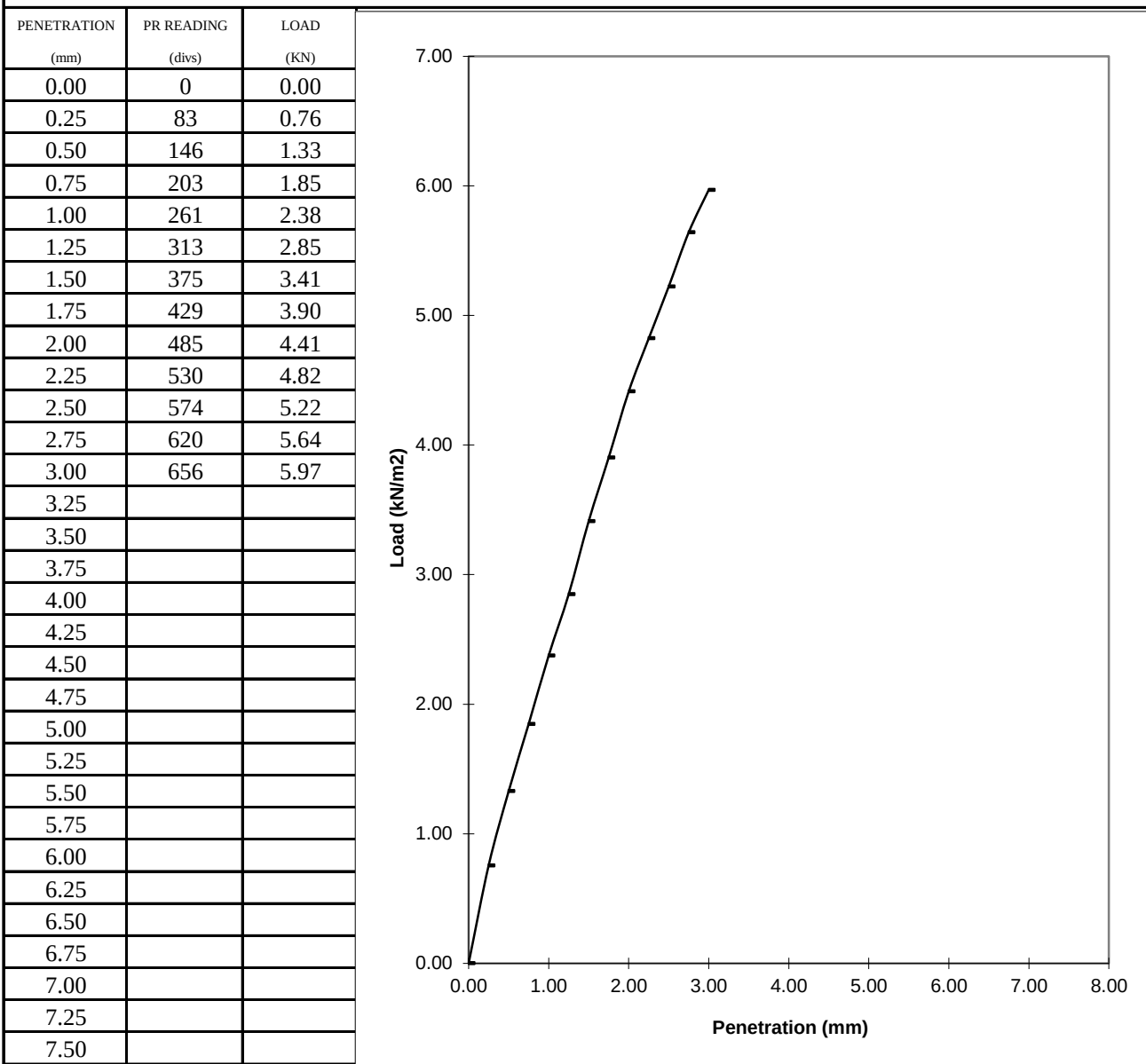
Carried out in accordance
with BS1377: Part 9: 1990, Test 4.3

CONTRACT: Atlantic Recycling, Cardiff.

DATE: 30.06.15
TEST REFERENCE: 14

SOUTHERN GROUND TESTING

IN SITU CBR TEST



Test Depth: 0.51m.	Soil Description: Demolition Rubble.	CBR at 2.50mm	39.45 %
Mass of Split Rings: 5Kg		CBR at 5.00mm	0.00 %
PR Factor: 9.1 N/Div		CBR Value:	39.5 %
		Checked By:	NPJ
REMARKS: 1.Test terminated early due to overstress on load cell.		Carried out in accordance with BS1377: Part 9: 1990, Test 4.3	
CONTRACT: Atlantic Recycling, Cardiff.		DATE: 30.06.15 TEST REFERENCE: 15	

**ATLANTIC WASTE
ECOPARK PAVING
PROJECT**

CQA VALIDATION REPORT

Appendix 2
Particle Size Distribution
Laboratory Test Certificates
Report Number 1379r4v1d0815



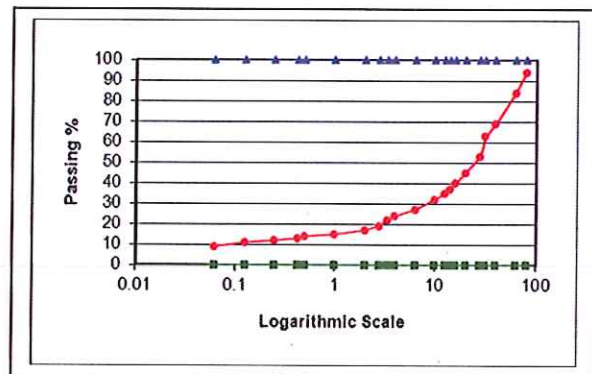
Amey OW Limited
Hackthorpe Hall Business Centre, Hackthorpe, Penrith, CA10 2HX
Tel. (01931) 711040, Fax (01931) 712147

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION ON AGGREGATES

Sample No.: 15A3746 Test No.: 1
Client: NEAL Atlantic
Job Title: Compliance Testing (Soils)
Location: Ex Site. Location TP 1, S1.
Aggregate: Crushed Limestone, Crushed Gravel, & Brick.
Material: Unknown (Aggregate 63)
Supplier/Source: Unknown
Contractor: Unknown
Specification: Unknown (Aggregate 63)

Job No.: 23472
Order No.:
Site Ref: TP1/S1.
Sampling Certificate: No
Sampled By: Client
Date Sampled: 17/07/2015
Date Received: 17/07/2015
Date Tested: 24/07/2015
Date Reported:

Sieve	Passing %	Specification
80mm	94	-
63mm	84	-
40mm	69	-
31.5mm	63	-
28mm	53	-
20mm	45	-
16mm	40	-
14mm	37	-
12.5mm	35	-
10mm	32	-
6.3mm	27	-
4mm	24	-
3.35mm	22	-
2.80mm	19	-
2mm	17	-
1mm	15	-
0.500mm	14	-
0.425mm	13	-
0.250mm	12	-
0.125mm	11	-
0.063mm	9	-



Test	Result	Specification
Moisture Content (%):	7.8	
Specified Size (%):		
Flakiness Index:		

Remarks:

Procedure: BSEN 933 -1 & 3 :2012 BSEN 1097 - 5: 2008 THE SAMPLE AS SUPPLIED AND TESTED COMPLIES/DOES NOT COMPLY WITH SPECIFICATION

Distribution:

NEAL Atlantic
Atlantic Eco Park
Newton Road
Rumney
Cardiff
CF3 2EJ

cc to 1:
cc to 2:

Signed: L. Scott
Authorised Signatories: L. Scott (Quality & Technical Manager)
I. A Lee (Senior Technician)
I. J. Scott (Senior Technician)

A01R

Page 1 of 1

*** End of Test Report ***





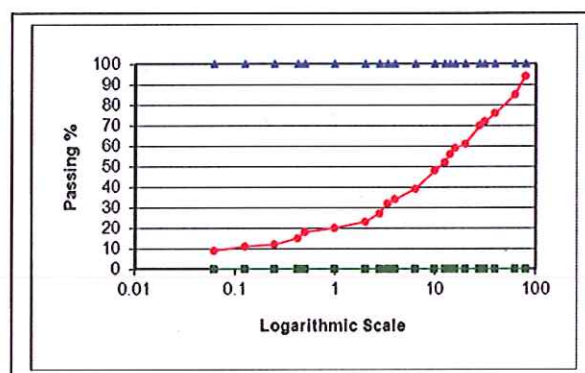
Amey OW Limited
Hackthorpe Hall Business Centre, Hackthorpe, Penrith, CA10 2HX
Tel. (01931) 711040, Fax (01931) 712147

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION ON AGGREGATES

Sample No.: 15A3747 Test No.: 1
Client: NEAL Atlantic
Job Title: Compliance Testing (Soils)
Location: Ex Site. Location TP 4, S1.
Aggregate: Crushed Limestone, Gravel, & Brick.
Material: Unknown (Aggregate 63)
Supplier/Source: Unknown
Contractor: Unknown
Specification: Unknown (Aggregate 63)

Job No.: 23472
Order No.:
Site Ref: TP4/S1.
Sampling Certificate: No
Sampled By: Client
Date Sampled: 17/07/2015
Date Received: 17/07/2015
Date Tested: 24/07/2015
Date Reported:

Sieve	Passing %	Specification
80mm	94	-
63mm	85	-
40mm	76	-
31.5mm	72	-
28mm	70	-
20mm	61	-
16mm	59	-
14mm	56	-
12.5mm	52	-
10mm	48	-
6.3mm	39	-
4mm	34	-
3.35mm	32	-
2.80mm	27	-
2mm	23	-
1mm	20	-
0.500mm	18	-
0.425mm	15	-
0.250mm	12	-
0.125mm	11	-
0.063mm	9	-



Test	Result	Specification
Moisture Content (%):	8.7	
Specified Size (%):		
Flakiness Index:		

Remarks:

Procedure: THE SAMPLE AS SUPPLIED AND TESTED
BSEN 933 -1 & 3 :2012 BSEN 1097 - 5: 2008 COMPLIES/DOES NOT COMPLY WITH SPECIFICATION

Signed: _____

L. Scott

Distribution:

Authorised Signatories: L. Scott (Quality & Technical Manager)
I. A Lee (Senior Technician)
I. J. Scott (Senior Technician)

NEAL Atlantic
Atlantic Eco Park
Newton Road
Rumney
Cardiff
CF3 2EJ

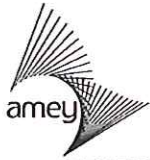
cc to 1:
cc to 2:

A01R

Page 1 of 1

*** End of Test Report ***





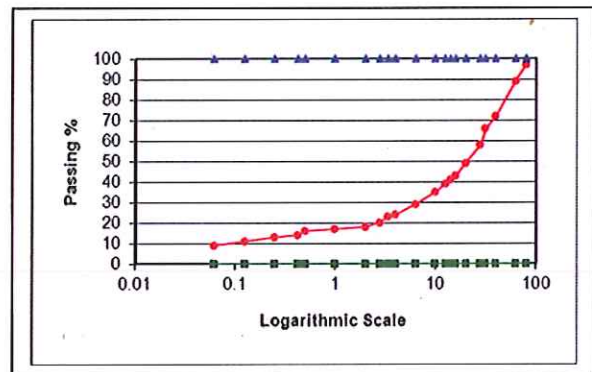
Amey OW Limited
Hackthorpe Hall Business Centre, Hackthorpe, Penrith, CA10 2HX
Tel. (01931) 711040, Fax (01931) 712147

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION ON AGGREGATES

Sample No.: 15A3748 Test No.: 1
Client: NEAL Atlantic
Job Title: Compliance Testing (Soils)
Location: Ex Site. Location TP 7, S1.
Aggregate: Crushed Limestone, Gravel, & Brick.
Material: Unknown (Aggregate 63)
Supplier/Source: Unknown
Contractor: Unknown
Specification: Unknown (Aggregate 63)

Job No.: 23472
Order No.:
Site Ref: TP7/S1.
Sampling Certificate: No
Sampled By: Client
Date Sampled: 17/07/2015
Date Received: 17/07/2015
Date Tested: 24/07/2015
Date Reported: 27/07/2015

Sieve	Passing %	Specification
80mm	97	-
63mm	89	-
40mm	72	-
31.5mm	66	-
28mm	58	-
20mm	49	-
16mm	43	-
14mm	41	-
12.5mm	39	-
10mm	35	-
6.3mm	29	-
4mm	24	-
3.35mm	23	-
2.80mm	20	-
2mm	18	-
1mm	17	-
0.500mm	16	-
0.425mm	14	-
0.250mm	13	-
0.125mm	11	-
0.063mm	9	-



Test	Result	Specification
Moisture Content (%):	7.3	
Specified Size (%):		
Flakiness Index:		

Remarks:

Procedure: THE SAMPLE AS SUPPLIED AND TESTED
BSEN 933 -1 & 3 :2012 BSEN 1097 - 5: 2008 COMPLIES/DOES NOT COMPLY WITH SPECIFICATION

Signed: _____

L. Scott

Distribution:

Authorised Signatories: L. Scott (Quality & Technical Manager)
I. A Lee (Senior Technician)
I. J. Scott (Senior Technician)

NEAL Atlantic
Atlantic Eco Park
Newton Road
Rumney
Cardiff
CF3 2EJ

cc to 1:
cc to 2:

A01R

Page 1 of 1

*** End of Test Report ***





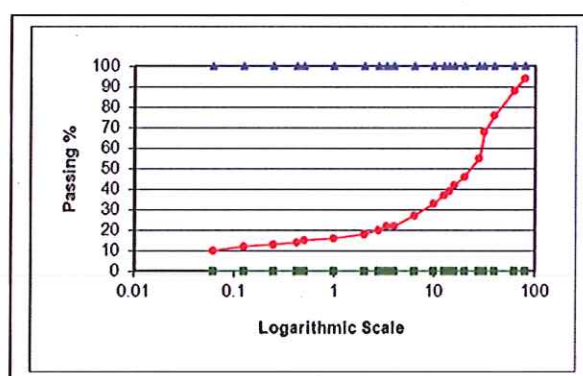
Amey OW Limited
Hackthorpe Hall Business Centre, Hackthorpe, Penrith, CA10 2HX
Tel. (01931) 711040, Fax (01931) 712147

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION ON AGGREGATES

Sample No.: 15A3749 Test No.: 1
Client: NEAL Atlantic
Job Title: Compliance Testing (Soils)
Location: Ex Site. Location TP 10, S1.
Aggregate: Crushed Limestone, Gravel, & Brick.
Material: Unknown (Aggregate 63)
Supplier/Source: Unknown
Contractor: Unknown
Specification: Unknown (Aggregate 63)

Job No.: 23472
Order No.:
Site Ref: TP10/S1.
Sampling Certificate: No
Sampled By: Client
Date Sampled: 17/07/2015
Date Received: 17/07/2015
Date Tested: 24/07/2015
Date Reported: 27/07/2015

Sieve	Passing %	Specification
80mm	94	-
63mm	88	-
40mm	76	-
31.5mm	68	-
28mm	55	-
20mm	46	-
16mm	42	-
14mm	39	-
12.5mm	37	-
10mm	33	-
6.3mm	27	-
4mm	22	-
3.35mm	22	-
2.80mm	20	-
2mm	18	-
1mm	16	-
0.500mm	15	-
0.425mm	14	-
0.250mm	13	-
0.125mm	12	-
0.063mm	10	-



Test	Result	Specification
Moisture Content (%):	5.9	
Specified Size (%):		
Flakiness Index:		

Remarks:

Procedure: BSEN 933 -1 & 3 :2012 BSEN 1097 - 5: 2008 THE SAMPLE AS SUPPLIED AND TESTED COMPLIES/DOES NOT COMPLY WITH SPECIFICATION

Signed: _____

L. Scott

Distribution:

Authorised Signatories: L. Scott (Quality & Technical Manager)
I. A Lee (Senior Technician)
I. J. Scott (Senior Technician)

NEAL Atlantic
Atlantic Eco Park
Newton Road
Rumney
Cardiff
CF3 2EJ

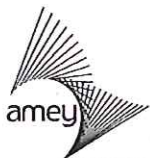
cc to 1:
cc to 2:

A01R

Page 1 of 1

*** End of Test Report ***





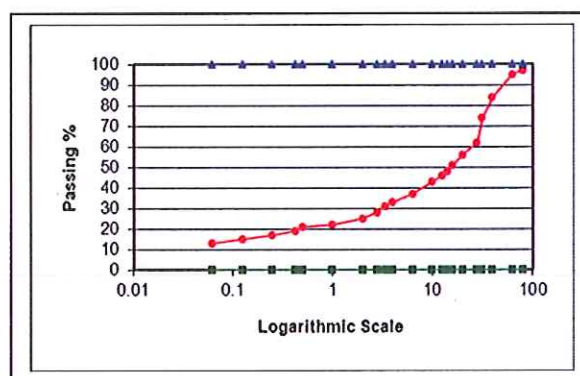
Amey OW Limited
Hackthorpe Hall Business Centre, Hackthorpe, Penrith, CA10 2HX
Tel. (01931) 711040, Fax (01931) 712147

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION ON AGGREGATES

Sample No.: 15A3750 Test No.: 1
Client: NEAL Atlantic
Job Title: Compliance Testing (Soils)
Location: Ex Site. Location TP 14, S1.
Aggregate: Crushed Limestone
Material: Unknown (Aggregate 63)
Supplier/Source: Unknown
Contractor: Unknown
Specification: Unknown (Aggregate 63)

Job No.: 23472
Order No.:
Site Ref: TP14/S1.
Sampling Certificate: No
Sampled By: Client
Date Sampled: 17/07/2015
Date Received: 17/07/2015
Date Tested: 24/07/2015
Date Reported: 27/07/2015

Sieve	Passing %	Specification
80mm	97	-
63mm	95	-
40mm	84	-
31.5mm	74	-
28mm	62	-
20mm	56	-
16mm	51	-
14mm	48	-
12.5mm	46	-
10mm	43	-
6.3mm	37	-
4mm	33	-
3.35mm	31	-
2.80mm	28	-
2mm	25	-
1mm	22	-
0.500mm	21	-
0.425mm	19	-
0.250mm	17	-
0.125mm	15	-
0.063mm	13	-



Test	Result	Specification
Moisture Content (%):	7.0	
Specified Size (%):		
Flakiness Index:		

Remarks:

Procedure:

BSEN 933 -1 & 3 :2012 BSEN 1097 - 5: 2008

THE SAMPLE AS SUPPLIED AND TESTED
COMPLIES/DOES NOT COMPLY WITH SPECIFICATION

Signed: _____

L. Scott

Distribution:

Authorised Signatories: L. Scott (Quality & Technical Manager)
I. A Lee (Senior Technician)
I. J. Scott (Senior Technician)

NEAL Atlantic
Atlantic Eco Park
Newton Road
Rumney
Cardiff
CF3 2EJ

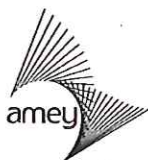
cc to 1:
cc to 2:

A01R

Page 1 of 1

*** End of Test Report ***





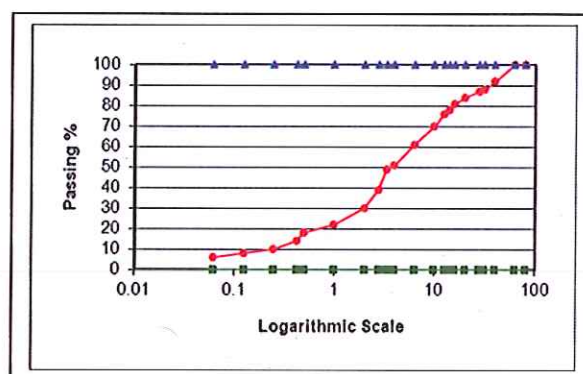
Amey OW Limited
Hackthorpe Hall Business Centre, Hackthorpe, Penrith, CA10 2HX
Tel. (01931) 711040, Fax (01931) 712147

TEST REPORT ON DETERMINATION OF PARTICLE SIZE DISTRIBUTION ON AGGREGATES

Sample No.: 15A3751 Test No.: 1
Client: NEAL Atlantic
Job Title: Compliance Testing (Soils)
Location: Ex Site. Location S1, 001, TP4, S1.
Aggregate: Fine Crushed Gravel
Material: Unknown (Aggregate 63)
Supplier/Source: Unknown
Contractor: Unknown
Specification: Unknown (Aggregate 63)

Job No.: 23472
Order No.:
Site Ref: TP14/S1. 001
Sampling Certificate: No
Sampled By: Client
Date Sampled: 17/07/2015
Date Received: 17/07/2015
Date Tested: 24/07/2015
Date Reported: 27/07/2015

Sieve	Passing %	Specification
80mm	100	-
63mm	100	-
40mm	92	-
31.5mm	88	-
28mm	87	-
20mm	84	-
16mm	81	-
14mm	78	-
12.5mm	76	-
10mm	70	-
6.3mm	61	-
4mm	51	-
3.35mm	49	-
2.80mm	39	-
2mm	30	-
1mm	22	-
0.500mm	18	-
0.425mm	14	-
0.250mm	10	-
0.125mm	8	-
0.063mm	6	-



Test	Result	Specification
Moisture Content (%):	12.1	
Specified Size (%):		
Flakiness Index:		

Remarks:

Procedure:

BSEN 933 -1 & 3 :2012 BSEN 1097 - 5: 2008

THE SAMPLE AS SUPPLIED AND TESTED
COMPLIES/DOES NOT COMPLY WITH SPECIFICATION

Signed: _____

L. Scott

Distribution:

NEAL Atlantic
Atlantic Eco Park
Newton Road
Rumney
Cardiff
CF3 2EJ

Authorised Signatories: L. Scott (Quality & Technical Manager)
I. A Lee (Senior Technician)
I. J. Scott (Senior Technician)

cc to 1:
cc to 2:

A01R

Page 1 of 1

*** End of Test Report ***



TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No: D5234-15	Client: Geotechnology Limited
Project Name: 1379 Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8HE
ATS Sample No: 6325	

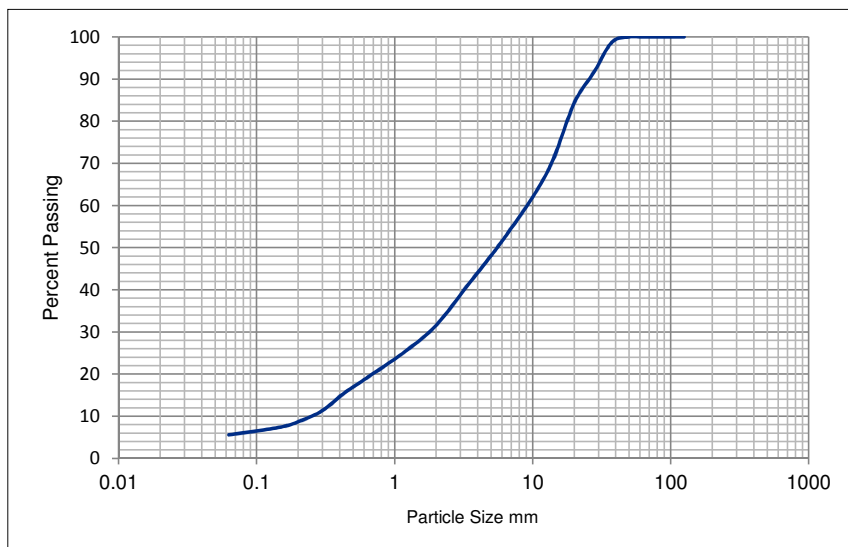
Site Ref / Hole ID: S1002	Depth (m):
Sample No:	Sample Type: Bulk
Sampling Certificate Received: No	Material Description: Brown silty very sandy GRAVEL
Location in Works: Unknown	Material Source: N/A
Date Sampled: Unknown	Material Supplier: N/A
Sampled By: Unknown	Specification: BS1377
Date Received: 14 July 2015	Date Tested: 23 July 2015

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	99
28	92
20	84
14	71
10	62
6.3	53
5.0	48
3.35	41
2.00	32
1.18	25
0.600	19
0.425	15
0.300	11
0.212	9
0.150	7
0.063	6

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D ₆₀ / D ₁₀
Cobbles / Boulders	0	N/A	
Gravel	68		
Sand	26	Dry mas of sample, kg	
Silt / Clay	6	14.2	N/A

Remarks:

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No:	D5234-15	Client:	Geotechnology Limited
Project Name:	1379 Atlantic	Address:	5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8HE
ATS Sample No:	6334		

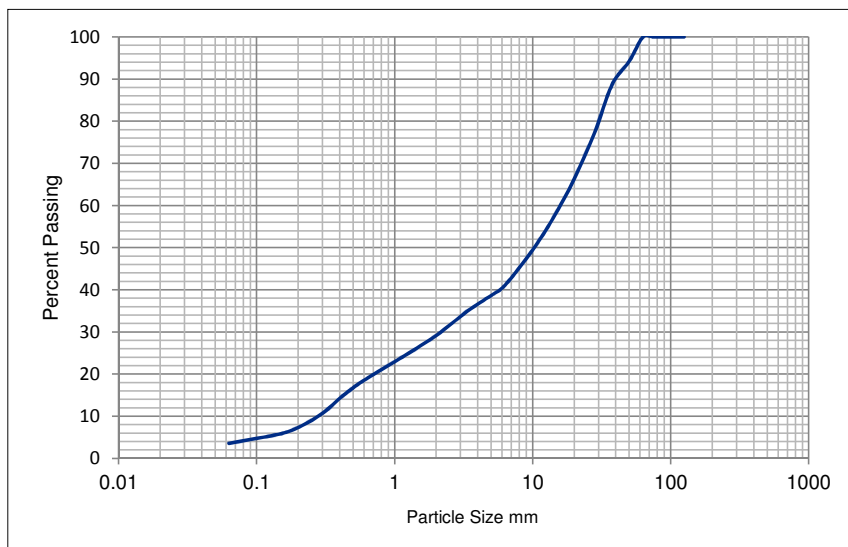
Site Ref / Hole ID:	S1003	Depth (m):	
Sample No:		Sample Type:	Bulk
Sampling Certificate Received:	No	Material Description:	Grey slightly silty very sandy GRAVEL
Location in Works:	Unknown	Material Source:	N/A
Date Sampled:	Unknown	Material Supplier:	N/A
Sampled By:	Unknown	Specification:	BS1377
Date Received:	16 July 2015	Date Tested:	23 July 2015

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	94
37.5	89
28	77
20	66
14	57
10	49
6.3	41
5.0	39
3.35	35
2.00	29
1.18	24
0.600	19
0.425	15
0.300	11
0.212	8
0.150	6
0.063	4

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	71	Dry mas of sample, kg	N/A
Sand	25		
Silt / Clay	4	17.7	

Remarks:

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS 1377:Part 2:1990: Clause 9.2 / 9.4

Project No: D5234-15	Client: Geotechnology Limited
Project Name: 1379 Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8HE
ATS Sample No: 6391	

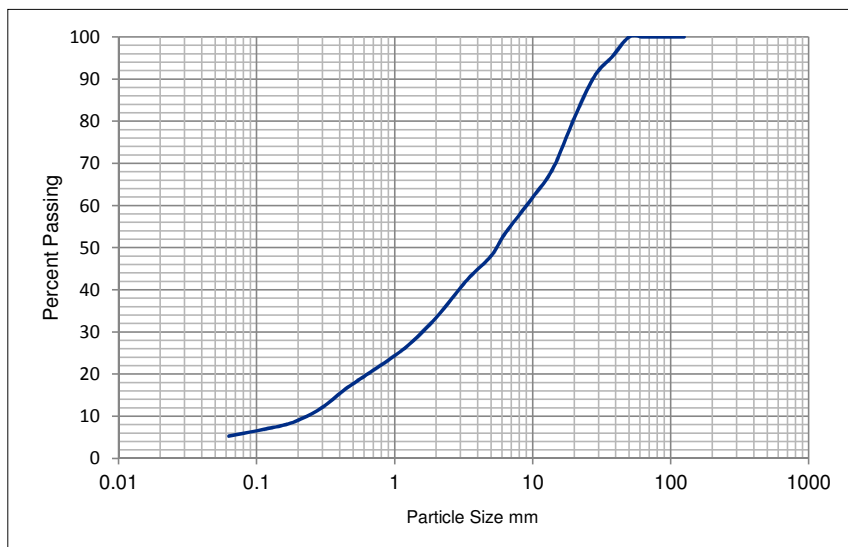
Site Ref / Hole ID: S1004	Depth (m):
Sample No:	Sample Type: Bulk
Sampling Certificate Received: No	Material Description: Brown grey silty very sandy GRAVEL
Location in Works: Unknown	Material Source: N/A
Date Sampled: Unknown	Material Supplier: N/A
Sampled By: Unknown	Specification: BS1377
Date Received: 20 July 2015	Date Tested: 28 July 2015

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	95
28	91
20	81
14	69
10	62
6.3	53
5.0	48
3.35	42
2.00	33
1.18	26
0.600	19
0.425	16
0.300	12
0.212	9
0.150	8
0.063	5

Sedimentation	
Particle Size mm	% Passing
0.0201	
0.0060	
0.0020	

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient D_{60} / D_{10}
Cobbles / Boulders	0	N/A	
Gravel	67	Dry mas of sample, kg	N/A
Sand	28		
Silt / Clay	5	11.2	

Remarks:

**ATLANTIC WASTE
ECOPARK PAVING
PROJECT**

CQA VALIDATION REPORT

Appendix 3

Photographic Record

Report Number 1379r4v1d0815



Ground condition prior to works



Delivery of aggregate to site



Placement of 200mm thick aggregate layer



Final preparation of sub-grade for drainage channel



Aggregate stockpile and spinning laser setup



Southern edge of prepared area



Spinning Laser Setup



Delivery and spreading of aggregate



Aggregate Stockpiles



Additional area on northwest edge



Top of 300mm thick layer



Placement of 200mm thick layer



Level checks with grading laser



Formation



Formation and spreading of 200mm thick aggregate layer



Spinning laser setup of topographic change point



Dust layer prepared for Drainage Channel Construction



Edge of 300mm thick aggregate layer preparation



Shuttering for first concrete pour



First concrete pour



First concrete pour



Final grading of surface with fine aggregate



Infilling of low areas



First section of concrete drainage channel



Removal of soft natural ground



Reinstated area with dust finish for concrete

**ATLANTIC WASTE
ECOPARK PAVING
PROJECT**

CQA VALIDATION REPORT

**Appendix 4
TVC Concrete Cube
Laboratory Test
Certificates**

Report Number 1379r4v1d0815

TEST CERTIFICATE

Compressive Strength Density of Concrete Cubes (BS EN 12390-7 2009 BSEN 12390-3 2009)

Project No	D5234-15	Sample No	6130 A - B	Type	Concrete
Project Name	Atlantic	Client ID	06/07/2015 T T 2752		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Unknown	Date sampled	06/07/2015
Location of placement in works	Unknown	Time sampled	Unknown
Specification as ordered	C40	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A	B					
Condition at time of test	Water Saturated						
Method of calculation	Water Displacement						
Calculated Density	2360						Kg/m ³

Curing

Date of receipt	08/07/2015						
Date of test	13/07/2015						
Age of specimen	7						Days
Curing conditions (since receipt)	min 18						°C
	max 22						

Compressive strength

Designated Size	150						mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	150						mm
	150						
	150						
Surface condition	Surface Dried						
	Checked						
Observations							
Adjustments/Preparation	None						
Maximum load at failure	376						KN
Failure type	Normal						
Compressive strength	16.7						Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

18/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength Density of Concrete Cubes (BS EN 12390-7 2009 BSEN 12390-3 2009)

Project No	D5234-15	Sample No	6132 A	Type	Concrete
Project Name	Atlantic	Client ID	17/06/2015 T T 2754		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Unknown	Date sampled	17/06/2015
Location of placement in works	Unknown	Time sampled	Unknown
Specification as ordered	Unknown	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A					
Condition at time of test	Water Saturated					
Method of calculation	Water Displacement					
Calculated Density	2380					Kg/m ³

Curing

Date of receipt	08/07/2015					
Date of test	15/07/2015					
Age of specimen	28					Days
Curing conditions (since receipt)	min 18 max 22					°C

Compressive strength

Designated Size	150					mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	150					mm
	150					
	150					
Surface condition	Surface Dried					
	Checked					
Observations						
Adjustments/Preparation	None					
Maximum load at failure	569					KN
Failure type	Normal					
Compressive strength	25.3					Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

18/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength Density of Concrete Cubes (BS EN 12390-7 2009 BSEN 12390-3 2009)

Project No	D5234-15	Sample No	6134 A	Type	Concrete
Project Name	Atlantic	Client ID	25/06/2015 T T 2754		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Unknown	Date sampled	25/06/2015
Location of placement in works	Unknown	Time sampled	Unknown
Specification as ordered	Unknown	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A					
Condition at time of test	Water Saturated					
Method of calculation	Water Displacement					
Calculated Density	2370					Kg/m ³

Curing

Date of receipt	08/07/2015					
Date of test	23/07/2015					
Age of specimen	28					Days
Curing conditions (since receipt)	min 18 max 22					°C

Compressive strength

Designated Size	150					mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	150					mm
	150					
	150					
Surface condition	Surface Dried					
	Checked					
Observations						
Adjustments/Preparation	None					
Maximum load at failure	553					KN
Failure type	Normal					
Compressive strength	24.6					Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

26/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength Density of Concrete Cubes (BS EN 12390-7 2009 BSEN 12390-3 2009)

Project No	D5234-15	Sample No	6133 A	Type	Concrete
Project Name	Atlantic	Client ID	22/06/2015 T T 2754		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Unknown	Date sampled	22/06/2015
Location of placement in works	Unknown	Time sampled	Unknown
Specification as ordered	Unknown	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A					
Condition at time of test	Water Saturated					
Method of calculation	Water Displacement					
Calculated Density	2360					Kg/m ³

Curing

Date of receipt	08/07/2015					
Date of test	20/07/2015					
Age of specimen	28					Days
Curing conditions (since receipt)	min 18 max 22					°C

Compressive strength

Designated Size	150					mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	150					mm
	150					
	150					
Surface condition	Surface Dried					
	Checked					
Observations						
Adjustments/Preparation	None					
Maximum load at failure	669					KN
Failure type	Normal					
Compressive strength	29.7					Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

26/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength & Density of Concrete Cubes (BS EN 12390-7:2009 & BSEN 12390-3:2009)

Project No	D5234-15	Sample No	6129 A - B	Type	Concrete
Project Name	Atlantic	Client ID	02/07/2015 TKT 2751		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Unknown	Date sampled	02/07/2015
Location of placement in works	Unknown	Time sampled	Unknown
Specification as ordered	C32/40	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A	B					
Condition at time of test	Water Saturated	Water Saturated					
Method of calculation	Water Displacement	Water Displacement					
Calculated Density	2350	2350					Kg/m ³

Curing

Date of receipt	08/07/2015	08/07/2015					
Date of test	09/07/2015	30/07/2015					
Age of specimen	7	28					Days
Curing conditions	18	18					°C
(since receipt)	22	22					

Compressive strength

Designated Size	150	150					mm
Actual Dimensions (mean)	150	150					mm
(if tested in accordance with Annex B)	150	150					
	150	150					
Surface condition	Surface Dried	Surface Dried					
	Checked	Checked					
Observations							
Adjustments/Preparation	None	None					
Maximum load at failure	461	625					KN
Failure type	Normal	Normal					
Compressive strength	20.5	27.8					Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle,
Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

31/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength & Density of Concrete Cubes (BS EN 12390-7:2009 & BSEN 12390-3:2009)

Project No	D5234-15	Sample No	6131 A - B	Type	Concrete
Project Name	Atlantic	Client ID	30/06/2015 TKT 2753		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Unknown	Date sampled	30/06/2015
Location of placement in works	Unknown	Time sampled	Unknown
Specification as ordered	Unknown	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A	B					
Condition at time of test	Water Saturated	Water Saturated					
Method of calculation	Water Displacement	Water Displacement					
Calculated Density	2380	2390					Kg/m ³

Curing

Date of receipt	08/07/2015	08/07/2015					
Date of test	08/07/2015	28/07/2015					
Age of specimen	8	28					Days
Curing conditions (since receipt)	min 18	18					°C
	max 22	22					

Compressive strength

Designated Size	150	150					mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	X _m 150	150					mm
	Y _m 150	150					
	Z _m 150	150					
Surface condition	Surface Dried	Surface Dried					
Observations	Checked	Checked					
Adjustments/Preparation	None	None					
Maximum load at failure	583	697					KN
Failure type	Normal	Normal					
Compressive strength	25.9	31.0					Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

31/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength Density of Concrete Cubes (BS EN 12390-7 2009 BSEN 12390-3 2009)

Project No	D5234-15	Sample No	6130 A - B	Type	Concrete
Project Name	Atlantic	Client ID	06/07/2015 T T 2752		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Unknown	Date sampled	06/07/2015
Location of placement in works	Unknown	Time sampled	Unknown
Specification as ordered	C40	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A	B					
Condition at time of test	Water Saturated	Water Saturated					
Method of calculation	Water Displacement	Water Displacement					
Calculated Density	2360	2360					Kg/m ³

Curing

Date of receipt	08/07/2015	08/07/2015					
Date of test	13/07/2015	03/08/2015					
Age of specimen	7	28					Days
Curing conditions (since receipt)	min 18	18					°C
	max 22	22					

Compressive strength

Designated Size	150	150					mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	X _m 150	150					mm
	Y _m 150	150					
	Z _m 150	150					
Surface condition	Surface Dried	Surface Dried					
Observations	Checked	Checked					
Adjustments/Preparation	None	None					
Maximum load at failure	376	584					KN
Failure type	Normal	Normal					
Compressive strength	16.7	26.0					Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

08/08/2015

Fig.

**ATLANTIC WASTE
ECOPARK PAVING
PROJECT**

CQA VALIDATION REPORT

**Appendix 5
DLS Concrete Cube
Laboratory Test
Certificates**

Report Number 1379r4v1d0815

TEST CERTIFICATE

Compressive Strength Density of Concrete Cubes (BS EN 12390-7 2009 BSEN 12390-3 2009)

Project No	D5234-15	Sample No	6225 A - B	Type	Concrete
Project Name	Atlantic	Client ID	DLS3 T T 2757		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Composite	Date sampled	13/07/2015
Location of placement in works	Slab	Time sampled	Unknown
Specification as ordered	C8/10	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A					
Condition at time of test	Water Saturated					
Method of calculation	Water Displacement					
Calculated Density	2080					Kg/m ³

Curing

Date of receipt	15/07/2015					
Date of test	20/07/2015					
Age of specimen	7					Days
Curing conditions (since receipt)	min 18 max 22					°C

Compressive strength

Designated Size	150					mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	150					mm
	150					
	150					
Surface condition	Surface Dried					
	Damaged edges					
Observations						
Adjustments/Preparation	None					
Maximum load at failure	88					KN
Failure type	Normal					
Compressive strength	3.9					Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

26/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength Density of Concrete Cubes (BS EN 12390-7 2009 BSEN 12390-3 2009)

Project No	D5234-15	Sample No	6279 A - B	Type	Concrete
Project Name	Atlantic	Client ID	DLS4 T T 2758		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Composite	Date sampled	14/07/2015
Location of placement in works	Slab	Time sampled	Unknown
Specification as ordered	C8/10	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A					
Condition at time of test	Water Saturated					
Method of calculation	Water Displacement					
Calculated Density	1850					Kg/m ³

Curing

Date of receipt	20/07/2015					
Date of test	21/07/2015					
Age of specimen	7					Days
Curing conditions (since receipt)	min 18 max 22					°C

Compressive strength

Designated Size	150					mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	150					mm
	150					
	150					
Surface condition	Surface Dried					
	Checked					
Observations						
Adjustments/Preparation	None					
Maximum load at failure	45					KN
Failure type	Normal					
Compressive strength	2.0					Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

26/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength Density of Concrete Cubes (BS EN 12390-7 2009 BSEN 12390-3 2009)

Project No	D5234-15	Sample No	6280 A - C	Type	Concrete
Project Name	Atlantic	Client ID	DLS5 T T 2759		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Composite	Date sampled	16/07/2015
Location of placement in works	Slab	Time sampled	Unknown
Specification as ordered	C8/10	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A	B	C			
Condition at time of test	Water Saturated	Water Saturated				
Method of calculation	Water Displacement	Water Displacement				
Calculated Density	2060	2030				Kg/m ³

Curing

Date of receipt	20/07/2015	20/07/2015				
Date of test	23/07/2015	23/07/2015				
Age of specimen	7	7				Days
Curing conditions (since receipt)	min 18	min 18				°C
	max 22	max 22				

Compressive strength

Designated Size	150	150				mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	X _m 150	Y _m 150	Z _m 150			mm
Surface condition	Surface Dried	Surface Dried				
Observations	Checked	Checked				
Adjustments/Preparation	None	None				
Maximum load at failure	102	83				KN
Failure type	Normal	Normal				
Compressive strength	4.5	3.7				Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

26/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength Density of Concrete Cubes (BS EN 12390-7 2009 BSEN 12390-3 2009)

Project No	D5234-15	Sample No	6340 A - C	Type	Concrete
Project Name	Atlantic	Client ID	DLS6 T T 2760		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Composite	Date sampled	17/07/2015
Location of placement in works	Slab	Time sampled	Unknown
Specification as ordered	C8/10	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A	B	C			
Condition at time of test	Water Saturated	Water Saturated				
Method of calculation	Water Displacement	Water Displacement				
Calculated Density	1960	2070				Kg/m ³

Curing

Date of receipt	23/07/2015	23/07/2015				
Date of test	24/07/2015	24/07/2015				
Age of specimen	7	7				Days
Curing conditions	18	18				°C
(since receipt)	22	22				

Compressive strength

Designated Size	150	150					mm
Actual Dimensions (mean)	150	150					mm
(if tested in accordance with Annex B)	150	150					
	150	150					
Surface condition	Surface Dried	Surface Dried					
	Checked	Checked					
Observations							
Adjustments/Preparation	None	None					
Maximum load at failure	299	395					KN
Failure type	Normal	Normal					
Compressive strength	13.3	17.6					Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

26/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength Density of Concrete Cubes (BS EN 12390-7 2009 BSEN 12390-3 2009)

Project No	D5234-15	Sample No	6341 A - C	Type	Concrete
Project Name	Atlantic	Client ID	DLS7 T T 2761		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Composite	Date sampled	20/07/2015
Location of placement in works	Slab Edge	Time sampled	Unknown
Specification as ordered	C8/10	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A	B	C			
Condition at time of test	Water Saturated	Water Saturated				
Method of calculation	Water Displacement	Water Displacement				
Calculated Density	1980	2030				Kg/m ³

Curing

Date of receipt	23/07/2015	23/07/2015				
Date of test	27/07/2015	27/07/2015				
Age of specimen	7	7				Days
Curing conditions (since receipt)	min 18	min 18				°C
	max 22	max 22				

Compressive strength

Designated Size	150	150				mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	X _m 150	Y _m 150	Z _m 150			mm
Surface condition	Surface Dried	Surface Dried				
Observations	Checked	Checked				
Adjustments/Preparation	None	None				
Maximum load at failure	172	403				KN
Failure type	Normal	Normal				
Compressive strength	7.6	17.9				Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

27/07/2015

Fig.

TEST CERTIFICATE

Compressive Strength & Density of Concrete Cubes (BS EN 12390-7:2009 & BSEN 12390-3:2009)

Project No	D5234-15	Sample No	6223 A	Type	Concrete
Project Name	Atlantic	Client ID	DLS1 TKT 2755		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Composite	Date sampled	09/07/2015
Location of placement in works	Slab	Time sampled	Unknown
Specification as ordered	C8/10	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A					
Condition at time of test	Water Saturated					
Method of calculation	Water Displacement					
Calculated Density	2200					Kg/m ³

Curing

Date of receipt	15/07/2015					
Date of test	06/08/2015					
Age of specimen	28					Days
Curing conditions (since receipt)	18					°C
	22					

Compressive strength

Designated Size	150					mm
Actual Dimensions (mean) (if tested in accordance with Annex B)	150					mm
	150					
	150					
Surface condition	Surface Dried					
	Checked					
Observations						
Adjustments/Preparation	None					
Maximum load at failure	499					KN
Failure type	Normal					
Compressive strength	22.2					Mpa (N/mm ²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



Approver

R. Anstee

R Anstee, Laboratory Manager

Date

07/08/2015

Fig.

TEST CERTIFICATE

Compressive Strength & Density of Concrete Cubes (BS EN 12390-7:2009 & BSEN 12390-3:2009)

Project No	D5234-15	Sample No	6224 A - C	Type	Concrete
Project Name	Atlantic	Client ID	DLS2 TKT 2756		
Client	Geotechnology Limited 5 Ty Coed, Cefn-yr-Allt, Aberdulais, Neath, SA10 8 HE				

Sampling

Type of sample	Composite	Date sampled	10/07/2015
Location of placement in works	Slab	Time sampled	Unknown
Specification as ordered	C8/10	Delivery Number	Unknown
Sampling Remarks	Cubes sampled and made by client		

Density

Specimen Ref	A	B	C			
Condition at time of test	Water Saturated	Water Saturated	Water Saturated			
Method of calculation	Water Displacement	Water Displacement	Water Displacement			
Calculated Density	2100	2160	2150			

Kg/m³

Curing

Date of receipt	15/07/2015	15/07/2015	15/07/2015			
Date of test	17/07/2015	07/08/2015	07/08/2015			
Age of specimen	7	28	28			
Curing conditions (since receipt)	min 18	18	18			
	max 22	22	22			

Days

°C

Compressive strength

Designated Size	150	150	150			
Actual Dimensions (mean) (if tested in accordance with Annex B)	X _m 150	150	150			
	Y _m 150	150	150			
	Z _m 150	150	150			
Surface condition	Surface Dried	Surface Dried	Surface Dried			
Observations	Checked	Checked	Checked			
Adjustments/Preparation	None	None	None			
Maximum load at failure	354	530	459			
Failure type	Normal	Normal	Normal			
Compressive strength	15.7	23.6	20.4			

mm

mm

KN

Mpa (N/mm²)

Remarks

QA Ref

BSEN 12390

Rev No 1

19/05/2012



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ

Tel: 01656 746762 Fax: 01656 749096



7771

Approver

R. Anstee

R Anstee, Laboratory Manager

Date

07/08/2015

Fig.

**ATLANTIC WASTE
ECOPARK PAVING
PROJECT**

CQA VALIDATION REPORT

**Appendix 6
Slab Core Laboratory
Test Certificates**

Report Number 1379r4v1d0815

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6485	

Site Reference: BH2	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **198**

Minimum Length (mm): **170**

Diameter: **94**

Saturated Density (kg/m³): **2010**

Visual Description:

CBM containing 20mm aggregate with wood, plastic and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **10 to 95**

Length/Diameter Ratio: **0.90**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2030**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **6.5**

Type of Failure: **Normal**

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

Remarks:

QA Ref.

EN 12504-1
Rev. 1.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle,
Bridgend, CF33 6BZ
Tel: 01656 746762 Fax: 01656 749096

Approver

R. Anstee

R Anstee, Laboratory Manager

Date

06/08/2015

Fig.

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6486	

Site Reference: BH3	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **192**

Minimum Length (mm): **160**

Diameter: **94**

Saturated Density (kg/m³): **2160**

Visual Description:

CBM containing 20mm aggregate with plastic and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **20 to 104**

Length/Diameter Ratio: **0.89**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2190**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **12.5**

Type of Failure: **Normal**

Remarks:

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

QA Ref. EN 12504-1 Rev. 1.0	 Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	Approver  R Anstee, Laboratory Manager	Date 06/08/2015	Fig.
--	---	---	---------------------------	-------------

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6487	

Site Reference: BH4	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **152**

Minimum Length (mm): **110**

Diameter: **94**

Saturated Density (kg/m³): **2150**

Visual Description:

CBM containing 20mm aggregate with plastic and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **10 to 90**

Length/Diameter Ratio: **0.85**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2140**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **6.5**

Type of Failure: **Normal**

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

Remarks:

QA Ref.

EN 12504-1
Rev. 1.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle,
Bridgend, CF33 6BZ
Tel: 01656 746762 Fax: 01656 749096

Approver

R. Anstee

R Anstee, Laboratory Manager

Date

06/08/2015

Fig.

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6488	

Site Reference: BH5	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **244**

Minimum Length (mm): **196**

Diameter: **94**

Saturated Density (kg/m³): **2120**

Visual Description:

CBM containing 20mm aggregate with plastic, glass and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **20 to 114**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2130**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **10.0**

Type of Failure: **Normal**

Remarks:

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

QA Ref. EN 12504-1 Rev. 1.0	 Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	Approver  R Anstee, Laboratory Manager	Date 06/08/2015	Fig.
--	---	---	--	-------------

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6489	

Site Reference: BH6	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **190**

Minimum Length (mm): **136**

Diameter: **94**

Saturated Density (kg/m³): **2210**

Visual Description:

CBM containing 20mm aggregate with plastic and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **25 to 119**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2210**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **10.0**

Type of Failure: **Normal**

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

Remarks:

QA Ref.

EN 12504-1
Rev. 1.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle,
Bridgend, CF33 6BZ
Tel: 01656 746762 Fax: 01656 749096

Approver

R. Anstee

R Anstee, Laboratory Manager

Date

06/08/2015

Fig.

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6490	

Site Reference: BH7	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **192**

Minimum Length (mm): **149**

Diameter: **94**

Saturated Density (kg/m³): **2140**

Visual Description:

CBM containing 20mm aggregate with plastic and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **40 to 134**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2150**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **6.5**

Type of Failure: **Normal**

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

Remarks:

QA Ref.

EN 12504-1
Rev. 1.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle,
Bridgend, CF33 6BZ
Tel: 01656 746762 Fax: 01656 749096

Approver

R. Anstee

R Anstee, Laboratory Manager

Date

06/08/2015

Fig.

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6491	

Site Reference: BH8	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **260**

Minimum Length (mm): **212**

Diameter: **94**

Saturated Density (kg/m³): **2210**

Visual Description:

CBM containing 20mm aggregate with plastic, wood and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **15 to 109**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2190**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **17.0**

Type of Failure: **Normal**

Remarks:

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

QA Ref. EN 12504-1 Rev. 1.0	 Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	Approver  R Anstee, Laboratory Manager	Date 06/08/2015	Fig.
--	---	---	--	-------------

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6492	

Site Reference: BH9	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **148**

Minimum Length (mm): **111**

Diameter: **94**

Saturated Density (kg/m³): **2120**

Visual Description:

CBM containing 20mm aggregate with plastic and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **6 to 100**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2110**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **5.0**

Type of Failure: **Normal**

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

Remarks:

QA Ref.

EN 12504-1
Rev. 1.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle,
Bridgend, CF33 6BZ
Tel: 01656 746762 Fax: 01656 749096

Approver

R. Anstee

R Anstee, Laboratory Manager

Date

06/08/2015

Fig.

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6493	

Site Reference: BH10	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **210**

Minimum Length (mm): **173**

Diameter: **94**

Saturated Density (kg/m³): **2110**

Visual Description:

**CBM containing 20mm aggregate with brick fragments.
Aggregate evenly distributed with no segregation,**

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **10 to 104**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2110**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **6.5**

Type of Failure: **Normal**

Remarks:

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

QA Ref. EN 12504-1 Rev. 1.0	 Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	Approver  R Anstee, Laboratory Manager	Date 06/08/2015	Fig.
--	---	---	---------------------------	-------------

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6494	

Site Reference: BH11	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **184**

Minimum Length (mm): **149**

Diameter: **94**

Saturated Density (kg/m³): **2150**

Visual Description:

**CBM containing 20mm aggregate with brick fragments.
Aggregate evenly distributed with no segregation,**

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **50 to 144**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2190**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **8.5**

Type of Failure: **Normal**

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

Remarks:

QA Ref. EN 12504-1 Rev. 1.0	 Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	Approver  R Anstee, Laboratory Manager	Date 06/08/2015	Fig.
--	---	---	---------------------------	-------------

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6495	

Site Reference: BH12	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **300**

Minimum Length (mm): **282**

Diameter: **94**

Saturated Density (kg/m³): **2160**

Visual Description:

CBM containing 20mm aggregate with wood, plastic and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **90 to 184**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2220**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **15.5**

Type of Failure: **Normal**

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

Remarks:

QA Ref.

EN 12504-1
Rev. 1.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle,
Bridgend, CF33 6BZ
Tel: 01656 746762 Fax: 01656 749096

Approver

R. Anstee

R Anstee, Laboratory Manager

Date

06/08/2015

Fig.

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6496	

Site Reference: BH13	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **292**

Minimum Length (mm): **229**

Diameter: **94**

Saturated Density (kg/m³): **2130**

Visual Description:

CBM containing 20mm aggregate with plastic and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **65 to 159**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2130**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **8.5**

Type of Failure: **Normal**

Remarks:

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

QA Ref. EN 12504-1 Rev. 1.0	 Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	Approver  R Anstee, Laboratory Manager	Date 06/08/2015	Fig.
--	---	---	--	-------------

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6497	

Site Reference: BH14	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **232**

Minimum Length (mm): **195**

Diameter: **94**

Saturated Density (kg/m³): **2070**

Visual Description:

CBM containing 20mm aggregate with wood, plastic and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **70 to 164**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2090**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **4.5**

Type of Failure: **Normal**

Remarks:

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

QA Ref. EN 12504-1 Rev. 1.0	 Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	Approver  R Anstee, Laboratory Manager	Date 06/08/2015	Fig.
--	---	---	--	-------------

TEST REPORT
COMPRESSIVE STRENGTH CONCRETE CORES
BS EN 12504-1

Project No.: D5234-15	Client: Geotechnology Limited
Project Name: Atlantic	Address: 5 Ty Coed, Cefn-yr-Allt Aberdulais Neath SA10 8 HE
ATS Sample No: 6498	

Site Reference: BH15	Date Received: 29 July 2015
Location in works: Unknown	Condition as Received: Dry
	Cores Taken By: Apex Testing Solutions
Mix Details: Unknown	Direction of Drilling: Vertical
Date Cast: Unknown	Date of Drilling: 29 July 2015
Age at Test (days): Unknown	Date Tested: 05 August 2015

TEST RESULTS

As Received

Maximum Length (mm): **244**

Minimum Length (mm): **218**

Diameter: **94**

Saturated Density (kg/m³): **2180**

Visual Description:

CBM containing 20mm aggregate with plastic and brick fragments. Aggregate evenly distributed with no segregation,

Size of Bar (mm)	Distance from centre of bar to the top of the core (mm)
None	

After Preparation

Method of End Preparation: **Grinding**

Position Relative to Total Length (mm): **70 to 164**

Length/Diameter Ratio: **1.00**

Time in Water Before Test (days): **1**

Saturated Density (kg/m³): **2190**

Surface Moisture Condition at Test: **Wet**

Compressive Strength (N/mm²) **17.0**

Type of Failure: **Normal**

Remarks:

Size of Bar (mm)	Distance from centre of bar to the nearest end (mm)
None	

QA Ref. EN 12504-1 Rev. 1.0	 Apex Testing Solutions Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	Approver  R Anstee, Laboratory Manager	Date 06/08/2015	Fig.
--	---	--	--	-------------

**ATLANTIC WASTE
ECOPARK PAVING
PROJECT**

CQA VALIDATION REPORT

**Appendix 7
Oil Interceptor Delivery
Note**

Report Number 1379r4v1d0815

DELIVERED NOTE

KINGSPAN ENVIRONMENTAL LTD

COLLEGE ROAD NORTH

ASTON CLINTON

AYLESBURY

BUCKINGHAMSHIRE

HP22 5EW

TEL: +44 (0) 1296 633000

FAX: +44 (0) 1296 633001

Email: kpc.creditcontrol@kingspan.net

Website: www.kingspanenvy.com

Order No:	782381
Order Date:	12/06/15
Account:	09838
Delivery Method:	Normal

DELIVER TO:

THAMES VALLEY CONSTRUCTION
NEAL SOILS, ATLANTIC ECOPARK
NEWTON ROAD
RUMNEY
CARDIFF
CF3 2EJ
Phone 02920 667755

Klargester Reserve The Right To Charge For Re Stocking

CUSTOMER ORDER NO	DESPATCH DATE	HAULIER
QBC-902287-1	30/06/15	

WH	PRODUCT CODE	DESCRIPTION	QUANTITY	UNIT	DELIVERED
A5	NSBECASE025AFK	NSBECASE 025 - 0.7m INV 250P OPA *1.4m Class 1 Bypass Separator, 0.7m Drain Inlet Invert. Nominal Size (Flow Rating) 25 Litres / Second. 250mm PVCu Inlet / Outlet. Pipework Orientation Option A. With Oil Alarm Probe Tube. Klargester Mains High Oil Outdoor Alarm IP65 Mains Powered With High Oil Probe. Installation instructions included Goods must be offloaded by JCB. This is the customer's responsibility MERCHANT - WOLSELEY 02920 667755 SITE - LIAM 01633 615151 ***** For enquires please call 01296 633000 For all DELIVERY related queries, please call the transport department on 01296 633278	1.00	EA	1.00
	017020		1.00	EA	1.00

Haulier Info.

CONDITIONS APPLICABLE TO CLAIMS FOR BREAKAGES SHORTAGES, NON-DELIVERY ETC (BY OUR OWN LORRIES (and transport hired by us))

All goods MUST BE EXAMINED in the presence of our driver and any discrepancies or shortages noted on this paperwork. No claim will be entertained when signed for as Unexamined, with the exception of goods which are packed in parcels, which may be signed for as Unexamined but we must be advised verbally within 48 hours of delivery or in writing within 3 days of any discrepancies or shortages. We take great care in loading our lorries especially on multi drop loads.

PLEASE USE EXTREME CARE AND CAUTION WHILST UNLOADING.

SIGNATURE

PRINT NAME

DATE :

S. MANNING





Geotechnical &
Environmental Services

Ty Coed
Cefn-yr-Allt
Aberdulais
Neath SA10 8HE

T 01639 775293
F 01639 779173

enquiries@geotechnology.net
www.geotechnology.net