Gourock Pierhead Regeneration
Ground Investigation

Interpretative Report

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1.0 Introduction and Objectives

As part of the regeneration of the Gourock Pierhead area, proposals are in place for a variety of new and upgraded facilities. The plans include the construction of a quay wall/ revetment on the present shore line, the development of an area of currently unoccupied land with commercial properties and the upgrading of existing car parking facilities both on Kempock Street and around the railway station. In order to satisfy regulatory authorities and to obtain information for the detailed design of the proposals, a geotechnical and geo-environmental ground investigation has been carried out across the area.

In June 2010 a desk study report was produced by W A Fairhurst & Partners (Fairhurst) for the Gourock Pierhead site and this represented the first phase of the geotechnical and geo-environmental review. An intrusive ground investigation was then carried out between September and December 2011 in order to obtain factual information on the geotechnical properties of the ground and the nature of any contamination present at the site. This report will present an interpretation of the ground investigation data and will provide geotechnical parameters for use in the design process. An environmental risk assessment will also be carried out to establish if there are any issues associated with contamination at the site. Outline recommendations will be given to address any identified development constraints.

2.0 Previous Reports

2.1 Desk Study Information

In June 2010 a geotechnical and geo-environmental desk study report (Reference 1) was produced by Fairhurst to assist in the masterplanning stage of the project. Although at that time the development proposals were not known, the area of the site addressed by the desk study was the same as the area currently being investigated. The site location is given on drawing no 87097/REP/9001 in Appendix 1.

The site area includes at its western end, a car park which runs parallel to Kempock Street. This is accessed from Kempock Street by a ramp that is retained by a wall on its seaward side. In the central part of the site is a natural shingle beach with larger angular blocks placed higher on the shore line. In the east of the site is Gourock Railway Station with associated car parking and an area of largely flat, unoccupied and grass covered ground.

The desk study report used published geological maps to determine that the superficial geology beneath the site was expected to be raised marine deposits of sand and gravel over much of the site. Both Kempock Street and the railway car parks were noted to be underlain by made ground indicating that they may have been constructed on reclaimed land. The bedrock in the area was determined to be a mixture of sedimentary sandstones and siltstones and igneous feldspathic trachyte. The geological map showed the differing rock types to be separated by a number of faults.

The rock types present in Gourock are non-coal bearing strata and underground mining is therefore not a concern, however the trachyte is known to have been locally extracted in the area. An old quarry located around 600m south of the site is now noted to be a local authority registered landfill.

A Landmark Envirocheck report was purchased for the site and historical map extracts were reviewed to establish if any potentially contaminative historical site uses were present in the vicinity of the site. A plan was produced to summarise the potential historical sources of contamination. This showed historical railway sidings through the current railway car park, reclaimed land across the Kempock Street and Railway car parks and two gas works approximately 60m south of the site. The landfill site 600m south of the site was also highlighted on the plan.

The preliminary conceptual site model concluded that hardstanding and building footprints would effectively break the pathway to receptors and the only sensitive type of development with respect to contamination would be areas of reserved green space. A potential pollutant linkage could exist if the soils at any such locations were found to be contaminated because site users could then come into contact with the contamination through dermal contact, inhalation or ingestion.

3.0 Development Proposals

Development proposals are shown on Drawing No. 87097/REP/9002 in Appendix 1. The site can be conveniently split into four discrete areas based on the type of development that is intended for each. A summary of the principal development proposals' is given below:

- Kempock Street car park – it is proposed to alter the layout of the existing car park to accommodate a carriageway on the southern side. The retaining wall adjacent to the access ramp will be replaced and other minor superficial improvements will be made including the introduction of raised planters.
- Shingle beach – the new carriageway will be extended through the current beach area and a quay wall/ revetment will be constructed. It is possible that the Kempock Street car park will be extended into the western end of the current beach area.
- The layout of the railway car park will be altered and it will be extended to the south to provide additional car parking spaces. Localised soft landscaping areas will be introduced.
- Grassed area - the currently unoccupied grassed area of ground is shown to be partially soft landscaping with around half of the zone indicated to be without any development proposals. It is understood, however that this area is intended for future commercial development.

4.0 Ground Investigation

A ground investigation was designed by Fairhurst and was carried out in two phases by BAM Ritchies. The first phase of the works included Kempock Street Car Park, the shingle beach and the grassed area and was carried out between 12th September and 29th October 2011. During this period there were days where no work was carried out due to unfavourable tide conditions preventing work from progressing on the beach. The investigation within the railway car park was subject to prior approval from Network Rail which delayed the commencement of works in this area. These works were therefore carried out as a second phase of ground investigation between 14th and 18th December 2011.

4.1 Site Works

In order to investigate potential constraints to each type of development proposed, the following intrusive investigation was scoped and carried out:

- 3 no. rotary open hole boreholes – on the shingle beach to determine the density profile of superficial soils and the position of rockhead
- 3 no. cable percussion boreholes with rotary cored follow on – on the grassed area proposed for commercial development, to investigate the geotechnical and contamination properties of superficial deposits and the condition of bedrock for a possible piled foundation solution
- 13 no. machine excavated trial pits – 6 no. on the shingle beach to investigate the geotechnical nature of near surface deposits and to collect samples for contamination testing. 7 no. on the grassed area proposed for commercial development, to investigate the geotechnical and contamination properties of shallow superficial soils
- 20 no. window sample holes – 1 no. on the proposed commercial land, 3 no. in Kempock Street car park and 16 no. in the railway car park to investigate the geotechnical nature of shallow soils whilst minimising the area requiring reinstatement
- 3 no. road pavement cores – in Kempock Street car park to assess the condition of the existing road make up
- 15 no. Dynamic Cone Penetration tests – 4 no. in Kempock Street car park (in hand dug inspection pits), 1 no. on the proposed commercial land and 10 no. in the railway car park to assess the engineering property of soils at possible road formation level.

A plan showing the location of exploratory holes is given on drawing no. 87097/REP/9003 in Appendix 1.

4.1.1 Variations to Site Works

Initially it had been proposed to carry out cable percussion boreholes on the beach with rotary open hole follow on, however due to the expected density of granular deposits there and the time restrictions associated with tidal variations, the cable percussion holes were cancelled in favour of rotary open hole drilling throughout the full depth.

Machine excavated trial pits were originally proposed of the two car parks, however it was recognised that this would cause greater disruption during the works and would require a larger area of asphalt reinstatement than the preferred window sample solution.

The Dynamic Cone Penetration (DCP) tests that were carried out in both the Kempock Street and railway car parks and on the proposed commercial site were originally intended to be California Bearing Ratio (CBR) tests. The TRL equation (Reference 2) was used to calculate the equivalent CBR value.

BH02 on the beach was moved to a new position slightly to the east of its original location. This was necessary as tidal variations made it impossible to drill the hole in its original location using the plant that was available for the task. Having reviewed historical map extracts, it is expected that ground conditions at the new position will be representative of those at the original location.

During the excavation of a hand pit to clear services at WS23, an obstruction was encountered. The exploratory hole had to be moved to the side to avoid the obstruction and was undertaken as WS23A.

4.2 Laboratory Testing

Geotechnical laboratory tests were scheduled to characterise the ground and to obtain parameters for the design stage. In line with the preliminary qualitative risk assessment in the June 2010 Desk Study (reference 1); contamination testing was targeted at areas of possible soft landscaping in the proposed commercial development area and the railway car park. Testing required to satisfy the Water Regulations Advisory Scheme (WRAS) and the Building Research Establishment (BRE) were also carried out where water supply pipes or buried concrete respectively could be required. Additionally contamination testing was carried out on samples collected on the beach to assess the possible impact on the marine environment when soil is disturbed during construction works.

Laboratory testing results are presented in the BAM Ritchies factual report in Appendix 2.

4.2.1 Geotechnical Laboratory Testing

The following geotechnical laboratory testing was scheduled and carried out:

- 16 no. natural moisture content tests
- 11 no. plasticity index tests
- 28 no. particle size distribution (PSD) tests
- 7 no. organic matter tests
- 39 no. sulphate and pH tests
- 3 no. one dimensional consolidation tests
- 3 no. triaxial compression tests
- 2 no. uniaxial compressive strength (UCS) tests
- 7 no. point load tests

There were a small number of additional tests (2 no. compaction and 1 no. UCS) that were scheduled but could not be carried out because the samples were unsuitable.

4.2.2 Geo-Environmental Laboratory Testing

The following geo-environmental laboratory testing was scheduled and carried out:

- 22 no. metals suites
- 22 no. total petroleum hydrocarbons (TPH) suites
- 22 no. poly aromatic hydrocarbons (PAH) suites
- 22 no. poly chlorinated biphenols (PCB) suites
- 22 no. volatile organic carbon (VOC) suites
- 22 no. semi-volatile organic carbon (SVOC) suites

5.0 Ground Conditions

The ground descriptions below are based on the factual exploratory hole records from the recent ground investigation. The findings of the intrusive ground investigation are given in the BAM Ritchies factual report in Appendix 2.

5.1 Made Ground

Made ground was encountered in almost all exploratory holes across the site (with the exception of BH02) and was generally found to be granular in nature.

In Kempock Street carpark the made ground was typically gravel with a proportion of sand and less commonly clay. It was encountered for the full depth of the window samples (maximum 3.0m bgl) and was noted to include brick, concrete, ash and tarmac. Obstructions of concrete and brick were recorded at 2.4m in WS30 and at 2.0m in WS32.

On the beach the made ground was encountered to a maximum depth of 2.3m bgl and usually took the form of slightly silty, sandy gravel and cobbles. Foreign debris noted within the made ground in this area included shells, glass, brick, wood, blaes, pottery, cable and wire.

On the grassed area, made ground was recorded to a maximum depth of 4.6m bgl in BH04. The composition of the made ground in this area was a mixture of granular and cohesive material. In places the made ground was noted to be possible land reclamation deposits including reworked bedrock or beach deposits, however elsewhere it was noted to contain foreign debris including brick, concrete, clinker and slag. Black organic silt was also noted locally in TP12.

Made ground was the only material encountered in any of the exploratory holes undertaken in the Network Rail carpark. The made ground here was observed to be almost entirely granular in nature, but usually containing a silt or clay component. Occasionally the granular material was noted to be intermixed with cohesive soil typically described as soft to firm, reddish brown, sandy gravelly clay. In the few locations where the made ground was logged as clay, it was noted to contain significant quantities of sand and gravel. Other material in the made ground in this area included ash, cinders, brick, slag, timber, concrete, blaes and plastic. Obstructions were encountered in WS14, WS23 and WS25 at 2.65m, 0.6m and 2.5m respectively. In WS14 and WS25 the logs indicate that these are likely to be boulders. No comment was made on the nature of the obstruction in WS23.

5.2 Natural Deposits

Natural superficial soils were encountered in none of the window sample holes and in only two trial pits. However, all boreholes extended into natural superficial deposits.

5.2.1 Granular

On the beach, natural granular soils were encountered immediately beneath the made ground and are likely to represent raised marine or beach deposits. They are typically recorded as medium dense reddish brown or brown silty, gravelly fine to coarse sand, sometimes mixed with layers of sandy fine to coarse gravel. The gravel is noted to be of mixed lithologies but is sometimes described as dolerite, basalt or quartz.

The natural granular soils on the beach have been encountered from a minimum depth of 0.6m bgl and extend to a maximum recorded depth of 12.0m bgl where they give way to cohesive soils.

No natural granular material was recorded in the boreholes on the grassed area.

5.2.2 Cohesive

Natural cohesive soils were encountered beneath the granular soils on the beach and also immediately beneath made ground in the proposed commercial area. The cohesive soils have been consistently described in the exploratory hole logs as slightly sandy slightly gravelly clay and is likely to represent a deposit of glacial till. The till is usually stiff, becoming very stiff in BH01, however in BH02 the clay between 11m and 22m depth is recorded as being soft becoming very soft before giving way to very stiff clay at 22m. In BH03 the upper 1.1m of clay was also noted to be soft.

5.3 Bedrock

Bedrock was encountered at 20.7m in BH01 and at 18.7m in BH03 on the shore but was not encountered within the 27.0m hole drilled at BH02. Both BH01 and BH03 continued by open hole drilling through 6.3m of rock. Rock was described as very hard red basalt with 1m of red sandstone recorded at rockhead in BH01.

Beneath the proposed commercial area, the rock was noted to be medium strong or strong, grey, medium grained trachyte. Some slight weathering was visible in fracture zones and two discontinuity sets were detailed – one sub horizontal, close to medium spaced and one sub vertical, medium to widely spaced. Discontinuities are noted to be rough, undulating and sometimes planar. In this area rockhead was encountered at depths ranging from 5.6m to 6.3m bgl and 6m of rock core was obtained from each borehole.

5.4 Road Pavement Cores

Three road pavement cores were obtained in Kempock Street car park. Each of these showed a 50mm thick tarmac wearing coarse underlain by a tarmac base coarse ranging from 70mm to 90mm thick. The stratum beneath this was described as grey angular coarse gravel and cobbles of basalt coated in a fine red dust. Underlying this was a granular material described as brown silty, very gravelly fine to coarse sand or brown sandy fine to coarse gravel.

5.5 Groundwater

Groundwater was encountered in a number of exploratory holes, however it should be noted that, particularly in the vicinity of the beach (BH01, TP01 – TP05) groundwater conditions could be subject to tidal variations.

A summary of groundwater strikes is given in table 1 below:

Table 1: Summary of Groundwater Strikes

Exploratory Hole No.	Depth of Groundwater Strike	Description of Flow Rate
BH01	20.8m	None given
BH04	7.0m	None given
BH05	6.8m	None given
TP01	0.4m	Strong inflow
TP02	0.3m	Seepage

Exploratory Hole No.	Depth of Groundwater Strike	Description of Flow Rate
TP03	0.1m	None given
TP04	0.5m	Strong upweeling flow
TP05	0.1m	Strong flow
TP08	0.4m	Seepage
TP10	0.3m	Seepage
TP12	0.4m	Local seepage

Almost all trial pits (except TP11 and TP13) were noted to be unstable, either locally or affecting all sides. In some cases, particularly on the shore, this may be related to the presence of groundwater within the pit, but even those pits that were recorded as being dry were often noted to have unstable sides.

Groundwater monitoring standpipes were installed in two boreholes on the grassed area that is proposed for future commercial development. The installations were installed through the full depth of made ground at each location. Six rounds of groundwater monitoring were undertaken over the 3 month period following installation of the standpipes. Results are given in Table 2 below:

Table 2: Summary of Groundwater Monitoring Results

	BH04	BH06
Depth of Installation	4.60m	3.90m
Visit 1: 25/10/2011	DRY	3.90m
Visit 2: 02/11/2011	DRY	Damp at base
Visit 3: 21/12/2011	DRY	3.88m
Visit 4: 16/01/2012	DRY	3.88m
Visit 5: 21/01/2012	DRY	3.87m
Visit 6: 24/01/12	DRY	3.87m

Borehole BH04 has been consistently dry and BH05 appears to have only a very small amount of water at the base of the hole.

6.0 Geotechnical Testing and Engineering Properties

The results of all geotechnical laboratory tests are given in the BAM Ritchies factual report in Appendix 2.

6.1 Made Ground

Laboratory tests carried out in made ground were mainly limited to classification tests, together with a number of sulphate and pH tests to carry out a BRE assessment. A summary of the testing

carried out in made ground, both cohesive and granular, is given in table 3 below. This also includes in-situ tests (DCPs and SPTs).

Table 3: Summary of Test Results for Made Ground

Test	No. of Tests	Range	Average
SPT 'N' Value	54	0 - 50	13
Natural Moisture Content	10	12 – 21 %	14.8 %
Sulphate Content (2:1 Aqueous Extract)	35	0.05 – 0.73 g/l	0.18 g/l
pH	35	7.5 – 11	8.4

SPT results for the made ground have been plotted against depth in a graph presented in Appendix 3. The graph shows that the results are typically between 4 and 17 (loose to medium dense) with a small number of higher results.

A graph of natural moisture content against depth is given in Appendix 3 and shows a clustering of results for made ground around 12 to 14%.

As well as natural moisture content tests, several samples of made ground were tested to establish Atterberg Limits. The results of these tests are shown on the Graph in Appendix 3. The cohesive samples of made ground that were tested are shown to be typically low but occasionally intermediate plasticity clay.

A total of 26 PSD tests were also undertaken in the made ground and generally confirm the predominantly granular nature of this material.

The results of sulphate and pH tests have been used to carry out a BRE Special Digest 1 classification. This is discussed in Section 10.0.

A total of 15 DCP tests were undertaken: 4 no. in Kempock Street car park (in hand dug inspection pits), 1 no. on the proposed commercial land and 10 no. in the railway car park. All tests were carried out through made ground materials and the resulting CBR values are variable. Results for each position are given in the Factual Report in Appendix 2 and are discussed in Section 10.0.

6.2 Natural Superficial Deposits

6.2.1 Granular

Due to the limited number of samples of granular material (as it was encountered only in the shore area where boreholes were advanced by open hole methods) laboratory tests in this stratum were restricted to two sulphate and pH tests and two PSD tests. Results are summarised below, together with in-situ SPTs.

Table 4: Summary of Test Results for Natural Granular Material

Test	No. of Tests	Range	Average
SPT 'N' Value	16	10 - 38	21.6
Sulphate Content (2:1 Aqueous Extract)	2	0.1 – 0.15 g/l	0.125 g/l
pH	2	8.4 – 8.5	8.45

The SPT N-values for granular material are plotted against depth on a graph given in Appendix 3. The graph shows that most results are between 19 and 27 indicating that the majority of the material is medium dense.

PSD test results confirm the high granular content of the material.

6.2.2 Cohesive

A summary of the tests carried out in the natural cohesive deposits is given in Table 5 below.

Table 5: Summary of Test Results for Natural Cohesive Material

	No. of Tests	Range	Average
SPT 'N' Value	21	4 - 50	32.2
Moisture Content (%)	6	9.8 – 15 %	12.3 %
Sulphate Content (2:1 Aqueous Extract)	2	0.1 – 0.15 g/l	0.125 g/l
pH	2	8.4 – 8.5	8.45
Undrained shear strength (triaxial test) (kPa)	3	58 – 333 kN/m^2	181 kN/m^2
Undrained shear strength from SPT correlation* (kPa)	21	18 – 225 kN/m^2	145 kN/m^2
Compressibility (m^2/MN) (Pressure range 100-200 kPa)	3	0.06 – 0.12 m^2/MN	0.09 m^2/MN

* SPT correlation for cohesive material only, as presented by Stroud (Reference 3), with a conservative factor of 4.5.

The graph of SPT N values against depth in Appendix 3 shows results for the natural cohesive soils and show that the majority plot between 23 and 38 with no particular trend with increasing depth. This generally classifies the clay as stiff to very stiff.

Results of moisture content tests are plotted against depth on a graph presented in Appendix 3. The graph confirms that the natural moisture content of the clay is consistently between 10 and 15% as detailed in the table above.

Results of Atterberg Limits testing are shown on the Plasticity chart in Appendix 3. Although only three results are available, these indicate that the natural cohesive material is low plasticity clay.

Three undrained triaxial compression tests were undertaken on samples of natural clay. These have been plotted against depth on a graph presented in Appendix 3. Also on this graph are shear strengths determined by correlation with SPT N values for the clay. The Stroud correlation was used (Reference 3) with a conservative correlation factor of 4.5. Although the plasticity index for the clay material has been recorded as 13 which would give a correlation factor greater than 6, plasticity indexes are available over a limited depth range of between 4 and 6m and the plasticity index therefore cannot be relied upon for all SPT results. Results of these tests and correlations indicate that the majority of clay samples tested fall into the high to very high strength category.

Three one dimensional consolidation tests were carried out on samples of the cohesive soil and the resulting coefficient of volume compressibility (Mv) values indicate that the material is of low to medium compressibility. Coefficient of consolidation (Cv) values range from 1.99m^2/yr to 3.6m^2/yr

for samples of the clay. Values quoted take into account in-situ overburden pressures with an allowance of around 100kPa for structural loads.

6.3 Bedrock

Samples of bedrock were tested in the laboratory and results are summarised in Table 6 below and presented on graphs in Appendix 3.

Table 6: Summary of Test Results for Bedrock

	No. of Tests	Range	Average
Point Load Test - Axial	7	2.78 – 7.49 MN/m^2	5.73 MN/m^2
Point Load Test - Diametral	9	4.39 – 7.21 MN/m^2	5.51 MN/m^2
Uniaxial Compressive Strength Test	2	80.76 – 143.02 N/mm^2	111.9 N/mm^2

Uniaxial compressive strength (UCS) tests were carried out on 2 samples of bedrock and these results have been plotted against depth on a graph presented in Appendix 3. A further 8 number point load index tests (7 no. axial and 9 no. diametral) were carried out on rock samples and these have been correlated with UCS using the correlation after Bieniawski, Z.T., 1975 (reference 4). The correlated UCS values from point loads have also been plotted on the graph in Appendix 3. The majority of results indicate that the rock is very strong with two results falling into the strong category.

Axial and diametral point load index tests have been distinguished and presented separately within the plot however no significant differences between the two data sets have been noted, most likely because discontinuities do not favour a single orientation as they are more likely to do in a sedimentary rock.

7.0 Derivation of Characteristic Values

Site wide Characteristic Values have been derived based on a cautious estimate of the in-situ and laboratory test result data taking into account a well established experience of the type of ground conditions present at the site and the nature of the proposed development.

A graph showing SPT 'N' values plotted against depth is given in Appendix 3. The graph has been annotated with lines to represent a cautious estimate of the characteristic N-value for the natural deposits. A dashed line has been used to represent the natural granular material and a solid line has been used to define the natural cohesive material. The profile for the characteristic values represents 10 + (1.8 x depth) and 24 + (0.4 x depth) for the granular and cohesive deposits respectively. It should be noted that the four low (≤10) N values shown below 10m depth on the graph were all recorded in BH02. Therefore the characteristic values quoted should not be relied upon in the vicinity of BH02 where material appears to be generally softer or less dense.

Insufficient consistent or reliable results are available to provide an accurate estimate of the characteristic N-value of the made ground.

Appendix 3 shows the results of moisture content laboratory tests against depth for the various strata tested during the intrusive investigation. A line showing the best fit conservative average for moisture content values for the cohesive soils are shown on that drawing. The characteristic moisture content value for this material has been taken as 12%. This value should only be

assumed to be accurate over the depth range shown on the graph as the moisture content would normally be expected to be higher within the weathered zone near the top of the deposit.

The natural moisture content appears to decrease with depth in the made ground material, however it is considered that showing this as a characteristic value would give a false impression of the reliability of the data for a variable deposit such as made ground.

The characteristic value of undrained shear strength for the natural clay is shown by the line plotted on the graph in Appendix 3. The profile for these values has been taken as 123 + (1.35 x depth)kN/m^2. Although these results are quite widely scattered, this is considered to be a reasonable conservative average. Again, the three results that are < 50kN/m^2 relate to the correlation with SPT results obtained in BH02. The characteristic value for undrained shear strength quoted for clay should therefore not be relied upon for soils in the vicinity of BH02.

The uniaxial compressive strength of rock samples was obtained by laboratory testing both directly and through correlation with point load index tests. The plotted results are shown in Appendix 3. The point load index correlations have been used in combination with the direct UCS test results to obtain the characteristic UCS value for the bedrock. The value has been taken as 132MPa.

8.0 Geo-Chemical Testing and Geo-Environmental Assessment

The Fairhurst Desk Study report produced in June 2010 (Reference 1) included a preliminary geo-environmental assessment and a preliminary conceptual site model. Although the desk study was produced at master planning stage, before development proposals or a plan were available, it did consider options including each of the types of development now being proposed:

- Extension to the promenade and sea wall construction/ repair/ alteration
- New build, mixed use structures
- New roads
- Parking areas
- Areas of soft/ hard landscaping

The following assessment will take forward the initial geo-environmental assessment with consideration of the development plan that is now available and is shown on Drawing No 87097/REP/9002. The principles of environmental risk assessment are given in Appendix 4.

8.1 Human Health Risk Assessment

The preliminary conceptual model confirmed that where hardstanding or building footprints were introduced, the pathway between potential contamination and site users would be effectively broken. These types of land use account for the majority of the development.

The exception to this was noted to be where soft landscaping was proposed. Based on current development proposals, this is likely to be restricted to local areas of planting around the Network Rail car par and the proposed commercial development zone in the east of the site. Although small areas of soft landscaping are shown south of the proposed quay wall/ revetment, it is understood that this ground will be raised as part of the development, reducing the likelihood of end users coming into contact with existing potentially contaminated soils present at the site.

A further possible risk to end users is where water supply pipes could be attacked by contaminants in the soil leading to contamination of the water supply.

The possible pollutant linkages highlighted above have been investigated through the testing of soil deposits in proposed landscaped areas and in areas that could come into contact with water supply pipes. Soils were tested for a range of determinands based on the contaminants of concern identified in the desk study (Reference 1) and those required to carry out a WRAS assessment (Reference 5).

Due to the anticipated presence of made ground and railway land on site, the potential for the migration and build up of gases in confined spaces was highlighted in the initial geo-environmental assessment. This could also impact end users of the site and was therefore assessed by installing ground gas monitoring standpipes in the area proposed for commercial development, i.e. where buildings may be introduced.

8.1.1 Assessment for Soft Landscaped Areas

There will be a risk of site end users coming into contact with potential contamination in areas of soft landscaping either by dermal contact, or by inhalation or ingestion of soil particles. This possible pollutant linkage has been investigated by testing soils in areas that may be occupied by soft landscaping for the contaminants of concern identified at desk study stage. Test results were interpreted using assessment criteria appropriate for residential developments without plant uptake. Where assessment criteria applicable to “residential with no plant uptake” were not available, the criteria suitable for “residential with plant uptake” were used and this is considered to provide a more conservative interpretation. For Benzene the assessment criteria of 0.27µg/kg is lower than the laboratory detection limit of 10µg/kg. In each sample tested Benzene was found at concentrations lower than the limit of detection, however it cannot be confirmed that this determinand passes the assessment criteria.

The test results are given in the Factual Report in Appendix 2 and the assessment is summarised in Table 7 below.

Table 7: Summary of Exceedances in Soil Samples from Possible Areas of Soft Landscaping

Determinand	No. of Samples Tested	No. of Samples Exceeding Assessment Criteria	Assessment Criteria	Maximum Concentration
Napthalene	19	1	1.5 mg/kg	7.2 mg/kg
Benz(a)anthracene	19	6	3.1 mg/kg	26.1 mg/kg
Chrysene	19	3	6 mg/kg	19.9 mg/kg
Benzo(b)fluoranthene	19	2	5.6 mg/kg	20.0 mg/kg
Benzo(k)fluoranthene	19	1	8.5 mg/kg	13.9 mg/kg
Benzo(a)pyrene	19	13	0.83 mg/kg	17.5 mg/kg
Indeno(1,2,3-cd)pyrene	19	2	3.2 mg/kg	9.7 mg/kg
Dibenz(a,h)anthracene	19	6	0.76 mg/kg	3.8 mg/kg
TPH >C16-C21 Aromatic	19	1	250 mg/kg	300 mg/kg

In order to break the pathway from these contaminants (and potentially benzene which cannot be fully assessed) to site end users, it is recommended that a 600mm thick layer of clean soils are introduced to all areas of soft landscaping. The clean cover should comprise a geotextile separator at the base overlain by a 300mm granular deposit of clean crushed stone to act as a capillary break layer. Above this a further 200mm of subsoil and 100mm of topsoil will provide a plant growing medium. This has been designed with reference to the BRE Document, Cover Systems for Land Regeneration (Reference 6).

8.1.2 WRAS Assessment

In areas of contaminated material, water supply pipes may be at risk of failure resulting in leakage to ground and potentially the introduction of contaminants to the water supply. This can happen as a result of the permeation and accelerated deterioration of the pipe material due to chemical reaction between the pipe and contaminants in the ground in which it is laid. Different contaminants have different effects on pipe materials so it is therefore important to consider the effect of contaminants present on a site by site basis. Careful selection, design and installation will not only reduce the risk to human health, it will also conform to the requirement of the various UK Regulations relating to the supply of drinking water.

To assess the risk of this potential linkage, soil results have been analysed using WRAS Report No 9-04-03 Issue 1 “The selection of materials for water supply pipes to be laid in contaminated land” (Reference 5) to allow appropriate pipeline material selection. This guidance states that where soil concentrations exceed the prescribed threshold values specification of the material selected for the pipes will be required.

Samples from exploratory holes on the proposed commercial development site were selected for testing in accordance with WRAS guidelines. Samples were obtained from 0.5m in each exploratory hole and based on logs this material is representative of soils to depths of 1m or

greater. This is considered to be representative of the soils that water supply pipes are likely be in direct contact with.

Table 8 shows the soil test exceedances for WRAS testing for specification of water pipes.

Table 8: Summary of Exceedances in Soil Samples for WRAS Assessment

Determinand	No. of Samples Tested	No. of Samples Exceeding Assessment Criteria	Assessment Criteria	Maximum Concentration
Arsenic	10	3	10 mg/kg	14 mg/kg
Mercury	10	1	1 mg/kg	1.7 mg/kg
pH	10	10	< 5 and > 8	9.1
PAH	10	2	50 mg/kg	77.1 mg/kg
TPH	10	3	50 mg/kg	187 mg/kg

The testing and subsequent analysis shows that the samples tested contain levels of corrosive substances, organic contaminants and toxic substances which exceed the WRAS criteria. The guidance states that where these types of substances are recorded, barrier pipes may be specified. Therefore, to reduce the risk posed by the substances encountered, barrier pipes should be specified for new water pipes. It is expected that only a very short length of new water supply pipe will be required as it is considered likely that the pipe will be brought to the development from Shore Street immediately to the west of the proposed commercial development site.

8.1.3 Ground Gas Assessment

Six rounds of gas monitoring were undertaken at the Gourock Pierhead site in accordance with good practice. The results are summarised in Table 9 below.

Table 9: Summary of Ground Gas Monitoring

	BH No.	Visit 1 25/10/11	Visit 2 02/11/11	Visit 3 21/12/11	Visit 4 16/01/12	Visit 5 21/01/12	Visit 6 24/01/12
CH_4 (%)	BH04	0.0	0.0	0.0	0.0	0.0	0.0
	BH06	0.0	0.0	0.0	0.0	0.1	0.0
CO_2 (%)	BH04	0.1	0.4	1.1	0.2	1.1	0.1
	BH06	0.0	0.1	0.5	0.0	0.6	0.1
O_2 (%)	BH04	19.8	20.3	20.3	20.9	20.5	20.5
	BH06	19.8	20.6	20.6	21.1	20.6	20.6
H_2S (ppm)	BH04	0.0	0.0	0.0	0.0	0.0	0.0
	BH06	0.0	0.0	0.0	0.0	0.0	0.0
CO (pmm)	BH04	0.0	0.0	0.0	0.0	0.0	0.0
	BH06	0.0	0.0	0.0	0.0	0.0	0.0
Atmospheric Pressure	BH04	995	998	1012	1022	1002	1012
	BH06	995	998	1012	1022	1002	1012
Flow (l/h)	BH04	0	0	0.1	0.0	0.0	0.0
	BH06	0	0	0.1	0.0	0.2	0.0

These results have been used to undertake a gas risk assessment as follows:

CIRIA Guideline

A series of guidance documents were published for the construction industry as part of CIRIA's 1990s research programme 'Methane and Associated Hazards to Construction'. These publications included advice on protecting development from methane (Protecting Development from Methane Report 149, 1995) and on the assessment of risk (Risk Assessment for Methane and Other Gases from the Ground, Report 152). Other widely used guidance on ground gases was published by Wilson and Card (1999).

The report '**Assessing Risks Posed by Hazardous Ground Gases to Buildings**' (Report C659, CIRIA, December 2006) has been published aiming to clarify, simplify and update earlier guidance. In December 2007, CIRIA published the revised version of the C659 document under the name '**Assessing Risks Posed by Hazardous Ground Gases to Buildings (revised)** (Report C665, CIRIA, December 2007)' (Reference 7). Previous guidelines all used a method, based on both gas concentrations and borehole flow rates to define a characteristic situation for a site based on the limiting borehole gas volume flow for methane and carbon dioxide. In the new guidance, the limiting borehole gas volume flow is now renamed as the Gas Screening Value (GSV) and can be calculated as follows:

$$GSV\ (l\ of\ gas\ per\ hr) = borehole\ flow\ rate\ (l/hr) \times \frac{gas\ concentration\ (\%)}{100}$$

(Source: C665, CIRIA 2007)

The calculation has been carried out for both methane and carbon dioxide and the worst case value adopted. The 'Characteristic Situation' can then be determined from Table 8.5 in the C665 report.

Ground Gas – Methane and Carbon Dioxide

Six gas monitoring rounds were undertaken between 25th October 2011 and 24th January 2012, and results are enclosed. Carbon dioxide has been recorded at concentrations ranging from 0% (BH06) to 1.1% (BH04), and methane was recorded at concentrations of 0% on all occasions with the exception of visit number 5 when BH06 gave a recording of 0.1%. Flow rate was recorded as 0.0 l/hr with the exception of visit number 3, where it was recorded as 0.1 l/hr and visit number 5 when it was recorded as 0.2 l/hr in BH06 only.

Based on worst case levels for Carbon dioxide, methane and flow rate, the GSV was calculated for each borehole. For BH04 and BH06 the GSV values calculated for both carbon dioxide and methane were found to be less than 0.07 l/hr and therefore lie within Characteristic Situation 1. Furthermore methane levels were always recorded to be below the trigger value of 1% and carbon dioxide concentrations were below 5%. Characteristic situation 1 is classified as very low risk and therefore no special gas protection precautions are considered to be necessary.

8.2 Water Environment Risk Assessment

8.2.1 Superficial Aquifer

The June 2010 desk study report estimated that there was unlikely to be an extensive superficial aquifer due to the limited thickness of natural superficial soils that were expected beneath the site. The ground investigation has confirmed that in the vicinity of the shoreline, natural superficial

deposits are extensive with granular soils encountered to a maximum depth of 12m bgl and then underlain by cohesive material to a maximum confirmed depth of 27m bgl. However, no water was encountered in the granular or cohesive soils soils.

The exploratory holes that were carried out on the proposed commercial site found that natural superficial deposits are limited in this area with a maximum thickness of 2.4m of slightly sandy, slightly gravelly clay being encountered beneath made ground. Water strikes were encountered in two of the three boreholes in this area, however both were within rock. Boreholes BH4 and BH6 had groundwater monitoring standpipes installed through the made ground deposit but these have been found to be dry or contain only a very small amount of water (maximum 30mm) on each occasion that they have been monitored.

Although trial pits in the intertidal zone on the shoreline recorded strong inflows of water, this is related to the tidal conditions and the proximity of these trial pits to the waters edge. Trial pits undertaken on the commercial site recorded only a near surface seepage in three of the seven trial pits carried out in this area (TP08, TP10 and TP12).

None of the twenty window sample holes that were completed on the site recorded any groundwater in superficial deposits.

Excluding the five trial pits on the shore that were affected by water inflow from the Clyde, a total of thirty four exploratory holes were undertaken on the site to investigate the superficial soils. Of these thirty four positions, only three trial pits (TP08, TP10 and TP12) recorded any water strikes within superficial soils and these were noted to be seepages in each case at depths of 0.3m to 0.4m. Furthermore, the groundwater monitoring standpipes that were installed through made ground deposits in two boreholes have been noted to be dry or contain only a very small amount of water (maximum 30mm) on each occasion that they have been monitored. It is therefore considered that the ground investigation confirms that an extensive or continuous superficial aquifer is not present in this area and superficial groundwater is therefore not a viable receptor.

8.2.2 Bedrock Aquifer

Based on published sources detailed in the desk study report (Reference 1), the rock beneath the site is generally classified as a moderately permeable aquifer that does not have a high primary permeability but it is noted that permeability may be variable due to the number of fractures and fissures present in the rock.

On the basis that the site is located very close to the sea, any bedrock aquifer would not be considered suitable as a future drinking water source and therefore it does not represent a receptor. Furthermore, wherever bedrock has been investigated, a layer of relatively impermeable glacial till has been encountered separating the near surface made ground from the bedrock essentially breaking any pathway from potentially contaminated soils to the bedrock.

8.2.3 Surface Waters

The Firth of Clyde surface water body is present to the north of the site. Possible pathways for contaminants to reach the Clyde are either by transport via superficial or bedrock aquifer or by surface water run-off directly into the surface water body.

Section 8.2.1 above concludes that there is no extensive or continuous superficial aquifer and therefore the pathway for transporting potential contamination to the Clyde is broken. Similarly in

Section 8.2.2 the pathway for contamination to reach any bedrock aquifer is broken by the layer of glacial till that been confirmed to be present above the bedrock.

The risks from contaminated surface water run-off to surface water bodies are considered to be reduced by the development as it will introduce or retain existing hardcover. In areas of soft landscaping it has been recommended that clean cover be introduced as part of the recommendations to address the risk to human health described in Section 8.1.1. In the vicinity of the shoreline, the ground will be raised to construct the new carriageway and material will be added to the ground surface to construct the revetment type solution. Each part of the development will therefore reduce the likelihood of potentially contaminated surface water run-off reaching the Firth of Clyde.

During construction of the revetment/ sea wall soil particles will be disturbed near the shoreline. This will increase the likelihood of potentially contaminated soils entering the Firth of Clyde over the construction phase. The construction Contractor should be alerted to this potential pollutant linkage in order that it be addressed in the construction phase method statement and risk assessments.

8.3 Buildings and Services Risk Assessment

The integrity of buried concrete may be at risk from direct contact with aggressive contaminants in made ground present beneath the site. The hardstanding may also be at risk from aggressive contaminants in superficial groundwater from on site sources. Aggressive contaminants include sulphates and sulphides, and acidic conditions. These cause cementitious bonds to break down effectively causing the concrete to disintegrate. Although it has been concluded that superficial groundwater is not present beneath the site, the nature of soil deposits requires an assessment using guidelines set out in BRE Special Digest 1, 2005 3rd Edition (Reference 8). The BRE assessment is detailed in Section 8.3.1 below.

The potential build-up of soil gas in confined spaces could pose an explosion risk to buildings. As discussed in section 8.1 above, ground gas monitoring was carried out on the site proposed for commercial development as it is understood that this is the only part of the site where a building (confined space) is currently proposed. The assessment of the risk from ground gas, together with the recommended mitigation measures are detailed in Section 8.1.3.

8.3.1 BRE Testing

Sulphate and pH testing were undertaken on soil samples in accordance with BRE guidance. Testing was undertaken on samples at a range of depths in exploratory holes located on the shore, in the proposed commercial development site and in the car park areas. Samples were mainly of made ground, however in BH04 and BH06 natural clay was also tested at 5.2 and 4.55m bgl respectively. Natural granular material from TP01 and TP02 was also tested. Based on the history of the site and presence of made ground, the results were assessed for a Brownfield site.

Of the 39 no. samples tested, only one sample (from granular made ground at 2m depth in TP08) recorded a sulphate concentration in excess of 0.5g/l. All 39 samples tested were found to have a pH greater than 6.5. Based on these laboratory test results (excluding TP08, 2m), buried concrete in contact with the range of materials tested should be of design sulphate class DS-1 and ACEC Class AC-1. Locally at TP08, 2m depth the laboratory test result indicates that buried concrete here should be of design sulphate class DS-2 and ACEC class AC-2.

9.0 Geo-Environmental Conclusions

The findings of the ground investigation have been used to update the preliminary conceptual site model that was included in the original Desk Study Report (reference 1). The revised conceptual site model is shown on Drawing No 87097/REP/9004 in Appendix 1 and is summarised below:

- Site end users – exposure to contaminated soil via inhalation, ingestion or dermal contact. It is understood that soft landscaping areas are proposed in parts of the network rail car park and over parts of the proposed commercial development. This introduces a pathway from contaminated made ground to site end users. It is recommended that a layer of clean cover be introduced in areas of soft landscaping to effectively break this pathway and remove the pollutant linkage. Elsewhere, hardstanding or buildings will break the pathway from contaminated made ground to site end users.
- Site end users – ingestion of contaminated drinking water. The risk may be mitigated by selection of appropriate water supply pipe material. Based on the chemical results obtained, barrier pipes may be specified to reduce the risk posed by the substances encountered.
- Site end users – build-up of ground gas posing an asphyxiation or explosion risk. The potential for ground gas generation has been assessed using the results of ground gas monitoring in accordance with CIRIA guidance document C665, 2007. The results of the assessment classify the site Characteristic Situation 1 which is very low risk and does not require any special gas protection measures.
- Water Environment – Superficial aquifer. Based on the findings of the intrusive ground investigation, particularly the absence of consistent groundwater observations, it is considered unlikely that a continuous superficial aquifer is present beneath the site.
- Water Environment – Bedrock Aquifer. Given that the site is in very close proximity to the Firth of Clyde, any aquifer within the bedrock is unlikely to be considered a viable drinking water source and therefore this would not be considered a receptor. Furthermore a layer of relatively impermeable cohesive glacial till has been recorded above bedrock in each exploratory hole where bedrock has been encountered. This would effectively break the pathway from contaminated made ground to the bedrock aquifer.
- Water Environment – Surface Water. Contaminants cannot be transported to surface water bodies via a superficial or bedrock aquifer as it has been demonstrated that a continuous superficial aquifer does not exist beneath the site and because relatively impermeable glacial till above bedrock will prevent contaminants from the made ground reaching the bedrock aquifer. The potential for surface run off to transport contaminants to surface water is reduced by the introduction of hardstanding or clean cover across all parts of the development.
- Buildings and services – potential for ground to be aggressive to buried concrete. The risks may be mitigated through specification of appropriate concrete. Chemical results obtained generally indicate that concrete to Design Sulphate Class DS-1 and ACEC Class AC-1 should be specified. A local result leading to Design Sulphate Class DS-2 and ACEC Class AC-2 was obtained from TP08.

- Construction and maintenance workers may be exposed to potentially contaminated soil and groundwater via inhalation, ingestion and dermal contact. However the risks posed to construction and maintenance works may be mitigated through the adoption of safe systems of work including the wearing of appropriate PPE.
- Construction and maintenance workers – potential for build up of ground gas in confined spaces such as excavations and service trenches, posing an asphyxiation or explosion risk. The findings of the intrusive ground investigation indicate that the potential for generation of significant levels of ground gas is low. However, entry to confined spaces should be carried out in accordance with best practice.

10.0 Engineering Discussion

10.1 Ground Conditions

The intrusive ground investigation confirmed the presence of typically granular made ground across the entire site (with the exception of BH02). The made ground, whilst generally sand and gravel, is usually noted to contain some silt or clay material and also a significant proportion of anthropogenic material including brick, concrete, ash and cinders. Beneath the commercial site layers of cohesive made ground are more common.

A significant thickness of natural silty gravelly sand was recorded in the boreholes on the shingle beach and this was underlain by cohesive material at around 12m depth. On the grassed area, no granular natural soils were encountered but glacial till directly underlay the made ground.

On the beach, rock of red sandstone and basalt was confirmed in only two of the three rotary boreholes at depths of 18.7m and 20.7m. The third rotary hole extended to 27m bgl but terminated in cohesive superficial material. Bedrock was found at depths ranging from 5.6m to 6.3m beneath the proposed commercial site and comprised grey trachyte.

With the exception of the trial pits on the beach, which were heavily affected by the proximity to the Firth of Clyde, very little groundwater was encountered on the site. Water strikes in boreholes were generally at or below rockhead and three trial pits on the grassed area recorded seepages at shallow depths. The groundwater monitoring installation in BH04 was noted to be dry on each of the six monitoring visits. The installation at BH06 usually found a very small amount of water (maximum 30mm) in the base of the hole.

10.2 Foundation Design

Buildings are proposed only on the grassed part of the site. Exploratory holes undertaken here indicate that ground conditions comprise granular and cohesive made ground to depths ranging from 3.5m to 4.6m underlain by stiff slightly sandy, slightly gravelly clay. Trachyte bedrock was encountered at depths ranging from 5.6m to 6.3m. The made ground is likely to have variable engineering properties which is confirmed by the variable SPT and CBR values obtained throughout this material. Untreated made ground is rarely considered to be a suitable bearing stratum for structural foundations in view of the unacceptably high risk of compression and/or differential settlement.

The geotechnical properties of the made ground could be improved using a ground improvement technique such as vibro replacement subject to consultation with specialist contractors. Suitable treatment of the made ground will increase the allowable bearing capacity and traditional strip

foundations for a low rise commercial structure are likely to be feasible. A second possible foundation solution is the use of mini-piles to carry loads to deeper levels within the underlying competent glacial till or bedrock. Stiff glacial till would be expected to have a minimum presumed bearing value of around 150 – 200kN/m^2 with trachyte having a presumed bearing value in excess of 500kN/m^2. Given the minimal thickness of clay situated above the rock, it may prove more economical to drive piles through the clay to rock in order to increase the capacity of each pile and optimise the spacing. It is suggested that driven steel tubes or precast concrete will be the most economical mini-pile solution. Few obstructions were encountered during the ground investigation across the entire site and none were found in the area of the proposed commercial development, however trial pits in this area did record boulders, brick and concrete. A specialist piling contractor should be consulted to discuss the most appropriate detailed design.

The presence of sulphates within soil and groundwater may lead to the attack and corrosion of concrete structures. Based on the geochemical test results in relation to BRE Special Digest the site generally has an Aggressive Chemical Environment for Concrete (ACEC) site classification of AC-1. The design sulphate class is DS-1. However, a local variation was found at TP08 where the ACEC class is AC-2 with design sulphate class DS-2.

Shallow foundations or piles will come into contact with the made ground and it is therefore recommended that all buried concrete be designed in accordance with BRE Special Digest 1 for the conditions indicated above.

10.3 Earthworks, Excavations and Dewatering

It is understood that the majority of the development, excluding the shore area, will not require any significant earthworks and that excavations are likely to be restricted to those required for foundations and installing services. During the trial pitting exercise, most trial pits were noted to be unstable to some degree, regardless of the presence or absence of groundwater. It is therefore expected that excavations in the made ground will require support to side walls.

Shallow excavations in cohesive glacial till are likely to remain stable in the short term, however support may be required if excavations are deep or require to stay open for extended periods of time.

Granular material encountered beneath made ground on the shore was generally noted to be medium dense and excavations in this material may be expected to remain stable in the short term. However groundwater fluctuations associated with tidal conditions will lead to instability and it is likely that when excavations are required to remain open for long periods, wall support will be necessary.

Near the shingle beach proposals include raising ground level and constructing a sea wall or revetment. Given the granular nature of the soils in this area no special measures are considered necessary to prepare the ground prior to upfilling other than those required for normal earthworks exercises including levelling and benching. A geotechnical global stability check will be required regardless of whether a sea wall or a revetment solution is taken forward. Additionally it is anticipated that an engineering assessment of bearing, overturning and sliding potential will be required for the sea wall option.

Trial pits excavated near the shore were subject to almost instantaneous water ingress, however it is recognised that this will vary with location and tidal fluctuations. This should be highlighted as a construction hazard and should be addressed within the construction methodology. It is

expected that the effects of groundwater inflow will be more significant in the event that a sea wall design is taken forward than would be for a rock armour solution.

Across the proposed commercial development area groundwater was encountered only as local relatively minor seepages and no water has been recorded in groundwater monitoring standpipes. Exploratory holes carried out in the two car parks did not record any water strikes. It is therefore considered that sump pumping should be an adequate method of dewatering any shallow excavations undertaken in these areas.

It is understood that there are proposals for improving the retaining wall that currently forms the access into Kempock St car park. Window samples undertaken in this area indicate that the existing retaining wall is founded on granular made ground, and the wall currently appears to be in good condition.

10.4 Roads and Car Parking

Car parking is proposed over a large part of the site and CBRs (converted from DCPs) were carried out within near surface material in order to establish the nature of the shallow soils for road pavement construction. All DCPs were undertaken in made ground as this material extended the full depth of the window sample hole in each case. Graphs showing CBR values plotted against depth are given in the Factual Report in Appendix 2. The CBR values obtained are variable, as would be expected in this type of material. For example when debris such as brick or concrete is encountered a false high CBR value will be recorded but this cannot be relied upon.

Given the presence of variable made ground, a full capping thickness is considered to be necessary for the road construction. Generally this is required where made ground is present and the road is to be adopted. If the existing car parks to not have to meet adoptable standard, it may be possible to reduce the capping thickness. However it is recommended that as a minimum, the area be proof rolled and any soft spots are removed and replaced with compacted granular material, such as type 1, to achieve a consistent formation platform.

Based on the descriptions shown on the exploratory hole logs, made ground beneath the car parks is predominantly granular. It may therefore be possible to reuse this material as capping beneath the new road subject to compliance testing. Grading and crushing may be required in order to meet grading requirements.

10.5 Obstructions and Services

During the ground investigation, obstructions were encountered in five window sample holes: WS14, WS23 and WS25 in the Network Rail car park and WS30 and WS32 in the Kempock Street car park. In the Network Rail car park the obstructions were typically thought to be boulders, however in Kempock Street the obstructions were noted to be concrete and brick. Obstructions within the made ground can therefore be expected during excavation works, however the ground investigation revealed no conditions that would indicate that there are large or onerous obstructions present beneath the site. Active buried services are present frequently beneath the site and redundant services are also thought to be present beneath the grassed area proposed for commercial development.

Allowance should also be made for breaking out hard cover at the surface as this is widely present across the site.

Water supply pipes should be specified in accordance with the WRAS assessment outlined in Section 8.1.2. Barrier pipes are considered appropriate at this site.

11.0 References

1. W A Fairhurst & Partners, Gourock Pierhead Masterplan, Geotechnical & Geoenvironmental Desk Study Report, Ref: 85160, Date: 18/06/10
2. Log10(CBR) = 2.48 - 1.057 Log10 (mm/blow) : Overseas Road Note 8. A users manual for a program to analyse dynamic cone penetrometer data. Transport and Road Research Laboratory, 1990
3. Stroud, M.A., The standard penetration test in insensitive clays and soft rocks, Proceedings of the European Symposium on Penetration Testing
4. Is(50) * k = UCS, where k = 24 - Bieniawski, Z.T., 1975
5. Water Regulations Advisory Scheme, October 2002, “The selection of materials for water supply pipes to be laid in contaminated land” Information and Guidance Note No. 9-04-03, Issue 1
6. BRE Press, Cover Systems for Land Regeneration, Thickness Design of Cover Systems for Contaminated Land, March 2004
7. Report C665, CIRIA, December 2007, Assessing Risks Posed by Hazardous Ground Gases to Buildings (revised)
8. BRE, 2005, Special Digest 1, “Concrete in Aggressive Ground”, 3rd edition

Appendix 1

Drawings

87097/REP/9001 Site Location Plan

87097/REP/9002 Development Proposals

87097/REP/9003 Exploratory Hole Location Plan

87097/REP/9004 Developed Conceptual Site Model

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Rev.	Date	Description	Drawn	Checked	Approved

riverside inverclyde

Project Title:
GOUROCK PIERHEAD REGENERATION
GROUND INVESTIGATION

Drawing Title:
SITE LOCATION PLAN

FAIRHURST
W.A. Fairhurst & Partners
225 Bath Street, GLASGOW, G2 4GZ
Tel: 0141 204 8800 Fax: 0141 204 8801

Scale at A4:	Status:	
NTS	For Information	
Drawn: MEW	Checked: SE	Approved: AB
Date: 16/01/12	Date: 16/01/12	Date: 16/01/12
Drawing No.: 87097/REP/9001		Revision: –

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CAR PARKING SUMMARY		
LOCATION	EXISTING	PROPOSED
KEMPOCK STREET CAR PARK	200	164
KEMPOCK STREET (NORTH SIDE)	25-30	25-30
KEMPOCK STREET (SOUTH SIDE)	-	25
NEW EAST BOUND CARRIAGEWAY ON STREET PARKING	-	34
NEWORK RAIL STATION CAR PARK *	112	143
TOTAL PROJECTED PROVISION	337-342	391-396

*PER EXISTING PLANNING APPROVAL

BUDGET COST SUMMARY	
AREA	COST
1.01	£148,000
1.02	£405,000
1.03	£100,000
1.04	£20,000
2	£1,240,000
3	£405,000
4	£975,000
PRELIMINARIES	10%
CONTINGENCIES	10%
DESIGN FEES	£650,000
INFLATION	£50,000
TOTAL	£4,660,000

IMPORTANT
The contractor will be held to have examined the site and checked all dimensions and levels before commencing construction work. Do not make assumptions - refer to the Landscape Architect. Do not scale from this drawing. If in doubt - ask

REVISIONS
REV A - 19/07/11 - RGI/BJH
DWG UPDATED TO REFLECT ENGINEER'S & INVERCLYDE COUNCIL'S COMMENTS.
REV B - 22/08/11 - BM/PRM
DWG UPDATED TO REFLECT ENGINEERS COMMENTS (22/08/11)
REV C - 23/09/11 - BM/PRM
BUDGET COST SUMMARY SHOWN.
REV D 25/09/11 BM/PRM
DRAWING UPDATED TO INCORPORATE IC COMMENTS (25/09/11). ACCESS TO STATION RELOCATED FURTHER EAST SIGNALISED JUNCTION AT SHORE STREET/KEMPOCK STREET REMOVED. MR CAR PARK RECONFIGURED, BEACH ACCESS ADDED, POTENTIAL EXTENDED CAR PARKING ZONE INDICATED.
REV E - 22/09/11 - BM/PRM
LAYOUT AMENDED FOLLOWING COMMENTS FROM FAIRHURST - JUNCTION TO STATION EXIT AND JUNCTION TO SOUTHWEST CORNER ADJUSTED.
REV F 05/10/11 BM/PRM
POTENTIAL EXTENDED PARKING ZONE INDICATED, BUDGET COST SUMMARY SHOWN.
REV G - 26/10/11 - BM/PRM
MARINA BRIDGE, ADDITIONAL SLIP ROAD AT EAST JUNCTION ADDED, CAR PARK EXTENSION COLOURED AND POSSIBLE ADVANCED WORKS AREA NOTED - ALL PER CLIENTS INSTRUCTIONS.
REV H - 14/11/11 - AR/PRM
BUS LAY-BY AT STATION EXTENDED

Hirst
LANDSCAPE ARCHITECTS
16 ROYAL TERRACE, GLASGOW, G3 7NY - T: 0141-332-2052
F: 0141-332-2058 - E: info@hirsts.co.uk - W: www.hirsts.co.uk

Issue for: INFORMATION

Project: GOUROCK WATERFRONT

Title: SPLIT CARRIAGEWAY OPTION SKETCH DESIGN

Client: RIVERSIDE INVERCLYDE

Drawn	Checked
BM	PRM
Scale	Date
1:500@A1	05/08/11
Job No	Drawing No	Revision
1194	40	H

Rev.	Date	Description	Drawn	Checked	Approved

Notes:
LEGEND
SITE BOUNDARY

Client: riverside inverclyde

Project Title:
GOUROCK PIERHEAD REGENERATION
GROUND INVESTIGATION

Drawing Title:
DEVELOPMENT PROPOSALS

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Scale at A3:	Status:	
NTS	For Information	
Drawn:	Checked:	Approved:
MW	SE	AB
Date:	Date:	Date:
16/01/12	16/01/12	16/01/12

Drawing No.: 87097/REP/9002
Revision: –

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LEGEND

- BOREHOLE
- TRIAL PIT
- WINDOW SAMPLER
- ROAD PAVEMENT CORE
- CBR TEST
- AREA OF PROPOSED HARDSTANDING/CAR PARKING
- EXISTING CAR PARK
- AREA OF PROPOSED QUAY WALL/REVETMENT
- AREA OF PROPOSED COMMERCIAL DEVELOPMENT
- AREA OF EXISTING CAR PARKING

Rev.	Date:	Description	Drwn.	Chkd.	Appd.

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Client: riverside inverclyde

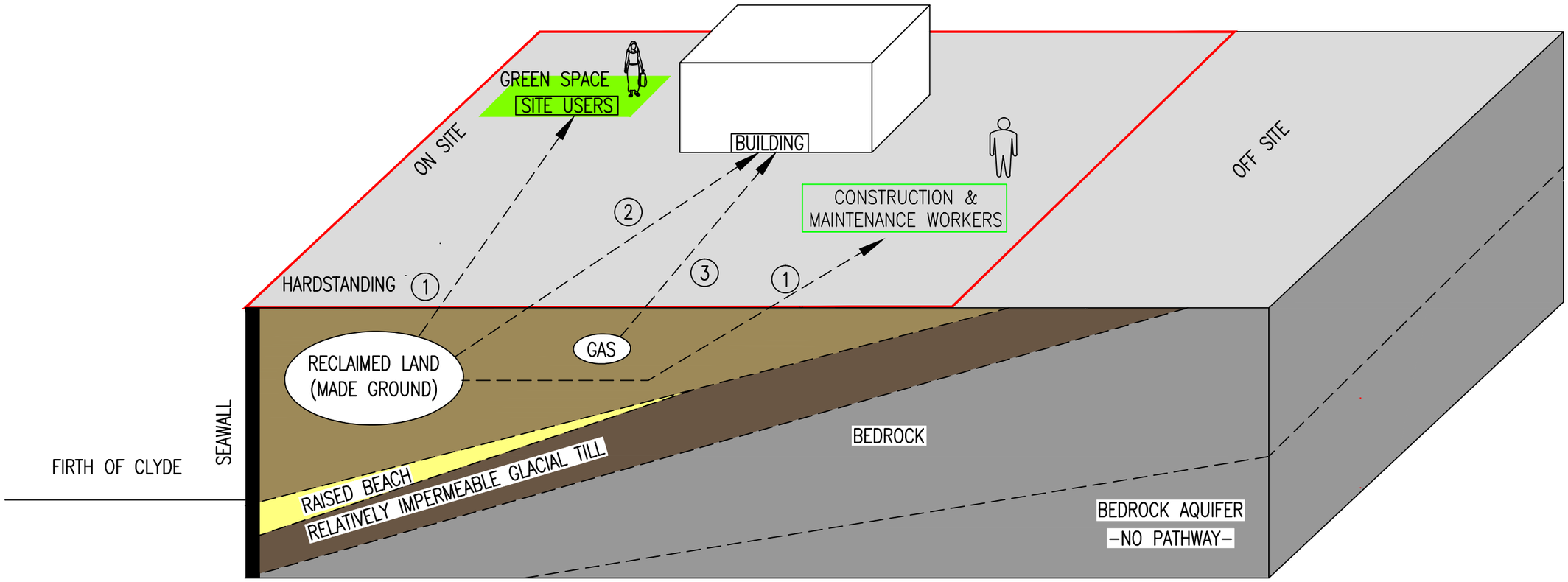
Project Title:
GOUROCK PIERHEAD REGENERATION
GROUND INVESTIGATION

Drawing Title:
EXPLORATORY HOLE LOCATION PLAN

Scale at A1:	Status:	
NTS	For Information	
Drawn:	Checked:	Approved:
MW	SE	AB
Date:	Date:	Date:
16/01/12	16/01/12	16/01/12

Drawing No.: 87097/REP/9003 Revision: –

Do not scale from this drawing.



Rev.	Date	Description	Drawn	Checked	Approved

Notes:

SOURCE

RECEPTOR

1 DERMAL CONTACT–INHALLATION–INGESTION

2 DIRECT CONTACT

3 VOLATALISATION

Client: riverside inverclyde

Project Title:
GOUROCK PIERHEAD REGENERATION
GROUND INVESTIGATION

Drawing Title:
DEVELOPED CONCEPTUAL
SITE MODEL

FAIRHURST
W.A. Fairhurst & Partners
225 Bath Street, GLASGOW, G2 4GZ
Tel: 0141 204 8800 Fax: 0141 204 8801

Scale at A3:	Status:		
NTS	For Information		
Drawn:	Checked:	Approved:	
MW	SE	AB	
Date:	Date:	Date:	
16/01/12	16/01/12	16/01/12	
Drawing No.:			Revision:
87097/REP/9004			–

Appendix 2

Factual Ground Investigation Report

Ground Investigation Report




Gourock Pierhead

For

W.A. Fairhurst & Partners

Ground Investigation Report
Control Sheet

BAM Ritchies
Division of BAM Nuttall Ltd.
Group Company of Royal BAM

Glasgow Road
Kilsyth
Glasgow. G65 9BL

Telephone 01236 467000
Telefax 01236 467030

Contract No.	4618
Report Status	Final
Issued To:	W.A. Fairhurst & Partners
Site:	**Gourock Pierhead Regeneration**
Consultant:	W.A. Fairhurst & Partners 225 Bath Street Glasgow G2 2GZ
Volume No.:	1
Copy Number:	1 pdf copy

Prepared &: P. McGinily: BSc(Hons) MSc FGS R Cameron Date: 03-02-12
Checked By Senior Geotechnical Engineer

Approved By: A.H. Stevenson: BEng. A. H. Stevenson Date: 03-02-12
Ground Investigation Manager

CONTENTS

1.0 INTRODUCTION

The contents of this report relate to a ground investigation carried out at Gourock Railway Station Car Park and the area immediately to the west and south of the Station.

The purpose of the investigation was to provide additional information on the sequence of strata and soil Conditions' at the site. This report has been prepared in accordance with the principles of BS EN 1997-2:2007[1] and BS EN ISO 22475-1:2006[2].

The report was commissioned by W.A. Fairhurst & Partners, 225 Bath Street, Glasgow, G2 2GZ.

A factual account only of all fieldwork and laboratory testing was requested by the Engineer

2.0 BRIEF DESCRIPTION OF THE SITE

The site is located in Gourock, west of the City of Glasgow, at approximate national Grid Reference 224100E 67795N. The site is suited on the seaward boundary of the headland between West Bay and Gourock Bay. The site can be broken into four areas:-

1. Kempock street car park running west from the Shingle beach to the Outdoor swimming pool.
2. Shingle beach north-west of the station, between the Station car park and Kempock Street Car park.
3. Station car park and derelict ground running south east from the existing car park
4. Vacant land between the station car park and Shore Street, site of the former Bay Hotel and Post office.

3.0 PROPOSED DEVELOPMENT

Consideration is being given to the regeneration of the area around the Railway Station, which at the time of the ground Investigation was undergoing a major redevelopment. The regeneration includes:-

- A new quay wall/revetment along the shingle beach.
- Extension and alteration of the existing station car park
- Area of vacant land intended for commercial use.

[1] BS EN 1997-2:2007 Eurocode 7 – Geotechnical design – Part 2: Ground Investigation and testing.
[2] BS EN IS0 22475-1: 2006 Geotechnical investigation and testing – Sampling methods and groundwater measurements – Part 1: Technical principles for execution.

4.0 RECORDED GEOLOGY

From the 1:50,000 scale published geological maps[3] of the area the following stratigraphy of the site has been inferred. No assurance is given as to its accuracy.

The drift deposits at the site are documented as consisting Recent Raised Beach Deposits and associated marine and estuarine alluvium from post-Glacial times. It is inferred that Glacial Till deposits underlie the Raised Beach Deposits.

The underlying solid geology at the site is recorded as being from the Lower Carboniferous era and is expected to be in the Kinnesswood Formation consisting mainly of red sandstones and siltstones. Also a Trachyte igneous intrusion is shown to underlie the centre portion of the site

The published geological records consulted during the preparation of this report show made ground, of varying thicknesses will be encountered across the area of the site covering the station and car park up to Kempock Street in direct relation to past land reclamation.

5.0 FIELDWORK

5.1 Position Fixing and Levelling

The Client's preferred borehole and trial pit locations were set out by BAM Ritchies Geotechnical Engineer in agreement with the Engineer and the locations were scanned for the presence of any Statutory Undertakers and/or any other apparatus. On completion of the fieldwork all boreholes and trial pits were co-ordinated to the Ordnance Survey National Grid and levelled to Ordnance Datum by BAM Ritchies survey team.

A location plan of the surveyed positions is contained in Appendix 1.0 of this report.

5.2 Fieldwork Period

Fieldwork was carried out between 12th September 2011 and 6th October 2011 and the 25th October 2011 and 29th October 2011 to complete the intertidal work. Weekly groundwater and gas monitoring of the borehole installations was carried out from 6th October to 4th November 2011.

[3] BGS Scotland Sheet 30W and 29E: Solid and Drift Editions

5.3 Ground Investigation

5.3 1 Hand Excavation and Buried Services

Prior to the commencement of each exploratory hole, a BAM Ritchies Buried and Overhead Services Co–ordinator undertook a CAT and Genny survey of the site. In addition an inspection pit was hand excavated to a depth of 1.20m at each borehole location in order to locate any otherwise undetected service pipes, ducts, conduits or cables.

5.3.2 Continuous Percussion Boring

Three number boreholes, WS30 to WS32 were formed using a Dando 'Terrier' 200 continuous percussion soils boring rig and were sunk to depths of between 2.00m (WS32) and 3.00m (WS31).

Regular undisturbed U86's for geotechnical testing were recovered, in addition, Standard Penetration Tests (S.P.T.) were carried out. Environmental samples comprising, tub, amber jar and vial were obtained from the inspection pit for contamination testing

5.3.3 Light Cable Percussion Boring

Three boreholes, BH04 to BH06 were sunk using light cable percussion soils boring techniques. Bulk soil samples were recovered from the hand dug inspection pits and at intervals throughout the borehole. In predominantly fine soils, U100 open-drive soil samples were attempted at regular depth intervals. Standard Penetration Tests (SPTs) were carried out in predominantly coarse soils.

5.3.4 Trial Pitting

Thirteen number trial pits, TP01 to 13 were excavated using a 13t tracked excavator (TP01 to 06) and JCB 3Cx (TP 07 to TP13). The purpose of the pits was to allow inspection of the soil deposits and to recover samples for subsequent laboratory testing. The machine-dug pits were logged by BAM Ritchies Geotechnical Engineer. Photographs were taken of pit side, base and spoil and are presented in Appendix 8.

5.3.5 Rotary Boring

Three number boreholes, 01 to 03, were undertaken by rotary open hole and methods from ground level. Boreholes 04 to 06, were continued from the base of the LCP boreholes by rotary coring methods.

A track mounted hydraulic top-drive rig was utilised for all rotary drilling. During coring operations, double-tube face discharge 412DT core barrels were used in conjunction with air and flush and diamond tipped core bits; the resultant rock cores were nominally 76mm in diameter.

5.3.6 Pavement Cores

Three number pavement cores RPC01 to RPC03, were recovered from Kempock Car Park by rotary coring techniques.. After completing the coring operation the holes were extended by hand digging to confirm the depth of sub base.

5.4 Insitu and Field Testing

5.4.1 Standard Penetration Tests

Standard Penetration Tests (SPTs) were performed at regular depths in coarse soils or where undisturbed sampling proved ineffective. A split barrel sampler or cone was used as appropriate. The uncorrected N-value results of these tests have been used to describe the relative density of coarse soils as illustrated in section 41.3.2 of BS5930:1999 Amendment 2[4].

The relative density terms displayed on the borehole logs are for descriptive purposes only and no correction or interpretation of N-values, or density terms relating to corrected values, has been made. Any corrections to the N-values or relative density terms should only be made using procedures contained within BS EN 1997-2:2007 and associated relevant standards.

The uncorrected results of the standard penetration tests are displayed on the borehole logs provided in Appendix 2.0 of this report. A certificate of calibration for SPT Hammer BRK 02 is presented after the borehole logs in Appendix 2.0.

[4] BS 5930:1999 Amendment 2 – Code of practise for site investigations.

5.4.2 Dynamic Cone Penetration Tests

Four number DCP tests, CBR01 to 04 were undertaken in Kempock Car park from the base of hand dug pits. The results of these tests are presented in Appendix 3.0.

5.5 Standpipe Installations

On the instruction of the Client, perforated standpipes complete with valve taps and removable screw caps were installed at shallow depths in two boreholes, 04 and 06, to allow monitoring of groundwater levels and gas concentrations. Water sampling was carried out in compliance with BS 10175:2001[5].

Details of the installations are provided on the appropriate borehole log in Appendix 2.0 of this report.

5.6 Groundwater Observations

In the course of drilling each borehole, the incidence of groundwater was noted by the driller.

All groundwater observations are detailed in the borehole logs in Appendix 2.0 of this report.

Subsequently, upon installation of the standpipes, BAM Ritchies Geotechnical Engineer has taken electric dipmeter soundings on a regular basis in accordance with CIRIA C665-2007[6].

The results of the soundings are presented in Appendix 4.0 of this report.

5.7 Gas and Groundwater Monitoring

Upon the completion of the site works, Ritchies Geotechnical Engineer returned to site on six occasions to monitor groundwater levels, flow rates and composition. Monitoring for gas included oxygen, carbon dioxide, methane, carbon monoxide and hydrogen sulphide levels together with barometric pressure and flow. This was carried out using a GA-2000 Infra Red Analyser manufacture by Geotechnical

[5] BS 10175:2001 – Investigation of potentially contaminated sites.
[6] CIRIA C665: 2007 Assessing risks posed by hazardous ground gases to buildings.

Instruments. These results are presented in Appendix 4.0 of this report.

6.0 ROCK

All rock cores were logged by BAM Ritchies Geotechnical Engineer using guidelines detailed in BS EN ISO 14689-1:2003[7]. Measurements of Total and Solid Core Recovery together with Rock Quality Designation are detailed on the borehole logs in Appendix 2.0 of this report.

All rock cores were photographed by BAM Ritchies Geotechnical Engineer using a digital camera. Each core photograph includes a clear title sheet indicating the borehole number, core run information and a standard colour chart and grey scale. Photographs are presented in Appendix 7.0 of this report.

7.0 LABORATORY WORK

7.1 Soil

All soil samples were described in the laboratory by BAM Ritchies Geotechnical Engineer using guidelines detailed in BS EN ISO 14688-1:2002[8] and BS EN ISO 14688-2:2004[9]. The relative density terms, relating to coarse soils, displayed on the borehole logs are for descriptive purposes only and no correction or interpretation of N-values, or density terms relating to corrected values, has been made.

The relative density terms and corresponding uncorrected N values are illustrated in section 41.3.2 of BS5930:1999 Amendment 2. Consistency terms for fine soils are based on manual tests as detailed in BS EN ISO 14688-1:2002.

Borehole and hand pit logs are provided in Appendix 2.0 of this report.

A programme of laboratory testing instructed by the Engineer was carried out on selected soil samples. All testing was undertaken in accordance with BS1377:1990[10] and other relevant, current standards as appropriate. References and methods for each test are detailed on the appropriate result sheets in Appendix 5.0 of this report.

[7] BS EN ISO 14689: 2003 Geotechnical investigation and testing – Identification and classification of rock – Part 1: Identification and description.
[8] BS EN ISO 14688-1:2002 Geotechnical investigation and testing – Identification and classification of a soil – Part 1: Identification and description.
[9] BS EN ISO 14688-2:2004 Geotechnical investigation and testing – Identification and classification of a soil – Part 2: Principles for a classification.

7.1.1 Soil Classification Tests

The following soil classification tests were carried out:

- Sixteen Natural Moisture Content determinations.
- Eleven Atterberg Limits tests.
- Twenty eight Particle Size Distribution tests including ten Sedimentation tests.

7.1.2 Soil Chemical Tests

The following soil chemical tests were carried out:

- Twenty seven Sulphate Content tests on 2:1 aqueous extracts.
- Twenty seven pH. Value tests
- Seven organic Matter tests

7.1.3 Soil Compressibility Tests

The following soil compressibility tests were carried out.

- Three Oedometer One Dimensional Consolidation tests.

7.1.4 Soil Strength Tests

The following soil strength tests were carried out:

.

- Three Immediate Undrained Triaxial Compression Strength tests, performed using multi stage testing techniques on approximately 100mm diameter undisturbed samples

The results of all Geotechnical laboratory tests are contained in Appendix 5.0 of this report

[10] BS1377:1990 Methods of test for soils for civil engineering purposes: Incorporating Amendment No.1.

7.1.5 Soil Contaminant Tests

Analyses for the presence and quantity of the following contaminants were carried out:

- Thirteen tests for Arsenic, Cadmium, Chromium, Chromium VI, Lead, Mercury, Selenium, Boron, Copper, Nickel, Zinc
- Thirteen, free Cyanide, Phenols, Ammonia
- Thirteen Fractional Organic Carbon
- Thirteen speciated TPH Banded (Aliphatic/ Aromatic split) tests.
- Thirteen Speciated PAHs
- Thirteen PCBs
- Thirteen SVOCs
- Thirteen Volatile Organic Compounds
- Thirteen Asbestos Screens

The results of all soils laboratory tests are contained in Appendix 6.0 of this report.

7.2 Soil Leachate

7.2.1 Leachate Tests

Analyses for the presence and quantity of the following contaminants were carried out.

- Thirteen tests for Arsenic, Boron, Cadmium, Chromium, Chromium VI, Copper, Lead, Mercury, Nickel, Selenium, Zinc, Cyanide (free), Phenols(total), TPH, speciated PAH (USEPA 16), BTEX, PCBs, Ammonia.

The leachate test results are expressed in accordance with BS EN 12457-3:2002[11] and are contained in Appendix 6.0 of this report.

The results of all Geochemical laboratory tests are contained in Appendix 6.0 of this report

[11] BS EN 12457-3:2002 Characterisation of waste. Compliance test for leaching of granular waste materials and sludges.

7.3 Rock

The following tests were carried out on selected sections of rock core:

- Seven Point Load Tests.

Sample unsuitability prevented the following tests from being carried out:

- Two Uniaxial Compression tests

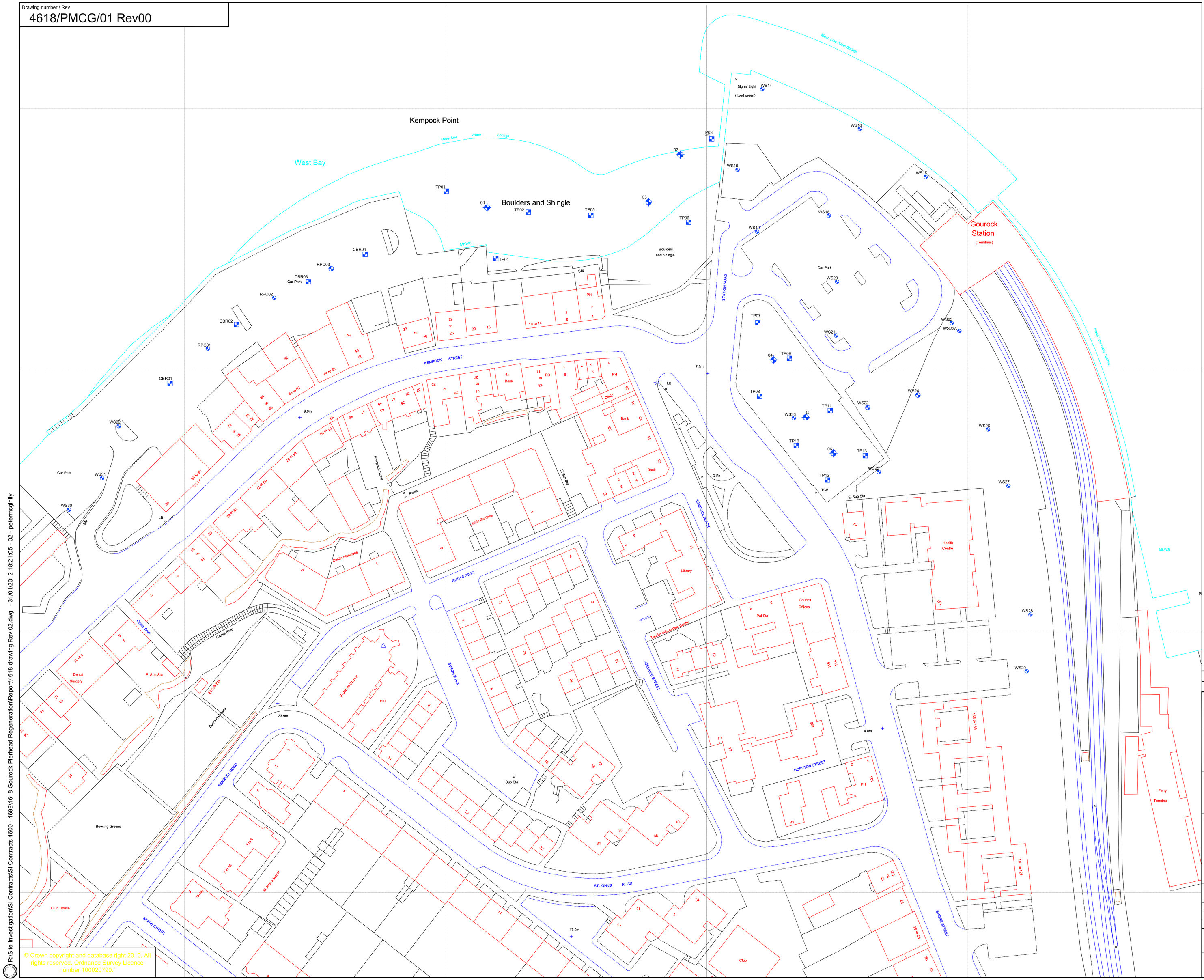
The results of all Rock laboratory tests are contained in Appendix 5.0 of this report.

APPENDIX 1.0

BOREHOLE LOCATION PLAN

Drawing number / Rev

4618/PMCG/01 Rev00



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bam ritchies

Notes:

1.

Key:

- 04 — Borehole Location
- WS14 — Terrier Location
- TP01 — Trial Pit Location

Rev	Rev. Date	Purpose of revision	Drawn	Checkd	Rev'd	Apprv'd
00	Jan 2012	ISSUE FOR CONSTRUCTION	PMCG	PMCG	LMG	LMG

Contractor

BAM Ritchies
Glasgow Road
Kilsyth, Glasgow,G65 9BL

Client

RIVERSIDE INVERCLYDE LTD

Project

GOUROCK PIERHEAD REGENERATION

Drawing title

GROUND INVESTIGATION 2011
LOCATION PLAN
SHEET 1 OF 1

Drawing status

Scale	1:750 @ A1	DO NOT SCALE
Bam Ritchies No.	BAX.4618	
Client no.		

Drawing number: 4618/PMCG/01 — Rev: 00

APPENDIX 2.0

EXPLORATORY HOLE LOGS

Appendix 2.1

Borehole Logs

BOREHOLE LOG

Gourock Pierhead

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Borehole No 01
Sheet 1 of 4

Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	01/10/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224115.820 m National Grid
Date Complete:	03/10/2011	Initial Core Diameter			N 677962.190 m National Grid
Hole Type:	RO	Rotary Casing Type	-Robit	Ground Level:	0.40 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Sand and gravel (Driller's description) (Open holed).											
MADE GROUND: Medium dense brown slightly sandy sub rounded to rounded fine to coarse gravel of quartz and basalt with occasional fragments of wood and blaes and shells.		1.50	-1.10	D	1.50-1.95		S	22			
Medium dense reddish brown silty very gravelly fine to coarse SAND. Gravel is sub rounded to rounded fine to coarse of quartz and basalt.		1.95	-1.55	D	3.00-3.45		S	15			
				D	4.50-4.95		S	24			
Medium dense brown silty slightly gravelly fine to coarse SAND. Gravel is sub rounded to rounded fine to coarse of quartz and basalt.		6.00	-5.60	D	6.00-6.45		S	25			
				D	7.50		S	21			

Continued next sheet

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
01
Sheet 2 of 4
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	01/10/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224115.820 m National Grid
Date Complete:	03/10/2011	Initial Core Diameter			N 677962.190 m National Grid
Hole Type:	RO	Rotary Casing Type	-Robit	Ground Level:	0.40 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing		TCR (SCR) RQD	FI	Install -ation
							Test	Result			
Medium dense brown silty slightly gravelly fine to coarse SAND. Gravel is sub rounded to rounded fine to coarse of quartz and basalt.				-	9.00		S	26			
Medium dense light brown slightly clayey sandy sub angular to sub rounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.		10.50	-10.10	D	10.50-10.95		S	25			
Stiff light brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse of quartz, basalt and schist. Sand is fine to coarse.		12.00	-11.60	D	12.00-12.45		S	31			
				D	13.50-13.95		S	36			
				D	15.00-15.95		S	36			

Continued next sheet

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No 01
Sheet 3 of 4

Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	01/10/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224115.820 m National Grid
Date Complete:	03/10/2011	Initial Core Diameter			N 677962.190 m National Grid
Hole Type:	RO	Rotary Casing Type	-Robit	Ground Level:	0.40 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Stiff light brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse of quartz, basalt and schist. Sand is fine to coarse.				-	16.50		S	50/0			
		18.00	-17.60	D	18.00-18.45		S	32			
Very stiff light bluish grey slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse of quartz and schist. Sand is fine to coarse.											
		19.50	-19.10	D	19.50-19.95		S	33			
Very stiff reddish brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse of quartz, basalt and schist. Sand is fine to coarse.											
		20.70	-20.30								
Red SANDSTONE (Driller's description) (Open holed).											
		21.70	-21.30								
Red BASALT very hard (Driller's Description) (Open holed).											

Continued next sheet

U	Undisturbed U100 / U86 Sample
P	Piston Sample
TW	Thin Wall Sample
D	Small Disturbed Sample
B	Bulk Disturbed Sample
LB	Large Bulk Disturbed Sample
W	Water Sample
G	Gas Sample
C	Core
J	Amber Jar Sample
V	Vial Sample

	Core Run
TCR	Total Core Recovery
SCR	Solid Core Recovery
RQD	Rock Quality Designation
FI	Fracture Index
NI	Non Intact
U*	Blows to drive U100 / U86
UT	Thin wall undisturbed sample
NA	Not Applicable
NR	No Recovery
NP	No Penetration

S	Standard Penetration Test
C	Cone Penetration Test
32	N for full 300mm penetration
/175	For given penetration (mm)
/25#	Seating blows only (mm)
PP	Pocket Penetrometer Test
K	Permeability Test (m/s)
L	Packer Test (Lugeons)
IV	Insitu Vane Test. Peak
IVR	Insitu Vane Test. Residual
HV	Hand Vane Test. Peak
HVR	Hand Vane Test. Residual

CP	Cable Percussion
RO	Rotary Open Hole
RC	Rotary Cored
SO	Sonic Open holed
CONP	Continuous Percussion
WLS	Windowless Sampler

Installation

Slotted Pipe
Piezometer Tip
Grout
Concrete
Sand Filter
Bentonite Seal
Gravel Filter

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No 01
Sheet 4 of 4

Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	01/10/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224115.820 m National Grid
Date Complete:	03/10/2011	Initial Core Diameter			N 677962.190 m National Grid
Hole Type:	RO	Rotary Casing Type	-Robit	Ground Level:	0.40 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run	U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Red BASALT very hard (Driller's Description) (Open holed).										
		27.00	-26.60							
End of Borehole at 27.00 m										

U	Undisturbed U100 / U86 Sample		Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
01
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	01/10/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224115.820 m National Grid
Date Complete:	03/10/2011	Initial Core Diameter			N 677962.190 m National Grid
Hole Type:	RO	Rotary Casing Type	-Robit	Ground Level:	0.40 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
01/10/2011	14:00	16.50	12.00	-	Tidal
03/10/2011	08:15	16.50	12.00	20.80	Tidal
03/10/2011	12:00	27.00	13.50	-	Tidal

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush
			0.00	27.00	125	-	air

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed
03/10/2011	00:00	20.80	-	-	12.00	-	-

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.50	N=22 (4,5,5,4,6,7)
3.00	N=15 (4,4,5,3,3,4)
4.50	N=24 (4,4,5,6,6,7)
6.00	N=25 (5,6,5,6,6,8)
7.50	N=21 (5,4,4,5,6,6)
9.00	N=26 (4,4,5,7,6,8)
10.50	N=25 (6,4,5,7,7,6)
12.00	N=31 (6,6,8,8,7,8)
13.50	N=36 (4,8,6,8,10,12)
15.00	N=36 (7,8,9,8,10,9)
16.50	50/0mm (25,0,50,0,0,0)
18.00	N=32 (5,8,7,7,9,9)
19.50	N=33 (6,7,7,9,9,8)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Drilling undertaken between high and low tide, rig removed from beach at end of each shift. Borehole completed at 27.00m, backfilled with cement bentonite to rockhead and arisings to surface.

PERSONNEL

Driller:	Logged by:	Checked by:
GU	PMcG	PMcG

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No 02
Sheet 1 of 4

Status Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	25/10/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224189.490 m National Grid
Date Complete:	29/10/2011	Initial Core Diameter			N 677984.450 m National Grid
Hole Type:	RO	Rotary Casing Type	Robit	Ground Level:	-0.05 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Green angular coarse GRAVEL and COBBLES of various litholgies		0.10	-0.15								
Medium dense brown sandy sub rounded to rounded fine to coarse GRAVEL of various lithologies. Sand is fine to coarse.				D	1.00-1.45		S	15			
				D	2.50-2.95		S	14			
Medium dense pale reddish brown silty gravelly fine to coarse SAND. Gravel is sub rounded to rounded fine and medium occasionally coarse of various litholgies.		3.00	-3.05								
				D	4.00-4.45		S	19			
				D	5.50-5.95		S	20			
Medium dense pale reddish brown very sandy sub angular to rounded fine to coarse GRAVEL of various lithologies.		6.70	-6.75								

Continued next sheet

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No 02
Sheet 2 of 4

Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	25/10/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224189.490 m National Grid
Date Complete:	29/10/2011	Initial Core Diameter			N 677984.450 m National Grid
Hole Type:	RO	Rotary Casing Type	Robit	Ground Level:	-0.05 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Medium dense pale reddish brown very sandy sub angular to rounded fine to coarse GRAVEL of various lithologies.				D	8.50-8.95		S	22			
		9.50	-9.55								
Medium dense greyish brown silty gravelly fine to coarse SAND with many shell fragments. Gravel is sub rounded to rounded fine to coarse of various lithologies.											
Below 10.50m becoming clayey				D	10.50-10.95		S	10			
		11.00	-11.05								
Soft brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse of various lithologies. Sand is fine to coarse.				-	12.80-13.25		S	10			
Continued next sheet											

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No 02
Sheet 3 of 4

Status Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	25/10/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224189.490 m National Grid
Date Complete:	29/10/2011	Initial Core Diameter			N 677984.450 m National Grid
Hole Type:	RO	Rotary Casing Type	Robit	Ground Level:	-0.05 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Soft brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse of various lithologies. Sand is fine to coarse.				D	16.00-16.45		S	9			
Below 19.00m becoming very soft				D	19.00-19.45		S	4			
		22.00	-22.05								
Very stiff light grey brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse of various lithologies. Sand is fine to coarse.				D	23.20-23.65		S	61			
Continued next sheet											

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
02
Sheet 4 of 4
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	25/10/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224189.490 m National Grid
Date Complete:	29/10/2011	Initial Core Diameter			N 677984.450 m National Grid
Hole Type:	RO	Rotary Casing Type	Robit	Ground Level:	-0.05 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run	U	In Situ Testing: Test	In Situ Testing: Result	TCR (SCR) RQD	FI	Install -ation
Very stiff light grey brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse of various lithologies. Sand is fine to coarse.										
End of Borehole at 27.00 m		27.00	-27.05							

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)	Slotted Pipe	Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak	Piezometer Tip	Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual	Grout	Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak	Concrete	
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
02
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	25/10/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224189.490 m National Grid
Date Complete:	29/10/2011	Initial Core Diameter			N 677984.450 m National Grid
Hole Type:	RO	Rotary Casing Type	Robit	Ground Level:	-0.05 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
25/10/2011	18:30	7.50	7.50	-	
26/10/2011	16:20	7.50	7.50	-	
26/10/2011	19:20	13.00	13.00	-	Dry
27/10/2011	17:00	13.00	13.00	-	
27/10/2011	20:00	20.50	20.50	-	
28/10/2011	05:50	20.50	20.50	-	
28/10/2011	08:30	27.00	23.20	-	Dry
29/10/2011	06:30	27.00	23.20	-	

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush
			0.00	27.00	125	-	Air

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=15 (3,4,4,3,4,4)
2.50	N=14 (3,4,3,4,3,4)
4.00	N=19 (3,4,4,5,5,5)
5.50	N=20 (3,4,4,5,6,5)
8.50	N=22 (4,5,5,5,6,6)
10.50	N=10 (1,2,2,2,3,3)
12.80	N=10 (2,2,3,2,2,3)
16.00	N=9 (1,1,2,2,2,3)
19.00	N=4 (1,1,1,1,1,1)
23.20	N=61 (4,10,12,16,16,17)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Borehole completed at 27.00m

PERSONNEL

Driller:	Logged by: PMcG	Checked by: PMcG

bam ritchies

BOREHOLE LOG

Gourock Pierhead

Borehole No 03
Sheet 1 of 4
Status Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	27/09/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224177.715 m National Grid
Date Complete:	30/09/2011	Initial Core Diameter			N 677964.246 m National Grid
Hole Type:	RO	Rotary Casing Type	Robit	Ground Level:	1.31 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Loose gravel (Driller's description) ((Open holed) .		0.30	1.01								
MADE GROUND: Sand and gravel (Driller's description) (Open holed).											
		1.50	-0.19				S	37			
MADE GROUND: Dense greyish brown slightly silty sandy sub angular to sub rounded fine to coarse gravel of sandstone, quartz and dolerite and occasional gravel sized fragments of brick. Sand is fine to coarse.		1.95	-0.64								
SAND and GRAVEL (Driller's description) (Open holed).											
		3.00	-1.69	D	3.00-3.45		S	38			
Medium dense light reddish brown silty gravelly fine to coarse SAND. Gravel is sub angular to sub rounded fine to coarse of dolerite and quartz.											
				D	4.50-4.95		S	22			
				D	6.00-6.45		S	22			
				D	7.50-7.95		S	27			

Continued next sheet

U	Undisturbed U100 / U86 Sample
P	Piston Sample
TW	Thin Wall Sample
D	Small Disturbed Sample
B	Bulk Disturbed Sample
LB	Large Bulk Disturbed Sample
W	Water Sample
G	Gas Sample
C	Core
J	Amber Jar Sample
V	Vial Sample

	Core Run
TCR	Total Core Recovery
SCR	Solid Core Recovery
RQD	Rock Quality Designation
FI	Fracture Index
NI	Non Intact
U*	Blows to drive U100 / U86
UT	Thin wall undisturbed sample
NA	Not Applicable
NR	No Recovery
NP	No Penetration

S	Standard Penetration Test
C	Cone Penetration Test
32	N for full 300mm penetration
/175	For given penetration (mm)
/25#	Seating blows only (mm)
PP	Pocket Penetrometer Test
K	Permeability Test (m/s)
L	Packer Test (Lugeons)
IV	Insitu Vane Test. Peak
IVR	Insitu Vane Test. Residual
HV	Hand Vane Test. Peak
HVR	Hand Vane Test. Residual

CP	Cable Percussion
RO	Rotary Open Hole
RC	Rotary Cored
SO	Sonic Open holed
CONP	Continuous Percussion
WLS	Windowless Sampler

Installation: Slotted Pipe; Sand Filter; Piezometer Tip; Bentonite Seal; Grout; Gravel Filter; Concrete

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No 03
Sheet 2 of 4

Status Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	27/09/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224177.715 m National Grid
Date Complete:	30/09/2011	Initial Core Diameter			N 677964.246 m National Grid
Hole Type:	RO	Rotary Casing Type	Robit	Ground Level:	1.31 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Medium dense light reddish brown silty gravelly fine to coarse SAND. Gravel is sub angular to sub rounded fine to coarse of dolerite and quartz.											
Soft CLAY with gravel bands (Driller's description) (Open holed).		9.40	-8.09								
Stiff light brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse		10.50	-9.19	-	10.50		S	38			
				D	12.00-12.45		S	50			
				D	13.50-13.95		S	32			
				D	15.00-15.45		S	32			

Continued next sheet

U	Undisturbed U100 / U86 Sample
P	Piston Sample
TW	Thin Wall Sample
D	Small Disturbed Sample
B	Bulk Disturbed Sample
LB	Large Bulk Disturbed Sample
W	Water Sample
G	Gas Sample
C	Core
J	Amber Jar Sample
V	Vial Sample

	Core Run
TCR	Total Core Recovery
SCR	Solid Core Recovery
RQD	Rock Quality Designation
FI	Fracture Index
NI	Non Intact
U*	Blows to drive U100 / U86
UT	Thin wall undisturbed sample
NA	Not Applicable
NR	No Recovery
NP	No Penetration

S	Standard Penetration Test
C	Cone Penetration Test
32	N for full 300mm penetration
/175	For given penetration (mm)
/25#	Seating blows only (mm)
PP	Pocket Penetrometer Test
K	Permeability Test (m/s)
L	Packer Test (Lugeons)
IV	Insitu Vane Test. Peak
IVR	Insitu Vane Test. Residual
HV	Hand Vane Test. Peak
HVR	Hand Vane Test. Residual

CP	Cable Percussion
RO	Rotary Open Hole
RC	Rotary Cored
SO	Sonic Open holed
CONP	Continuous Percussion
WLS	Windowless Sampler

Installation

Slotted Pipe
Piezometer Tip
Grout
Concrete
Sand Filter
Bentonite Seal
Gravel Filter

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No 03
Sheet 3 of 4

Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	27/09/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224177.715 m National Grid
Date Complete:	30/09/2011	Initial Core Diameter			N 677964.246 m National Grid
Hole Type:	RO	Rotary Casing Type	Robit	Ground Level:	1.31 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Stiff light brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse				-	16.50		S	26			
				-	18.00		S	23			
Red BASALT very hard (Driller's description) (Open holed).		18.70	-17.39								
Continued next sheet											

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
03
Sheet 4 of 4
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	27/09/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224177.715 m National Grid
Date Complete:	30/09/2011	Initial Core Diameter			N 677964.246 m National Grid
Hole Type:	RO	Rotary Casing Type	Robit	Ground Level:	1.31 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run	U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Red BASALT very hard (Driller's description) (Open holed).										
		25.00	-23.69							
End of Borehole at 25.00 m										

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
03
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	27/09/2011	Initial Boring Diameter:	125mm	Coordinates:	E 224177.715 m National Grid
Date Complete:	30/09/2011	Initial Core Diameter			N 677964.246 m National Grid
Hole Type:	RO	Rotary Casing Type	Robit	Ground Level:	1.31 m OD
Equipment:	A65	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
27/09/2011	16:30	1.50	1.50	1.00	-
28/09/2011	08:00	1.50	1.50	-	Tidal
28/09/2011	12:15	10.50	10.50	-	Tidal
29/09/2011	07:00	10.50	10.50	-	Tidal
29/09/2011	12:30	16.50	13.50	-	Tidal
30/09/2011	06:00	16.50	13.50	-	Tidal
30/09/2011	12:00	25.00	13.50	-	Tidal

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush
			0.00	25.00	125	-	air

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed
27/09/2011	:	1.00	-	-	1.00	-	-

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.50	N=37 (6,7,8,11,10,8)
3.00	N=38 (4,6,8,9,12,9)
4.50	N=22 (4,4,4,5,6,7)
6.00	N=22 (3,3,5,5,5,7)
7.50	N=27 (7,7,7,6,6,8)
10.50	N=38 (8,5,8,9,9,12)
12.00	N=50 (7,6,8,9,16,17)
13.50	N=32 (5,6,7,8,8,9)
15.00	N=32 (6,7,8,8,7,9)
16.50	N=26 (4,4,5,6,7,8)
18.00	N=23 (5,7,6,5,4,8)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Drilling undertaken between high and low tides, rig removed from beach at the end of each shift. No SPT test at 9.00m blowing sand. Borehole completed at 25m, backfilled with cement bentonite grout to rockhead and arisings to ground level.

PERSONNEL

Driller:	Logged by:	Checked by:
GU	PMcG	PMcG

BOREHOLE LOG

Gourock Pierhead

Borehole No 04
Sheet 1 of 2
Status Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	30/09/2011	Initial Boring Diameter:	200mm	Coordinates:	E 224225.560 m National Grid
Date Complete:	03/10/2011	Initial Core Diameter	76mm		N 677903.810 m National Grid
Hole Type:	CP+RC	Rotary Casing Type	Robit	Ground Level:	5.89 m OD
Equipment:	3.0T Dando + A65	Core Barrel:	412	Plunge:	90 °
		Core Bit:	Diam FC	Scale:	1:50

Description of Strata	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Turf over brown slightly sandy slightly gravelly clay. Gravel is sub angular to sub rounded fine to coarse of various lithologies. (Topsoil)	0.30	5.59	DJJ	0.20						
			DJJ	0.50						
MADE GROUND: Medium dense dark brown silty very gravelly fine to coarse sand with occasional angular cobbles of concrete. Gravel is angular to sub rounded fine to coarse of brick, concrete and slag.			B	0.50						
			DJJ	1.00						
			B	1.00						
			D	1.20-1.65		S	10			
			B	1.80						
	2.00	3.89	D	1.80						
MADE GROUND: Firm pale red purple and light grey mottled slightly sandy slightly gravelly clay with occasional angular cobble of sandstone. Gravel is angular to sub angular fine to coarse of sandstone. Sand is fine to coarse.			DJJ	2.00		S	9			
			D	2.10-2.55						
			B	2.75						
			D	2.75						
			DNR	3.10-3.55		S	12			
MADE GROUND: Brown silty very gravelly fine to coarse sand. Gravel is sub rounded fine to coarse of various lithologies.	3.70	2.19	BD	3.70						
Stiff light brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse of quartz and basalt. Sand is fine to coarse.	4.60	1.29	U	4.60-5.05	69					
			DJJ	4.80						
			B	5.20						
			D	5.20						
			D	5.60-5.90		S	33			
at 5.90m hard	5.90	-0.01								
Medium strong grey medium grained porphyritic TRACHYTE. Weathering: Slight weathering visible as brown penetrative staining at fracture zones. Fractures: Discontinuities are 5 - 10º sub horizontal very coarse to medium spaced, rough undulating. Discontinuities are 75 - 85º sub vertical medium to widely spaced, rough, undulating.				6.20-9.20				100 (90) 65	12	
									4	
Continued next sheet										

U	Undisturbed U100 / U86 Sample		Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No 04
Sheet 2 of 2

Status Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	30/09/2011	Initial Boring Diameter:	200mm	Coordinates:	E 224225.560 m National Grid
Date Complete:	03/10/2011	Initial Core Diameter	76mm		N 677903.810 m National Grid
Hole Type:	CP+RC	Rotary Casing Type	Robit	Ground Level:	5.89 m OD
Equipment:	3.0T Dando + A65	Core Barrel:	412	Plunge:	90 °
		Core Bit:	Diam FC	Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run	U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Medium strong grey medium grained porphyritic TRACHYTE. Weathering: Slight weathering visible as brown penetrative staining at fracture zones. Fractures: Discontinuities are 5 - 10º sub horizontal very coarse to medium spaced, rough undulating. Discontinuities are 75 - 85º sub vertical medium to widely spaced, rough, undulating.				9.20-12.20				100 (90) 83	5 2 1 8	
End of Borehole at 12.20 m		12.20	-6.31							

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
04
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	30/09/2011	Initial Boring Diameter:	200mm	Coordinates:	E 224225.560 m National Grid
Date Complete:	03/10/2011	Initial Core Diameter	76mm		N 677903.810 m National Grid
Hole Type:	CP+RC	Rotary Casing Type	Robit	Ground Level:	5.89 m OD
Equipment:	3.0T Dando + A65	Core Barrel:	412	Plunge:	90 °
		Core Bit:	Diam FC	Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
30/09/2011	17:00	5.90	4.20	-	
03/10/2011	14:00	5.90	5.90	-	Dry
03/10/2011	17:00	12.20	5.90	-	-

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush
3.90	4.50	1.00	5.90	12.20	105	74	Air
5.90	5.90	1.00					

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed
03/10/2011	:	7.00	-	-	5.90	-	-

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.20	N=10 (2,2,2,3,3,2)
2.10	N=9 (2,2,2,2,3,2)
3.10	N=12 (3,3,4,3,3,2)
5.60	N=33 (6,7,7,8,8,10)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Inspection pit dug to 1.20m (0.6 x 0.6). Borehole completed at 11.90m, 50mm standpipe installed at 4.6m, slotted from 4.6m to 1.0m. Finished at ground level with screw cap, gas valve and toby cover.

PERSONNEL

Driller:	Logged by:	Checked by:
AP	PMcG	PMcG

bam ritchies

BOREHOLE LOG

Gourock Pierhead

Borehole No 05
Sheet 1 of 2

Status Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	27/09/2011	Initial Boring Diameter:	200mm	Coordinates:	E 224237.950 m National Grid
Date Complete:	04/10/2011	Initial Core Diameter	76mm		N 677881.750 m National Grid
Hole Type:	CP+RC	Rotary Casing Type	Robit	Ground Level:	5.46 m OD
Equipment:	3.0T Dando + A65	Core Barrel:	412DT	Plunge:	90 °
		Core Bit:	Diam FC	Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Turf over brown slightly sandy slightly gravelly clay. (Topsoil).				DJ	0.20						
		0.40	5.06								
MADE GROUND: Brown slightly sandy slightly gravelly clay with occasional sub angular cobble of concrete. Gravel is angular to sub rounded fine to coarse of brick, concrete and quartz. Sand is fine to coarse.				DJB	0.50						
		1.00	4.46	DJB	1.00						
MADE GROUND: Loose brown and red silty very sandy angular to sub angular fine to coarse gravel of brick, concrete and clinker. low cobble content. Sand is fine to coarse.				D	1.20-1.65		S	9			
		1.40	4.06								
MADE GROUND: Firm red and reddish brown mottled light grey sandy slightly gravelly clay. Gravel is sub angular to sub rounded fine to coarse of predominantly sandstone. Sand is fine to coarse. Driller notes cobble.				B D DJJ D	1.80 1.80 1.90 2.00-2.45		S	8			
MADE GROUND: Loose brown silty very gravelly fine to coarse sand with low cobble content of basalt. Gravel is angular to sub rounded fine to coarse of quartz, concrete and brick.		2.70	2.76	B D DJJ D	2.70 2.70 2.90 3.00-3.45		S	9			
Stiff light brown slightly sandy slightly gravelly CLAY with low cobble content. Gravel is sub angular to sub rounded fine to coarse of sandstone, quartz. Sand is fine to coarse.		3.50	1.96	D	3.50-3.95		S	27			
				B D DJJ	4.00 4.00 4.20						
				U	4.50-4.95	78					
				B	5.30						
at 5.60m hard		5.60	-0.14	DNR	5.60		S	50/0			
Strong greenish grey and brown medium grained porphyritic feldspathic TRACHYTE. Weathering: Some slight weathering visible as brown partial penetrative staining at fracture zones. Fractures: Discontinuities are 5 - 15º sub horizontal very coarse to medium spaced, rough, undulating. Discontinuities are 80 - 90º sub vertical medium to widely spaced, rough, planar and undulating.					5.70-8.70				100 (83) 20	14 7	
Continued next sheet											

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No 05
Sheet 2 of 2

Status Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	27/09/2011	Initial Boring Diameter:	200mm	Coordinates:	E 224237.950 m National Grid
Date Complete:	04/10/2011	Initial Core Diameter	76mm		N 677881.750 m National Grid
Hole Type:	CP+RC	Rotary Casing Type	Robit	Ground Level:	5.46 m OD
Equipment:	3.0T Dando + A65	Core Barrel:	412DT	Plunge:	90 °
		Core Bit:	Diam FC	Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run	U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Strong greenish grey and brown medium grained porphyritic feldspathic TRACHYTE. Weathering: Some slight weathering visible as brown partial penetrative staining at fracture zones. Fractures: Discontinuities are 5 - 15º sub horizontal very coarse to medium spaced, rough, undulating. Discontinuities are 80 - 90º sub vertical medium to widely spaced, rough, planar and undulating.				8.70-11.70				100 (93) 80	6 5 3 5	
End of Borehole at 11.70 m		11.70	-6.24							

U	Undisturbed U100 / U86 Sample		Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
05
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	27/09/2011	Initial Boring Diameter:	200mm	Coordinates:	E 224237.950 m National Grid
Date Complete:	04/10/2011	Initial Core Diameter	76mm		N 677881.750 m National Grid
Hole Type:	CP+RC	Rotary Casing Type	Robit	Ground Level:	5.46 m OD
Equipment:	3.0T Dando + A65	Core Barrel:	412DT	Plunge:	90 °
		Core Bit:	Diam FC	Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
27/09/2011	17:00	1.20	-	-	Dry
28/09/2011	07:30	1.20	-	-	Dry
28/09/2011	17:00	5.60	4.00	-	Dry
04/10/2011	10:30	5.60	5.60	-	Dry
04/10/2011	13:00	11.70	5.70	-	-

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush
2.50	2.70	0.50	5.60	11.70	105	74	Air
5.60	5.60	1.00					

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed
04/10/2011	:	6.80	-	-	5.70	-	-

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.20	N=9 (2,2,3,2,2,2)
2.00	N=8 (2,2,2,2,2,2)
3.00	N=9 (2,2,2,3,2,2)
3.50	N=27 (6,6,6,8,7,6)
5.60	50/0mm (25,0,50,0,0,0)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Inspection pit dug to 1.20m. Borehole completed at 11.70m, on completion borehole backfilled with cement bentonite pellets to rockhead and arisings to ground level.

PERSONNEL

Driller:	Logged by:	Checked by:
AP	ARM	PMcG

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
06
Sheet 1 of 2
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	29/09/2011	Initial Boring Diameter:	200mm	Coordinates:	E 224248.530 m National Grid
Date Complete:	04/10/2011	Initial Core Diameter	76mm		N 677868.060 m National Grid
Hole Type:	CP+RC	Rotary Casing Type	-	Ground Level:	5.13 m OD
Equipment:	3.0T Dando + A65	Core Barrel:	412DT	Plunge:	90 °
		Core Bit:	Diam FC	Scale:	1:50

Description of Strata	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Turf over brown slightly sandy slightly gravelly clay (Topsoil) .			DJJ	0.20						
	0.35	4.78								
MADE GROUND: Medium dense brown silty very gravelly fine to coarse sand with occasional angular cobbles of basalt and brick. Gravel is angular to sub rounded fine to coarse of brick, concrete. With occasional gravel sized fragments of ceramic			DJJ	0.50						
			B	0.50						
			DJJ	1.00						
			B	1.00						
			D	1.20-1.65		S	11			
			B	1.70						
			D	1.70						
			DJJ	2.00						
			D	2.10-2.55		S	11			
			B	2.80						
at 2.80m slightly clayey with gravel sized lenses of rotten vegetation.			D	2.80						
	3.10	2.03	DJJ	3.00						
MADE GROUND: Medium dense brown silty very gravelly fine to coarse sand. Gravel is sub angular to sub rounded fine to coarse of various lithologies.			D	3.20-3.65		S	12			
			B	3.75						
	3.90	1.23	D	3.75						
Stiff light brown slightly sandy slightly gravelly CLAY. Gravel is sub angular to sub rounded fine to coarse of quartz and basalt. Sand is fine to coarse.			U	3.90-4.35	55					
			B	4.55						
			D	4.55						
			DJJ	4.60						
			D	5.10-5.55		S	24			
			B	6.00		S	35/125			
			D	6.00						
at 6.30m hard.	6.30	-1.17	D	6.00-6.30				100		
				6.30-9.30				(33) 20		
Medium strong to strong grey medium grained porphorytic TRACHYTE. Weathering: Some slight weathering visible as brown partial penetrative staining at fractures zones. Fractures: Discontinuities are 5 - 20º sub horizontal closely to medium spaced, rough undulating. Discontinuities are 80 - 85º sub vertical medium to widely spaced, rough, planar and undulating.									12	
Continued next sheet									NI	

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No 06
Sheet 2 of 2

Status Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	29/09/2011	Initial Boring Diameter:	200mm	Coordinates:	E 224248.530 m National Grid
Date Complete:	04/10/2011	Initial Core Diameter	76mm		N 677868.060 m National Grid
Hole Type:	CP+RC	Rotary Casing Type	-	Ground Level:	5.13 m OD
Equipment:	3.0T Dando + A65	Core Barrel:	412DT	Plunge:	90 °
		Core Bit:	Diam FC	Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run	U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
Medium strong to strong grey medium grained porphorytic TRACHYTE. Weathering: Some slight weathering visible as brown partial penetrative staining at fractures zones. Fractures: Discontinuities are 5 - 20º sub horizontal closely to medium spaced, rough undulating. Discontinuities are 80 - 85º sub vertical medium to widely spaced, rough, planar and undulating.				9.30-12.30				93 (63) 57	5 7 4 NI	
End of Borehole at 12.30 m		12.30	-7.17							

U	Undisturbed U100 / U86 Sample		Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
06
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	29/09/2011	Initial Boring Diameter:	200mm	Coordinates:	E 224248.530 m National Grid
Date Complete:	04/10/2011	Initial Core Diameter	76mm		N 677868.060 m National Grid
Hole Type:	CP+RC	Rotary Casing Type	-	Ground Level:	5.13 m OD
Equipment:	3.0T Dando + A65	Core Barrel:	412DT	Plunge:	90 °
		Core Bit:	Diam FC	Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
29/09/2011	17:00	6.30	6.30	-	Dry
04/10/2011	13:30	6.30	6.30	-	Dry
04/10/2011	17:00	12.30	6.30	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush
2.60	2.75	0.50	6.30	12.30	105	74	Air
6.30	6.30	1.00					

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.20	N=11 (2,2,3,3,3,2)
2.10	N=11 (4,3,4,2,2,3)
3.20	N=12 (2,3,3,3,3,3)
5.10	N=24 (4,6,6,6,6,6)
6.00	35/125mm - Abandoned

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Inspection pit dug to 1.20m. Borehole completed at 12.30m, on completion. 50mm standpipe installed at 3.90m, slotted from 1.00m to 3.90m. Finished at ground level with screw cap, gas valve and toby cover.

PERSONNEL

Driller:	Logged by:	Checked by:
AP	ARM	PMcG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS14
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224221.210 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 678007.440 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.27 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Dark grey sandy angular fine to coarse gravel intermixed with brown silty sand. Occasional fragments of brick. Traces of ash. Sand is fine to coarse.		0.15	4.12	DJ	0.20						
		0.40	3.87	DJ	0.50						
MADE GROUND: Dark dark grey sandy angular to sub rounded fine to coarse gravel of ash and cinders with occasional fragments of slag and sandstone. sand fine to coarse.				D	1.00-1.45		S	9			
				DJ	1.00						
				U	1.00-2.00						
MADE GROUND: Loose reddish brown and red silty fine to coarse sand and angular to sub rounded fine to coarse gravel with occasional cobbles and gravel sized very sandy pockets.				D	2.00-2.45		S	45			
From 2.40m hard sandstone obstruction presumed boulder.				D	2.50-2.65		S	50			
		2.65	1.62								
End of Borehole at 2.65 m											

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS14
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224221.210 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 678007.440 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.27 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
14/12/2011	10:00	2.65	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=9 (2,2,2,3,2,2)
2.00	N=45 (1,1,2,2,3,38)
2.50	N=50 (25,0,50,0,0,0)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
WS15
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	17/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224211.800 m National Grid
Date Complete:	17/12/2011	Initial Core Diameter			N 677976.640 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.40 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing		TCR (SCR) RQD	FI	Install -ation
							Test	Result			
MADE GROUND: Type one overlying Tarmac.		0.18	4.22								
MADE GROUND: Weak concrete.		0.30	4.10								
MADE GROUND: Loose brown, light brown and dark grey mottled silty gravelly fine to coarse sand intermixed with fragments of brick, concrete, ash and cinders. Gravel is angular to sub rounded and fine to coarse.				DB DJ	0.50 0.50						
		1.10	3.30	D DJ U	1.00-1.45 1.00 1.00-2.00		S	9			
MADE GROUND: Loose dark grey and brown silty fine to coarse sand and angular to sub angular fine to coarse gravel with occasional fragments of brick, clay pipe and sandstone and with occasional cobbles. Occasional gravel sized very sandy light grey pockets intermixed with ash and cinders. Clayey at depth.				D U	2.00-2.45 2.00-3.00		S	6			
		3.00	1.40								
End of Borehole at 3.00 m											

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS15
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	17/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224211.800 m National Grid
Date Complete:	17/12/2011	Initial Core Diameter			N 677976.640 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.40 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
17/12/2011	15:30	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=9 (1,1,2,3,2,2)
2.00	N=6 (1,1,1,1,2,2)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
WS16
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224258.620 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 677992.330 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.43 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Loose brown clayey sandy angular to sub rounded fine to coarse gravel with occasional gravel sized pockets of soft brown sandy gravelly clay, fragments of timber, concrete and brick. Traces of ash.				DJ	0.20						
				DJ	0.50						
				D	1.00-1.45		S	4			
				DJ	1.00						
MADE GROUND: Medium dense reddish brown and red silty fine to coarse sand and angular to sub rounded fine to coarse gravel with occasional cobbles and gravel sized very sandy pockets.		1.20	3.23	U	1.00-2.00						
				D	2.00-2.45		S	17			
				U	2.00-3.00						
End of Borehole at 3.00 m		3.00	1.43								

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS16
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224258.620 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 677992.330 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.43 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
14/12/2011	11:00	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=4 (3,1,1,1,1,1)
2.00	N=17 (3,4,4,5,4,4)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS17
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224283.840 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 677973.830 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.39 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Compact becoming very loose brown and slightly reddish brown mottled clayey sandy angular to sub rounded fine to coarse gravel with occasional gravel sized pockets of soft brown sandy gravelly clay and fragments of plastic, blaes, timber, concrete and brick. Sand is fine to coarse. Traces of ash at top.				DJ	0.20						
				DJ	0.50						
				D	1.00-1.45		S	0			
				DJ	1.00						
				U	1.00-2.00						
MADE GROUND: Loose reddish brown and red mottled silty fine to coarse sand and angular to sub rounded fine to coarse gravel with occasional cobbles, fragments of timber and gravel sized very sandy pockets.		1.50	2.89	D	2.00-2.45		S	4			
				U	2.00-3.00						
End of Borehole at 3.00 m		3.00	1.39								

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS17
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224283.840 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 677973.830 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.39 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
14/12/2011	12:00	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=0 (0,0,0,0,0,0)
2.00	N=4 (1,1,1,2,1,0)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
WS18
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	17/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224246.770 m National Grid
Date Complete:	17/12/2011	Initial Core Diameter			N 677959.070 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.49 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Tarmac.		0.10	4.39	DJ	0.20						
MADE GROUND: Grey sandy angular fine to coarse gravel.		0.40	4.09	DJBD	0.50						
MADE GROUND: Loose brown becoming grey silty gravelly fine to coarse sand intermixed with fragments of brick, concrete and glass. Intermixed with ash and cinders at depth. Gravel is angular to sub rounded fine to coarse.				D DJ U	1.00-1.45 1.00 1.00-2.00		S	7			
MADE GROUND: Medium dense brown and reddish brown mottled slightly clayey gravelly fine to coarse sand intermixed with soft to firm reddish brown very sandy gravelly clay with occasional fragments of sandstone. Locally darker brown with traces of ash.		1.40	3.09	D U	2.00-2.45 2.00-3.00		S	12			
End of Borehole at 3.00 m		3.00	1.49								

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS18
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	17/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224246.770 m National Grid
Date Complete:	17/12/2011	Initial Core Diameter			N 677959.070 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.49 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
17/12/2011	12:15	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=7 (3,4,2,2,2,1)
2.00	N=12 (1,1,5,3,2,2)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion and finished at surface with HRA.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS19
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224217.950 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677954.390 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.84 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND:- Turf/Topsoil		0.15	4.69	DJ	0.20						
MADE GROUND:- Grey slightly silty sandy angular fine to coarse gravel. Sand is fine to coarse.				DJ DB	0.50 0.50						
MADE GROUND:- Medium dense dark grey and brown silty fine to coarse sand and angular to sub rounded gravel with occasional fragments of brick, clay pipe and sandstone, cobbles and gravel sized very sandy pockets intermixed with ash and cinders.		0.90	3.94	D DJ U	1.00-1.45 1.00 1.00-2.00		S	10			
MADE GROUND:- Loose brown and reddish brown slightly clayey gravelly fine to coarse sand intermixed with firm reddish brown sandy gravelly clay with occasional fragments of sandstone. Gravel is angular to sub rounded and fine to coarse.		1.60	3.24	D U	2.00-2.45 2.00-3.00		S	8			
End of Borehole at 3.00 m		3.00	1.84								

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS19
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224217.950 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677954.390 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.84 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
15/12/2011	16:30	3.00	-	-	dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=10 (2,3,2,3,2,3)
2.00	N=8 (1,2,1,2,2,3)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit to 1.0m (0.3m x 0.3m). Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS20
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	17/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224249.900 m National Grid
Date Complete:	17/12/2011	Initial Core Diameter			N 677933.700 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.96 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Tarmac.		0.10	4.86								
MADE GROUND: Grey sandy angular fine to coarse gravel.				DJ	0.20						
MADE GROUND: Concrete.		0.50	4.46	DJBD	0.50						
		0.60	4.36								
MADE GROUND: Loose dark brown and dark grey mottled silty gravelly fine to coarse sand intermixed with fragments of brick, concrete, ash and cinders. Gravel is angular to sub rounded fine to coarse. Poor recovery at depth				D	1.00-1.45		S	6			
				DJ	1.00						
				U	1.00-2.00						
MADE GROUND: Medium dense brown and reddish brown mottled slightly clayey gravelly fine to coarse sand intermixed with soft to firm reddish brown very sandy gravelly clay with occasional fragments of sandstone. Gravel is angular to sub rounded fine to coarse. Locally darker brown and dark reddish brown with traces of ash.		1.80	3.16								
				D	2.00-2.45		S	11			
				U	2.00-3.00						
End of Borehole at 3.00 m		3.00	1.96								

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS20
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	17/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224249.900 m National Grid
Date Complete:	17/12/2011	Initial Core Diameter			N 677933.700 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.96 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
17/12/2011	12:40	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=6 (2,2,1,1,2,2)
2.00	N=11 (2,2,2,3,3,3)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion and finished at ground level with HRA.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS21
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	17/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224249.530 m National Grid
Date Complete:	17/12/2011	Initial Core Diameter			N 677913.130 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.96 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Tarmac.		0.08	4.88	DJ	0.20						
MADE GROUND: Grey sandy angular fine to coarse gravel.		0.35	4.61	DJBD	0.50						
MADE GROUND: Medium dense dark brown and brown mottled silty gravelly fine to coarse sand intermixed with fragments of brick, concrete, ash and cinders with occasional gravel sized clayey pockets. Gravel fine to coarse and angular to sub rounded. More gravelly at depth.				D DJ U	1.00-1.45 1.00 1.00-2.00		S	17			
MADE GROUND: Medium dense brown, dark brown and reddish brown mottled slightly clayey gravelly fine to coarse sand intermixed with soft to firm reddish brown very sandy gravelly clay with occasional fragments of sandstone. Locally darker brown and grey with occasional pockets intermixed with ash.		1.60	3.36	D U	2.00-2.45 2.00-3.00		S	10			
End of Borehole at 3.00 m		3.00	1.96								

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS21
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	17/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224249.530 m National Grid
Date Complete:	17/12/2011	Initial Core Diameter			N 677913.130 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.96 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
17/12/2011	13:15	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=17 (5,5,5,4,4,4)
2.00	N=10 (2,2,1,1,3,5)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion and finished at surface with HRA.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
WS22
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	17/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224261.700 m National Grid
Date Complete:	17/12/2011	Initial Core Diameter			N 677885.490 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.68 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Tarmac.		0.19	4.49	DJ	0.20						
MADE GROUND: Grey sandy angular fine to coarse gravel.		0.55	4.13	DJBD	0.50						
MADE GROUND: Dark brown and dark grey silty gravelly fine to coarse sand intermixed with fragments of brick, concrete, ash and cinders with occasional gravel sized clayey pockets towards base. Gravel fine to coarse and angular to sub rounded.		1.10	3.58	D DJ U	1.00-1.45 1.00 1.00-2.00		S	9			
MADE GROUND: Loose brown, dark brown and reddish brown mottled slightly clayey gravelly fine to coarse sand intermixed with soft to firm and firm reddish brown very sandy gravelly clay and with occasional fragments of sandstone. Locally darker brown and grey with occasional pockets intermixed with ash and cinders.		2.00	2.68	D U	2.00-2.45 2.00-3.00		S	10			
MADE GROUND: Firm reddish brown sandy gravelly clay with occasional fragments of sandstone. Locally darker brown and intermixed with clayey gravelly fine to coarse sand. Gravel is angular to sub rounded fine to coarse.		3.00	1.68								
End of Borehole at 3.00 m											

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS22
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	17/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224261.700 m National Grid
Date Complete:	17/12/2011	Initial Core Diameter			N 677885.490 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.68 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
17/12/2011	14:30	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=9 (1,1,3,4,1,1)
2.00	N=10 (2,2,1,1,3,5)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion and finished at surface with HRA.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
WS23
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224293.760 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 677917.890 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.74 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing		TCR (SCR) RQD	FI	Install -ation
							Test	Result			
MADE GROUND: Topsoil / turf intermixed with brown silty sand at depth.		0.15	4.59	DJ	0.20						
MADE GROUND: Brown and dark brown clayey sandy angular to sub rounded fine to coarse gravel with occasional gravel sized pockets of soft brown sandy gravelly clay, cobbles and fragments of brick and blaes. Traces of ash. Intermixed with ash at depth. at 0.60m concrete obstruction		0.60	4.14	DJ	0.50						
End of Borehole at 0.60 m											

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS23
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224293.760 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 677917.890 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.74 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
14/12/2011	15:00	0.60	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 0.60m. Obstruction (buried manhole) encountered at 0.50m, moved pit to side and had 2 attemps to clear obstruction (concrete). Borehole backfilled with arisings on completion. Position moved about 4m west to avoid cable (WS23A).

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
WS23A
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224296.780 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 677914.840 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.68 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Medium dense brown and dark brown mottled silty sandy angular to sub rounded fine to coarse gravel with occasional gravel sized pockets of dark grey sandy gravelly ash and cinders, cobbles and fragments of timber, brick and concrete.				DJ	0.20						
				DJBD	0.50						
				D	1.00-1.45		S	13			
				DJ	1.00						
				U	1.00-2.00						
		1.60	3.08								
MADE GROUND: Loose reddish brown and red mottled silty fine to coarse sand and angular to subrounded fine to coarse gravel with occasional cobbles and gravel sized very sandy pockets. Clayey bands at depth.				D	2.00-2.45		S	6			
				U	2.00-3.00						
		3.00	1.68								
End of Borehole at 3.00 m											

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS23A
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224296.780 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 677914.840 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.68 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
14/12/2011	15:45	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=13 (6,5,4,3,3,3)
2.00	N=6 (2,2,2,1,2,1)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS24
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224280.820 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 677890.280 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.52 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Topsoil / turf intermixed with brown silty sand at depth.		0.25	4.27	DJ	0.20						
MADE GROUND: Brown and dark brown mottled clayey sandy angular to sub rounded fine to coarse gravel with occasional gravel sized pockets of soft brown sandy gravelly clay, cobbles and fragments of slag. Traces of ash.		0.60	3.92	DJ	0.50						
				D	1.00-1.45		S	0			
				DJ	1.00						
				U	1.00-2.00						
MADE GROUND: Very loose dark grey and brown mottled sandy gravelly ash and cinders intermixed with very soft brown sandy gravelly clay with occasional fragments of slag, brick and sandstone. Gravel is angular to sub rounded fine to coarse. Sand is fine to coarse. Some gravel sized pockets of clayey gravelly sand at depth.		2.00	2.52	D	2.00-2.45		S	4			
				U	2.00-3.00						
MADE GROUND: Loose reddish brown and red mottled silty fine to coarse sand and angular to sub rounded fine to coarse gravel with occasional cobbles and gravel sized very sandy pockets		3.00	1.52								
End of Borehole at 3.00 m											

U	Undisturbed U100 / U86 Sample		Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS24
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224280.820 m National Grid
Date Complete:	14/12/2011	Initial Core Diameter			N 677890.280 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.52 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
14/12/2011	15:00	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=0 (0,0,0,0,0,0)
2.00	N=4 (3,2,2,1,0,1)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS25
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224265.870 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677860.840 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.75 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing		TCR (SCR) RQD	FI	Install -ation
							Test	Result			
MADE GROUND: Topsoil / moss.		0.25	4.50	DJ	0.20						
MADE GROUND: Brown clayey gravelly fine to coarse sand intermixed with topsoil. Gravel is angular to sub rounded fine to coarse.		0.45	4.30	DJ DB	0.50 0.50						
MADE GROUND: Very loose dark grey sandy angular fine to coarse gravel intermixed with brown silty sand with occasional fragments of brick, concrete, ash and cinders and gravel sized slightly clayey pockets.				D DJ U	1.00-1.45 1.00 1.00-2.00		S	2			
				D U	2.00-2.45 2.00-2.50		S	4			
MADE GROUND: Loose reddish brown and brown mottled fine to coarse sand and angular to sub rounded fine to coarse gravel with occasional cobbles and gravel sized clayey pockets. At 2.50m hard obstruction, presumed boulder.		2.20	2.55								
End of Borehole at 2.50 m		2.50	2.25								

U	Undisturbed U100 / U86 Sample		Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS25
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224265.870 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677860.840 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.75 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
15/12/2011	16:00	2.50	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=2 (1,0,1,0,1,0)
2.00	N=4 (0,0,0,1,1,2)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS26
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224307.710 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677877.110 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.71 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Brown and grey mottled silty gravelly fine to coarse sand intermixed with fragments of brick, timber, concrete ash and cinders with occasional gravel sized slightly clayey pockets. Gravel angular to subrounded fine to coarse.		0.25	4.46	DJ DJBD	0.20 0.50						
MADE GROUND: Soft to firm brown very sandy gravelly clay intermixed with clayey gravelly sand. Some fragments of sandstone. Traces of ash. Gravel is angular to subrounded fine to coarse. Sand is fine to coarse.		0.90	3.81	D DJ U	1.00-1.45 1.00 1.00-2.00		S	11			
MADE GROUND: Medium dense dark grey silty fine to coarse sand and angular to sub rounded fine to coarse gravel with occasional fragments of brick, slag and sandstone, cobbles and gravel sized very sandy pockets intermixed with ash and cinders.		1.60	3.11	D U	2.00-2.45 2.00-3.00		S	8			
MADE GROUND: Loose brown and reddish brown mottled silty gravelly fine to coarse sand intermixed with firm reddish brown sandy gravelly clay. Traces of dark grey ash and cinders and occasional fragments of sandstone. Gravel angular to subrounded fine to coarse.		3.00	1.71								
End of Borehole at 3.00 m											

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS26
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224307.710 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677877.110 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.71 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
15/12/2011	15:30	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=11 (5,4,4,3,2,2)
2.00	N=8 (1,2,1,2,2,3)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

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BOREHOLE LOG

Gourock Pierhead

Borehole No
WS27
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224315.520 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677855.550 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.77 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Dark grey and grey silty gravelly fine to coarse sand intermixed with fragments of brick, timber, concrete, ash and cinders. Gravel is angular to subrounded fine to coarse.		0.25	4.52	DJ	0.20						
				DJ	0.50						
				DB	0.50						
MADE GROUND: Soft to firm brown sandy gravelly clay intermied with clayey gravelly sand. Some fragments of sandstone and timber. Gravel is angular to sub rounded fine to coarse. Sand is fine to coarse		0.90	3.87	D	1.00-1.45		S	12			
				DJ	1.00						
				U	1.00-2.00						
MADE GROUND: Medium dense dark grey silty fine to coarse sand and angular to sub rounded fine to coarse gravel with occasional fragments of brick, slag and sandstone, cobbles and gravel sized very sandy pockets intermixed with ash and cinders.		1.60	3.17								
				D	2.00-2.45		S	16			
				U	2.00-3.00						
MADE GROUND: Medium dense brown and reddish brown mottled silty gravelly fine to coarse sand intermixed with firm reddish brown sandy gravelly clay. Traces of dark grey ash and cinders and occasional fragments of sandstone. Gravel is angular to subrounded fine to coarse.		3.00	1.77								
End of Borehole at 3.00 m											

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS27
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224315.520 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677855.550 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.77 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
15/12/2011	14:00	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=12 (2,2,3,3,3,3)
2.00	N=16 (1,2,3,4,4,5)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS28
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224323.970 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677806.240 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.36 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Topsoil / rough grass and roots.		0.10	4.26	DJ	0.20						
MADE GROUND: Medium dense becoming loose dark brown at top becoming brown silty fine to coarse sand and angular to sub rounded fine to coarse gravel with occasional fragments of brick, slag and sandstone, cobbles and gravel sized clayey pockets intermixed with ash and cinders.				DJ DB	0.50 0.50						
				D DJ U	1.00-1.45 1.00 1.00-2.00		S	12			
				D	2.00-2.45		S	9			
				D	2.50-3.00		S	5			
End of Borehole at 3.00 m		3.00	1.36								

U	Undisturbed U100 / U86 Sample	▀	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS28
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224323.970 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677806.240 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.36 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
15/12/2011	13:00	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=12 (2,2,2,3,4,3)
2.00	N=9 (1,2,2,3,2,2)
2.50	N=5 (2,1,1,2,1,1)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS29
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224322.540 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677784.550 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.32 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Compact dark grey sandy angular medium and coarse gravel of slag. Sand is fine to coarse. Roots and weeds at top.		0.10	4.22	DJ	0.20						
				DJBD	0.50						
MADE GROUND: Dark grey silty fine to coarse sand and angular to subrounded fine to coarse gravel with occasional fragments of brick, slag and sandstone, cobbles and gravel sized very sandy pockets intermixed with ash and cinders.		1.00	3.32	D DJ U	1.00-1.45 1.00 1.00-2.00		S	38			
MADE GROUND: Medium dense becoming loose brown and reddish brown mottled silty gravelly fine to coarse sand intermixed with firm reddish brown sandy gravelly clay. Traces of dark grey ash and occasional fragments of sandstone. Gravel angular to sub rounded fine to coarse.				D U	2.00-2.45 2.00-3.00		S	7			
		2.70	1.62								
MADE GROUND: Loose brown and light brown silty gravelly fine to coarse sand with occasional fragments of sandstone. Gravel angular to sub rounded fine to coarse.		3.00	1.32								
End of Borehole at 3.00 m											

U	Undisturbed U100 / U86 Sample		Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS29
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224322.540 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677784.550 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.32 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
15/12/2011	12:00	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=38 (1,1,1,2,8,27)
2.00	N=7 (1,1,1,2,2,2)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMcG

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
WS30
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	13/09/2011	Initial Boring Diameter:	115mm	Coordinates:	E 223955.735 m National Grid
Date Complete:	13/09/2011	Initial Core Diameter			N 677846.373 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.15 m OD
Equipment:	Terrier	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Tarmac.		0.14	4.01								
MADE GROUND: Brown and grey sandy angular fine to coarse gravel of sandstone.		0.25	3.90	DJV	0.25						
				DJV	0.50						
MADE GROUND: Brown clayey gravelly fine to coarse sand. Gravel is angular fine to coarse of brick, sandstone and concrete and some ash.		0.70	3.45	B	0.50						
				DJV	1.00						
				B	1.00						
MADE GROUND: Brown and grey sandy angular fine to coarse gravel of brick, concrete, ash and occasional sandstone.				D	1.20-1.65		S	8			
				U	1.20-2.00	21					
				D	2.00-2.45		S	16			
				U	2.00-2.60	91					
MADE GROUND: Concrete (Driller's description).		2.40	1.75								
End of Borehole at 2.60 m		2.60	1.55	D	2.60						

U	Undisturbed U100 / U86 Sample		Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS30
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	13/09/2011	Initial Boring Diameter:	115mm	Coordinates:	E 223955.735 m National Grid
Date Complete:	13/09/2011	Initial Core Diameter			N 677846.373 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.15 m OD
Equipment:	Terrier	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
13/09/2011	17:00	2.60	2.00	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.20	N=8 (1,2,2,2,2,2)
2.00	N=16 (2,3,4,4,4,4)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

PERSONNEL

Driller: AP	Logged by: ARM	Checked by: PMcG

BOREHOLE LOG

Gourock Pierhead

bam ritchies

Borehole No
WS31
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	13/09/2011	Initial Boring Diameter:	115mm	Coordinates:	E 223968.448 m National Grid
Date Complete:	13/09/2011	Initial Core Diameter			N 677858.489 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.05 m OD
Equipment:	Terrier	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Tarmac.		0.14	3.91								
MADE GROUND: Brown and grey sandy angular fine to coarse gravel of sandstone.		0.30	3.75	DJV	0.30						
MADE GROUND: Loose becoming medium dense brown and dark brown slightly clayey sandy angular to sub angular fine to coarse gravel with occasional bands of clay and some cobbles. Gravel is of sandstone, brick, ash, tarmac and occasional concrete.				DJV	0.60						
				B	0.60						
				DJV	1.00						
				B	1.00		S	9			
				D	1.20-1.65						
				U	1.20-2.00	31					
				D	2.00-2.45		S	8			
				U	2.00-2.60	101					
				D	2.60-3.05		S	16			
End of Borehole at 3.05 m		3.00	1.05								

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS31
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	13/09/2011	Initial Boring Diameter:	115mm	Coordinates:	E 223968.448 m National Grid
Date Complete:	13/09/2011	Initial Core Diameter			N 677858.489 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.05 m OD
Equipment:	Terrier	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
13/09/2011	17:00	3.00	2.00	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.20	N=9 (2,2,3,2,2,2)
2.00	N=8 (2,2,2,2,2,2)
2.60	N=16 (2,2,4,4,4,4)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

PERSONNEL

Driller: AP	Logged by: ARM	Checked by: PMcG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS32
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	13/09/2011	Initial Boring Diameter:	115mm	Coordinates:	E 223974.817 m National Grid
Date Complete:	13/09/2011	Initial Core Diameter			N 677878.450 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.51 m OD
Equipment:	Terrier	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Tarmac.		0.14	4.37								
MADE GROUND: Brown and grey sandy angular fine to coarse gravel of sandstone.		0.30	4.21	DJV	0.25						
				DJV	0.50						
MADE GROUND: Medium dense dark brown sandy angular fine to coarse gravel with frequent cobbles and some boulders. Sand is fine to coarse predominantly of ash. Gravel is of brick, ash and sandstone.				DJV	1.00						
				B	1.00						
				D	1.20-1.65		S	11			
				U	1.20-2.00						
At 2.00m, terminated on brick obstruction.		2.00	2.51	D	2.00-2.10		S	50/0			
End of Borehole at 2.00 m											

U	Undisturbed U100 / U86 Sample	▪	Core Run	S	Standard Penetration Test
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak
				HVR	Hand Vane Test. Residual

CP	Cable Percussion
RO	Rotary Open Hole
RC	Rotary Cored
SO	Sonic Open holed
CONP	Continuous Percussion
WLS	Windowless Sampler

Installation

Slotted Pipe
Piezometer Tip
Grout
Concrete
Sand Filter
Bentonite Seal
Gravel Filter

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS32
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	13/09/2011	Initial Boring Diameter:	115mm	Coordinates:	E 223974.817 m National Grid
Date Complete:	13/09/2011	Initial Core Diameter			N 677878.450 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	4.51 m OD
Equipment:	Terrier	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
13/09/2011	17:00	2.00	2.00	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.20	N=11 (3,2,3,3,2,3)
2.00	50/0mm (16,9,50,0,0,0)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

PERSONNEL

Driller: AP	Logged by: ARM	Checked by: PMcG

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS33
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224233.410 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677881.510 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	5.70 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling/ Core Run		U	In Situ Testing Test	In Situ Testing Result	TCR (SCR) RQD	FI	Install -ation
MADE GROUND: Clayey topsoil / turf.				DJ	0.20						
		0.40	5.30								
MADE GROUND: Medium dense becoming loose greyish brown and grey silty fine to coarse sand and angular to sub rounded fine to coarse gravel with occasional fragments of brick and concrete, cobbles and gravel sized very sandy pockets intermixed with ash and cinders.				DJ DB	0.50 0.50						
				D DJ U	1.00-1.45 1.00 1.00-2.00		S	13			
				D U	2.00-2.45 2.00-3.00		S	6			
		3.00	2.70								
End of Borehole at 3.00 m											

U	Undisturbed U100 / U86 Sample	▚	Core Run	S	Standard Penetration Test	CP	Cable Percussion
P	Piston Sample	TCR	Total Core Recovery	C	Cone Penetration Test	RO	Rotary Open Hole
TW	Thin Wall Sample	SCR	Solid Core Recovery	32	N for full 300mm penetration	RC	Rotary Cored
D	Small Disturbed Sample	RQD	Rock Quality Designation	/175	For given penetration (mm)	SO	Sonic Open holed
B	Bulk Disturbed Sample	FI	Fracture Index	/25#	Seating blows only (mm)	CONP	Continuous Percussion
LB	Large Bulk Disturbed Sample	NI	Non Intact	PP	Pocket Penetrometer Test	WLS	Windowless Sampler
W	Water Sample	U*	Blows to drive U100 / U86	K	Permeability Test (m/s)	Installation	
G	Gas Sample	UT	Thin wall undisturbed sample	L	Packer Test (Lugeons)		Slotted Pipe / Sand Filter
C	Core	NA	Not Applicable	IV	Insitu Vane Test. Peak		Piezometer Tip / Bentonite Seal
J	Amber Jar Sample	NR	No Recovery	IVR	Insitu Vane Test. Residual		Grout / Gravel Filter
V	Vial Sample	NP	No Penetration	HV	Hand Vane Test. Peak		Concrete
				HVR	Hand Vane Test. Residual		

BOREHOLE LOG

Gourock Pierhead

Borehole No
WS33
Information
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/12/2011	Initial Boring Diameter:	115mm	Coordinates:	E 224233.410 m National Grid
Date Complete:	15/12/2011	Initial Core Diameter			N 677881.510 m National Grid
Hole Type:	CONP	Rotary Casing Type	-	Ground Level:	5.70 m OD
Equipment:	Competitor 130	Core Barrel:		Plunge:	90 °
		Core Bit:		Scale:	1:50

PROGRESS

Date	Time	Hole Depth	Casing Depth	Water Depth	Remarks
15/12/2011	10:45	3.00	-	-	Dry

DRILLING DETAILS

CP Chiselling			Rotary				
From	To	Hours	From	To	Hole Dia	Core Dia	Flush

WATER STRIKES

Date	Time	Strike	Risen To	After n Minutes	Casing Depth	Flow	Sealed

IN SITU SPT TEST DETAILS

Depth	Blows for 75mm Increments
1.00	N=13 (3,3,3,4,3,3)
2.00	N=6 (1,2,1,1,2,2)

NOTES

All depth in metres; all diameters in millimetres.

Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Hand dug inspection pit 0.30m x 0.30m x 1.00m. Borehole backfilled with arisings on completion.

PERSONNEL

Driller: SKF	Logged by: SKF	Checked by: PMCG

Appendix 2.2

Trial Pit Logs

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
CBR01
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/09/2011	Dimensions	◁ 0.50m ▷ △ 0.30m ▽	Coordinates:	E 223994.456 m National Grid
Date Complete:	15/09/2011				N 677894.667 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	4.54 m OD
Equipment:	Hand Tools			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Tarmac		0.14	4.40					
MADE GROUND: Grey angular coarse gravel and cobbles of basalt. Coated in a fine red dust.		0.36 0.45	4.18 4.09					
MADE GROUND: Brown silty very gravelly fine to coarse sand with occasional angular cobble of light grey sandstone. Gravel is sub angular to sub rounded fine to coarse predominantly sandstone.								
End of Trial Pit at 0.45 m								

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Stable

Shoring: None

General: Hand dug inspection pit. DCP test undertaken at base of pit. Photographs taken of pit and spoil. On completion pit backfilled with arising and finished at ground level with HRA.

Logged by: PMcG

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
CBR02
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/09/2011	Dimensions	◁ 0.44m ▷ △ 0.35m ▽	Coordinates:	E 224019.891 m National Grid
Date Complete:	15/09/2011				N 677917.341 m National Grid
Hole Type:	TP			Ground Level:	4.54 m OD
Equipment:	Hand Tools		Bearing -	Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Tarmac		0.12	4.42					
MADE GROUND: Grey angular coarse gravel and cobbles of basalt. Coated in a fine red dust.		0.53	4.01					
MADE GROUND: Brown silty very gravelly fine to coarse sand. Gravel is sub angular to sub rounded fine to coarse of various lithologies.		0.67	3.87					
End of Trial Pit at 0.67 m								

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Stable

Shoring: None

General: Hand dug inspection pit. DCP test undertaken at base of pit. Photographs taken of pit and spoil. On completion trial pit backfilled with arising and finished at ground level with HRA.

Logged by: PMcG

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
CBR03
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/09/2011	Dimensions	◁ 0.48m ▷ △ 0.36m ▽
Date Complete:	15/09/2011	Bearing	-
Hole Type:	TP	Coordinates:	E 224047.536 m National Grid
Equipment:	Hand Tools		N 677933.617 m National Grid
		Ground Level:	4.51 m OD
		Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing Depth	In Situ Testing Result	Installation
MADE GROUND: Tarmac		0.13	4.38					
MADE GROUND: Grey angular coarse gravel and cobbles of basalt. Coated in a fine red dust.		0.37	4.14					
MADE GROUND: Brown slightly sandy sub rounded fine to coarse gravel of various lithologies. Sand is fine to coarse.		0.47	4.04					
End of Trial Pit at 0.47 m								

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Stable

Shoring: None

General: Hand dug inspection pit. DCP test undertaken at base of pit. Photographs taken of pit and spoil. On completion trial pit backfilled with arising and finished at ground level with HRA.

Logged by: PMcG

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
CBR04
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	15/09/2011	Dimensions	◁ 0.55m ▷ △ 0.35m ▽	Coordinates:	E 224069.205 m National Grid
Date Complete:	15/09/2011				N 677944.145 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	4.49 m OD
Equipment:	Hand Tools			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Tarmac		0.13	4.36					
MADE GROUND: Grey angular coarse gravel and cobbles of basalt. Coated in a fine red dust.		0.60	3.89					
MADE GROUND: Brown silty very gravelly fine to coarse sand with occasional sub angular cobble of sandstone. Gravel is sub angular to angular of blaes and sandstone.		0.80	3.69					
End of Trial Pit at 0.80 m								

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Stable

Shoring: None

General: Hand dug inspection pit. DCP test undertaken at base of pit. Photographs taken of pit and spoil. On completion trial pit backfilled with arising and finished at ground level with HRA.

Logged by: PMcG

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
RPC01
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/09/2011	Dimensions	◁ 0.45m ▷ △ 0.35m ▽	Coordinates:	E 224008.820 m National Grid
Date Complete:	14/09/2011				N 677908.210 m National Grid
Hole Type:	TP			Ground Level:	4.54 m OD
Equipment:	Hand Tools		Bearing -	Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Tarmac ((Wearing course).		0.05	4.49					
MADE GROUND: Tarmac (Base course).		0.13	4.41					
MADE GROUND: Grey angular coarse gravel and cobbles of basalt. Coated in a fine red dust.		0.45	4.09					
MADE GROUND: Brown silty very gravelly fine to coarse sand. Gravel sub rounded to rounded fine to coarse of various lithologies .		0.60	3.94					
End of Trial Pit at 0.60 m								

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Stable

Shoring: None

General: Precored to recover 130mm diameter road core. Extended by hand digging to determine base of sub base. Photographs taken of pit and spoil. On completion pit backfilled with arising and finished at ground level with HRA.

Logged by: PMcG

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
RPC02
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/09/2011	Dimensions	◁ 0.48m ▷ △ 0.38m ▽	Coordinates:	E 224034.260 m National Grid
Date Complete:	14/09/2011				N 677927.510 m National Grid
Hole Type:	TP			Ground Level:	4.54 m OD
Equipment:	Hand Tools		Bearing -	Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Installation
						Depth	Result	
MADE GROUND: Tarmac (Wearing course).		0.05	4.49					
MADE GROUND: Tarmac (Base course).		0.14	4.40					
MADE GROUND: Grey angular coarse gravel and cobbles of basalt. Coated in a fine red dust.		0.35	4.19					
MADE GROUND: Brown sandy sub rounded to rounded fine to coarse gravel of various lithologies. Sand is fine to coarse.		0.45	4.09					
End of Trial Pit at 0.45 m								

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Stable

Shoring: None

General: Precored to recover 130mm diameter road core. Extended by hand digging to determine base of sub base. Photographs taken of pit and spoil. On completion pit backfilled with arising and finished at ground level with HRA.

Logged by: PMcG

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
RPC03
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	14/09/2011	Dimensions	◁ 0.48m ▷ △ 0.38m ▽	Coordinates:	E 224056.110 m National Grid
Date Complete:	14/09/2011				N 677938.710 m National Grid
Hole Type:	TP			Ground Level:	4.44 m OD
Equipment:	Hand Tools		Bearing -	Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Tarmac (Wearing course).		0.05	4.39					
MADE GROUND: Tarmac (Base course).		0.12	4.32					
MADE GROUND: Grey angular coarse gravel and cobbles of basalt. Coated in a fine red dust.		0.60	3.84					
MADE GROUND: Brown silty very gravelly fine to coarse sand. Gravel is sub angular to sub rounded fine to coarse of various lithologies.		1.00	3.44					
End of Trial Pit at 1.00 m								

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Stable

Shoring: None

General: Pit precored to recover 130mm diameter road core. Extended by hand digging to confirm depth of sub base. Photographs taken of pit and spoil. On completion trial pit backfilled with arising and finished at ground level with HRA.

Logged by: PMcG

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

bam ritchies

Trial Pit No
TP01
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	21/09/2011	Dimensions	◁ 2.40m ▷ △ 0.80m ▽	Coordinates:	E 224100.222 m National Grid
Date Complete:	21/09/2011				N 677968.284 m National Grid
Hole Type:	TP			Ground Level:	0.13 m OD
Equipment:	8T Tracked 360		Bearing -	Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing Depth	In Situ Testing Result	Installation
MADE GROUND: Brown sandy sub rounded and sub angular fine to coarse gravel with high cobble and boulder content of mixed lithologies. Numerous shell fragments, many brick fragments and some metal wire.				DJV	0.50			
				B	0.50			
				D	0.50			
				DJV	1.00			
Brown slightly silty very gravelly fine to coarse SAND with a high sub rounded cobbles and boulder content of mixed lithologies.		1.10	-0.97	B	1.00			
				D	1.00			
		1.50	-1.37	B	1.50			
End of Trial Pit at 1.50 m				D	1.50			
				DJV	1.50			

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Strong inflow at 0.40m

Stability: Unstable

Shoring: None

General: Pit located adjacent to low tide level. Services cleared before commencing pit. Pit backfilled with arisings on completion

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
TP02
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	21/09/2011	Dimensions	◁ 2.60m ▷ △ 1.00m ▽	Coordinates:	E 224131.685 m National Grid
Date Complete:	21/09/2011				N 677960.272 m National Grid
Hole Type:	TP			Ground Level:	0.28 m OD
Equipment:	8T Tracked 360		Bearing -	Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Brown slightly silty sandy sub rounded fine to coarse gravel with a high sub rounded cobble and medium boulder content of mixed lithologies. Many shell fragments, some glass fragments, and some cobble sized brick fragments.				DJV	0.50			
		0.60	-0.32	B	0.50			
				D	0.50			
Brown gravelly fine to coarse SAND with medium cobble and boulder content. Gravel is sub rounded fine to coarse of mixed lithologies.				DJV	1.00			
				B	1.00			
				D	1.00			
		1.80	-1.52	B	1.80			
End of Trial Pit at 1.80 m				D	1.80			
				DJV	1.80			

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Seepage from 0.30m.

Stability: Unstable

Shoring: None

General: Services cleared before commencing pit. Pit backfilled with arisings on completion. Pit located at waters edge during period of low tide.

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

bam ritchies

Trial Pit No
TP03
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	21/09/2011	Dimensions	◁ 2.70m ▷ △ 1.20m ▽	Coordinates:	E 224201.954 m National Grid
Date Complete:	21/09/2011				N 677988.239 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	0.36 m OD
Equipment:	8T Tracked 360			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Brown slightly silty sandy sub rounded fine to coarse gravel with a high sub angular and sub rounded cobble and boulder content of mixed lithologies. Some rebar rods, wooden blocks, and old cable. Many concrete blocks 0.50m x 0.50m.				DJV B D	0.50 0.50 0.50			
End of Trial Pit at 1.00 m		1.00	-0.64	DJV B D	1.00 1.00 1.00			

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Groundwater at 0.10m depth.

Stability: Caving in from surface.

Shoring: None

General: Pit located adjacent to low tide level. Services cleared before commencing pit. Pit backfilled with arisings on completion

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

bam ritchies

Trial Pit No
TP04
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	21/09/2011	Dimensions	◁ 2.30m ▷ △ 0.90m ▽	Coordinates:	E 224119.243 m National Grid
Date Complete:	21/09/2011				N 677942.538 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	3.05 m OD
Equipment:	8T Tracked 360			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Grey brown gravelly angular and sub angular cobbles of basalt, dolerite and concrete. Some thin bands of brown silty fine to coarse sand. Gravel is angular to sub angular fine to coarse of basalt, dolerite and concrete.				DJV	0.50			
		0.70	2.35	B	0.70			
End of Trial Pit at 0.70 m				DJV	0.70			

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Strond upweeling flow from 0.50m depth.

Stability: Pit sides caving in.

Shoring: None

General: Services cleared before commencing pit. Pit backfilled with arisings on completion

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
TP05
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	21/09/2011	Dimensions	◁ 2.50m ▷ △ 1.10m ▽	Coordinates:	E 224155.570 m National Grid
Date Complete:	21/09/2011				N 677959.049 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	0.25 m OD
Equipment:	8T Tracked 360			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Brown slightly silty sandy sub angular and sub rounded fine to coarse gravel with a high sub angular cobble and boulder content. Gravel is of mixed lithologies, shell fragments, glass, and pottery. Cobbles and boulders of basalt, sandstone, and concrete. Cobble sized fragments of wooden planks, metal pipe and pottery. Thin bands of brown silty fine to coarse sand.				DJV	0.50			
				B	0.50			
				D	0.50			
				DJV	1.00			
				B	1.00			
				D	1.00			
				B	1.50			
				D	1.50			
End of Trial Pit at 1.70 m		1.70	-1.45	DJV	1.50			

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Groundwater at 0.10m depth - strong flow.

Stability: Unstable

Shoring: None

General: Pit located on seaward side of existing sheet piled wall, adjacent to low water line. Services cleared before commencing pit. Pit backfilled with arisings on completion

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
TP06
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	21/09/2011	Dimensions	◁ 2.40m ▷ △ 0.80m ▽	Coordinates:	E 224193.000 m National Grid
Date Complete:	21/09/2011				N 677956.378 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	4.30 m OD
Equipment:	8T Tracked 360			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Brown slightly clayey, sandy sub angular and sub rounded fine to coarse gravel of aggregate and other lithologies.		0.15	4.15					
MADE GROUND: Brown slightly clayey, sandy sub rounded fine to coarse gravel with a high sub angular and sub rounded cobbles and medium boulder content of mixed lithologies, brick and tarmac. Fragments of wood, terram, 20mm diameter wire rope, metal pipe, ceramic fragments. Sand is fine to coarse of ash. Sand is fine to coarse.				DJV	0.50			
				B	0.50			
				D	0.50			
				DJV	1.00			
				B	1.00			
				D	1.00			
				B	1.50			
				D	1.50			
				DJV	1.50			
				B	2.00			
				D	2.00			
End of Trial Pit at 2.30 m		2.30	2.00	DJV	2.00			

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Unstable

Shoring: None

General: Services cleared before commencing pit. Pit backfilled with arisings on completion

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
TP07
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	22/09/2011	Dimensions	◁ 2.80m ▷ △ 0.70m ▽	Coordinates:	E 224219.425 m National Grid
Date Complete:	22/09/2011				N 677918.022 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	5.94 m OD
Equipment:	JCB 3CX			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Topsoil		0.20	5.74	DJV	0.20			
MADE GROUND: Brown slightly clayey sandy angular fine to coarse gravel with a high angular cobble and boulder content of brick and concrete. Some sections of metal post, metal pipe, wire, and canvas sheeting. Sand is fine to coarse.				DJV B D	0.50 0.50 0.50			
MADE GROUND: Soft to firm reddish brown sandy gravelly silt with a medium cobble content of mixed lithologies. Gravel is sub angular to sub rounded fine to coarse of sandstone and quartz. Sand is fine to coarse. (Reworked Land Reclamation Deposits including beach deposits).		1.00	4.94	D B DJV	1.00 1.00 1.00			
POSSIBLE MADE GROUND: Reddish brown silty gravelly sand with a medium to high angular and sub rounded cobble content of limestone, silty sandstone and weathered schist. Gravel is angular to sub rounded of mixed lithologies. Sand is fine to coarse. (Possible Land Reclamation Deposits including Reworked Bedrock)		1.70	4.24	B D DJV	1.50 1.50 1.50			
				B D DJV	2.00 2.00 2.00			
				B D DJV	2.50 2.50 2.50			
End of Trial Pit at 3.10 m		3.10	2.84	B D DJV	3.00 3.00 3.00			

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Locally Unstable

Shoring: None

General: Services cleared before commencing pit. Pit backfilled with arisings on completion.

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
TP08
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	22/09/2011	Dimensions	◁ 3.10m ▷ △ 0.80m ▽	Coordinates:	E 224220.281 m National Grid
Date Complete:	22/09/2011				N 677889.741 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	6.39 m OD
Equipment:	JCB 3CX			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Topsoil.		0.20	6.19	DJV	0.20			
MADE GROUND: Brown slightly silty sandy angular fine to coarse gravel with a high angular cobble and boulder content of brick, concrete, mortar, sandstone. Rare delayed set tar cobbles. Wood fragments. Sand is fine to coarse.				DJV B D D B DJV	0.50 0.50 0.50 1.00 1.00 1.00			
MADE GROUND: Brown silty gravelly fine to coarse sand with a medium sub angular cobble content of mixed lithologies. Gravel is sub angular to sub rounded fine to coarse of mixed lithologies. Band of black sand of ash between 1.60m and 1.70m depth.		1.20 1.75	5.19 4.64	B D DJV DJV B D	1.50 1.50 1.50 1.70 2.00 2.00			
MADE GROUND: Brown slightly silty sandy sub rounded fine to coarse gravel with a high sub angular and sub rounded cobble content of mixed lithologies. Sand is fine to coarse of black ash.		2.50	3.89	DJV B D DJV	2.00 2.50 2.50 2.50			
End of Trial Pit at 2.50 m								

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Seepage at 0.40m depth.

Stability: Unstable from 1.75m depth.

Shoring: None

General: Services cleared before commencing pit. Pit backfilled with arisings on completion.

Logged by: AGM

Checked by: PMCG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
TP09
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	22/09/2011	Dimensions	◁ 3.00m ▷ △ 0.70m ▽	Coordinates:	E 224231.516 m National Grid
Date Complete:	22/09/2011				N 677904.296 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	5.65 m OD
Equipment:	JCB 3CX			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Topsoil		0.20	5.45	DJV	0.20			
MADE GROUND: Brown slightly clayey, slightly sandy angular fine to coarse gravel and cobbles of brick, concrete, tarmac and slate. Some glass fragments, pockets of brown slightly sandy clay, sand and gravel of cinders with fragments of charred wood. Sand is fine to coarse.				DJV B D B D	0.50 0.50 0.50 1.00 1.00			
POSSIBLE MADE GROUND: Firm reddish brown slightly sandy silt with high angular and sub angular cobble content of extremely weak to weak silty fine grained sandstone. (Possible Reworked Weathered Bedrock).		1.30	4.35	DJV B D DJV	1.00 1.50 1.50 1.50			
POSSIBLE MADE GROUND: Weak to medium strong reddish brown silty fine grained sandstone with thin bands of conglomerate. (Possible Reworked Bedrock).		1.90 2.10	3.75 3.55	B D DJV	2.00 2.00 2.00			
End of Trial Pit at 2.10 m								

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Locally unstable.

Shoring: None

General: Services cleared before commencing pit. Pit backfilled with arisings on completion.

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
TP10
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	22/09/2011	Dimensions	◁ 2.80m ▷ △ 0.90m ▽	Coordinates:	E 224234.251 m National Grid
Date Complete:	22/09/2011				N 677870.893 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	5.69 m OD
Equipment:	JCB 3CX			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing Depth	In Situ Testing Result	Install -ation
MADE GROUND: Topsoil.		0.20	5.49	DJV	0.20			
MADE GROUND: Brown clayey sandy angular fine to coarse gravel with a medium sub angular cobble content of mixed lithologies, brick and concrete. Rare plastic food wrappers. Sand is fine to coarse.		0.50	5.19	DJV B D	0.50 0.50 0.50			
MADE GROUND: Soft orangish brown sandy silt with medium to high sub angular and sub rounded cobble and boulder content of brick and concrete. Sand is fine to coarse of ash and soot.		1.50	4.19	D B DJV B D DJV	1.00 1.00 1.00 1.50 1.50 1.50			
MADE GROUND: Brown slightly silty slightly sandy sub rounded fine to coarse gravel with a high sub angular and sub rounded cobble content of mixed lithologies. Some fragments of broken white pottery. Sand is fine to coarse.				B D DJV B D DJV	2.00 2.00 2.00 2.50 2.50 2.50			
End of Trial Pit at 2.70 m		2.70	2.99					

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Seepage at 0.30m depth

Stability: Unstable

Shoring: None

General: Services cleared before commencing pit. Pit backfilled with arisings on completion.

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
TP11
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	22/09/2011	Dimensions	◁ 3.20m ▷ △ 0.60m ▽	Coordinates:	E 224247.266 m National Grid
Date Complete:	22/09/2011				N 677884.321 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	5.20 m OD
Equipment:	JCB 3CX			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Topsoil		0.20	5.00	DJV	0.20			
MADE GROUND: Brown slightly clayey sandy angular fine to coarse gravel with a high sub angular and angular cobble and boulder content of brick, concrete, slate and tarmac. Some lenses of brown soft slightly gravelly silt. Sand is fine to coarse.				DJV B D B D DJV	0.50 0.50 0.50 1.00 1.00 1.00			
POSSIBLE MADE GROUND: Firm reddish brown sandy silt with high angular cobble content of extremely weak to medium strong silty sandstone. Thin bands of weak conglomerate and medium strong reddish brown silty sandstone; recovered as cobbles and boulders. (Possible Reworked Bedrock).		1.10	4.10	B D DJV B D DJV	1.50 1.50 1.50 2.00 2.00 2.00			
End of Trial Pit at 2.20 m		2.20	3.00					

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Stable

Shoring: None

General: Services cleared before commencing pit. Pit backfilled with arisings on completion.

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

bam ritchies

Trial Pit No
TP12
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	22/09/2011	Dimensions	◁ 3.00m ▷ △ 0.70m ▽	Coordinates:	E 224246.273 m National Grid
Date Complete:	22/09/2011				N 677857.673 m National Grid
Hole Type:	TP		Bearing -	Ground Level:	5.24 m OD
Equipment:	JCB 3CX			Scale:	1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing		Install -ation
						Depth	Result	
MADE GROUND: Topsoil		0.20	5.04	DJV	0.20			
MADE GROUND: Brown clayey sandy angular fine to coarse gravel with a high sub angular cobble and boulder content of brick, concrete, slate, and sandstone. Some lead pipe fragments. Sand is fine to coarse.		0.70	4.54	DJV B D	0.50 0.50 0.50			
MADE GROUND: Light brown very silty gravelly fine to coarse sand. Gravel is sub rounded fine to coarse of mixed lithologies.		1.30	3.94	B D DJV	1.00 1.00 1.00			
MADE GROUND: Red silty fine to coarse sand with a high sub angular and sub rounded fine to coarse gravel and cobble content of mixed lithologies and broken red tile.		1.50	3.74	B D DJV	1.50 1.50 1.50			
MADE GROUND: Brown slightly sandy sub rounded and sub angular fine to coarse gravel with a high sub angular cobble content of basalt. Rare blue glazed pottery fragments and concrete. Some pockets of black organic silt. Thin bands of silty fine to coarse sand				B D DJV	2.00 2.00 2.00			
				B D DJV	2.50 2.50 2.50			
End of Trial Pit at 3.00 m		3.00	2.24	B D DJV	3.00 3.00 3.00			

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Local seepage at 0.4m

Stability: Falling in from 1.50m

Shoring: None

General: Services cleared before commencing pit. Pit backfilled with arisings on completion.

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

TRIAL PIT LOG

Gourock Pierhead

Trial Pit No
TP13
Sheet 1 of 1
Status
Final
01/02/2012

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Date Started	22/09/2011	Dimensions ◁ 2.90m ▷ △ 0.90m ▽	Coordinates: E 224260.691 m National Grid
Date Complete:	22/09/2011	Bearing -	N 677867.012 m National Grid
Hole Type:	TP		Ground Level: 4.95 m OD
Equipment:	JCB 3CX		Scale: 1:50

Description of Strata	Legend	Depth	Reduced Level	Sampling		In Situ Testing Depth	In Situ Testing Result	Install -ation
MADE GROUND: Topsoil.		0.20	4.75	DJV	0.20			
MADE GROUND: Reddish brown clayey sandy angular fine to coarse gravel with a high angular to sub angular cobble and boulder content of brick and concrete. Some blocks of double skin brick wall and clay pipe fragments. Sand is fine to coarse.				DJV B D B D DJV	0.50 0.50 0.50 1.00 1.00 1.00			
POSSIBLE MADE GROUND: Extremely weak to medium strong reddish brown conglomerate with thin layers of silty sandstone, recovered as a sandy clay with a high angular and sub angular cobble and boulder content. Becoming slightly silty fine to coarse sand from 1.70m depth. (Possible Reworked Bedrock).		1.50	3.45	B D DJV	1.50 1.50 1.50			
		2.05	2.90	B D DJV	2.00 2.00 2.00			
End of Trial Pit at 2.05 m								

NOTES

All Dimensions in Metres.
Groundwater levels are subject to seasonal, tidal and other fluctuations and should not be taken as constant

Groundwater: Dry

Stability: Stable

Shoring: None

General: Services cleared before commencing pit. Pit backfilled with arisings on completion.

Logged by: AGM

Checked by: PMcG

KEY TO SYMBOLS AND ABBREVIATIONS

D	Small Disturbed Sample	W	Water Sample	HV	Hand Vane Test. Peak
B	Bulk Disturbed Sample	G	Gas Sample	HVR	Hand Vane Test. Residual
LB	Large Bulk Disturbed Sample	NR	No Recovery	PP	Pocket Penetrometer Test
U	Undisturbed U100 Sample	*	Estimated Relative Density	ICBR	In Situ CBR Test
BLK	Block Sample	J	Amber Jar Sample	IDEN	In Situ Density Test
CBR	CBR Mould Sample	V	Vial Sample	MCV	In Situ MCV Test

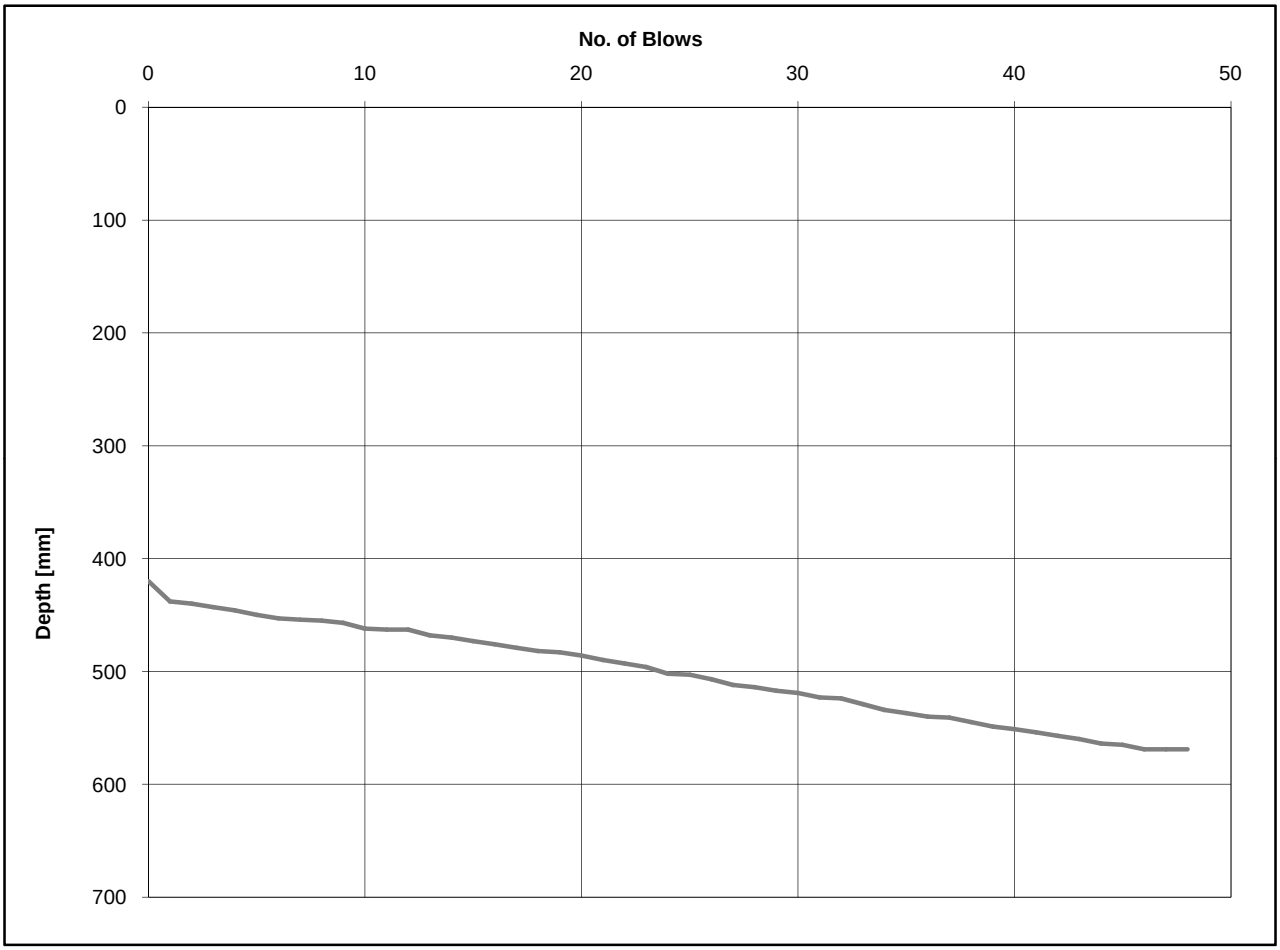
APPENDIX 3.0

DYNAMIC CONE PENETRATION TESTS

DYNAMIC CONE PENETRATION TEST RESULTS

Test Location
CBR01

Contract Name	Gourock Pierhead		
Contract No	4618	Start Depth mm	420
Client:		Final Depth mm:	569
Engineer:	W.A Fairhurst and Partners		
Equipment:	CNS Farnell DCP Model A2465		



CBR RESULTS

TEST No	Depth m From	Depth m To	CBR Value %
CBR 1	0.42	0.57	91.2
			0.0

CBR Calculated using TRL equation

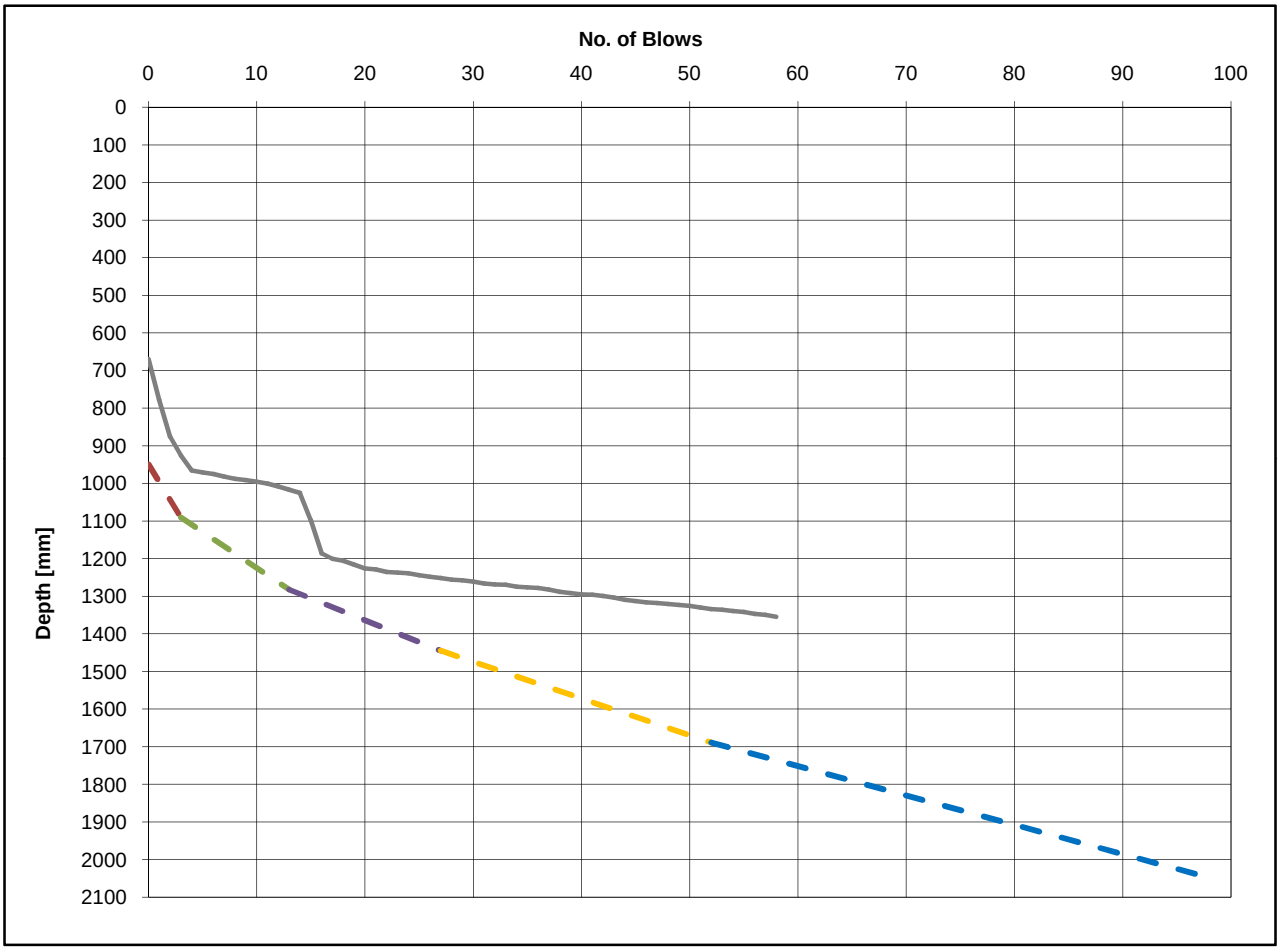
Log10(CBR)=2.48 - 1.057 Log10(mm/blow)

Reference

DYNAMIC CONE PENETRATION TEST RESULTS

Test Location
CBR02

Contract Name	Gourock Pierhead		
Contract No	4618	Start Depth mm	670
Client:		Final Depth mm:	1355
Engineer:	W.A Fairhurst & Partners		
Equipment:	CNS Farnell DCP Model A2465		



CBR RESULTS

TEST No	Depth m From	Depth m To	CBR Value %
CBR 1	0.95	1.09	5.2
CBR 2	1.09	1.28	13.4
CBR 3	1.28	1.45	22.6
CBR 4	1.45	1.69	27.2
CBR 5	1.69	2.05	34.4

CBR Calculated using TRL equation

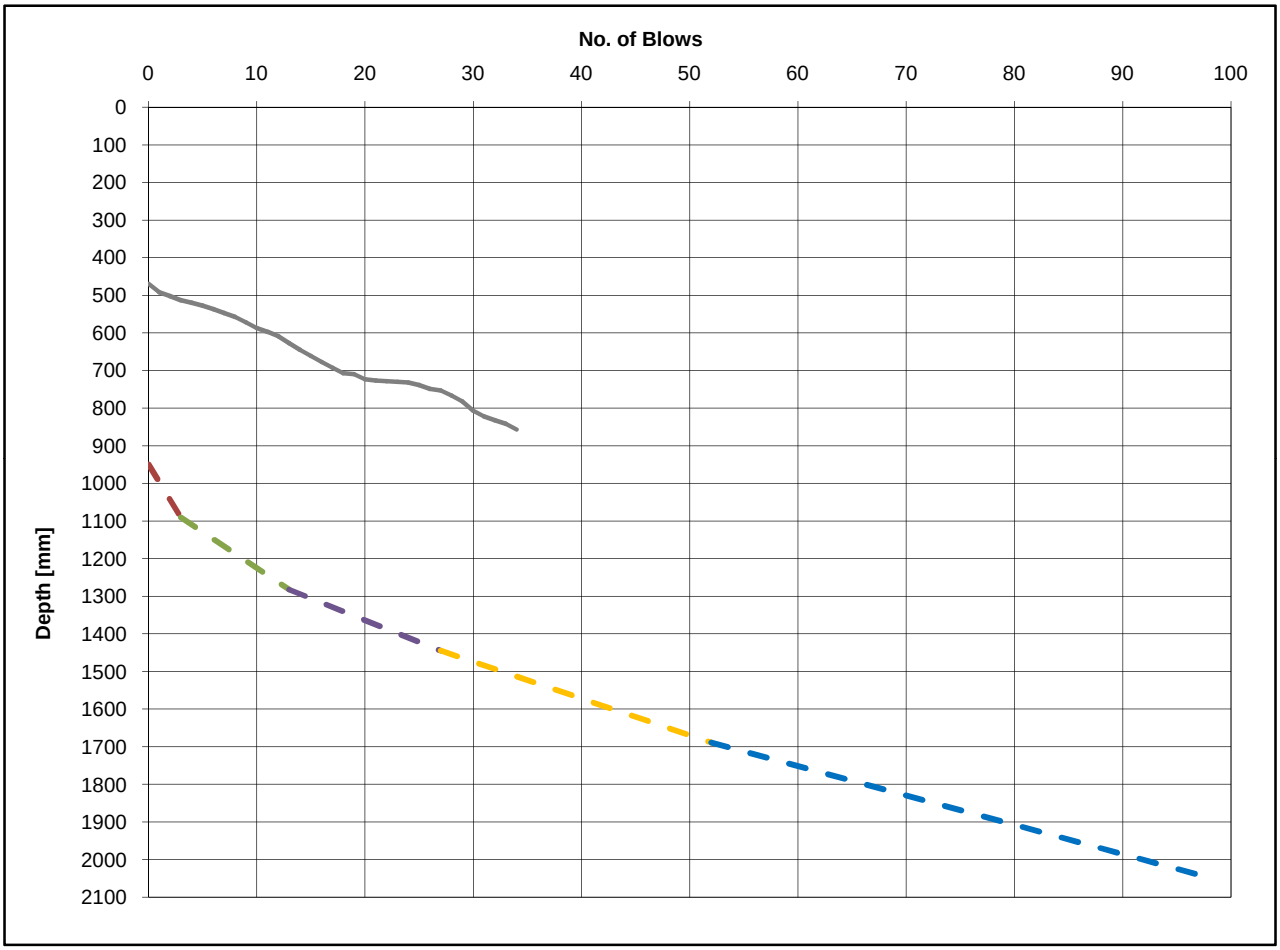
Log10(CBR)=2.48 - 1.057 Log10(mm/blow)

Reference

DYNAMIC CONE PENETRATION TEST RESULTS

Test Location
CBR03

Contract Name	Gourock Pierhead		
Contract No	4618	Start Depth mm	470
Client:		Final Depth mm:	857
Engineer:	W.A Fairhurst and Partners		
Equipment:	CNS Farnell DCP Model A2465		



CBR RESULTS

TEST No	Depth m From	Depth m To	CBR Value %
CBR 1	0.95	1.09	5.2
CBR 2	1.09	1.28	13.4
CBR 3	1.28	1.45	22.6
CBR 4	1.45	1.69	27.2
CBR 5	1.69	2.05	34.4

CBR Calculated using TRL equation

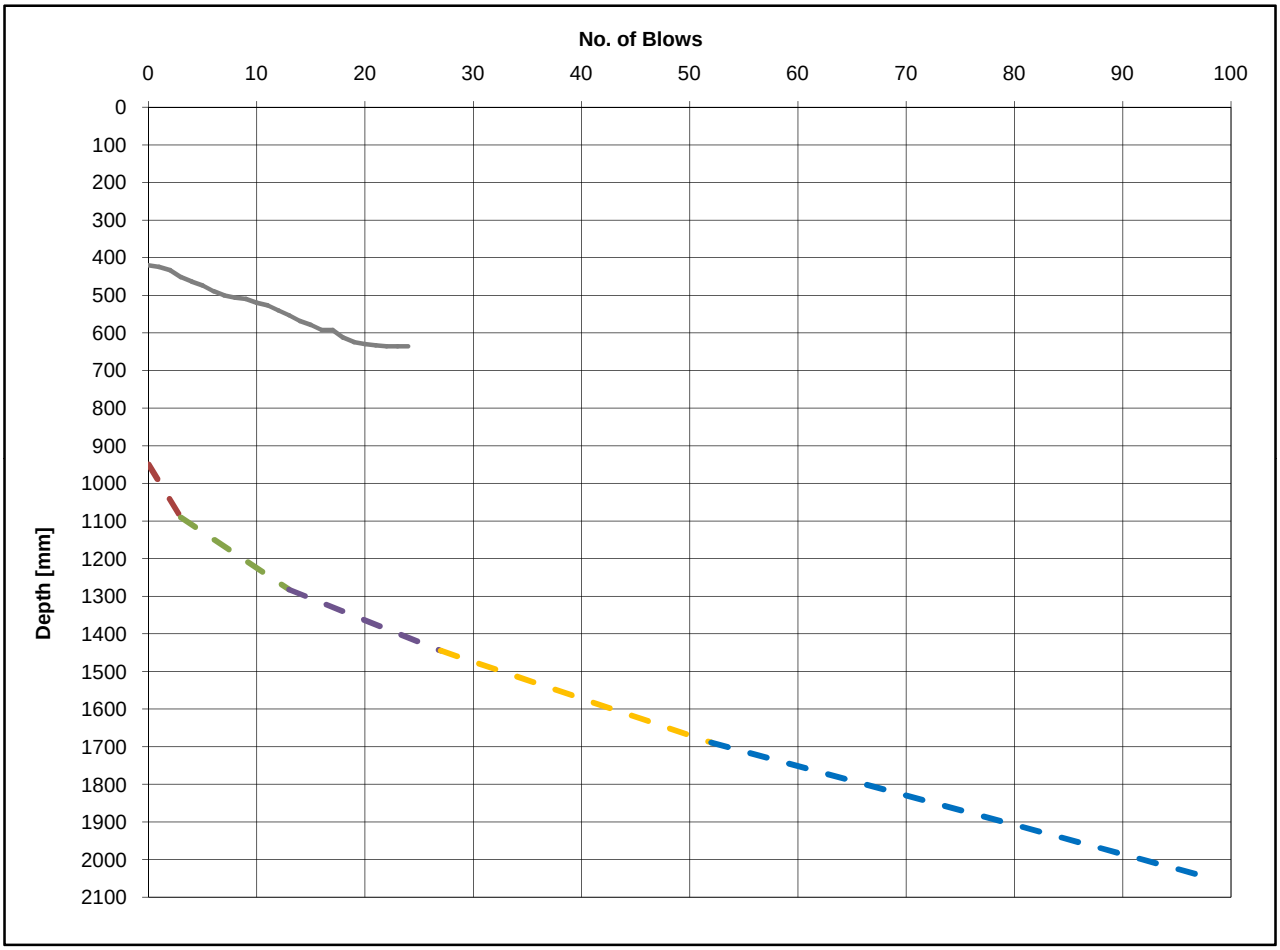
Log10(CBR)=2.48 - 1.057 Log10(mm/blow)

Reference

DYNAMIC CONE PENETRATION TEST RESULTS

Test Location
CBR04

Contract Name	Gourock Pierhead		
Contract No	4618	Start Depth mm	420
Client:		Final Depth mm:	636
Engineer:	W.A Fairhurst and Partners		
Equipment:	CNS Farnell DCP Model A2465		



CBR RESULTS

TEST No	Depth m From	Depth m To	CBR Value %
CBR 1	0.95	1.09	5.2
CBR 2	1.09	1.28	13.4
CBR 3	1.28	1.45	22.6
CBR 4	1.45	1.69	27.2
CBR 5	1.69	2.05	34.4

CBR Calculated using TRL equation

Log10(CBR)=2.48 - 1.057 Log10(mm/blow)

Reference

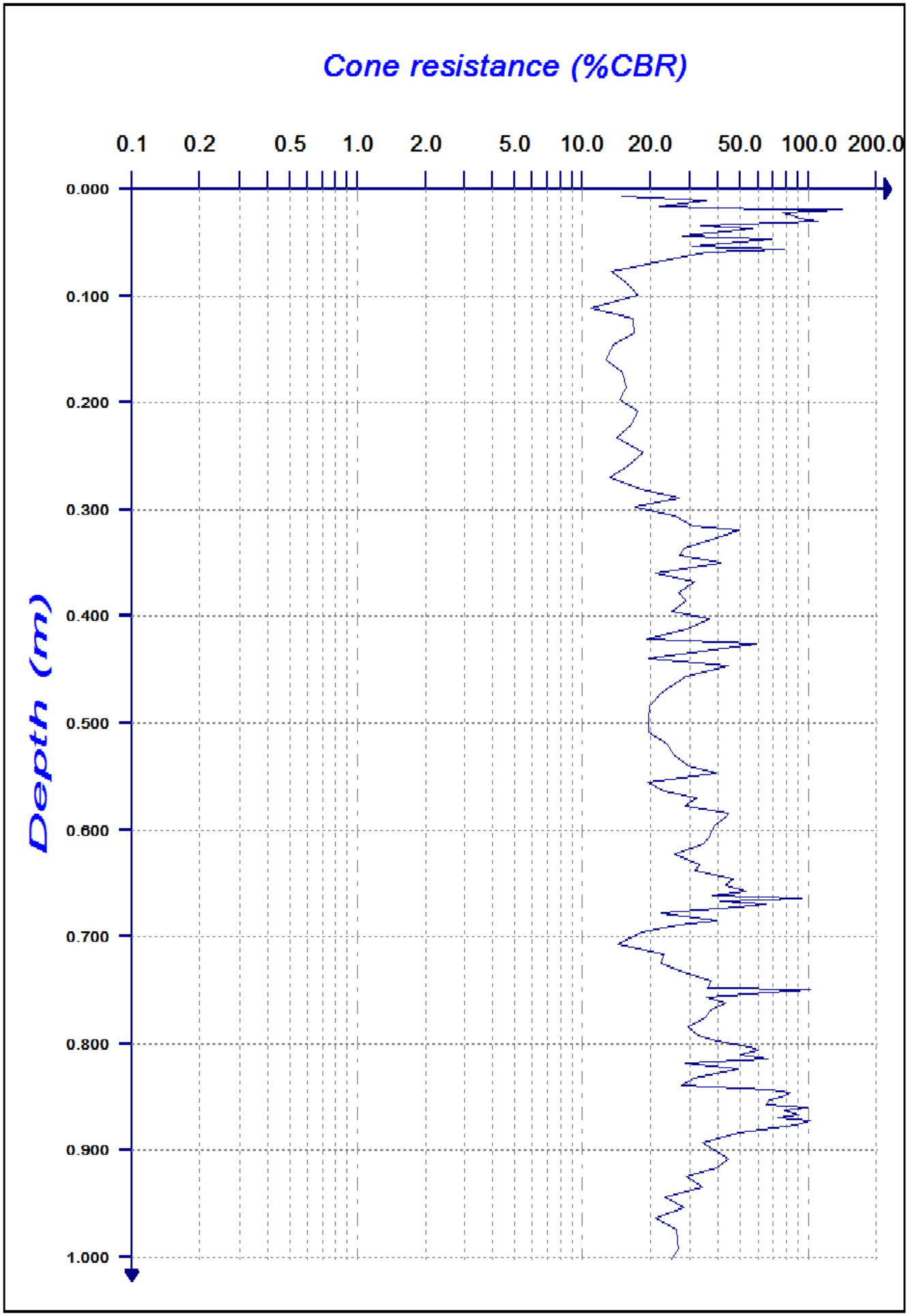
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P14



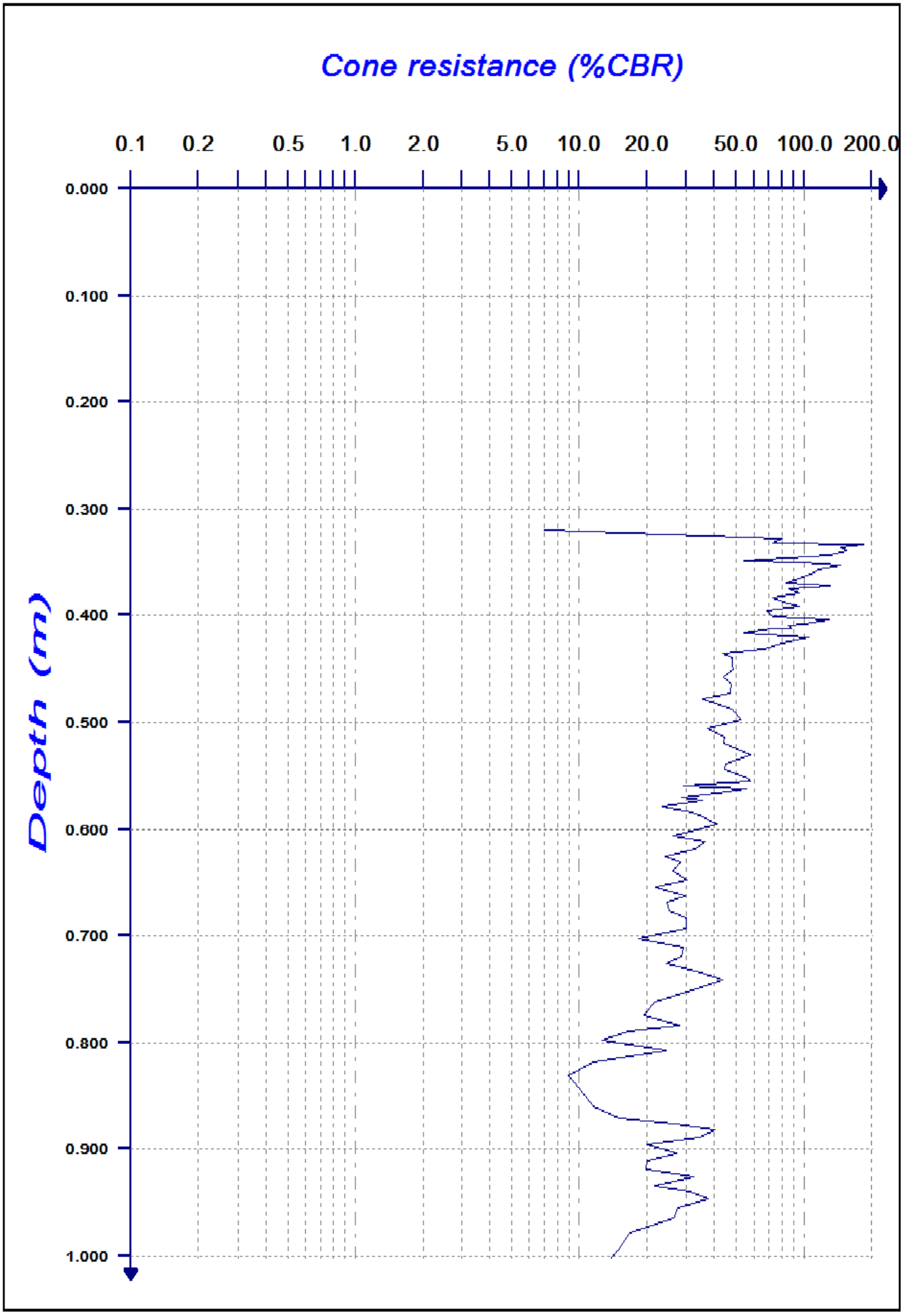
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P15



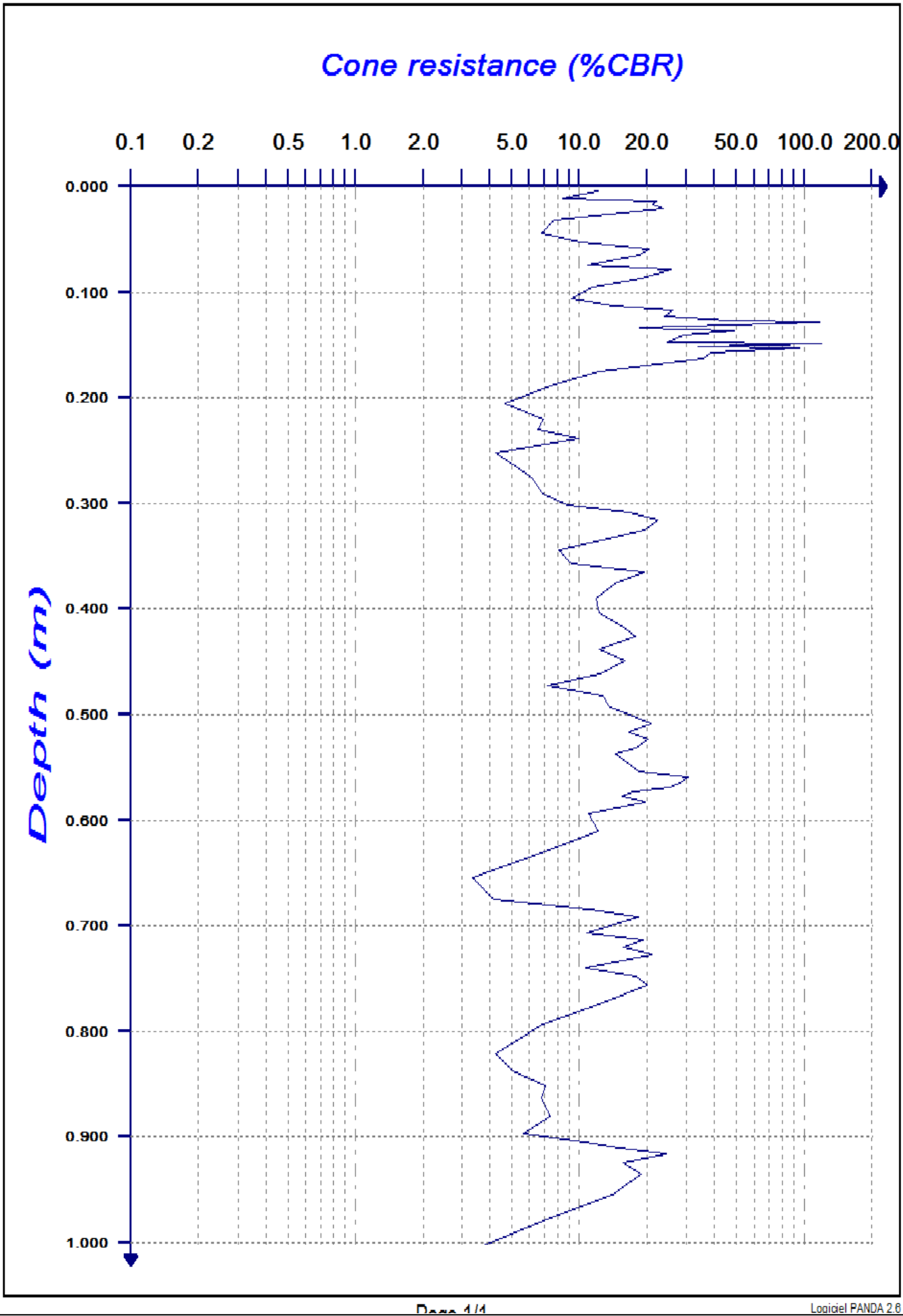
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P17



Logiciel PANDA 2.6

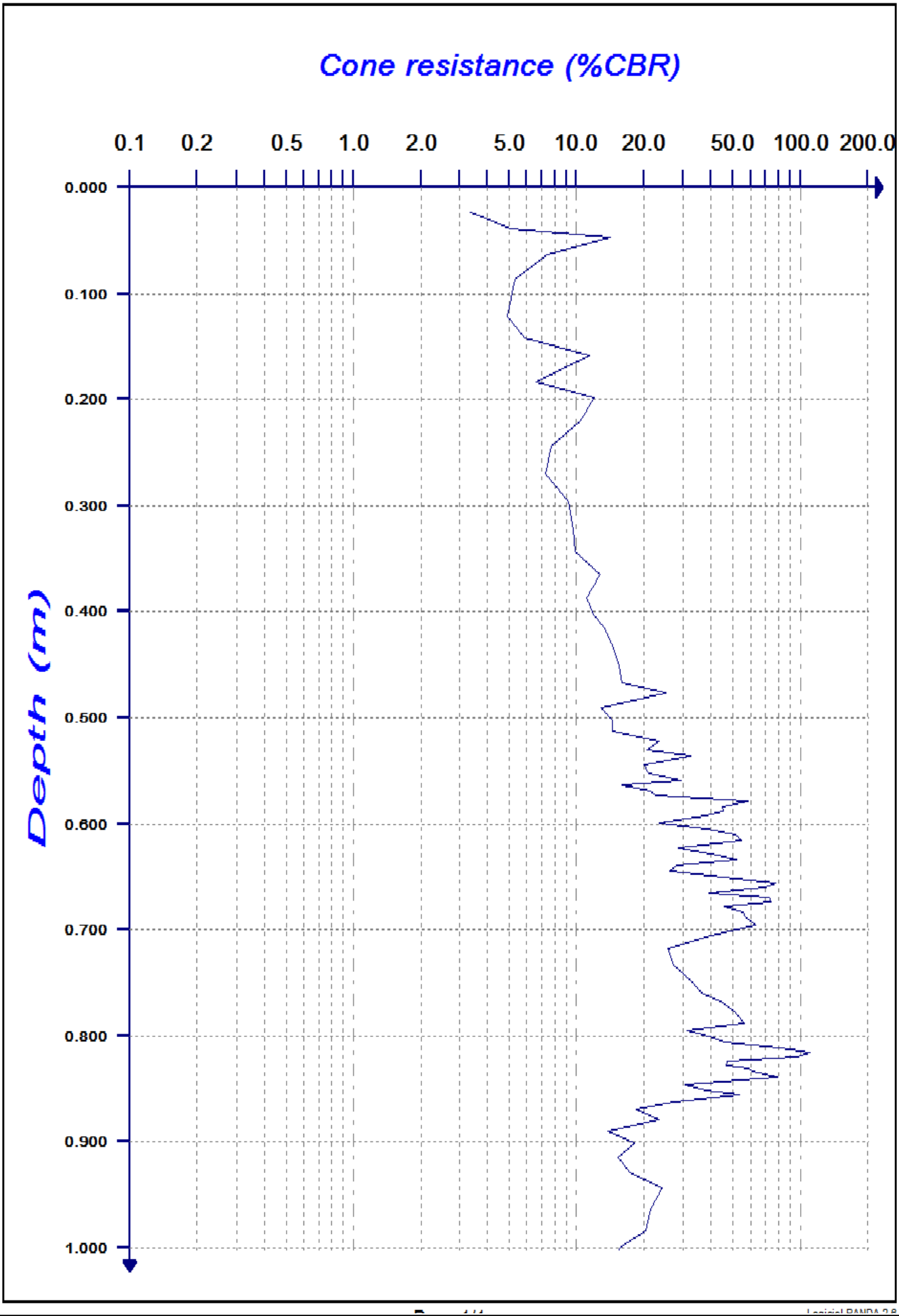
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P19



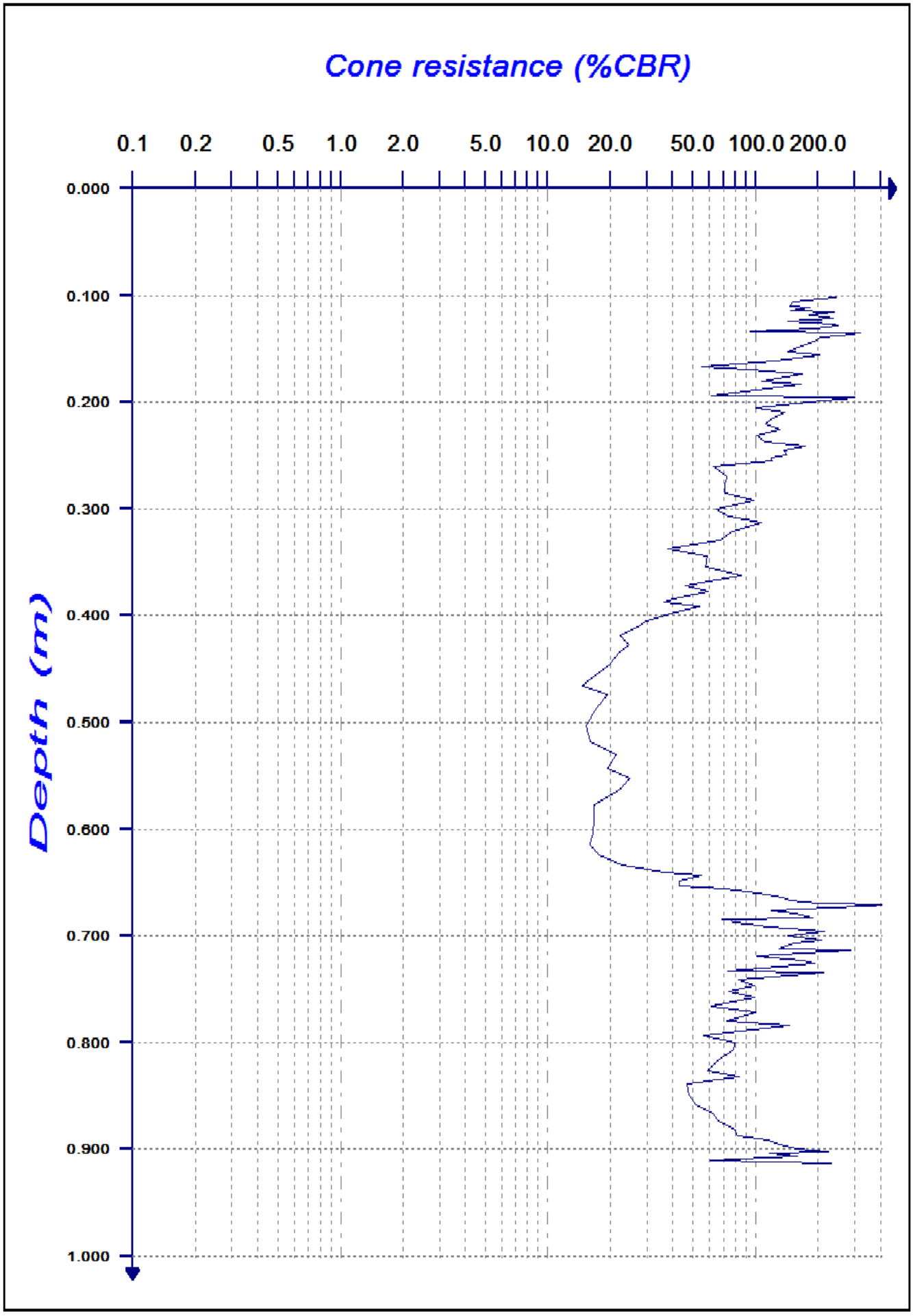
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P21



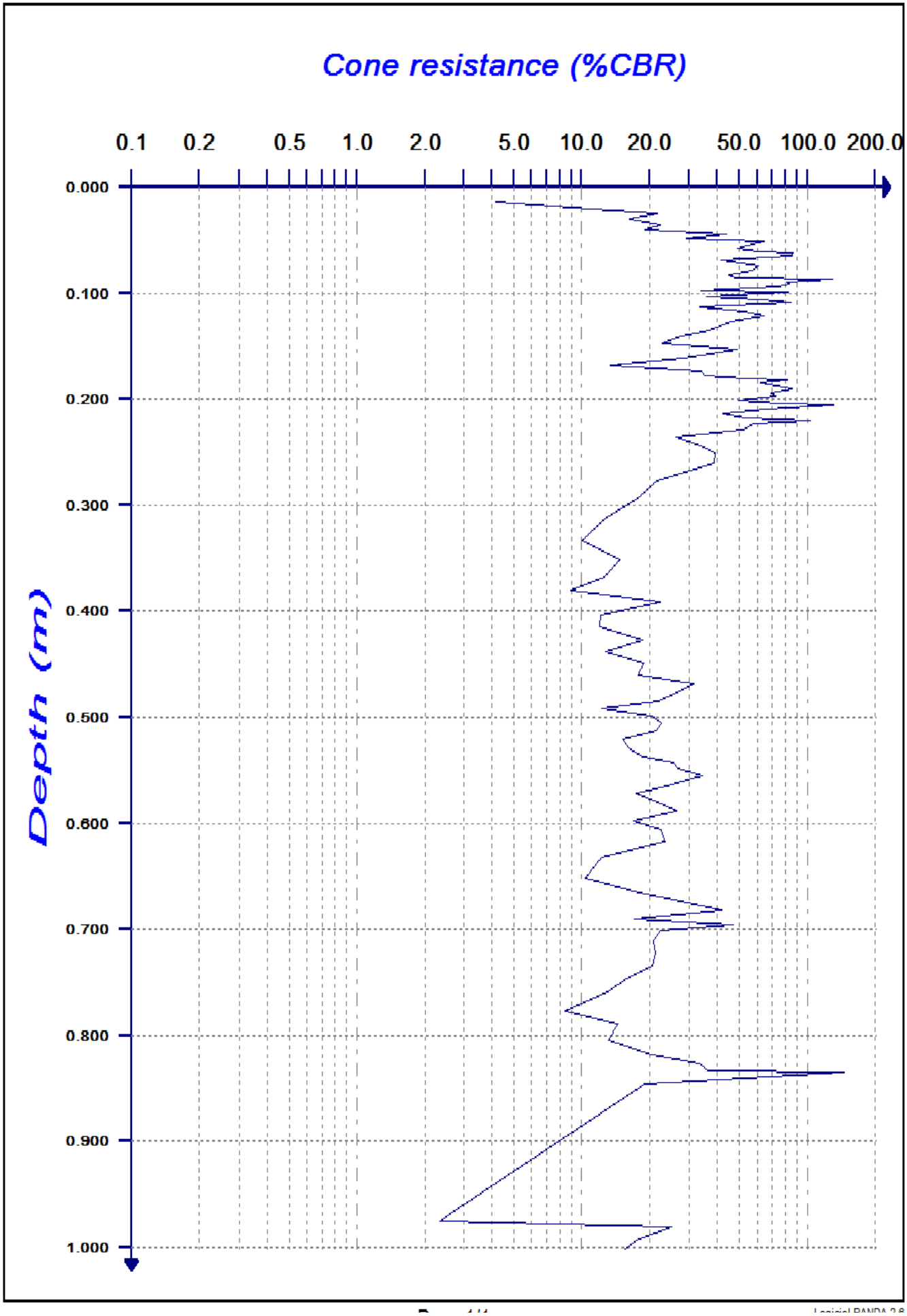
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P23



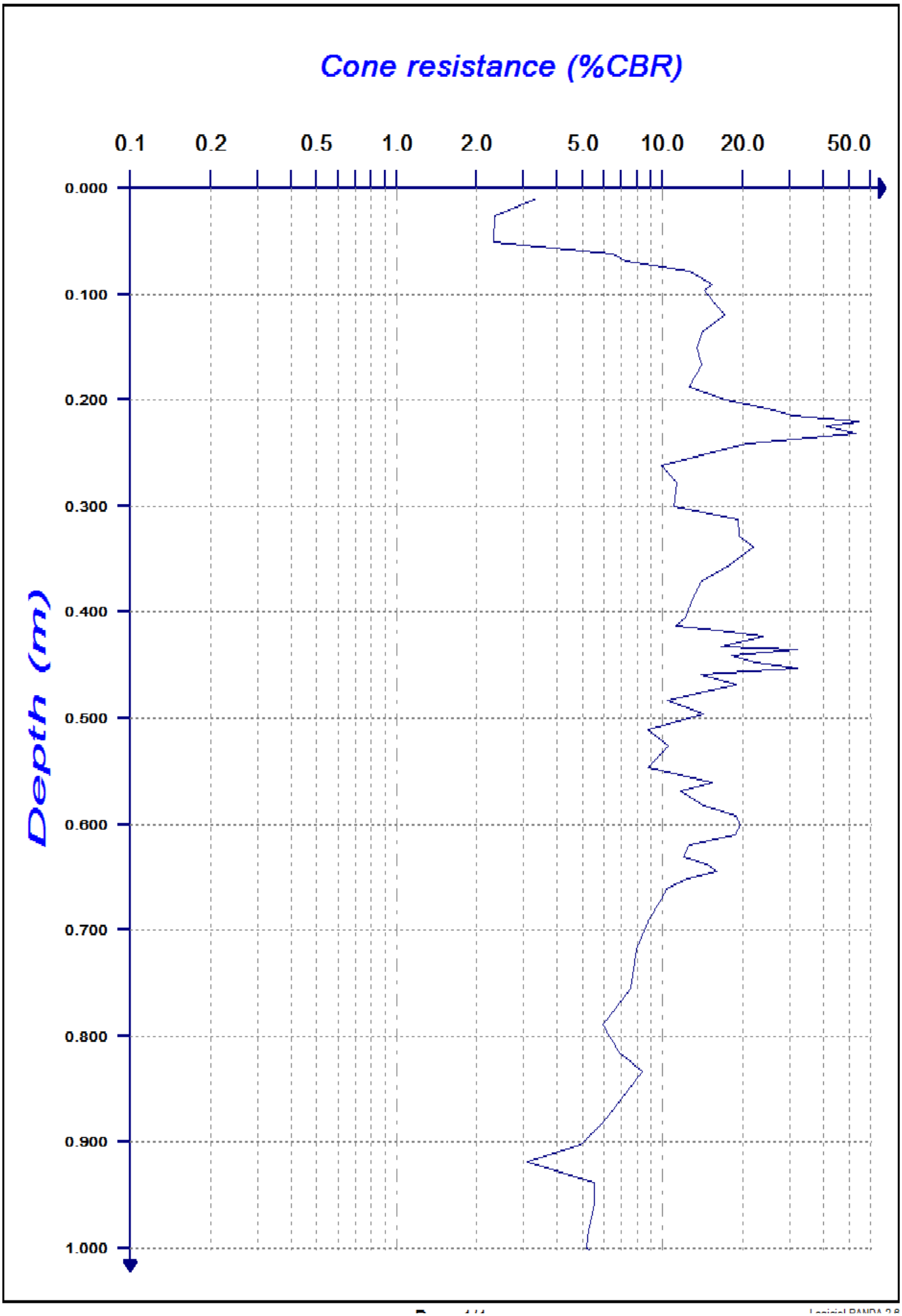
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P24



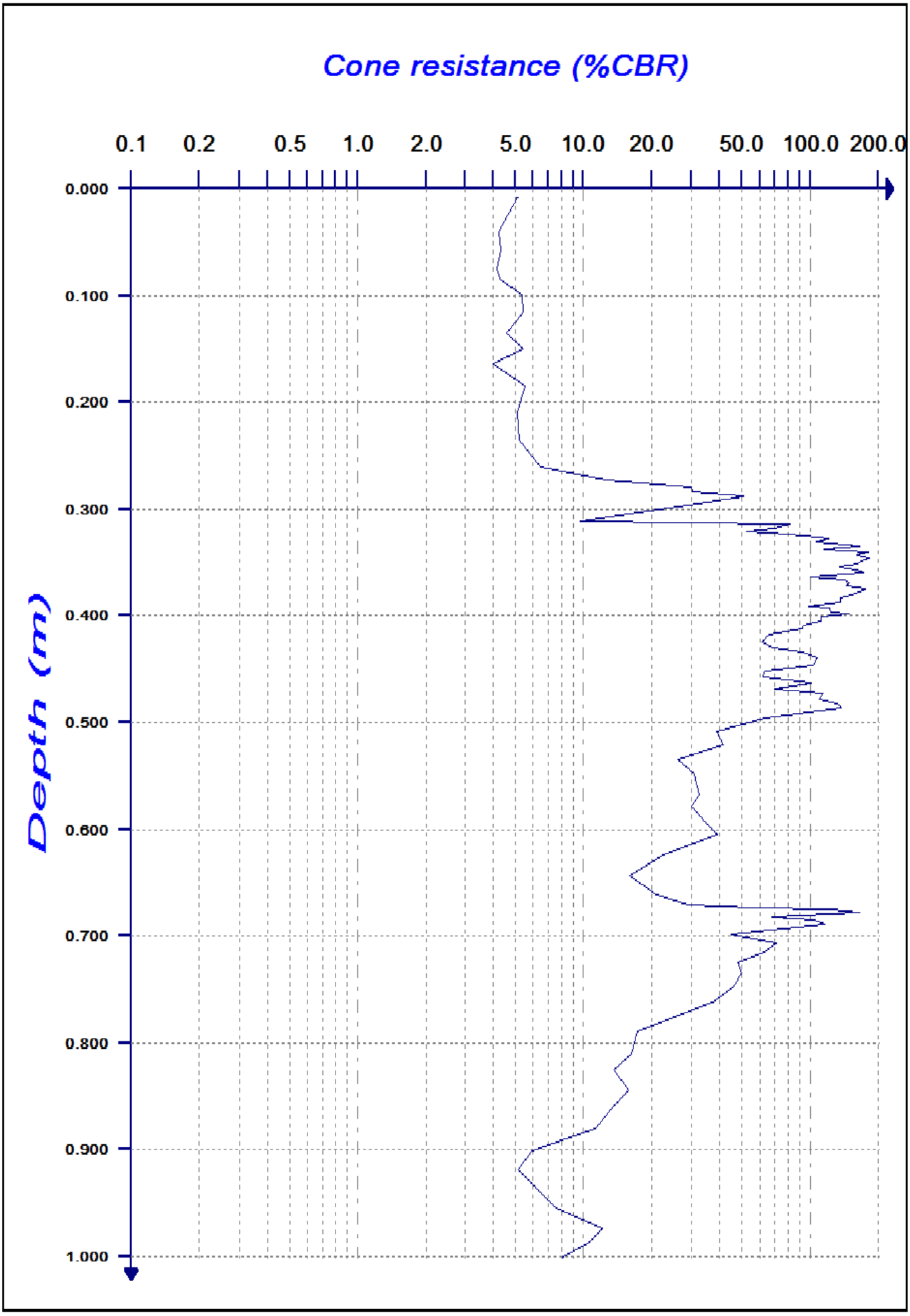
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P25



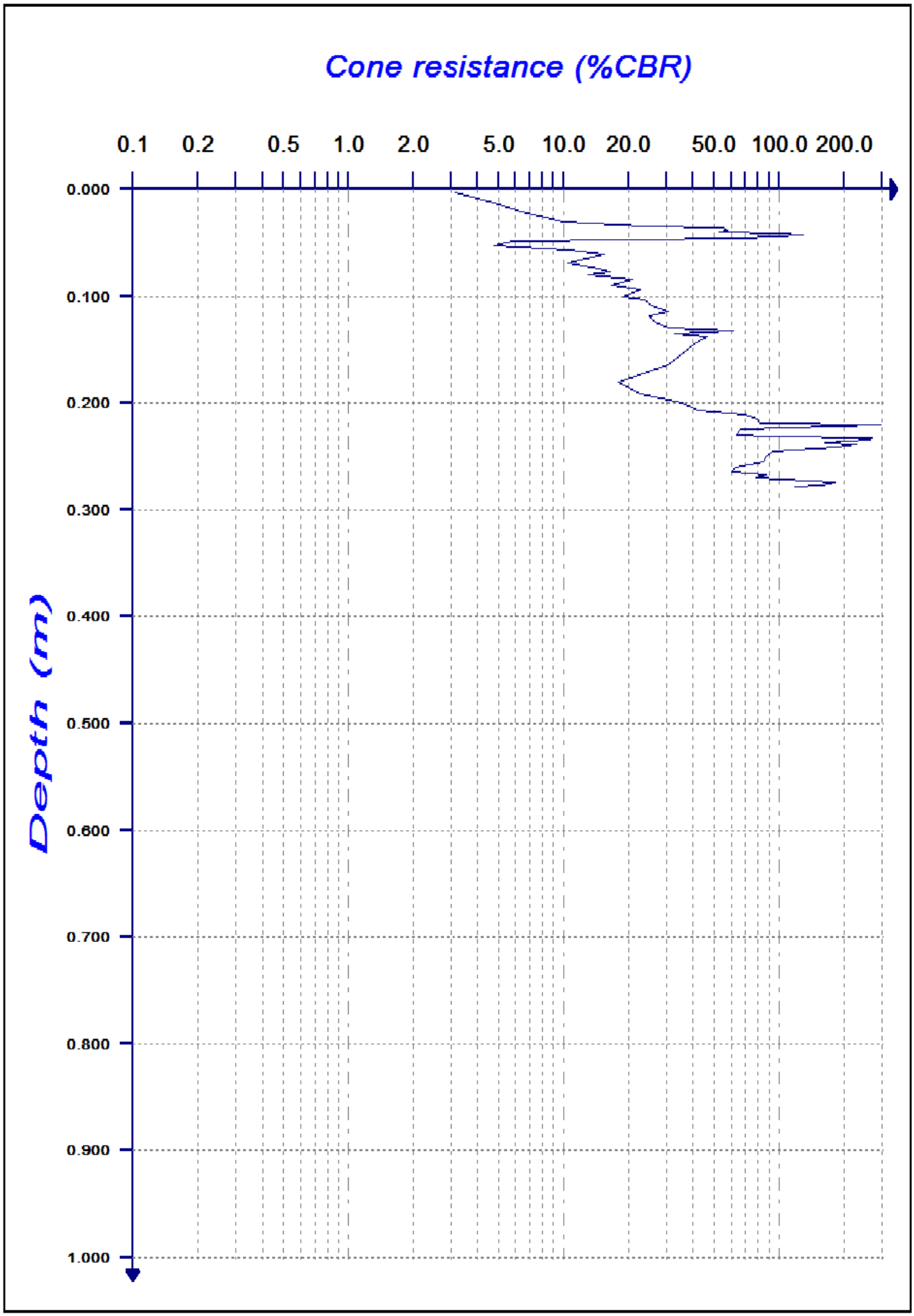
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P27



Logiciel PANDA 2 B

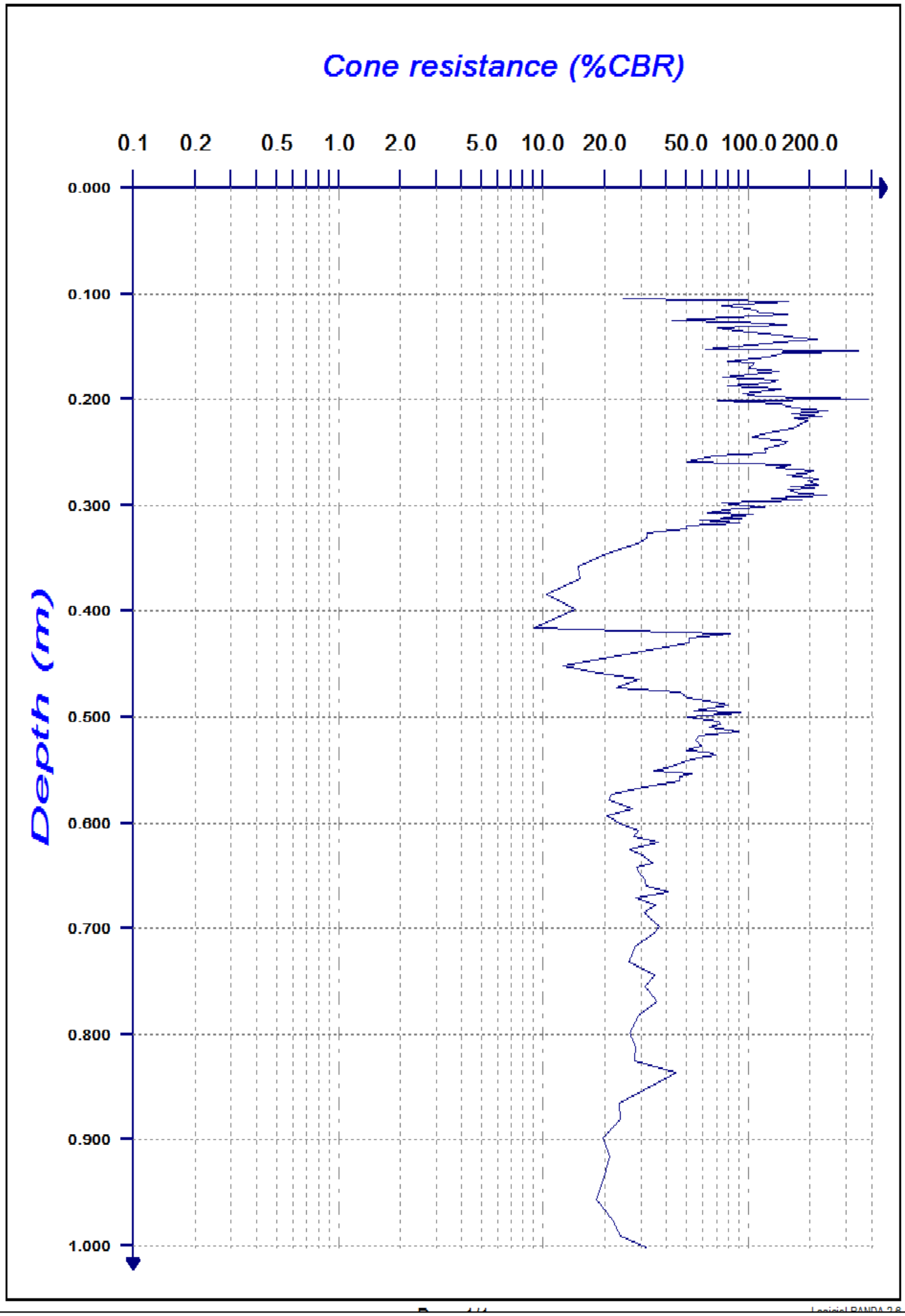
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P29



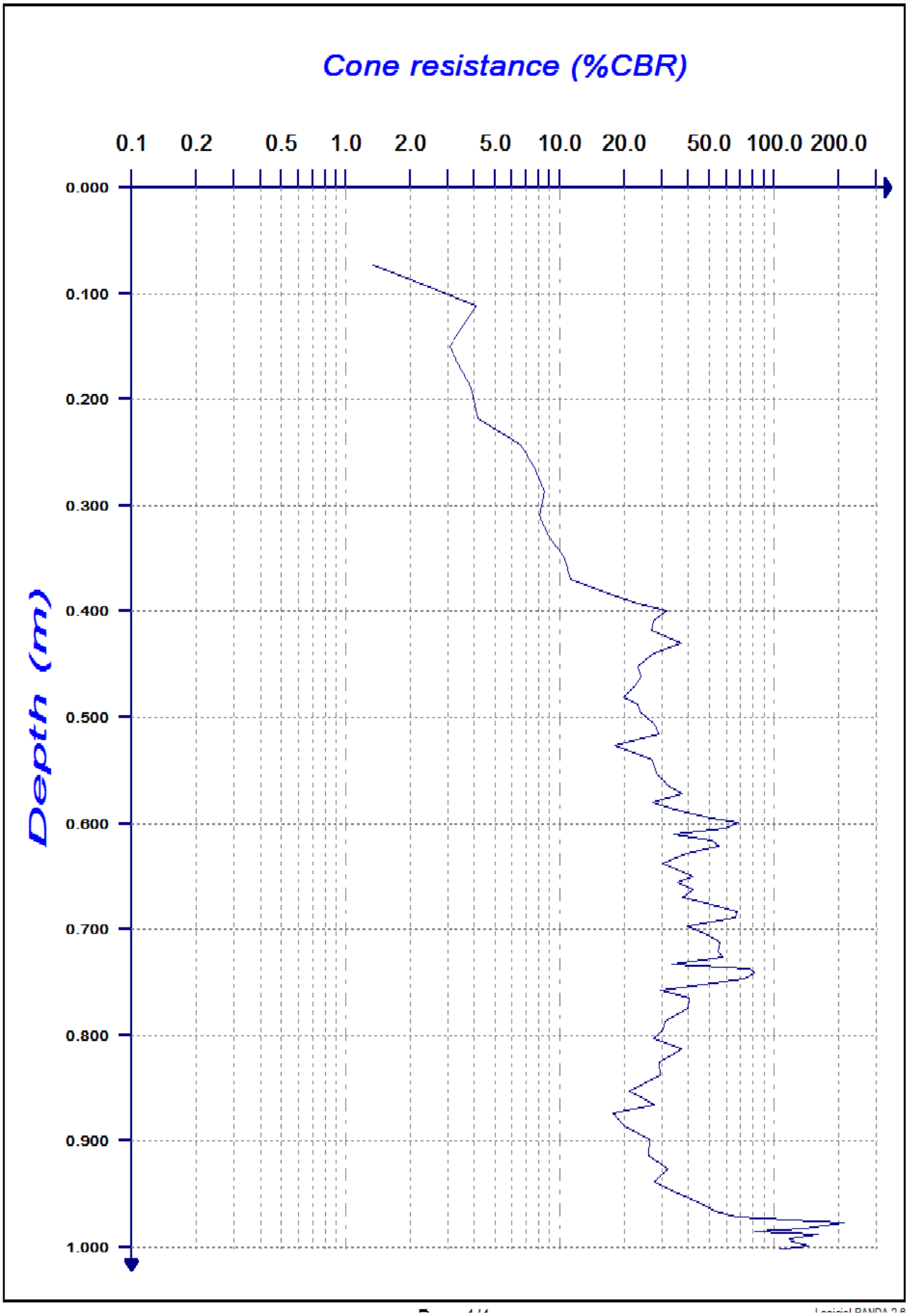
bam ritchies
BAM Ritchies, Glasgow Road, Kilsyth, Glasgow. G65 9BL
Tel: 01236 467000 / Fax: 01236 467030

GOUROCK PIERHEAD REGEN.

LOGGED BY: SKF | DATE: 21/12/2011

VARIABLE ENERGY DYNAMIC CONE PROBE

HOLE NO: P33



APPENDIX 4.0

GROUNDWATER AND GAS MONITORING RESULTS

RESULTS OF GROUNDWATER AND GAS MONITORING

Contract No: 4618
Contract Name: Gourock Pierhead Regeneration
Engineer: W.A Fairhurst
Client: Riverside Inverclyde Ltd
Date: 06/10/2011
Weather: Heavy showers
Gas Meter Type: GA2000
Water Meter Type: Battery Operated Dipmeter

Borehole Number	Date Installed	Depth	CH_4	CO_2	O_2	H2S	CO	Atmospheric Pressure	Flow	Time	Water Level	Remarks
			(%)	(%)	(%)	(ppm)	(ppm)	(mbars)	(l/h)	(hh:mm)	(mbgl)	
04	04/10/2011	4.60	0.0	0.4	13.7	0	0	1000	0.0	08:20	3.70	Probable rain water - installation to be purged
06	05/10/2011	3.90	0.0	0.0	19.3	0	0	1000	0.0	08:30	3.88	

RESULTS OF GROUNDWATER AND GAS MONITORING

Contract No: 4618
Contract Name: Gourock Pierhead Regeneration
Engineer: W.A Fairhurst
Client: Riverside Inverclyde Ltd
Date: 25/10/2011
Weather: Overcast
Gas Meter Type: GA2000
Water Meter Type: Battery Operated Dipmeter

Borehole Number	Date Installed	Depth	CH_4	CO_2	O_2	H2S	CO	Atmospheric Pressure	Flow	Time	Water Level	Remarks
			(%)	(%)	(%)	(ppm)	(ppm)	(mbars)	(l/h)	(hh:mm)	(mbgl)	
04	04/10/2011	4.60	0.0	0.1	19.8	0	0	995	0.0	09:00	Dry	
06	05/10/2011	3.90	0.0	0.0	19.8	0	0	995	0.0	09:07	3.90	

RESULTS OF GROUNDWATER AND GAS MONITORING

Contract No: 4618
Contract Name: Gourock Pierhead Regeneration
Engineer: W.A Fairhurst
Client: Riverside Inverclyde Ltd
Date: 02/11/2011
Weather: Overcast
Gas Meter Type: GA2000
Water Meter Type: Battery Operated Dipmeter

Borehole Number	Date Installed	Depth	CH_4	CO_2	O_2	H2S	CO	Atmospheric Pressure	Flow	Time	Water Level	Remarks
			(%)	(%)	(%)	(ppm)	(ppm)	(mbars)	(l/h)	(hh:mm)	(mbgl)	
04	04/10/2011	4.60	0.0	0.4	20.3	0	0	998	0.0	13:00	dry	
06	05/10/2011	3.90	0.0	0.1	20.6	0	0	998	0.0	13:05	dry	damp at base

RESULTS OF GROUNDWATER AND GAS MONITORING

Contract No: 4618
Contract Name: Gourock Pierhead Regeneration
Engineer: W.A Fairhurst
Client: Riverside Inverclyde Ltd
Date: 21/12/2012
Weather: Light rain
Gas Meter Type: GA2000
Water Meter Type: Battery Operated Dipmeter

Borehole Number	Date Installed	Depth	CH_4	CO_2	O_2	H2S	CO	Atmospheric Pressure	Flow	Time	Water Level	Remarks
			(%)	(%)	(%)	(ppm)	(ppm)	(mbars)	(l/h)	(hh:mm)	(mbgl)	
04	04/10/2011	4.60	0.0	1.1	20.3	0	0	1012	0.1	08:50	dry	CO2 rising to 1.0% @ 60 secs, then 1.1% @ 90 secs, steady up to 180 secs
06	05/10/2011	3.90	0.0	0.5	20.6	0	0	1012	0.1	08:57	3.88	

RESULTS OF GROUNDWATER AND GAS MONITORING

Visit: 4
Contract No: 4618
Contract Name: Gourock Pierhead
Engineer: Fairhurst
Client: Riverside Inverclyde
Date: 16 January 2012
Weather: Very cold, dry and overcast
Gas Meter Type: GA2000
Water Meter Type: Battery Operated Dip meter
Monitor ID: J.Mchutchison

Borehole Number	Date of Installation	Depth of Installation	CH_4	CO_2	O_2	H2S	CO	Atmospheric Pressure	Flow	Time	Water Level	Gas Monitoring Remarks	Groundwater Monitoring Remarks
		(mbgl)	(%)	(%)	(%)	(ppm)	(ppm)	(mbars)	(l/h)	(hh:mm)	(mbgl)		
4	03/10/2011	4.60	0.0	0.2	20.9	0	0	1022	0.0		Dry		
6	05/10/2011	3.90	0.0	0.0	21.1	0	0	1022	0.0		3.88		

APPENDIX 5.0
GEOTECHNICAL LABORATORY TEST RESULTS

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NATURAL MOISTURE CONTENT

Gourock Pierhead

Client: Riverside Inverclyde Ltd

Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990:Part 2:Method 3.2

Sample Identification				Moisture Content (%)
Hole ID	Type	Number	Depth	
04	D	230497	2.10 m	13
04	U	114901	4.60 m	12
04	D	114903	5.20 m	12
05	DJB	230460	0.50 m	21
05	D	230464A	1.80 m	14
05	D	230471	4.00 m	13
05	U	230472	4.50 m	9.8
06	U	230485	3.90 m	12
06	D	230490	6.00 m	15
TP07	D	229294	1.50 m	14
TP08	B	229281	1.00 m	17
TP09	D	229238	1.50 m	14
TP10	D	229172	1.00 m	16
TP11	B	229245	1.50 m	13
TP11	D	229248	2.00 m	14
TP13	D	229256	2.00 m	12

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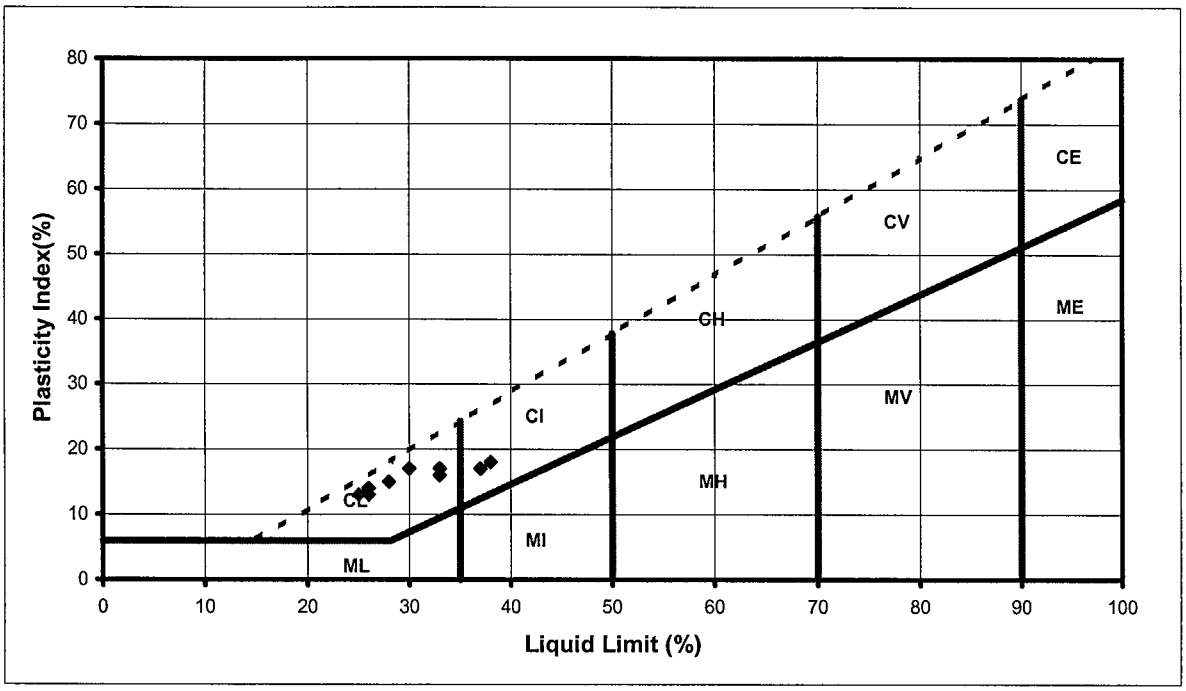
PLASTICITY CHART
Summary of Liquid & Plastic Limits

BS1377:Part 2:1990, clauses 3.2, 4 & 5
Chart in accordance with BS5930:1999, fig.18

Gourock Pierhead

Client: Riverside Inverclyde Ltd Job No. 4618
Consultant: W.A. Fairhurst & Partners



	BH/TP	Sample	Depth (m)	Type	MC%	LL%	PL%	PI%	%>0.425µm	Remarks
1	04	230497	2.10	D	13.0	26	12	14	58.0	Clay with low plasticity
2	04	114903	5.20	D	12.0	26	13	13	32.0	Clay with low plasticity
3	05	230460	0.50	DJB	21.0	38	20	18	53.0	Clay with intermediate plasticity
4	05	230464A	1.80	D	14.0	30	13	17	54.0	Clay with low plasticity
5	05	230471	4.00	D	13.0	25	12	13	60.0	Clay with low plasticity
6	06	230490	6.00	D	15.0	26	13	13	34.0	Clay with low plasticity
7	TP07	229294	1.50	D	14.0	30	13	17	50.0	Clay with low plasticity
8	TP09	229238	1.50	D	14.0	37	20	17	56.0	Clay with intermediate plasticity
9	TP10	229172	1.00	D	16.0	33	17	16	60.0	Clay with low plasticity
10	TP11	229248	2.00	D	14.0	33	16	17	55.0	Clay with low plasticity
11	TP13	229256	2.00	D	12.0	28	13	15	58.0	Clay with low plasticity

NP denotes specimen is non-plastic.

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PARTICLE SIZE DISTRIBUTION

Borehole No 04 Test Results

Gourock Pierhead

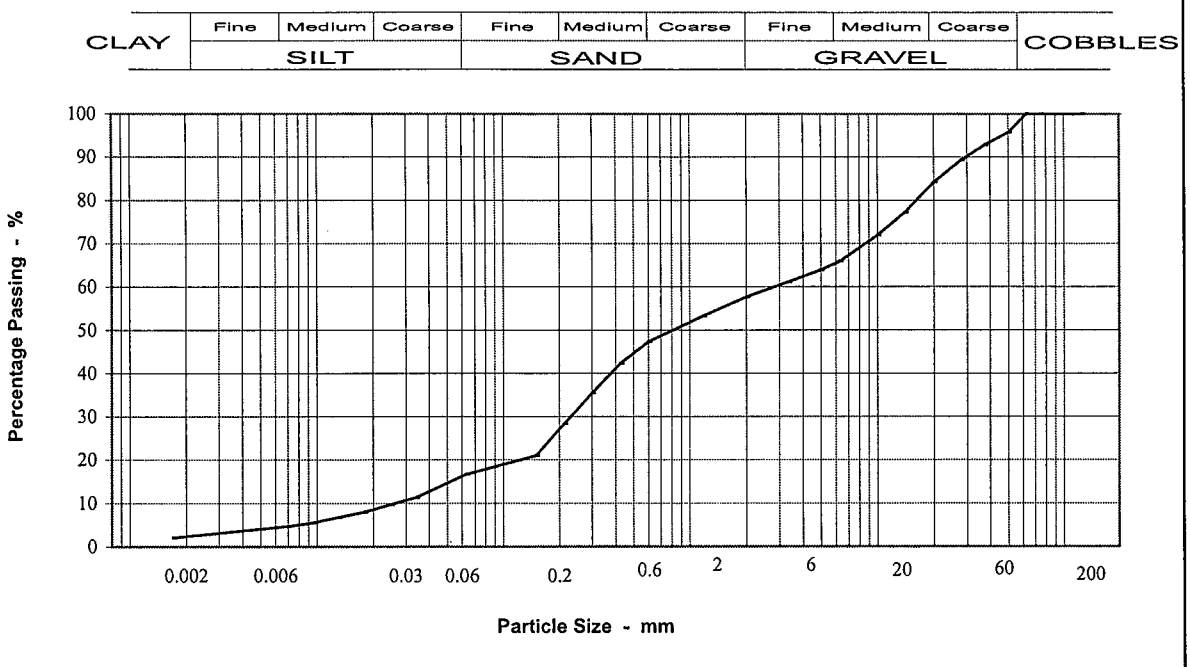
Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 230493
Depth (m) : 1.00
Sample Type: B

Initial Total Dry Weight: 9135.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100	0.034	11
75.0	100	0.025	10
63.0	100	0.018	8
50.0	96	0.013	7
37.5	93	0.009	5
28.0	89	0.007	5
20.0	84	0.002	2
14.0	77		
10.0	72		
6.30	66		
5.00	64		
3.35	61		
2.00	58		
1.18	53		
0.600	47		
0.425	42		
0.300	35		
0.212	28		
0.150	21		
0.063	17		

Sample passing BS 0.063mm sieve washed and/or collected in pan
No Pretreatment
Uniformity Coefficient = 109.5

% CLAY	%SILT	%SAND	%GRAVEL
2	13.8	41.6	42.4

D10	D30	D60	D100
0.0267	0.233	2.93	125.00

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PARTICLE SIZE DISTRIBUTION

Borehole No 04 Test Results

Gourock Pierhead

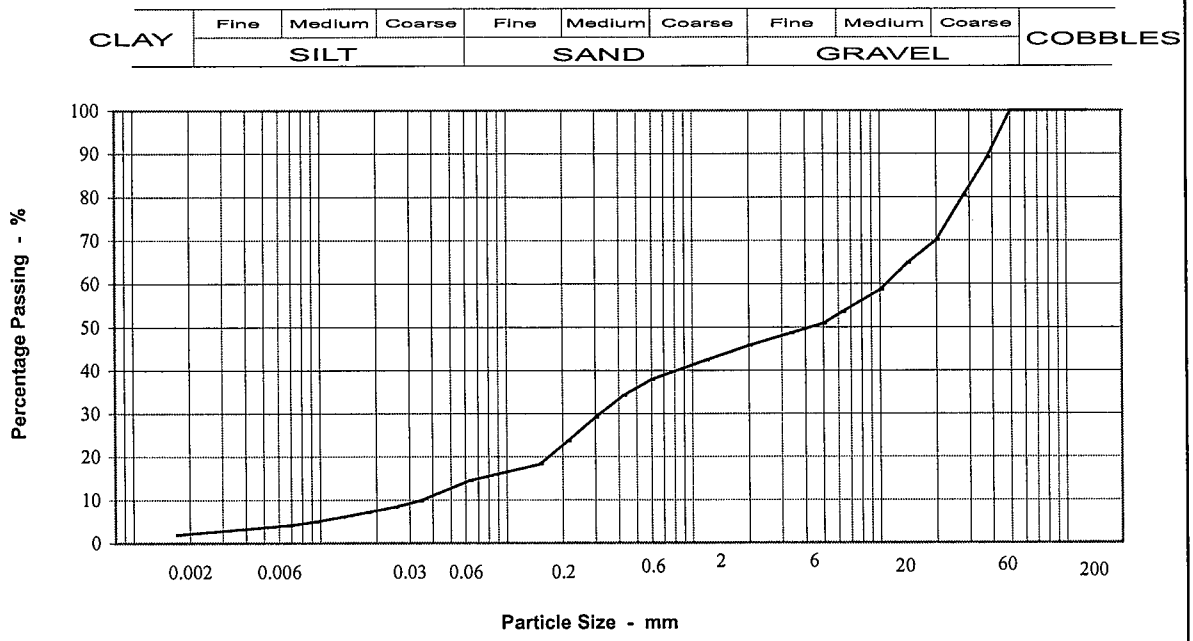
Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 220498
Depth (m) : 3.70
Sample Type: BD

Initial Total Dry Weight: 6311.00 g



SIEVING	
BS Sieve Size mm	Cumulative Percentage Passing
125.0	100
75.0	100
63.0	100
50.0	100
37.5	89
28.0	80
20.0	70
14.0	65
10.0	59
6.30	54
5.00	51
3.35	49
2.00	46
1.18	42
0.600	38
0.425	34
0.300	29
0.212	24
0.150	18
0.063	15

SEDIMENTATION	
Particle Size mm	Corrected Percentage Passing
0.034	10
0.025	8
0.018	7
0.013	6
0.009	5
0.007	4
0.002	2

Sample passing BS 0.063mm sieve washed and/or collected in pan
No Pretreatment
Uniformity Coefficient = 309.5

% CLAY	%SILT	%SAND	%GRAVEL
2	12.0	31.7	54.2

D10	D30	D60	D100
0.0353	0.322	10.92	125.00

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PARTICLE SIZE DISTRIBUTION

Borehole No 05 Test Results

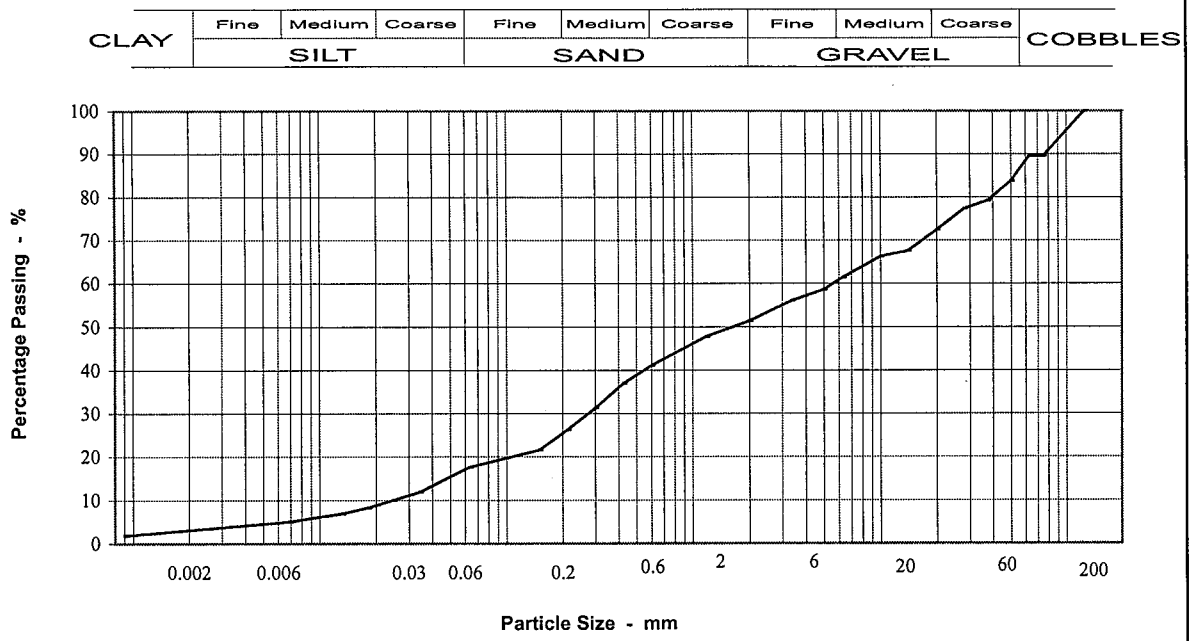
Gourock Pierhead

Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 230466	Initial Total Dry Weight: 7685.00 g
Depth (m) : 2.70	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100	0.034	12
75.0	90	0.025	10
63.0	90	0.018	8
50.0	84	0.013	7
37.5	79	0.009	6
28.0	77	0.007	5
20.0	72	0.001	2
14.0	68		
10.0	66		
6.30	61		
5.00	59	Sample passing BS 0.063mm sieve washed and/or collected in pan	
3.35	56	No Pretreatment	
2.00	51	Uniformity Coefficient = 229.1	
1.18	48		
0.600	41	**% CLAY** **%SILT** **%SAND** **%GRAVEL**	
0.425	37	2 14.6 34.4 48.6	
0.300	31		
0.212	26		
0.150	22	**D10** **D30** **D60** **D100**	
0.063	18	0.0246 0.278 5.64 125.00	

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PARTICLE SIZE DISTRIBUTION

Borehole No
06
Test Results

Gourock Pierhead

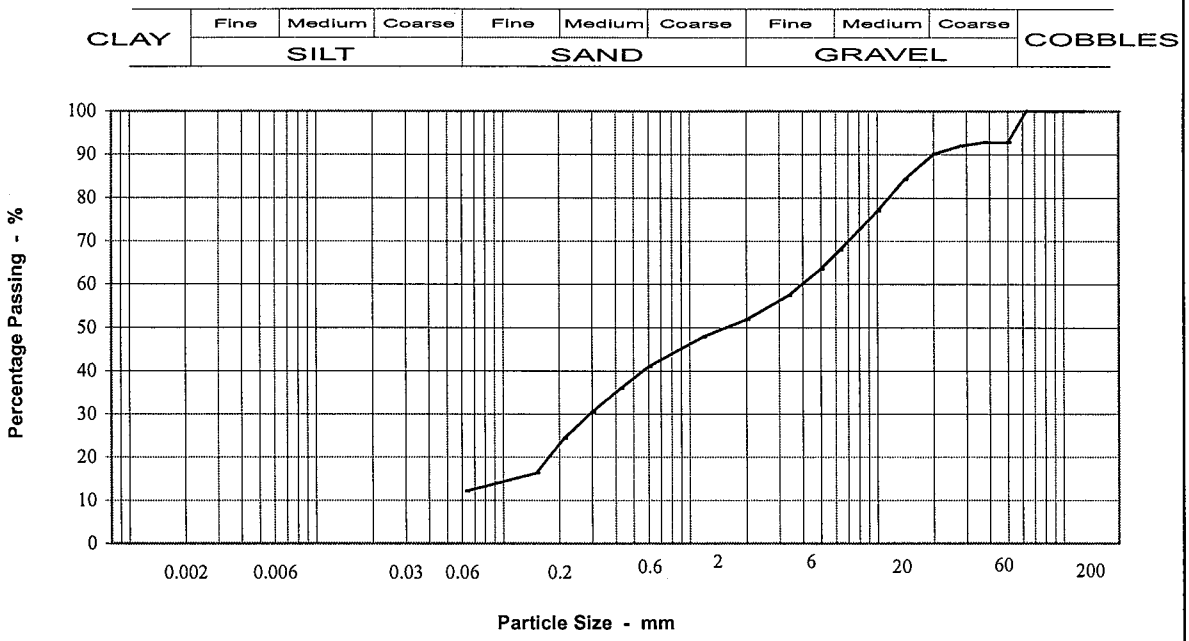
Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 230477
Depth (m) : 1.70
Sample Type: B

Initial Total Dry Weight: 6148.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	100		
50.0	93		
37.5	93		
28.0	92		
20.0	90		
14.0	84		
10.0	77		
6.30	68		
5.00	64		
3.35	57		
2.00	52		
1.18	48		
0.600	41		
0.425	36		
0.300	31		
0.212	24		
0.150	16		
0.063	12		

%SILT & CLAY	%SAND	%GRAVEL
12.1	39.8	48.1

D10	D30	D60	D100
	0.293	4.04	125.00

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PARTICLE SIZE DISTRIBUTION

Borehole No 06 Test Results

Gourock Pierhead

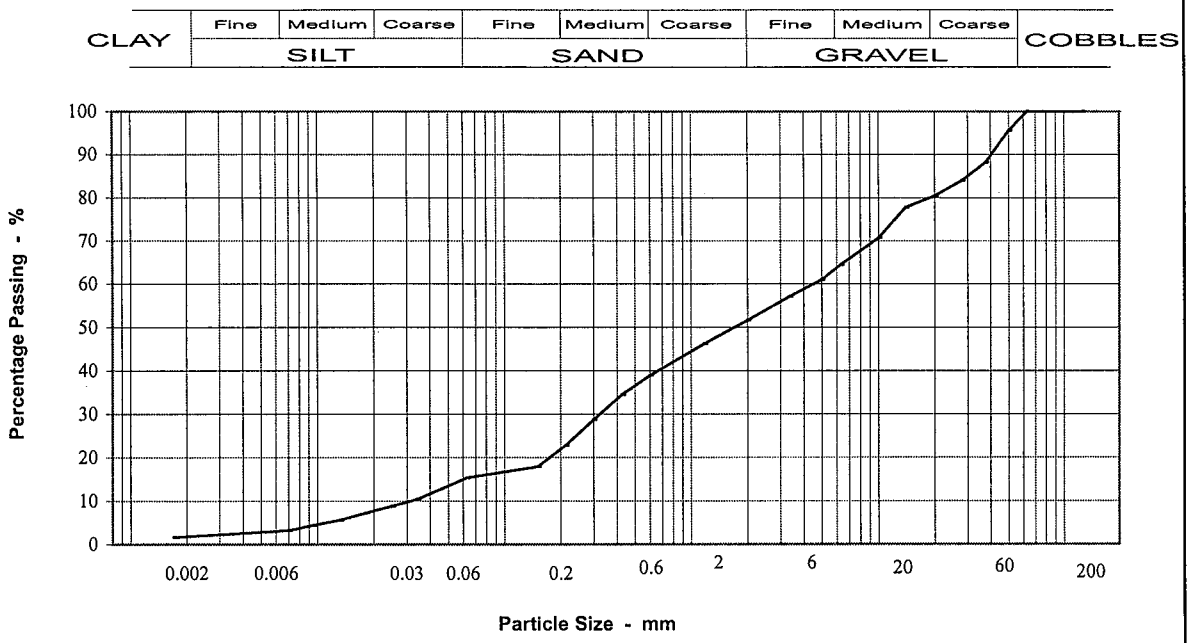
Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 230483
Depth (m) : 3.75
Sample Type: B

Initial Total Dry Weight: 5895.00 g



SIEVING	
BS Sieve Size mm	Cumulative Percentage Passing
125.0	100
75.0	100
63.0	100
50.0	96
37.5	88
28.0	84
20.0	80
14.0	78
10.0	71
6.30	64
5.00	61
3.35	57
2.00	52
1.18	46
0.600	39
0.425	34
0.300	29
0.212	23
0.150	18
0.063	15

SEDIMENTATION	
Particle Size mm	Corrected Percentage Passing
0.034	10
0.025	9
0.018	7
0.013	6
0.010	4
0.007	3
0.002	2

Sample passing BS 0.063mm sieve washed and/or collected in pan
No Pretreatment
Uniformity Coefficient = 144.2

% CLAY	%SILT	%SAND	%GRAVEL
2	13.2	36.8	48.4

D10	D30	D60	D100
0.0318	0.327	4.59	125.00

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PARTICLE SIZE DISTRIBUTION

Borehole No
TP01
Test Results

Gourock Pierhead

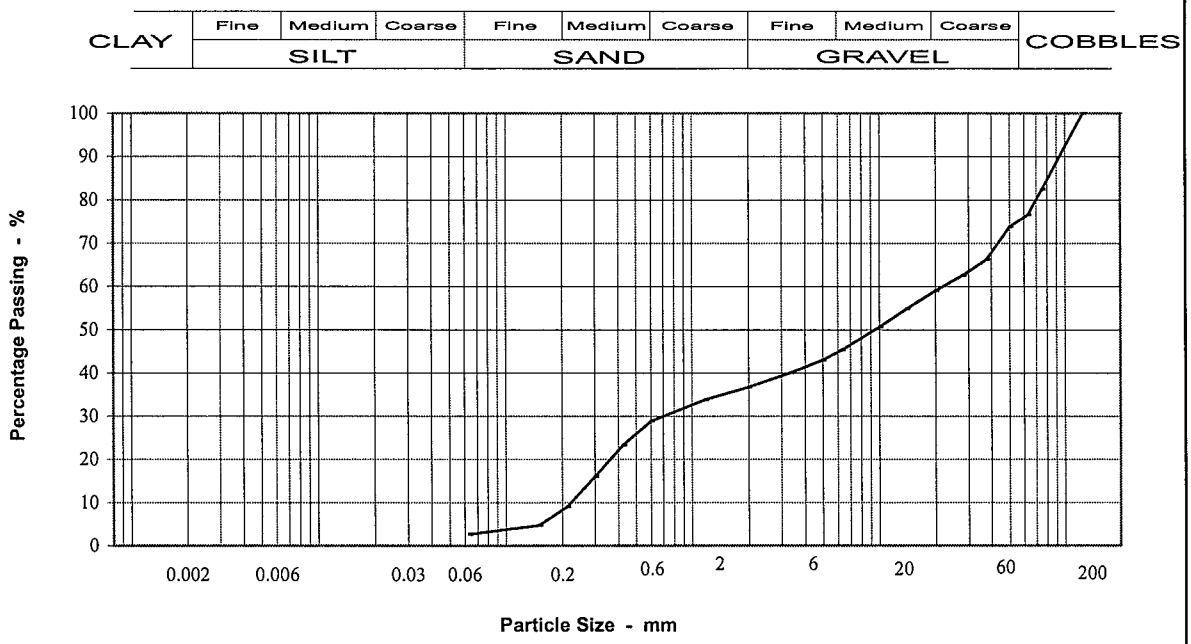
Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229209
Depth (m) : 0.50
Sample Type: B

Initial Total Dry Weight: 7768.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	82		
63.0	76		
50.0	74		
37.5	66		
28.0	63		
20.0	59		
14.0	55		
10.0	51		
6.30	45		
5.00	43		
3.35	40		
2.00	37		
1.18	34		
0.600	29		
0.425	23		
0.300	16		
0.212	9		
0.150	5		
0.063	3		

Uniformity Coefficient = 98.8

%SILT & CLAY	%SAND	%GRAVEL
2.7	34.0	63.3

D10	D30	D60	D100
0.2242	0.736	22.15	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP01
Test Results

Gourock Pierhead

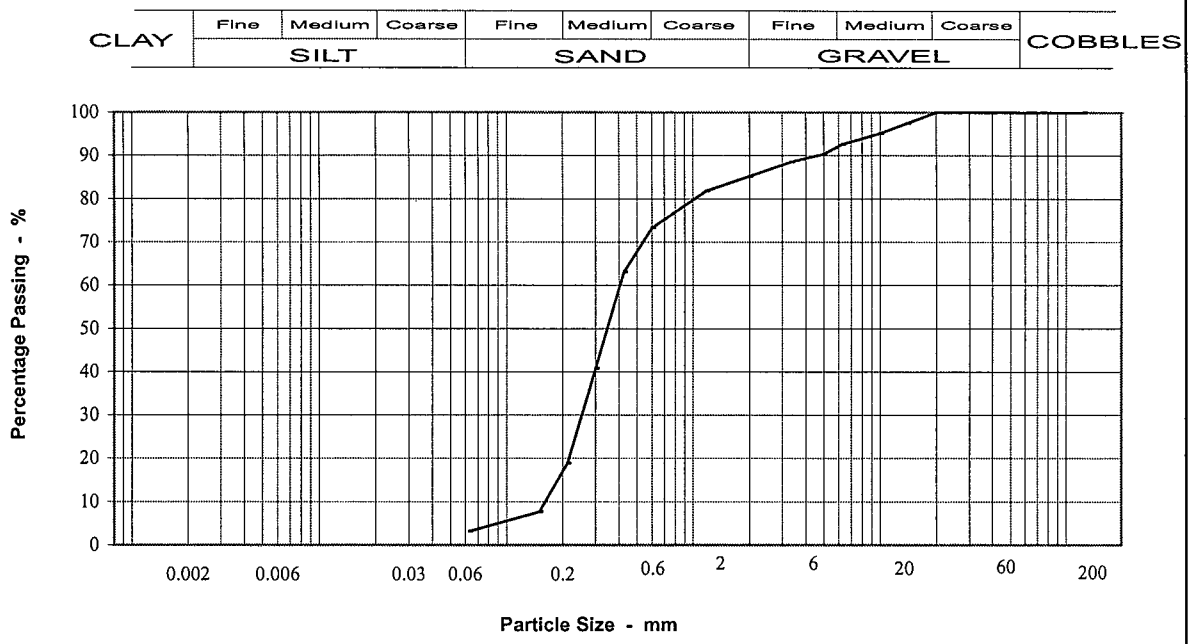
Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229213
Depth (m) : 1.50
Sample Type: B

Initial Total Dry Weight: 3642.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	100		
50.0	100		
37.5	100		
28.0	100		
20.0	100		
14.0	98		
10.0	95		
6.30	93		
5.00	90		
3.35	89		
2.00	85		
1.18	82		
0.600	73		
0.425	63		
0.300	41		
0.212	19		
0.150	8		
0.063	3		

Uniformity Coefficient = 2.5

%SILT & CLAY	%SAND	%GRAVEL
3.2	82.1	14.8

D10	D30	D60	D100
0.1628	0.257	0.41	125.00

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PARTICLE SIZE DISTRIBUTION

Borehole No
TP02
Test Results

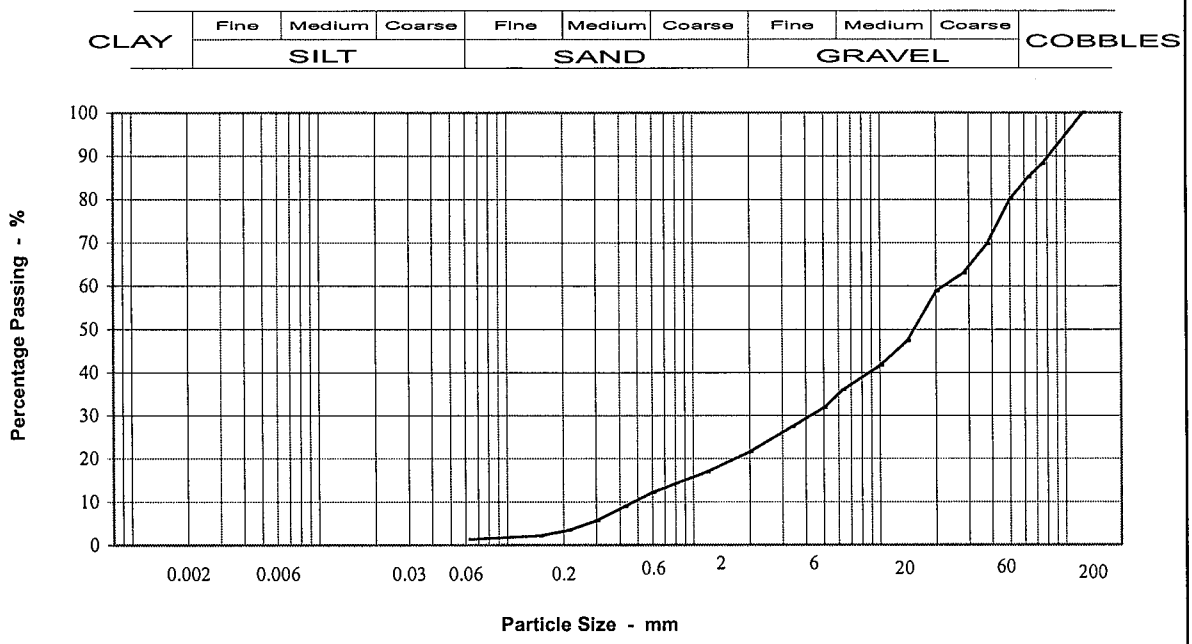
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229215	Initial Total Dry Weight: 13981.00 g
Depth (m) : 0.50	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	88		
63.0	85		
50.0	80		
37.5	70		
28.0	63		
20.0	59		
14.0	47		
10.0	42		
6.30	36		
5.00	32		
3.35	27		
2.00	22		
1.18	17		
0.600	12		
0.425	9		
0.300	6		
0.212	3		
0.150	2		
0.063	1		

Uniformity Coefficient = 46.4

%SILT & CLAY	%SAND	%GRAVEL
1.3	20.3	78.4

D10	D30	D60	D100
0.4813	4.329	22.32	125.00

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PARTICLE SIZE DISTRIBUTION

Borehole No **TP02** Test Results

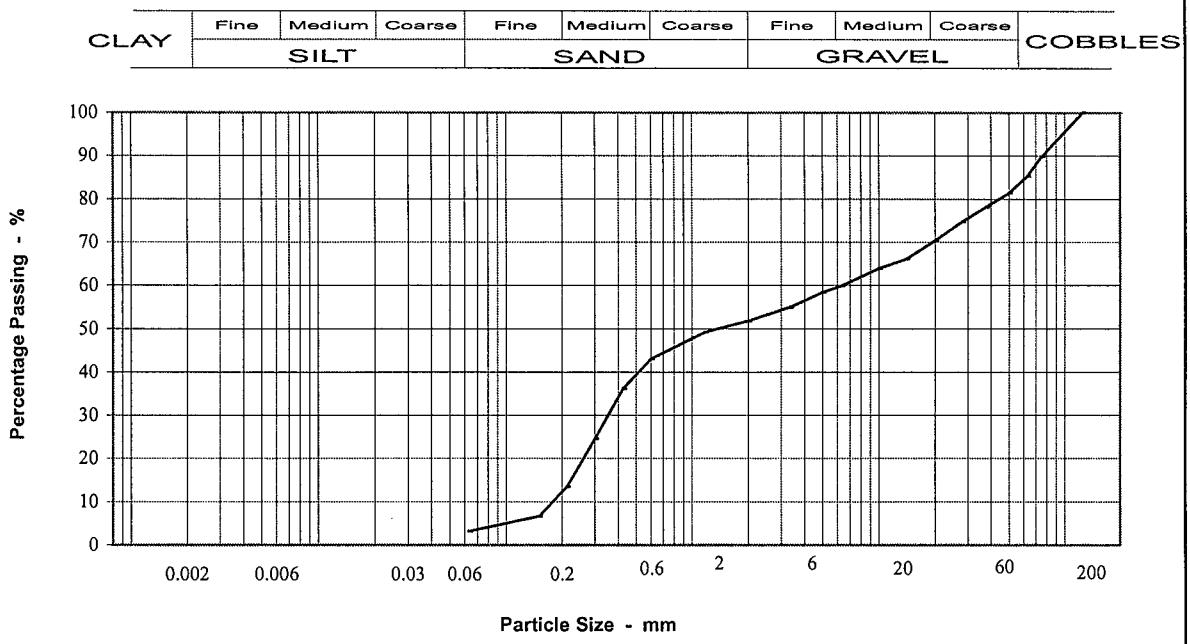
Gourock Pierhead

Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229217 Depth (m) : 1.00 Sample Type: B	Initial Total Dry Weight: 10082.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	90		
63.0	85		
50.0	81		
37.5	78		
28.0	75		
20.0	70		
14.0	66		
10.0	64		
6.30	60		
5.00	58		
3.35	55		
2.00	52		
1.18	49		
0.600	43		
0.425	36		
0.300	25		
0.212	13		
0.150	7		
0.063	3		

Uniformity Coefficient = 35.7

	%SILT & CLAY	%SAND	%GRAVEL
	3.2	48.6	48.2

D10	D30	D60	D100
0.1804	0.359	6.43	125.00

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PARTICLE SIZE DISTRIBUTION

Borehole No
TP03
Test Results

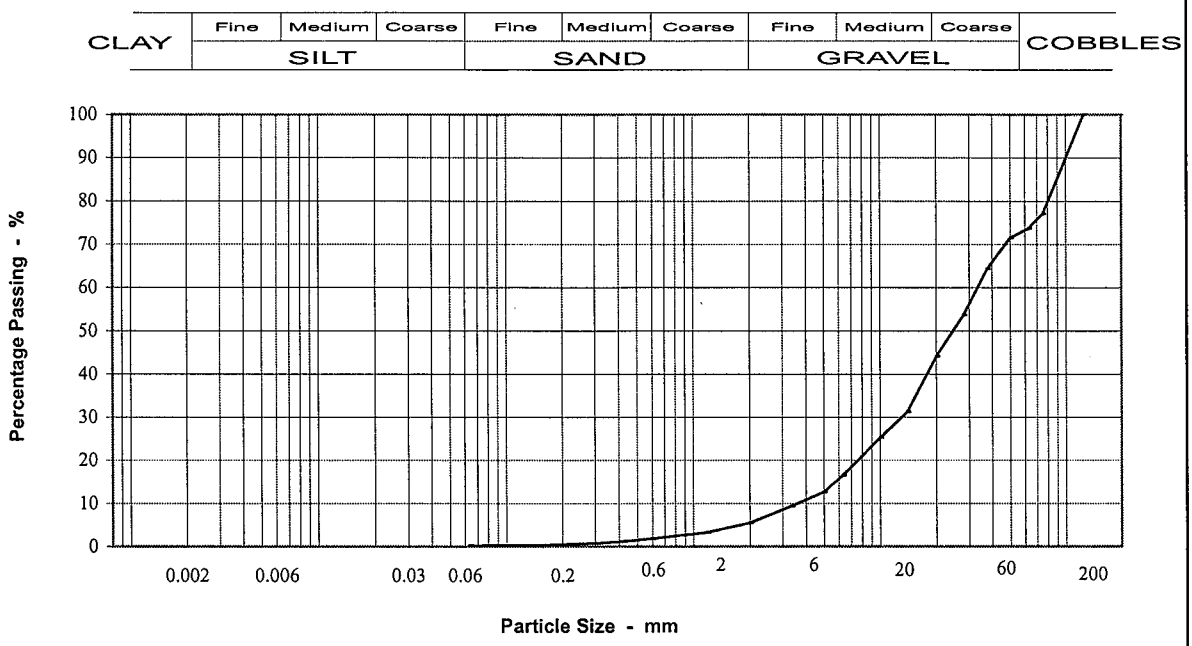
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229221 Depth (m) : 0.50 Sample Type: B	Initial Total Dry Weight: 11381.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	77		
63.0	74		
50.0	72		
37.5	64		
28.0	54		
20.0	44		
14.0	31		
10.0	25		
6.30	17		
5.00	13		
3.35	9		
2.00	5		
1.18	3		
0.600	2		
0.425	1		
0.300	1		
0.212	0		
0.150	0		
0.063	0		

Uniformity Coefficient = 9.2

%SILT & CLAY	%SAND	%GRAVEL
0.2	5.3	94.5

D10	D30	D60	D100
3.6519	13.159	33.67	125.00

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PARTICLE SIZE DISTRIBUTION

Borehole No
TP04
Test Results

Gourock Pierhead

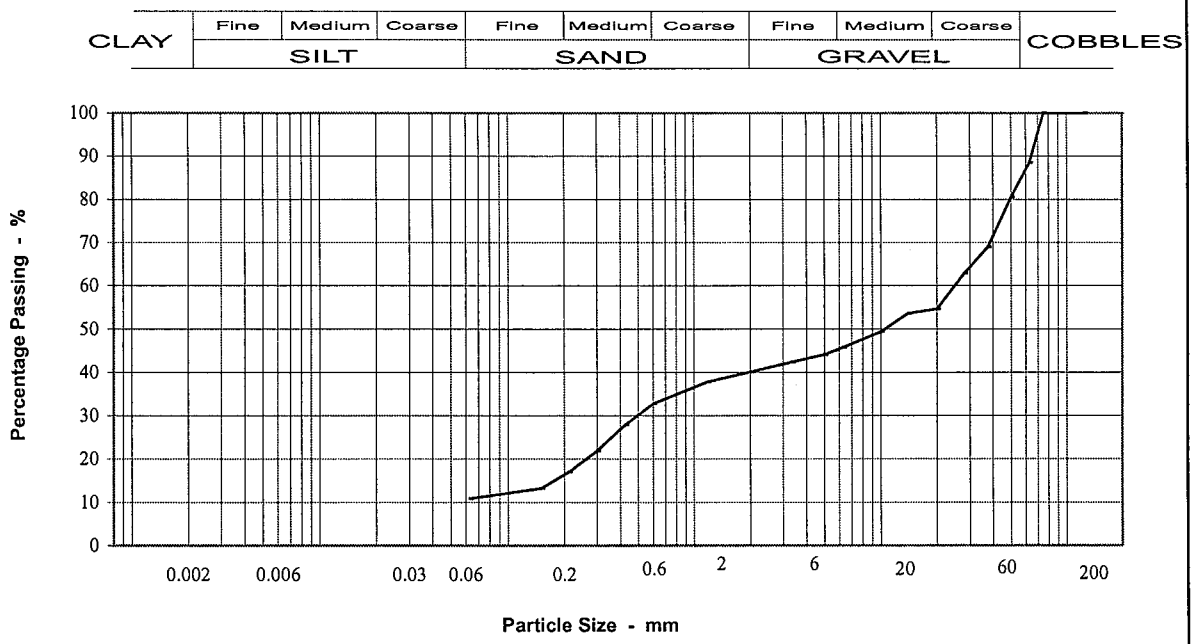
Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229201
Depth (m) : 0.70
Sample Type: B

Initial Total Dry Weight: 17094.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	88		
50.0	80		
37.5	69		
28.0	63		
20.0	55		
14.0	54		
10.0	49		
6.30	46		
5.00	44		
3.35	42		
2.00	40		
1.18	38		
0.600	33		
0.425	28		
0.300	22		
0.212	17		
0.150	13		
0.063	11		

%SILT & CLAY	%SAND	%GRAVEL
10.9	29.2	59.9

D10	D30	D60	D100
	0.501	25.26	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP05
Test Results

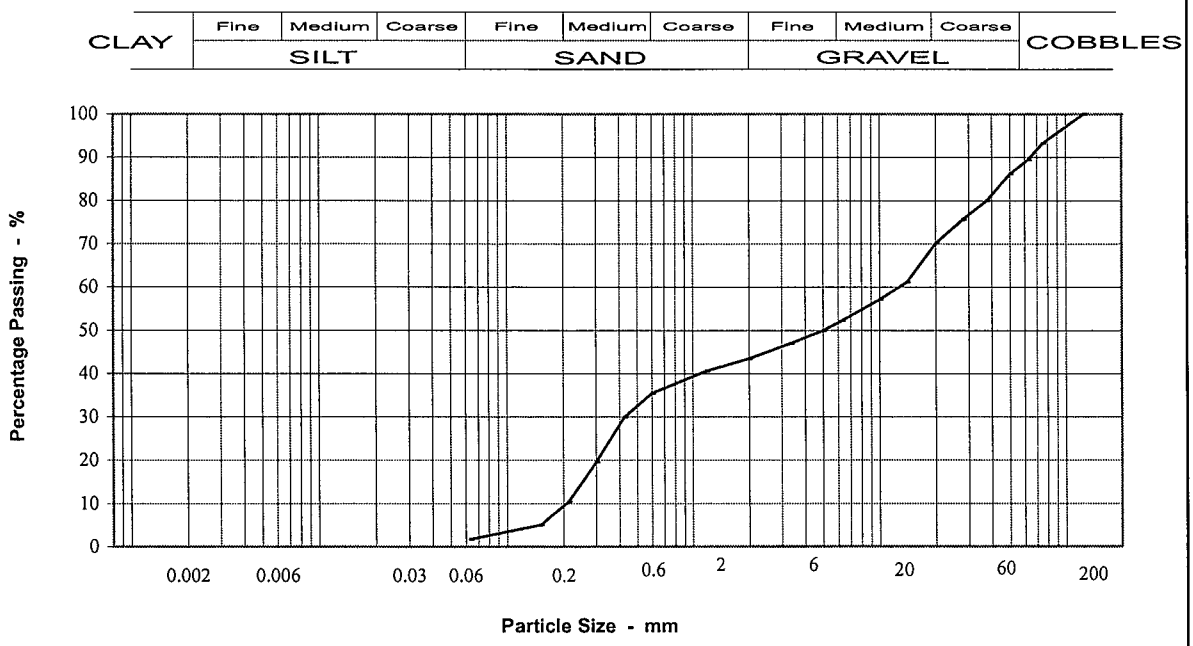
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229207	Initial Total Dry Weight: 15273.00 g
Depth (m) : 1.50	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	93		
63.0	90		
50.0	86		
37.5	80		
28.0	76		
20.0	70		
14.0	61		
10.0	57		
6.30	52		
5.00	50		
3.35	47		
2.00	43		
1.18	41		
0.600	35		
0.425	30		
0.300	20		
0.212	10		
0.150	5		
0.063	2		

Uniformity Coefficient = 61.9

%SILT & CLAY	%SAND	%GRAVEL
1.7	41.7	56.6

D10	D30	D60	D100
0.2079	0.428	12.86	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP06
Test Results

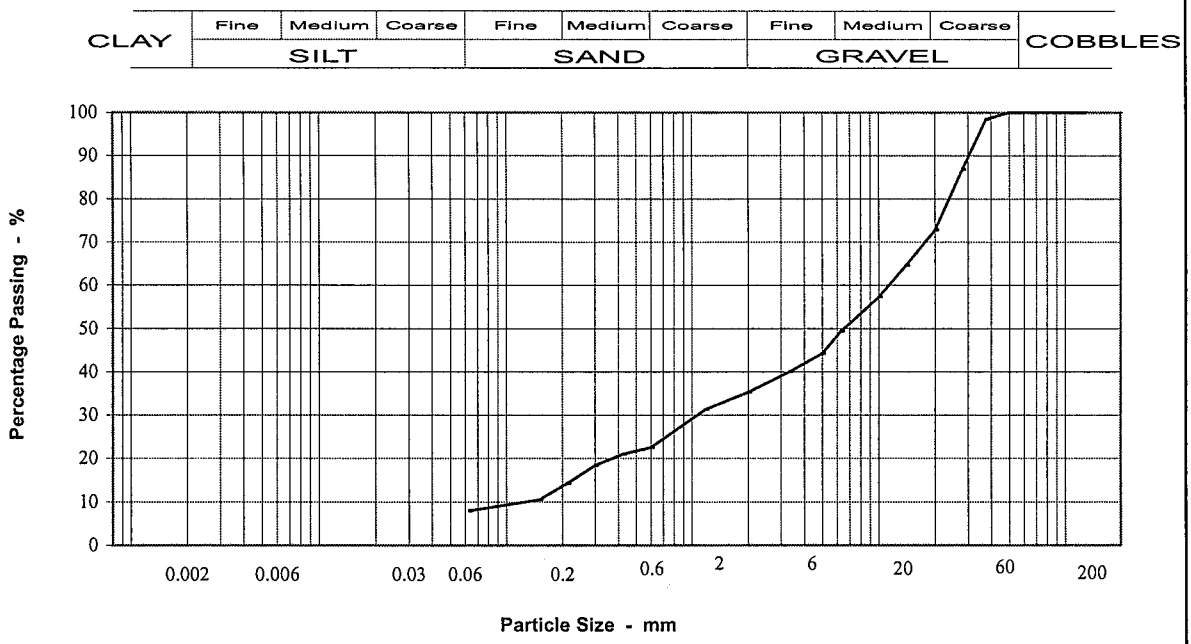
Gourock Pierhead

Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229225	Initial Total Dry Weight: 9922.00 g
Depth (m) : 0.50	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	100		
50.0	100		
37.5	98		
28.0	87		
20.0	73		
14.0	65		
10.0	57		
6.30	49		
5.00	44		
3.35	40		
2.00	35		
1.18	31		
0.600	23		
0.425	21		
0.300	18		
0.212	14		
0.150	11		
0.063	8		

Uniformity Coefficient = 86.8

%SILT & CLAY	%SAND	%GRAVEL
8.0	27.2	64.8

D10	D30	D60	D100
0.1323	1.095	11.48	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No **TP06** Test Results

Gourock Pierhead

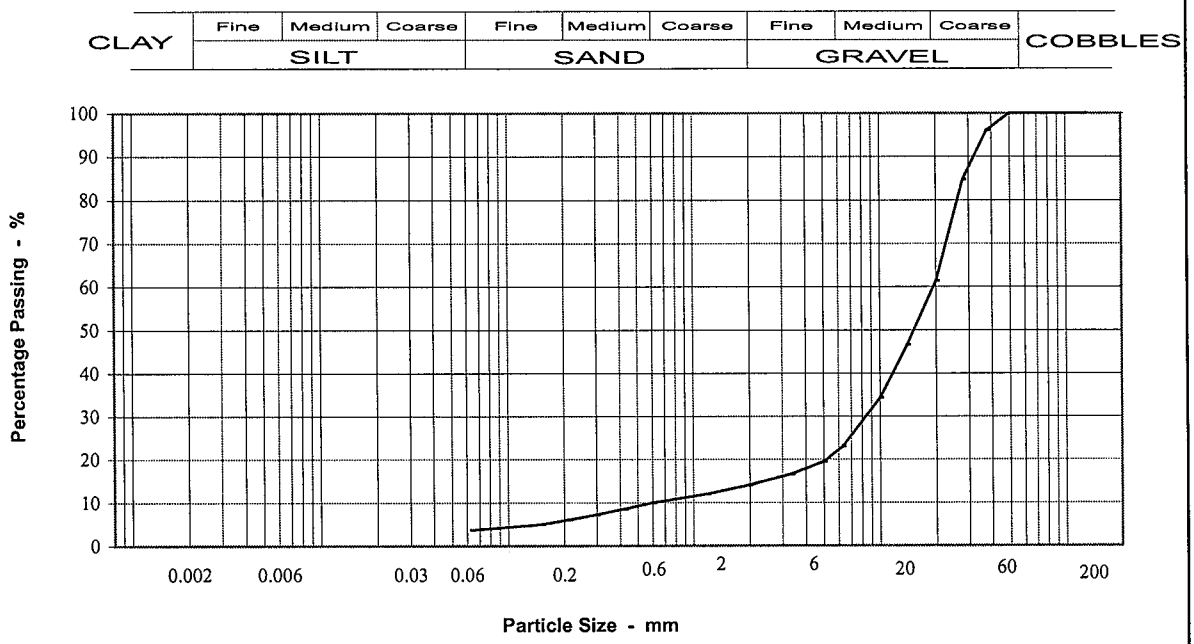
Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229231
Depth (m) : 2.00
Sample Type: B

Initial Total Dry Weight: 11295.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	100		
50.0	100		
37.5	96		
28.0	85		
20.0	61		
14.0	47		
10.0	34		
6.30	23		
5.00	20		
3.35	17		
2.00	14		
1.18	12		
0.600	10		
0.425	9		
0.300	7		
0.212	6		
0.150	5		
0.063	4		

Uniformity Coefficient = 32.0

%SILT & CLAY	%SAND	%GRAVEL
3.7	10.4	85.9

D10	D30	D60	D100
0.6081	8.605	19.45	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP07
Test Results

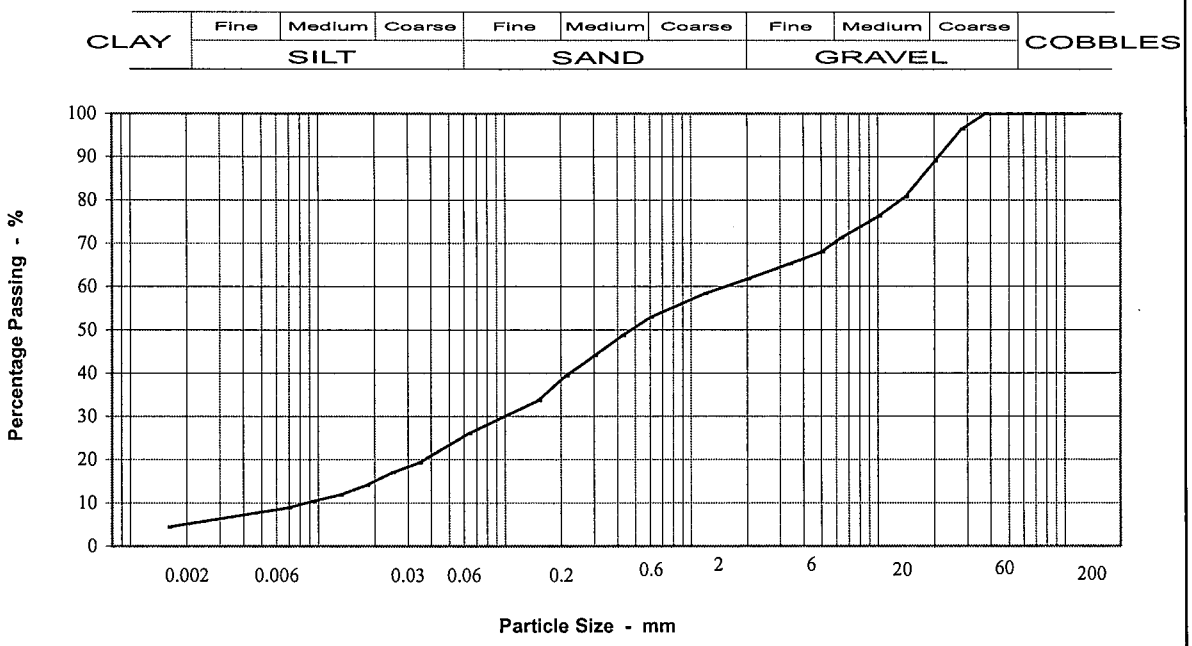
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229297	Initial Total Dry Weight: 7842.00 g
Depth (m) : 2.50	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100	0.034	19
75.0	100	0.025	17
63.0	100	0.018	14
50.0	100	0.013	12
37.5	100	0.009	10
28.0	96	0.007	9
20.0	89	0.002	4
14.0	81		
10.0	76		
6.30	71		
5.00	68		
3.35	65		
2.00	62		
1.18	58		
0.600	53		
0.425	49		
0.300	44		
0.212	39		
0.150	34		
0.063	26		

Sample passing BS 0.063mm sieve washed and/or collected in pan
No Pretreatment
Uniformity Coefficient = 182.2

% CLAY	%SILT	%SAND	%GRAVEL
5	20.5	36.4	38.3

D10	D30	D60	D100
0.0087	0.109	1.59	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP08
Test Results

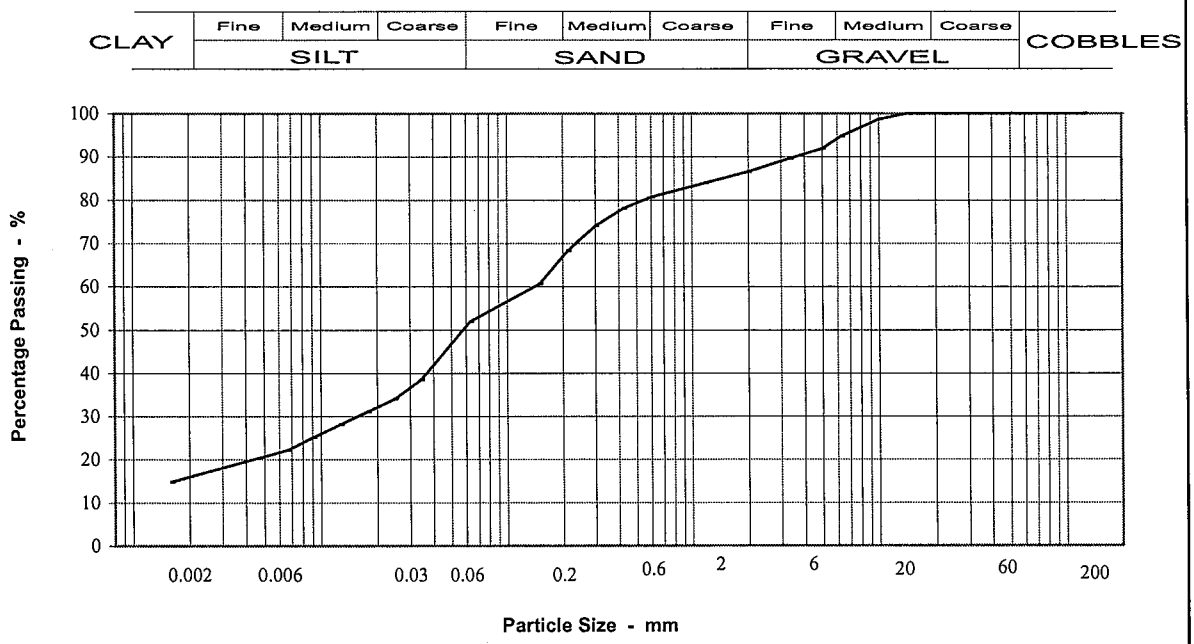
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229183	Initial Total Dry Weight: 3348.00 g
Depth (m) : 1.50	
Sample Type: B	



SIEVING	
BS Sieve Size mm	Cumulative Percentage Passing
125.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	100
14.0	100
10.0	99
6.30	95
5.00	92
3.35	90
2.00	87
1.18	84
0.600	81
0.425	78
0.300	74
0.212	68
0.150	61
0.063	52

SEDIMENTATION

Particle Size mm	Corrected Percentage Passing
0.034	39
0.025	34
0.018	31
0.013	28
0.009	25
0.007	22
0.002	15

Sample passing BS 0.063mm sieve washed and/or collected in pan
No Pretreatment

% CLAY	%SILT	%SAND	%GRAVEL
15	35.2	35.9	13.5

D10	D30	D60	D100
	0.016	0.14	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No **TP09** Test Results

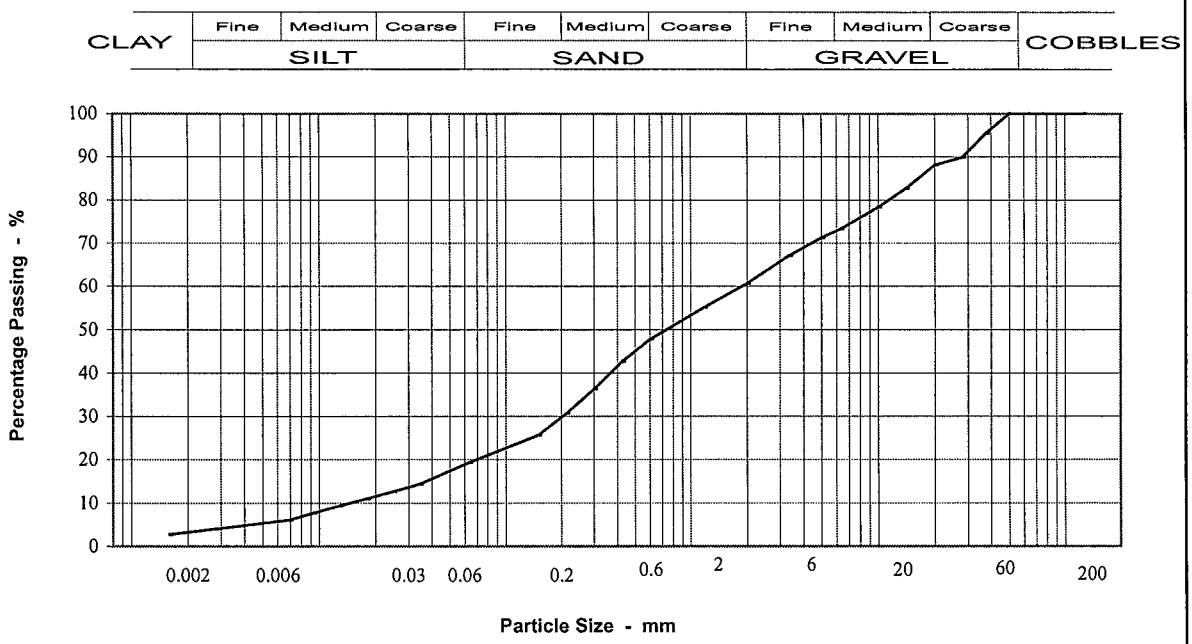
Gourock Pierhead

Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229233	Initial Total Dry Weight: 4924.00 g
Depth (m) : 0.50	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100	0.034	14
75.0	100	0.025	13
63.0	100	0.018	11
50.0	100	0.013	9
37.5	95	0.009	8
28.0	90	0.007	6
20.0	88	0.002	3
14.0	83		
10.0	78		
6.30	73		
5.00	71		
3.35	67		
2.00	61		
1.18	55		
0.600	48		
0.425	43		
0.300	36		
0.212	31		
0.150	26		
0.063	19		

Sample passing BS 0.063mm sieve washed and/or collected in pan
No Pretreatment
Uniformity Coefficient = 128.0

% CLAY	%SILT	%SAND	%GRAVEL
3	15.8	41.9	39.3

D10	D30	D60	D100
0.0148	0.204	1.90	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP10
Test Results

Gourock Pierhead

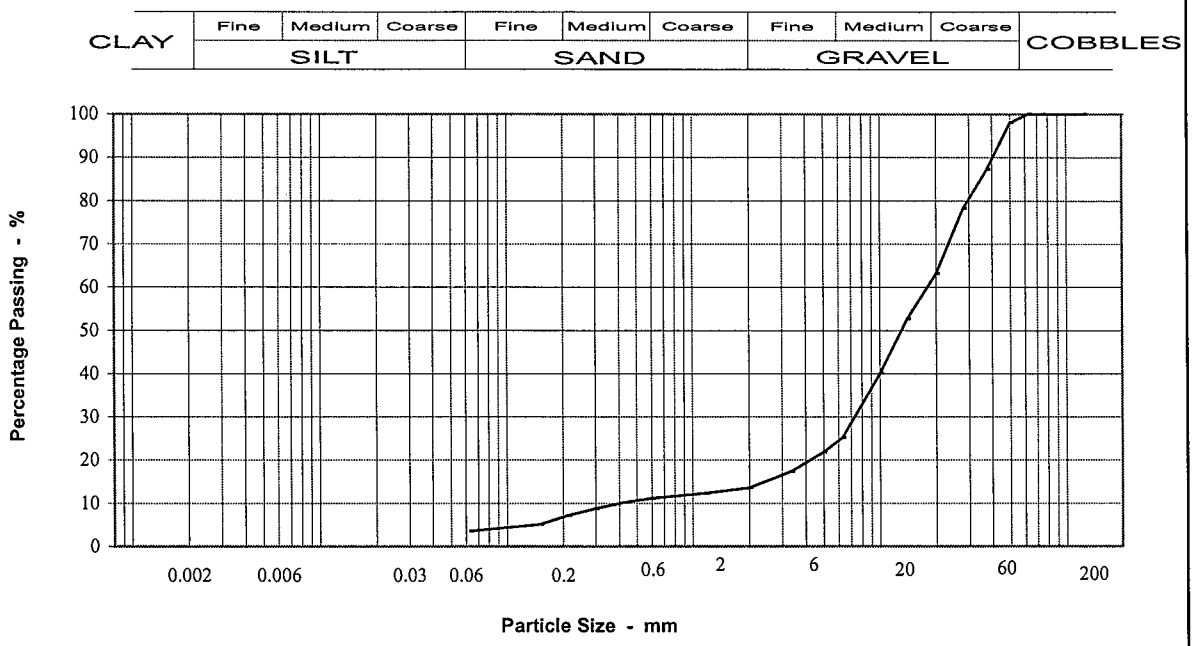
Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229275
Depth (m) : 2.00
Sample Type: B

Initial Total Dry Weight: 14582.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	100		
50.0	98		
37.5	87		
28.0	78		
20.0	63		
14.0	53		
10.0	40		
6.30	25		
5.00	22		
3.35	17		
2.00	14		
1.18	12		
0.600	11		
0.425	10		
0.300	9		
0.212	7		
0.150	5		
0.063	4		

Uniformity Coefficient = 44.8

%SILT & CLAY	%SAND	%GRAVEL
3.6	10.0	86.4

D10	D30	D60	D100
0.4054	7.492	18.17	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP11
Test Results

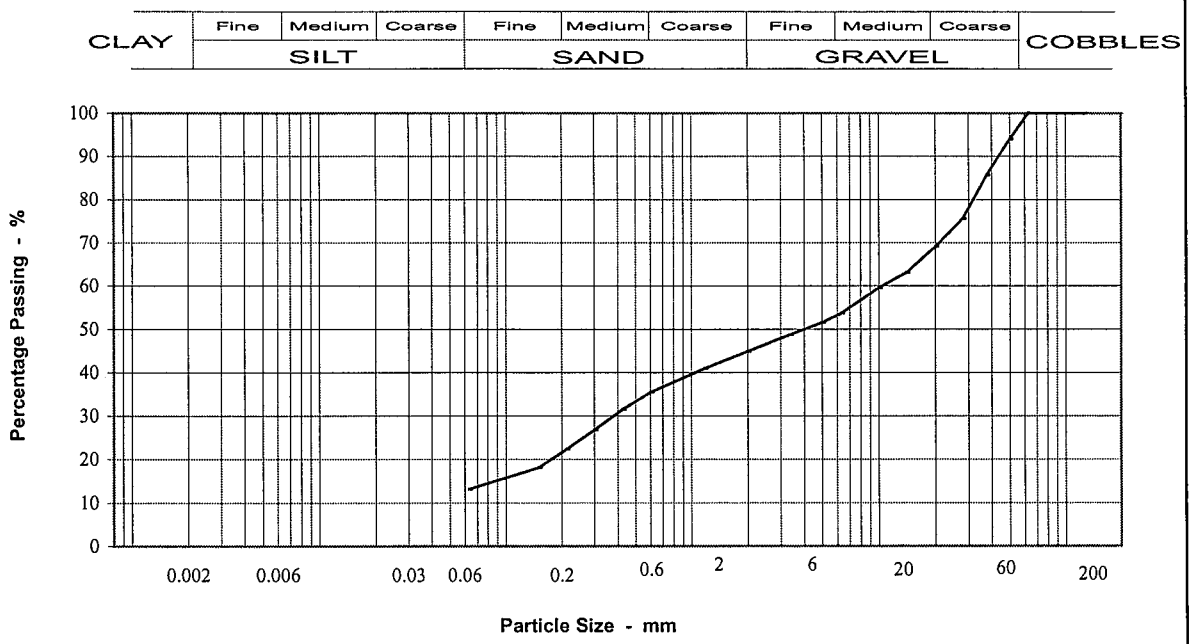
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229243	Initial Total Dry Weight: 9161.00 g
Depth (m) : 1.00	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	100		
50.0	94		
37.5	86		
28.0	76		
20.0	69		
14.0	63		
10.0	60		
6.30	54		
5.00	52		
3.35	49		
2.00	45		
1.18	41		
0.600	35		
0.425	31		
0.300	27		
0.212	22		
0.150	18		
0.063	13		

%SILT & CLAY	%SAND	%GRAVEL
13.2	31.7	55.2

D10	D30	D60	D100
	0.386	10.51	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP12
Test Results

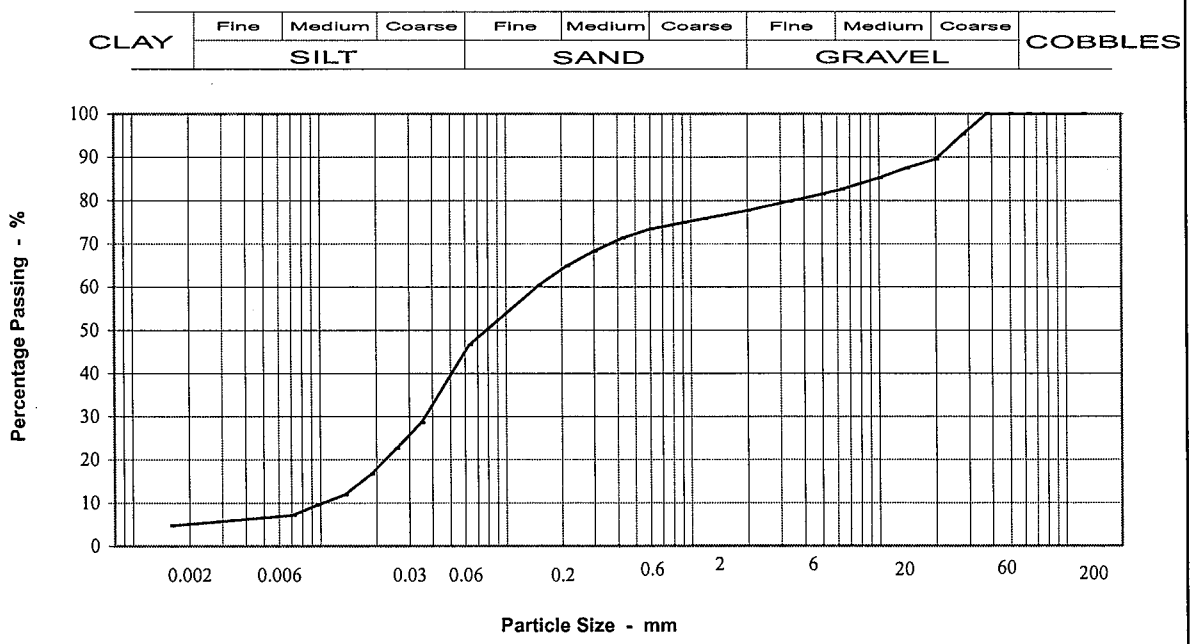
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229259	Initial Total Dry Weight: 3579.00 g
Depth (m) : 1.00	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100	0.035	29
75.0	100	0.026	23
63.0	100	0.019	17
50.0	100	0.014	12
37.5	100	0.010	10
28.0	95	0.007	7
20.0	90	0.002	5
14.0	88		
10.0	85		
6.30	83		
5.00	81		
3.35	80		
2.00	78		
1.18	76		
0.600	73		
0.425	71		
0.300	68		
0.212	65		
0.150	60		
0.063	47		

Sample passing BS 0.063mm sieve washed and/or collected in pan
No Pretreatment
Uniformity Coefficient = 14.2

% CLAY	%SILT	%SAND	%GRAVEL
5	39.7	33.0	22.3

D10	D30	D60	D100
0.0104	0.037	0.15	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP12
Test Results

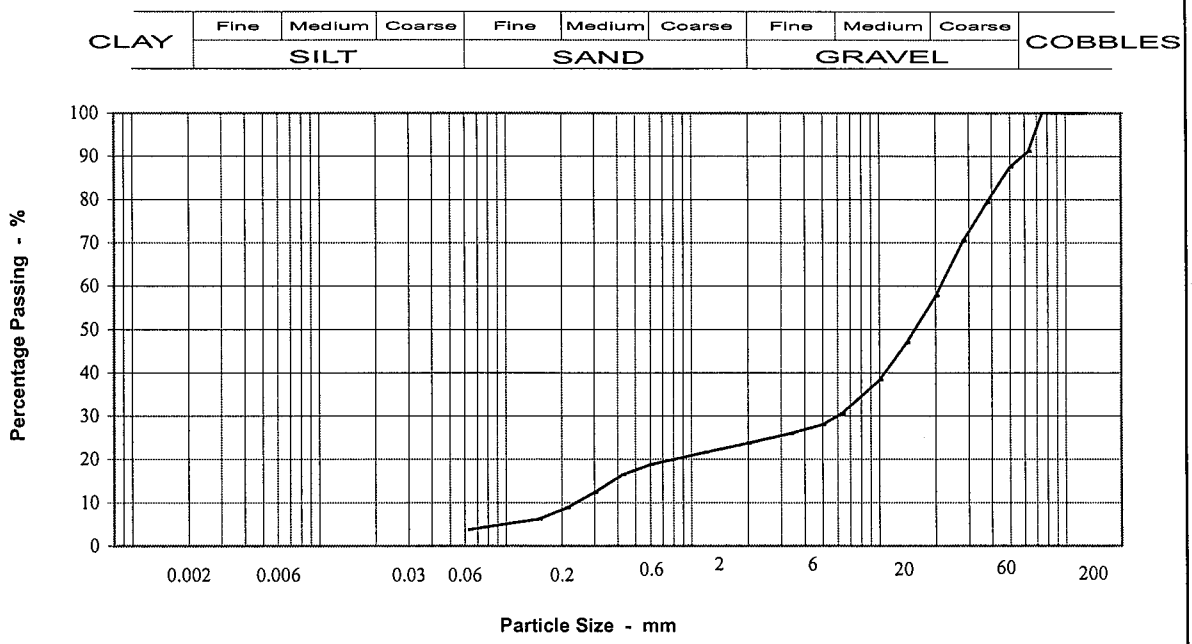
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229267	Initial Total Dry Weight: 8805.00 g
Depth (m) : 3.00	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	91		
50.0	88		
37.5	79		
28.0	70		
20.0	58		
14.0	47		
10.0	38		
6.30	30		
5.00	28		
3.35	26		
2.00	24		
1.18	22		
0.600	19		
0.425	16		
0.300	12		
0.212	9		
0.150	6		
0.063	4		

Uniformity Coefficient = 88.6

%SILT & CLAY	%SAND	%GRAVEL
3.8	20.0	76.2

D10	D30	D60	D100
0.2420	6.039	21.45	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP13
Test Results

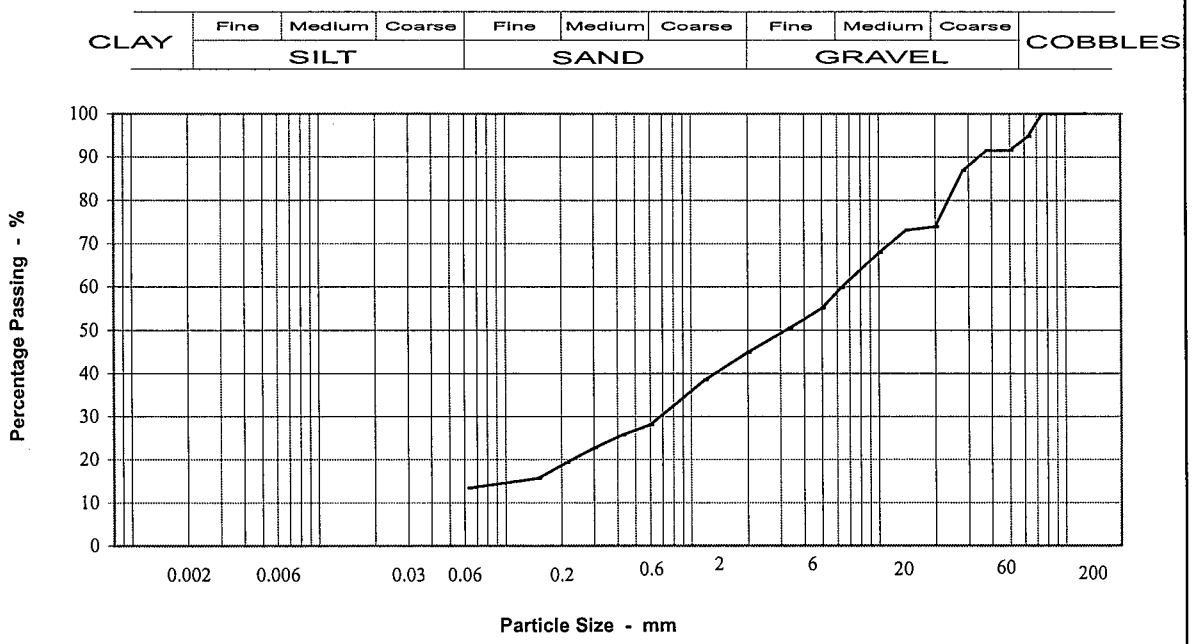
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229249	Initial Total Dry Weight: 9772.00 g
Depth (m) : 0.50	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	95		
50.0	92		
37.5	92		
28.0	87		
20.0	74		
14.0	73		
10.0	68		
6.30	60		
5.00	55		
3.35	51		
2.00	45		
1.18	38		
0.600	28		
0.425	26		
0.300	23		
0.212	19		
0.150	16		
0.063	13		

%SILT & CLAY	%SAND	%GRAVEL
13.4	31.4	55.1

D10	D30	D60	D100
	0.709	6.40	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
TP13
Test Results

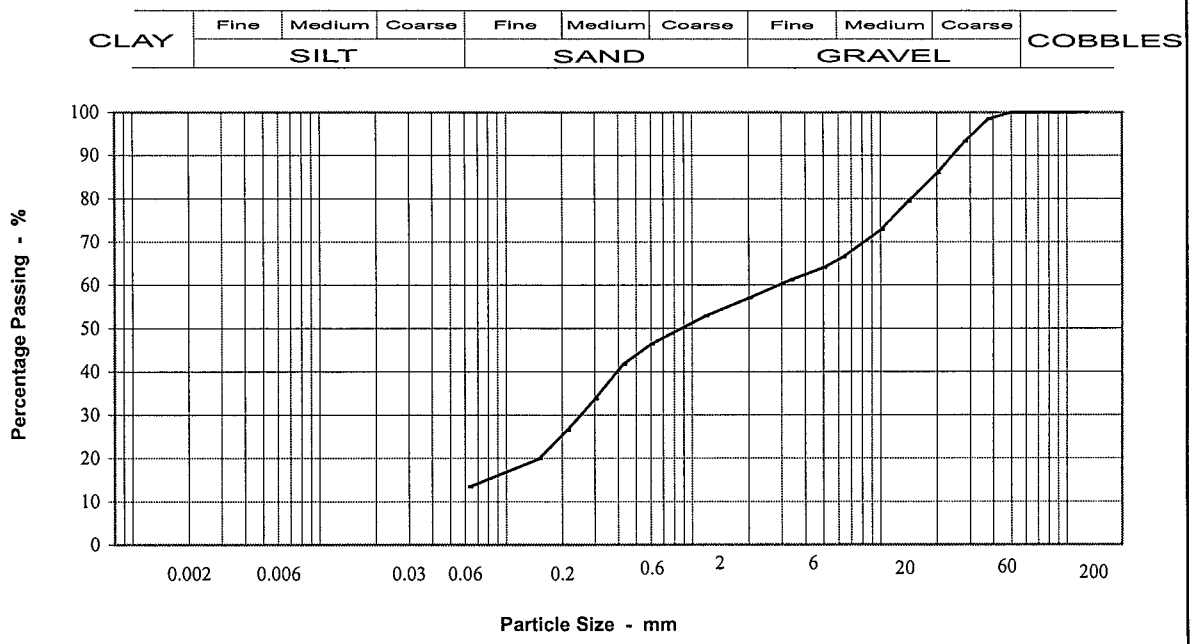
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 229255	Initial Total Dry Weight: 9280.00 g
Depth (m) : 2.00	
Sample Type: B	



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	100		
50.0	100		
37.5	98		
28.0	93		
20.0	86		
14.0	79		
10.0	73		
6.30	66		
5.00	64		
3.35	61		
2.00	57		
1.18	53		
0.600	46		
0.425	42		
0.300	34		
0.212	26		
0.150	20		
0.063	13		

%SILT & CLAY	%SAND	%GRAVEL
13.4	43.6	43.0

D10	D30	D60	D100
	0.255	2.97	125.00

PARTICLE SIZE DISTRIBUTION

Borehole No
WS30
Test Results

Gourock Pierhead

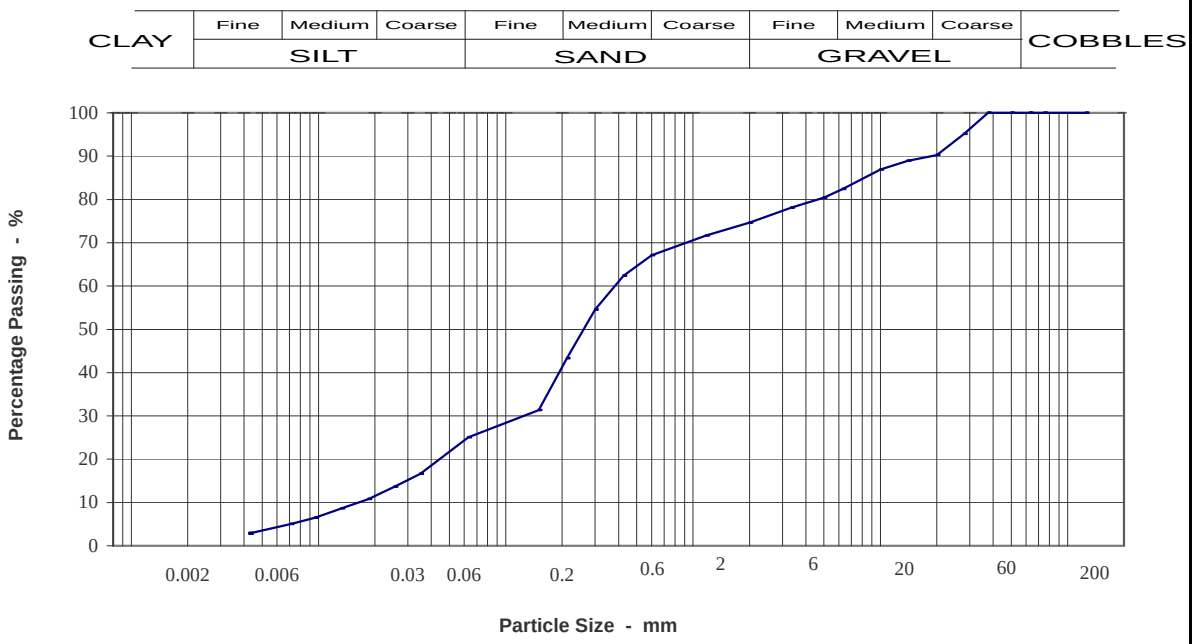
Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 235528
Depth (m) : 0.50
Sample Type: B

Initial Total Dry Weight: 7132.00 g



SIEVING	
BS Sieve Size mm	Cumulative Percentage Passing
125.0	100
75.0	100
63.0	100
50.0	100
37.5	100
28.0	95
20.0	90
14.0	89
10.0	87
6.30	82
5.00	80
3.35	78
2.00	75
1.18	72
0.600	67
0.425	62
0.300	55
0.212	43
0.150	31
0.063	25

SEDIMENTATION

Particle Size mm	Corrected Percentage Passing
0.035	17
0.026	14
0.019	11
0.013	9
0.010	6
0.007	5
0.004	3

Sample passing BS 0.063mm sieve washed and/or collected in pan
No Pretreatment
Uniformity Coefficient = 23.4

% CLAY	%SILT	%SAND	%GRAVEL
3	21.3	50.5	25.4

D10	D30	D60	D100
0.0165	0.131	0.39	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No **WS30** Test Results

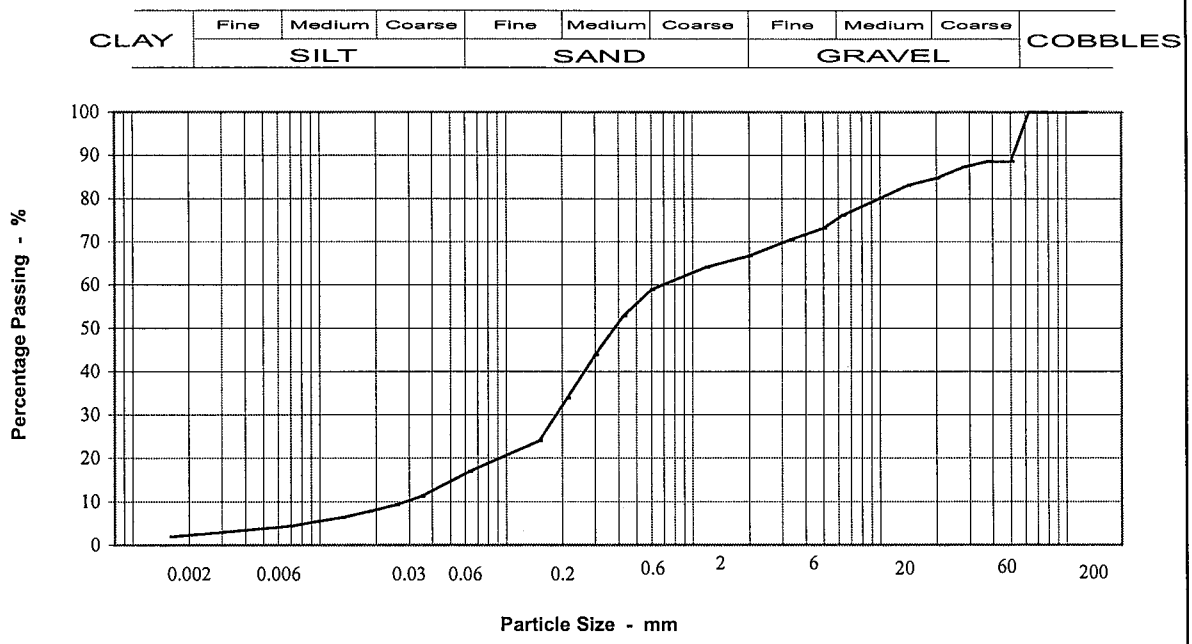
Gourock Pierhead

Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 235529 Depth (m) : 1.00 Sample Type: B	Initial Total Dry Weight: 4280.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100	0.035	11
75.0	100	0.026	9
63.0	100	0.018	8
50.0	89	0.013	6
37.5	89	0.010	5
28.0	87	0.007	4
20.0	85	0.002	2
14.0	83		
10.0	80		
6.30	76		
5.00	73	Sample passing BS 0.063mm sieve washed and/or collected in pan No Pretreatment Uniformity Coefficient = 24.8	
3.35	71		
2.00	67		
1.18	64		
0.600	59	**% CLAY** 2 / **%SILT** 14.2 / **%SAND** 50.5 / **%GRAVEL** 33.2	
0.425	53		
0.300	44		
0.212	34		
0.150	24	**D10** 0.0291 / **D30** 0.188 / **D60** 0.72 / **D100** 125.00	
0.063	17		

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No **WS31** Test Results

Gourock Pierhead

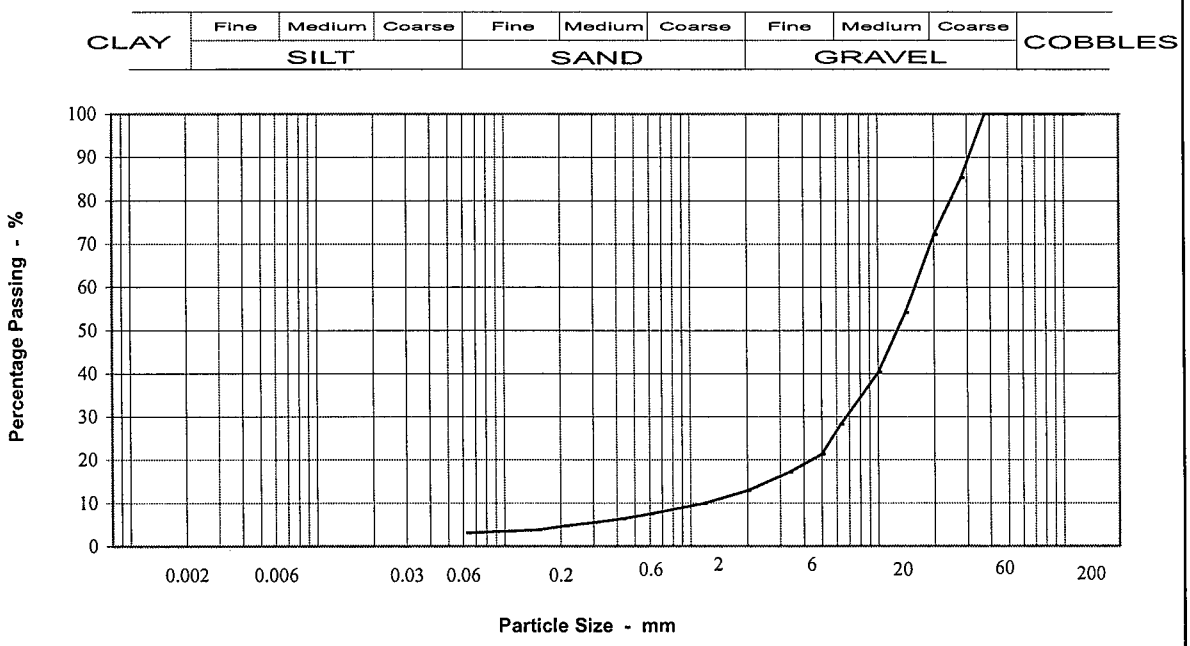
Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 235534
Depth (m) : 0.60
Sample Type: B

Initial Total Dry Weight: 1509.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	100		
50.0	100		
37.5	100		
28.0	85		
20.0	72		
14.0	54		
10.0	40		
6.30	28		
5.00	21		
3.35	17		
2.00	13		
1.18	10		
0.600	7		
0.425	6		
0.300	5		
0.212	5		
0.150	4		
0.063	3		

Uniformity Coefficient = 13.3

%SILT & CLAY	%SAND	%GRAVEL
3.1	9.8	87.1

D10	D30	D60	D100
1.1994	6.872	15.96	125.00

bam ritchies

PARTICLE SIZE DISTRIBUTION

Borehole No
WS31
Test Results

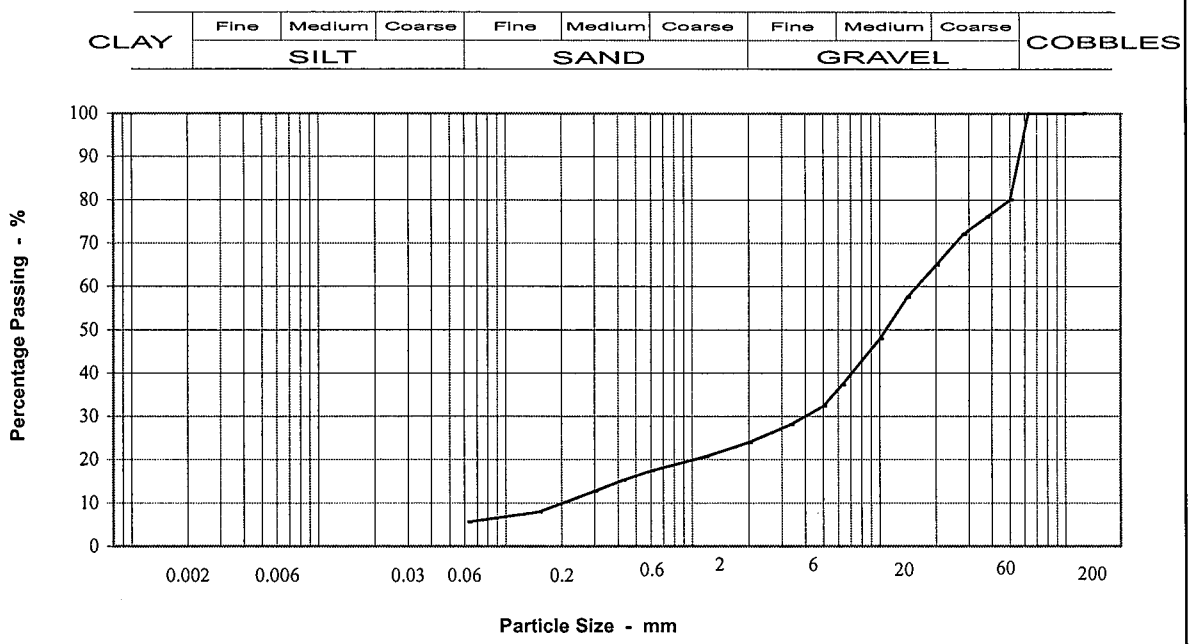
Gourock Pierhead

Client: Riverside Inverclyde Ltd — Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 235535 Depth (m) : 1.00 Sample Type: B	Initial Total Dry Weight: 3290.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	100		
63.0	100		
50.0	80		
37.5	76		
28.0	72		
20.0	65		
14.0	57		
10.0	48		
6.30	37		
5.00	32		
3.35	28		
2.00	24		
1.18	21		
0.600	17		
0.425	15		
0.300	13		
0.212	10		
0.150	8		
0.063	6		

Uniformity Coefficient = 78.2

%SILT & CLAY	%SAND	%GRAVEL
5.6	18.4	76.1

D10	D30	D60	D100
0.2055	4.094	16.06	125.00

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PARTICLE SIZE DISTRIBUTION

Borehole No **WS32** Test Results

Gourock Pierhead

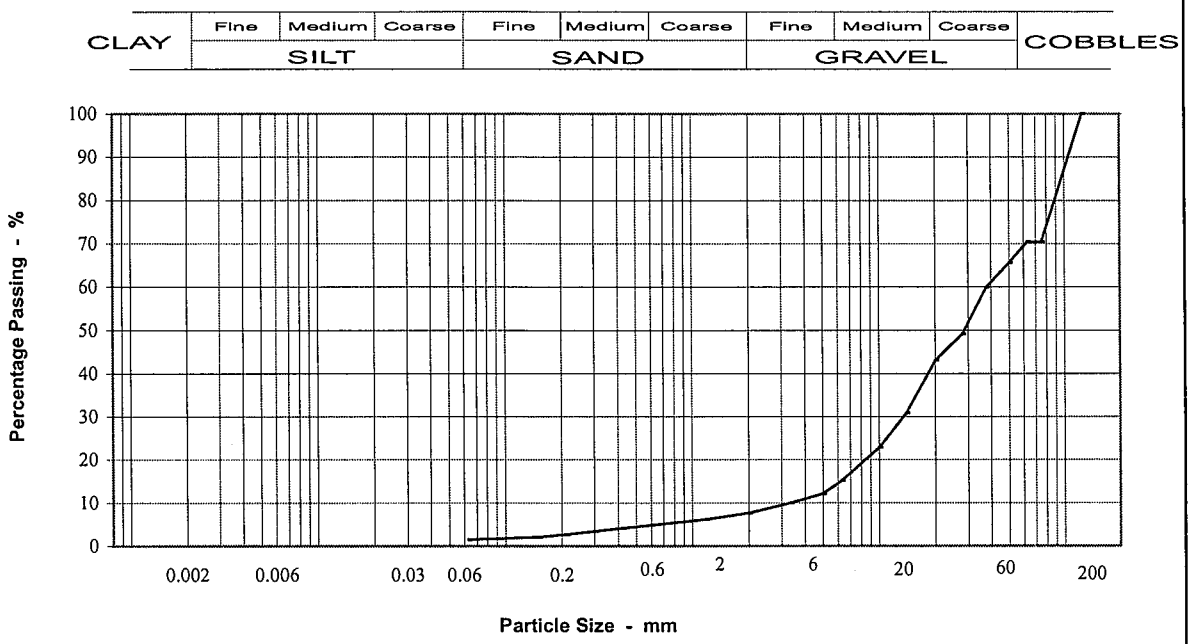
Client: Riverside Inverclyde Ltd Job No: 4618

Consultant: W.A. Fairhurst & Partners

Test Method - BS 1377:1990 Part 2 Clause 9.2 & 9.5

Sample Number: 235540
Depth (m) : 1.00
Sample Type: B

Initial Total Dry Weight: 8887.00 g



SIEVING		SEDIMENTATION	
BS Sieve Size mm	Cumulative Percentage Passing	Particle Size mm	Corrected Percentage Passing
125.0	100		
75.0	70		
63.0	70		
50.0	66		
37.5	60		
28.0	49		
20.0	43		
14.0	31		
10.0	23		
6.30	15		
5.00	12		
3.35	10		
2.00	8		
1.18	6		
0.600	5		
0.425	4		
0.300	3		
0.212	3		
0.150	2		
0.063	1		

Uniformity Coefficient = 11.2

%SILT & CLAY	%SAND	%GRAVEL
1.5	6.1	92.4

D10	D30	D60	D100
3.3742	13.592	37.73	125.00

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ORGANIC MATTER CONTENT

Gourock Pierhead

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No. **4618**

Test Method - BS 1377 : Part 3 : 1990 : Clause 3

Sample Identification					% Passing 2 mm	Organic Matter Content %
05	230460	DJB	0.50	m	49	3.5
TP07	229290	D	0.50	m	35	1.2
TP08	229280	D	0.50	m	48	1.8
TP09	229234	D	0.50	m	58	1.2
TP10	229270	D	0.50	m	52	1.2
TP13	229250	D	0.50	m	45	2.4

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pH Value and Sulphate Content

Gourock Pierhead

Client: Riverside Inverclyde Ltd

Consultant: W.A. Fairhurst & Partners

Job No: 4618

Test Method - BS 1377:1990:Part 3:Methods 5 & 9

Sample Identification				pH Value	Sulphate Content			
					2:1 Aqueous Extract g/l	Total %	Water Soluble g/l	%
Hole ID	Sample No.		Depth (m)	Method 9	Method 5.3/5.5	Method 5.2/5.5	Method 5.4/5.5	<2.00mm
04	230499	D	2.75	7.9	0.09			95
04	114903	D	5.20	8.3	0.10			57
05	230460	DJB	0.50	7.9	0.12			77
06	12	DJJ	1.00	8.5	0.28			31
06	230487	D	4.55	8.1	0.11			100
TP01	229210	D	0.50	8.3	0.25			46
TP01	229214	D	1.50	8.4	0.10			73
TP02	229216	D	0.50	8.6	0.09			69
TP02	229219	B	1.80	8.5	0.15			50
TP03	229224	D	1.00	8.2	0.47			11
TP05	229203	B	0.50	8.3	0.33			14
TP05	229206	D	1.00	8.2	0.27			24
TP06	229230	D	1.50	8.0	0.05			32
TP07	229290	D	0.50	8.1	0.09			35
TP07	229294	D	1.50	8.4	0.07			25
TP08	229286	D	2.00	7.7	0.73			25
TP09	229236	D	1.00	8.0	0.35			77
TP10	229270	D	0.50	8.0	0.07			60
TP10	229172	D	1.00	8.3	0.06			33
TP11	229246	D	1.50	8.2	0.07			76
TP12	229260	D	1.00	8.0	0.08			67
TP13	229250	D	0.50	8.2	0.09			40
TP13	229256	D	2.00	8.4	0.10			38
WS30	235530	D	1.20	8.3	0.28			58
WS30	191992	D	2.60	8.0	0.31			61
WS31	235537	D	2.00	8.3	0.28			46
WS32	235543	D	2.00	9.5	0.26			13

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ONE DIMENSIONAL CONSOLIDATION TEST

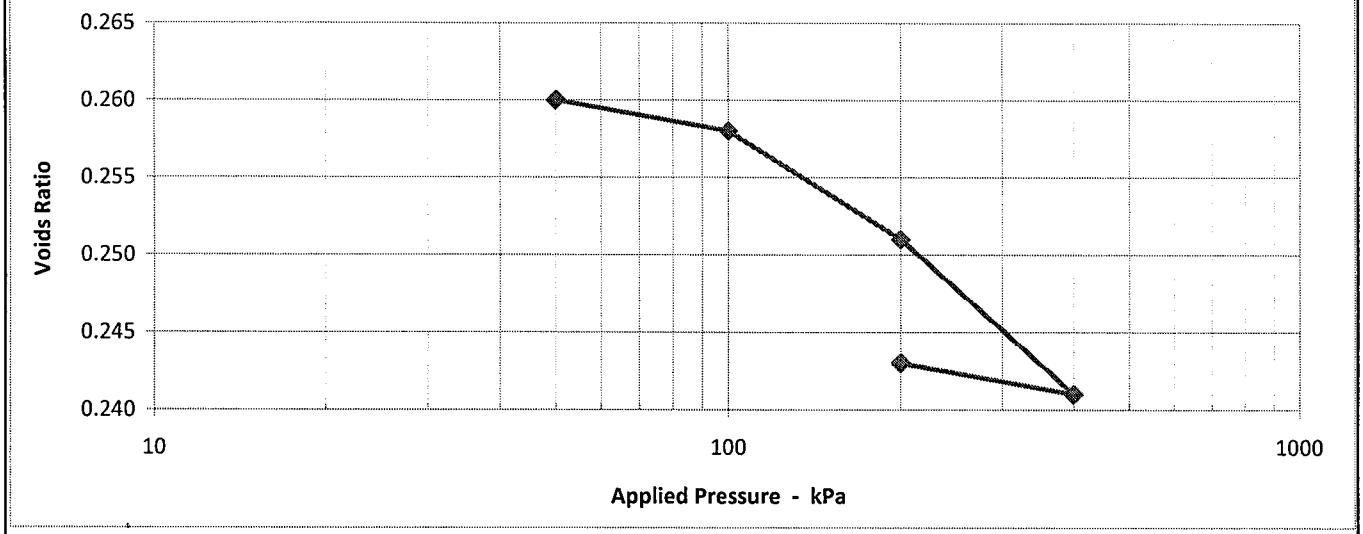
Borehole No 04

Gourock Pierhead

Client: Riverside Inverclyde Ltd
Consultant: W.A. Fairhurst & Partners
Job No: 4618

Test Method - BS 1377 : 1990 : Part 5 Clause 3

Sample No: 114901
Depth 4.60 m
Sample Type U

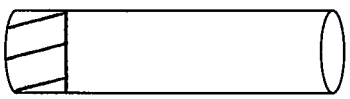


Initial Sample Conditions		
Diameter	mm	75.00
Height	mm	19.00
Moisture Content	%	8.90
Bulk Density	Mg/m³	2.31
Dry Density	Mg/m³	2.12
Voids Ratio		0.261
Assumed Particle Density	Mg/m³	2.68
Swelling Pressure	kPa	
Final Sample Conditions		
Moisture Content	%	9.40
Bulk Density	Mg/m³	2.36
Dry Density	Mg/m³	2.16
Voids Ratio		0.243

Degree of Saturation	%	90.99
Seating Pressure	kPa	0
Laboratory Temperature	°C	20.0
Sample Condition		Undisturbed

Pressure Range kPa		Laboratory Coefficients of Compressibility m²/MN	Consolidation m²/year	Method of Curve Fitting
0 -	50.0	0.010	—	root time
50.0 -	100.0	0.040	2.24	root time
100.0 -	200.0	0.060	2.71	root time
200.0 -	400.0	0.040	3.01	root time
400.0 -	200.0	0.010	—	root time

Location of Test Specimen within Undisturbed Sample



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ONE DIMENSIONAL CONSOLIDATION TEST

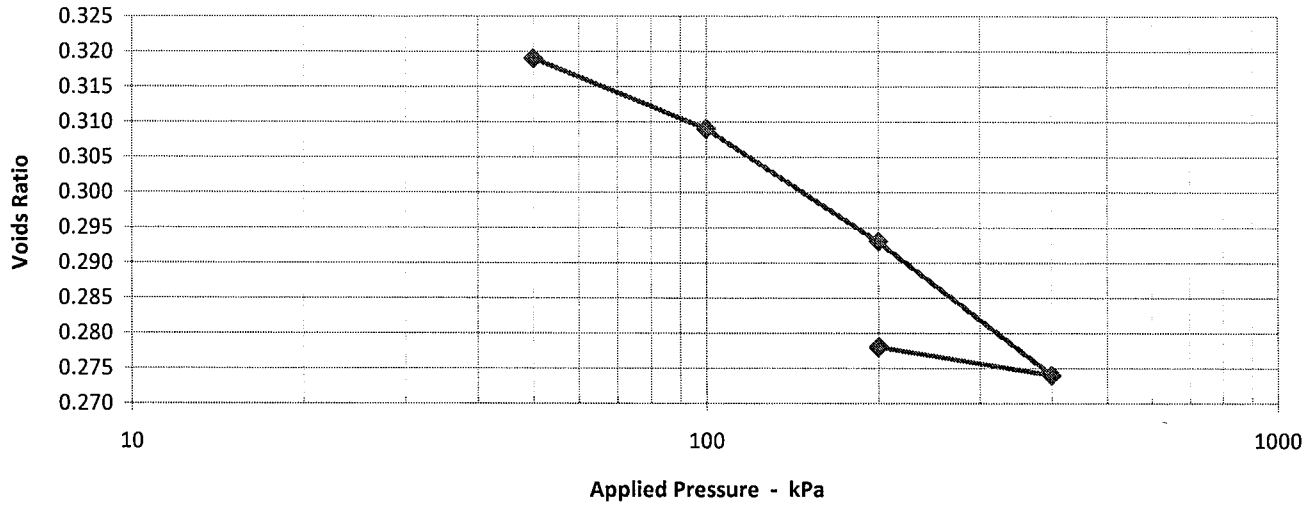
Borehole No 05

Gourock Pierhead

Client: Riverside Inverclyde Ltd
Consultant: W.A. Fairhurst & Partners
Job No: 4618

Test Method - BS 1377 : 1990 : Part 5 Clause 3

Sample No: 230472
Depth 4.50 m
Sample Type U

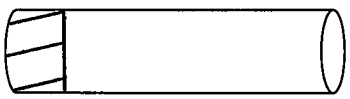


Initial Sample Conditions		
Diameter	mm	75.00
Height	mm	20.00
Moisture Content	%	10.40
Bulk Density	Mg/m³	2.24
Dry Density	Mg/m³	2.03
Voids Ratio		0.322
Assumed		
Particle Density	Mg/m³	2.68
Swelling Pressure	kPa	
Final Sample Conditions		
Moisture Content	%	10.20
Bulk Density	Mg/m³	2.31
Dry Density	Mg/m³	2.10
Voids Ratio		0.278

Degree of Saturation	%	86.63
Seating Pressure	kPa	0
Laboratory Temperature	°C	20.0
Sample Condition		Undisturbed

Pressure Range kPa		Laboratory Coefficients of Compressibility m²/MN	Laboratory Coefficients of Consolidation m²/year	Method of Curve Fitting
0 -	50.0	0.040	3.31	root time
50.0 -	100.0	0.160	2.96	root time
100.0 -	200.0	0.120	3.60	root time
200.0 -	400.0	0.070	2.65	root time
400.0 -	200.0	0.010	—	root time

Location of Test Specimen within Undisturbed Sample



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ONE DIMENSIONAL CONSOLIDATION TEST

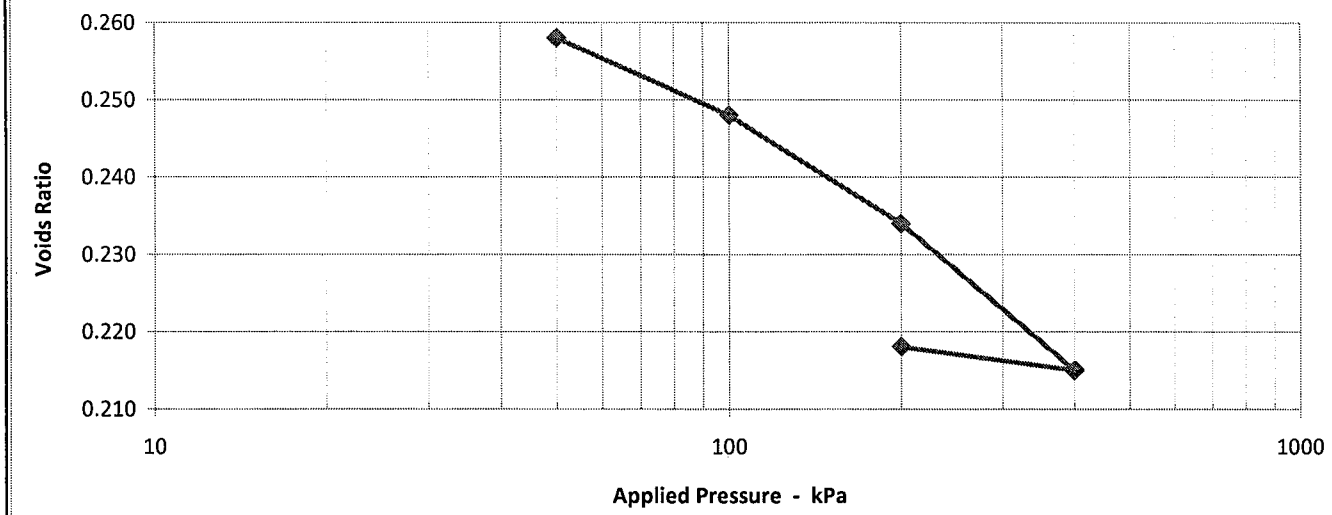
Borehole No 06

Gourock Pierhead

Client: Riverside Inverclyde Ltd
Consultant: W.A. Fairhurst & Partners
Job No: 4618

Test Method - BS 1377 : 1990 : Part 5 Clause 3

Sample No: 230485
Depth 3.90 m
Sample Type U

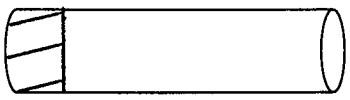


Initial Sample Conditions		
Diameter	mm	75.00
Height	mm	18.50
Moisture Content	%	12.10
Bulk Density	Mg/m³	2.34
Dry Density	Mg/m³	2.09
Voids Ratio		0.283
Assumed		
Particle Density	Mg/m³	2.68
Swelling Pressure	kPa	
Final Sample Conditions		
Moisture Content	%	9.90
Bulk Density	Mg/m³	2.42
Dry Density	Mg/m³	2.20
Voids Ratio		0.218

Degree of Saturation	%	99.65
Seating Pressure	kPa	0
Laboratory Temperature	°C	20.0
Sample Condition		Undisturbed

Pressure Range kPa		Laboratory Coefficients of Compressibility m²/MN	Laboratory Coefficients of Consolidation m²/year	Method of Curve Fitting
0 -	50.0	0.380	2.69	root time
50.0 -	100.0	0.160	2.27	root time
100.0 -	200.0	0.110	1.99	root time
200.0 -	400.0	0.080	2.04	root time
400.0 -	200.0	0.010	—	root time

Location of Test Specimen within Undisturbed Sample



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UNDRAINED MULTISTAGE TRIAXIAL COMPRESSION

Borehole No 04 Test Results

Gourock Pierhead

Client: Riverside Inverclyde Ltd
Consultant: W.A. Fairhurst & Partners
Job No: 4618

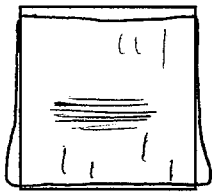
Test Method - BS 1377:1990:Part 7 Clause 9

Sample Number: 114901
Depth (m) : 4.60

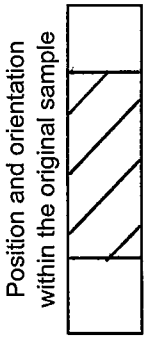
Notes :

Sample Details

Sample Condition		Undisturbed
Height	mm	199.0
Diameter	mm	103.0
Moisture Content	%	12
Bulk Density	Mg/m³	2.32
Dry Density	Mg/m³	2.06

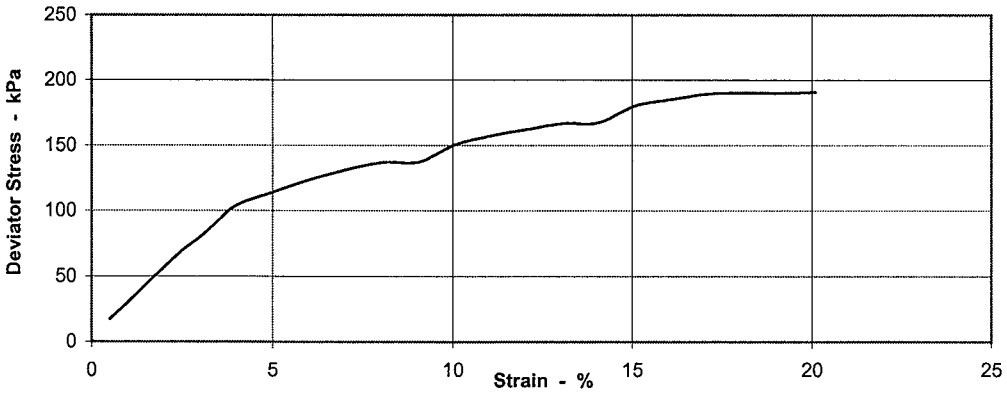


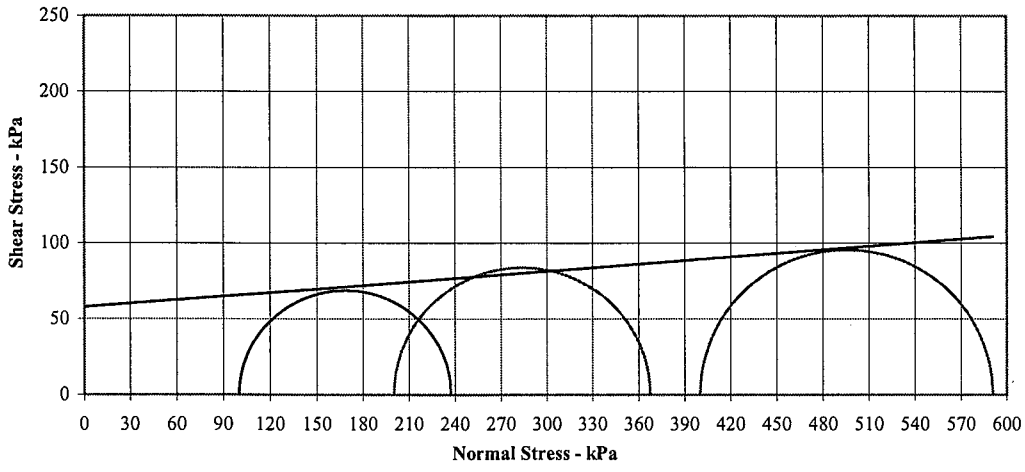
Sketch of Failure



Test Details	Stage	1	2	3
Membrane Thickness	mm	0.30	0.30	0.30
Membrane Correction	kPa	0.61	0.85	1.11
Rate of Axial Displacement	%/min	2.01	2.01	2.01
Cell Pressure	kPa	100	200	400
Strain at Failure	%	9.0	14.1	20.1
Maximum Deviator Stress	kPa	137	167	191
Shear Strength	kPa	69	84	95
Mode of Failure				Intermediate

Shear Strength Parameters	
C	58 kPa
Phi	4.5 °





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UNDRAINED TRIAXIAL COMPRESSION

Borehole No **05** Test Results

Gourock Pierhead

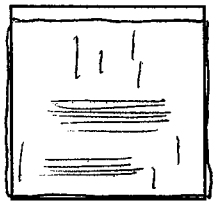
Client: Riverside Inverclyde Ltd
Consultant: W.A. Fairhurst & Partners
Job No: 4618

Test Method - BS 1377:1990:Part 7 Clause 8

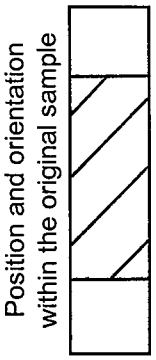
Sample Num 230472 Depth (m) : 4.50	Notes :

Sample Details

Sample Condition		Undisturbed
Height	mm	199.0
Diameter	mm	102.0
Moisture Content	%	9.8
Bulk Density	Mg/m^3	2.23
Dry Density	Mg/m^3	2.03

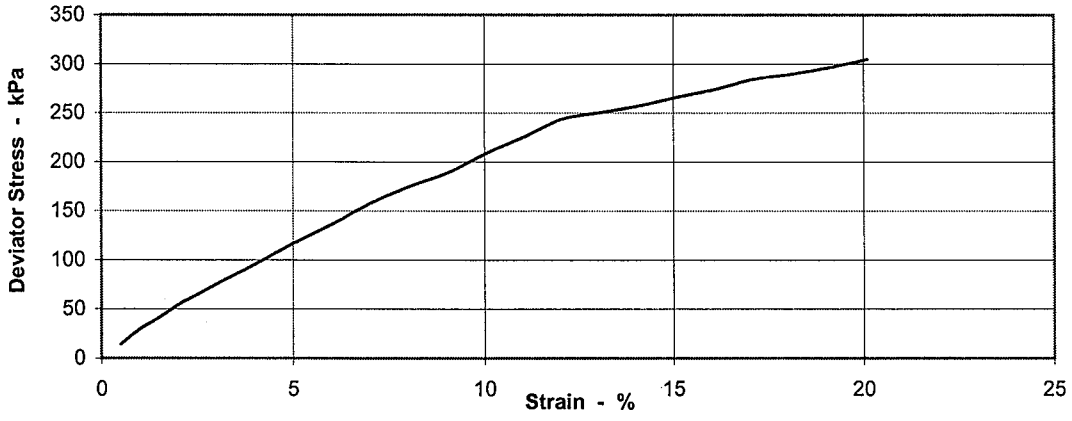


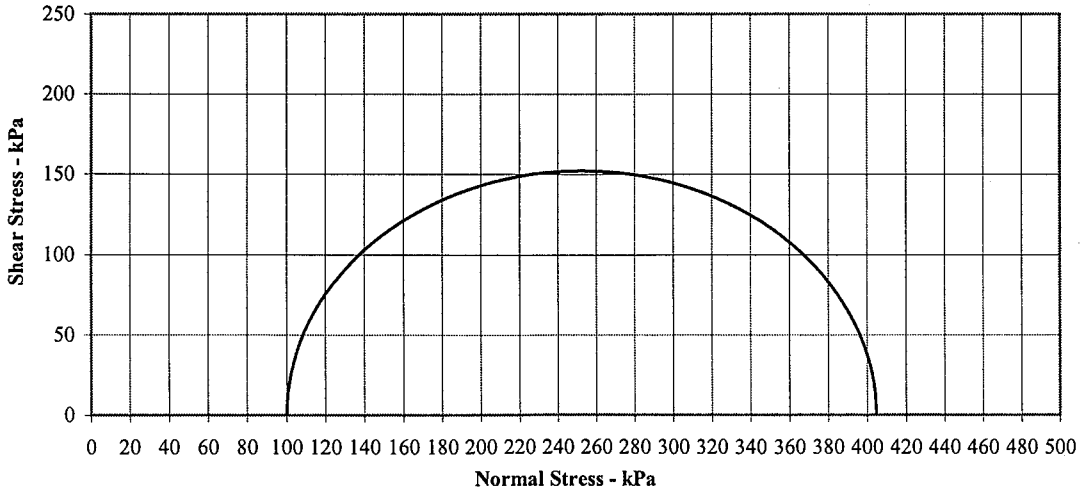
Sketch of Failure



Test Details

Membrane Thickness	mm	0.30
Membrane Correction	kPa	1.12
Rate of Axial Displacement	%/min	2.01
Cell Pressure	kPa	100
Strain at Failure	%	20.1
Maximum Deviator Stress	kPa	305
Shear Strength	kPa	152
Mode of Failure		Intermediate





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UNDRAINED TRIAXIAL COMPRESSION

Gourock Pierhead

Borehole No 06 Test Results

Client: Riverside Inverclyde Ltd
Consultant: W.A. Fairhurst & Partners
Job No: 4618

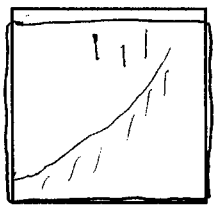
Test Method - BS 1377:1990:Part 7 Clause 8

Sample Num	230485
Depth (m) :	3.90

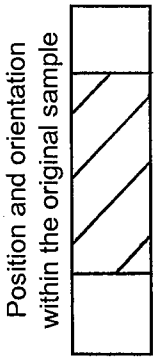
Notes :

Sample Details

Sample Condition		Undisturbed
Height	mm	202.0
Diameter	mm	103.0
Moisture Content	%	12
Bulk Density	Mg/m^3	2.40
Dry Density	Mg/m^3	2.13

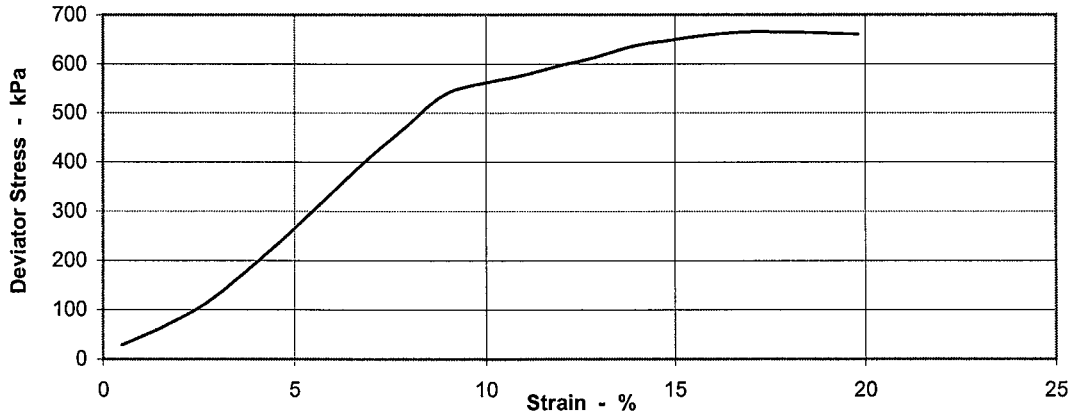


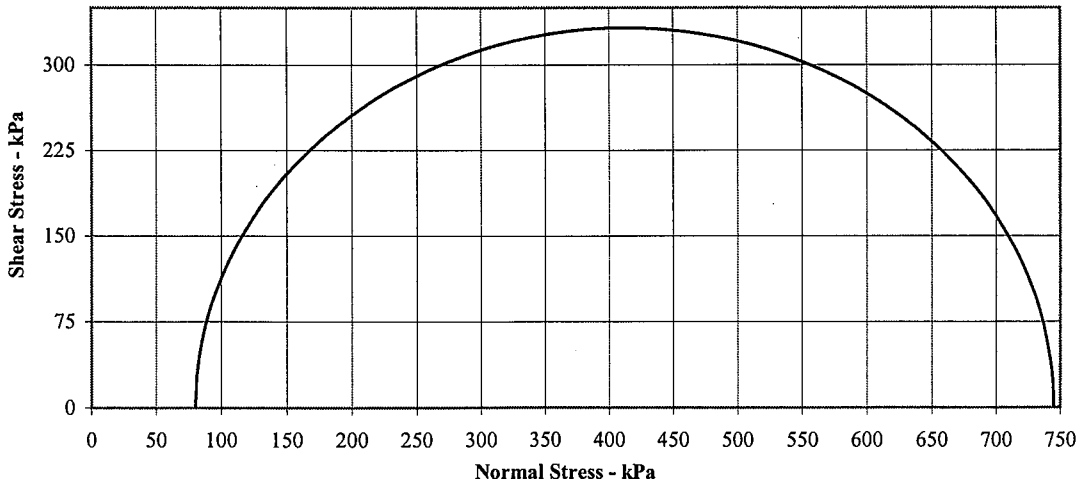
Sketch of Failure



Test Details

Membrane Thickness	mm	0.30
Membrane Correction	kPa	0.98
Rate of Axial Displacement	%/min	1.98
Cell Pressure	kPa	80
Strain at Failure	%	16.8
Maximum Deviator Stress	kPa	665
Shear Strength	kPa	333
Mode of Failure		Brittle





UNIAXIAL COMPRESSIVE STRENGTH

Tested in accordance with ISRM 1981

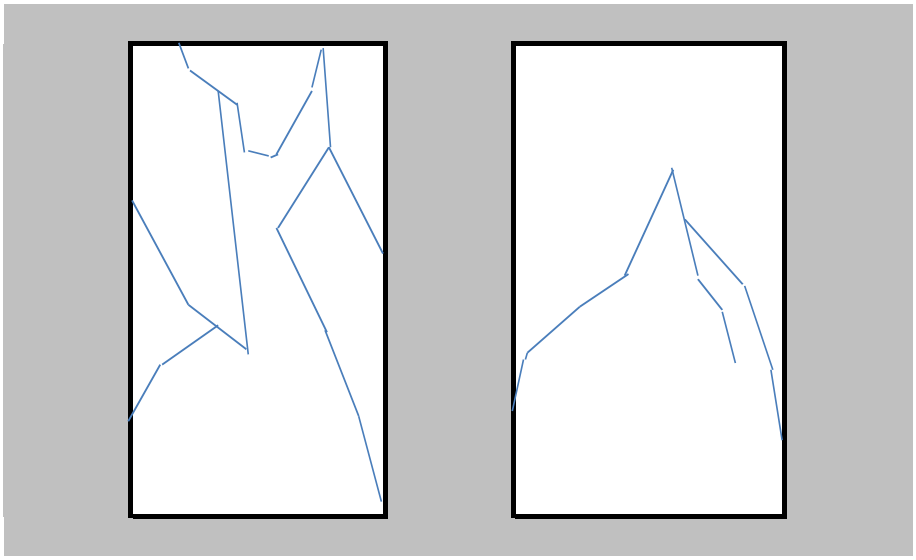
'Suggested Methods for Determination of the Uniaxial Compressive Strength of Rock Materials'

Gourock Pierhead

Client	Riverside Inverclyde Limited	**Contract No.**	BAX.4618
Consultant	W. A. Fairhurst & Partners		

Borehole reference		**R04**
Core Run		**-**
Depth	m	**7.20**
Lithologic description of rock		**TRACHYTE**
Method of sampling		**Rotary**
Storage environment		**Enclosed/Uncontrolled**
Core Diameter	mm	**72.7**
Core Height	mm	**186**
Water content	%	**0.1**
Test Condition		**Moist**
Rate of loading	kN/s	**0.5**
Test Duration	min.sec	**6.02**
Date of testing		**28.10.11**
Load frame used		**ELE Autotest 2000kN**
Orientation of the axis of loading (with respect to lithology)		**Perpendicular**
Failure Load	kN	**593.4**
Mode of failure		**Multiple Shear**
Uniaxial Compressive Strength	*MPa*	**143.024**

Sample Failure Sketches



External **Internal**

Approved for issue

W. O'Hara (Laboratory Manager)

Date *29/10/2011*

UNIAXIAL COMPRESSIVE STRENGTH

Tested in accordance with ISRM 1981

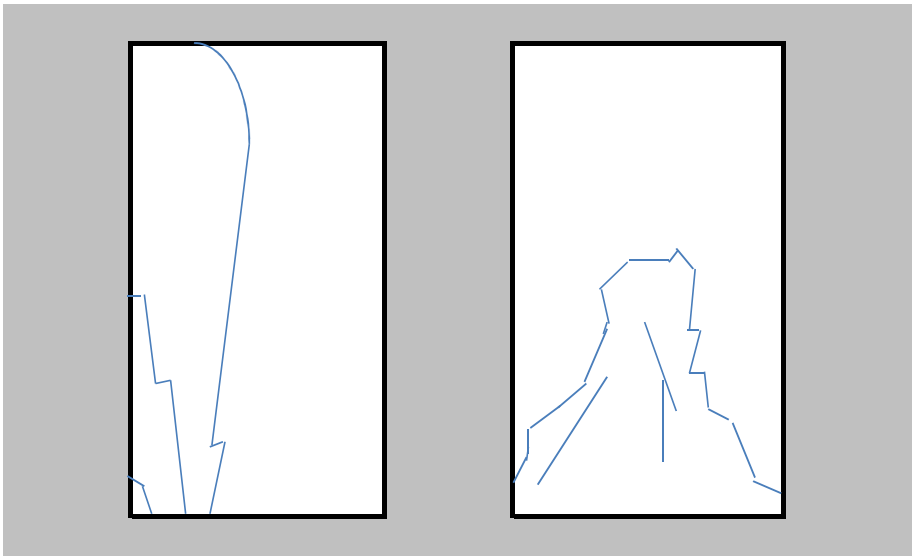
'Suggested Methods for Determination of the Uniaxial Compressive Strength of Rock Materials'

Gourock Pierhead

Client	Riverside Inverclyde Limited	**Contract No.**	BAX.4618
Consultant	W. A. Fairhurst & Partners		

Borehole reference		**R05**
Core Run		**-**
Depth	m	**8.70**
Lithologic description of rock		**TRACHYTE**
Method of sampling		**Rotary**
Storage environment		**Enclosed/Uncontrolled**
Core Diameter	mm	**72.65**
Core Height	mm	**186**
Water content	%	**2.6**
Test Condition		**Moist**
Rate of loading	kN/s	**0.5**
Test Duration	min.sec	**2.54**
Date of testing		**28.10.11**
Load frame used		**ELE Autotest 2000kN**
Orientation of the axis of loading (with respect to lithology)		**Perpendicular**
Failure Load	kN	**334.6**
Mode of failure		**Axial**
Uniaxial Compressive Strength	*MPa*	**80.758**

Sample Failure Sketches



External **Internal**

Approved for issue

W. O'Hara (Laboratory Manager)

Date *29/10/2011*

SUMMARY OF POINT LOAD TEST RESULTS

Tested in accordance with ISRM Standard 1985

"Suggested Method for determining Point Load Strength"

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Gourock Pierhead

Client **Riverside Inverclyde Limited** **BAX. 4618**

Consultant **W. A. Fairhurst & Partners**

Borehole Reference	Depth	Type of test	Sample Width (mm)	D (mm)	De2	P (kN)	Is (MNm-2)	Is(50) (MNm-2)	Rock Type	Failure Remarks
4	6.20	Diametral	36	73	5329	22.417	4.21	4.99	TRACHYTE	V
	6.25	Axial	73	44	4090	27.409	6.70	7.49	TRACHYTE	V
4	7.20	Diametral	60	73	5329	32.391	6.08	7.21	TRACHYTE	V
	7.25	Axial	73	54	5019	23.820	4.75	5.55	TRACHYTE	V
4	10.20	Diametral	55	73	5329	27.301	5.12	6.07	TRACHYTE	V
	10.30	Axial	73	69	6413	29.419	4.59	5.67	TRACHYTE	V
5	5.70	Diametral	36	73	5329	19.730	3.70	4.39	TRACHYTE	V
	5.80	Axial	73	55	5112	12.101	2.37	2.78	TRACHYTE	P
5	8.70	Diametral	44	73	5329	23.398	4.39	5.21	TRACHYTE	V
	8.80	Diametral	47	73	5329	23.888	4.48	5.31	TRACHYTE	P
	8.85	Axial	73	40	3718	20.642	5.55	6.07	TRACHYTE	V
5	9.70	Diametral	43	73	5329	24.652	4.63	5.48	TRACHYTE	V
	9.75	Axial	73	72	6692	34.234	5.12	6.38	TRACHYTE	V
6	6.30	Diametral	45	73	5329	23.732	4.45	5.28	TRACHYTE	V
	6.40	Axial	73	50	4647	24.903	5.36	6.16	TRACHYTE	V
6	8.30	Diametral	45	73	5329	25.252	4.74	5.62	TRACHYTE	V
	8.30	Axial	No suitable sample for test							

Failure remarks

V	Valid	S	Spall
P	Through one platen only	I	Other Invalid
B	Obvious bedding plane		

(D=Distance between platens)

$I_s = (P/D_e^2) \times 10^3$ where D_e^2 = D^2 for diametral tests

(4WD)/pi for axial, block and lump tests

$I_{s(50)} = (D_e/50)^{0.45} \times I_s$

The above test results relate only to the items tested
Rock Type descriptions as per BAM Ritchies Ground Investigation Department Log
*Unable to calculate Mean Is(50) due to limitations on test sample/s available

Mean Is(50) - Axial tests*	-
Mean Is(50) - Diametral tests*	-

bam ritchies

SAMPLES UNSUITABLE FOR TESTING

Gourock Pierhead

Client : Riverside Inverclyde Ltd. **Contract No : 4618**
Consultant : W.A. Fairhurst & Partners

The following samples have proved unsuitable for testing.
Please advise us if any replacement sample(s) are to be tested.

Sample Identification			Test(s) Required	Reason for Unsuitability
TP03	D	1.00m	SO3/pH	Insufficient material passing 425µm test sieve. (B @ 1.00m used)
TP08	B	1.00m	Vibrating Hammer Compaction	Insufficient material to carry out test, approx. 30Kg required for test. (14Kg)
TP11	B	1.5 & 2.0m	4.5Kg Compaction	>10% Retained on 37.5mm test sieve test test not applicable - BS 1377 Pt 4 Table 2. (70% retained)
WS30	D	2.60m	SO3/pH	Sample is a no recovery.
WS31	B	0.6m	PSD	Sample not received to laboratory.

SAMPLES UNSUITABLE FOR TESTING

Gourock Pierhead

Client : **Contract No :** 4618

Consultant : W.A. Fairhurst & Partners

The following samples have proved unsuitable for testing.
Please advise us if any replacement sample(s) are to be tested.

Sample Identification	Test(s) Required	Reason for Unsuitability
BH06 Core 6.30m	UCS	No suitable length of core available for UCS test, PLT carried out.

APPENDIX 6.0
GEOCHEMICAL LABORATORY TEST RESULTS

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618 - Soils
Date Tested: 13/10/11
Date Reported: 31 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
File No: 11/2443/C
Client Ref: RIT 136713

					Lab sample ref:	C127889	C127890	C127892	C127894	C127896
					Client sample ref:	TP04 0.50m	TP06 1.00m	TP07 1.50m	TP08 1.00m	TP09 2.00m
					Sample matrix:	Leachate	Leachate	Leachate	Leachate	Leachate
Determinand	**Method**	**Units**	**ISO17025**	**LOD**						
Metals (Leachate)										
Arsenic leachable	AN47e	µg/l	Y	0.25		9.40	12.58	4.98	1.01	0.28
Boron leachable	AN47c	µg/l	Y	1		51	63	29	15	36
Cadmium leachable	AN47a	µg/l	Y	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Chromium leachable	AN47a	µg/l	Y	0.05		2.52	12.61	3.17	3.61	0.16
Copper leachable	AN47a	µg/l	Y	0.05		18.10	13.41	1.51	4.60	0.42
Lead leachable	AN47a	µg/l	Y	0.05		18.82	90.76	0.75	1.70	<0.05
Nickel leachable	AN47b	µg/l	Y	0.1		2.31	2.17	1.42	2.16	<0.10
Selenium leachable	AN47c	µg/l	Y	1		<1.00	<1.00	<1.00	<1.00	<1.00
Vanadium leachable	AN47a	µg/l	Y	0.05		12.31	11.53	76.79	5.32	17.38
Zinc leachable	AN47g	µg/l	Y	0.5		9.5	49.8	1.3	3.7	<0.5
Mercury leachable	Subcontract*	µg/l	N	0.015		0.086	0.640	0.649	0.162	0.051
Misc										
Ammoniacal Nitrogen leachable	HACH9b	mg/l-N	Y	0.2		<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide (free) leachable	Subcontract*	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Phenols (screen) leachable	AN45c	mg/l	Y	0.03		<0.03	<0.03	<0.03	<0.03	<0.03
Chromium (VI) leachable	HACH 4	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
BTEX leachable										
Benzene leachable	AN15	µg/l	Y	5		<5	<5	<5	<5	<5
Toluene leachable	AN15	µg/l	Y	5		<5	<5	<5	<5	<5
Ethylbenzene leachable	AN15	µg/l	Y	5		<5	<5	<5	<5	<5
m,p-Xylene leachable	AN15	µg/l	Y	5		<5	<5	<5	<5	<5
o-Xylene leachable	AN15	µg/l	Y	5		<5	<5	<5	<5	<5
PAH(USEPA16) leachable										
Naphthalene leachable	GCM502	µg/l	Y	0.02		1.00	0.11	0.04	1.51	0.10
Acenaphthylene leachable	GCM502	µg/l	Y	0.02		1.07	0.10	<0.02	0.17	0.14
Acenaphthene leachable	GCM502	µg/l	Y	0.02		2.06	1.48	0.04	0.79	0.13
Fluorene leachable	GCM502	µg/l	Y	0.02		1.42	0.26	<0.02	0.46	0.13
Phenanthrene leachable	GCM502	µg/l	Y	0.02		1.75	0.43	0.04	1.09	0.35
Anthracene leachable	GCM502	µg/l	Y	0.02		0.60	0.51	0.03	0.32	0.15
Fluoranthene leachable	GCM502	µg/l	Y	0.02		1.19	18.2	0.20	2.68	1.18
Pyrene leachable	GCM502	µg/l	Y	0.02		1.09	15.4	0.10	2.91	1.08
Benzo(a)anthracene leachable	GCM502	µg/l	Y	0.02		1.35	1.38	0.07	2.08	0.42
Chrysene leachable	GCM502	µg/l	Y	0.02		1.34	1.34	0.08	1.80	0.43
Benzo(b)fluoranthene leachable	GCM502	µg/l	Y	0.02		0.66	0.61	0.06	1.29	0.33
Benzo(k)fluoranthene leachable	GCM502	µg/l	Y	0.02		0.57	0.54	0.05	1.57	0.35
Benzo(a)pyrene leachable	GCM502	µg/l	Y	0.02		0.86	0.69	0.06	1.62	0.36
Indeno(1,2,3-cd)pyrene leachable	GCM502	µg/l	Y	0.02		0.32	0.35	0.04	0.71	0.19
Dibenzo(a,h)anthracene leachable	GCM502	µg/l	Y	0.02		0.11	0.13	<0.02	0.30	0.09
Benzo(ghi)perylene leachable	GCM502	µg/l	Y	0.02		0.43	0.50	0.06	0.67	0.20

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618 - Soils
Date Tested: 13/10/11
Date Reported: 31 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
File No: 11/2443/C
Client Ref: RIT 136713

					Lab sample ref:	C127889	C127890	C127892	C127894	C127896
					Client sample ref:	TP04 0.50m	TP06 1.00m	TP07 1.50m	TP08 1.00m	TP09 2.00m
					Sample matrix:	Leachate	Leachate	Leachate	Leachate	Leachate
Determinand	**Method**	**Units**	**ISO17025**	**LOD**						
PCB Congeners leachable										
PCB 28 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
PCB 52 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
PCB 101 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
PCB 118 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
PCB 153 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
PCB 138 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
PCB 180 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
TPH Banded(Ali/Aro) leachable										
>C6-C8 Aliphatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
>C7-C8 Aromatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
C5-C6 Aliphatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
C5-C7 Aromatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C12 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C12 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
>C12-C16 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		0.04	<0.01	<0.01	<0.01	<0.01
>C12-C16 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
>C16-C21 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		0.02	<0.01	<0.01	<0.01	<0.01
>C16-C21 Aromatic Leachable	AN34A/1	mg/l	N	0.01		0.02	<0.01	<0.01	0.02	<0.01
>C21-C36 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
>C21-C36 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01	0.09	<0.01
>C8-C10 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01
>C8-C10 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01	<0.01	<0.01

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618 - Soils
Date Tested: 13/10/11
Date Reported: 31 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
File No: 11/2443/C
Client Ref: RIT 136713

					Lab sample ref:	C127898	C127900	C127902
					Client sample ref:	TP10 2.00m	TP11 1.50m	TP12 1.00m
					Sample matrix:	Leachate	Leachate	Leachate
Determinand	**Method**	**Units**	**ISO17025**	**LOD**				
Metals (Leachate)								
Arsenic leachable	AN47e	µg/l	Y	0.25	2.49	9.92	1.47
Boron leachable	AN47c	µg/l	Y	1	17	29	16
Cadmium leachable	AN47a	µg/l	Y	0.05	<0.05	<0.05	<0.05
Chromium leachable	AN47a	µg/l	Y	0.05	1.23	2.59	6.59
Copper leachable	AN47a	µg/l	Y	0.05	1.86	2.97	9.52
Lead leachable	AN47a	µg/l	Y	0.05	1.89	0.87	2.48
Nickel leachable	AN47b	µg/l	Y	0.1	0.81	1.48	2.49
Selenium leachable	AN47c	µg/l	Y	1	<1.00	<1.00	<1.00
Vanadium leachable	AN47a	µg/l	Y	0.05	4.22	43.74	6.40
Zinc leachable	AN47g	µg/l	Y	0.5	3.1	1.9	4.3
Mercury leachable	Subcontract*	µg/l	N	0.015	0.053	14.4	0.29
Misc							
Ammoniacal Nitrogen leachable	HACH9b	mg/l-N	Y	0.2	<0.2	<0.2	0.4
Cyanide (free) leachable	Subcontract*	mg/l	N	0.01	<0.01	<0.01	<0.01
Phenols (screen) leachable	AN45c	mg/l	Y	0.03	<0.03	<0.03	<0.03
Chromium (VI) leachable	HACH 4	mg/l	N	0.01	<0.01	<0.01	<0.01
BTEX leachable							
Benzene leachable	AN15	µg/l	Y	5	<5	<5	<5
Toluene leachable	AN15	µg/l	Y	5	<5	<5	<5
Ethylbenzene leachable	AN15	µg/l	Y	5	<5	<5	<5
m,p-Xylene leachable	AN15	µg/l	Y	5	<5	<5	<5
o-Xylene leachable	AN15	µg/l	Y	5	<5	<5	<5
PAH(USEPA16) leachable							
Naphthalene leachable	GCM502	µg/l	Y	0.02	0.02	<0.02	<0.02
Acenaphthylene leachable	GCM502	µg/l	Y	0.02	0.06	<0.02	<0.02
Acenaphthene leachable	GCM502	µg/l	Y	0.02	0.05	<0.02	0.03
Fluorene leachable	GCM502	µg/l	Y	0.02	0.03	<0.02	<0.02
Phenanthrene leachable	GCM502	µg/l	Y	0.02	0.43	0.03	0.18
Anthracene leachable	GCM502	µg/l	Y	0.02	0.14	<0.02	0.09
Fluoranthene leachable	GCM502	µg/l	Y	0.02	1.29	0.10	1.15
Pyrene leachable	GCM502	µg/l	Y	0.02	1.29	0.10	1.59
Benzo(a)anthracene leachable	GCM502	µg/l	Y	0.02	0.58	0.05	0.53
Chrysene leachable	GCM502	µg/l	Y	0.02	0.62	0.05	0.58
Benzo(b)fluoranthene leachable	GCM502	µg/l	Y	0.02	0.60	0.05	0.71
Benzo(k)fluoranthene leachable	GCM502	µg/l	Y	0.02	0.69	0.06	0.65
Benzo(a)pyrene leachable	GCM502	µg/l	Y	0.02	0.72	0.06	0.87
Indeno(1,2,3-cd)pyrene leachable	GCM502	µg/l	Y	0.02	0.45	0.03	0.62
Dibenzo(a,h)anthracene leachable	GCM502	µg/l	Y	0.02	0.15	<0.02	0.18
Benzo(ghi)perylene leachable	GCM502	µg/l	Y	0.02	0.54	0.04	0.82

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618 - Soils
Date Tested: 13/10/11
Date Reported: 31 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
File No: 11/2443/C
Client Ref: RIT 136713

					Lab sample ref:	C127898	C127900	C127902
					Client sample ref:	TP10 2.00m	TP11 1.50m	TP12 1.00m
					Sample matrix:	Leachate	Leachate	Leachate
Determinand	**Method**	**Units**	**ISO17025**	**LOD**				
PCB Congeners leachable								
PCB 28 leachable $_{M}$	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 52 leachable $_{M}$	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 101 leachable $_{M}$	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 118 leachable $_{M}$	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 153 leachable $_{M}$	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 138 leachable $_{M}$	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 180 leachable $_{M}$	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
TPH Banded(Ali/Aro) leachable								
>C6-C8 Aliphatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C7-C8 Aromatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01
C5-C6 Aliphatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01
C5-C7 Aromatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C10-C12 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C10-C12 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C12-C16 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C12-C16 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C16-C21 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C16-C21 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C21-C36 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C21-C36 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C8-C10 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C8-C10 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01

Notes
1. Tests marked * indicate subcontracted analyses.
2. The laboratory has tested the material/items supplied by the client as sampled in accordance with the client's own requirements.
3. Results reported for metals are 'dissolved' unless otherwise stated.
4. Dates of testing for all parameters are available upon request.
5. Leachate preparation is not included in our UKAS accreditation.
6. All analyses performed on the sample dried at <30ºC, except analyses suffixed with 'M'.
7. Analyses suffixed 'M' were performed on the sample as received and corrected for '% moisture at <30ºC' where applicable.

Signed for, and on behalf of Exova (UK) Ltd.

Prepared by:

F Leckie
Logistics Manager

Approved by:

C McGinty
Inorganics Head of Section

UKAS TESTING
0568

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618 - Soils
Date Tested: 13/10/11
Date Reported: 26 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
File No: 11/2443/C
Client Ref: RIT 136713

						Lab sample ref:	C127886	C127887	C127888	C127891	C127893
						Client sample ref:	TP01 1.00m	TP02 0.50m	TP03 0.50mj	TP07 0.50m	TP08 0.50m
						Sample matrix:	S	S	O	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
Metals (Leachate)											
Arsenic leachable	AN47e	µg/l	Y	N	0.25	NR	2.02	NR	NR	NR
Boron leachable	AN47c	µg/l	Y	N	1	NR	90	NR	NR	NR
Cadmium leachable	AN47a	µg/l	Y	N	0.05	NR	<0.05	NR	NR	NR
Chromium leachable	AN47a	µg/l	Y	N	0.05	NR	0.47	NR	NR	NR
Copper leachable	AN47a	µg/l	Y	N	0.05	NR	1.03	NR	NR	NR
Lead leachable	AN47a	µg/l	Y	N	0.05	NR	0.09	NR	NR	NR
Nickel leachable	AN47b	µg/l	Y	N	0.1	NR	0.37	NR	NR	NR
Selenium leachable	AN47c	µg/l	Y	N	1	NR	<1.00	NR	NR	NR
Vanadium leachable	AN47a	µg/l	Y	N	0.05	NR	4.68	NR	NR	NR
Zinc leachable	AN47g	µg/l	Y	N	0.5	NR	<0.5	NR	NR	NR
Mercury leachable	Subcontract*	µg/l	N	N	0.015	NR	0.046	NR	NR	NR
Metals (soil)											
Arsenic	AN8b	mg/kg	Y	Y	2	4.0	4.7	4.7	11.8	6.5
Boron (water soluble)	AN03	mg/kg	Y	N	0.1	1.9	1.7	4.2	1.0	1.1
Cadmium	AN8a	mg/kg	Y	N	1	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium (total)	AN8b	mg/kg	Y	Y	2	6.4	7.5	12.0	20.5	22.1
Copper	AN8b	mg/kg	Y	Y	2	11.1	11.1	33.7	48.5	156.7
Lead	AN8b	mg/kg	Y	Y	2	34.9	12.9	43.4	122.7	148.0
Mercury	AN8a	mg/kg	Y	N	1	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	AN8b	mg/kg	Y	Y	2	6.8	6.1	9.8	26.2	24.0
Selenium	AN8a	mg/kg	Y	N	1	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	AN8b	mg/kg	Y	Y	2	30.9	30.1	57.6	144.0	182.3
Sample Prep(C)											
EMR	EMR	%	N	N/A	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Stones	Stones	%	N	N/A	0.1	29.2	13.7	57.1	15.5	27.1
Moisture Content @ <30°C	AN1	%	Y	N/A	0.1	11.5	12.8	8.7	15.0	13.0
Sample Description	MCERTS ver3.	N/A	N	N/A	N/A	1a	1a	7a	6a	6a
Misc											
pH	AN5a	N/A	Y	Y	N/A	9.0	9.0	9.1	9.0	8.1
Ammoniacal Nitrogen (s)	HACH9c	mg/kg	N	N	1	<1	<1	<1	2	<1
Cyanide (free) $_{M}$	AN45i	mg/kg	N	N	1	<1	<1	<1	<1	<1
Phenols (screen) $_{M}$	AN45d	mg/kg	N	N	1	<1	<1	<1	<1	<1
Fraction of Organic Carbon (FOC)	AN48	%	N	N/A	0.1	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium (VI)	AN7	mg/kg	N	N	1	<1.0	<1.0	<1.0	<1.0	<1.0
Asbestos	ASB001	%	Y	N/A	0.001	ND	ND	ND	ND	ND
Ammoniacal Nitrogen leachable	HACH9b	mg/l-N	Y	N/A	0.2	NR	<0.2	NR	NR	NR
Cyanide (free) leachable	Subcontract*	mg/l	N	N/A	0.01	NR	<0.01	NR	NR	NR
Phenols (screen) leachable	AN45c	mg/l	Y	N/A	0.03	NR	<0.03	NR	NR	NR
Chromium (VI) leachable	HACH 4	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618 - Soils
Date Tested: 13/10/11
Date Reported: 26 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
File No: 11/2443/C
Client Ref: RIT 136713

						Lab sample ref:	C127886	C127887	C127888	C127891	C127893
						Client sample ref:	TP01 1.00m	TP02 0.50m	TP03 0.50mj	TP07 0.50m	TP08 0.50m
						Sample matrix:	S	S	O	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
BTEX leachable											
Benzene leachable	AN15	µg/l	Y	N	5	NR	<5	NR	NR	NR
Toluene leachable	AN15	µg/l	Y	N	5	NR	<5	NR	NR	NR
Ethylbenzene leachable	AN15	µg/l	Y	N	5	NR	<5	NR	NR	NR
m,p-Xylene leachable	AN15	µg/l	Y	N	5	NR	<5	NR	NR	NR
o-Xylene leachable	AN15	µg/l	Y	N	5	NR	<5	NR	NR	NR
PAH (USEPA16)											
PAH (total) M	GCM501	mg/kg	Y	Y	1	<1	1.9	1.6	15.4	19.2
Naphthalene (PAH) M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene M	GCM501a	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	0.1
Fluorene M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	<0.1	0.1
Phenanthrene M	GCM501	mg/kg	Y	Y	0.1	0.2	0.2	<0.1	0.8	1.5
Anthracene M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	0.4	0.7
Fluoranthene M	GCM501	mg/kg	Y	Y	0.1	0.2	0.5	0.2	2.1	3.4
Pyrene M	GCM501	mg/kg	Y	Y	0.1	0.2	0.3	0.2	2.2	3.1
Benz(a)anthracene M	GCM501	mg/kg	Y	Y	0.1	0.1	0.2	0.1	1.3	1.5
Chrysene M	GCM501	mg/kg	Y	Y	0.1	0.2	0.2	0.2	1.5	1.6
Benzo(b)fluoranthene M	GCM501	mg/kg	Y	Y	0.1	<0.1	0.1	0.1	1.3	1.5
Benzo(k)fluoranthene M	GCM501	mg/kg	Y	Y	0.1	<0.1	0.1	0.2	1.5	1.6
Benzo(a)pyrene M	GCM501	mg/kg	Y	Y	0.1	0.1	0.2	0.2	1.9	1.8
Indeno(1,2,3-cd)pyrene M	GCM501a	mg/kg	Y	N	0.1	<0.1	<0.1	0.1	0.9	0.9
Dibenz(a,h)anthracene M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	<0.1	0.5	0.5
Benzo(ghi)perylene M	GCM501	mg/kg	Y	Y	0.1	<0.1	<0.1	0.1	1.2	1.1
PAH(USEPA16) leachable											
Naphthalene leachable	GCM502	µg/l	Y	N	0.02	NR	0.05	NR	NR	NR
Acenaphthylene leachable	GCM502	µg/l	Y	N	0.02	NR	0.07	NR	NR	NR
Acenaphthene leachable	GCM502	µg/l	Y	N	0.02	NR	0.09	NR	NR	NR
Fluorene leachable	GCM502	µg/l	Y	N	0.02	NR	0.08	NR	NR	NR
Phenanthrene leachable	GCM502	µg/l	Y	N	0.02	NR	0.41	NR	NR	NR
Anthracene leachable	GCM502	µg/l	Y	N	0.02	NR	0.09	NR	NR	NR
Fluoranthene leachable	GCM502	µg/l	Y	N	0.02	NR	0.64	NR	NR	NR
Pyrene leachable	GCM502	µg/l	Y	N	0.02	NR	0.61	NR	NR	NR
Benzo(a)anthracene leachable	GCM502	µg/l	Y	N	0.02	NR	0.29	NR	NR	NR
Chrysene leachable	GCM502	µg/l	Y	N	0.02	NR	0.33	NR	NR	NR
Benzo(b)fluoranthene leachable	GCM502	µg/l	Y	N	0.02	NR	0.29	NR	NR	NR
Benzo(k)fluoranthene leachable	GCM502	µg/l	Y	N	0.02	NR	0.25	NR	NR	NR
Benzo(a)pyrene leachable	GCM502	µg/l	Y	N	0.02	NR	0.33	NR	NR	NR
Indeno(1,2,3-cd)pyrene leachable	GCM502	µg/l	Y	N	0.02	NR	0.19	NR	NR	NR
Dibenzo(a,h)anthracene leachable	GCM502	µg/l	Y	N	0.02	NR	0.06	NR	NR	NR
Benzo(ghi)perylene leachable	GCM502	µg/l	Y	N	0.02	NR	0.25	NR	NR	NR
PCB Congeners											
PCB 28 M	GCMS	µg/kg	N	N	1	<1	<1	<1	<1	<1
PCB 52 M	GCMS	µg/kg	N	N	1	<1	<1	<1	<1	<1
PCB 101 M	GCMS	µg/kg	N	N	1	<1	<1	<1	<1	<1
PCB 118 M	GCMS	µg/kg	N	N	1	<1	<1	<1	<1	<1
PCB 153 M	GCMS	µg/kg	N	N	1	<1	<1	<1	<1	<1
PCB 138 M	GCMS	µg/kg	N	N	1	<1	<1	<1	<1	<1
PCB 180 M	GCMS	µg/kg	N	N	1	<1	<1	<1	<1	<1

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618 - Soils
Date Tested: 13/10/11
Date Reported: 26 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
File No: 11/2443/C
Client Ref: RIT 136713

						Lab sample ref:	C127886	C127887	C127888	C127891	C127893
						Client sample ref:	TP01 1.00m	TP02 0.50m	TP03 0.50mj	TP07 0.50m	TP08 0.50m
						Sample matrix:	S	S	O	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
PCB Congeners leachable											
PCB 28 leachable M	GCMS	µg/l	N	N	0.1	NR	<0.1	NR	NR	NR
PCB 52 leachable M	GCMS	µg/l	N	N	0.1	NR	<0.1	NR	NR	NR
PCB 101 leachable M	GCMS	µg/l	N	N	0.1	NR	<0.1	NR	NR	NR
PCB 118 leachable M	GCMS	µg/l	N	N	0.1	NR	<0.1	NR	NR	NR
PCB 153 leachable M	GCMS	µg/l	N	N	0.1	NR	<0.1	NR	NR	NR
PCB 138 leachable M	GCMS	µg/l	N	N	0.1	NR	<0.1	NR	NR	NR
PCB 180 leachable M	GCMS	µg/l	N	N	0.1	NR	<0.1	NR	NR	NR
TPH Banded(Ali/Aro)											
>C7-C8 Aromatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00	<1.00	<1.00
>C6-C8 Aliphatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00	<1.00	<1.00
C5-C6 Aliphatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00	<1.00	<1.00
C5-C7 Aromatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00	<1.00	<1.00
>C8-C10 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C8-C10 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C10-C12 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C10-C12 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C12-C16 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C12-C16 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C16-C21 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C16-C21 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C21-C36 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	25
>C21-C36 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	12	54
TPH Banded(Ali/Aro) leachable											
>C6-C8 Aliphatic Leachable	AN15-1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C7-C8 Aromatic Leachable	AN15-1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
C5-C6 Aliphatic Leachable	AN15-1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
C5-C7 Aromatic Leachable	AN15-1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C10-C12 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C10-C12 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C12-C16 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C12-C16 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C16-C21 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C16-C21 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C21-C36 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C21-C36 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C8-C10 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR
>C8-C10 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	<0.01	NR	NR	NR

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Test Certificate

Client: BAM Ritchies
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Site: Gourock Pierhead - Job No 4618 - Soils
Date Tested: 13/10/11
Date Reported: 26 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
File No: 11/2443/C
Client Ref: RIT 136713

						Lab sample ref:	C127886	C127887	C127888	C127891	C127893
						Client sample ref:	TP01 1.00m	TP02 0.50m	TP03 0.50mj	TP07 0.50m	TP08 0.50m
						Sample matrix:	S	S	O	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
SVOC											
Phenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,3-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Chlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,4-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,2-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroisopropyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
N-nitrosodi-n-propylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachloroethane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Nitrophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dimethylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,2,4-Trichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	0.2	0.2	0.7
4-Chloro-3-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,5/2,4,6-Trichlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-chloronaphthalene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Dimethyl phthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,6-dinitrotoluene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	0.4	0.6	1.7
2,4-dinitrotoluene M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Nitrophenol M	AN42b	mg/kg	N	N	2	<2	<2	<2	<2	<2
Fluorene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	0.4	0.2	0.9
Diethylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-chlorophenyl-phenylether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
N-nitrosodiphenylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Bromophenyl-phenyl ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pentachlorophenol M	AN42c	mg/kg	N	N	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.8	0.7	2.1	3.1	6.9
Anthracene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.3	0.3	0.8	1.4	3.4
Di-n-butylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene (SVOC) M	AN42	mg/kg	Y	N	0.1	1.0	0.8	2.6	7.3	18.0
Pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.9	0.7	2.3	6.8	18.6
Chrysene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.6	0.3	1.8	4.2	8.5
Bis(2-ethylhexyl) phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Di-n-octyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.5	0.3	0.3	3.6	12.4
Indeno(1,2,3-cd)pyrene (SVOC) M	AN42a	mg/kg	N	N	0.1	0.1	0.1	0.4	1.8	6.7
1,2 Benzanthracene M	AN42a	mg/kg	N	N	0.1	0.3	0.3	1.0	4.2	9.3
1,2:5,6 - Dibenzanthracene (SVOC) (w)	AN42-1	mg/kg	N	N	0.1	<0.1	<0.1	0.1	0.5	1.9
2,3,4,6-Tetrachlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,6-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Azobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b/k)fluoranthere (SVOC) M	AN42	mg/kg	Y	N	0.1	0.6	0.5	0.8	5.8	17.8
Benzo(g,h,i)perylene (SVOC) M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	0.5	2.2	7.9
Butyl benzyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	1.0	<0.1	<0.1
Hexachloro-1,3-butadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorocyclopentadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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						Client sample ref:	TP01 1.00m	TP02 0.50m	TP03 0.50mj	TP07 0.50m	TP08 0.50m
						Sample matrix:	S	S	O	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
VOC											
Vinyl chloride M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Bromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Trichlorofluoromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1-Dichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
2,2-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Bromochloromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Chloroform M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1,1-Trichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Carbon tetrachloride M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Benzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2-Dichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Trichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Dibromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Bromodichloromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
cis-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Toluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
trans-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1,2-Trichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Tetrachloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,3-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2-Dibromoethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Chlorobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Ethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
m,p-xylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
o-Xylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Styrene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Bromoform M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
iso-Propylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Bromobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2,3-Trichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
n-Propylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
2-Chlorotoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,3,5-Trimethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
4-Chlorotoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
tert-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2,4-Trimethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
sec-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,3-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,4-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
n-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2-Dibromo-3-chloro-propane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2,4-Trichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Hexachlorobutadiene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2,3-Trichlorobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1,2,2 -Tetrachloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1-Dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
4-isopropyltoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Chlorodibromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Cis - 1,2 -dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Naphthalene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
trans-1,2-Dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618 - Soils
Date Tested: 13/10/11
Date Reported: 26 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
File No: 11/2443/C
Client Ref: RIT 136713

						Lab sample ref:	C127895	C127897	C127899	C127901	C127903
						Client sample ref:	TP09 0.50m	TP10 0.50m	TP11 0.50m	TP12 0.50m	TP13 0.50m
						Sample matrix:	S	S	S	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
Metals (Leachate)											
Arsenic leachable	AN47e	µg/l	Y	N	0.25	NR	NR	NR	NR	16.56
Boron leachable	AN47c	µg/l	Y	N	1	NR	NR	NR	NR	46
Cadmium leachable	AN47a	µg/l	Y	N	0.05	NR	NR	NR	NR	<0.05
Chromium leachable	AN47a	µg/l	Y	N	0.05	NR	NR	NR	NR	1.79
Copper leachable	AN47a	µg/l	Y	N	0.05	NR	NR	NR	NR	5.39
Lead leachable	AN47a	µg/l	Y	N	0.05	NR	NR	NR	NR	2.79
Nickel leachable	AN47b	µg/l	Y	N	0.1	NR	NR	NR	NR	1.42
Selenium leachable	AN47c	µg/l	Y	N	1	NR	NR	NR	NR	<1.00
Vanadium leachable	AN47a	µg/l	Y	N	0.05	NR	NR	NR	NR	36.73
Zinc leachable	AN47g	µg/l	Y	N	0.5	NR	NR	NR	NR	5.2
Mercury leachable	Subcontract*	µg/l	N	N	0.015	NR	NR	NR	NR	4.69
Metals (soil)											
Arsenic	AN8b	mg/kg	Y	Y	2	6.7	5.7	6.4	5.8	3.9
Boron (water soluble)	AN03	mg/kg	Y	N	0.1	1.9	0.8	1.2	0.9	1.5
Cadmium	AN8a	mg/kg	Y	N	1	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium (total)	AN8b	mg/kg	Y	Y	2	26.9	31.3	22.4	25.8	20.4
Copper	AN8b	mg/kg	Y	Y	2	30.2	54.3	56.3	49.0	27.1
Lead	AN8b	mg/kg	Y	Y	2	246.2	150.9	103.1	77.9	35.7
Mercury	AN8a	mg/kg	Y	N	1	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel	AN8b	mg/kg	Y	Y	2	26.9	27.2	34.7	28.9	20.8
Selenium	AN8a	mg/kg	Y	N	1	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	AN8b	mg/kg	Y	Y	2	166.4	139.9	278.7	121.9	59.2
Sample Prep(C)											
EMR	EMR	%	N	N/A	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Stones	Stones	%	N	N/A	0.1	18.9	28.5	32.1	19.3	50.2
Moisture Content @ <30°C	AN1	%	Y	N/A	0.1	14.4	14.2	15.6	13.1	10.2
Sample Description	MCERTS ver3.	N/A	N	N/A	N/A	6a	6a	6a	6a	6a
Misc											
pH	AN5a	N/A	Y	Y	N/A	8.2	9.1	8.3	8.6	9.0
Ammoniacal Nitrogen (s)	HACH9c	mg/kg	N	N	1	<1	2	2	1	2
Cyanide (free) $_{M}$	AN45i	mg/kg	N	N	1	<1	<1	<1	<1	<1
Phenols (screen) $_{M}$	AN45d	mg/kg	N	N	1	<1	<1	<1	<1	<1
Fraction of Organic Carbon (FOC)	AN48	%	N	N/A	0.1	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium (VI)	AN7	mg/kg	N	N	1	<1.0	<1.0	<1.0	<1.0	<1.0
Asbestos	ASB001	%	Y	N/A	0.001	ND	ND	ND	ND	ND
Ammoniacal Nitrogen leachable	HACH9b	mg/l-N	Y	N/A	0.2	NR	NR	NR	NR	<0.2
Cyanide (free) leachable	Subcontract*	mg/l	N	N/A	0.01	NR	NR	NR	NR	<0.01
Phenols (screen) leachable	AN45c	mg/l	Y	N/A	0.03	NR	NR	NR	NR	<0.03
Chromium (VI) leachable	HACH 4	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01

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Test Certificate

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Date Tested: 13/10/11
Date Reported: 26 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
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Client Ref: RIT 136713

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						Client sample ref:	TP09 0.50m	TP10 0.50m	TP11 0.50m	TP12 0.50m	TP13 0.50m
						Sample matrix:	S	S	S	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
BTEX leachable											
Benzene leachable	AN15	µg/l	Y	N	5	NR	NR	NR	NR	<5
Toluene leachable	AN15	µg/l	Y	N	5	NR	NR	NR	NR	<5
Ethylbenzene leachable	AN15	µg/l	Y	N	5	NR	NR	NR	NR	<5
m,p-Xylene leachable	AN15	µg/l	Y	N	5	NR	NR	NR	NR	<5
o-Xylene leachable	AN15	µg/l	Y	N	5	NR	NR	NR	NR	<5
PAH (USEPA16)											
PAH (total) M	GCM501	mg/kg	Y	Y	1	77.1	61.0	<1	39.9	2.6
Naphthalene (PAH) M	GCM501	mg/kg	Y	Y	0.1	0.5	0.3	<0.1	0.2	<0.1
Acenaphthylene M	GCM501a	mg/kg	Y	N	0.1	0.4	<0.1	<0.1	<0.1	<0.1
Acenaphthene M	GCM501	mg/kg	Y	Y	0.1	0.7	0.7	<0.1	0.6	<0.1
Fluorene M	GCM501	mg/kg	Y	Y	0.1	0.8	0.6	<0.1	0.5	<0.1
Phenanthrene M	GCM501	mg/kg	Y	Y	0.1	7.4	4.4	<0.1	3.3	0.2
Anthracene M	GCM501	mg/kg	Y	Y	0.1	2.3	1.4	<0.1	1.2	<0.1
Fluoranthene M	GCM501	mg/kg	Y	Y	0.1	16.0	9.8	<0.1	6.0	0.4
Pyrene M	GCM501	mg/kg	Y	Y	0.1	13.1	9.1	<0.1	5.8	0.4
Benz(a)anthracene M	GCM501	mg/kg	Y	Y	0.1	6.4	4.8	<0.1	3.0	0.2
Chrysene M	GCM501	mg/kg	Y	Y	0.1	6.4	4.9	<0.1	3.2	0.2
Benzo(b)fluoranthene M	GCM501	mg/kg	Y	Y	0.1	5.3	5.4	<0.1	3.2	0.2
Benzo(k)fluoranthene M	GCM501	mg/kg	Y	Y	0.1	5.4	4.7	<0.1	3.1	0.2
Benzo(a)pyrene M	GCM501	mg/kg	Y	Y	0.1	6.1	6.5	<0.1	4.1	0.2
Indeno(1,2,3-cd)pyrene M	GCM501a	mg/kg	Y	N	0.1	2.8	3.4	<0.1	2.4	0.2
Dibenz(a,h)anthracene M	GCM501	mg/kg	Y	Y	0.1	1.1	1.4	<0.1	0.8	<0.1
Benzo(ghi)perylene M	GCM501	mg/kg	Y	Y	0.1	2.8	3.7	<0.1	2.8	0.2
PAH(USEPA16) leachable											
Naphthalene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	0.03
Acenaphthylene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	0.18
Acenaphthene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	0.06
Fluorene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	0.07
Phenanthrene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	0.99
Anthracene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	0.30
Fluoranthene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	3.19
Pyrene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	3.30
Benzo(a)anthracene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	2.03
Chrysene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	1.89
Benzo(b)fluoranthene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	2.03
Benzo(k)fluoranthene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	2.02
Benzo(a)pyrene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	2.08
Indeno(1,2,3-cd)pyrene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	0.93
Dibenzo(a,h)anthracene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	0.34
Benzo(ghi)perylene leachable	GCM502	µg/l	Y	N	0.02	NR	NR	NR	NR	1.64
PCB Congeners											
PCB 28 M	GCMS	µg/kg	N	N	1	<1	1.2	<1	<1	<1
PCB 52 M	GCMS	µg/kg	N	N	1	<1	<1	<1	<1	<1
PCB 101 M	GCMS	µg/kg	N	N	1	<1	2.7	<1	3.0	<1
PCB 118 M	GCMS	µg/kg	N	N	1	<1	<1	<1	15.0	<1
PCB 153 M	GCMS	µg/kg	N	N	1	<1	<1	<1	2.4	<1
PCB 138 M	GCMS	µg/kg	N	N	1	<1	<1	<1	<1	<1
PCB 180 M	GCMS	µg/kg	N	N	1	<1	<1	<1	<1	<1

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Date Tested: 13/10/11
Date Reported: 26 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
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Client Ref: RIT 136713

						Lab sample ref:	C127895	C127897	C127899	C127901	C127903
						Client sample ref:	TP09 0.50m	TP10 0.50m	TP11 0.50m	TP12 0.50m	TP13 0.50m
						Sample matrix:	S	S	S	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
PCB Congeners leachable											
PCB 28 leachable M	GCMS	µg/l	N	N	0.1	NR	NR	NR	NR	<0.1
PCB 52 leachable M	GCMS	µg/l	N	N	0.1	NR	NR	NR	NR	<0.1
PCB 101 leachable M	GCMS	µg/l	N	N	0.1	NR	NR	NR	NR	<0.1
PCB 118 leachable M	GCMS	µg/l	N	N	0.1	NR	NR	NR	NR	<0.1
PCB 153 leachable M	GCMS	µg/l	N	N	0.1	NR	NR	NR	NR	<0.1
PCB 138 leachable M	GCMS	µg/l	N	N	0.1	NR	NR	NR	NR	<0.1
PCB 180 leachable M	GCMS	µg/l	N	N	0.1	NR	NR	NR	NR	<0.1
TPH Banded(Ali/Aro)											
>C7-C8 Aromatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00	<1.00	<1.00
>C6-C8 Aliphatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00	<1.00	<1.00
C5-C6 Aliphatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00	<1.00	<1.00
C5-C7 Aromatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00	<1.00	<1.00
>C8-C10 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C8-C10 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C10-C12 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C10-C12 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C12-C16 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C12-C16 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C16-C21 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C16-C21 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10	<10	<10
>C21-C36 Aliphatic M	AN34A	mg/kg	N	N	10	<10	72	<10	17	<10
>C21-C36 Aromatic M	AN34A	mg/kg	N	N	10	32	115	37	<10	<10
TPH Banded(Ali/Aro) leachable											
>C6-C8 Aliphatic Leachable	AN15-1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C7-C8 Aromatic Leachable	AN15-1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
C5-C6 Aliphatic Leachable	AN15-1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
C5-C7 Aromatic Leachable	AN15-1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C10-C12 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C10-C12 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C12-C16 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C12-C16 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C16-C21 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C16-C21 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C21-C36 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C21-C36 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C8-C10 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01
>C8-C10 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	NR	NR	NR	NR	<0.01

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Client Ref: RIT 136713

						Lab sample ref:	C127895	C127897	C127899	C127901	C127903
						Client sample ref:	TP09 0.50m	TP10 0.50m	TP11 0.50m	TP12 0.50m	TP13 0.50m
						Sample matrix:	S	S	S	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
SVOC											
Phenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,3-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Chlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,4-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,2-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroisopropyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
N-nitrosodi-n-propylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachloroethane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-Nitrophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dimethylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,2,4-Trichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.7	3.6	<0.1	2.4	<0.1
4-Chloro-3-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,5/2,4,6-Trichlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-chloronaphthalene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene (SVOC) M	AN42	mg/kg	Y	N	0.1	1.8	0.6	<0.1	<0.1	<0.1
Dimethyl phthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,6-dinitrotoluene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene (SVOC) M	AN42	mg/kg	Y	N	0.1	1.6	2.9	0.4	3.8	<0.1
2,4-dinitrotoluene M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Nitrophenol M	AN42b	mg/kg	N	N	2	<2	<2	<2.0	<2	<2
Fluorene (SVOC) M	AN42	mg/kg	Y	N	0.1	2.3	2.8	0.2	2.2	<0.1
Diethylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-chlorophenyl-phenylether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
N-nitrosodiphenylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4-Bromophenyl-phenyl ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pentachlorophenol M	AN42c	mg/kg	N	N	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene (SVOC) M	AN42	mg/kg	Y	N	0.1	17.1	15.7	1.5	15.9	1.9
Anthracene (SVOC) M	AN42	mg/kg	Y	N	0.1	4.7	4.9	0.8	4.9	0.7
Di-n-butylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	0.1	<0.1
Fluoranthene (SVOC) M	AN42	mg/kg	Y	N	0.1	27.2	18.6	3.6	21.1	3.0
Pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	24.9	17.1	2.8	21.6	2.6
Chrysene (SVOC) M	AN42	mg/kg	Y	N	0.1	19.9	6.9	1.8	10.0	1.9
Bis(2-ethylhexyl) phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Di-n-octyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	16.8	4.1	1.4	14.7	1.3
Indeno(1,2,3-cd)pyrene (SVOC) M	AN42a	mg/kg	N	N	0.1	7.0	2.1	0.6	6.6	0.8
1,2 Benzanthracene M	AN42a	mg/kg	N	N	0.1	19.2	7.6	1.8	13.3	1.8
1,2:5,6 - Dibenzanthracene (SVOC) (w)	AN42-1	mg/kg	N	N	0.1	1.6	0.9	0.2	1.0	0.2
2,3,4,6-Tetrachlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,6-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Azobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b/k)fluoranthere (SVOC) M	AN42	mg/kg	Y	N	0.1	25.6	9.0	2.5	20.4	2.8
Benzo(g,h,i)perylene (SVOC) M	AN42a	mg/kg	N	N	0.1	7.7	<0.1	0.7	7.9	1.0
Butyl benzyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachloro-1,3-butadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorocyclopentadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618 - Soils
Date Tested: 13/10/11
Date Reported: 26 October, 2011
Date Received: 11 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2443/C/C1
File No: 11/2443/C
Client Ref: RIT 136713

						Lab sample ref:	C127895	C127897	C127899	C127901	C127903
						Client sample ref:	TP09 0.50m	TP10 0.50m	TP11 0.50m	TP12 0.50m	TP13 0.50m
						Sample matrix:	S	S	S	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
VOC											
Vinyl chloride M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Bromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Trichlorofluoromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1-Dichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
2,2-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Bromochloromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Chloroform M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1,1-Trichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Carbon tetrachloride M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Benzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2-Dichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Trichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Dibromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Bromodichloromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
cis-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Toluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
trans-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1,2-Trichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Tetrachloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,3-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2-Dibromoethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Chlorobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Ethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
m,p-xylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
o-Xylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Styrene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Bromoform M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
iso-Propylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Bromobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2,3-Trichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
n-Propylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
2-Chlorotoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,3,5-Trimethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
4-Chlorotoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
tert-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2,4-Trimethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
sec-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,3-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,4-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
n-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2-Dibromo-3-chloro-propane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2,4-Trichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Hexachlorobutadiene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,2,3-Trichlorobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1,2,2 -Tetrachloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
1,1-Dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
4-isopropyltoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Chlorodibromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Cis - 1,2 -dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
Naphthalene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10
trans-1,2-Dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10	<10

Notes
1. All analyses performed on the sample dried at <30ºC, except analyses suffixed with 'M'.
2. Analyses suffixed 'M' were performed on the sample as received and corrected for '% moisture at <30ºC' where applicable.
3. All results are expressed as dry weight.
4. MCERTS accreditation applicable to Sample Matrix 'S' only.
5. Natural stones (pebbles, gravels etc.) which do not pass a 2mm sieve are excluded from dried analyses.
6. Tests marked * indicate subcontracted analyses.
7. ND denotes None Detected.
8. The laboratory has tested the material/items supplied by the client as sampled in accordance with the client's own requirements.
9. ^Sample Description key: 1. - Sand, 2. Loam, 3. Clay, 4. Sand/loam mix, 5. Sand/clay mix, 6. Clay/loam mix, 7. Other.
suffixed with: A - Stones, B - Construction rubble, C - Visible Hydrocarbons
10. Leachate preparation is not included in our UKAS accreditation.
11. Dates of testing for all parameters are available upon request.

Signed for, and on behalf of Exova (UK) Ltd.

Prepared by:

F Leckie
Logistics Manager

Approved by:

C McGinty
Inorganics Head of Section

0568

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 17/10/11
Date Reported: 26 October, 2011
Date Received: 12 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2461/C/C1
File No: 11/2461/C
Client Ref: RIT 136713

					Lab sample ref:	C127984	C127986	C127988
					Client sample ref:	BH04 2.00m	BH05 1.00m	BH06 3.00m
					Sample matrix:	Leachate	Leachate	Leachate
Determinand	**Method**	**Units**	**ISO17025**	**LOD**				
Metals (Leachate)								
Arsenic leachable	AN47e	µg/l	Y	0.25		0.93	1.73	2.75
Boron leachable	AN47c	µg/l	Y	1		254	219	228
Cadmium leachable	AN47a	µg/l	Y	0.05		<0.05	<0.05	<0.05
Chromium leachable	AN47a	µg/l	Y	0.05		1.07	1.43	2.53
Copper leachable	AN47a	µg/l	Y	0.05		2.01	7.17	7.03
Lead leachable	AN47a	µg/l	Y	0.05		0.22	1.49	2.49
Nickel leachable	AN47b	µg/l	Y	0.1		0.67	0.95	0.81
Selenium leachable	AN47c	µg/l	Y	1		<1.00	<1.00	1.07
Zinc leachable	AN47g	µg/l	Y	0.5		22.8	24.5	16.2
Mercury leachable	Subcontract*	µg/l	N	0.015		0.093	0.145	0.181
Misc								
Ammoniacal Nitrogen leachable	HACH9b	mg/l-N	Y	0.2		<0.2	<0.2	<0.2
Cyanide (free) leachable	Subcontract*	mg/l	N	0.01		<0.01	<0.01	<0.01
Phenols (screen) leachable	AN45c	mg/l	Y	0.03		<0.03	<0.03	<0.03
Chromium (VI) leachable	HACH 4	mg/l	N	0.01		<0.01	<0.01	<0.01
BTEX leachable								
Benzene leachable	AN15	µg/l	Y	5		<5	<5	<5
Toluene leachable	AN15	µg/l	Y	5		<5	<5	<5
Ethylbenzene leachable	AN15	µg/l	Y	5		<5	<5	<5
m,p-Xylene leachable	AN15	µg/l	Y	5		<5	<5	<5
o-Xylene leachable	AN15	µg/l	Y	5		<5	<5	<5
PAH(USEPA16) leachable								
Naphthalene leachable	GCM502	µg/l	Y	0.02		0.03	0.13	0.38
Acenaphthylene leachable	GCM502	µg/l	Y	0.02		0.05	0.35	0.34
Acenaphthene leachable	GCM502	µg/l	Y	0.02		<0.02	0.21	1.51
Fluorene leachable	GCM502	µg/l	Y	0.02		0.03	0.14	0.76
Phenanthrene leachable	GCM502	µg/l	Y	0.02		0.20	1.62	7.76
Anthracene leachable	GCM502	µg/l	Y	0.02		0.06	0.43	2.63
Fluoranthene leachable	GCM502	µg/l	Y	0.02		0.64	1.94	29.2
Pyrene leachable	GCM502	µg/l	Y	0.02		0.62	2.21	29.4
Benzo(a)anthracene leachable	GCM502	µg/l	Y	0.02		0.21	4.24	16.9
Chrysene leachable	GCM502	µg/l	Y	0.02		0.22	1.89	9.88
Benzo(b)fluoranthene leachable	GCM502	µg/l	Y	0.02		0.17	3.57	11.7
Benzo(k)fluoranthene leachable	GCM502	µg/l	Y	0.02		0.18	3.20	11.5
Benzo(a)pyrene leachable	GCM502	µg/l	Y	0.02		0.20	2.56	13.2
Indeno(1,2,3-cd)pyrene leachable	GCM502	µg/l	Y	0.02		0.13	1.18	0.95
Dibenzo(a,h)anthracene leachable	GCM502	µg/l	Y	0.02		0.08	0.87	0.59
Benzo(ghi)perylene leachable	GCM502	µg/l	Y	0.02		0.18	1.49	0.58

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 17/10/11
Date Reported: 26 October, 2011
Date Received: 12 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2461/C/C1
File No: 11/2461/C
Client Ref: RIT 136713

					Lab sample ref:	C127984	C127986	C127988
					Client sample ref:	BH04 2.00m	BH05 1.00m	BH06 3.00m
					Sample matrix:	Leachate	Leachate	Leachate
Determinand	**Method**	**Units**	**ISO17025**	**LOD**				
PCB Congeners leachable								
PCB 28 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 52 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 101 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 118 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 153 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 138 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
PCB 180 leachable M	GCMS	µg/l	N	0.1		<0.1	<0.1	<0.1
TPH Banded(Ali/Aro) leachable								
>C6-C8 Aliphatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C7-C8 Aromatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01
C5-C6 Aliphatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01
C5-C7 Aromatic Leachable	AN15-1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C10-C12 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C10-C12 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C12-C16 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C12-C16 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C16-C21 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C16-C21 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C21-C36 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C21-C36 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	0.12	0.04
>C8-C10 Aliphatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01
>C8-C10 Aromatic Leachable	AN34A/1	mg/l	N	0.01		<0.01	<0.01	<0.01

Notes
1. Tests marked * indicate subcontracted analyses.
2. The laboratory has tested the material/items supplied by the client as sampled in accordance with the client's own requirements.
3. Results reported for metals are 'dissolved' unless otherwise stated.
4. Dates of testing for all parameters are available upon request.
5. Leachate preparation is not included in our UKAS accreditation.
6. All analyses performed on the sample dried at <30ºC, except analyses suffixed with 'M'.
7. Analyses suffixed 'M' were performed on the sample as received and corrected for '% moisture at <30ºC' where applicable.

Signed for, and on behalf of Exova (UK) Ltd.

Prepared by:

J McEleny
Laboratory Manager

Approved by:

C McGinty
Inorganics Head of Section

UKAS TESTING
0568

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 17/10/11
Date Reported: 26 October, 2011
Date Received: 12 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2461/C/C1
File No: 11/2461/C
Client Ref: RIT 136713

						Lab sample ref:	C127983	C127985	C127987
						Client sample ref:	BH04 0.50m	BH05 0.50m	BH06 0.50m
						Sample matrix:	S	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**				
Metals (soil)									
Arsenic	AN8b	mg/kg	Y	Y	2	10.9	9.1	14.0
Boron (water soluble)	AN03	mg/kg	Y	N	0.1	0.9	1.4	1.3
Cadmium	AN8a	mg/kg	Y	N	1	<1.0	<1.0	<1.0
Chromium (total)	AN8b	mg/kg	Y	Y	2	28.7	20.7	24.3
Copper	AN8b	mg/kg	Y	Y	2	297	57.6	140
Lead	AN8b	mg/kg	Y	Y	2	287	111	314
Mercury	AN8a	mg/kg	Y	N	1	<1.0	<1.0	1.7
Nickel	AN8b	mg/kg	Y	Y	2	33.4	24.6	34.2
Selenium	AN8a	mg/kg	Y	N	1	<1.0	<1.0	<1.0
Zinc	AN8b	mg/kg	Y	Y	2	236	122	240
Sample Prep(C)								
EMR	EMR	%	N	N/A	0.1	<0.1	<0.1	<0.1
% Stones	Stones	%	N	N/A	0.1	33.9	31.7	35.5
Moisture Content @ <30°C	AN1	%	Y	N/A	0.1	17.1	15.2	13.9
Sample Description	MCERTS ver3.	N/A	N	N/A	N/A	2a	5a	5a
Misc								
pH	AN5a	N/A	Y	Y	N/A	8.6	8.6	8.6
Ammoniacal Nitrogen (s)	HACH9c	mg/kg	N	N	1	2	<1	<1
Cyanide (free) M	AN45i	mg/kg	N	N	1	<1	<1	<1
Phenols (screen) M	AN45d	mg/kg	N	N	1	<1	<1	<1
Fraction of Organic Carbon (FOC)	AN48	%	N	N	0.1	<0.10	<0.10	<0.10
Chromium (VI)	AN7	mg/kg	N	N	1	<1.0	<1.0	<1.0
Asbestos	ASB001	%	Y	N/A	0.001	ND	ND	ND
PAH (USEPA16)								
PAH (total) M	GCM501	mg/kg	Y	Y	1	25.2	30.9	20.9
Naphthalene (PAH) M	GCM501	mg/kg	Y	Y	0.1	0.2	0.2	0.2
Acenaphthylene M	GCM501a	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Acenaphthene M	GCM501	mg/kg	Y	Y	0.1	0.6	0.5	0.3
Fluorene M	GCM501	mg/kg	Y	Y	0.1	0.6	0.5	0.3
Phenanthrene M	GCM501	mg/kg	Y	Y	0.1	3.3	2.9	2.7
Anthracene M	GCM501	mg/kg	Y	Y	0.1	1.2	1.1	0.9
Fluoranthene M	GCM501	mg/kg	Y	Y	0.1	4.7	5.5	3.4
Pyrene M	GCM501	mg/kg	Y	Y	0.1	3.6	4.8	3.3
Benz(a)anthracene M	GCM501	mg/kg	Y	Y	0.1	2.3	2.7	1.6
Chrysene M	GCM501	mg/kg	Y	Y	0.1	2.1	2.8	1.6
Benzo(b)fluoranthene M	GCM501	mg/kg	Y	Y	0.1	1.3	2.1	1.3
Benzo(k)fluoranthene M	GCM501	mg/kg	Y	Y	0.1	1.4	2.1	1.4
Benzo(a)pyrene M	GCM501	mg/kg	Y	Y	0.1	1.7	2.7	1.6
Indeno(1,2,3-cd)pyrene M	GCM501a	mg/kg	Y	N	0.1	0.8	1.2	0.8
Dibenz(a,h)anthracene M	GCM501	mg/kg	Y	Y	0.1	0.5	0.6	0.5
Benzo(ghi)perylene M	GCM501	mg/kg	Y	Y	0.1	1.0	1.2	0.9

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 17/10/11
Date Reported: 26 October, 2011
Date Received: 12 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2461/C/C1
File No: 11/2461/C
Client Ref: RIT 136713

						Lab sample ref:	C127983	C127985	C127987
						Client sample ref:	BH04 0.50m	BH05 0.50m	BH06 0.50m
						Sample matrix:	S	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**				
PCB Congeners									
PCB 28 M	GCMS	µg/kg	N	N	1		2.1	<1	<1
PCB 52 M	GCMS	µg/kg	N	N	1		<1	2.4	<1
PCB 101 M	GCMS	µg/kg	N	N	1		<1	<1	2.0
PCB 118 M	GCMS	µg/kg	N	N	1		<1	<1	<1
PCB 153 M	GCMS	µg/kg	N	N	1		<1	<1	2.6
PCB 138 M	GCMS	µg/kg	N	N	1		<1	<1	<1
PCB 180 M	GCMS	µg/kg	N	N	1		<1	<1	<1
TPH Banded(Ali/Aro)									
>C7-C8 Aromatic M	AN15a-1	mg/kg	N	N	1		<1.00	<1.00	<1.00
>C6-C8 Aliphatic M	AN15a-1	mg/kg	N	N	1		<1.00	<1.00	<1.00
C5-C6 Aliphatic M	AN15a-1	mg/kg	N	N	1		<1.00	<1.00	<1.00
C5-C7 Aromatic M	AN15a-1	mg/kg	N	N	1		<1.00	<1.00	<1.00
>C8-C10 Aliphatic M	AN34A	mg/kg	N	N	10		<10	<10	<10
>C8-C10 Aromatic M	AN34A	mg/kg	N	N	10		<10	<10	<10
>C10-C12 Aliphatic M	AN34A	mg/kg	N	N	10		<10	<10	<10
>C10-C12 Aromatic M	AN34A	mg/kg	N	N	10		<10	<10	<10
>C12-C16 Aliphatic M	AN34A	mg/kg	N	N	10		<10	<10	<10
>C12-C16 Aromatic M	AN34A	mg/kg	N	N	10		<10	<10	<10
>C16-C21 Aliphatic M	AN34A	mg/kg	N	N	10		<10	<10	<10
>C16-C21 Aromatic M	AN34A	mg/kg	N	N	10		22	<10	<10
>C21-C36 Aliphatic M	AN34A	mg/kg	N	N	10		<10	<10	15
>C21-C36 Aromatic M	AN34A	mg/kg	N	N	10		112	18	<10

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Test Certificate

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Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 17/10/11
Date Reported: 26 October, 2011
Date Received: 12 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2461/C/C1
File No: 11/2461/C
Client Ref: RIT 136713

					Lab sample ref:	C127983	C127985	C127987
					Client sample ref:	BH04 0.50m	BH05 0.50m	BH06 0.50m
					Sample matrix:	S	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**			
SVOC								
Phenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Bis(2-chloroethyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
1,3-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2-Chlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
1,4-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
1,2-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Bis(2-chloroisopropyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
N-nitrosodi-n-propylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Hexachloroethane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
4-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Nitrobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2-Nitrophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2,4-Dimethylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2,4-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
1,2,4-Trichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Naphthalene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.7	2.6	0.9
4-Chloro-3-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2,4,5/2,4,6-Trichlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1
2-chloronaphthalene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Acenaphthylene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.2	0.5	0.2
Dimethyl phthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2,6-dinitrotoluene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Acenaphthene (SVOC) M	AN42	mg/kg	Y	N	0.1	1.9	3.1	1.6
2,4-dinitrotoluene M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1
4-Nitrophenol M	AN42b	mg/kg	N	N	2	<2	<2	<2.0
Fluorene (SVOC) M	AN42	mg/kg	Y	N	0.1	1.4	2.7	1.3
Diethylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
4-chlorophenyl-phenylether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
N-nitrosodiphenylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
4-Bromophenyl-phenyl ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Hexachlorobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Pentachlorophenol M	AN42c	mg/kg	N	N	0.5	<0.5	<0.5	<0.5
Phenanthrene (SVOC) M	AN42	mg/kg	Y	N	0.1	9.3	13.4	7.8
Anthracene (SVOC) M	AN42	mg/kg	Y	N	0.1	3.0	4.2	3.0
Di-n-butylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Fluoranthene (SVOC) M	AN42	mg/kg	Y	N	0.1	19.3	21.6	10.9
Pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	15.2	16.6	10.1
Chrysene (SVOC) M	AN42	mg/kg	Y	N	0.1	8.0	9.1	5.8
Bis(2-ethylhexyl) phthalate M	AN42a	mg/kg	N	N	0.1	0.7	0.7	<0.1
Di-n-octyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	8.7	9.2	4.6
Indeno(1,2,3-cd)pyrene (SVOC) M	AN42a	mg/kg	N	N	0.1	3.4	3.1	1.7
1,2 Benzanthracene M	AN42a	mg/kg	N	N	0.1	8.7	10.1	5.7
1,2:5,6 - Dibenzanthracene (SVOC)	AN42-1	mg/kg	N	N	0.1	1.0	0.9	0.5
2,3,4,6-Tetrachlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1
2,6-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Azobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Benzo(b/k)fluoranthere (SVOC) M	AN42	mg/kg	Y	N	0.1	13.8	11.8	7.4
Benzo(g,h,i)perylene (SVOC) M	AN42a	mg/kg	N	N	0.1	3.9	3.8	2.6
Butyl benzyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	3.2	<0.1
Hexachloro-1,3-butadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Hexachlorocyclopentadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1

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Test Certificate

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Site: Gourock Pierhead - Job No 4618
Date Tested: 17/10/11
Date Reported: 26 October, 2011
Date Received: 12 October, 2011
Sample Type: Solid, Leachate

Certificate No: 11/2461/C/C1
File No: 11/2461/C
Client Ref: RIT 136713

						Lab sample ref:	C127983	C127985	C127987
						Client sample ref:	BH04 0.50m	BH05 0.50m	BH06 0.50m
						Sample matrix:	S	S	S
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**				
VOC									
Vinyl chloride M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Bromomethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Trichlorofluoromethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,1-Dichloroethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
2,2-Dichloropropane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Bromochloromethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Chloroform M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,1,1-Trichloroethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Carbon tetrachloride M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,1-Dichloropropene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Benzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,2-Dichloroethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Trichloroethylene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,2-Dichloropropane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Dibromomethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Bromodichloromethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
cis-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Toluene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
trans-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,1,2-Trichloroethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Tetrachloroethylene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,3-Dichloropropane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,2-Dibromoethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Chlorobenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Ethylbenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
m,p-xylene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
o-Xylene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Styrene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Bromoform M	AN15a	µg/kg	Y	N	10		<10	<10	<10
iso-Propylbenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Bromobenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,2,3-Trichloropropane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
n-Propylbenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
2-Chlorotoluene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,3,5-Trimethylbenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
4-Chlorotoluene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
tert-Butylbenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,2,4-Trimethylbenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
sec-Butylbenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,3-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,4-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10		<10	<10	<10
n-Butylbenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,2-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,2-Dibromo-3-chloro-propane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,2,4-Trichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Hexachlorobutadiene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,2,3-Trichlorobenzene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,1,2,2 -Tetrachloroethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
1,1-Dichloroethylene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
4-isopropyltoluene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Chlorodibromomethane M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Cis - 1,2 -dichloroethylene M	AN15a	µg/kg	Y	N	10		<10	<10	<10
Naphthalene (VOC) M	AN15a	µg/kg	Y	N	10		<10	<10	<10
trans-1,2-Dichloroethylene M	AN15a	µg/kg	Y	N	10		<10	<10	<10

Notes
1. All analyses performed on the sample dried at <30ºC, except analyses suffixed with 'M'.
2. Analyses suffixed 'M' were performed on the sample as received and corrected for '% moisture at <30ºC' where applicable.
3. All results are expressed as dry weight.
4. MCERTS accreditation applicable to Sample Matrix 'S' only.
5. Natural stones (pebbles, gravels etc.) which do not pass a 2mm sieve are excluded from dried analyses.
6. Tests marked * indicate subcontracted analyses.
7. ND denotes None Detected.
8. The laboratory has tested the material/items supplied by the client as sampled in accordance with the client's own requirements.
9. ^Sample Description key: 1. - Sand, 2. Loam, 3. Clay, 4. Sand/loam mix, 5. Sand/clay mix, 6. Clay/loam mix, 7. Other.
suffixed with: A - Stones, B - Construction rubble, C - Visible Hydrocarbons
10. Leachate preparation is not included in our UKAS accreditation.
11. Dates of testing for all parameters are available upon request.

Signed for, and on behalf of Exova (UK) Ltd.

Prepared by:
Julie McEleny

J McEleny
Laboratory Manager

Approved by:
C McGinty

C McGinty
Inorganics Head of Section

0568

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

						Lab sample ref:	**C131357**	**C131358**	**C131359**	**C131360**	**C131361**
						Client sample ref:	**WS14 0.20m**	**WS15 1.00m**	**WS17 0.50m**	**WS18 1.00m**	**WS19 1.00m**
						Date sampled:	**14/12/11**	**14/12/11**	**14/12/11**	**14/12/11**	**14/12/11**
						Sample matrix (see notes page):	**O**	**S**	**S**	**O**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**						
Metals (Leachate)											
Arsenic leachable	AN47e	µg/l	Y	N	0.25		7.86	NR	6.41	NR	4.97
Boron leachable	AN47c	µg/l	Y	N	1		106	NR	158	NR	87
Cadmium leachable	AN47a	µg/l	Y	N	0.05		<0.05	NR	<0.05	NR	<0.05
Chromium leachable	AN47a	µg/l	Y	N	0.05		1.17	NR	0.87	NR	1.35
Copper leachable	AN47a	µg/l	Y	N	0.05		4.15	NR	7.04	NR	5.75
Lead leachable	AN47a	µg/l	Y	N	0.05		1.03	NR	5.06	NR	5.45
Mercury leachable	Subcontract*	µg/l	N	N	0.015		0.138	NR	0.069	NR	0.117
Nickel leachable	AN47b	µg/l	Y	N	0.1		1.05	NR	0.65	NR	0.47
Selenium leachable	AN47c	µg/l	Y	N	1		<1.00	NR	<1.00	NR	<1.00
Zinc leachable	AN47g	µg/l	Y	N	0.5		39.7	NR	38.8	NR	33.6
Metals (soil)											
Arsenic	AN8b	mg/kg	Y	Y	2		14.4	NR	6.7	NR	4.8
Boron (water soluble)	AN03	mg/kg	Y	N	0.1		0.9	NR	0.6	NR	0.7
Cadmium	AN8a	mg/kg	Y	N	1		<1.0	NR	<1.0	NR	<1.0
Chromium (total)	AN8b	mg/kg	Y	Y	2		27.7	NR	38.5	NR	24.6
Copper	AN8b	mg/kg	Y	Y	2		91.1	NR	47.3	NR	140.4
Lead	AN8b	mg/kg	Y	Y	2		29.5	NR	76.1	NR	296.4
Mercury	AN8a	mg/kg	Y	N	1		<1.0	NR	<1.0	NR	<1.0
Nickel	AN8b	mg/kg	Y	Y	2		46.0	NR	22.1	NR	23.0
Selenium	AN8a	mg/kg	Y	N	1		<1.0	NR	4.2	NR	<1.0
Zinc	AN8b	mg/kg	Y	Y	2		167.7	NR	109.6	NR	124.0
Sample Prep(C)											
EMR	EMR	%	N	N/A	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
% Stones	Stones	%	N	N/A	0.1		26.1	23.1	22.7	30.5	21.7
Moisture Content @ <30°C	AN1	%	Y	N/A	0.1		18.3	12.9	13.4	19.0	11.8
Sample Description	MCERTS ver3.	N/A	N	N/A	N/A		7A	1A	1A	7A	1A
pH	AN5a		Y	Y			8.5	9.1	9.3	7.5	10
Ammoniacal Nitrogen (s)	HACH9c	mg/kg	N	N	1		2	NR	1	NR	1
Ammoniacal Nitrogen leachable	HACH9b	mg/l-N	Y	N/A	0.2		<0.2	NR	<0.2	NR	<0.2
Sulphate (water soluble)	Hach 15	g/l	N	N/A	0.1		0.13	0.10	0.12	0.32	0.12
Cyanide (free) $_M$	AN45i	mg/kg	N	N	1		<1	NR	<1	NR	<1
Cyanide (free) leachable	Subcontract*	mg/l	N	N/A	0.01		<0.01	NR	<0.01	NR	<0.01
Phenols (screen) $_M$	AN45d	mg/kg	N	N	1		<1	NR	<1	NR	<1
Phenols (screen) leachable	AN45c	mg/l	Y	N/A	0.03		<0.03	NR	<0.03	NR	<0.03
Fraction of Organic Carbon (FOC)	AN48	%	N	N/A	0.1		<0.10	NR	<0.10	NR	<0.10
Chromium (VI)	AN7	mg/kg	N	N	1		<1.0	NR	<1.0	NR	<1.0
Chromium (VI) leachable	HACH 4	mg/l	N	N	0.01		0.01	NR	<0.01	NR	<0.01
Asbestos	ASB001		Y	N/A	0.001		ND	NR	ND	NR	ND

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

					Lab sample ref:	**C131357**	**C131359**	**C131361**
					Client sample ref:	**WS14 0.20m**	**WS17 0.50m**	**WS19 1.00m**
					Date sampled:	**14/12/11**	**14/12/11**	**14/12/11**
					Sample matrix (see notes page):	**O**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**			
BTEX leachable								
Benzene leachable	AN15	µg/l	Y	N	5	<5	<5	<5
Toluene leachable	AN15	µg/l	Y	N	5	<5	<5	<5
Ethylbenzene leachable	AN15	µg/l	Y	N	5	<5	<5	<5
m,p-Xylene leachable	AN15	µg/l	Y	N	5	<5	<5	<5
o-Xylene leachable	AN15	µg/l	Y	N	5	<5	<5	<5
PAH (USEPA16)								
PAH (total) M	GCM501	mg/kg	Y	Y	1	<1	127	33.7
Naphthalene (PAH) M	GCM501	mg/kg	Y	Y	0.1	<0.1	0.5	<0.1
Acenaphthylene M	GCM501a	mg/kg	Y	N	0.1	<0.1	1.5	<0.1
Acenaphthene M	GCM501	mg/kg	Y	Y	0.1	<0.1	0.7	0.3
Fluorene M	GCM501	mg/kg	Y	Y	0.1	<0.1	3.5	0.1
Phenanthrene M	GCM501	mg/kg	Y	Y	0.1	0.1	23.3	3.1
Anthracene M	GCM501	mg/kg	Y	Y	0.1	<0.1	6.8	1.4
Fluoranthene M	GCM501	mg/kg	Y	Y	0.1	<0.1	22.4	5.4
Pyrene M	GCM501	mg/kg	Y	Y	0.1	<0.1	22.9	5.6
Benz(a)anthracene M	GCM501	mg/kg	Y	Y	0.1	<0.1	10.4	3.7
Chrysene M	GCM501	mg/kg	Y	Y	0.1	<0.1	8.8	3.2
Benzo(b)fluoranthene M	GCM501	mg/kg	Y	Y	0.1	<0.1	6.8	2.6
Benzo(k)fluoranthene M	GCM501	mg/kg	Y	Y	0.1	<0.1	5.2	1.7
Benzo(a)pyrene M	GCM501	mg/kg	Y	Y	0.1	<0.1	7.3	2.6
Indeno(1,2,3-cd)pyrene M	GCM501a	mg/kg	Y	N	0.1	<0.1	3.0	1.1
Dibenz(a,h)anthracene M	GCM501	mg/kg	Y	Y	0.1	<0.1	1.6	0.7
Benzo(ghi)perylene M	GCM501	mg/kg	Y	Y	0.1	<0.1	3.0	2.2
PAH(USEPA16) leachable								
Naphthalene leachable	GCM502	µg/l	Y	N	0.02	<0.02	<0.02	0.12
Acenaphthylene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.15	0.04
Acenaphthene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.06	0.66
Fluorene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.32	0.22
Phenanthrene leachable	GCM502	µg/l	Y	N	0.02	<0.02	1.14	0.61
Anthracene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.73	0.47
Fluoranthene leachable	GCM502	µg/l	Y	N	0.02	<0.02	3.69	2.70
Pyrene leachable	GCM502	µg/l	Y	N	0.02	<0.02	3.64	2.34
Benzo(a)anthracene leachable	GCM502	µg/l	Y	N	0.02	<0.02	1.11	0.84
Chrysene leachable	GCM502	µg/l	Y	N	0.02	<0.02	1.09	0.85
Benzo(b)fluoranthene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.55	0.48
Benzo(k)fluoranthene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.51	0.37
Benzo(a)pyrene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.66	0.47
Indeno(1,2,3-cd)pyrene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.29	0.18
Dibenzo(a,h)anthracene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.18	0.14
Benzo(ghi)perylene leachable	GCM502	µg/l	Y	N	0.02	0.02	0.50	0.40
PCB Congeners								
PCB 28 M	GCMS	µg/kg	N	N	1	<1	<1	<1
PCB 52 M	GCMS	µg/kg	N	N	1	<1	<1	<1
PCB 101 M	GCMS	µg/kg	N	N	1	<1	<1	<1
PCB 118 M	GCMS	µg/kg	N	N	1	<1	<1	<1
PCB 153 M	GCMS	µg/kg	N	N	1	<1	<1	<1
PCB 138 M	GCMS	µg/kg	N	N	1	<1	<1	<1
PCB 180 M	GCMS	µg/kg	N	N	1	<1	<1	<1
PCB Congeners leachable								
PCB 28 leachable M	GCMS	µg/l	N	N	1	<1	<1	<1
PCB 52 leachable M	GCMS	µg/l	N	N	1	<1	<1	<1
PCB 101 leachable M	GCMS	µg/l	N	N	1	<1	<1	<1
PCB 118 leachable M	GCMS	µg/l	N	N	1	<1	<1	<1
PCB 153 leachable M	GCMS	µg/l	N	N	1	<1	<1	<1
PCB 138 leachable M	GCMS	µg/l	N	N	1	<1	<1	<1
PCB 180 leachable M	GCMS	µg/l	N	N	1	<1	<1	<1

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

					Lab sample ref:	**C131357**	**C131359**	**C131361**
					Client sample ref:	**WS14 0.20m**	**WS17 0.50m**	**WS19 1.00m**
					Date sampled:	**14/12/11**	**14/12/11**	**14/12/11**
					Sample matrix (see notes page):	**O**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**			
SVOC								
Phenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Bis(2-chloroethyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
1,3-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2-Chlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
1,4-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
1,2-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Bis(2-chloroisopropyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
N-nitrosodi-n-propylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Hexachloroethane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
4-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	0.1
Nitrobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2-Nitrophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2,4-Dimethylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	0.1
Bis(2-chloroethoxy)methane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2,4-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
1,2,4-Trichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Naphthalene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	0.2	1.7
4-Chloro-3-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2,4,5/2,4,6-Trichlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1
2-chloronaphthalene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Acenaphthylene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Dimethyl phthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
2,6-dinitrotoluene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Acenaphthene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	0.2	2.3
2,4-dinitrotoluene M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	1.5
4-Nitrophenol M	AN42b	mg/kg	N	N	2	<2	<2	<2
Fluorene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	0.1	1.6
Diethylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
4-chlorophenyl-phenylether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
N-nitrosodiphenylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
4-Bromophenyl-phenyl ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Hexachlorobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Pentachlorophenol M	AN42c	mg/kg	N	N	0.5	<0.5	<0.5	<0.5
Phenanthrene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	1.6	16.1
Anthracene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	0.6	4.2
Di-n-butylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Fluoranthene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	3.6	21.9
Pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	3.6	16.8
Chrysene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	1.8	8.0
Bis(2-ethylhexyl) phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	0.2	<0.1
Di-n-octyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	2.3	8.7
Indeno(1,2,3-cd)pyrene (SVOC) M	AN42a	mg/kg	N	N	0.1	<0.1	1.3	5.0
1,2 Benzanthracene M	AN42a	mg/kg	N	N	0.1	<0.1	2.1	9.6
1,2:5,6 - Dibenzanthracene (SVOC) (w)	AN42-1	mg/kg	N	N	0.1	<0.1	0.4	1.3
2,3,4,6-Tetrachlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1
2,6-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Azobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Benzo(b/k)fluoranthene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	3.6	14.9
Benzo(g,h,i)perylene (SVOC) M	AN42a	mg/kg	N	N	0.1	<0.1	2.1	5.3
Butyl benzyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1
Hexachloro-1,3-butadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1
Hexachlorocyclopentadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1

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Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

					Lab sample ref:	**C131357**	**C131359**	**C131361**
					Client sample ref:	**WS14 0.20m**	**WS17 0.50m**	**WS19 1.00m**
					Date sampled:	**14/12/11**	**14/12/11**	**14/12/11**
					Sample matrix (see notes page):	**O**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**			
TPH Banded(Ali/Aro)								
>C7-C8 Aromatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00
>C6-C8 Aliphatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00
C5-C6 Aliphatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00
C5-C7 Aromatic M	AN15a-1	mg/kg	N	N	1	<1.00	<1.00	<1.00
>C8-C10 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10
>C8-C10 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10
>C10-C12 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10
>C10-C12 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10
>C12-C16 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10
>C12-C16 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10
>C16-C21 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10
>C16-C21 Aromatic M	AN34A	mg/kg	N	N	10	<10	<10	<10
>C21-C36 Aliphatic M	AN34A	mg/kg	N	N	10	<10	<10	<10
>C21-C36 Aromatic M	AN34A	mg/kg	N	N	10	<10	31	43
TPH Banded(Ali/Aro) leachable								
>C6-C8 Aliphatic Leachable	AN15-1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C7-C8 Aromatic Leachable	AN15-1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
C5-C6 Aliphatic Leachable	AN15-1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
C5-C7 Aromatic Leachable	AN15-1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C8-C10 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C8-C10 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C10-C12 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C10-C12 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C12-C16 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C12-C16 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C16-C21 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C16-C21 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C21-C36 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01
>C21-C36 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

					Lab sample ref:	**C131357**	**C131359**	**C131361**
					Client sample ref:	**WS14 0.20m**	**WS17 0.50m**	**WS19 1.00m**
					Date sampled:	**14/12/11**	**14/12/11**	**14/12/11**
					Sample matrix (see notes page):	**O**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**			
VOC								
Vinyl chloride M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Bromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Trichlorofluoromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,1-Dichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
2,2-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Bromochloromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Chloroform M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,1,1-Trichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Carbon tetrachloride M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,1-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Benzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,2-Dichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Trichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,2-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Dibromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Bromodichloromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
cis-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Toluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
trans-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,1,2-Trichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Tetrachloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,3-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,2-Dibromoethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Chlorobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Ethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
m,p-xylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
o-Xylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Styrene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Bromoform M	AN15a	µg/kg	Y	N	10	<10	<10	<10
iso-Propylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Bromobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,2,3-Trichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
n-Propylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
2-Chlorotoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,3,5-Trimethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
4-Chlorotoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
tert-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,2,4-Trimethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
sec-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,3-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,4-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10
n-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,2-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,2-Dibromo-3-chloro-propane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,2,4-Trichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Hexachlorobutadiene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,2,3-Trichlorobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,1,2,2 -Tetrachloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
1,1-Dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
4-isopropyltoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Chlorodibromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Cis - 1,2 -dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10
Naphthalene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10
trans-1,2-Dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

					Lab sample ref:	**C131362**	**C131363**	**C131364**	**C131365**	**C131366**
					Client sample ref:	**WS21 0.50m**	**WS23A 0.50m**	**WS24 2.0-3.0m**	**WS25 0.50m**	**WS26 0.20m**
					Date sampled:	**14/12/11**	**14/12/11**	**14/12/11**	**14/12/11**	**14/12/11**
					Sample matrix (see notes page):	**S**	**S**	**S**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**					
Metals (Leachate)										
Arsenic leachable	AN47e	µg/l	Y	N	0.25	7.62	2.14	NR	1.02	8.22
Boron leachable	AN47c	µg/l	Y	N	1	153	99	NR	163	117
Cadmium leachable	AN47a	µg/l	Y	N	0.05	<0.05	<0.05	NR	0.13	<0.05
Chromium leachable	AN47a	µg/l	Y	N	0.05	1.32	0.52	NR	2.58	1.67
Copper leachable	AN47a	µg/l	Y	N	0.05	4.48	6.94	NR	12.41	13.57
Lead leachable	AN47a	µg/l	Y	N	0.05	2.73	2.04	NR	4.11	6.35
Mercury leachable	Subcontract*	µg/l	Y	N	0.015	0.116	0.065	NR	0.098	0.077
Nickel leachable	AN47b	µg/l	Y	N	0.1	0.72	0.97	NR	0.69	0.97
Selenium leachable	AN47c	µg/l	Y	N	1	1.17	<1.00	NR	<1.00	<1.00
Zinc leachable	AN47g	µg/l	Y	N	0.5	28.1	170.0	NR	78.8	36.6
Metals (soil)										
Arsenic	AN8b	mg/kg	Y	Y	2	4.0	4.6	NR	8.0	5.4
Boron (water soluble)	AN03	mg/kg	Y	N	0.1	0.3	0.7	NR	0.4	1.0
Cadmium	AN8a	mg/kg	Y	N	1	<1.0	<1.0	NR	2.2	<1.0
Chromium (total)	AN8b	mg/kg	Y	Y	2	33.0	17.2	NR	21.8	20.3
Copper	AN8b	mg/kg	Y	Y	2	66.5	77.8	NR	1364.9	47.5
Lead	AN8b	mg/kg	Y	Y	2	80.6	146.3	NR	227.1	140.8
Mercury	AN8a	mg/kg	Y	N	1	<1.0	<1.0	NR	<1.0	<1.0
Nickel	AN8b	mg/kg	Y	Y	2	38.0	30.9	NR	33.4	28.7
Selenium	AN8a	mg/kg	Y	N	1	<1.0	<1.0	NR	<1.0	<1.0
Zinc	AN8b	mg/kg	Y	Y	2	112.5	186.3	NR	184.4	113.1
Sample Prep(C)										
EMR	EMR	%	N	N/A	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
% Stones	Stones	%	N	N/A	0.1	17.8	38.7	41.4	34.8	30.2
Moisture Content @ <30°C	AN1	%	Y	N/A	0.1	13.5	14.0	14.2	13.4	12.5
Sample Description	MCERTS ver3.	N/A	N	N/A	N/A	1A	1A	1A	1A	1A
Misc										
pH	AN5a	units	Y	Y	N/A	9.2	8.9	8.1	8.0	11
Ammoniacal Nitrogen (s)	HACH9c	mg/kg	N	N	1	2	<1	NR	2	2
Ammoniacal Nitrogen leachable	HACH9b	mg/l-N	Y	N/A	0.2	<0.2	<0.2	NR	<0.2	<0.2
Sulphate (water soluble)	Hach 15	g/l	N	N/A	0.1	0.07	0.11	0.06	0.07	0.27
Cyanide (free) M	AN45i	mg/kg	N	N	1	<1	<1	NR	<1	<1
Cyanide (free) leachable	Subcontract*	mg/l	N	N/A	0.01	<0.01	<0.01	NR	<0.01	<0.01
Phenols (screen) M	AN45d	mg/kg	N	N	1	<1	1	NR	<1	<1
Phenols (screen) leachable	AN45c	mg/l	Y	N/A	0.03	<0.03	<0.03	NR	<0.03	<0.03
Fraction of Organic Carbon (FOC)	AN48	%	N	N/A	0.1	<0.10	<0.10	NR	<0.10	<0.10
Chromium (VI)	AN7	mg/kg	N	N	1	<1.0	<1.0	NR	<1.0	<1.0
Chromium (VI) leachable	HACH 4	mg/l	N	N	0.01	<0.01	<0.01	NR	<0.01	<0.01
Asbestos	ASB001	%	Y	N/A	0.001	ND	ND	NR	ND	ND

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

						Lab sample ref:	**C131362**	**C131363**	**C131365**	**C131366**
						Client sample ref:	**WS21 0.50m**	**WS23A 0.50m**	**WS25 0.50m**	**WS26 0.20m**
						Date sampled:	**14/12/11**	**14/12/11**	**14/12/11**	**14/12/11**
						Sample matrix (see notes page):	**S**	**S**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**					
BTEX leachable										
Benzene leachable	AN15	µg/l	Y	N	5		<5	<5	<5	<5
Toluene leachable	AN15	µg/l	Y	N	5		<5	<5	<5	<5
Ethylbenzene leachable	AN15	µg/l	Y	N	5		<5	<5	<5	<5
m,p-Xylene leachable	AN15	µg/l	Y	N	5		<5	<5	<5	<5
o-Xylene leachable	AN15	µg/l	Y	N	5		<5	<5	<5	<5
PAH (USEPA16)										
PAH (total) M	GCM501	mg/kg	Y	Y	1		24.3	4.4	40.5	27.8
Naphthalene (PAH) M	GCM501	mg/kg	Y	Y	0.1		1.5	0.1	0.1	0.7
Acenaphthylene M	GCM501a	mg/kg	Y	N	0.1		<0.1	<0.1	<0.1	0.1
Acenaphthene M	GCM501	mg/kg	Y	Y	0.1		0.2	<0.1	<0.1	9.3
Fluorene M	GCM501	mg/kg	Y	Y	0.1		0.2	<0.1	<0.1	5.8
Phenanthrene M	GCM501	mg/kg	Y	Y	0.1		2.2	0.7	1.8	3.8
Anthracene M	GCM501	mg/kg	Y	Y	0.1		0.7	0.2	0.5	0.8
Fluoranthene M	GCM501	mg/kg	Y	Y	0.1		3.7	0.7	7.2	1.9
Pyrene M	GCM501	mg/kg	Y	Y	0.1		3.4	0.7	6.2	1.5
Benz(a)anthracene M	GCM501	mg/kg	Y	Y	0.1		2.1	0.3	3.7	0.6
Chrysene M	GCM501	mg/kg	Y	Y	0.1		2.0	0.3	3.1	0.7
Benzo(b)fluoranthene M	GCM501	mg/kg	Y	Y	0.1		2.1	0.3	4.0	0.6
Benzo(k)fluoranthene M	GCM501	mg/kg	Y	Y	0.1		1.5	0.2	3.1	0.5
Benzo(a)pyrene M	GCM501	mg/kg	Y	Y	0.1		1.8	0.2	3.9	0.6
Indeno(1,2,3-cd)pyrene M	GCM501a	mg/kg	Y	N	0.1		1.2	0.2	2.9	0.5
Dibenz(a,h)anthracene M	GCM501	mg/kg	Y	Y	0.1		0.7	<0.1	1.0	0.2
Benzo(ghi)perylene M	GCM501	mg/kg	Y	Y	0.1		1.2	0.2	2.8	0.5
PAH(USEPA16) leachable										
Naphthalene leachable	GCM502	µg/l	Y	N	0.02		0.35	<0.02	<0.02	0.05
Acenaphthylene leachable	GCM502	µg/l	Y	N	0.02		0.05	<0.02	0.04	<0.02
Acenaphthene leachable	GCM502	µg/l	Y	N	0.02		0.15	<0.02	0.02	0.06
Fluorene leachable	GCM502	µg/l	Y	N	0.02		0.12	<0.02	0.03	0.04
Phenanthrene leachable	GCM502	µg/l	Y	N	0.02		0.99	<0.02	0.41	0.19
Anthracene leachable	GCM502	µg/l	Y	N	0.02		0.34	0.03	0.15	0.11
Fluoranthene leachable	GCM502	µg/l	Y	N	0.02		2.43	0.02	1.97	0.75
Pyrene leachable	GCM502	µg/l	Y	N	0.02		0.32	0.03	1.76	0.73
Benzo(a)anthracene leachable	GCM502	µg/l	Y	N	0.02		0.82	<0.02	0.55	0.27
Chrysene leachable	GCM502	µg/l	Y	N	0.02		0.86	<0.02	0.54	0.28
Benzo(b)fluoranthene leachable	GCM502	µg/l	Y	N	0.02		0.63	<0.02	0.38	0.19
Benzo(k)fluoranthene leachable	GCM502	µg/l	Y	N	0.02		0.66	<0.02	0.35	0.18
Benzo(a)pyrene leachable	GCM502	µg/l	Y	N	0.02		0.71	<0.02	0.38	0.20
Indeno(1,2,3-cd)pyrene leachable	GCM502	µg/l	Y	N	0.02		0.44	<0.02	0.25	0.12
Dibenzo(a,h)anthracene leachable	GCM502	µg/l	Y	N	0.02		0.25	<0.02	0.11	0.08
Benzo(ghi)perylene leachable	GCM502	µg/l	Y	N	0.02		0.57	<0.02	0.43	0.19
PCB Congeners										
PCB 28 M	GCMS	µg/kg	N	N	1		5.1	<1	<1	<1
PCB 52 M	GCMS	µg/kg	N	N	1		2.9	1.7	<1	<1
PCB 101 M	GCMS	µg/kg	N	N	1		<1	<1	<1	<1
PCB 118 M	GCMS	µg/kg	N	N	1		<1	<1	<1	<1
PCB 153 M	GCMS	µg/kg	N	N	1		19.0	11.6	<1	<1
PCB 138 M	GCMS	µg/kg	N	N	1		18.8	12.1	<1	<1
PCB 180 M	GCMS	µg/kg	N	N	1		30.9	15.8	<1	<1
PCB Congeners leachable										
PCB 28 leachable M	GCMS	µg/l	N	N	1		<1	<1	<1	<1
PCB 52 leachable M	GCMS	µg/l	N	N	1		3.7	<1	<1	<1
PCB 101 leachable M	GCMS	µg/l	N	N	1		8.8	<1	<1	<1
PCB 118 leachable M	GCMS	µg/l	N	N	1		<1	<1	<1	<1
PCB 153 leachable M	GCMS	µg/l	N	N	1		34.9	<1	<1	<1
PCB 138 leachable M	GCMS	µg/l	N	N	1		35.4	7.7	<1	<1
PCB 180 leachable M	GCMS	µg/l	N	N	1		58.2	10.7	<1	<1

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

					Lab sample ref:	**C131362**	**C131363**	**C131365**	**C131366**
					Client sample ref:	**WS21 0.50m**	**WS23A 0.50m**	**WS25 0.50m**	**WS26 0.20m**
					Date sampled:	**14/12/11**	**14/12/11**	**14/12/11**	**14/12/11**
					Sample matrix (see notes page):	**S**	**S**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**				
SVOC									
Phenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
1,3-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
2-Chlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
1,4-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
1,2-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroisopropyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
2-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
N-nitrosodi-n-propylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Hexachloroethane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
4-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Nitrobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
2-Nitrophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dimethylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Bis(2-chloroethoxy)methane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
1,2,4-Trichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene (SVOC) M	AN42	mg/kg	Y	N	0.1	1.4	<0.1	0.2	<0.1
4-Chloro-3-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
2,4,5/2,4,6-Trichlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1
2-chloronaphthalene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Dimethyl phthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
2,6-dinitrotoluene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.2	<0.1	0.1	<0.1
2,4-dinitrotoluene M	AN42a	mg/kg	N	N	0.1	0.1	<0.1	<0.1	<0.1
4-Nitrophenol M	AN42b	mg/kg	N	N	2	<2	<2	<2	<2
Fluorene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.1	<0.1	<0.1	<0.1
Diethylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
4-chlorophenyl-phenylether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
N-nitrosodiphenylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
4-Bromophenyl-phenyl ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Pentachlorophenol M	AN42c	mg/kg	N	N	0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene (SVOC) M	AN42	mg/kg	Y	N	0.1	1.7	0.3	2.3	0.5
Anthracene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.6	<0.1	0.6	0.1
Di-n-butylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene (SVOC) M	AN42	mg/kg	Y	N	0.1	3.2	0.3	5.4	0.7
Pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	2.8	0.3	4.6	0.6
Chrysene (SVOC) M	AN42	mg/kg	Y	N	0.1	1.6	0.1	2.3	0.3
Bis(2-ethylhexyl) phthalate M	AN42a	mg/kg	N	N	0.1	0.2	0.1	0.2	0.2
Di-n-octyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	2.1	0.2	2.9	0.3
Indeno(1,2,3-cd)pyrene (SVOC) M	AN42a	mg/kg	N	N	0.1	1.4	<0.1	2.3	0.2
1,2 Benzanthracene M	AN42a	mg/kg	N	N	0.1	1.7	0.2	2.4	0.2
1,2:5,6 - Dibenzanthracene (SVOC) (w)	AN42-1	mg/kg	N	N	0.1	0.3	<0.1	0.6	<0.1
2,3,4,6-Tetrachlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1
2,6-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Azobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b/k)fluoranthere (SVOC) M	AN42	mg/kg	Y	N	0.1	3.5	<0.1	5.2	0.5
Benzo(g,h,i)perylene (SVOC) M	AN42a	mg/kg	N	N	0.1	1.5	<0.1	2.7	0.2
Butyl benzyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1	<0.1	<0.1
Hexachloro-1,3-butadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorocyclopentadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1	<0.1	<0.1

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

					Lab sample ref:	**C131362**	**C131363**	**C131365**	**C131366**
					Client sample ref:	**WS21 0.50m**	**WS23A 0.50m**	**WS25 0.50m**	**WS26 0.20m**
					Date sampled:	**14/12/11**	**14/12/11**	**14/12/11**	**14/12/11**
					Sample matrix (see notes page):	**S**	**S**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**				
TPH Banded(Ali/Aro)									
>C7-C8 Aromatic $_{M}$	AN15a-1	mg/kg	N	N	1	<1	<1	<1	<1
>C6-C8 Aliphatic $_{M}$	AN15a-1	mg/kg	N	N	1	<1	<1	<1	<1
C5-C6 Aliphatic $_{M}$	AN15a-1	mg/kg	N	N	1	<1	<1	<1	<1
C5-C7 Aromatic $_{M}$	AN15a-1	mg/kg	N	N	1	<1	<1	<1	<1
>C8-C10 Aliphatic $_{M}$	AN34A	mg/kg	N	N	10	<10	<10	<10	<10
>C8-C10 Aromatic $_{M}$	AN34A	mg/kg	N	N	10	<10	<10	<10	<10
>C10-C12 Aliphatic $_{M}$	AN34A	mg/kg	N	N	10	<10	<10	<10	<10
>C10-C12 Aromatic $_{M}$	AN34A	mg/kg	N	N	10	<10	<10	<10	<10
>C12-C16 Aliphatic $_{M}$	AN34A	mg/kg	N	N	10	<10	<10	<10	<10
>C12-C16 Aromatic $_{M}$	AN34A	mg/kg	N	N	10	<10	<10	<10	<10
>C16-C21 Aliphatic $_{M}$	AN34A	mg/kg	N	N	10	<10	<10	<10	<10
>C16-C21 Aromatic $_{M}$	AN34A	mg/kg	N	N	10	13	<10	<10	<10
>C21-C36 Aliphatic $_{M}$	AN34A	mg/kg	N	N	10	<10	41	37	<10
>C21-C36 Aromatic $_{M}$	AN34A	mg/kg	N	N	10	104	21	48	14
TPH Banded(Ali/Aro) leachable									
>C6-C8 Aliphatic Leachable	AN15-1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
>C7-C8 Aromatic Leachable	AN15-1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
C5-C6 Aliphatic Leachable	AN15-1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
C5-C7 Aromatic Leachable	AN15-1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
>C8-C10 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
>C8-C10 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
>C10-C12 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
>C10-C12 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
>C12-C16 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
>C12-C16 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
>C16-C21 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
>C16-C21 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	<0.01	<0.01
>C21-C36 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	0.21	<0.01
>C21-C36 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01	<0.01	<0.01	0.02	<0.01

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

					Lab sample ref:	**C131362**	**C131363**	**C131365**	**C131366**
					Client sample ref:	**WS21 0.50m**	**WS23A 0.50m**	**WS25 0.50m**	**WS26 0.20m**
					Date sampled:	**14/12/11**	**14/12/11**	**14/12/11**	**14/12/11**
					Sample matrix (see notes page):	**S**	**S**	**S**	**S**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**				
VOC									
Vinyl chloride M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Bromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Trichlorofluoromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,1-Dichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
2,2-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Bromochloromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Chloroform M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,1,1-Trichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Carbon tetrachloride M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,1-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Benzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,2-Dichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Trichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,2-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Dibromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Bromodichloromethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
cis-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Toluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
trans-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,1,2-Trichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Tetrachloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,3-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,2-Dibromoethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Chlorobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Ethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
m,p-xylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
o-Xylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Styrene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Bromoform M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
iso-Propylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Bromobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,2,3-Trichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
n-Propylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
2-Chlorotoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,3,5-Trimethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
4-Chlorotoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
tert-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,2,4-Trimethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
sec-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,3-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,4-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
n-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,2-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,2-Dibromo-3-chloro-propane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,2,4-Trichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Hexachlorobutadiene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,2,3-Trichlorobenzene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,1,2,2 -Tetrachloroethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
1,1-Dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
4-isopropyltoluene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Chlorodibromomethane M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Cis - 1,2 -dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
Naphthalene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10
trans-1,2-Dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10	<10	<10

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

						Lab sample ref:	**C131367**	**C131368**
						Client sample ref:	**WS27 1.00m**	**WS29 0.20m**
						Date sampled:	**14/12/11**	**14/12/11**
						Sample matrix (see notes page):	**O**	**O**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**			
Metals (Leachate)								
Arsenic leachable	AN47e	µg/l	Y	N	0.25	0.59	1.21
Boron leachable	AN47c	µg/l	Y	N	1	167	96
Cadmium leachable	AN47a	µg/l	Y	N	0.05	<0.05	<0.05
Chromium leachable	AN47a	µg/l	Y	N	0.05	0.52	0.33
Copper leachable	AN47a	µg/l	Y	N	0.05	4.17	10.68
Lead leachable	AN47a	µg/l	Y	N	0.05	0.80	1.50
Mercury leachable	Subcontract*	µg/l	Y	N	0.015	0.030	<0.015
Nickel leachable	AN47b	µg/l	Y	N	0.1	0.82	1.08
Selenium leachable	AN47c	µg/l	Y	N	1	<1.00	<1.00
Zinc leachable	AN47g	µg/l	Y	N	0.5	142.9	143.2
Metals (soil)							
Arsenic	AN8b	mg/kg	Y	Y	2	7.6	8.7
Boron (water soluble)	AN03	mg/kg	Y	N	0.1	1.0	0.7
Cadmium	AN8a	mg/kg	Y	N	1	<1.0	<1.0
Chromium (total)	AN8b	mg/kg	Y	Y	2	19.5	59.6
Copper	AN8b	mg/kg	Y	Y	2	89.8	29.4
Lead	AN8b	mg/kg	Y	Y	2	75.7	28.2
Mercury	AN8a	mg/kg	Y	N	1	<1.0	<1.0
Nickel	AN8b	mg/kg	Y	Y	2	51.4	13.3
Selenium	AN8a	mg/kg	Y	N	1	<1.0	13.5
Zinc	AN8b	mg/kg	Y	Y	2	124.5	50.5
Sample Prep(C)							
EMR	EMR	%	N	N/A	0.1	<0.1	<0.1
% Stones	Stones	%	N	N/A	0.1	21.0	26.9
Moisture Content @ <30°C	AN1	%	Y	N/A	0.1	17.8	11.1
Sample Description	MCERTS ver3.	N/A	N	N/A	N/A	7A	7A
Misc							
pH	AN5a	units	Y	Y	N/A	7.9	8.3
Ammoniacal Nitrogen (s)	HACH9c	mg/kg	N	N	1	<1	2
Ammoniacal Nitrogen leachable	HACH9b	mg/l-N	Y	N/A	0.2	<0.2	0.4
Sulphate (water soluble)	Hach 15	g/l	N	N/A	0.1	0.07	0.10
Cyanide (free) $_{M}$	AN45i	mg/kg	N	N	1	<1	<1
Cyanide (free) leachable	Subcontract*	mg/l	Y	N/A	0.01	<0.01	<0.01
Phenols (screen) $_{M}$	AN45d	mg/kg	N	N	1	<1	<1
Phenols (screen) leachable	AN45c	mg/l	Y	N/A	0.03	<0.03	<0.03
Fraction of Organic Carbon (FOC)	AN48	%	N	N/A	0.1	0.11	<0.10
Chromium (VI)	AN7	mg/kg	N	N	1	<1.0	<1.0
Chromium (VI) leachable	HACH 4	mg/l	N	N	0.01	<0.01	<0.01
Asbestos	ASB001	%	Y	N/A	0.001	ND	ND

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

						Lab sample ref:	C131367	C131368
						Client sample ref:	WS27 1.00m	WS29 0.20m
						Date sampled:	14/12/11	14/12/11
						Sample matrix (see notes page):	O	O
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**			
BTEX leachable								
Benzene leachable	AN15	µg/l	Y	N	5	<5	<5	
Toluene leachable	AN15	µg/l	Y	N	5	<5	<5	
Ethylbenzene leachable	AN15	µg/l	Y	N	5	<5	<5	
m,p-Xylene leachable	AN15	µg/l	Y	N	5	<5	<5	
o-Xylene leachable	AN15	µg/l	Y	N	5	<5	<5	
PAH (USEPA16)								
PAH (total) M	GCM501	mg/kg	Y	Y	1	7.2	320	
Naphthalene (PAH) M	GCM501	mg/kg	Y	Y	0.1	0.4	7.2	
Acenaphthylene M	GCM501a	mg/kg	Y	N	0.1	<0.1	0.7	
Acenaphthene M	GCM501	mg/kg	Y	Y	0.1	<0.1	8.3	
Fluorene M	GCM501	mg/kg	Y	Y	0.1	<0.1	6.5	
Phenanthrene M	GCM501	mg/kg	Y	Y	0.1	1.0	47.0	
Anthracene M	GCM501	mg/kg	Y	Y	0.1	0.2	15.1	
Fluoranthene M	GCM501	mg/kg	Y	Y	0.1	1.2	61.6	
Pyrene M	GCM501	mg/kg	Y	Y	0.1	1.1	52.4	
Benz(a)anthracene M	GCM501	mg/kg	Y	Y	0.1	0.6	26.1	
Chrysene M	GCM501	mg/kg	Y	Y	0.1	0.6	19.9	
Benzo(b)fluoranthene M	GCM501	mg/kg	Y	Y	0.1	0.6	20.0	
Benzo(k)fluoranthene M	GCM501	mg/kg	Y	Y	0.1	0.5	13.9	
Benzo(a)pyrene M	GCM501	mg/kg	Y	Y	0.1	0.5	17.5	
Indeno(1,2,3-cd)pyrene M	GCM501a	mg/kg	Y	N	0.1	0.2	9.7	
Dibenz(a,h)anthracene M	GCM501	mg/kg	Y	Y	0.1	0.1	3.8	
Benzo(ghi)perylene M	GCM501	mg/kg	Y	Y	0.1	0.4	9.0	
PAH(USEPA16) leachable								
Naphthalene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.02	
Acenaphthylene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.24	
Acenaphthene leachable	GCM502	µg/l	Y	N	0.02	<0.02	5.41	
Fluorene leachable	GCM502	µg/l	Y	N	0.02	<0.02	1.26	
Phenanthrene leachable	GCM502	µg/l	Y	N	0.02	0.09	0.97	
Anthracene leachable	GCM502	µg/l	Y	N	0.02	0.04	4.22	
Fluoranthene leachable	GCM502	µg/l	Y	N	0.02	0.19	18.6	
Pyrene leachable	GCM502	µg/l	Y	N	0.02	0.18	15.5	
Benzo(a)anthracene leachable	GCM502	µg/l	Y	N	0.02	0.06	6.95	
Chrysene leachable	GCM502	µg/l	Y	N	0.02	0.05	1.87	
Benzo(b)fluoranthene leachable	GCM502	µg/l	Y	N	0.02	0.04	0.75	
Benzo(k)fluoranthene leachable	GCM502	µg/l	Y	N	0.02	0.06	0.84	
Benzo(a)pyrene leachable	GCM502	µg/l	Y	N	0.02	0.05	0.96	
Indeno(1,2,3-cd)pyrene leachable	GCM502	µg/l	Y	N	0.02	0.03	0.51	
Dibenzo(a,h)anthracene leachable	GCM502	µg/l	Y	N	0.02	<0.02	0.25	
Benzo(ghi)perylene leachable	GCM502	µg/l	Y	N	0.02	0.06	0.66	
PCB Congeners								
PCB 28 M	GCMS	µg/kg	N	N	1	10.6	<1	
PCB 52 M	GCMS	µg/kg	N	N	1	13.3	<1	
PCB 101 M	GCMS	µg/kg	N	N	1	25.8	<1	
PCB 118 M	GCMS	µg/kg	N	N	1	<1	<1	
PCB 153 M	GCMS	µg/kg	N	N	1	75.2	<1	
PCB 138 M	GCMS	µg/kg	N	N	1	72.5	<1	
PCB 180 M	GCMS	µg/kg	N	N	1	98.1	<1	
PCB Congeners leachable								
PCB 28 leachable M	GCMS	µg/l	N	N	1	<1	<1	
PCB 52 leachable M	GCMS	µg/l	N	N	1	6.8	<1	
PCB 101 leachable M	GCMS	µg/l	N	N	1	16.4	<1	
PCB 118 leachable M	GCMS	µg/l	N	N	1	<1	<1	
PCB 153 leachable M	GCMS	µg/l	N	N	1	62.2	<1	
PCB 138 leachable M	GCMS	µg/l	N	N	1	58.4	<1	
PCB 180 leachable M	GCMS	µg/l	N	N	1	98.3	<1	

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

					Lab sample ref:	**C131367**	**C131368**
					Client sample ref:	**WS27 1.00m**	**WS29 0.20m**
					Date sampled:	**14/12/11**	**14/12/11**
					Sample matrix (see notes page):	**O**	**O**
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**		
SVOC							
Phenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
Bis(2-chloroethyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
1,3-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
2-Chlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
1,4-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
1,2-Dichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
Bis(2-chloroisopropyl)ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
2-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
N-nitrosodi-n-propylamine M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
Hexachloroethane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
4-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	0.6
Nitrobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
2-Nitrophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
2,4-Dimethylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	0.6
Bis(2-chloroethoxy)methane M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
2,4-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
1,2,4-Trichlorobenzene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
Naphthalene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	13.3
4-Chloro-3-Methylphenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
2,4,5/2,4,6-Trichlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1
2-chloronaphthalene M	AN42	mg/kg	Y	N	0.1	<0.1	0.2
Acenaphthylene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	0.4
Dimethyl phthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
2,6-dinitrotoluene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
Acenaphthene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	8.3
2,4-dinitrotoluene M	AN42a	mg/kg	N	N	0.1	<0.1	4.5
4-Nitrophenol M	AN42b	mg/kg	N	N	2	<2	<2
Fluorene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	5.2
Diethylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
4-chlorophenyl-phenylether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
N-nitrosodiphenylamine M	AN42	mg/kg	Y	N	0.1	<0.1	1.8
4-Bromophenyl-phenyl ether M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
Hexachlorobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
Pentachlorophenol M	AN42c	mg/kg	N	N	0.5	<0.5	<0.5
Phenanthrene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.2	37.2
Anthracene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	13.7
Di-n-butylphthalate M	AN42	mg/kg	Y	N	0.1	<0.1	0.1
Fluoranthene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.4	67.8
Pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.2	55.2
Chrysene (SVOC) M	AN42	mg/kg	Y	N	0.1	0.2	18.4
Bis(2-ethylhexyl) phthalate M	AN42a	mg/kg	N	N	0.1	0.2	0.3
Di-n-octyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1
Benzo(a)pyrene (SVOC) M	AN42	mg/kg	Y	N	0.1	<0.1	15.9
Indeno(1,2,3-cd)pyrene (SVOC) M	AN42a	mg/kg	N	N	0.1	<0.1	7.9
1,2 Benzanthracene M	AN42a	mg/kg	N	N	0.1	0.1	23.1
1,2:5,6 - Dibenzanthracene (SVOC) (w)	AN42-1	mg/kg	N	N	0.1	<0.1	2.0
2,3,4,6-Tetrachlorophenol M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1
2,6-Dichlorophenol M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
Azobenzene M	AN42	mg/kg	Y	N	0.1	<0.1	0.4
Benzo(b/k)fluoranthere (SVOC) M	AN42	mg/kg	Y	N	0.1	0.4	27.3
Benzo(g,h,i)perylene (SVOC) M	AN42a	mg/kg	N	N	0.1	<0.1	8.1
Butyl benzyl phthalate M	AN42a	mg/kg	N	N	0.1	<0.1	<0.1
Hexachloro-1,3-butadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1
Hexachlorocyclopentadiene M	AN42	mg/kg	Y	N	0.1	<0.1	<0.1

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

						Lab sample ref:	C131367	C131368
						Client sample ref:	WS27 1.00m	WS29 0.20m
						Date sampled:	14/12/11	14/12/11
						Sample matrix (see notes page):	O	O
Determinand	**Method**	**Units**	**ISO17025**	**MCERTS**	**LOD**			
TPH Banded(Ali/Aro)								
>C7-C8 Aromatic $_{M}$	AN15a-1	mg/kg	N	N	1		<1	<1
>C6-C8 Aliphatic $_{M}$	AN15a-1	mg/kg	N	N	1		<1	<1
C5-C6 Aliphatic $_{M}$	AN15a-1	mg/kg	N	N	1		<1	<1
C5-C7 Aromatic $_{M}$	AN15a-1	mg/kg	N	N	1		<1	<1
>C8-C10 Aliphatic $_{M}$	AN34A	mg/kg	N	N	10		<10	<10
>C8-C10 Aromatic $_{M}$	AN34A	mg/kg	N	N	10		<10	<10
>C10-C12 Aliphatic $_{M}$	AN34A	mg/kg	N	N	10		<10	<10
>C10-C12 Aromatic $_{M}$	AN34A	mg/kg	N	N	10		<10	<10
>C12-C16 Aliphatic $_{M}$	AN34A	mg/kg	N	N	10		<10	87
>C12-C16 Aromatic $_{M}$	AN34A	mg/kg	N	N	10		<10	60
>C16-C21 Aliphatic $_{M}$	AN34A	mg/kg	N	N	10		<10	173
>C16-C21 Aromatic $_{M}$	AN34A	mg/kg	N	N	10		<10	300
>C21-C36 Aliphatic $_{M}$	AN34A	mg/kg	N	N	10		50	45
>C21-C36 Aromatic $_{M}$	AN34A	mg/kg	N	N	10		18	537
TPH Banded(Ali/Aro) leachable								
>C6-C8 Aliphatic Leachable	AN15-1	mg/l	N	N	0.01		<0.01	<0.01
>C7-C8 Aromatic Leachable	AN15-1	mg/l	N	N	0.01		<0.01	<0.01
C5-C6 Aliphatic Leachable	AN15-1	mg/l	N	N	0.01		<0.01	<0.01
C5-C7 Aromatic Leachable	AN15-1	mg/l	N	N	0.01		<0.01	<0.01
>C8-C10 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01		<0.01	<0.01
>C8-C10 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01		<0.01	<0.01
>C10-C12 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01		<0.01	<0.01
>C10-C12 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01		<0.01	<0.01
>C12-C16 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01		<0.01	0.01
>C12-C16 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01		<0.01	0.02
>C16-C21 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01		<0.01	0.03
>C16-C21 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01		<0.01	0.08
>C21-C36 Aliphatic Leachable	AN34A/1	mg/l	N	N	0.01		0.01	<0.01
>C21-C36 Aromatic Leachable	AN34A/1	mg/l	N	N	0.01		0.01	0.06

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Test Certificate

Client: BAM Ritchies
Glasgow Road, Kilsyth, Glasgow, G65 9BL
Site: Gourock Pierhead - Job No 4618
Date Tested: 22/12/11
Date Reported: 20 January, 2012
Date Received: 22 December, 2011
Sample Type: Solid

Certificate No: 11/3111/C/C1
File No: 11/3111/C
Client Ref: RIT136713

Lab sample ref:	**C131367**	**C131368**
Client sample ref:	**WS27 1.00m**	**WS29 0.20m**
Date sampled:	**14/12/11**	**14/12/11**
Sample matrix (see notes page):	**S**	**S**

Determinand	Method	Units	ISO17025	MCERTS	LOD		
VOC							
Vinyl chloride M	AN15a	µg/kg	Y	N	10	<10	<10
Bromomethane M	AN15a	µg/kg	Y	N	10	<10	<10
Trichlorofluoromethane M	AN15a	µg/kg	Y	N	10	<10	<10
1,1-Dichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10
2,2-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10
Bromochloromethane M	AN15a	µg/kg	Y	N	10	<10	<10
Chloroform M	AN15a	µg/kg	Y	N	10	<10	<10
1,1,1-Trichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10
Carbon tetrachloride M	AN15a	µg/kg	Y	N	10	<10	<10
1,1-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10
Benzene M	AN15a	µg/kg	Y	N	10	<10	<10
1,2-Dichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10
Trichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10
1,2-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10
Dibromomethane M	AN15a	µg/kg	Y	N	10	<10	<10
Bromodichloromethane M	AN15a	µg/kg	Y	N	10	<10	<10
cis-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10
Toluene M	AN15a	µg/kg	Y	N	10	<10	<10
trans-1,3-Dichloropropene M	AN15a	µg/kg	Y	N	10	<10	<10
1,1,2-Trichloroethane M	AN15a	µg/kg	Y	N	10	<10	<10
Tetrachloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10
1,3-Dichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10
1,2-Dibromoethane M	AN15a	µg/kg	Y	N	10	<10	<10
Chlorobenzene M	AN15a	µg/kg	Y	N	10	<10	<10
Ethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10
m,p-xylene M	AN15a	µg/kg	Y	N	10	<10	<10
o-Xylene M	AN15a	µg/kg	Y	N	10	<10	<10
Styrene M	AN15a	µg/kg	Y	N	10	<10	<10
Bromoform M	AN15a	µg/kg	Y	N	10	<10	<10
iso-Propylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10
Bromobenzene M	AN15a	µg/kg	Y	N	10	<10	<10
1,2,3-Trichloropropane M	AN15a	µg/kg	Y	N	10	<10	<10
n-Propylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10
2-Chlorotoluene M	AN15a	µg/kg	Y	N	10	<10	<10
1,3,5-Trimethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10
4-Chlorotoluene M	AN15a	µg/kg	Y	N	10	<10	<10
tert-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10
1,2,4-Trimethylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10
sec-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10
1,3-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10
1,4-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10
n-Butylbenzene M	AN15a	µg/kg	Y	N	10	<10	<10
1,2-Dichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10
1,2-Dibromo-3-chloro-propane M	AN15a	µg/kg	Y	N	10	<10	<10
1,2,4-Trichlorobenzene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10
Hexachlorobutadiene M	AN15a	µg/kg	Y	N	10	<10	<10
1,2,3-Trichlorobenzene M	AN15a	µg/kg	Y	N	10	<10	<10
1,1,2,2 -Tetrachloroethane M	AN15a	µg/kg	Y	N	10	<10	<10
1,1-Dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10
4-isopropyltoluene M	AN15a	µg/kg	Y	N	10	<10	<10
Chlorodibromomethane M	AN15a	µg/kg	Y	N	10	<10	<10
Cis - 1,2 -dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10
Naphthalene (VOC) M	AN15a	µg/kg	Y	N	10	<10	<10
trans-1,2-Dichloroethylene M	AN15a	µg/kg	Y	N	10	<10	<10

Notes
1. All analyses performed on the sample dried at <30ºC, except analyses suffixed with 'M'.
2. Analyses suffixed 'M' were performed on the sample as received and corrected for '% moisture at <30ºC' where applicable.
3. All results are expressed as dry weight.
4. MCERTS accreditation applicable to Sample Matrix 'S' only.
5. Natural stones (pebbles, gravels etc.) which do not pass a 2mm sieve are excluded from dried analyses.
6. Tests marked * indicate subcontracted analyses.
7. ND denotes None Detected.
8. The laboratory has tested the material/items supplied by the client as sampled in accordance with the client's own requirements.
9. ^Sample Description key: 1. - Sand, 2. Loam, 3. Clay, 4. Sand/loam mix, 5. Sand/clay mix, 6. Clay/loam mix, 7. Other.
suffixed with: A - Stones, B - Construction rubble, C - Visible Hydrocarbons
10. Leachate preparation is not included in our UKAS accreditation.
11. Dates of testing for all parameters are available upon request.

Signed for, and on behalf of Exova (UK) Ltd.

Approved by:

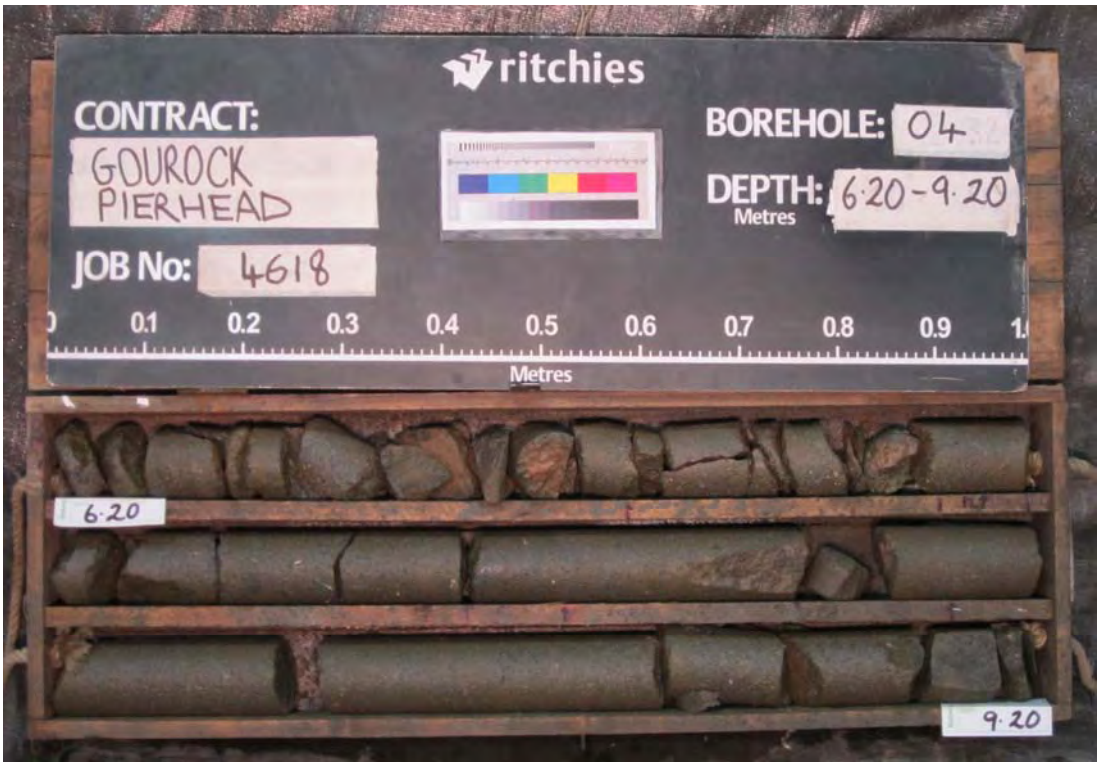
C McGinty
Inorganics Head of Section

Approved by:

J McEleny
Laboratory Manager

0568

APPENDIX 7.0
ROCK CORE PHOTOGRAPHS

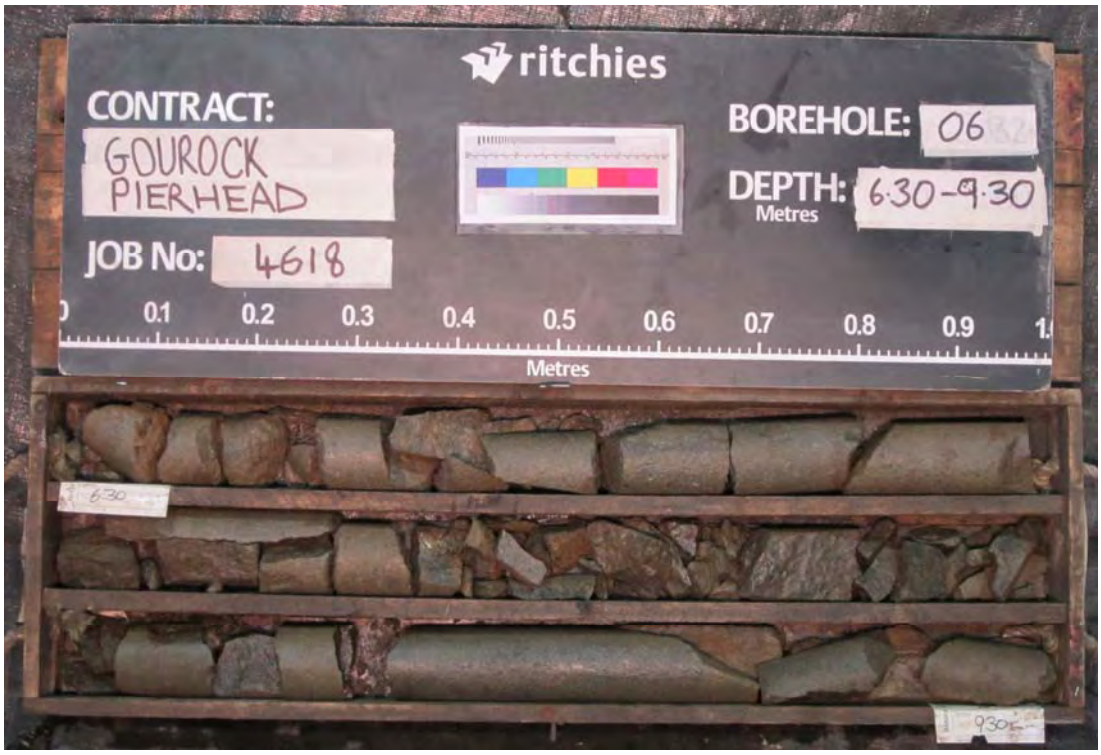


BH04 6.20—9.20m

BH04 9.20—12.20m

BH05 5.70—8.70m

BH05 8.70—11.70m



BH06 6.30—9.30m

BH06 9.30—12.30m

TP10 Spoil

TP10 Topsoil

TP11 Excavation

TP11 Spoil

TP11 Topsoil

TP12 Excavation

TP12 Excavation

TP12 Spoil

TP12 Topsoil

TP13 Excavation

TP13 Spoil

TP13 Topsoil

Appendix 3

Graphs of Laboratory and In-situ Test Results

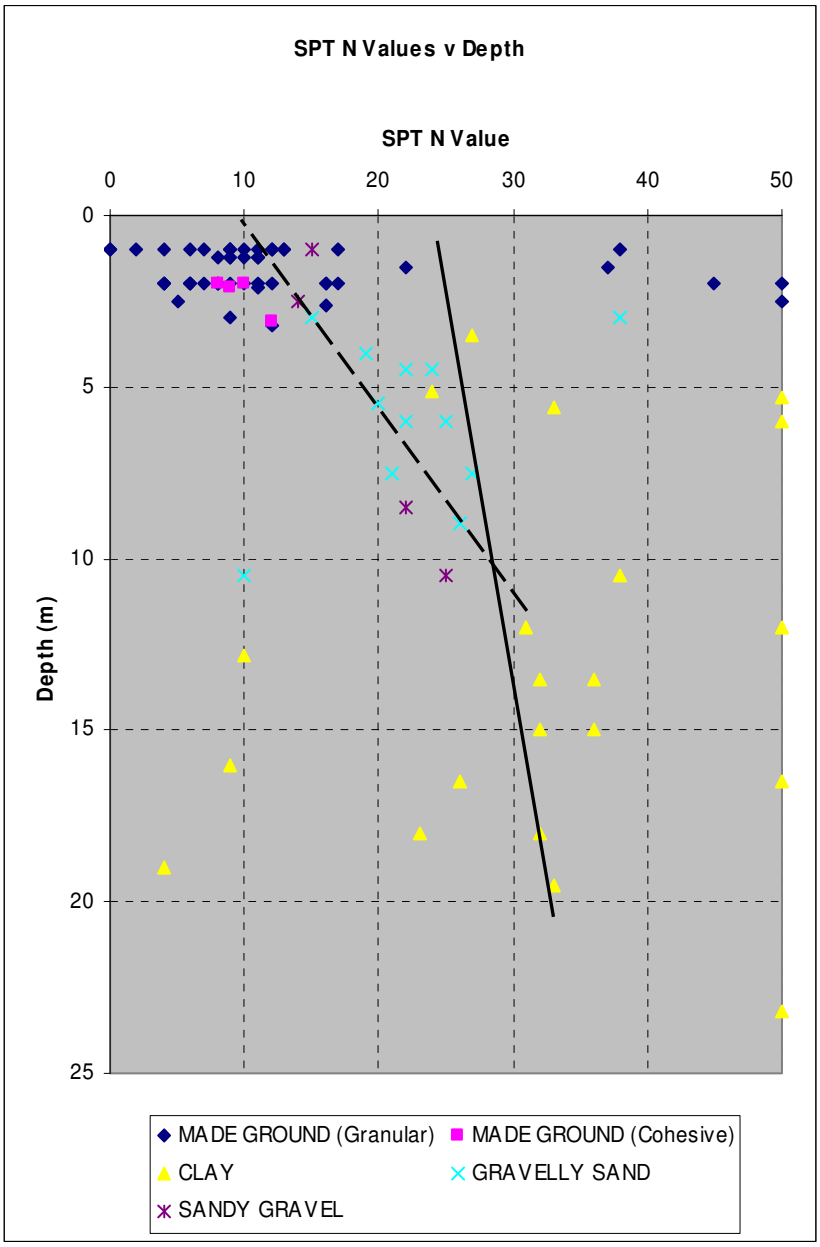
SPT N Values v Depth

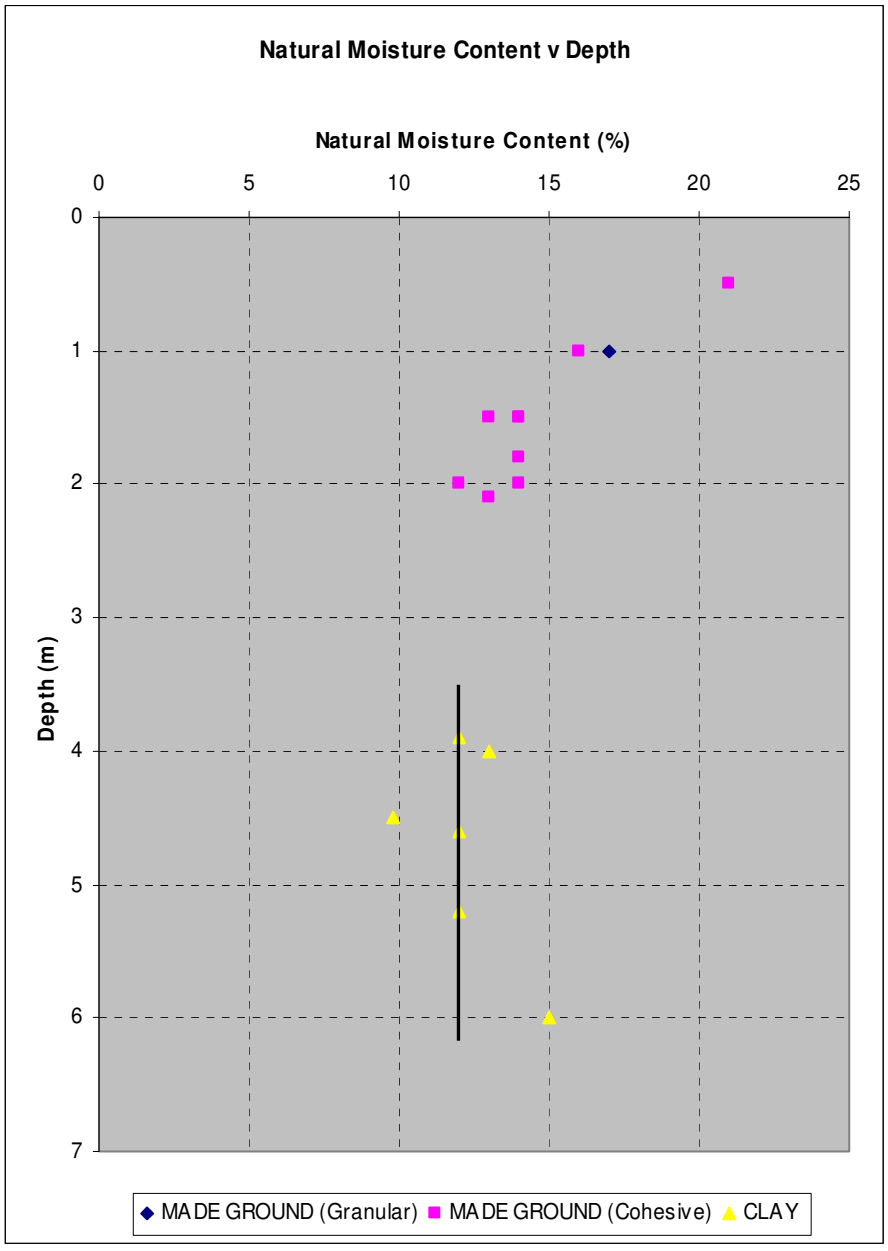
Natural Moisture Content v Depth

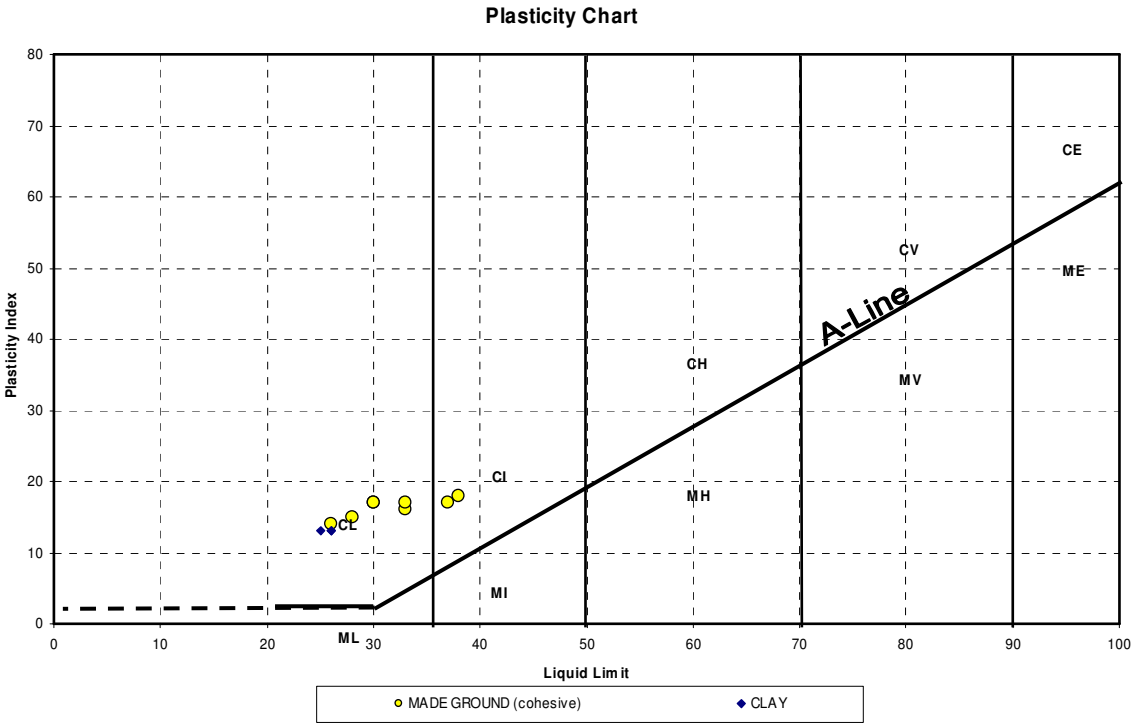
Plasticity Chart

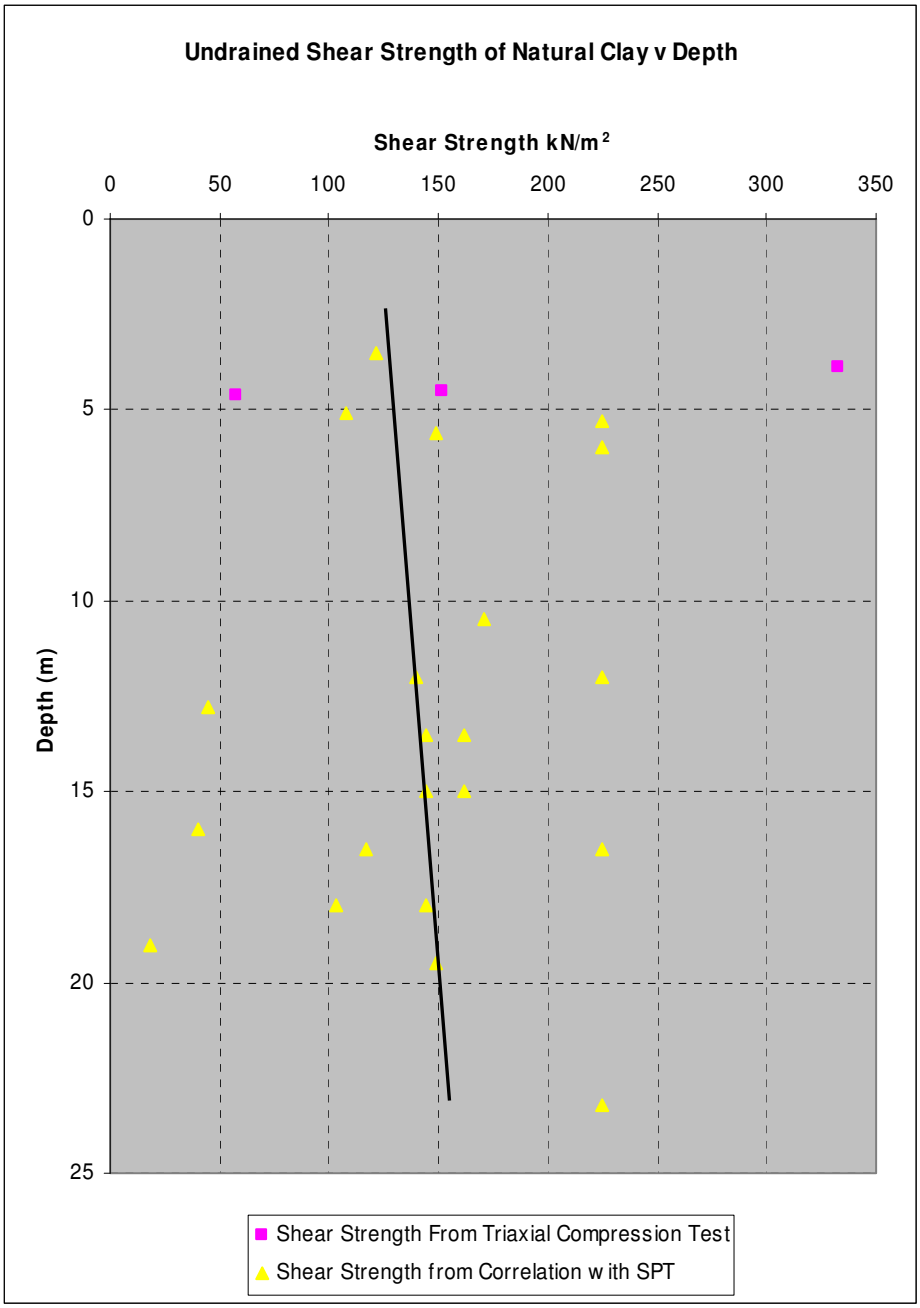
Undrained Shear Strength of Natural Clay v Depth

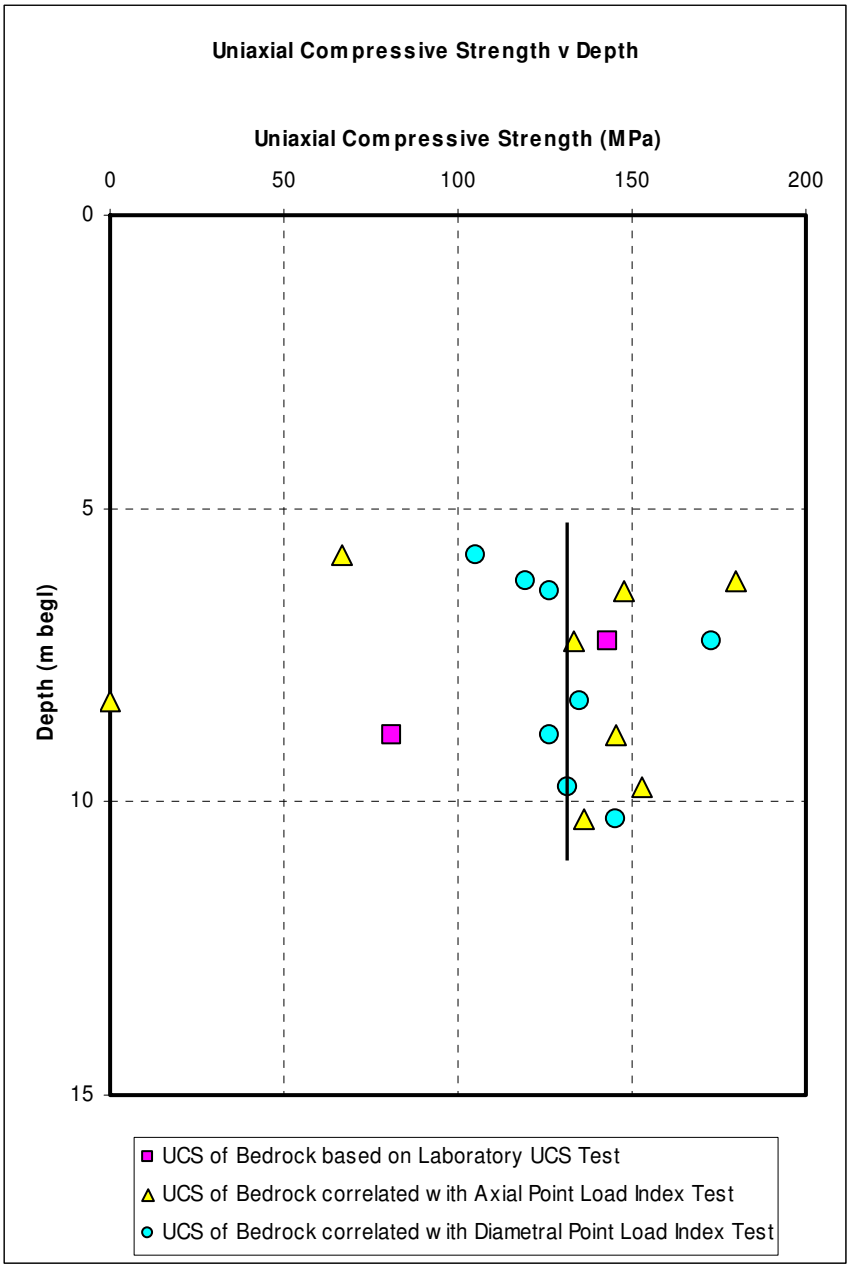
Uniaxial Compressive Strength v Depth


SPT N Values v Depth
SPT N Value
0
10
20
30
40
50
0
5
10
15
20
25
Depth (m)
MADE GROUND (Granular)
MADE GROUND (Cohesive)
CLAY
GRAVELLY SAND
SANDY GRAVEL


Natural Moisture Content v Depth
Natural Moisture Content (%)
0
5
10
15
20
25
Depth (m)
0
1
2
3
4
5
6
7
MADE GROUND (Granular)
MADE GROUND (Cohesive)
CLAY


Plasticity Chart
Plasticity Index
Liquid Limit
A-Line
CE
CV
ME
MV
CH
MH
CI
CL
MI
ML
MADE GROUND (cohesive)
CLAY


Undrained Shear Strength of Natural Clay v Depth
Shear Strength kN/m²
0
50
100
150
200
250
300
350
Depth (m)
0
5
10
15
20
25
Shear Strength From Triaxial Compression Test
Shear Strength from Correlation with SPT


Uniaxial Compressive Strength v Depth
Uniaxial Compressive Strength (MPa)
0
50
100
150
200
Depth (m begl)
0
5
10
15
UCS of Bedrock based on Laboratory UCS Test
UCS of Bedrock correlated with Axial Point Load Index Test
UCS of Bedrock correlated with Diametral Point Load Index Test

Appendix 4

Principles of Environmental Risk Assessment

Principles of Environmental Risk Assessment

The Environmental Protection Act 1990, Part II A Contaminated Land (Section 57 of the Environment Act 1995) and the Contaminated Land (Scotland) Regulations 2005 provide a basis on which to determine the risks and liabilities presented by a contaminated site. Contaminated Land is defined within Annex 3, Chapter A Part 1- Scope of Chapter and in all those Sections mentioned as:

"Any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that-

(a) Significant harm is being caused or there is significant possibility of such harm being caused; or

(b) Significant pollution of the water environment is being caused or there is a significant possibility of such pollution being caused."

Section 57 of the Environment Act 1995 requires that any site identified as being "contaminated" by the Local Authority will be registered by them and remediation will be required to render the site fit for use.

The presence of contamination is not the sole factor for deciding whether a site is contaminated. Relevant parties should identify site-specific risks and provide objective, cost-effective methods to manage the contamination in a manner which satisfies the proposed end-use.

A risk-based approach, which takes both technical and non-technical aspects into consideration when making decisions on contamination resulting from past, present or future human activities, is advocated. The assessment of environmental risks generally relies on the identification of three principal elements forming a 'pollutant linkage':

- Source: the contaminant
- Pathway: the route through which the contaminant can migrate, and
- Receptor**:** any human, animal, plant, water environment or property that may be adversely affected (harmed) by the contaminant

In the absence of any one of these elements, on any given site, there is no risk. Where all three elements are present, risk assessment is required to determine the significance of the harm or pollution that is being or may be caused. As outlined above, the terms of the Contaminated Land regime specify that remediation need only be implemented where a site is causing, or there is a significant possibility that it will cause, significant harm, or that significant pollution of the water environment is being, or there is a significant possibility of such pollution being caused.

Development of contaminated land is usually addressed through the application of planning and development legislation and guidance (i.e. Planning Guidance Note PPG23 in England and Advice Note 33 in Scotland). The suitable for use approach is seen as the most appropriate basis to deal with contaminated land, taking account of environmental, social and economic objectives. The assessment is made in the context of the proposed land use (e.g. residential, commercial, industrial and public open-space).