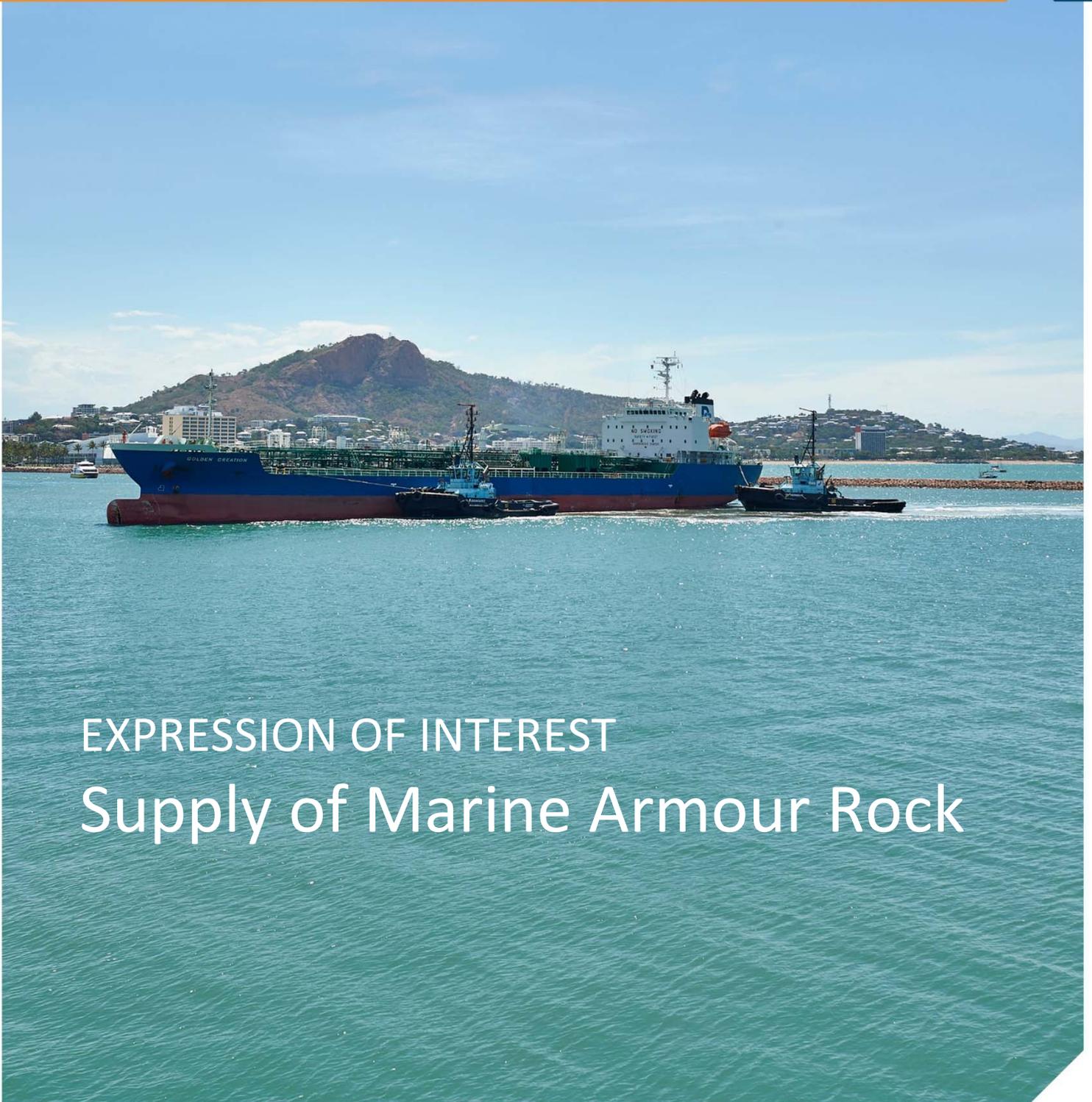




# TOWNSVILLE CHANNEL CAPACITY UPGRADE



EXPRESSION OF INTEREST

# Supply of Marine Armour Rock

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## INTRODUCTION

### PURPOSE

Recent demand studies have shown potential for growth in a variety of existing and new commodities through the Port of Townsville (Port). The Port is an important trade gateway for Northern Australia supporting an economy and providing opportunities for regional and economic growth. As one of the four Priority Ports under the Sustainable Ports Development Act 2015 (Qld) and the largest mixed commodity port in North Queensland, the Port is ideally positioned to support increased growth in line with State and Federal governments' objectives. Upgrades to the Port's existing infrastructure continue to enable it to respond to its environment including increased demand for trade through Townsville.

However, the Port is currently being limited by the capacity of its access channel and should this limitation continue there is a real risk that trade will decline as larger vessels are now more frequently used to achieve economies of scale in shipping. This risk significantly impacts the realisation of future regional and economic opportunities for Northern Australia.

Accordingly, Port of Townsville Limited (POTL) recently obtained environmental approvals to proceed with works to upgrade the Port's channel to overcome its current limitations. The Channel Capacity Upgrade Project (CCU Project) involves the widening of existing navigational channels to the Port to allow larger vessels safe access (and to improve navigational safety for existing vessels). The capital construction cost of the project is \$193.5 million and will take up to six years to complete. This project will enable the Port to respond to existing demand and significant increases in forecast trade for all commodities moved through the Port further facilitating the regional and economic growth of North Queensland and Northern Australia.

The CCU Project involves:

- widening of the Platypus Channel from 92 metres width to 180 metres (at the harbour entrance) tapering to 135 metres at the northern 'dog leg';
- widening of the Sea Channel from 92 metres to 120 metres at the connection to the Platypus Channel to the most seaward end;
- construction of rock walls and revetments forming receival ponds for beneficial re-use of all capital dredge material from the channel widening works, which will create a ~60 hectare reclamation area;
- establishment of a quarry to supply or supply from an existing quarries of marine-grade armour rock required for rock walls and revetments; and
- installation of navigation aids in alignment with the new channel configuration.

The purpose of this Expression of Interest (EOI) process is for POTL to assess the interest of the market to supply marine-grade armour rock required for the rock walls revetments for the CCU Project. This EOI document details:

- the requirements for Respondents interested in registering their interest in supplying the marine-grade armour rock;
- provides an overview of the Port and, in particular, the CCU Project;
- details POTL's objectives;
- specifies the requirements for the preparation and submission of responses;
- outlines how responses will be evaluated; and
- specifies the procedures and protocols governing the EOI process.

## BACKGROUND

### REGIONAL CONTEXT

North Queensland spans a land mass of some one million square kilometres with a total population of around 700,000 people. North Queensland has been one of the fastest growing regional economies in Queensland, if not Australia, over the past 15-20 years and has one of the highest population growth rates in Australia. Significant industries include mining, construction, manufacturing, property and business services, health and education, public administration and defence.

Townsville is the largest city in Northern Australia and is, in fact, the largest Australian city north of the Queensland South East Corner, with one of the strongest economies in the country. In 2014, the Townsville region population was estimated at \$13.501 billion, representing 4.42% of Queensland's Gross State Product of \$305.354 billion and 0.84% of Australia's GRP of \$1.610 trillion.

Australia depends on maritime trade. The country's 77 trading ports handle 1.2 billion tonnes of trade worth \$438 billion. Queensland's 15 trading ports handle just over a quarter of this trade. Ports are a vital part of the freight and logistics industry supporting cities and regional centres. They are the country's trade gateways, facilitating imports and exports of goods that underpin the national economy and social standards of living.

Port of Townsville is a multi-purpose seaport that serves the geographically large hinterland region of Northern and North-West Queensland. Predominant trades include mineral concentrates and ores, agricultural products and commodities that support a large regional population centre, as well as supporting a significant military presence and cruise ship operations.

### PORT OF TOWNSVILLE

The Port of Townsville is a significant piece of economic and social infrastructure for Queensland and Australia, handling around 10.5 million tonnes of trade per annum worth more than \$10 billion each year, and servicing 70% of the population of Northern Australia. Townsville is designated as one of four Priority Ports under the Sustainable Ports Development Act 2015 (QLD) where future expansion is to be concentrated to meet Queensland's growing trade needs.

Since establishment in 1864, the Port of Townsville has been intrinsically tied to the prosperity and sustainability of North Queensland. Townsville's eight berths handled more than \$10 billion in trade during the 2014–15 financial year. With its close locality to Asian markets, it is ideally placed to service the growing economy.

Geographically, Townsville is exceptionally well positioned, connecting to over 240 Ports in 42 countries, accommodating over 20 shipping lines. Three quarters of Port of Townsville's trade is with Asia, and Port of Townsville has the fastest direct shipping connection from Australia to mainland China (Shanghai) for containerised trade.

Commodities/cargoes that pass over the Port of Townsville's wharves include:

- Imports: Motor vehicles, general cargo, cement, sulphuric acid, fertiliser, copper nickel, zinc, copper anode, petroleum products, gas, sulphur, containers, tyres, coke.
- Exports: Sugar, general cargo, fertiliser, containers, cattle, refrigerated meat, magnetite, copper, lead, zinc, zinc ferrites, molasses, project cargo, scrap metal, sulphuric acid.

Port of Townsville had 668 vessel arrivals in 2014–15, with 1407 vessel movements (inclusive of movements between berths). Port of Townsville handled 10.5 million tonnes of trade worth more than \$10 billion in 2014–15. This predominantly included mineral ores, concentrates and refined metals, agricultural products, fuels, cement and general cargo. The Port of Townsville is Queensland's second largest container port with approximately 60,000 containers being handled per annum in recent years.

## THE OPPORTUNITY

### CCU PROJECT DESCRIPTION

Planning for the expansion of facilities at the Port to cater for growth in key trades is well advanced, with recent demand modelling showing potential for trade to increase to 48 Mtpa by 2040. The proposal for the CCU Project was developed following extensive investigations since 2007, when the original need for a number of Port capacity upgrades were identified. The CCU Project aligns with the Port Master Plan 2007, Port Development Plan 2009, Townsville Port Expansion Environmental Impact Statement 2013 and Additional Environmental Impact Statement 2016. The CCU Project will enable existing port and transport assets to be optimised and facilitate forecast trade growth for the region.

The CCU Project involves the widening of the existing navigational channels to the Port to allow larger vessels safe access (and to improve navigational safety for existing vessels). The CCU Project involves:

- widening of the Platypus Channel from 92 metres width to 180 metres (at the harbour entrance) tapering to 135 metres at its seaward end;
- widening of the Sea Channel from 92 metres to 120 metres;
- construction of rock walls and revetments forming receival ponds for beneficial re-use of all capital dredge material from the channel widening works, which will create a ~60 hectare reclamation area;
- establishment of a quarry to supply or supply from existing quarries of marine-grade armour rock required for rock walls and revetments; and
- installation of navigation aids in alignment with the new channel configuration.

The Sea Channel extends 6.54 kilometres from the ocean past Magnetic Island to connect with the Platypus Channel, which extends 6.6 kilometres to the Port's harbour entrance. The Platypus Channel is currently declared to a depth of -11.4 metres depth LAT and is 92 metres wide across the base. The Sea Channel is also 92 metres wide across the base, and is currently declared to a depth of -11.5 metres depth LAT. The Sea Channel extends past Magnetic Island, to the point of open deeper water for vessels where no further dredging is currently required.

The CCU Project will see the widening of both channels from the existing 92 metre width to sectional widening of 120 metres at the sea end of the Sea Channel to 180 metres width at the Platypus Channel harbour entrance. This tapering and profiling will allow for larger vessels to enter the port.

### EXPRESSIONS OF INTEREST

All capital dredge material associated with the CCU Project will be brought to land through a reclamation program, which will expand the Port land footprint to the north-east. These works specifically include creation of rock walls and revetments with placement of approximately ~1.2 million tonnes of armour rock to create receival area for the capital dredge material and to provide an extension north-east of the existing Port footprint. It is expected that dredging of approximately 3.9 million cubic metres of material will be required, with all capital dredge material to be placed in the new receival ponds for beneficial re-use to create a ~60 hectare reclamation area.

As part of the preliminary planning works for the project, an opportunity exists for the market to express interest in supplying the marine grade armour rock required for the CCU Project.

## PROCESS DESCRIPTION

### EXPRESSION OF INTEREST PROCESS

POTL proposes the following indicative timeframe for the EOI Process:

<b>Step 1</b>	<b>Issue EOI</b> Documentation will be available at 12:00 pm as per details in advertisement and as issued by POTL Contact Officer.	<b>Monday 19<sup>th</sup> March 2018</b>
<b>Step 2</b>	<b>Lodgement of EOI Submission by Respondents</b> Conforming submissions must be received by 12:00 pm in the manner prescribed in this EOI document.	<b>Friday 6<sup>th</sup> April 2018 at 3pm</b>
<b>Step 3</b>	<b>Evaluation of EOI Submissions</b> The Assessment Panel will conduct the evaluation of proposals and either put forward recommendation to POTL's Board to terminate the process or short list Respondent/s to submit proposals to a Request for Tender.	<b>Friday 27<sup>th</sup> April 2018</b>

This timeframe is intended to give an indication of the timing of the EOI process. The target dates are not binding on POTL, and POTL retains the absolute right to change any dates and times at its discretion.

### EOI EVALUATION

The purpose of this invitation is to enable POTL to assess the interest of the market to supply quality marine grade armour rock for the CCU Project.

Upon completion of the evaluation process, POTL may:

- seek further information or presentations from Respondents;
- invite short-listed Respondents to participate in a Request for Tender process; or
- terminate the process.

Short listed Respondents will be selected on the basis of a set of key evaluation criteria. Respondents are required to address information requirements contained in section 4 of this EOI.

## EXPRESSIONS OF INTEREST INVITED

POTL invites an expression of interest from parties for the supply of rock material. Further information on the rock material specification can be found in Appendix A.

The expression of interest is for the potential supply of a minimum of 200,000 Tonne packages for Primary Armour, Secondary Armour and Core rock within the single package. Assume haulage hours are between 7am to 6pm on weekdays and 7:30am to 1pm Saturday

Submissions must include the following information:

- Respondent Details:
  - Company Name.
  - ABN / can.
  - A brief overview of the Respondent including background information and details of their operations.
  - Place of incorporation / registration, registered office, postal address.
  - Number of employees on site.
  - Number of employees within the Townsville and Local Region.
  - Proof of Insurances and Approvals to trade as a Quarry supplier.
  - Respondents should provide the name, title, address, telephone number, mobile number and email address of their relevant contact person.
- Quality Assurance is to be met as per Appendix A.
- Quarry Assessment report as per Appendix A.
- Provide comment on your ability to stockpile onsite.
- Provide information on the Respondent's safety record, WorkCover claim history (including current), and documented breaches (if any). Likewise, regarding environmental performance against approval conditions.
- Provide an indication of the proposed hauling route the quarry would seek to adopt, if hauling
- Provide Photos of the site.
- Guaranteed production rate per day (taking into consideration allowance for other current or forecasted projects).
- The estimated \$/tonnage for a 200,000tonne package with the minimum rock split is as per below: (+/-2%), including and excluding haulage rates.
  - Core – 76%.
  - Secondary Armour – 9%.
  - Primary Armour – 15%.
- Any other items in Appendix A not reproduced in the above list.
- Respondents should detail any other matters or issues of relevance that they wish to raise with POTL.

The following provisional options to the tender are also requested:

- Option 1- Costs associated with separation and stockpiling of rock sizing onsite at quarry.
- Option 2 - Inclusion of haulage estimate to site to be a separate line item within the submission. (haulage is to include the requirement to provide weighbridge documents for each truck). In the submission provide commentary on likely truck haulage routes that may be used for haulage between the quarry and Port of Townsville Benwell Road Gate. NOTE: POTL will securing the operational approval for haulage for the trucking routes just past the turn into/out of the Quarries to the construction work front. Excluding the compliant safe turn into and out of the

quarries onto the main highways, which remains the responsibility of the Quarry traffic management plans.

- Option 2 - Alternative Rock Splits that can be offered by the quarries that may better suit the natural geometry of the localised quarry site. This alternative option may be provided in addition to the specified rock design in Appendix A, as an alternative consideration by the CCU design team.
- Variation 3- Impacts on \$/tonnage if larger packages (say 300,000tonnes) are considered.

**Note:** Submissions as Alternative rock design splits and quality other than that listed in Appendix A, must in all cases arising be clearly marked as “ALTERNATIVE OPTION”. The Principal may in its absolute discretion reject any Alternative Options as invalid if proven the quality and sizing of the alternative rock design doesn’t achieve the design intent nor present as value for money by the assessing CCU Team.

Respondents should be able to on request provide the following additional information:

- (a) Evidence of necessary management plans for the management of environmental impacts of operation; and
- (b) Have the ability to provide relevant evidence of Approvals Insurance, permits, approvals and licences relevant to operate as an approved quarry for the supply of rock

Short listed candidates at their cost, if short listed, may be required to produce a sample blast to validate their ability to produce rock specifications as per Appendix A.

All submissions must remain valid and open for acceptance for a minimum period of ninety (90) days from the submission date.

## CONDITIONS OF EOI

By lodgement of a response, each Respondent is deemed to have accepted the general terms and conditions set out in this section.

### LODGEMENT OF PROPOSALS

Respondents are to submit:

- An electronic version through QTender website;

The submission is to be clearly labelled **“CCU Project – Supply of Marine Armour Rock EOI”** and is to be submitted by no later than **3:00pm on Friday, 6th April 2018**.

A proposal or additional non-solicited information submitted after the closing time and date referred to above is a late proposal. A late proposal will be excluded from consideration unless POTL otherwise determines, in its absolute discretion and without having any obligation to do so, that it is appropriate for a late proposal to be considered.

### POTL CONTACT OFFICER

All enquiries in relation to the EOI document or the EOI process should be submitted in writing, through the QTender Website, addressed to the CCU Technical Lead.

POTL will aim to respond to inquiries within 2 business days of receipt.

At its absolute discretion, POTL may pass on to all Respondents, any written response by POTL to questions asked by any Respondent.

POTL will only be bound by information provided to Respondents in writing from POTL’s CCU Technical Lead.

### COSTS BORNE BY RESPONDENTS

No Respondent shall have any claim of any kind against POTL, the State of Queensland or advisors to any of them (whether in contract, in tort including negligence, in equity, at law, under statute or otherwise) arising from or in connection with:

- (i) any costs, expenses, losses or liabilities suffered or incurred by the Respondent in preparing and submitting a response, including any amendments or requests for further information by POTL;
- (ii) POTL exercising or failing to exercise, in its absolute discretion, any discretion, right or power it has under or in connection with this EOI or the response; or
- (iii) any of the matters or things relevant to this EOI or the response in respect of which the Respondent must satisfy itself under this EOI (including request for Quarries to undertake a blast if required to demonstrate the quality and sizing of the rock).

### CONFIDENTIALITY

Respondents must keep confidential and not:

- (i) disclose to any person; or
- (ii) copy, use or otherwise deal with for any purpose, any information regarding the EOI, except to the extent:
  - (a) the Respondent is specifically authorised in writing by POTL.

- (b) the information is disclosed to and used by others (who are also bound to keep the information confidential) for the purposes of enabling the Respondent prepare a response; or
- (c) the information is already in the public domain, otherwise than because of a breach by the Respondent of these confidentiality obligations.

Respondents should note that the Right to Information Act 2009 (Qld) (the RTI Act) allows members of the public rights to be given access to certain documents held by public sector bodies (including POTL). These access rights are limited by exceptions and exemptions necessary for the protection of the public interest and private and business affairs of persons or organisations in respect of which information is collected and held by the public sector bodies.

All or part of a response may be disclosed to third parties if there is a requirement to do so under the provisions of the RTI Act. Any information that is of a confidential nature or concerns the business, professional, commercial or financial affairs of a Respondent, the disclosure of which could reasonably be expected to have an adverse effect on those affairs, may be exempt from disclosure under the RTI Act and should be marked by the Respondent as follows:

“RTI ACT – SENSITIVE BUSINESS INFORMATION”

- Confidential to [entity name]
- Refer to [name and title of company representative who is claiming exemption]
- Telephone [direct telephone number]

Marking information in the manner stated above will not necessarily prevent disclosure of the matter in accordance with the RTI Act. Any decision to grant access to a document will be determined by the requirements of the RTI Act. Respondents will not be entitled to make any claim against POTL in relation to any actions taken by it in relation to, or under, the RTI Act.

By submitting a response (whether or not it complies in all respects with this EOI), a Respondent undertakes not to apply under the RTI Act for information regarding any proposal by another Respondent.

## **PRIVACY ACT COMPLIANCE**

In relation to any personal information as defined in the Privacy Act 1988 (Cth) (the Privacy Act) provided by a Respondent in connection with the Respondent’s response, the Respondent warrants to POTL that:

- (i) the Respondent has obtained the consent of each individual about which any sensitive information (as defined by the Privacy Act) is provided; and
- (ii) the Respondent has ensured or will ensure, within the time required by the Privacy Act, that each individual about whom any personal information (as defined by the Privacy Act) is provided has received a written statement setting out all of the matters required by the National Privacy Principle 1.3:
  - (a) in relation to disclosure of the personal information to POTL or any of its officers, employees, agents or advisors requiring the information for the purposes set out in subparagraph (ii); and
  - (b) disclosing that the persons referred to in subparagraph (i) will use the personal information for the purposes of reviewing and assessing the Respondent’s response.

The Respondent will comply with the provisions of the Privacy Act in relation to any personal information provided to them by POTL or by any of its officers, employees, agents or advisors.

## **NO CONTRACT, NO RECOURSE, NO LIABILITY**

- (a) This EOI has been prepared to give potentially interested parties background information on the EOI process and must not be construed, interpreted, or relied upon, whether by expression or implication, as an offer capable of acceptance by any person, or as creating any form of contractual, quasi-contractual, restitutionary or promissory estoppel rights, or rights based upon similar legal or equitable grounds.
- (b) POTL may, at its discretion and at any time, add to, vary, modify, amend, suspend, defer or terminate this EOI. Respondents will have no claim against POTL or the State of Queensland in connection with either the exercise of, or failure by, POTL to exercise their discretion (including but not limited to recovery of costs associated with preparing responses, loss of expectation, loss of opportunity, or any other form of consequential or economic loss).
- (c) Any EOI response made is subject to an express acknowledgement by the Respondents that, without limiting any of POTL rights under this EOI, POTL and the State of Queensland have no liability to the Respondents and the Respondents will have no recourse against POTL for any cost, loss, expense, claim or damage (including but not limited to recovery of costs associated with preparing responses, loss of expectation, loss of opportunity, or any other form of consequential or economic loss) if, for any reason, POTL does not proceed with this EOI (or proceeds in an altered form from that contemplated in this EOI) including as a result of POTL:
  - not inviting a Respondent to participate in any subsequent phases of the process;
  - not proceeding with the EOI process or any part of it;
  - failing to obtain any approvals from the State of Queensland including relevant shareholding Ministers;
  - failing to obtain approvals from the boards of POTL;
  - failing to obtain any other relevant approvals relating to the CCU Project; or
  - exercising any other right under this EOI or at law.

Participation in this EOI is at the Respondent's sole risk, cost and expense.

## **DISCLAIMER**

By participating in the EOI, each Respondent will be taken to have acknowledged that:

- whilst POTL has taken care in the preparation of all information in connection with the EOI:
  - neither POTL nor any related body corporate of POTL nor any of their officers, employees, consultants, officers, advisors or agents gives any warranty, nor makes any representations (express or implied) as to the completeness, adequacy, suitability or accuracy of that information; and
  - the information has not necessarily been independently verified; and
- it has not relied on the accuracy of any information provided by POTL, its employees, consultants, officers, advisors or agents and has made its own investigations and taken its own professional advice in relation to the EOI and information provided under it.

Respondents are responsible for:

- examining this EOI, any documents referenced in or attached to this EOI and any other information made available by POTL to Respondents in connection with this EOI;
- obtaining and examining all further information which is obtainable by the making of reasonable enquiries relevant to the risks, contingencies, and other circumstances having an effect on their EOI response; and
- satisfying themselves as to the accuracy and completeness of their submission to the request for EOI.

## **RESPONDENT'S LEGAL AND ETHICAL OBLIGATIONS**

Each Respondent must, in preparing and lodging a response, comply with all applicable laws, legal requirements and acceptable probity standards. Without limiting the application of this clause, the Respondent and each member must not:

- (i) collude with, accept any commission from, or offer any commission to any other prospective Respondent, other Respondent or member of another Respondent;
- (ii) disclose any part of its response (or any draft thereof) to any other prospective Respondent or other Respondent;
- (iii) enter any contract, arrangement or understanding with any other prospective Respondent or Respondent or any trade, industry or other association with the effect that if the Respondent is selected a benefit will be conferred on any other party;
- (iv) enter any improper or anti-competitive contract, arrangement or understanding with any other person in connection with this EOI; or
- (v) offer any incentives, gifts or other favours to any person who is in any way involved with, in a position to influence, or capable of providing technical or other advice to, those who are involved in any way with the evaluation of the responses.

## **OWNERSHIP OF PROPOSALS**

All EOI responses will become the property of POTL on submission and will not be returned to Respondents.

Any intellectual property right (including copyright) that may exist in a proposal will remain the property of the Respondent. Any element of a response considered to carry any intellectual property rights should be clearly identified by the Respondent. Where POTL, in its absolute discretion, determines that such elements are subject to such a right, POTL will treat that element as protected.

By submitting a response (whether or not it complies with this EOI), the Respondent will be taken to have licenced POTL and each of its officers, employees, agents and advisors to use, copy, adapt, modify, disclose or do anything else necessary, at POTL's absolute discretion, to all material (including material that contains any intellectual property rights of the proponent or any Respondent member or other person) contained in a response, for the purpose of evaluating and clarifying that response.

## APPENDIX A – ROCK WALL SPECIFICATION

### DEFINITIONS

The following applies throughout the Specification;

- **“Principal”** means Port of Townsville Limited.
- **“Superintendent”** means person/s appointed by the Principal to undertake the role of Superintendent.
- **“Designer”** means POTL and its consultants, responsible for the engineering design as represented on the reference drawings.
- **“Supplier”** means the party contracted to supply quarry materials from one or more quarries.

### STANDARDS AND CODES OF PRACTICE

All materials, workmanship and testing must conform to the requirements of the latest edition of the following standards and codes of practice, as detailed below in Table 1, except as explicitly varied within this Specification.

Table 1: Standards

Standard	Title
AS 1470	Health and Safety at Work – Principles and Practices
AS 1141.6	Methods for Sampling and Testing Aggregates: Particle Density and Water Absorption of Coarse Aggregate
AS 1141.23	Methods for Sampling and Testing Aggregates: Los Angeles Value
AS 1141.24	Methods for Sampling and Testing Aggregates: Aggregate Soundness – Evaluation by exposure to sodium sulphate solution
AS 4133	Methods of testing rocks for engineering purposes
AS 1289	Methods of testing soils for engineering purposes
ISO 17025	General Requirements for the Competence of Testing and Calibration Laboratories
CIRIA Special Publication 83 / CUR Report 154 (1991)	Manual on the Use of Rock in Shoreline and Coastal Engineering
CIRIA (2007)	C683 The Rock Manual
AS 1174	Methods for sampling and testing aggregates

## ROCK MATERIAL SPECIFICATION

### GENERAL REQUIREMENTS

Rock and quarry materials must be naturally occurring, dense and of sound material.

The quality of the rock and quarry materials must be such that it:

- Conforms with the specified physical, chemical and petrographic test parameters and acceptance criterion detailed in Appendix A of this Specification.
- Is free of cracks and fissures, bedding planes, cleavage planes, foliation planes, seams, veins, shale layers, stylolite seams, laminations, unit contacts and other defects which may result in breakdown, fracture or weathering of the rock during handling, transportation, placing and in the environment of the site of the works.
- Does not contain visually observable or chemically detectable impurities or foreign matter defects which may result in breakdown, fracture or weathering of the rock during handling, during transport, during placing and in the environment of the site of the works.
- Is of such character that it will not be subject to disintegration and erosion by the action of air, seawater, wetting and drying, extremes of temperature and impact due to wave action or any other natural or climatic factors.
- Rock and quarry materials must be free from quarry fines, soil, peat, loam, clay or any organic matter.

### ROCK GRADING

Rock grading of each class of rock must comply as set out in Table 2 to Table 4 below.

Table 2: Primary Armour Stone Grading

PRIMARY ROCK - Nominal Rock Mass % Passing by Size (Max)					
	W <sub>min</sub> (kg)	W <sub>15</sub> (kg)	W <sub>50</sub> (kg)	W <sub>85</sub> (kg)	W <sub>max</sub> (kg)
Min	3650	4000	4850	5500	6000
Design	4300	4800	5700	6500	7000
Max	4950	5500	6550	7500	8000

Table 3: Secondary Armour Stone Grading

SECONDARY ARMOUR - Nominal Rock Mass % Passing by Size (Max)					
	W <sub>min</sub> (kg)	W <sub>15</sub> (kg)	W <sub>50</sub> (kg)	W <sub>85</sub> (kg)	W <sub>max</sub> (kg)
Min	215	320	400	500	600
Design	270	400	500	615	750
Max	300	440	550	680	825

Table 4: Core Quarry Run Grading

CORE ROCK - Nominal Rock Mass % Passing by Size (Max)					
	D <sub>min</sub> (mm)	D <sub>15</sub> (mm)	D <sub>50</sub> (mm)	D <sub>85</sub> (mm)	D <sub>max</sub> (mm)
Min	120	150	260	300	310
Design	122	155	265	302	315
Max	137	173	295	338	350

## **SHAPE OF ROCK**

Primary and secondary armour stone must not contain more than 50% by weight of rock with a length to thickness (L/d) ratio greater than 2.

No greater than 5% of the primary and secondary armour stone must have a length to thickness (L/d) ratio greater than 3. The length, L, is defined as the greatest distance between two points on the rock and the thickness, d, is the minimum distance between two enclosing parallel planes through which the rock can pass.

## **QUALITY ASSURANCE**

### **GENERAL REQUIREMENTS**

The Supplier shall be wholly responsible for identifying and securing all the necessary permits for the quarrying of the material.

The Supplier shall also be responsible for the payment of all royalties, fees, access fees, charges, bonds or the like which may be required for the supply of the material.

Adequate provision must be made to allow the Superintendent to inspect the rock at source.

The Supplier shall notify the Superintendent and seek approval for any changes in the rock production/handling methods and of any relocation of the blast face within the quarry.

### **SAMPLE PRODUCTION LOADS**

The Supplier shall provide sample production loads for each class of rock. Sample production loads must be set aside at the quarry for the duration of the Contract.

The sample production for both primary and secondary armour stone representing the design gradings (Wmin, W15, W50, W85 and Wmax) must be marked with spray paint and used as a visual reference.

The sample production loads must be produced using the quarrying techniques proposed for full production. Each sample load must be fully tested to demonstrate compliance with the requirements specified in Annexure A – Rock Testing Suite.

Inspection and review by the Superintendent of the sample loads will not relieve the Supplier's obligation to ensure all rock for incorporation in the works are to the requirement of this Specification.

### **COMPLIANCE TESTING AND REPORTING**

The Supplier shall be entirely responsible for the planning and timely undertaking of the specified requirements for compliance testing and reporting. Moreover, the Supplier shall be entirely responsible for the cost of compliance testing and reporting throughout the term of the supply contract.

The Supplier shall ensure testing is carried out regularly to monitor the quality and size of rock, as per this Appendix A – Rock Testing Suite. The Supplier shall report the results to the Superintendent immediately they are available. The Superintendent may order additional tests or more frequent testing if the quarry is worked inconsistently or the testing demonstrates variability in the character of the rock.

## ROCK STOCKPILING

The Supplier shall undertake ongoing visual inspection of stockpiled primary and secondary armour and core quarry run, to ensure that the degree of weathering, shape, grading, rock quality and integrity is in accordance with this Specification. Likewise, the quarry is to allow suitable access to the quality assurance team for CCU to inspect stockpiles at the quarry site and stockpile area when requested.

## DOCUMENTATION REQUIREMENTS

The Supplier shall submit as a returnable schedule to the Principal, a Quarry Assessment Report. The Quarry Assessment report must provide details of the following:

- Quarry location/s and contingency quarry location/s.
- Evidence of a system for inspection and testing to identify rock which does not comply with the requirements of this specification prior to dispatch from the quarry.
- Details of rock quality control procedures proposed at the quarry to provide demonstrable evidence that the rock and quarry materials comply with the requirements of this Specification.
- A method statement outlining how the proposed quarry operations will produce the specified gradings of rock and quarry materials for the works.
- Anticipated production potential for each rock grading.
- Evidence that the quarry and/or contingency quarry locations contains sufficient rock for the works.
- Grading curves representing both primary and secondary armour and core quarry rock. A minimum of 50 primary and secondary armour stones must be weighed, by an appropriate weight scale, within the quarry. The mass of each rock must be recorded and grading curves produced. Provide photographic evidence of the mass of each rock within the Quarry Assessment Report. Measure the length and thickness of each armour stone, in accordance with section 2.1.2, and provide the length to thickness ratio within submittal to the Principal.
- The volume of rock stockpiles within the quarry to accommodate interruptions to production.
- The estimated duration which stockpiled rock will lay in the quarry stockpile.
- Evidence of the length of time that the rock has been stockpiled within each quarry stockpile.
- Details of how non-compliant rock will be quarantined from stockpiles of rock proposed for incorporation in the works.
- Within the Quarry Assessment Report, The Supplier shall include a geological assessment, undertaken by a suitability qualified engineering geologist, of the proposed quarry and/or contingency quarry location/s, identifying the following:
  - the nature of the rocks
  - the volume of the various rock formations
  - fracturing of the rock
  - orientation of rock bedding planes
  - foliations
  - the locations and quarry faces which the rock and quarry materials for each material class are to be won.
- Assessment of any changes anticipated in the geology of the production faces during the works that are likely to affect rock quality, type, block composition or integrity. Where potential changes are anticipated, details of the changing character of the rock must be provided.
- Assessment of the suitability of the rock to be supplied for its intended purpose. The geologist must prepare the report based on an inspection of the rock, the results of the petrographic analysis and laboratory testing undertaken.

- Demonstrable evidence of the proposed blasting pattern will minimise the production of latent fractures.
- Current results of testing by a NATA (National Association of Testing Authorities) accredited (or approved equivalent) testing laboratory of rock and quarry material from each location / quarry face. Testing must demonstrate the compliance of the proposed materials to this Specification and Appendix A – Rock Testing Suite. The test results must have been undertaken within the last 3 months.
- A test report from a NATA registered accredited testing laboratory on the physical and chemical properties of the rock to be supplied. The report must include the results of a petrographic analysis and have been undertaken within the last 3 months. The petrographic report must provide a statement on whether the rock proposed for use within the works is suitable for marine rock exposure and function.

The supplier shall allow for the updating and reproduction of the Quarry Assessment Report every 200,000 tonnes of any class of rock or every 12 months, whichever is sooner.

## ANNEXURE A ROCK TESTING SUITE

Characteristic	Standard	Acceptance Criterion		Frequency of Testing
Visual Inspection	Degree of weathering, shape, grading, rock quality and integrity	In accordance with the Provisions of this Specification		Allow continual throughout quarry process
Grading	n/a - Refer to Tables 2, 3 and 4 on page 13.	Refer to Tables 2, 3 and 4 on page 13.		Weekly or each 5,000 tonnes for each Class of Rock – whichever is the greatest tonnage
Length-to-Thickness ratio	Sampled tested and reported in accordance with Appendix 2, Section A2.3 of the “Manual on the use of Rock in Coastal and Shoreline Engineering”.	Refer to Tables 2, 3 and 4 on page 13.		Weekly or each 5,000 tonnes for each Class of Rock – whichever is the greatest tonnage
Saturated Surface-dry relative density	Sampled, tested and reported in accordance with AS 4133.2.1.2 – Rock Density	Armour rock	Average > 2,680 kg/m <sup>3</sup> 90% of rock, 2,600 kg/m <sup>3</sup>	Weekly or each 5,000 tonnes from a given working quarry face – whichever is the greatest tonnage
		Other grades of rock	Minimum 2,600 kg/m <sup>3</sup>	
Water Absorption	Sampled, tested and reported in accordance with AS 4133.2.1.2 – Rock Porosity tests	For armour	Maximum 2%	Weekly or each 5,000 tonnes from a given working quarry face – whichever is the greatest tonnage
		Other grades of rock	Maximum 3%	
Los Angeles Abrasion Test	AS 1141, Section 23	Loss must be less than 25% for all rock grades		Weekly or each 5,000 tonnes from a given working quarry face – whichever is the greatest tonnage
Sodium Sulphate Soundness Test	AS 1141, Section 24 for 5 cycles, the loss shall not exceed 2.5%.	Loss must be less than 2.5% for all rock grades		Weekly or each 5,000 tonnes from a given working quarry face – whichever is the greatest tonnage
Crushing Resistance	Ultimate Compressive Strength UCS test in accordance with AS 4133.4.2.1	Armour 80 MPa Minimum Filter 80 MPa Minimum Core 50 MPa Minimum Other Quarry Materials 50 MPa Minimum		Weekly or each 5,000 tonnes from a given working quarry face – whichever is the greatest tonnage
	i) The Point Load Index (IS50) (determined to AS 4133.4.1)	Armour 3.5 MPa Minimum Other Quarry Materials - 2.3 MPa Minimum		Weekly or each 5,000 tonnes from a given working quarry face – whichever is the greatest tonnage
Block Integrity	Drop Test Breakage Index, sampled tested and reported in accordance with Appendix 2, Section A2.11 of the “Manual on the use of Rock in Coastal and Shoreline Engineering”.	For all grades – 4% maximum		Monthly or each 15,000 tonnes from a given working quarry face – whichever is the greatest tonnage

The Superintendent may order additional tests or more frequent testing if the quarry is worked inconsistently or the testing demonstrates variability in the rock character.

Allow within Quotation for the quantum of testing required based on the frequency of testing specified in the table above.



**TOWNSVILLE  
CHANNEL  
CAPACITY  
UPGRADE**

**Registered Office**

Administration Building  
Benwell Road  
South Townsville QLD 4810

**p** + 61 7 4781 1500

**f** + 61 7 4781 1525

**e** [ccuproject@townsvilleport.com.au](mailto:ccuproject@townsvilleport.com.au)

**w** [www.channelcapacityupgrade.com.au](http://www.channelcapacityupgrade.com.au)