

## HARBOURSIDE

## **EXCAVATION DA**

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## STORMWATER AND INFRASTRUCTURE REPORT

CLIENT/ MIRVAC DATE/ 26/04/2022 CODE/ 21-926

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#### 1. Introduction

This report supports a State Significant Development Application (SSDA 38881729) submitted to the Minister for Planning pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Following consent being granted for the Concept Proposal and Stage 1 demolition works, Mirvac Projects Pty Ltd (Mirvac) is now pursuing the next stage of planning approvals for the detailed design, construction, and operation of the redevelopment of the Harbourside Shopping Centre at Darling Harbour. Mirvac has divided these detailed design works across three related, but separate, SSDAs to ensure the efficient staged delivery of this large-scale project.

This report is part of the first detailed SSDA application for bulk excavation works and construction of retaining structures. It more broadly forms part of the Harbourside Shopping Centre redevelopment that will deliver a world-class mixed-use retail, commercial and lifestyle precinct and contribute to the ongoing renewal and revitalisation of Darling Harbour.

#### 1.1. Background

Mirvac is pursuing the staged redevelopment of the Harbourside Shopping Centre, with the first key planning approval secured on 25 June 2021 (SSD 7874) establishing the relevant planning parameters, including building envelopes, maximum GFA limits, Design Guidelines and Design Excellence Strategy, and car parking rates to guide the future detailed design, construction, and operation of Harbourside under subsequent SSD applications. SSD 7874 also granted consent to the demolition of the existing shopping centre and associated structures to ground floor slab level.

To enable the efficient delivery of the project, Mirvac has divided the detailed design and construction works across separate SSDAs, comprising:

- SSDA 1: Bulk excavation works and construction of retaining structures.
- SSDA 2: Detailed design, construction, and operation of the new podium and tower building.
- SSDA 3: Construction and use of the public domain, and Guardian Square, including construction and use of the Murray Street and Bunn Street bridges.

This report forms part of the first detailed design application for bulk excavation works and construction of retaining structures (SSDA 1).

#### 1.2. Site Description

The Harbourside redevelopment site is located within the Darling Harbour Precinct inside the City of Sydney Local Government Area (LGA), at the south-western edge of the Sydney CBD. The precinct remains as Sydney's premier tourist and entertainment destination and accommodates varied recreation, tourism, entertainment, retail, residential apartments, and business land uses.

Specifically, the site occupies an area of approximately 2.05 hectares within the northwestern portion of Darling Harbour, in between Cockle Bay and the Pyrmont Peninsula. It is irregularly shaped and existing site improvements include the 2-3 storey Harbourside Shopping Centre – noting approval has already been granted for stage 1 demolition works. Indicative site boundaries are shown in Figure 1.

# at&l



The Site

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Figure 1 Harbourside Shopping Centre redevelopment site

### 2. Planning Approvals

#### 2.1. Planning Approvals Strategy

State Environmental Planning Policy (Planning Systems) 2022 identifies development which is declared to be State Significant. The proposal is SSD as it is located within Darling Harbour and the proposed development has a Capital Investment Value (CIV) of more than \$10 million.

#### 2.2. Secretary's Environmental Assessment Requirements

Key Issue	Response	
Stormwater Drainage and Water Quality		
Is prepared in consultation with Council and any other relevant drainage authority	Refer to AT&L drawing series 0000 for excavation stormwater drawings. Proposed internal stormwater will connect into the existing Placemaking NSW stormwater assets within the site.	
Details the proposed drainage design for the site, including on-site detention facilities, water quality measures and the nominated discharge point(s)	Refer to AT&L drawing series 0000 for excavation stormwater drawings. Proposed internal stormwater will connect into the existing Placemaking NSW stormwater assets within the site. OSD is not being proposed for this development in accordance with Sydney Water On Site Stormwater Detention Policy 2021 Section 2.2. The proposed	
	accordance with Sydney Water On Site Stormwate Detention Policy 2021 Section 2.2. The propose development site is impacted by mainstream floc	

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	and is located within the lower section of the catchment, being adjacent to Cockle Bay.		
	WSUD will be included as part of SSDA 2 and 3 for the site and will be integrated into the built form and public domain.		
Demonstrates compliance with relevant provisions of the State Environmental Planning Policy (Biodiversity and Conservation) 2021 and Council or other drainage authority requirements and avoids adverse impacts on any downstream properties.	All surface water runoff collected within the basement excavation will be discharged as per AT&L drawings series 0000. Noting this does include groundwater dewatering and testing as this will be completed by others.		
Where drainage infrastructure works are required that would be handed over to Council, provide full hydraulic details and detailed plans and specifications of proposed works that have been prepared in consultation with Council and comply with Council's standards.	No stormwater works proposed as part of SSDA 1 will be dedicated to City of Sydney Council.		
Infrastructure and Utilities			
Detail the existing infrastructure and services on site and outline what infrastructure and services will be decommissioned.	Refer to detailed site survey by Beveridge Williams and the existing utility investigations by Geoscope for details. Existing utilities within the proposed basement excavation footprint will be decommissioned as part of the demolition DA, therefore no impacts on existing utilities with all services protected to the satisfaction of the relevant utility authority.		

#### 3. Stormwater Management

#### 3.1. Existing Stormwater Drainage

Based upon the existing site survey prepared by Beveridge Williams, the existing site drains via pit and pipe to the stormwater network contained under Darling Drive. Due to the existing site's location within the catchment it is anticipated that there is no existing On Site Detention present on site.

#### 3.2. Proposed Site Stormwater Drainage SSDA 1

All proposed stormwater drainage from the development will be designed in accordance with City of Sydney and Sydney Water requirements.

All stormwater is proposed to connect into the existing Placemaking Assets in the immediate vicinity of the site. Stormwater runoff generated in the proposed excavation footprint will be treated and discharged at best practise rates to ensure minimal disturbance on downstream waterways.

Refer to the Civil Drawings in Appendix B for layout and details for the proposed stormwater network across the site.



#### 3.3. Proposed Site Stormwater Drainage SSDA 2

Stormwater generated within the proposed site will be treated to CoS water treatment rates through the use of proprietary treatment devices/green infrastructure and discharged at rates acceptable to CoS.

OSD is not being proposed for this development in accordance with Sydney Water On Site Stormwater Detention Policy 2021 Section 2.2. The proposed development site is impacted by mainstream flood and is located within the lower section of the catchment, being adjacent to Cockle Bay.

#### 3.4. Hydrology

- Pipe drainage shall be designed to accommodate the 20-year ARI storm event (5% AEP) in accordance with City of Sydney Council requirements;
- The combined piped and overland flow paths shall be designed to accommodate the 100-year ARI storm event.
- Where trapped low points are unavoidable and potential for flooding private property is a concern, an overland flowpath capable of carrying the total 100-year ARI storm event shall be provided. Alternatively, the pipe and inlet system may be upgraded to accommodate the 100-year ARI storm event;
- Rainfall intensities shall be as per the Intensity-Frequency-Duration table in accordance with the City of Sydney Council rainfall data;
- Times of concentration for each sub catchment shall be determined using the kinematic wave equation. Minimum time of concentration is 5 mins and the maximum is 20 mins. Runoff coefficients shall be calculated in accordance with AR&R. The fraction impervious shall be determined from analysis of the sub catchments;
- Runoff coefficients shall be calculated in accordance with the ARR&R. The fraction impervious shall be determined from analysis of the sub-catchments;
- Flow width in gutter shall not exceed 2.0m for the minor design storm event.
- Velocity depth ratios shall not exceed 0.4 for all storms up to and including the 100-year ARI event.
- Bypass from any pit on grade shall not exceed 15% of the total flow at the pit;
- Blockage factors of 10% and 30% shall be adopted for kerb inlet and grated pits respectively; and
- All pits deeper than 1.8m to be reinforced.

#### 3.5. Hydraulics

- A hydraulic grade line HGL design method shall be adopted for all road pipe drainage design. The HGL shall be shown on all drainage long sections;
- The minimum pipe size shall be 375mm diameter RCP (external) and 150mm uPVC (internal);
- Maximum spacing between pits shall not exceed 75m;
- The minimum pipe grade shall be 1% (external) and 0.5% (internal);
- All pipes shall be Rubber Ring Jointed unless noted otherwise;



- The minimum cover over pipes shall be 450mm in grassed areas and 600mm within carriageways;
- Where minimum cover cannot be achieved due to physical constraints the pipe class shall be suitably increased;
- All trafficable pipes shall be a minimum Class 3 Reinforced Concrete Pipes or Fibre Reinforced Cement equivalent;
- The pipe friction coefficients to be adopted shall be:

Materials	Mannings – n	Colebrook-White – k	Min. Pipe Class
RCP	0.012	0.3	3
FRC	0.011	0.15	3

#### Table 1 - Pipe Details

- All pipes classes shall be designed for the ultimate service loads and where applicable, construction loads will be designed for;
- Pipes discharging to the overland flow path shall adopt a minimum tailwater level equivalent to respective overland flow level;
- Pit Loss coefficients shall be calculated in accordance with Missouri Charts;
- A minimum 150mm freeboard shall be maintained between pit HGL and pit surface levels;
- Overland flowpaths shall maintain a minimum of 300mm freeboard to all habitable floor levels; and
- Pits deeper than 1.2m shall contain step irons at 300 mm centers.

#### 3.6. Modelling Software SSDA 2 and 3

MUSIC modelling software will be used to evaluate pollutant loads from generated by the stormwater runoff for the proposed development.

DRAINS modelling software will be used to calculate the Hydraulic Grade Line (HGL) of the proposed stormwater pipes and OSD. DRAINS is a computer program used for designing and analysing urban stormwater drainage systems and catchments. It is widely accepted by Council's across NSW as the basis for stormwater design and has been confirmed by the CoS as the preferred stormwater software analysis package.

#### 3.7. Overland Flows and Flooding SSDA 2 and 3

All property drainage will be designed to the 20-year ARI storm with all overland flow paths designed to the 100-year ARI storm.

Overland flow paths have been designed in conjunction with the existing road network levels to protect all buildings and ensure freeboards are achieved for habitable ground floor levels to CoS flooding requirements.

Cardno was engaged by Mirvac to provide an assessment of the compliance of the proposed development with the flood related development controls applicable under the CoS standards and guidelines.

#### 4. Sedimentation and Erosion Control

#### 4.1. Sedimentation and Erosion Control (Construction)

Soil and Water Management Plans (SWMP) has been prepared in accordance with the NSW Department of Housing Publication titled: Managing Urban Stormwater- Soils and Construction (2004) and the relevant CoS guidelines for the whole site.



#### 4.2. Sources of Pollution

The activities and aspects of the works that have potential to lead to erosion, sediment transport, siltation and contamination of natural waters include:

- Earthworks undertaken immediately prior to rainfall periods;
- Work areas that have not been stabilised;
- Extraction of construction water from waterways during low rainfall periods;
- Clearing of vegetation and the methods adopted, particularly in advance of construction works;
- Stripping of topsoil, particularly in advance of construction works;
- Bulk earthworks and construction of pavements;
- Works within drainage paths, including depressions and waterways;
- Stockpiling of excavated materials;
- Storage and transfer of oils, fuels, fertilisers and chemicals;
- Maintenance of plant and equipment;
- Ineffective implementation of erosion and sediment control measures;
- Inadequate maintenance of environmental control measures; and
- Time taken for the rehabilitation / revegetation of disturbed areas.

#### 4.3. Potential Impacts

The major potential impacts on the riparian environment relate to erosion of distributed areas or stockpiles and sediment transportation. Potential adverse impacts from erosion and sediment transportation can include:

- Loss of topsoil;
- Increased water turbidity;
- Decreased levels of dissolved oxygen;
- Changed salinity levels;
- Changed pH levels;
- Smothering of stream beds and aquatic vegetation;
- Reduction in aquatic habitat diversity;
- Increased maintenance costs; and
- Decrease in waterway capacity leading to increased flood levels and durations;

#### 4.4. Construction Methodology

The following construction methodology will be followed to minimise the impact of sedimentation due to construction works:

• Diversion of "clean" water away from the disturbed areas and discharge via suitable scour protection;



- Diversion of sediment-laden water into temporary sediment control basins to capture the design storm volume and undertake flocculation (if required);
- Provision of construction traffic shaker grids and wash-down to prevent vehicles carrying soils beyond the site;
- Provision of silt fences to filter and retain sediments at source; and
- Where future construction and building works are not proposed, the rapid stabilisation of disturbed and exposed ground surfaces with hydro-seeding.

#### 4.5. Site Inspection and Maintenance

The inspection and maintenance requirements outlined in this section must be carried out while either earthworks or quarrying is being conducted, and all areas re-established.

The Contractor will be required to inspect the site after every rainfall event and at least weekly, and will:

- Inspect and assess the effectiveness of the SWMP and identify any inadequacies that may arise during
  normal work activities or from a revised construction methodology. Construct additional erosion and
  sediment control works as necessary to ensure the desired protection is given to downstream lands and
  waterways;
- Ensure that drains operate properly and to effect any repairs;
- Remove spilled sand or other materials from hazard areas, including lands closer than 5 metres from areas of likely concentrated or high velocity flows especially waterways and paved areas;
- Remove trapped sediment whenever less than design capacity remains within the structure;
- Ensure rehabilitated lands have affectively reduced the erosion hazard and to initiate upgrading or repair as appropriate;
- Maintain erosion and sediment control measures in a fully functioning condition until all construction activity is completed and the site has been rehabilitated; and
- Remove temporary soil conservation structures as the last activity in the rehabilitation.

#### 5. Conclusion

The erosion control measures proposed for the site will comply with the requirements of City of Sydney Council Engineering Guidelines and The Department of Environment, Climate Change and Water (DECC).

The proposed SWMP will ensure that the best management practice is applied to the development site in controlling and minimising the negative impacts of soil erosion. Refer to AT&L drawings CIV-DWG-OA-0400 series for details.

OSD and Water Quality requirements will be assessed under SSDA 2, therefore this application will not cover any OSD and Water Quality requirements.



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