

Barangaroo South Stage 1C Remediation and Earthworks Stormwater Management and Infrastructure Assessment Project Application



Prepared for
Crown Resorts Ltd.

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1 Introduction

1.1 Purpose of this Report

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

1.2 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.



Figure 1-1 Barangaroo South Locality Plan

2 Erosion and Sediment Control

The objectives of the erosion and sediment control for the development site are to ensure:

- Adequate erosion and sediment control measures are implemented prior to the commencement of construction and are maintained during construction; and
- Construction site runoff is appropriately treated in accordance with the requirements of City of Sydney Council, EPA, and relevant authorities.

As part of the works, erosion and sedimentation controls shall be constructed generally in accordance with the drawings, Council requirements and the NSW Department of Housing Manual, “Managing Urban Stormwater Soils & Construction” 2004 prior to any earthworks commencing on site.

2.1 Construction Phase

Prior to any earthworks commencing on site, all erosion and sediment control measures will be implemented generally in accordance with the Construction Certificate drawings. The measures shown on the drawings are intended to be a minimum treatment only, as the contractor will be required to modify the erosion and sedimentation control measures to suit the construction program, sequencing and techniques. These measures may include:

- A site security fence and silt fence is to be constructed around the site;
- Installation of sediment fencing downstream of disturbed areas, including any stockpiles;
- Installation of silt arrestors to collect site runoff and retain suspended particles;
- Use of dust control measures including covering stockpiles, hessian to site fences and watering of exposed areas;
- Placement of hay bales or mesh and gravel filters around and along proposed catch drains and around stormwater inlet pits; and
- Construction of temporary sediment basins as required, and
- Harbour silt curtains.

3 Earthworks and Remediation

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.

An excavation staging plan is presented in **Appendix A**.

4 Stormwater services

4.1 Existing Condition

4.1.1 External Catchments

4.1.1.1 *Stage 1B and 1C*

Based on interpretation of Area Laser Scan (ALS) data (as used by City of Sydney Council) and available survey data, the external catchment area draining to the Stage 1B development site is approximately 5.28Ha. Details of the catchments are as follows:

- **Catchment 5:** This catchment has a total contributing area of approximately 2.83Ha, which discharges into Gas Lane and Jenkins Street through a 750mm diameter pipe and then into an existing 1200mm diameter pipe which traverses the Stage 1B development site prior to ultimately discharging directly into Darling Harbour.
- **Catchment 6:** This catchment has a total contributing area of approximately 2.29Ha, which discharges into the existing Hickson Road in-ground stormwater drainage network prior to ultimately discharging into Darling Harbour through a series of varying diameter pipes traversing the Stage 1B/1C development site.
- **Catchment 7:** This catchment has a total contributing area of approximately 0.16Ha, which discharges to Hickson Road drainage and then through the site via proposed drainage.

Drawing SK01 presented in **Appendix B** details external sub-catchment areas and nominated discharge locations.

4.1.2 Existing Stormwater Infrastructure Diversion

The pre-development stormwater network is characterised by a series of in ground piped stormwater lines (typically between 300mm to 1800mm in diameter) draining Hickson Road and other external catchments through the Barangaroo site directly to the Harbour. There are four (4) major stormwater lines within Barangaroo South as presented on drawing SK02 in **Appendix C**.

As part of the Stage 1A and 1B works, diversions have been planned for Line A, B and C including:

- The southern stormwater system (Line A), which drains the Hickson Road and Napoleon Street intersection has been diverted south around the Stage 1A basement. These works are complete.
- As part of the Stage 1B works it is proposed to demolish Line B and C then divert towards the south and discharge to the harbour between Stage 1A and 1B. Line C runs through the Stage 1C area however the diversion works as part of Stage 1B will negate the need for any works in Stage 1C apart from demolition of the redundant stormwater pipe. The Stage 1B permanent diversion has undergone preliminary discussion with Sydney Water and will proceed to detailed design pending formal applications to Sydney Water.

4.1.3 Overland Flows and Flooding

4.1.3.1 *Historic Flood Data*

The City of Sydney Council has confirmed that there is no available historical flood data for the Barangaroo site or the external catchments to the site.

Localised flooding is known to occur within the bounds of Hickson Road.

4.1.3.2 *Existing Overland Flow Paths (Stage 1B and 1C)*

The most prominent overland flow paths are generally:

- i. **Catchment 5:**

1. Overland flow splits at the intersection of Gas Lane and Jenkins Street prior to discharging into the existing Hickson Road in-ground stormwater drainage network.
- ii. **Catchments 6 and 7:**
 1. North and South on Hickson Road towards an existing low point generally located in front of "The Bond"; and
 2. Through the development site.

4.2 Proposed Condition

4.2.1 Proposed Stormwater Infrastructure Diversion

The proposed works involve the diversion of the remainder of stormwater assets affecting Stage 1C, being Line D. Line D runs predominantly through Barangaroo Central however discharges to the harbour via Stage 1C Barangaroo South. Should Barangaroo Central works be undertaken in advance of Stage 1C then no diversion works would be required as part of Stage 1C and the existing discharge location could be utilised for the proposed development. However, should Barangaroo Central works not be undertaken, temporary diversion of Line D would be required, most likely to the south to join Line B and C (subject to detailed design). Ultimately Line D will be discharged within the Barangaroo Central area.

The concept design for stormwater diversions are presented in **Appendix D**.

4.2.2 Overland Flow Impact

The key changes to overland flow paths and effects on existing stormwater infrastructure are as follows:

- The existing stormwater pipes for the external catchment that traverse the site are to be relocated due to the proposed earthworks and groundwater retention wall system;
- A harbour highest astronomical high tide water level of RL1.975 has been forecasted for the year 2100; and
- The proposed site levels preclude overland flow through the development from existing low points in Hickson Road.

5 Groundwater

Due to the excavation, groundwater water will be encountered during both the construction and operational phases of the development. The testing shows no contamination to the Stage 1C area however there is known contamination to the adjacent 1B site. During the construction phase, the groundwater will be treated and discharged to Darling Harbour in accordance with the guidelines established for Stage 1A.

6 Existing Utility Services

The Stage 1C site is not affected by any existing services.

7 Conclusion

This report supports a State Significant Development Application (SSDA) submitted to the Minister for Planning and Infrastructure pursuant to Section 75J of Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). The SSDA seeks approval for earthworks and remediation associated with the Crown Sydney Hotel Resort development.

Crown resorts Ltd. will enter into the necessary arrangements and obtain the necessary approvals from the

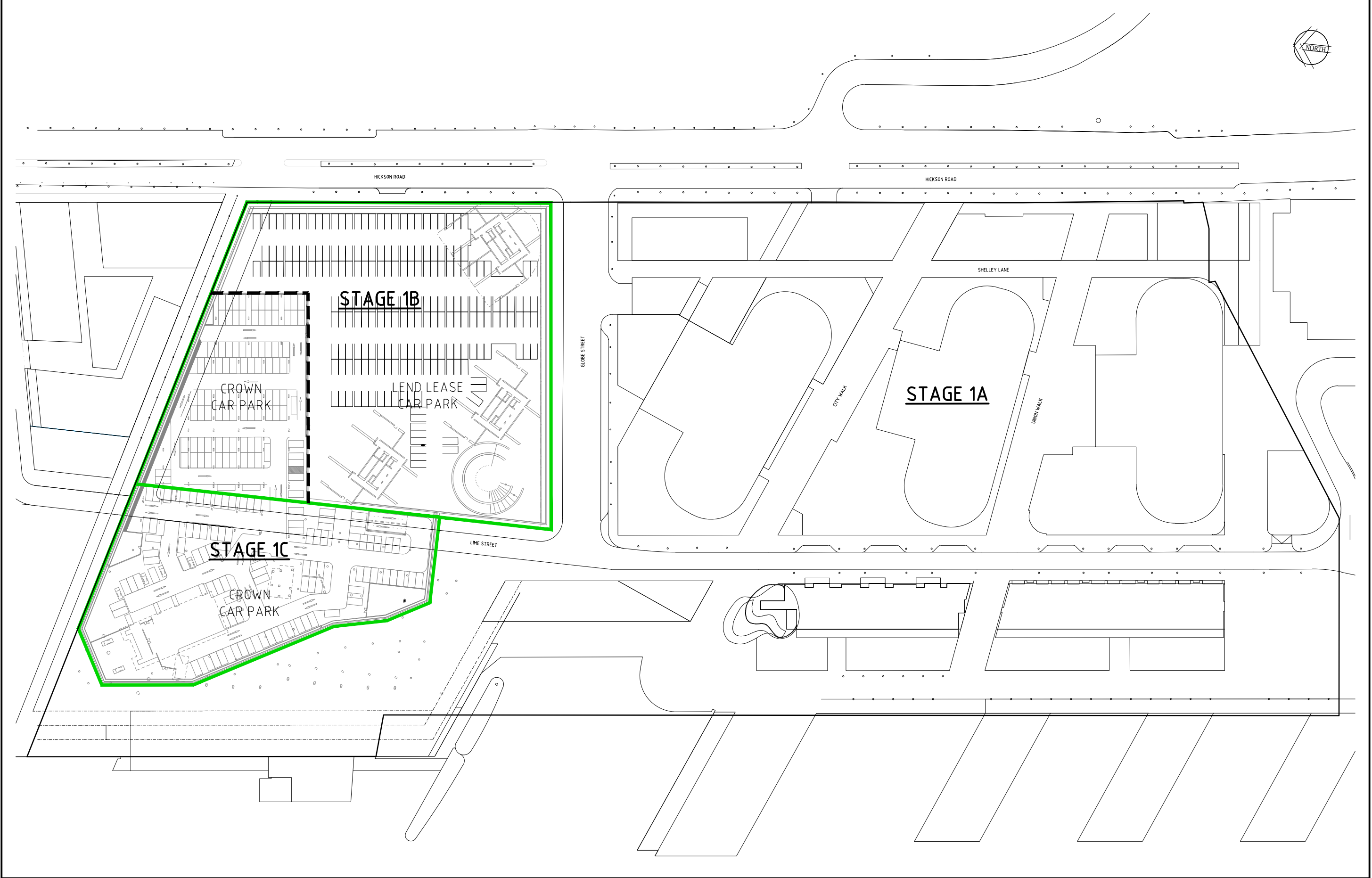
relevant authorities as required.

APPENDIX A

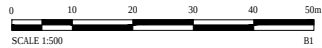
EXCAVATION STAGING PLAN

DATE PLOTTED: 17 February 2014 4:54 PM BY: ALEXANDER STEPHEN (SYDNEY)

XREF: GRP-SHT-B1; BU-LOGO-B1; 74216-38a_m; CID-SHT-B1; X-DETAIL SURVEY; X-BUILDING OUTLINES; X-STG1C ARCH BASEMENT L3
CAD FILE: N:\P\projects\061 FY 14\035_Crown Development Barangaroo\Drawings\B1\1 SKETCHES\035-SK000 (01) BASEMENT STAGING PLAN.dwg



Rev	Date	Description	Des.	Verif.	Appd.	Rev	Date	Description	Des.	Verif.	Appd.
1	17.02.14	ISSUED FOR INFORMATION	AD	AD	AD						



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Designed	AD	Date	FEB'14
Verified	AD	Date	FEB'14
Approved	AD	Date	FEB'14

Client	CROWN MELBOURNE LIMITED
	CIVIL ENGINEERING CONSTRUCTION DESIGN
	CROWN DEVELOPMENT BARANGAROO
	BASEMENT STAGING PLAN

Status	FOR INFORMATION ONLY			
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Datum	A.H.D.	Register	Scale	Size
			1:500	B1
Drawing Number	50614035-SK000			Revision
				01

APPENDIX B

STORMWATER CATCHMENT PLAN



CATCHMENT No.	FLOW (100yr ARI) (m³/s)	AREA (Ha)	DESCRIPTION
9	$Q_{99} = 2.35$	2.83	CATCHMENT DISCHARGES INTO GAS LANE THROUGH A Ø600 PIPE, THEN INTO AN EXISTING Ø1200 PIPE THROUGH THE STAGE 1B DEVELOPMENT SITE DIRECTLY INTO DARLING HARBOUR. OVERLAND FLOW SPLITS AT THE INTERSECTION OF GAS LANE AND JOKINS STREET AND DISCHARGES INTO HICKSON ROAD DRAINAGE.
10	$Q_{99} = 1.69$	2.29	CATCHMENT DISCHARGES INTO HICKSON ROAD DRAINAGE AND THEN DRAINS TO EXISTING STORMWATER SYSTEM, THROUGH THE STAGE 1B DEVELOPMENT SITE.
11	$Q_{99} = 0.2$	0.182	CATCHMENT DISCHARGES INTO HICKSON ROAD DRAINAGE, THEN DRAINS TO EXISTING STORMWATER SYSTEM THROUGH THE STAGE 1B DEVELOPMENT SITE.

0 20 40 60 80 100

SCALE 1:1000 B1

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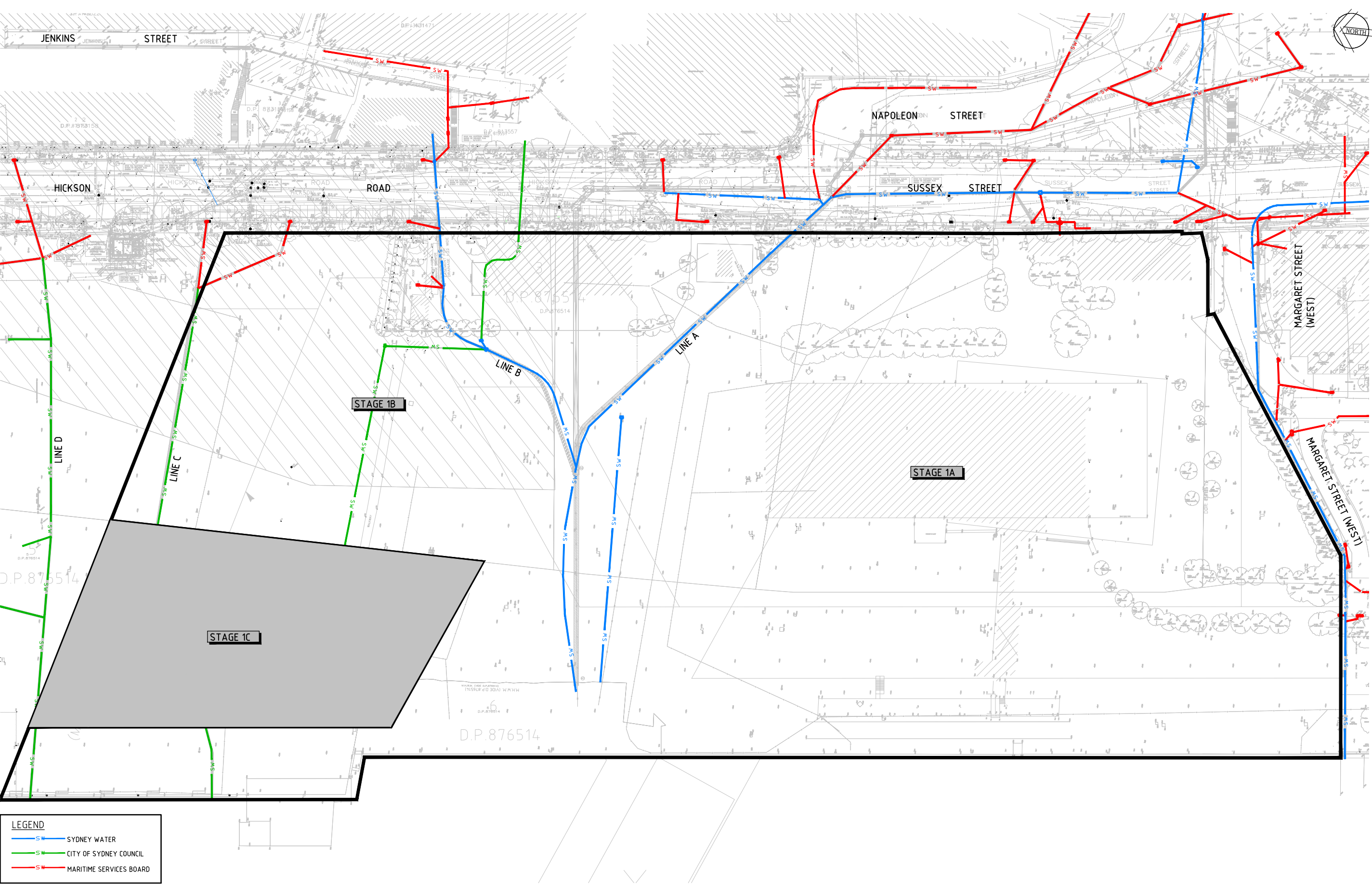
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Verified	Date	EXTERNAL CATCHMENT PLAN - STAGE 1A & 1B	Drawing Number		Revision			
AD	FEB'14		50614035-SK001		01			
Approved	Date							
AD	FEB'14							

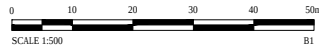
APPENDIX C

PRE-DEVELOPMENT STORMWATER PLAN



LEGEND			
— SW	SYDNEY WATER		
— SW	CITY OF SYDNEY COUNCIL		
— SW	MARITIME SERVICES BOARD		

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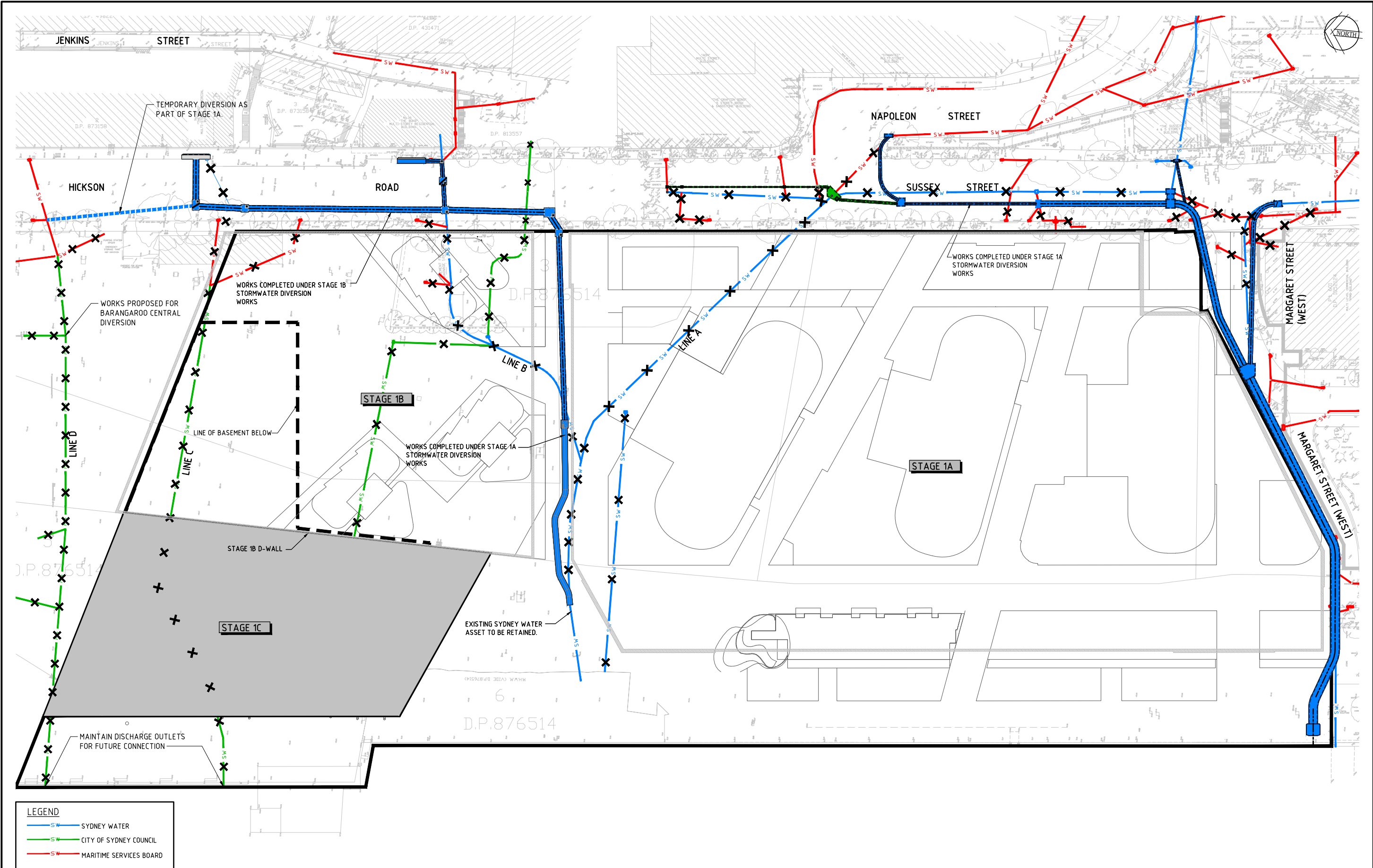
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Approved	AD	Date	FEB'14

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	PRE DEVELOPMENT STORMWATER DRAINAGE

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APPENDIX D

PROPOSED STORMWATER DIVERSION PLAN

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Verified AD	Date FEB'14					
Approved AD	Date FEB'14	PROPOSED STORMWATER DIVERSIONS				
			Datum A.H.D. Register Scale Size B1 Drawing Number 50614035-SK003			Revision 01