

Crown Resorts Limited

**Stage 1C Remediation &
Earthworks**

Issue | 10 April 2015

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 233906-00

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Contents

	Page
1 Introduction	2
1.1 Site Location and Context	2
1.2 Purpose of Report	2
1.3 Stage 1C Remediation and Earthworks	2
2 Guidelines and legislative requirements	4
2.1 NSW state legislation	4
2.2 Council of the City of Sydney <i>Policy for Waste Minimisation in New Developments</i> , 2005	5
2.3 Green Star	6
3 Construction waste	7
3.1 Construction waste streams	7
3.2 Construction waste management	9
3.3 Construction vehicles	11
4 Next steps	13

Appendices

Appendix A

Details of waste management form - Construction phase

1 Introduction

1.1 Site Location and Context

Barangaroo is located on the north western edge of the Sydney Central Business District (CBD), bounded by Sydney Harbour to the west and north; the historic precinct of Millers Point (for the northern half), The Rocks and the Sydney Harbour Bridge approach to the east; and a range of new development dominated by large CBD commercial tenants and the King Street Wharf/Cockle Bay precinct to the south.

The 22ha Barangaroo site is generally rectangular in shape and has a 1.4 kilometre harbour foreshore frontage, with an eastern street frontage to Hickson Road. The site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Central and Barangaroo South, and has been subject to multiple investigations that detail the physical and natural characteristics of the site.

1.2 Purpose of Report

This report has been prepared on behalf of Crown Resorts Limited to accompany a State Significant Development Application (SSDA) for remediation and earthworks at Barangaroo South.

1.3 Stage 1C Remediation and Earthworks

The works the subject of the SSDA are termed the Stage 1C remediation and earthworks.

The land which is the subject of the Stage 1C remediation and earthworks SSDA is located in the north-western corner of Barangaroo South. With reference to the Barangaroo ‘development blocks’, as identified within the approved Concept Plan Urban Design Controls (MP06_0162 MOD 6), the Stage 1C remediation and earthworks area is located to the west of Blocks 4A, 4B and 4C and incorporates part of Globe Harbour.

The Stage 1C remediation and earthworks are described as follows:

- Carrying out of remediation and validation within the Stage 1C remediation and earthworks area to ensure it is suitable for the intended future uses of the land;
- Construction of a perimeter retention wall system and internal stabilising walls (called the ‘Stage 1C groundwater retention wall system’) to the west of Block 4B and Block 4C. The Stage 1C groundwater retention wall system would be fully integrated with the Stage 1B retention wall system (as specified by Lend Lease in the EIS for SSD 5897-2013), with direct connections to create a unified groundwater retention wall system across Stage 1B and Stage 1C; and

- Bulk excavation within the perimeter of the Stage 1C groundwater retention wall, and the installation of lateral restraining structures to support the perimeter retention wall system.

2 Guidelines and legislative requirements

2.1 NSW state legislation

2.1.1 The Protection of the Environment Operations Act, 1997

The Protection of the Environment Operations Act 1997 covers the requirements for waste generators in terms of storage and correct disposal of waste. The Act establishes the waste generator as having responsibility for the correct management of waste, including final disposal.

2.1.2 Waste Avoidance and Resource Recovery Act 2001

Due to concerns about waste management practices and increasing volumes of waste, the NSW government introduced the Waste Avoidance and Resource Recovery Act 2001, superseding the Waste Minimisation and Management Act 1995 following its five year review.

The object of the Waste Avoidance and Resource Recovery Act is to encourage the most efficient use of resources, to reduce environmental harm, and to provide for the continual reduction in waste generation in line with the principles of ecologically sustainable development (ESD).

The WMP is a requirement for a new development in NSW and is written with reference to the NSW Waste Avoidance and Resource Recovery Strategy 2003, made under the Act.

The following hierarchy for managing waste, from most desirable to least desirable, meets the objects of the Act:

- Avoid unnecessary resource consumption;
- Recover resources (including reuse, reprocessing, recycling and energy recovery); and
- Dispose (as a last resort).

2.1.3 The NSW Waste Reduction and Purchasing Policy 2007 (WRAPP)

The NSW Waste Reduction and Purchasing Policy (WRAPP) requires all state government agencies and state owned corporations to develop and implement a WRAPP plan to reduce waste in four scheduled waste sources:

- Paper products;
- Office equipment and components;
- Vegetation material; and
- Construction and demolition materials.

WRAPP is not directly applicable to the project, but has been used as a guiding document for waste initiatives.

2.1.4 NSW Waste Classification Guidelines

The NSW EPA *Waste Classification Guidelines* 2014 provides guidance relating to classifying waste (Part 1), immobilising waste (Part 2), managing waste containing radioactive material (Part 3), and Acid sulphate soils (Part 4).

NSW EPA *Waste Classification Guidelines Part 1: Classifying waste* provides guidance which is directly relevant to Stage 1C Remediation and Earthworks, as per the SEARs requirements for this development. EPA guidance for classifying and managing waste streams has been observed throughout this WMP.

2.2 Council of the City of Sydney Policy for Waste Minimisation in New Developments, 2005

The Council of the City of Sydney *Policy for Waste Minimisation in New Developments* ('CoS Waste Policy') was developed in 2005 in support of the NSW Waste Avoidance and Resource Recovery Strategy (2003). The CoS Waste Policy is the guiding document for many of the waste initiatives and requirements for the proposed adaptive reuse project.

The specific sections which pertain to the proposed development include:

- Section A – All developments
- Section B – Residential Provisions; and
- Section C – Commercial Provisions.

Key requirements of the CoS Waste Policy include:

- All commercial premises must have a dedicated and enclosed waste and recycling storage area which has adequate storage to meet generation rates
- All businesses must have written evidence, held on site, of a valid and current contract with a licensed collector for waste and recycling collection and disposal; and,
- All businesses are encouraged to include provisions within waste contracts that allow for the collection and recycling of significant waste streams.

Numerous other requirements are specified within the Waste Policy. These have been addressed throughout this WMP where required.

2.3 Green Star

A number of the Green Star credits under the existing Green Building Council of Australia (GBCA) Green Star Multi Unit Residential v1 rating tool relate to waste management.

This WMP will inform the development of a Construction Waste Management Plan to be prepared by the contractor (MAN-7). This credit is summarised below in Table 1.

Table 1 Example Green Star credits relevant to waste

Relevant Green Star Credit	Initiative	Target	Environmental Benefit	Requirements
Multi Unit Residential V1 MAN-7	Waste Management (construction) <i>Up to 2 points</i>	To encourage and recognise management practices that minimise the amount of construction waste to landfill (at least 80% of all construction waste to be reused or recycled).	Reduces waste sent to landfill; responds to resource depletion.	Appointment of a Contractor to: • Develop a Waste Management Plan, retain waste records and submit quarterly reports to the building owner, and • Achieve a 60% (1 point) or 80% (2 points) rate of recycle or re-use for construction/ demolition waste.

3 Construction waste

Construction works for this development are to take place with consideration of ‘principle led’ Green Star pathway goals, particularly in regards to use of recycled building materials and recycling of construction waste streams. The primary goal for waste management in the construction phase is to achieve maximum diversion of construction waste from landfill.

Section 3.1 below identifies the key waste streams associated with remediation and earthworks.

Section 3.2 below identifies waste management procedures, responsibilities and objectives.

3.1 Construction waste streams

As per the Secretary’s Environment Assessment Requirements (SEARs), an overview of the major waste streams resulting from construction is provided below in Figure 1. All potential sources of liquid and non-liquid wastes from construction have been included. An indication of the quantity of each waste stream is provided by highlighting those waste streams which are predicted to generate the greatest volume in orange.

Further detail regarding classification of contaminated and hazardous components of these waste streams is provided in section 3.1.1 below. Ongoing testing throughout earthworks and remediation will be required to identify and delineated contaminated materials, and subsequently define the fate of fill and natural material (recycle, treatment, and/or disposal).

Further detail regarding construction waste management is provided below in Section 3.2.

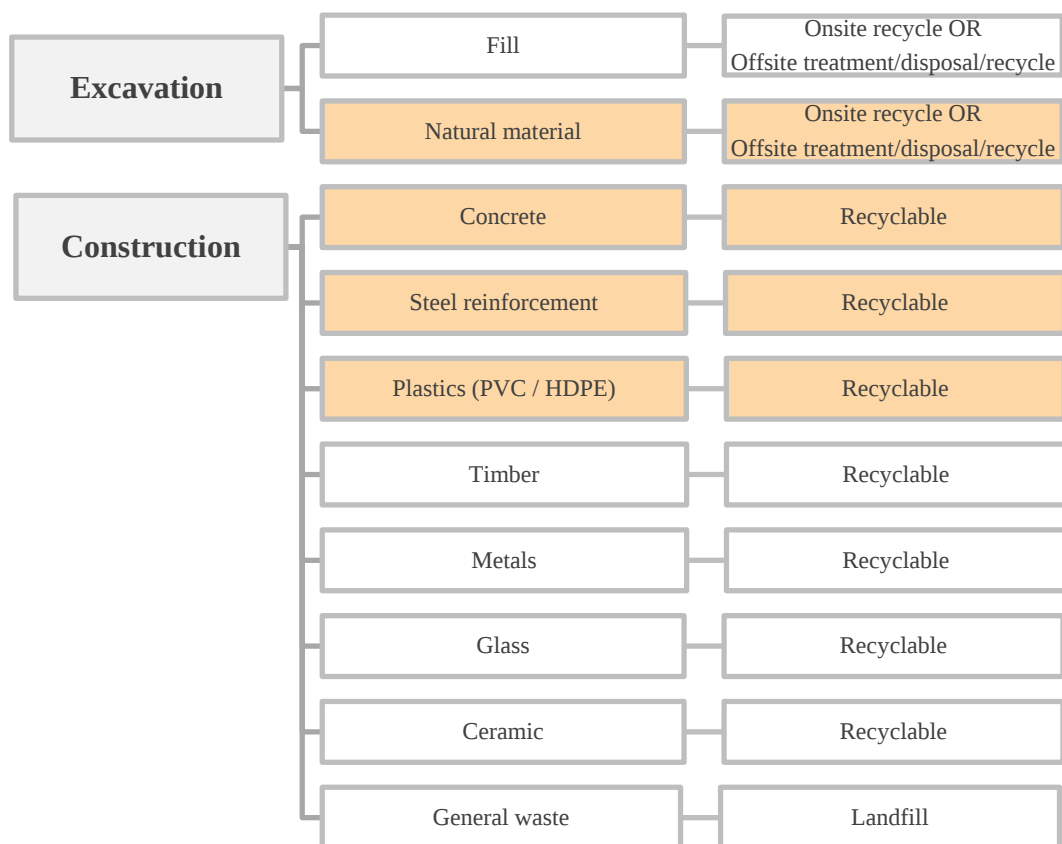


Figure 1 Excavation and construction waste streams

3.1.1 Contaminated materials

As outlined in the RAP¹, further work must be undertaken during remediation and earthworks to identify and delineate the exact quantities of contaminated waste streams across the site. Work to identify contaminated waste streams (including *in situ* classification) is to be carried out as per the strategies set out in the RAP, and in accordance with EPA *Waste Classification Guidelines 1 to 4*, 2014.

As per the SEARs requirements an initial summary of the estimated volumes of contaminated material to be removed as part of the basement excavation (including the D-wall construction) is as follows:

- General Solid Waste/Special Waste (asbestos) approximately 63,000 m³. This material would not require treatment prior to disposal to landfill.

¹ AECOM (2015), *Remedial Action Plan: Crown Hotel Development (Part of ORWN Area), Barangaroo South*,

| Issue | 10 April 2015 | Arup

- Restricted Solid Waste, approximately 2,000 m³ to 5,000 m³. This material consists of contaminated soil that would be of varying quality. With treatment some of this material may be suitable for disposal as General Solid Waste.
- Hazardous Waste, approximately 1,200 m³ of material, specifically marine sediment contaminated by tar. This material would require treatment prior to disposal to landfill. These estimated volumes are based on the currently available information and assumptions (AECOM 7 November 2013). Further details regarding site contamination are included in the Remedial Action Plan (RAP)². The RAP also identifies the history of the site and associated spoil material.³

3.1.2 Non contaminated materials

Further work must be undertaken during remediation and earthworks to identify and delineate the quantities and location of clean materials which are suitable for reuse onsite. Further detail is provided in the RAP. Management considerations, including preference for onsite reuse are outlined below in Section 3.2.

3.2 Construction waste management

Waste generation and management during excavation and construction phases is the responsibility of all on site, as it relates to materials procurement, handling, storage and use. Waste generated during construction will be reused and recycled as a priority, or disposed to landfill otherwise.

All waste is to be classified according to *EPA Waste Classification Guidelines 1 to 4, 2014*. Waste which cannot be beneficially used onsite is to be treated and/or disposed of offsite according to EPA guidelines. Where possible, clean spoil generated from the site will be beneficially re-used onsite. Further details on material fate for all EPA classified waste streams is included in the RAP⁴.

Further detail regarding the transportation, assessment and handling of waste including waste classified as contaminated under the *EPA Waste Classification Guidelines 1 to 4, 2014* is provided throughout the RAP. This includes proposed controls for managing the environmental impacts of these activities.

As per the SEARs requirements of this development, where ever possible, efforts must be made to minimise the environmental impacts associated with waste. This includes waste generation, transportation, and handling. Key techniques to be implemented by the construction contractor include:

- Recycling of waste and onsite reuse of spoil and natural materials (non-contaminated) where ever possible; and
- Efficient storage transport of waste to minimise vehicle emissions.

² AECOM (2015), *Remedial Action Plan: Crown Hotel Development (Part of ORWN Area), Barangaroo South*, pp. 34-36.

³ Ibid, pp. 10-12.

⁴ Ibid, pp. 71-72.

Operational strategies to minimise environmental impacts associated with remediation and earthworks are to be developed in further detail by the assigned contractor.

3.2.1 Contaminated waste management

All contaminated materials require appropriate waste classification prior to disposal at suitably licenced waste facilities. All classification, treatment and disposal of contaminated materials is to take place according to EPA *Waste Classification Guidelines 1 to 4*, 2014. Further detail regarding classification (including onsite classification), treatment and disposal is provided in the RAP.

Proposed strategies for the tracking, handling, stockpiling, reuse/recycling of excavation materials for this development, including contaminated materials, are set out in detail in the in the RAP⁵.

The preferred remedial management strategies and controls are also included in the RAP⁶. In addition, the RAP includes guidance on both on- and off-site transportation of materials⁷.

All contaminated materials would require appropriate waste classification prior to disposal at suitably licenced waste facilities.

3.2.2 Construction waste storage

During construction, suitable areas on site (or off site, if necessary), will be provisioned which provide adequate space and access for:

- Storage of building materials
- Storage of demolition and construction waste
- Sorting of demolition and construction waste; and
- Removal of demolition and construction waste for recycling, re-use or landfill

Suitable onsite storage areas for construction materials and waste will be identified prior to commencement of construction in Construction Environmental Management Plan or similar.

3.2.3 Green Star objectives for construction waste management

Construction waste management will be performed to meet the specific goals of the project 'principle led' Green Star pathway. Within the Management category of Green Star, the Waste Management (MAN-7) indicator addresses construction waste management and is worth a maximum of 2 points:

- **MAN-7: Construction Waste Management** - To encourage and recognise management practices that minimise the amount of construction waste to

⁵ Ibid, pp. 67-72.

⁶ Ibid, pp. 54-57.

⁷ Ibid, p. 69.

landfill (at least 80% of all construction waste to be reused or recycled to achieve 2 points).

As a requirement of MAN-7, the construction contractor will develop a Construction Waste Management Plan (CWMP) in order to ensure that construction waste is minimised and diverted from landfill where ever possible. The MAN-7 indicator is the only directly applicable Green Star indicator to be influenced by the Construction Waste Management Plan.

In the case where any hazardous or dangerous substances are used or stored onsite by the construction waste contractor, the CWMP will provide details of procedures for the assessment, handling, storage, transport and disposal of all hazardous and dangerous materials used, stored, processed or disposed of. In addition, the CWMP will provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage, as per the SEARs requirements.

A construction waste tracking sheet is to be completed by the demolition contractor during this phase of the project, as provided in the CoS Waste Policy. This sheet is attached in Appendix C.

3.3 Construction vehicles

3.3.1 Access

Construction vehicles (including construction waste collection vehicles) will enter and exit the site via Lime St, in a forward direction only.

The predominant traffic routes construction that vehicles utilise to Barangaroo and the Stage 1C Remediation & Earthworks site are summarised below.

From the north and north-west:

- Harbour Bridge – Western Distributor – Bathurst Street – Liverpool Street – Harbour Street – Shelley Street – Erskine Street – Sussex Street (inbound); and
- Hickson Road – Napoleon Street – Kent Street – Western Distributor – Harbour Bridge (outbound).

This southbound truck activity would occur during peak hours as there is no access for general traffic from the Harbour Bridge to York Street between 6.30am to 9.30am (Monday – Friday).

From the west and south-west:

- Anzac Bridge – Western Distributor – Sussex Street – Hickson Road (inbound); and
- Hickson Road – Sussex Street – Western Distributor – Anzac Bridge (outbound).

From the south and east:

- Eastern Distributor – Cross City Tunnel – Western Distributor – Wattle Street – Western Distributor – Sussex Street – Hickson Road (inbound); and

- Sussex Street – Harbour Street – Cross City Tunnel (outbound).

3.3.2 Vehicle movements

The full impacts of construction traffic activity associated with the works planned in the Barangaroo precinct have been assessed, including an analysis of future truck movements out of the proposed access and egress points. Traffic analysis relating to Stage 1C is included in detail in the Stage 1C Remediation & Earthworks Construction Traffic Management Plan.

The works associated with the stage 1C remediation and earthworks is anticipated to occur between September 2015 and April 2017.

Activity	Start Date	End Date
Stage 1C Remediation and Earthworks	22 September 2015	20 April 2017

The Construction Traffic Management Plan concludes that the construction related traffic impacts arising from the proposed works can be appropriately managed.

4 Next steps

This WMP forms a framework to implement best practice for waste management across all design and planning stages. The waste management approach supports the Green Star requirement for the project to enhance outcomes for waste minimisation, reuse and recycling.

If planning approval is granted for the proposed development, this WMP will:

1. Inform the development of a detailed Waste Policy Design Compliance Certificate for the Construction Certificate application, which is to include details regarding disposal and recycling of different materials expected from demolition, construction, and the transport and destinations of these materials;
2. Inform the Construction Waste Management Plan (MAN-7);

Appendix A

Details of waste management
form - Construction phase

Details of waste management – construction phase

MATERIALS ON-SITE				DESTINATION		
Type of materials	Est. Vol. (m ³)	Est. Wt. (t)		REUSE AND RECYCLING		DISPOSAL
				ON-SITE - specify proposed reuse or on-site recycling methods	OFF-SITE - specify contractor and recycling outlet	- specify contractor and landfill site
Excavated Materials						
Garden Organics						
Bricks						
Tiles						
Concrete						
Timber – please specify						
Plasterboard						
Metals						
Other waste eg. ceramic tiles, paints, PVC tubing, cardboard, fittings						