

Cranbrook School  
**Hordern Oval Precinct  
Redevelopment**  
ESD SSDA Report

ESD

Rev 3 | 27 November 2018

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 256385-00

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# Contents

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	Page
<b>1 Project Introduction</b>	<b>1</b>
1.1 Design Targets	3
<b>2 Sustainability Approach</b>	<b>3</b>
2.1 Energy	3
2.2 Water	4
2.3 Management	5
2.4 Indoor Environment Quality	5
2.5 Transport	5
2.6 Materials	6
2.7 Land Use and Ecology	6
2.8 Emissions	7
<b>3 Appendix A - Rainwater reuse</b>	<b>8</b>

# 1 Project Introduction

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Arup has prepared this document on behalf of Cranbrook School to aid the description of its Hordern Oval Precinct Redevelopment to be assessed by the Department of Planning as part of a State Significant Development Application.

The new Hordern Oval Precinct will consist of three components which will include an academic and liberal arts facility, a sub-surface car park under the existing oval and a new aquatic and fitness centre.

Arising from our considered initial analysis of the original buildings, associated grounds and heritage rich nature of the Bellevue Hill Campus it was determined that by demolishing the existing War Memorial Hall and Mansfield Building it would unlock the opportunity to develop a key area of the site. These existing buildings are underutilised and do not meet modern teaching standards, replacing these buildings will make way for an enhanced and world class teaching facility.

The new Centenary Building is a purposefully assembled teaching and learning environment which include, teaching and learning rooms, teaching terraces, a drama theatre, a dining commons, a place of worship and an assembly hall/ basketball court.

It is proposed to excavate the existing oval to accommodate a sub-surface car park which will provide an additional car parking spaces on the campus to lessen the impact of the school on the local neighbourhood.

The new aquatic and fitness centre is also proposed to be constructed beneath the northern end of Hordern Oval and will contain aquatic and fitness facilities.

The turfed surface of Hordern Oval is to be reinstated over both the new car park and the new aquatic recreation centre with a new groundsman's facility to be constructed to replace the existing series of ad hoc sheds along the eastern side of the oval.

The development contributes positively towards the neighbourhood and Cranbrook's vision of being a leading school that will support learning and the pursuit of excellence of its students in a supportive and nurturing environment.

Arup share the School's Vision which will encourage and enable all of its students to explore, enjoy and fulfil their potential in this new facility. We believe this development embodies the School's Mission which ultimately seeks to contribute to the betterment of society through the educational experience provided to its students, so that they may discover and make the most of their talents, to give of their best and to thrive in and love the pursuit of excellence.



## 1.1 Design Targets

The primary objectives of Cranbrook School Development are to achieve Australian best practice. Methods under consideration for achieving this include:

- 5-star Green Star in principle rating.
- Reduce water demand by using rainwater / stormwater capture and reuse
- Improve urban environment by including high quality landscaping

## 2 Sustainability Approach

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The sustainability approach for the Cranbrook School development focuses on creating a comfortable, flexible and community focussed space providing learning and teaching facilities alongside social study and collaboration spaces.

The sustainability strategy incorporated into Cranbrook School design is centred upon the following core principles:

- Comfort and Wellbeing
- Energy and Carbon
- Materials
- Water
- Waste Minimisation

The following sections details the proposed approach and highlights initiatives under investigation to satisfy the focus core principles noted above.

### 2.1 Energy

Energy is a key sustainability driver of the design of Horden Oval Precinct redevelopment. The overall strategy targets an improvement over the DTS Section J requirements.

The fabric performance requirements are addressed in the design by optimising the glazing performance and shading configuration for each orientation. This is to ensure that thermal comfort is achieved, and solar gains moderated. This allows effective application of the mixed mode ventilation strategy, and efficient operation of the mechanical system.

As HVAC systems contribute to a large percentage of overall energy consumption in educational buildings, minimising this is a key principle in the design of Cranbrook School. To address this, the majority of the building is designed to provide the opportunity of mixed mode operation.

In addition to this the following mechanical strategies are being investigated to decrease energy consumption while maintaining comfort for occupants:

- Spill air strategy – to increase thermal comfort in the informal teaching areas and transient spaces spill air from the formal teaching areas will be used to temper the air.
- Ceiling fans
- Demand driven ventilation to minimise the conditioning of outside air is appropriate locations.

In addition to efficient mechanical system the following principles and strategies may be implemented to achieve the energy targets:

- The building's shading structure will be designed to optimize solar gains while still providing natural daylight and views to the occupants.
- The use of high efficiency lighting with motion and daylight and occupancy sensing.
- The insulation of the building will target to be better than deemed to satisfy requirements, helping to reduce the air conditioning loads.
- Energy efficient appliances will be provided throughout the building.
- Green roofs above the AFC and Centenary Building will reduce the thermal loads on the façade while having a positive effect on the micro climate.
- Metering and monitoring of energy sources and usage to promote awareness of consumption.
- Air movers will be used to increase comfort while the building is naturally ventilated and reduce demand for air conditioning.
- The majority of the roofs in the development are green spaces, this limits the areas suitable for photovoltaics although photovoltaics will be considered on the Justin McDonald stand and the maintenance building.

## 2.2 Water

The water strategy focuses on; reducing potable water through efficient fixtures and monitoring water use. In addition stormwater runoff from the site will be design to not negatively affect the surrounding habitats.

Rainwater and stormwater harvesting and reuse will be key to reducing potable water demand at Cranbrook School. Two tanks are being proposed to capture stormwater run-off and re-use it for irrigation, the location and size of the tanks are currently being designed pending the final design of the landscaping schedule, hydraulic design of the Centenary Building and detailed MUSIC modelling. When completed these design inputs will drive the final size of the tanks and the availability of water for non-potable uses. Please see attached note from AECOM.

Permeable landscape surfaces have been investigated to reduce stormwater run off although as many of the landscape spaces proposed are on podium / over structure this will have limited benefit to reduce stormwater run off.

## 2.3 Management

The following management strategies are being considered to improve the project's sustainability by influencing areas where decision making is critical.

- The building will undergo a high level of commissioning and tuning upon completion to ensure the building services operate efficiently and to their full potential.
- A best practice formal environmental management plan will be implemented for procedures during construction of the building.
- The project will implement best practice waste management system allocating areas, size and collection strategies. This will include the collection and separation of distinct waste streams and the feasibility of off-site waste management.

## 2.4 Indoor Environment Quality

The following indoor environment quality strategies are being investigated to achieve sustainability performance in a manner that also improves the occupant experience of the space.

- The air conditioning system will be designed with fresh air which will meet or exceed Australian Standards.
- The acoustic insulation of the building will be designed to provide appropriate and comfortable acoustic conditions for occupants.
- Efficient, flicker free lighting.
- The lighting levels and glare reduction will comply with best practice guidelines and targeted ratings.
- Maximise the accessibility to high quality external views.
- Maximise the amount of natural daylight to the building. This provides passive solar heating during winter and increases the solar access to occupants while minimising solar gain during the summer.
- Indoor air quality will be improved by eliminating products, such as paints and carpets that do not meet appropriate minimum VOC standards.
- The building design will promote a high level of thermal comfort for occupants by controlling the envelope gains and designing to best practice HVAC standards.

## 2.5 Transport

The following transport strategies are aimed at minimising occupant dependency on using private cars in order to reduce overall greenhouse gas emissions.

- The building is located in area which has readily accessible transport options and which are close to a range of amenities, reducing the need to use private cars.

- Bicycle facilities will be provided to staff and student, these will consist of secure bicycle parking, lockers and showers.

## 2.6 Materials

The following material selections will be considered to address the consumption of resources within the construction of the building.

- Minimisation of PVC throughout building services
- The use of sustainable timber (FSC timber products) wherever timber is used
- Reduction of non-reused or recycled content in the concrete mixes
- Post-consumer recycled content structural steelwork, reinforcement bars and mesh will be maximised.
- Low VOC materials will be used for flooring, paint, adhesives and sealants.
- Low formaldehyde emission engineered woods products will be used.
- All thermal insulants will be selected to avoid the use of ozone depleting substances in both their manufacture and composition.
- The building will aim to reduce construction waste going to landfill by reducing or recycling building materials. Waste management during construction will target a 80% recycling rate during demolition and construction.
- Where possible materials will be selected to have a low carbon footprint for their total life cycle.

## 2.7 Land Use and Ecology

The following techniques are being considered to increase the ecological value of the site.

- The design includes an increase in the total area dedicated to green spaces by locating the AFC building below ground and having a green roof over the Centenary Building.
- New tree planting contains a mix of native and exotic planting. This is functional and not just aesthetic, in order to create microclimatic zones for human habitation throughout the day and year. Exotic trees have also been utilised where limited space is available. Native tree planting has been integrated into the deep soil zones at the boundary of the site where trees can reach their full potential and provide important connective habitat and contribute to the Wildlife Corridor identified in Woollahra Council's Biodiversity Conservation Strategy.
- The Biodiversity Conservation report identifies estuarine foreshore and seagrass areas and an adjacent wildlife corridor between Rose Bay Park and Blackburn Gardens. In addition to the existing street trees that are maintained, there are an additional 14 native / indigenous trees proposed along this corridor to enhance habitat and facilitate ease of movement for local fauna.

## 2.8 Emissions

The following strategies are being considered to reduce the environmental impacts of common building emissions.

- Care will be taken to minimise the potential impacts of legionella from the condenser water system.

## 3 Appendix A - Rainwater reuse

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Refer over

26 November 2018

Michael Nasiry  
epm Projects Pty Ltd  
Level 2, 146 Arthur Street, North Sydney NSW 2060

Dear Michael

**Cranbrook School Redevelopment - Rainwater Reuse**

As a part of the Water Sensitive Urban Design, rainwater collection tanks are being proposed which will be sized to accommodate the irrigation and water re-use demand of the site.

Two locations are proposed for these rainwater collection tanks:

- Tank 1: Adjacent to the proposed Centenary Building; and
- Tank 2: Adjacent to the Justin McDonald Stand.

These locations are attached to this document.

These two locations have been proposed as they offer the greatest potential to store and re-use rainwater from the redevelopment, in particular:

- Tank 1: To provide irrigation for the detailed planting around the Centenary Building and new landscape elements to the south of the Hordern Oval; and
- Tank 2: To provide the bulk of the irrigation for the Hordern Oval.

The exact location and sizing of the tanks are currently being designed along with the current inputs:

- Tree protection zones;
- Final landscape planting schedule and water demand (establishment and post-establishment);
- Hydraulics design of the Centenary Building; and
- The detailed MUSIC modelling calculations.

When completed these design inputs will drive the final size of the tanks, however the proposed locations offer the largest catchment areas suitable for refuse.

If required AECOM are happy to provide the final water balance to council and provide further details on the proposed re-use strategy.

Yours faithfully

**Daniel Fettell**

Principal Engineer – Urban Development Team Leader

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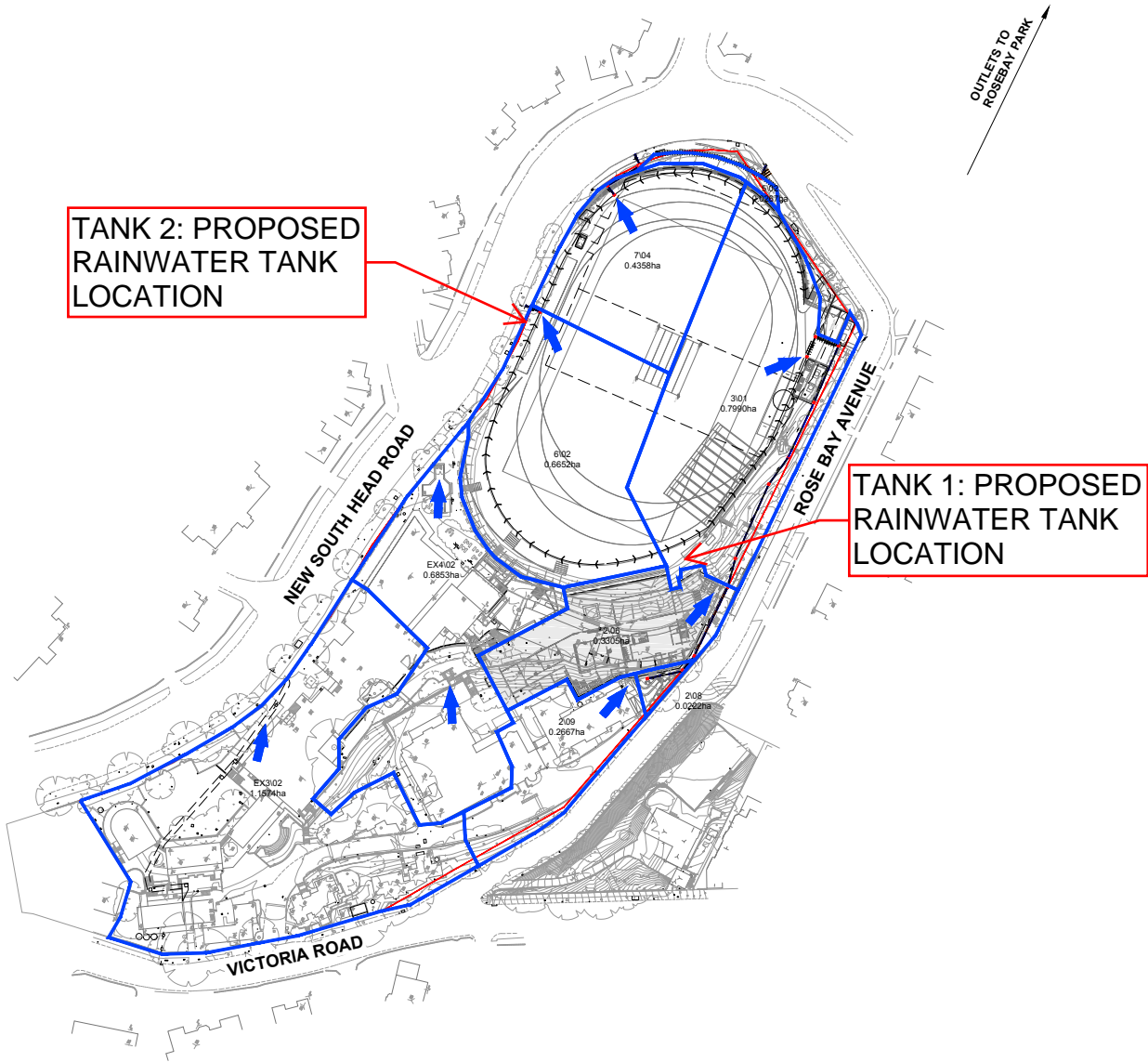
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OUTLETS TO  
ROSEBAY PARK



PROJECT

Cranbrook School  
Redevelopment

CLIENT

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LEGEND

- PROPOSED LOT BOUNDARY
- DRAINAGE LINE AND FLOW DIRECTION
- DRAINAGE PITS
- EXISTING DRAINAGE LINE
- CATCHMENT AREA
- CATCHMENT FLOW ARROWS

REGISTRATION

SCALE BAR (A1)



PROJECT MANAGEMENT INITIALS

JW	WH	DF
DESIGNER	CHECKED	APPROVED

ISSUE/REVISION

NO	DATE	DESCRIPTION
3	07.05.2018	SSDA ISSUE - FINAL
2	10.04.2018	TEST OF ADEQUACY
1	24.11.2017	SSDA ISSUE - DRAFT

KEY PLAN

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60549969

SHEET TITLE

DRAINAGE  
CATCHMENT PLAN

SHEET NUMBER

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