WASTE STRATEGY REPORT

APPENDIX H

Sydney Metro City & Southwest: Crows Nest Over Station Development

Waste strategy Report

Applicable to:	Sydney Metro City & Southwest
Author:	SMEC
Owner	Sydney Metro Authority
Status:	Final
Version:	1
Date of issue:	July 2020

Revision	Date	Suitability Code
0	*17/10/2019*	*For Stage Approval*
1	*31/07/2020*	*For Stage Approval*

Approval Record

Function	Position	Name	Date
Prepared by	*Environmental Engineer*	*Rachel Heriot*	*31/07/2020*
Technical Checker	*Principal Civil Engineer*	*Rachel Heriot*	*31/07/2020*
Reviewed By	*Principal Environmental Engineer*	*Greg Tallentire*	*31/07/2020*
Approved by	*Engineering Manager*	*Willem Van Ede*	*31/07/2020*

Amendment Record

Changes made to this document since its last revision, which affect its scope or sense, are marked in the right margin by a vertical bar (|).

Date	Rev	Amendment Description	By
	A	*Draft*	*Rachel Heriot*
	B	*Updated in response to Sydney Metro comments*	*Rachel Heriot*
17/10/2019	*0*	*Final draft*	*Rachel Heriot*
31/07/2020	*1*	*Final*	*Greg Tallentire*

Table of Contents

Terms & Definitions

	Definition
SSD	State Significant Development
OSD	Over Station Development
CSSI	Critical State Significant Infrastructure
EIS	Environment Impact Statement
SEARs	Secretary's Environmental Assessment Requirements
TfNSW	Transport for New South Wales
NSDCP	North Sydney Development Control Plan
WMP	Waste Management Plan
WARR	Waste Avoidance and Resource Recovery
CWSR	Central Waste Storage Room
WSR	Waste Storage Rooms
IRSR	Interim Recycling Storage Room
WCP	Waste Collection Point
MRV	Medium Rigid Vehicle
IRS	Interim Storage Room

Executive Summary

This report supports a concept State Significant Development Application (concept SSD Application) submitted to the Department of Planning, Industry and Environment (DPIE) for the Over Station Development (OSD) above Crows Nest Metro station.

This Waste Strategy report provides an assessment for the OSD concept drawings prepared by Sydney Metro in support of the concept SSD Application and Secretary's Environmental Assessment Requirements (SEARs). This report documents the waste management strategy required to service retail, residential, commercial in the development should this opportunity be pursued for the indicative OSD design.

The design of the OSD is an integrated design solution to occur in parallel with the station design. The station designers are to make provisions to for the OSD to be constructed after the station has become operational with no impact on Sydney Metro operations. The physical provisions for utilities connections and infrastructure below the Transfer Level are planned to be undertaken as part of the station works under the CSSI Approval. This strategy is aimed at reducing the potential for future disruption to the Metro Station and surrounding areas should the OSD construction be delayed after the completion of the station.

The Sydney Metro City & Southwest: Crows Nest Over Station Development Waste Strategy Report (Metron, 2018) was prepared as Appendix H of the Environmental Impact Statement for the concept SSD Application to specifically respond to the Secretary's Environmental Assessment Requirements (SEARs) issued on 26 September 2018. Following Exhibition of the Environmental Impact Statement, the design of the OSD has responded to issues raised in submissions. The purpose of this report is to identify those changes in the Amended OSD Scheme and to assess the impacts of changes with regards to waste management.

Based on the recalculations of waste generated by the OSD in comparison to the previous design, there has been a decrease in the volume of waste generated by the development and fewer truck movements, providing a better environmental outcome.

1.0 Introduction

1.1 Purpose of this report

This report supports the Response to Submissions Report (Submissions Report) for the concept State Significant Development application (concept SSD Application) submitted to the Department of Planning, Industry and Environment (DPIE) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The concept SSD Application is made under Section 4.22 of the EP&A Act.

Sydney Metro is seeking to secure concept approval for a mixed use development comprising three buildings above the Crows Nest Station, otherwise known as the over station development (OSD). The concept SSD Application seeks consent for building envelopes and land uses, maximum building heights, maximum gross floor areas, pedestrian and vehicular access, circulation arrangements and associated car parking and the strategies and design parameters for the future detailed design of the development.

The station and public domain elements form part of a separate planning approval for Critical State Significant Infrastructure (CSSI) approved by DPIE on 9 January 2017.

As the development is within a rail corridor, is associated with railway infrastructure and is for commercial premises and residential accommodation with a Capital Investment Value of more than $30 million, the project is identified as State Significant Development (SSD) pursuant to Schedule 1, 19(2)(a) of the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP). The development is, therefore, State significant development for the purposes of Section 4.36 of the EP&A Act.

A Waste Strategy Report (2018) was prepared as Appendix EE of the Environmental Impact Statement for the concept SSD Application to specifically respond to the Secretary's Environmental Assessment Requirements (SEARs) issued on 26 September 2018. Following Exhibition of the Environmental Impact Statement, the design of the OSD has responded to issues raised in submissions. The purpose of this report is to identify those changes in the Amended OSD Scheme and to assess the impacts of changes with regards to waste strategy of the OSD.

1.2 Changes between the Exhibited Scheme and Amended Scheme

In response to the submissions made on the Exhibited Scheme, the following changes have been made to the concept SSD Application under what is termed the Amended Scheme:

- Changes to the building envelope
- Changes in proposed land use on each site
- Reduction in car parking numbers
- Inclusion of an articulation zone
- Clarification on the provision of social infrastructure
- Amendments to the Design Guidelines.

These changes are described in further detail in Chapter 7 of the Submissions Report. The western elevation of the Amended Scheme is shown below, with a summary of the changes between the Exhibited Scheme and Amended Scheme provided in the table below.

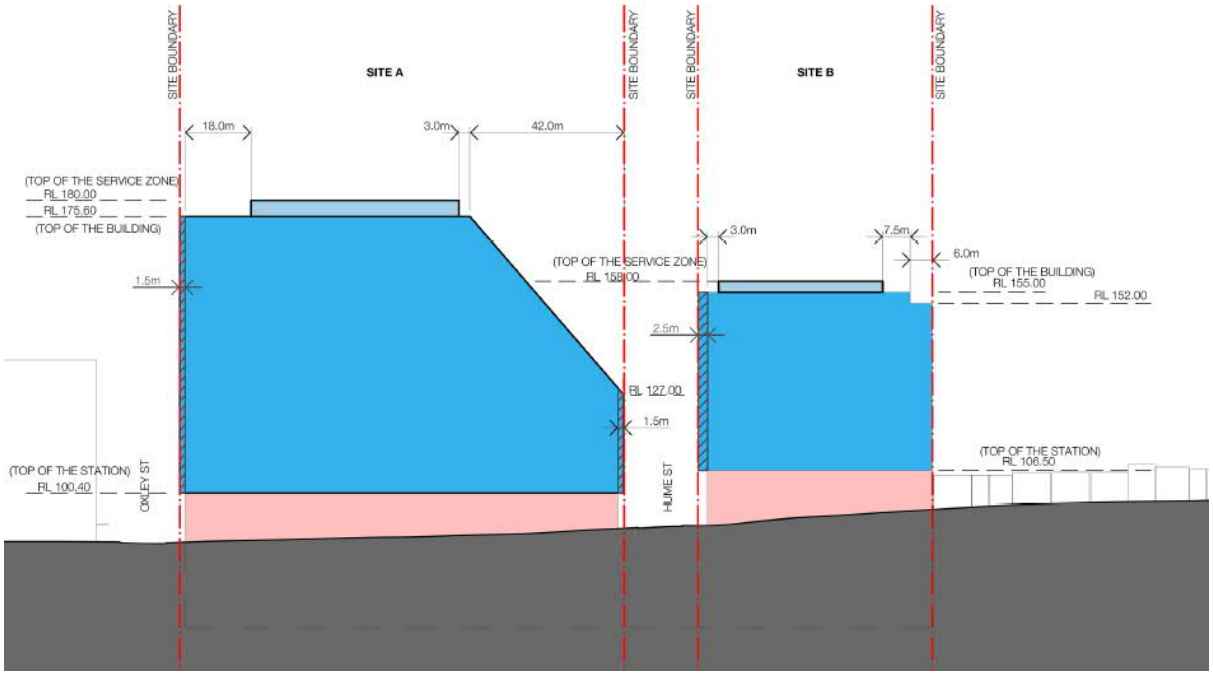

Figure 1 - West elevation of the building envelope under the Amended Scheme, showing CSSI Approval (pink) OSD components (blue) and articulation zone (hatched)

Table 1-1 - Changes to overall concept scheme per site under the Exhibited Scheme and Amended Scheme (excluding station GFA)

	Exhibited Scheme[1]	Amended Scheme[1]
Site A		
Land Use	Residential[2]	Commercial
GFA	37,500m2	40,207m2
Max height - top of roof (RL)	183	175.6
Max height – top of services zone (RL)	188	180
FSR - OSD	9.67:1	10.4:1
Non-residential FSR - OSD	0.7:1	10.4:1
Car parking	125	46
Site B		
Land Use	Tourist/visitor accommodation	Residential
GFA	155	155
Max height - top of roof (RL)	158	158
Max height – top of services zone (RL)	15,200m2	12,685m2
FSR - OSD	8.12:1	6.8:1
Non-residential FSR - OSD	8.12:1	0.1:1
Car parking	25	55
Site C		
Land Use	Commercial[2]	Commercial
GFA	127	127
Max height - top of roof (RL)	132	132
Max height - top of services zone (RL)	2,700m2	3,031m2
FSR - OSD	4.44:1	4.9:1
Non-residential FSR - OSD	4.44:1	4.9:1
Car parking	0	0

[1] GFA figures exclude GFA attributable to the station and station retail space approved under the CSSI approval

2 The Exhibited Scheme included a provisional option for social infrastructure GFA to be located on Site A or Site C inclusive of the GFA figures nominated above

The revised concept SSD Application (SSD-9579) under the Amended Scheme seeks approval for the following:

- Maximum building envelopes for Sites A, B and C, including street wall heights and setbacks as illustrated in the plans prepared by Crows Nest Design Consortium for Sydney Metro at Appendix A to the Submissions Report
- Maximum building heights:
    - **Site A:** RL 175.60 metres or equivalent of 21 storeys (includes two station levels and conceptual OSD space in the podium approved under the CSSI Approval)
    - **Site B:** RL 155 metres or equivalent of 17 storeys (includes two station levels and conceptual OSD space approved under the CSSI Approval)
    - **Site C:** RL 127 metres or 9 storeys (includes two station levels and conceptual OSD space approved under the CSSI Approval).

***Note 1**: the maximum building heights defined above are measured to the top of the roof slab and exclude building parapets which will be resolved as part of future detailed SSD Application(s)*

- Maximum height for a building services zone on top of each building to accommodate lift overruns, rooftop plant and services:
    - **Site A:** RL 180 or 4.4 metres
    - **Site B:** RL 158 or 3 metres
    - **Site C:** RL 132 or 5 metres.

***Note 1**: the use of the space within the building services zone is restricted to non-habitable floor space.*

***Note 2**: for the purposes of the concept SSD Application, the maximum height of the building envelope does not make provision for the following items, which will be resolved as part of the future detailed SSD Application(s):*

- *Communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like, which are excluded from the calculation of building height pursuant to the standard definition in NSLEP 2013*
- *Architectural roof features, which are subject to compliance with the provisions in Clause 5.6 of NSLEP 2013, and may exceed the maximum building height, subject to development consent.*

- Maximum gross floor area (GFA) of 56,400 square metres for the OSD comprising the following based on the proposed land uses:
    - ***Site A:** Commercial office premises - maximum 40,300 square metres*
    - ***Site B:** Residential accommodation - maximum of 13,000 square metres*
    - ***Site C:** Commercial office premises - maximum of 3,100 square metres.*

***Note:** GFA figures exclude GFA attributed to the station and station retail space approved under the CSSI Approval*

- minimum non-residential floor space for the OSD across combined Sites A, B and C of 43,505 square metres
- the use of conceptual areas associated with the OSD which have been provisioned for in the Crows Nest station box (CSSI Approval) including areas above ground level (i.e. OSD lobbies and associated spaces)
- a maximum of 101 car parking spaces on Sites A and B associated with the proposed commercial and residential uses
- modulation and expression of built forms within an articulation zone extending to the property boundary
- loading, vehicular and pedestrian access arrangements
- strategies for utilities and services provision
- strategies for managing stormwater and drainage
- a strategy for the achievement of ecological sustainable development
- a public art strategy
- indicative signage zones
- a design excellence framework
- the future subdivision of parts of the OSD footprint, if required.

2.0 Scope of Assessment

This waste strategy reflects the concept proposal and where relevant, references the exhibited indicative OSD design prepared by Sydney Metro. The built area schedule and development mix (i.e. proposed mix land uses shown in Table 2 below) has been used to assess the waste requirements of the site. However, it is noted that approval is only being sought for the concept SSD Application and the waste requirements for the final development should be considered during the future detailed design phase once the precise mix of land uses within the development is known.

This report presents an assessment of the waste management requirements relating to the construction and operation of the amended indicative OSD design. Relevant management strategies for effective storage, re-use/recovery, treatment and/or disposal of waste generated from the amended indicative OSD design have been proposed, in accordance with applicable guidelines and regulatory requirements and the requirements of the Secretary's Environmental Assessment Requirements issued for the concept SSD Application on 26 September 2018. Since exhibition of the EIS Sydney Metro have amended the concept SSD Application to address issues raised in submissions and during assessment. Among these are changes to land use and floor space ratios allocated to land uses. This waste strategy report forms part of the Submissions Report.. Demolition works will be undertaken as part of the CSSI approval, therefore have not been included in this plan.

As per the SEARs, this waste strategy is required to document the likely waste streams, indicative quantities, and management strategies for the storage, re-use/recovery, treatment and/or disposal of waste generated at each of the buildings proposed in the indicative OSD design, which specifically includes Site A, B and C.

This preliminary waste strategy forms the framework for the waste management measures for the future detailed design and planning stages of the Project.

The following tasks were undertaken as part of this Report:

- Review of relevant legislation, policies and guidelines associated with waste management
- Identify waste streams that may be generated during the construction and operation of the OSD
- Estimate indicative waste volumes which may be generated during the construction and operation of the OSD
- Recommend management strategies and mitigation measures, including methods for source separation of different waste streams and methods for storing, collecting and transporting waste steams
- Complete preliminary details required for a Waste Management Plan (WMP) in accordance with the North Sydney Development Control Plan (NSDCP).

It is noted that the scope of work outlined above does not cover waste management measures within the proposed Crows Nest Station. However, this report does include a waste management strategy for the retail spaces which have been conceptually approved in the CSSI Approval.

3.0 Relevant Standards and Guidelines

The following standards and guidelines are considered applicable to this Project and have been utilised or referenced as appropriate within this scope of assessment:

- Conditions of CSSI approval for Sydney Metro City and Southwest – Chatswood to Sydenham, January 2017
- North Sydney Local Environment Plan 2013 (NSLEP) and the North Sydney Development Control Plan 2013 (NSDCP)
- Green Star Design & As Built Manual v1.2
- Sydney Metro, Construction Environmental Management Framework
- Sydney Metro City & Southwest Sustainability Strategy 2017-24.

The regulatory framework, standards and guidelines relevant to this aspect of the Project are provided in this section.

3.1.1 National and State Regulatory Framework

- The Project will take place within the framework of legislation relating to waste management, which includes the following:
- Protection of the Environmental Operations Act 1997 (POEO Act)
- Protection of the Environment Operations (Waste) Regulation 2005
- Waste Avoidance and Resource Recovery Act 2001 (WARR Act)
- Contaminated Land Management Act 1997 (CLM Act)
- Commonwealth Hazardous Wastes (Regulation of Exports and Imports) Act 1989
- Environmentally Hazardous Chemicals Act 1985.
- Key NSW regulatory and policy requirements which are of particular relevance to the construction and operational phase of the project are outlined in the following sections.
- Protection of the Environment Operations Act 1997
- Section 88 of the Protection of the Environment Operations Act 1997 (PoEO Act) sets a levy on waste disposed to landfill. The levy aims to reduce the amount of waste being disposed and promote resource recovery and varies between different areas of NSW.
- The landfill levy significantly increases over time and therefore presents a financial driver for increased waste recovery. In addition to the landfill levy, the PoEO Act sets out strict requirements for the management of all material that will be excavated and removed from the Project construction site (including associated activities such as classification).

These requirements include:

- Ensuring waste is classified appropriately and in accordance with relevant guidelines;

- Waste materials are disposed to appropriately licensed landfill facilities; and
- Recoverable and other materials are removed to facilities lawfully able to accept such materials.

3.1.2 Protection of The Environment (Waste) Operations Regulation 2014

- The Protection of the Environment (Waste) Operations Regulation 2014 (the Regulations) set out requirements relating to non-licensed waste activities and waste transporting. The proposed works on the site are not required to be licensed. However, Section 70 of the Regulations requires that wastes are stored in an environmentally safe manner. It also stipulates that vehicles used to transport waste must be covered when loaded.
- The Regulations exempts certain waste streams from full waste tracking and record keeping requirements as waste tracking is required only for industrial and hazardous waste.

3.1.3 Waste Avoidance and Resource Recovery Act 2001

The Waste Avoidance and Resource Recovery (WARR) Act 2001 establishes the waste hierarchy to ensure that resource management options are considered against the following principles:

- Avoidance – actions to reduce the amount of waste generated
- Resource Recovery – which includes reuse, reprocessing, recycling and energy recovery, consistent with the most efficient use of the recovered resources; and
- Disposal – an 'end-of pipe' option that must be carefully undertaken to minimise any negative environmental outcomes.

3.1.4 Waste Avoidance and Resource Recovery Strategy 2014-2021

The NSW Environment Protection Authority Waste Avoidance and Resource Recovery Strategy (WARR Strategy) for 2014-2021 provides the strategic direction for future waste management and resource recovery activities in NSW. It establishes the following targets:

- Avoiding and reducing the amount of waste generated per person in NSW,
- Increasing recycling rates to 70% for municipal solid waste, 70% for commercial and industrial waste and 80% for construction and demolition waste, and
- Increasing waste diverted from landfill to 75%.

3.1.5 The NSW Waste Classification Guidelines

The NSW Waste Classification Guidelines (Guidelines) provide a procedure for classifying waste to support organisations in appropriately recovering, treating or disposing waste generated. The procedure for classifying waste includes:

- Establishing whether a waste is a 'special' waste
- Establishing whether the waste is a liquid waste

- Refer to the POEO 1997 definitions for waste classifications to assess whether the waste type can be pre-classified as waste hazardous, restricted solid, general solid waste (putrescible) or general solid waste (non-putrescible)
- Establishing whether the waste has hazardous characteristics
- Chemical assessment
- If the waste is assessed be general solid waste, further investigations are undertaken to determine if the waste is putrescible or non-putrescible.

3.2 Local Government Requirements

The Project is located within the North Sydney Local Government Area (LGA), governed by NSLEP and NSDCP which provides more detailed provisions to guide development within the North Sydney LGA.

It is noted that while the NSDCP does not apply to SSD projects, the requirements stipulated in the NSDCP have been used as a reference point for designing a best practice waste strategy and system for the Project. This strategy aims to align as close as possible with the NSDCP requirements.

The NSDCP specifically outlines waste management guidelines for any waste or recycling produced during construction and operational works, which the Project should align with.

The aspects of the NSDCP relevant to the waste management strategy of the Project include:

- Section 19 of the NSDCP: Waste Minimisation and Management. This Section applies to all development applications that involve demolition, construction activities or a change in use, and provides high level objectives and provisions for inclusion in the waste management plan.
- Section 2 of the NSDCP: Commercial and Mixed-Use Development. This Section of the DCP aims to ensure that commercial and mixed-use developments are aligned with broader Council objectives. Of particular relevance in Section 2.5.9, Garbage Storage.
- Appendix 3 of the NSDCP: The Waste Handling Guidelines for High-Residential and Mixed Residential / Commercial Buildings. This expands on requirements for waste facilities contained within the main NSDCP to ensure that all new facilities comply with Council's collection service and waste minimisation policy.

From these aspects, a summary of the key relevant requirements which have informed this development of this Strategy for the Project has been summarised below:

For residential buildings which are served by a passenger lift, waste facilities must:

- provide an internal garbage chute leading to a central garbage storage room that has a waste compaction unit attached. The compaction unit shall be set at a 2:1 ratio
- provide each level of the building with at least one point of access to the chute. The access point shall be located in a signposted room, having a floor area not less than 1.5 metres square, appropriate to hold as a minimum 1 x 240L mobile recycling bin for the collection of paper and containers such as glass/plastic bottles, steel/aluminium cans
- provide a separate bulky waste storage room for household clean-up material

In commercial buildings, waste facilities must:

- provide ventilation, fire control and other services to the garbage chute room in accordance with the Building Code of Australia 2019 (BCA).
- provide a commercial garbage storage facility, separate from the residential section of sufficient size to accommodate all waste generated from the commercial section. If a commercial section garbage facility is located within the building that is more than 2 metres from the street alignment, then a temporary holding bay must be provided that is located within 2 metres of the street alignment.

3.3 Green Star – Design & As Built v1.2

The aim of the operational waste credit is to recognise projects that implement waste management plans that facilitate the re-use, upcycling, or conversion of waste into energy, and stewardship of items to reduce the quantity of outgoing waste.

The relevant criteria for credit includes:

- Development of an operational waste management plan for the project in accordance with best practice approaches and this is reflected in the building's design
- Planning for collection and separation of distinct waste streams, and where facilities meet best practice access requirements for collection by the relevant waste contractor

The aim of the materials criteria is address consumption of resources within the construction sector, and reduce the amount of waste generated, or the recycling of as much of the waste generated as possible.

The relevant criteria for credit includes the use of materials with high levels of recycled content, or the selection of reused products and materials.

3.4 Sydney Metro City and Southwest Sustainability Strategy 2017-24

Sydney Metro has a clear vision for the Sydney Metro City and Southwest project to demonstrate best-practice environmental, social and economic outcomes in delivery and operation. The Sydney Metro City and Southwest Sustainability Strategy 2017-24 (Sustainability Strategy), documents and outlines performance targets, initiatives and outcomes which will be adopted across key policy areas in the design, construction and operation stages of the metro-related aspects of the Sydney Metro City and Southwest Project. The Sustainability Strategy notes that Sydney Metro will be seeking best-practice sustainable design and governance outcomes for OSD, including achieving site specific responses to achieve Sydney Metro City and Southwest projects sustainability objectives for waste which include:

- Minimising waste through the project lifecycle
- Reduce materials consumption
- Consider embodied impacts in materials selection
- Maximise beneficial reuse of spoil

These objectives of the Sustainability Strategy have been considered when preparing this waste strategy.

3.5 Construction Waste Management

Under the amended concept SSD Application construction waste material generated as part of the project will be managed in accordance with the construction waste assessment as detailed in *Appendix EE Sydney Metro City & Southwest: Crows Nest Over Station Development Waste Strategy Report* (Metron, 2018) of the exhibited concept SSD Application,

4.0 Waste Assessment

The original development scheme is provided in Table 1 and the revised development scheme is provided in Table 2.

Table 1: Exhibited SSD scheme

Site	Waste Generating Area	Value	Units
Site A	Apartments	350	Dwellings
	Retail (total)	669	m^2
	Community Centre (total)	591	m^2
	Day Care (total)	330	m^2
Site B	Hotel Rooms	250	keys
	Cafes (total)	116	m^2
	Restaurants (total, including preparation areas)	704	m^2
	Reception and Offices (total)	117	m^2
	Hotel Business Centre (total, include the meeting room)	722	m^2
	Gym	178	m^2
Site C	Commercial space (assumed 100% of GFA)	2,700	m^2

Table 2: Amended SSD Scheme

Site	Waste Generating Area	Maximum GFA / Units
Site A	Commercial	38,6070 m^2
	Retail non-food	1,600 m^2
Site B	Apartments	143 Dwellings
	Retail non-food	267 m^2
Site C	Commercial	3,031 m^2

SMEC note the Amended SSD Scheme differs significantly from the Exhibited SSD scheme. Specifically uses which generate a large volume of waste (restaurant, cafe and hotel) have been omitted from the Amended scheme and therefore the forecasted waste volumes has changed significantly between schemes. As such, the calculated waste volumes and management strategy for the development has been revised. Amended waste volumes and management arrangements are provided in Section 4.0 of this report.

The exhibited SSD scheme applied City of Melbourne waste generation rates during waste generation assessments as they were considered 'the most recent in the industry, and have been updated with new data, therefore superseding all other Development Control Plans (including North Sydney Development Control Plan)'. To remain consistent the Amended SSD Scheme has also applied City of Melbourne Waste generation rates. Waste generation rates applied during the Amended SSD Scheme are provided in Table 4.

Table 3: Waste Generation Rates

Waste Generating Area	Residual	Recycling	Units
Retail (Takeaway - pre-packaged food only)	150	150	L/100m2 floor area/day
Office	10	10	L/100m2 floor area/day
3 Bedroom	120	120	L/week
2 Bedroom	100	100	L/week
1 Bedroom/Studio	80	80	L/week

It was noted that the exhibited SSD scheme applied weekly waste generation rates to all uses and did not consider likely operation days. The waste generation assessment for the amended SSD Scheme has applied the following:

- Commercial spaces - 5 days per week operation
- Retail (Takeaway - pre-packaged food only) spaces - 7 days per week operation
- Residential dwellings - continued use

4.1 Station Waste

All station waste will be collected and managed by Sydney Metro. Station cleaning staff will collect and dispose of waste / recyclables in the back of house station services to be incorporated in the station design. Station waste collection may share the use of loading bays allocated for OSD collection outlined in this Strategy in Section 4.2.4, although collection times and contractors may be different. Station management and OSD building operators will liaise to ensure there are no conflicts in shared use of loading bays.

The management of station waste is as per Appendix EE Sydney Metro City & Southwest: Crows Nest Over Station Development Waste Strategy Report (Metron, 2018) of the Exhibited SSD Scheme, and as such has not been altered.

4.2 Site A

4.2.1 Waste Generation

It is expected that garbage waste and commingled recyclables would be generated during the operation of the office and retail uses. The expected use of the retail areas is currently undefined, as such takeaway (pre-packaged food only) waste generation rates have been applied to the retail areas. Takeaway (pre-packaged food only) rates have been selected in lieu of rates for shops (non-food) as

takeaway waste generation rates are larger and therefore a more conservative approach to waste generation estimations. Waste generation rates are provided in Table 4.

Table 4: Site A Waste Generation Rates

Usage	Rate (Litres Per Week/100 m^2)	
	Garbage	Commingled Recycling
Commercial	50	50
Retail (Takeaway - pre-packaged food only)	1,050	1,050

An assessment of the volumes of waste and recyclables generated was carried out in accordance with the requirements of the City of North Sydney Development Control Plan 2013 Appendix 3 *Waste Handling Guide* and is provided in Table 5. Waste generation rates for the commercial spaces have been based on 5 days per week operation and 7 days per week operation for retail spaces.

Table 5: Site A Waste Generation Assessment

Usage	Area (m^2)	Waste Per Week (L)	
		Garbage	Commingled Recycling
Commercial	38,607	19,304	19,304
Retail (Takeaway - pre-packaged food only)	1,600	16,800	16,800
Total		**36,104**	**36,104**

4.2.2 Waste Storage and Management

Storage for Site A waste will be provided within two areas of the Project, being:

- Individual premises: space within each premise to store up to one days' worth of residual waste and recyclables.
- Central Storage Room: A Central Waste Storage Room (CWSR) will be provided in the OSD BOH area provided on the Ground Level adjacent to the Site A Loading Bay (located off Clarke Lane). Waste from the commercial spaces and retail spaces should be transported to the bulk bins located in the CWSR by cleaners/staff on a daily basis via the passenger lifts after normal business hours.

Descriptions of the waste storage areas are outlined in Table 6.

Table 6: Site A **Waste Storage**

Waste storage area	Infrastructure required	Space required
Individual premises	Bins to be provided by tenants and located in open visible space in individual premises	<1 m^2
CWSR	7 x 1,100L garbage bins 7 x 1,100L commingled recycling bins 1 x 1,100L oversized cardboard bin	>35 m^2

The CWSR should also incorporate the following:

- A water tap located in the store area to facilitate regular washing of bins
- If a wash down area is provided within the bin store area, then the floor must be graded to a waste outlet to sewer
- Alternative to a bin wash area, a third-party bin washing service can be engaged to perform this service. Bin washing suppliers must retain all waste water to within their washing apparatus so as to not impact on the drainage provisions of the site.
- Designed to prevent access to vermin, and vermin control
- Adequate lighting
- Ventilation would be provided in accordance with Australian Standard AS1668.
- All waste areas would meet EPA, BCA and AS2107 acoustic requirements as appropriate within operational hours assigned to minimise acoustic impact on surrounding premises.

4.2.3 Waste Equipment

Details of the number, size and collection frequency of bins to be provided in the CWSR for both general waste and commingled recycling are presented in Table 7.

Table 7: Site A Bin Size and Collection Frequency

Waste Type	Collections Per Week	Bin Size (L)	No. Bins	Total Capacity (L)	Waste Per Week (L)
General Waste	5	1,100	5	27,500	24,904
Commingled Recycling	5	1,100	5	27,500	24,904
Oversized Cardboard*	As required	1,100L	1	1,100L	1,100L

* Estimations for commingled recycling include cardboard volumes, however an extra bin for oversized cardboard has been allowed to adequately manage any operational issue that may arise due to the size of cardboard boxes (i.e. boxes not being adequately broken down, resulting in overflowing bins)

Bin dimensions are provided in Table 8.

Table 8: Bin Dimensions

Capacity (L)	Width (mm)	Depth (mm)	Height (mm)	Area (m^2)
1,100	1240	1070	1330	1.33

4.2.4 Waste Collection

The Waste Collection Point for Site A (WCP Site A) is internal to the building off the loading dock and located near the CWSR. Building management will be responsible for moving the bins from the CWSR to the WCP Site A. As noted, it is anticipated that an electric bin mover will be required in order to move the bins.

The scale of the putrescible waste generated necessitates more frequent collection (five collections per week), therefore deviating from the NSDCP of one collection per week. The container necessary for weekly collection would require hook lift truck collection, which is not within the North Sydney collection fleet thus a private collection contractor is likely to be required regardless. Furthermore, the loading dock height and turn table restrictions prevent front lift, or hook lift access, therefore the waste management system is designed for rear lift truck and MRV access.

Collection vehicles required to service each waste stream are outlined in Table 9, with associated dimensions and clearance requirements.

Table 9: Site A Waste Collection Vehicle Specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual Waste	1,100L	Rear Lift	Overall Length* – 8.0 m Overall Width – 2.5 m Height (travel) – 3.4 m Height (operation) – 3.4m Turning circle 25.0m
Recyclables			
Oversize Cardboard			

* Older rear lift fleet are longer and would not fit on the turn table. At least two of the major waste collectors' user the smaller 8.0 m fleet

4.3 Building B – Residential

4.3.1 Waste Generation

It is expected that garbage waste and commingled recyclables would be generated from the residential dwellings.

Waste Generation rates are provided in Table 10.

Table 10: Site B Residential Waste Generation Rates

Dwelling Size	Rate (Litres Per Week)	
	Garbage	Commingled Recycling
One bedroom	80	80
Two-bedroom	100	100
Three-bedroom	120	120

An assessment of the volumes of waste and recyclables generated was carried out in accordance with the requirements of the City of North Sydney Development Control Plan 2013 Appendix 3 *Waste Handling Guide* and is provided in Table 11.

Table 11: Site B Residential Waste Generation Assessment

Dwelling Size	Number	Waste Per Week (L)	
		Garbage	Commingled Recycling
One bedroom	65	5200	5200
Two-bedroom	65	6500	6500
Three-bedroom	13	1560	1560
Total		**13,260**	**13,260**

An allowance of 2m^2 storage area for bulky waste has been included, based on the requirement of 1m^2 per 100 apartments.

4.3.2 Waste Storage and Management

Storage for Site B residential waste will be provided within three areas of the Project, being:

- Individual premises: space within each premise to store up to one days' worth of residual waste and recyclables.
- Individual levels – Waste Storage Rooms (WSR): Space/s allocated on each level for a Waste Storage Room, for interim waste storage of commingled recyclables and oversized cardboard and chute access for garbage. Garbage chutes will be fitted with an in-chute compactor, compacting waste by a ratio of 1:2. Garbage chutes would terminate directly into 1,100L bulk. Building management would be responsible for replacing full commingled recycling bins and oversized cardboard located in the Waste Storage Room on an as required basis.
- Central Storage Room: A Central Waste Storage Room – Non-Residential (CWSR-NR) will be provided in the OSD BOH area provided on the Ground Level adjacent to the car lifts. Waste from the retail spaces should be transported to the bulk bins located in the CWSR by

cleaners/staff on a daily basis via the passenger lifts after normal business hours. Residential and commercial waste is to be stored separately and as such, the CWSR-NR is to remain as a separate waste room to Site B CWSR-R.

Descriptions of the waste storage areas are outlined in Table 12.

Table 12: Site B **Residential Waste Storage**

Waste Storage Area	Infrastructure Required	Space Required
Individual premises	Bins to be provided by residentials owners/tenants within the dwelling footprint.	<1 m^2
WSR (per level)	1 x 240L commingled recycling bin 0.5 m^2 for the interim storage of large cardboard 1 x garbage chute terminal point	>2 m^2
CWSR-R	3 x 1,100L garbage bins 19 x 240L commingled recycling bins (in addition to the allowance of 240L commingled recycling bin s provided on each level within each WSR) 1 x 1,100L oversized cardboard bin 2 m^2 area provided for the storage of bulky waste	>25 m^2

The CWSR-R should also incorporate the following:

- A water tap located in the store area to facilitate regular washing of bins
- If a wash down area is provided within the bin store area, then the floor must be graded to a waste outlet to sewer
- Alternative to a bin wash area, a third-party bin washing service can be engaged to perform this service. Bin washing suppliers must retain all waste water to within their washing apparatus so as to not impact on the drainage provisions of the site.
- Designed to prevent access to vermin, and vermin control
- Adequate lighting
- Ventilation would be provided in accordance with Australian Standard AS1668.
- All waste areas would meet EPA, BCA and AS2107 acoustic requirements as appropriate within operational hours assigned to minimise acoustic impact on surrounding premises.
- Restricted access to the garbage chute (i.e chain wire fence) to reduce OHS issues associated with access to machinery and mitigation of unforeseen.

4.3.3 Waste Equipment

Details of the number, size and collection frequency of bins to be provided in the CWSR for both general waste and commingled recycling are presented in Table 13.

Table 13: Residential Bin Size and Collection Frequency

Waste Type	Collections Per Week	Bin Size (L)	No. Bins	Total Capacity (L)	Waste Per Week (L)
General Waste	3	1,100	1	19,800 (uncompacted)	13,260 (uncompacted)
Commingled Recycling	3	240	19**	13,680	13,260
Oversized Cardboard*	As required	1,100	1	1,100	1,100

* Estimations for commingled recycling include cardboard volumes, however an extra bin for oversized cardboard has been allowed to adequately manage any operational issue that may arise due to the size of cardboard boxes (i.e. boxes not being adequately broken down, resulting in overflowing bins)

**This is the number of 240L bin required for collection. An additional 13 240L bins should be purchased to allow for the continued disposal of commingled recyclables in the WSRs during collection periods.

Bin dimensions are provided in Table 14.

Table 14: Bin Dimensions

Capacity (L)	Width (mm)	Depth (mm)	Height (mm)	Area (m^2)
240	585	730	1060	0.43
1,100	1240	1070	1330	1.33

4.3.4 Waste Collection

The Waste Collection Point for Site B (WCP Site B)) is located within the Building B loading dock, located off Clarke Lane. Building management will be responsible for moving the bins from the CWSR to the WCP Site B. As noted, it is anticipated that an electric bin mover may be required in order to move the bins.

The scale of the putrescible waste generated necessitates more frequent collection (maximum five collections per week), therefore deviating from the NSDCP, which allows one collection per week. The container necessary for weekly collection would require hook lift truck collection, which is not within the North Sydney collection fleet thus a private collection contractor is likely to be required regardless. Furthermore, the loading dock height and turn table restrictions prevent side lift, front lift, or hook lift access, therefore the waste management system is designed for rear lift truck and MRV access.

Collection vehicles required to service each waste stream are outlined in Table 15, with associated dimensions and clearance requirements.

Table 15: Site B Residential Waste Collection Vehicle Specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual Waste	240L 1,100L	Rear Lift	Overall Length* - 8.0 m Overall Width - 2.5 m Height (travel) - 3.4 m Height (operation) - 3.4 m Turning circle 25.0 m
Recyclables			
Oversize Cardboard			

* Older rear lift fleet are longer and would not fit on the turn table. At least two of the major waste collectors' user the smaller 8.0 m fleet

4.4 Building B – Non-residential

4.4.1 Waste Generation

It is expected that garbage waste and commingled recyclables would be generated during the operation of the retail use. The expected use of the retail areas is currently undefined, as such takeaway (pre-packaged food only) waste generation rates have been applied to the retail areas. Takeaway (pre-packaged food only) rates have been selected in lieu of rates for shops (non-food) as takeaway waste generation rates are larger and therefore a more conservative approach to waste generation estimations.

Waste generation rates for the retail space has been based 7 days per week operation.

An assessment of the volumes of waste and recyclables generated was carried out in accordance with the requirements of the City of North Sydney Waste Policy and is provided in Table 16.

Table 16: Site B Non-residential Waste Generation Rates

Usage	Rate (Litres Per Week/100 m^2)	
	Garbage	Commingled Recycling
Retail (Takeaway - pre-packaged food only)	1,050	1,050

A waste generation assessment based on the floor areas of each use is provided in Table 17.

Table 17: Site B Non-residential Waste Generation Assessment

Usage	Area (m^2)	Waste Per Week (L)	
		Garbage	Commingled Recycling
Retail (Takeaway - pre-packaged food only)	267	2,804	1,113
Total		**2,804**	**2,804**

4.4.2 Waste Storage and Management

Storage for Site B non-residential waste will be provided within two areas of the Project, being:

- Individual premises: space within each premise to store up to one days' worth of residual waste and recyclables.
- Central Storage Room: A Central Waste Storage Room – Non-Residential (CWSR-NR) will be provided in the OSD BOH area provided on the Ground Level adjacent to the car lifts which are provided off Clarke Lane. Waste from the retail spaces should be transported to the bulk bins located in the CWSR by cleaners/staff on a daily basis via the passenger lifts after normal business hours. Residential and commercial waste is to be stored separately and as such, the CWSR-NR is to remain as a separate waste room to Site B CWSR-R.

Descriptions of the waste storage areas are outlined in Table 18.

Table 18: Site B Non-Residential Waste Storage

Waste storage area	Infrastructure required	Space required
Individual premises	Bins to be provided by tenants and located in open visible space in individual premises	<1 m^2
CWSR-NR	1 x 1,100L garbage bin 1 x 1,100L commingled recycling bin 1 x 1,100L oversized cardboard bin	>7 m^2

The CWSR should also incorporate the following:

- A water tap located in the store area to facilitate regular washing of bins
- If a wash down area is provided within the bin store area, then the floor must be graded to a waste outlet to sewer
- Alternative to a bin wash area, a third-party bin washing service can be engaged to perform this service. Bin washing suppliers must retain all waste water to within their washing apparatus so as to not impact on the drainage provisions of the site.
- Designed to prevent access to vermin, and vermin control
- Adequate lighting
- Ventilation would be provided in accordance with Australian Standard AS1668.
- All waste areas would meet EPA, BCA and AS2107 acoustic requirements as appropriate within operational hours assigned to minimise acoustic impact on surrounding premises.

4.4.3 Waste Equipment

Details of the number, size and collection frequency of bins to be provided in the CWSR for both general waste and commingled recycling are presented in Table 19.

Table 19: Bin Size and Collection Frequency

Waste Type	Collections Per Week	Bin Size (L)	No. Bins	Total Capacity (L)	Waste Per Week (L)
General Waste	2	1,100	1	2,200	1,113
Commingled Recycling	2	1,100	1	2,200	1,113
Oversized Cardboard*	As required	1,100	1	1,100	1,100

* Estimations for commingled recycling include cardboard volumes, however an extra bin for oversized cardboard has been allowed to adequately manage any operational issue that may arise due to the size of cardboard boxes (i.e. boxes not being adequately broken down, resulting in overflowing bins)

Bin dimensions are provided in Table 20.

Table 20: Bin Dimensions

Capacity (L)	Width (mm)	Depth (mm)	Height (mm)	Area (m^2)
1,100	1240	1070	1330	1.33

4.4.4 Waste Collection

The Waste Collection Point for Site B (WCP Site B) is located within the Building B loading dock, located off Clarke Lane. Building management will be responsible for moving the bins from the CWSR to the WCP Site B. As noted, it is anticipated that an electric bin mover may be required in order to move the bins.

The scale of the putrescible waste generated necessitates more frequent collection (two collections per week), therefore deviating from the NSDCP. The container necessary for weekly collection would require hook lift truck collection, which is not within the North Sydney collection fleet thus a private collection contractor is likely to be required regardless. Furthermore, the loading dock height and turn table restrictions prevent front lift, or hook lift access, therefore the waste management system is designed for rear lift truck and MRV access.

Collection vehicles required to service each waste stream are outlined in Table 21, with associated dimensions and clearance requirements.

Table 21:Site B Non-Residential Waste Collection Vehicle Specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual Waste	240L 1,100L	Rear Lift	Overall Length* - 8.0 m Overall Width - 2.5 m Height (travel) - 3.4 m Height (operation) - 3.4 m Turning circle 25.0 m
Recyclables			
Oversize Cardboard			
* Older rear lift fleet are longer and would not fit on the turn table. At least two of the major waste collector's user the smaller 8.0 m fleet.			

4.5 Site C

4.5.1 Waste Generation

It is expected that garbage waste and commingled recyclables would be generated during the operation of the office spaces. Office waste generation rates have been applied for the commercial area based on 5 days per week operation. Waste generation rates are provided in Table 22.

Table 22: Site C Waste Generation Rates

Usage	Rate (Litres Per Week/100 m^2)	
	Garbage	Commingled Recycling
Office	50	50

An assessment of the volumes of waste and recyclables generated was carried out in accordance with the requirements of the City of North Sydney Waste Policy. The waste generation assessment based on the floor areas is provided in Table 23.

Table 23: Site C Waste Generation Assessment

Usage	Area (m^2)	Waste Per Week (L)	
		Garbage	Commingled Recycling
Office	3,031	1,516	1,516
	Total	**1,516**	**1,516**

4.5.2 Waste Storage and Management

Storage for Site C waste will be provided within two areas of the Project, being:

- Individual premises: space within each premise to store up to one days' worth of residual waste and recyclables.
- Central Storage Room: A Central Waste Storage Room (CWSR) will be provided in the OSD BOH area provided on the Ground Level adjacent to the Crows Nest Station Lobby. Waste from the commercial spaces should be transported to the bulk bins located in the CWSR by cleaners/staff on a daily basis via the passenger lifts after normal business hours.

Descriptions of the waste storage areas are outlined in Table 24.

Table 24: Site C **Waste Storage**

Waste storage area	Infrastructure required	Space required
Individual premises	Bins to be provided by tenants and located in open visible space in the premises	<1m^2
CWSR	1 x 1,100L garbage bins 1 x 1,100L commingled recycling bins 1 x 1,100L oversized cardboard bin	>7 m^2

The CWSR should also incorporate the following:

- A water tap located in the store area to facilitate regular washing of bins
- If a wash down area is provided within the bin store area, then the floor must be graded to a waste outlet to sewer
- Alternative to a bin wash area, a third-party bin washing service can be engaged to perform this service. Bin washing suppliers must retain all waste water to within their washing apparatus so as to not impact on the drainage provisions of the site.
- Designed to prevent access to vermin, and vermin control
- Adequate lighting
- Ventilation would be provided in accordance with Australian Standard AS1668.

- All waste areas would meet EPA, BCA and AS2107 acoustic requirements as appropriate within operational hours assigned to minimise acoustic impact on surrounding premises.

4.5.3 Waste Equipment

Details of the number, size and collection frequency of bins to be provided in the CWSR for both general waste and commingled recycling are presented in Table 25.

Table 25: Site C Bin Size and Collection Frequency

Waste Type	Collections Per Week	Bin Size (L)	No. Bins	Total Capacity (L)	Waste Per Week (L)
General Waste	2	1,100	1	2,200	1,516
Commingled Recycling	2	1,100	1	2,200	1,516
Oversized Cardboard*	As required	1,100L	1	1,100L	1,100L

* Estimations for commingled recycling include cardboard volumes, however an extra bin for oversized cardboard has been allowed to adequately manage any operational issue that may arise due to the size of cardboard boxes (i.e. boxes not being adequately broken down, resulting in overflowing bins)

Bin dimensions are provided in Table 26.

Table 26: Bin Dimensions

Capacity (L)	Width (mm)	Depth (mm)	Height (mm)	Area (m^2)
1,100	1240	1070	1330	1.33

4.5.4 Waste Collection

The Central Storage Room shall act as the Waste Collection Point for Site C (WCP Site C). Waste collection vehicle operators would prop on Clarke Street and ferry waste bin from the WCP Site C to the collection vehicle and return upon emptying.

Collection vehicles required to service each waste stream are outlined in Table 27, with associated dimensions and clearance requirements.

Table 27: Site C Collection Vehicle Specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual Waste	1,100L	Rear Lift	Overall Length* - 8.0 m Overall Width - 2.5 m Height (travel) - 3.4 m Height (operation) - 3.4 m Turning circle 25.0 m
Recyclables			
Oversize Cardboard			
*Older rear lift fleet are longer and would not fit on the turn table. At least two of the major waste collectors' user the smaller 8.0 m fleet.			

4.6 Comparison between SSD Schemes

A comparison of total waste volumes and collection frequencies required between the exhibited and amended SSD schemes has been provided in Table 28. Table 28 shows a significant reduction in the overall estimated waste volume generated by the Amended SSD Scheme in comparison to the Exhibited SSD Scheme. The total collections per week are still comparative with little change. However, it should be noted that the capacity of the proposed collection vehicle is typically 57,000L and as such on some days more than one vehicle would have been required to perform collections for each stream of the Exhibited SSD Scheme. The estimated number of truck movements required to service the Exhibited Scheme is 18 movements. The total volume of waste generated per stream for the Amended SSD Scheme can be accommodated by one truck on any given day. The estimated number of truck movements required to service the Amended SSD Scheme is ten (10) movements.

Table 28: Comparison of Total Waste Volumes and Collection Frequencies required between the Exhibited and Amended SSD Schemes

Site	Parameter	Exhibited SSD Scheme		Amended SSD Scheme	
		Garbage	Recycling	Garbage	Recycling
Site A	Weekly Volume (L)	45,397	45,397	36,104	36,104
	Collections Per Week	7	7	5	5
Site B	Weekly Volume (L)	44,440	20,948	16,064	16,064
	Collections Per Week	2	2	3	3
Site C	Weekly Volume (L)	1,890	1,890	1,516	1,516
	Collections Per Week	2	2	2	2
Total	Weekly Volume (L)	91,727	68,235	53,684	53,684
	Maximum Collections Per Week	7	7	5	5
Maximum Truck Movements required to service development		9	9	5	5

5.0 Conclusion

This report presents the results of a waste assessment of the OSD above Crows Nest Station (the Project) based on the Amended SSD Scheme in comparison to the Exhibited SSD Scheme. This report has been prepared to outline the potential impacts from waste generation, storage and collection of the OSD and to specifically respond to any changes required for the management of waste between schemes.

Based on the recalculations of waste generated by the OSD in comparison to the previous design, there has been a decrease in the volume of waste generated by the development and fewer truck movements, providing a better environmental outcome.

It is noted that approval is only being sought for the OSD concept proposal and the waste requirements of the proposal should be considered further during the detailed design phase once the precise mix of uses is known. The future detailed design should revise the completed waste generation assessment against any revisions to the Amended SSD Scheme. A detailed waste strategy should be submitted with the future detailed SSD Applications demonstrating how the requirements stipulated in this report have been met in the final building design.