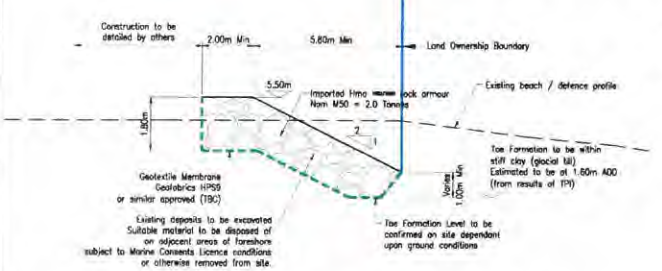


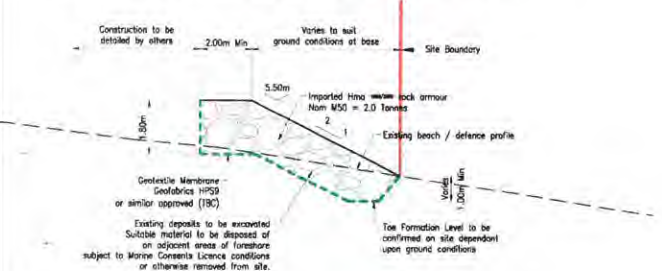
- Notes**
- All dimensions are in metres unless otherwise stated.
 - All levels are in metres above Ordnance Datum.
 - Extent of riprap armour protection alongside site ownership boundary assumes that the base of the riprap is founded on good bearing strata at 1.5m AOD; if this is not the case and the base of the riprap is lower, then the alternative route of the proposed walkway will be located further away from the site ownership boundary.
- Legend**
- Land Ownership Boundary
 - Developed Boundary
 - Top of proposed riprap
 - Bottom of proposed riprap
 - Slope of proposed riprap

GENERAL ARRANGEMENT SHOWING LOCATION OF TYPICAL CROSS SECTIONS
SCALE 1:500



- Notes**
- All dimensions are in metres unless otherwise stated.
 - All levels are in metres above Ordnance Datum.
 - Existing defences/washers profiles vary across the frontage and these shown are for guidance only.
 - Representation of Armour Stone Blocks shown are schematic and do not specify or imply exact sizes, shapes or layers of stone to be excavated or placed.
 - Structure setting out line and levels to be established on site, following pre-commencement survey.
 - Extent of riprap armour protection alongside site ownership boundary assumes that the base of the riprap is founded on good bearing strata at 1.5m AOD; if this is not the case, the thickness of the base should be extended until good bearing strata is uncovered.

TYPICAL CROSS SECTION A-A THROUGH ARMOUR STONE ALONG LAND OWNERSHIP BOUNDARY
SCALE 1:100



TYPICAL CROSS SECTION B-B THROUGH ARMOUR STONE ALONG DEVELOPMENT BOUNDARY
SCALE 1:100

SPECIFICATION

The following specification requirements are provided in relation to the site of the former Dick's Boatyard of Winkley Bay, Bangor.

ROCK MATERIALS

General Requirements

Specification and testing of stone for rock armour protection shall be in accordance with BS EN 13383-11, unless identified otherwise.

The rock to be used shall be a natural stone of suitable angular shape, dimension and weight. It shall be hard, durable and sound, free from laminations, weak cleavage planes, and undesirable weathering and shall be of such a character that it will not disintegrate or break from the action of air, water, acids, weathering and drying, freezing and thawing, or impact due to waves or water flow action. It shall also be capable of being handled and placed without undue fracture or damage.

The rock to be used shall be imported from an approved source that meets the requirements below.

Grading and Mass Distribution

The specified rock grading to be used in the works shall be as indicated on the graph below. The average mass and mass distribution for the graded rock to be used shall be as shown in Table 1 below.

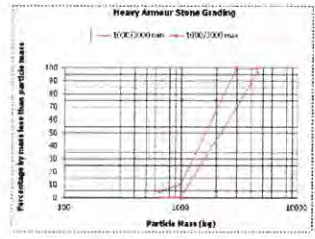
The minimum number of pieces in a bulk sample for determination of mass distribution shall be 200 as specified in BS EN 13383 - Part 22, Clause 6.3 Table 1.

The Contractor shall be responsible for ensuring that all the rock used in the works complies with the specified grading by sampling and testing for particle size in accordance with the requirements of BS EN 13383-22.

Table 1: Proposed Rock Armour Grading and Mass Distribution

Category	BS EN 13381 Part 1	HMA max/min
Type	Armour	
Mass M (kg)	% by mass < M	
4500	97-100	
3000	70-100	
1000	8-10	
650	0-5	
Average Mass M ₅₀ (kg)	1700-2100	
Nominal average dia. D ₅₀ (mm)	860-920	

A grading curve for the stone is provided in the graph and tabulated figures (below):



Rock to be used shall, unless otherwise stated, have a length to thickness ratio (L/T) generally not greater than 3 (the maximum dimension of an individual rock as measured in any direction shall not exceed three times the minimum dimension, where the minimum dimension is taken on the smallest top between two parallel lines through which the rock could pass). Not more than 5% by number of rocks as specified below shall exceed this figure.

The minimum number of pieces in a bulk sample for determination of mass distribution shall be 200 as specified in BS EN 13383 - Part 22, clause 6.3 Table 2. Testing of rock for compliance with the above requirements, as defined in BS EN 13383-22 shall be carried out and the results approved by the Supervisor for each source proposed before any rock is delivered to site.

Mechanical Properties

The material properties of rock to be used shall be tested in accordance with methods indicated in the relevant European Standard, where specified, and shall meet the requirements as shown in Table 2 below.

Test information as described above shall be provided for all sources of imported armour stone. One series of tests shall be provided for each source where only one face or working area of the quarry is to be used to produce stone. A full series of tests shall be carried out on material from each face or working area. Stone from different sources shall only be permitted where the stone is of a similar type, colour and shape.

Table 2: Material Properties Requirements

Test	BS	ENH	Value
Oven Dry Particle Density (mm)	BS EN 13383-2	g/m ³	2.85
Water Absorption (max)	BS EN 13383-2	%	2.0
Compressive Strength Category	EN 1926		C50
Resistance to wear: Micro Deval Co-efficient (Mag) (max)	BS EN 1097 Part 1		20
Resistance to Fragmentation: Los Angeles Test (LA) (max)	BS EN 1097 Part 2	%	25
Magnesium Sulphate Soundness (max)	BS EN 1367-2	%	10
Freeze-Thaw Loss (max) ¹	BS EN 13383-2	%	2.0

¹Only applicable if Water Absorption < 0.5%

Ground conditions at toe to be confirmed by further investigation.
Topographic survey to confirm ground profile.
Construction profile and details required of the time of construction.

GEOTEXTILES USED TO SEPARATE EARTHWORKS MATERIALS

The geotextile(s) to be used in the Works as a filter/seperator beneath the rock armour shall be a non-woven fabric manufactured by needle punching virgin, staple fibres of polypropylene with properties as described in Table 3 below.

Table 3: Preliminary Geotextile Properties (subject to type/ grading of formation)

Test description	Approved test method	Value
Stitch puncture strength (CBR) (N)	EN ISO 12220	9
Fracture through tensile strength (max)	EN ISO 12226	65
Tensile strength (kN)	EN ISO 10319	30
Tensile elongation (%)	EN ISO 10319	80
Catch drag perforation hole diameter (mm)	EN 14153	2
Thickness @20kPa (mm)	BS EN 120 8863-1	6.0
APPARENT VOLUME MASS - 50% finer (980) (t/m ³)	EN ISO 12456	70
Water flow normal to the plane of the geotextile @50mm head (L/s/m ²)	EN ISO 11058	40
Max. coefficient of permeability (m/s x 10 ⁻⁷)	EN ISO 11058	6.0

In addition, geotextiles to be used shall also meet the following requirements:

- Geotextiles manufactured from fibres of more than one polymer will not be permitted. Geotextiles constructed from virgin staple fibres of polypropylene shall incorporate a minimum of 1% by weight active carbon black. Geotextiles constructed from fibres of more than one polymer will not be permitted.
- Geotextiles shall be delivered to site in packaging which will protect the rolls from degradation by ultra violet light. The labelling shall clearly identify the product supplied in accordance with BS EN 30100/195.
- Geotextiles shall be protected at all times against physical or chemical damage. Geotextiles shall be kept in the wrappings provided by the manufacturer until required for use in the works. The rolls of Geotextiles shall be stored on level ground and stacked not more than five rolls high and no other materials shall be stacked on top of the geotextiles.
- The geotextile shall not be exposed to direct sunlight for longer than thirty days.
- The geotextile shall be laid and installed in the positions and to the line and levels shown on the drawings. Material which will be in contact with the geotextile, shall not have protrusions that are likely to damage the geotextile during installation or in service.
- The method of installation shall not impose stresses or strains likely to cause damage to the geotextile. The method of installation shall ensure that the geotextile is in continuous contact with the surface on which it is placed without stretching or bridging over humps or hollows. Construction plant must not operate directly on the geotextile.
- Joints between adjacent pieces of geotextile shall be formed by overlapping a minimum of 100mm.

Geotextile filter requirements to be confirmed by particle size analysis and classification of formation material.

Design details to prevent fines leaching through armour stone, adjacent to proposed walkway (by others) is to be confirmed.

Specification Requirements for Rock Construction

- General**
- No filling or geotextile placing shall take place until the foundation has been inspected and approved by the Works Supervisor.
 - Geotextile shall be placed in the position described on this Drawings, on a drained foundation.
 - Armour stone revetment construction shall be carried out in a single working face from the start position to completion, unless agreed otherwise with the Supervisor.
- Random Stone Construction - Handling & Placing**
- The following general method statement shall be adhered to by the Contractor:
- Construction shall be carried out on a drained foundation.
 - Geotextile placing shall be carried out during the same total shift as covering with armour stone except that sufficient cloth shall be left exposed such that the required top with the next piece of cloth can be achieved without displacing the armour stone previously placed.

Rock shall be unrolled in such a manner as to prevent the breakage of rock and disturbance of other construction layers and materials.

Rock shall not be dropped into position but placed individually and set into the formation to achieve a minimum three point support and be stable to the lines and levels shown on the drawings. Stones shall not be placed so that they can rock or obtain their stability on a plane by frictional resistance alone. Any voids below the finished profile level in excess of the armour stone D15 size shall require 'chairs', as determined by the Works Supervisor.

It is the Contractor's responsibility to ensure that all areas of armour stone in the works have an even distribution of the rock grading.

Random Stone Construction - Placing Tolerances

The final surface of the armour stone shall conform in general to the lines and levels shown on the drawings within the following tolerances:

- Individual rocks: +/- 0.3 Dn50
- Design profile to actual mean profile: +/- 0.35 to - 0.25 Dn50

The tolerance in finished level of fill material or excavated surfaces below armour stone shall be plus or minus 25mm, unless other specification requirements dictate otherwise.

REV	DATE	NATURE OF REVISION	BY	CHECKED
0	21.08.18	GENERAL MEASUREMENTS	JAE	CG
1	20.08.18	DRAWING REVISED IN LINE WITH LATEST PROPOSALS	JAE	CG
2	14.08.18	REVISION REVISED IN LINE WITH LATEST PROPOSALS	JAE	CG
3	22.02.18	DRAWING REVISED IN LINE WITH LATEST PROPOSALS	JAE	ZE

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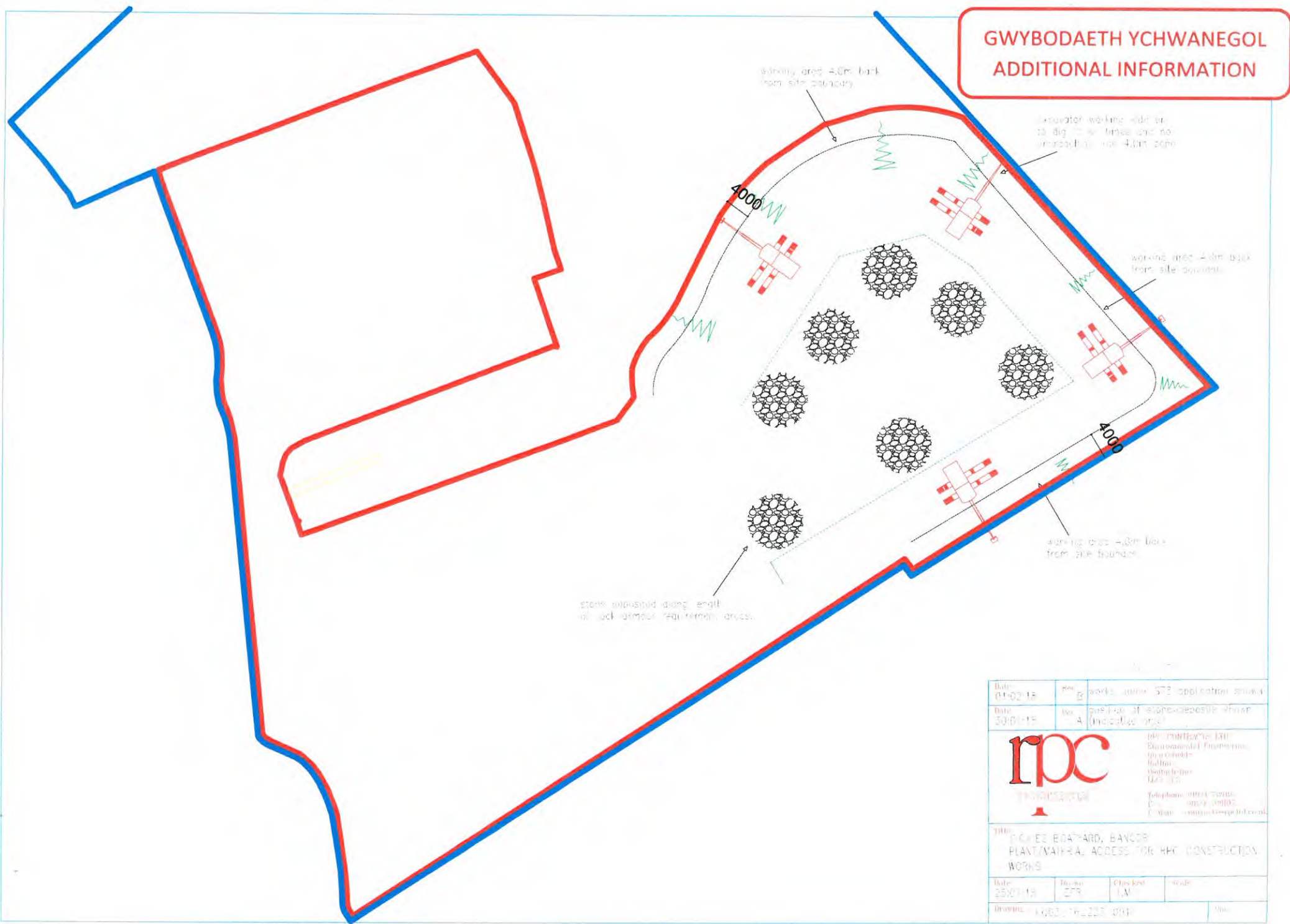
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01492 533117 info@rba.ltd.uk www.rba.ltd.uk


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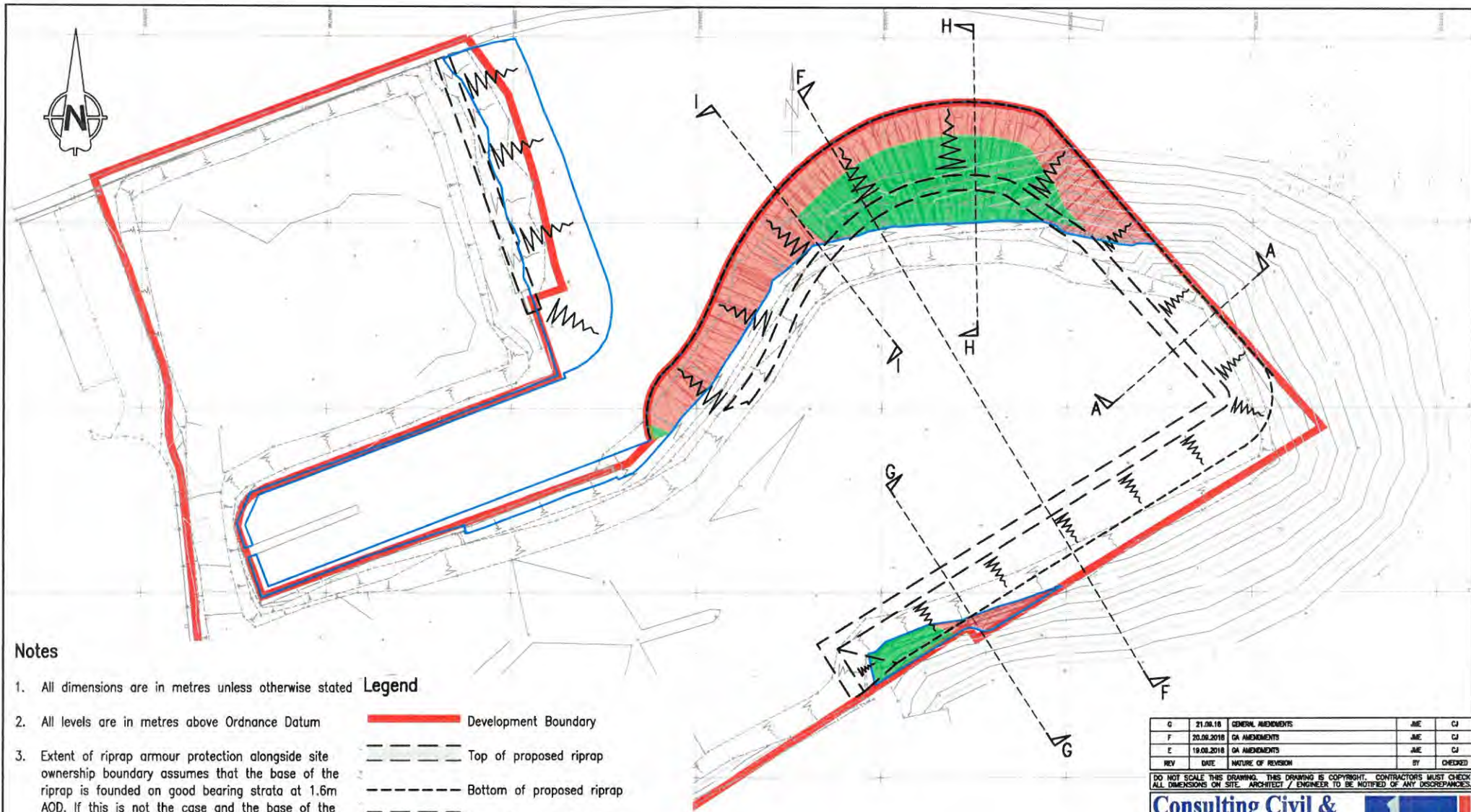
DEVELOPMENT ON LAND AT DICKIES BOATYARD PHASE 2

TYPICAL CROSS SECTIONS + SPECIFICATION FOR RIPRAP ARMOUR PROTECTION

**GWYBODAETH YCHWANEGOL
ADDITIONAL INFORMATION**



Date:	01-02-18	Rev:	E	works under 572 application shown			
Date:	30-01-18	Rev:	A	add-on of stone-deposit wheel (indicated area)			
		RPC CONTRACTS LTD Environmental Engineering 100 Church 100 Church 100 Church 100 Church					
Telephone: 01904 200000 Fax: 01904 200001 E-Mail: contracts@rpc.co.uk							
Title: P-C-123 8047-ARD, BANCOR PLANT/MAINTENANCE ACCESS FOR HFC CONSTRUCTION WORKS							
Date:	25-01-18	Drawn:	EPR	Checked:	L.M.	Scale:	
Drawing: 1-062176-222-0101							



Notes

1. All dimensions are in metres unless otherwise stated
2. All levels are in metres above Ordnance Datum
3. Extent of riprap armour protection alongside site ownership boundary assumes that the base of the riprap is founded on good bearing strata at 1.6m AOD. If this is not the case and the base of the riprap is lower, then the alternative route of the proposed walkway will be located further away from the site ownership boundary
4. Riprap shown at locations along development boundary where sheet piling not present
5. Extent of cut and fill volumes shown are based on a comparison between existing ground levels and proposed formation levels and does not include for any rip-rap volumes.
6. See Drawing 3475-2/212 & 214 for Cross Sections

Legend

- Development Boundary
- Top of proposed riprap
- Bottom of proposed riprap
- Slope of proposed riprap
- MHWS (3.6m AOD) for existing site conditions
- Volume=506m³ Extent of proposed excavated (cut) material on seaward side of MHWS
- Volume=386m³ Extent of proposed deposited (fill) material on seaward side of MHWS

REV	DATE	NATURE OF REVISION	BY	CHECKED
G	21.08.18	GENERAL AMENDMENTS	JME	CJ
F	20.08.2018	GA AMENDMENTS	JME	CJ
E	19.08.2018	GA AMENDMENTS	JME	CJ

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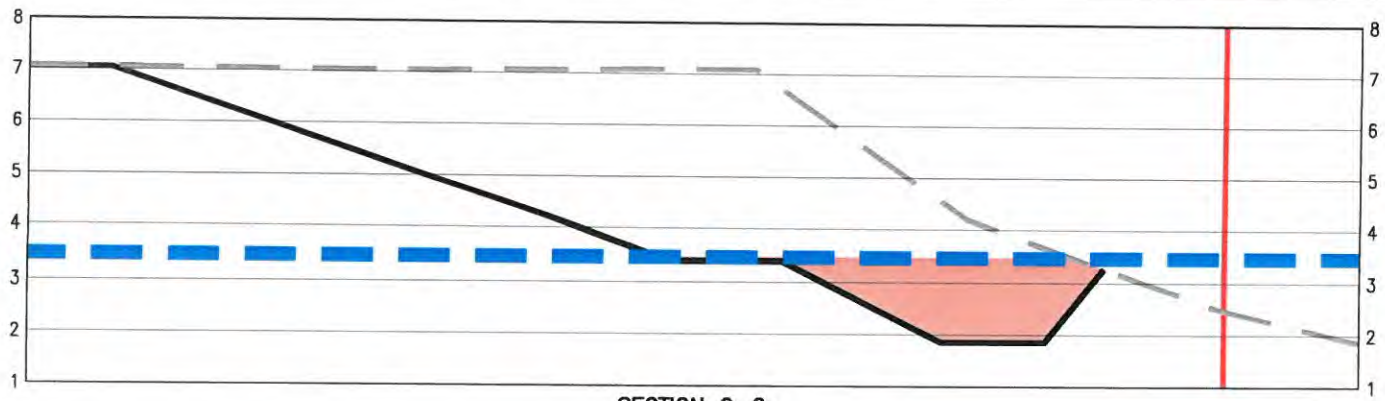
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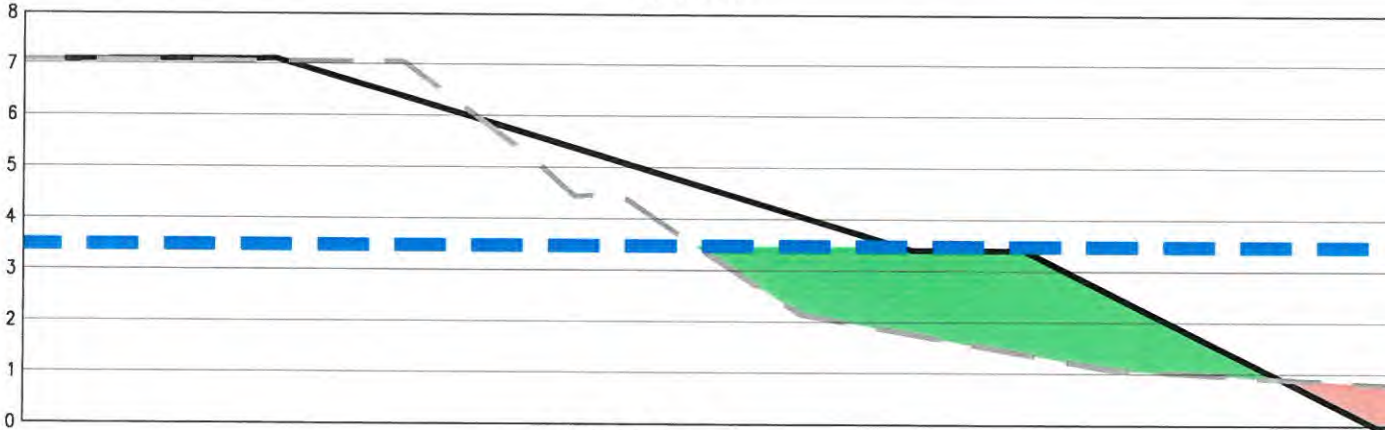
PROJECT
DEVELOPMENT ON LAND AT DICKIES BOATYARD PHASE 2

DRAWING
HEADLAND AREA OF FILL SECTION 73 APPLICATION

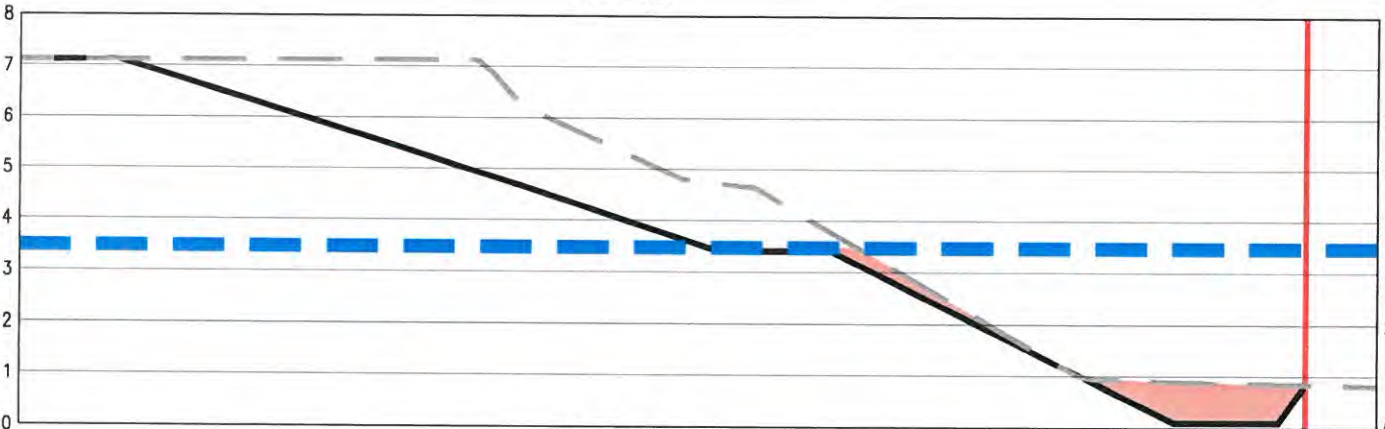
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SECTION G-G
SCALE 1:100



SECTION H-H
SCALE 1:100



SECTION I-I
SCALE 1:100

Legend

- Development Boundary
- - - Existing Ground Profile
- Proposed Formation Profile
- - - MHWS (3.6m AOD) for existing site conditions
- Extent of proposed excavated (cut) material on seaward side of MHWS
- Extent of proposed deposited (fill) material on seaward side of MHWS

Notes

1. All dimensions are in metres unless otherwise stated
2. All levels are in metres above Ordnance Datum
3. Extent of cut and fill volumes shown are based on a comparison between existing ground levels and proposed formation levels and does not include for any rip-rap volumes.
4. See Drawing 3475-2/210 for Cross Section locations

REV	DATE	NATURE OF REVISION	BY	CHECKED
A	19.08.2018	SECTION G-G AMENDED TO SUIT 200F GA	JAE	CJ

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PROJECT: DEVELOPMENT ON LAND AT DICKIES BOATYARD PHASE 2

DRAWING: CROSS SECTIONS G-G TO I-I SECTION 73 APPLICATION

SCALE	1:500	SHEET	A3	DRAWN	CHD	DATE	BY	CHKD	DATE	BY	CHKD
				JAE	DE	17.01.18	DE	DE		DE	

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DEVELOPMENT ON LAND AT DICKIES BOATYARD PHASE 2

PROPOSED SITE CROSS SECTIONS F-F

Scale: 1:500

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REV	DATE	NATURE OF REVISION	BY	CHECKED
A	18.08.2019	AMENDED TO SET 200P GENERAL ARRANGEMENT	JMC	CJ

