ALTERATIONS AND ADDITIONS TO THE GLADESVILLE BRIDGE MARINA

Waste Management Plan

Prepared for:

Gladesville Bridge Marina Pty Ltd
380 Victoria Place
Drummoyne NSW 2047

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Gladesville Bridge Marina Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.18292-R01-v2.0	4 October 2019	Celine El-Khouri	Sean Sciberras	Sean Sciberras
610.18292-R01-v1.0	5 July 2019	Celine El-Khouri	Andrew Quinn	Andrew Quinn

DOCUMENT REFERENCES

TABLES

FIGURES

APPENDICES

1 Introduction

This Waste Management Plan (WMP) report has been prepared as part of an Environmental Impact Statement (EIS) to accompany a Development Application (DA), lodged with Canada Bay Council under Part 4 of the *Environmental Planning and Assessment Act 1979*.

It addresses the following Secretary's Environmental Assessment Requirements (SEARs):

Waste Management

- details of waste handling including, transport, identification, receipt, stockpiling and quality control including off-site reuse and disposal – Page 11 to 33
- the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-2021* – Page 8 to 33
- the nature of the processes and the products, by products and waste produced – Pages 11 to 13 and 23 to 26
- the use or disposal of products or waste – Pages 11 to 19 and 23 to 28
- identify, characterise and classify all waste that will be generated on-site through excavation, demolition or construction activities, including proposed quantities of waste. Note: all waste must be classified in accordance with the EPA's Waste Classification Guidelines – Pages 11 to 15 and 23 to 26
- provide details on how any waste generated will be handled and managed on-site to minimise pollution – Pages 13 to 20 and 27 to 33.

The Gladesville Bridge Marina (GBM) includes a water-based structure and a land-based building. It is located at 380 Victoria Place, Drummoyne in the Canada Bay Local Government Area. The site is located on the eastern foreshore of the Parramatta River, to the south of the Gladesville Bridge.

The site is approximately 19,740 m^2 in area, comprising an approximate 1,740 m^2 land-based component and an approximate 18,000 m^2 of lease area, which accommodates the water-based component. An aerial photo of the site is shown at **Figure 1**.

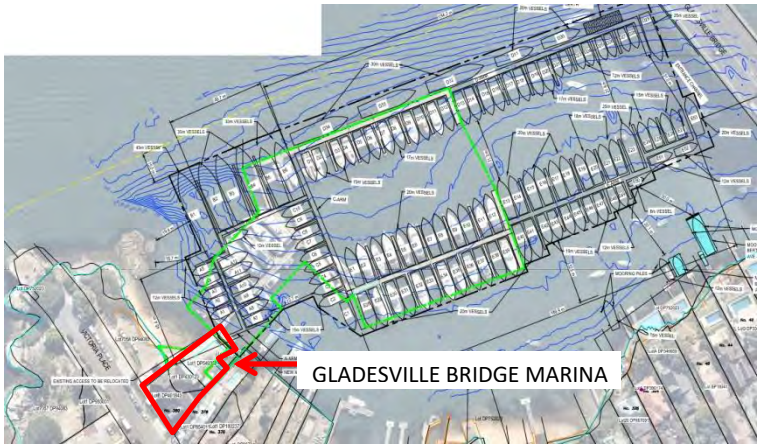


Figure 1 Aerial photograph of the site

Source: GHD Pty Ltd / NearMaps

A summary of GBM's current services is as follows:

- 50 floating berths; berth sizes range from 25' to 75.5' (7.6 m to 23 m)
- 44 swing moorings; swing moorings are available for boats, with the most popular lengths from 17' (5.2 m) up to 50' (15 m), although there is no limit in length
- Total capacity for 99 boats
- Complimentary tender service available seven days a week, transporting customers to and from the marina pontoons to their vessels on the swing moorings
- Dinghies availability for after-hours use
- Slipways – antifouling, boat surveys and painting. The slipway can accommodate vessels up to 60' (18 m) LOA[1] and 16' (5 m) beam. Non-flybridge power vessels of up to 40' (13 m) are able to be housed in their undercover slipway area for all weather painting and repairs
- Pump out facilities
- Food and beverage kiosk, currently machine based
- Boat repairs
- Shipwright services
- Mechanical services
- Work berths
- New and used boat sales
- Charter operation (back-of-house).

The proposed development constitutes alterations and additions to the marina berth layout to provide overall storage for 130 vessels comprising 15 swing moorings and 115 floating berths. The works include:

- removal 29 existing swing moorings and retention of 15 existing swing moorings
- construction of 65 new floating berth spaces of varying sizes, that increases the number of floating berths from 50 to 115
- cessation of the slipway activities
- demolition of the slipway rails and demolition of the internal office mezzanine structure within the covered slipway area, and
- provision of 8 new valet car parking spaces within the existing slipway area.

As the proposed development constitutes a 'marina', with an intended capacity of more than 15 vessels having a length of 20 metres or more and an intended capacity of more than 80 vessels of any size, it is classified as 'Designated Development' under Schedule 3, Clause 23 of the Environmental Planning and Assessment Regulation 2000.

[1] Length overall

2 Objective

2.1 Overview

SLR Consulting Australia Pty Ltd (SLR) was engaged by Gladesville Bridge Marina Pty Ltd (the Client) to prepare the waste management plan (WMP) for GBM as a part of the EIS documentation that will accompany the DA, lodged with Canada Bay Council (Council). The objectives of this WMP are to:

- Identify potential waste likely to be generated during the demolition and construction activities of GBM
- Provide advice on how construction and operational waste should be handled and processed, including disposal, reuse or recycle, in accordance with relevant Australian Codes and Standards and better practice waste minimisation principles
- Encourage waste avoidance through design, ordering and planning
- Help implement safe and practical options for waste collection from GBM by private waste servicing contractors
- Assist in the continuation of GBM as International Clean Marina[2], and
- Assist in improving public benefit through improved design and visual amenity

This WMP applies to waste generated during the demolition, construction and operation of GBM and was prepared using architectural drawings provided by the Client (**Appendix A**).

2.2 Review of WMP

This WMP is not a static document. It is a working document that requires review and updating to ensure ongoing suitability for the proposed on-going operations at the site.

This WMP should be reviewed and updated:

- to remain consistent with waste and landfill regulations and guidelines
- if changes are made to site waste and recycling management, or
- to take advantage of new technologies, innovations and methodologies for waste or recycling management.

Changes made to the WMP, as well as the reasons for the changes made, should be documented by the site operator as part of the review process.

Copies of the original WMP, as well as all future versions of the WMP, should be retained by the site operator.

[2] The International Clean Marina Program is a voluntary, incentive-based education and outreach program. It encourages environmental compliance and the use of best management practises for marinas.
https://www.marinas.net.au/industryprograms/international-clean-marina-program

3 Better Practice for Waste Management and Recycling

3.1 Waste Management Hierarchy

This WMP has been prepared in line with the waste management hierarchy shown in **Figure 2**. The hierarchy summarises the objectives of the *Waste Avoidance and Resource Recovery Act 2001* and is recommended in the NSW EPA Environmental Actions for Marinas, Boatsheds and Slipways (2007).

The waste management hierarchy comprises the following principles, from most to least preferable:

- Waste **avoidance** - prevention or reduction of waste generation. Achievable through better design and purchasing choices.
- Waste **reuse** - reuse without substantially changing the form of the waste.
- Waste **recycling** - treatment of waste that is no longer usable in its current form to produce new products.
- Energy **recovery** - processing of residual waste materials to recover energy.
- Waste **treatment** - reduce potential environmental, health and safety risks.
- Waste **disposal** – disposal in a manner that causes the least harm to the natural environment.

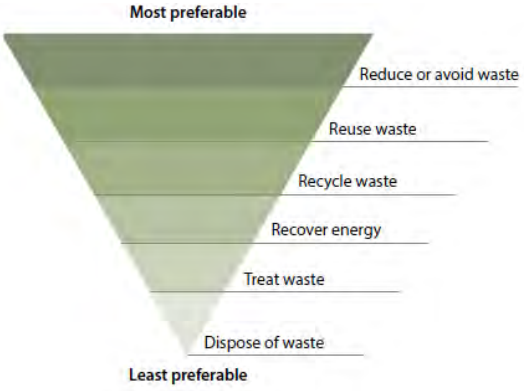


Image from NSW EPA (2014) NSW Waste Avoidance and Resource Recovery Strategy 2014-21.

Figure 2 Waste management hierarchy

3.2 Benefits of Adopting Better Practice

Adopting better practice principles in waste minimisation offers significant benefits for organisations, stakeholders and the wider community. Benefits from better practice waste minimisation include:

- Improved reputation of an organisation due to social and environmental responsibility.
- Lowered consumption of non-renewable resources.
- Reduced environmental impact, for example, pollution from materials manufacturing and waste treatment.
- Reduced expenses from lower waste disposal.
- Providing opportunities for additional revenue streams through beneficial reuse.

4 Legislation and Guidance

The legislation and guidance outlined in **Table 1** below should be referred to during the construction and operation of GBM.

Table 1 Legislation and guidance

Legislation and Guidance	Objectives
Council legislation and guidelines	
The City of Canada Bay Development Control Plan 2017	The City of Canada Bay Development Control Plan 2017 (Council's DCP) applies to all development proposals in the City of Canada Bay local government area that are lodged after 7 March 2017. The DCP supports provision of the LEP planning controls by providing detailed planning and design guidelines. The DCP has been prepared in accordance with the Section 3.43 of the *Environmental Planning and Assessment Act 1979*. The sections incorporated into this WMP are Part C – General Controls.
Canada Bay Local Environmental Plan 2013[3]	The Canada Bay Local Environmental Plan 2013 (LEP) provides the legal framework of the City of Canada Bay DCP 2017, including land use and development permitted in a set zone. The LEP also contains provisions to conserve local heritage and protect sensitive land.
Recycle Coach[4]	The Recycle Coach is a mobile application developed in Canada and available for smartphones through the Apple app store and the Google Play store. This application allows users to check details of upcoming waste events such as the Household Chemical Clean Out and other waste drop-off events such as e-waste drop off days. Further, it allows users to search their bin collection days and set reminders to put out bins. The main function of this application for GBM would be as a database for Council's waste and resource recovery information.
State and National legislation and guidelines	
NSW EPA's Environmental Action For Marinas, Boatsheds and Slipways 2007[5]	The NSW EPA Environmental Action for Marinas, Boatsheds and Slipways 2007 informs operators of the boating industry of the associated environmental risks and responsibilities and actions to assist the environment and their business. This document discloses priority actions for marinas, slipways and boatsheds, information sheets on relevant environmental topics and guides for an environmental action plan. For the purposes of this report, information from sheets 5 and 6 will be referenced in addition to the environmental action plan.
Sydney Harbour Foreshores and Waterways Area Development Control Plan 2005	The Sydney Harbour Foreshores and Waterways Area Development Control Plan 2005 (The Sydney Harbour Foreshores and Waterways Area DCP) aims to protect, secure and maintain the waterways in Sydney Harbour for future use in a manner that preserves natural amenity and public heritage values. Using a clear legislative framework for consistent future management, the urban environment can be preserved to a quality standard by managing design guidelines for land-based developments and foreshore interface developments.
Building Code of Australia (BCA) and relevant Australian Standards	The BCA has the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity and sustainability objectives efficiently.
Council of Australian Governments National Construction Code 2016	The National Construction Code 2016 sets the minimum requirements for the design, construction and performance of buildings throughout Australia.
NSW EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012	These better practice guidelines present information on waste minimisation and resource recovery as well as information on commonly used waste management provisions. The guidelines also provide benchmarks for assessing waste production rates in Australia.

[3] https://www.legislation.nsw.gov.au/#/view/EPI/2013/389/maps

[4] https://www.canadabay.nsw.gov.au/residents/waste-and-recycling/My-Waste-App

[5] https://www.epa.nsw.gov.au/~/media/EPA/Corporate%20Site/resources/clm/EnvironmentalActionMarinasBoatshedsSlipways2007.ashx

Legislation and Guidance	Objectives
Protection of the Environment Operations Act (POEO) 1997 and *Amendment Act 2011*	The POEO Act 1997 and POEO Amendment Act 2011 are administered by the NSW EPA to enable the NSW Government to establish instruments for setting environmental standards, goals, protocols and guidelines. They outline the regulatory requirements for lawful disposal of waste generated during the demolition, construction and operational phases of a development, as well as the system for licencing waste transport and disposal.
Protection of the Environment Operations Act (POEO) (Waste) Regulation 2014	The POEO Waste Regulation 2014 provides detailed actions that extend from the POEO Act and aim to aid NSW EPA in protecting human health and the environment in a fair and efficiently regulated waste industry. The regulations identify actions for items such as reporting and record keeping requirements, required contributions per tonne of waste that are to be paid by waste facilities, and the prohibitions of waste to land for the purpose of vegetation growth.
Waste Avoidance and Resource Recovery Act 2001	The *Waste Avoidance and Resource Recovery Act 2001* aims to promote waste avoidance and resource recovery and repeals the *Waste Minimisation and Management Act 1995*. Specific objectives of the *Waste Avoidance and Resource Recovery Act 2001* include: • encouraging efficient use of resources • minimising the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste • ensuring industry and the community share responsibility in reducing/dealing with waste, and • efficiently funding of waste and resource management planning, programs and service delivery. As of 2016, the addition to the Act of Part 5 defines the legislative framework for the 'Return and Earn Container Deposit Scheme' whereby selected beverage containers can be returned to State Government authorities for a monetary refund.
The Work Health and Safety Regulation 2011	The Work Health and Safety Regulation 2011 provide detailed actions and guidance associated with the topics discussed in *The Work Health and Safety Act 2011*. The primary aim of the regulation is to protect the health and safety of workers and ensure that risks are minimised in work environments. Workplaces are to ensure that they are compliant with the requirements specified in the regulations. The regulations discuss items such as actions that are prohibited or obligated in work environments, the requirements for obtaining licences and registrations, and the roles and responsibilities of staff in workplaces.
NSW EPA (2014) NSW Waste Avoidance and Resource Recovery Strategy 2014-21	The NSW Waste Avoidance and Resource Recovery Strategy 2014-21 is aimed at ultimately 'improving environment and community well-being by reducing the environmental impact of waste and using resources more efficiently' by presenting a framework intended to avoid and reduce waste generation, increase recycling, divert more waste from landfill, manage problem waste better, reduce litter and reduce illegal dumping.
NSW EPA Resource Recovery Orders and Resource Recovery Exemptions	The NSW EPA has issued a number of resource recovery orders and resource recovery exemptions under the POEO (Waste) Regulation 2014 for a range of waste that may be recovered for beneficial re-use. These wastes typically include those from demolition and construction works, as well as ongoing waste such as food waste. • Resource recovery orders present conditions which generators and processors of waste must meet to supply the waste material for beneficial re-use. • Resource recovery exemptions contain the conditions which consumers must meet to use waste for beneficial re-use.
NSW EPA's Waste Classification Guidelines 2014	The NSW EPA Waste Classification Guidelines assists waste generators to effectively manage, treat and dispose of waste to ensure the environmental and human health risks associated with waste are managed appropriately and is in accordance with the POEO Act 1997 and associated regulations.

5 Demolition and Construction Waste Management

5.1 Targets for Resource Recovery

The construction of each development should contribute to the following goal from the NSW EPA (2014) *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*[6]:

- 75% (increasing to 80% by the year 2021) of total construction and demolition waste recycled.

Waste minimisation measures that can be implemented to assist in achieving this resource recovery target are provided in the following sections. Waste audits will determine the actual percentage of waste that was recycled and disposed of at landfill during the construction of GBM.

5.2 Waste Streams and Classifications

The demolition and construction phase of the GBM is anticipated to generate the following broad waste streams:

- Minor construction waste including fit out offcuts and minor trimmings
- Unspecified waste from workshop demolition
- Packaging waste, and
- Work compound waste from on-site employees.

Although the quantity of generated waste is anticipated to be small, a summary of likely waste types generated from standard construction activities, along with their waste classifications and proposed management methods, is provided in **Table 2.** For further information on how to determine a waste's classification refer to the NSW EPA (2014) *Waste Classification Guidelines*[7]. Further information on managing site preparation and construction waste is available from the NSW EPA website[8].

Table 2 Potential waste types, classifications and management methods – construction and demolition waste

Waste Types	NSW EPA Waste Classification	Proposed Management Method
Demolition		
Sediment fencing, geotextile materials	General solid waste (non-putrescible)	Reuse at other sites where possible or disposal to landfill
Steel reinforcing, other metal, for example, wire mesh	General solid waste (non-putrescible)	Off-site recycling
Conduits and pipes	General solid waste (non-putrescible)	Off-site recycling
Timber formwork	General solid waste (non-putrescible)	Reuse on-site or off-site recycling
Metals and bulk electrical cabling	General solid waste (non-putrescible)	Off-site recycling
Glass	General solid waste (non-putrescible)	Off-site recycling

6 Available online from https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/warr-strategy

7 Available online from https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines

8 Available online from http://www.epa.nsw.gov.au/your-environment/waste/industrial-waste/construction-demolition

Waste Types	NSW EPA Waste Classification	Proposed Management Method
Light bulbs	Hazardous waste	Off-site recycling
Construction		
Sediment fencing, geotextile materials	General solid waste (non-putrescible)	Reuse at other sites where possible or disposal to landfill
Concrete	General solid waste (non-putrescible)	Off-site recycling for filling, levelling or road base
Bricks and pavers	General solid waste (non-putrescible)	Cleaned for reuse as footings, broken bricks for internal walls, crushed for landscaping or driveway use, off-site recycling
Gyprock or plasterboard	General solid waste (non-putrescible)	Off-site recycling or returned to supplier
Sand or soil	General solid waste (non-putrescible)	Off-site recycling
Metals such as fittings, appliances and bulk electrical cabling, including copper and aluminium	General solid waste (non-putrescible)	Off-site recycling at metal recycling compounds and remainder to landfill
Conduits and pipes	General solid waste (non-putrescible)	Off-site recycling
Timber	General solid waste (non-putrescible)	Off-site recycling, Chip for landscaping, Sell for firewood; *Treated*: reused for formwork, bridging, blocking, propping or second hand supplier; *Untreated*: reused for floorboards, fencing, furniture, mulched second hand supplier; and remainder to landscape supplies.
Doors, Windows, Fittings	General solid waste (non-putrescible)	Off-site recycling at second hand supplier
Insulation material	General solid waste (non-putrescible)	Off-site disposal
Glass	General solid waste (non-putrescible)	Off-site recycling, glazing or aggregate for concrete production
Asbestos	Hazardous waste	Off-site disposal at a licenced landfill facility.
Fluorescent light fittings and bulbs	Hazardous waste	Off-site recycling or disposal; contact *FluoroCycle* for more information[9]
Paint	Hazardous waste	Off-site recycling, Paintback collection[10] or disposal
Synthetic Rubber or carpet underlay	General solid waste (non-putrescible)	Off-site recycling, reprocessed and used in safety devices and speed humps
Ceramics including tiles	General solid waste (non-putrescible)	Off-site recycling at a crushing and recycling company

[9] Available online from http://www.fluorocycle.org.au/ or http://www.environment.gov.au/settlements/waste/lamp-mercury.html

[10] Available online from https://www.paintback.com.au/

Waste Types	NSW EPA Waste Classification	Proposed Management Method
Carpet	General solid waste (non-putrescible)	Off-site recycling or disposal, reused for landscaping, insulation or equestrian uses
Packaging		
Packaging materials, including wood, plastic, including stretch wrap or LLPE, cardboard and metals	General solid waste (non-putrescible)	Off-site recycling
Wooden or plastic crates and pallets	General solid waste (non-putrescible)	Reused for similar projects, returned to suppliers, or off-site recycling. Contact *Business Recycling* for more information[11]
Work Compound and Associated Offices		
Food Waste	General solid (putrescible) waste	Donate if suitable[12] or compost on-site. Alternatively dispose to landfill with general garbage
Recyclable beverage containers (glass and plastic bottles, aluminium cans), steel cans	General solid waste (non-putrescible)	Co-mingled recycling at off-site licensed facility or at a local NSW container deposit scheme 'Return and Earn' off-site licensed facility[13]
Clean paper and cardboard	General solid waste (non-putrescible)	Paper and cardboard recycling at off-site licensed facility
General domestic waste generated by workers (soiled paper and cardboard, food stuffs, polystyrene)	General solid waste (non-putrescible) mixed with putrescible waste	Disposal at landfill

5.3 Waste Generation Overview

5.3.1 Excavation Waste Management

Based on communications with the Client[14], SLR understands that excavation works are not expected for the alterations of GBM.

[11] Available online from http://businessrecycling.com.au/search/

[12] Available online from http://www.ozharvest.org/, https://www.foodbank.org.au/, https://www.secondbite.org/ or https://www.exodusfoundation.org.au/

[13] Available online from http://returnandearn.org.au/

[14] Email from Matthew Hundleby CMM and Robert Farrugia, 'RE: Request for Information: GBM DA', dated 26 June 2019

If any localised areas of the site are excavated, the excavated spoil is to be classified by an appropriately experienced environmental consultant and separated into contaminated materials, if any, uncontaminated fill or excavated natural material (ENM). Refer to **Section 5.6** for management of stockpiles. Uncontaminated fill or ENM should be retained on site and managed appropriately for beneficial re-use for filling earthworks. As a last resort, remaining uncontaminated fill or ENM is to be sent off-site to a licenced facility in accordance with the Protection of the Environment Operations (Waste) Regulation 2014.

Contaminated material, if any, should be sent for off-site treatment, if feasible. Disposal of contaminated fill to an off-site licenced landfill is to be considered as a last resort.

SLR recommends that waste disposal records for all excavated materials be kept on site at all times in case regulatory authorities make enquiries into the management of excavation waste.

5.3.2 Demolition Waste Management

Based on communications with the Client[15], SLR understands that demolition works are anticipated for the removal of current infrastructure. These are to be undertaken both on land and on water. The land-based items anticipated to be demolished are:

- Four slipway cradles
- 100 m of slipway rails
- A slipway winch, and
- The mezzanine offices and stair within the workshop.

The anticipated water-based demolition activities are for the removal of:

- Eight timber piles, and
- Corner brackets of the existing pontoons.

The disassembly of these existing services is to be managed by the private contractors hired to undertake their removal. The slipway cradles and slipway winch are to be disassembled and sold. The existing pontoons are to be reused on site.

All disassembled parts are to be preferentially reused and recycled on site, where possible. Where not possible, parts are to be sent for recycling and reused off-site. Delivery of items to an appropriately licenced landfill is to be considered as a last resort.

In the absence of demolition waste generation rates in Council's DCP and information on exact dimensions, SLR is unable to estimate quantities of demolition waste from the slipway cradles, slipway rails, slipway winch, stair, timber piles and corner brackets of the existing pontoons. Based on SLR's database however, SLR is able to calculate approximate quantities of demolition waste for the mezzanine offices.

In absence of applicable demolition waste generation rates from Council, SLR has adopted waste generation rates from Appendix A of The Hills Development Control Plan 2012, which provides typical waste generation rates for the demolition of an 'Office'. The demolition waste generation rates used for the mezzanine offices are provided in **Table 3**.

[15] Email from Matthew Hundleby CMM, 'RE: Request for Information: GBM DA', dated 23 May 2019

Table 3 Waste generation rates applied to the demolition of the mezzanine offices

Rate Type	Floor Area (m^2)	Waste types and quantities (tonnes)					
		Concrete	Brick	Timber	Plasterboard	Metal	Other
Office	1,000	7,410	1485	124	124	29	155

The waste generation rates in **Table 3** are used to estimate the quantities of waste generated from the demolition of the mezzanine offices, provided in **Table 4**. The floor area shown in **Table 4** has been estimated using the architectural drawing '21-27558-A051 Rev A' attached in **Appendix A**.

Actual waste tonnage and composition will vary, however this estimate is provided so that the construction site manager can make provision for on-site or off-site re-use and recycling opportunities.

Table 4 Estimated types and quantities of demolition waste

Development Component	Area (m^3)	Waste types and quantities (tonnes)					
		Concrete	Brick	Timber	Plasterboard	Metal	Other
Mezzanine Office	36	270	55	5	5	5	10

Waste estimates have been rounded up to the nearest 5 tonnes.

Should further information on types and quantities of demolition waste items be required, SLR recommends that a demolition quantities survey is undertaken by a qualified professional.

5.3.3 Construction Waste Management

SLR anticipates that construction activities for GBM will be undertaken off-site, with all items to arrive to the marina pre-fabricated. The items that are to be constructed for the marina are:

- Eight valet parking spaces
- 65 additional berths, and
- Berth layout infrastructure.

As the fitouts are expected to be completed mostly using pre-fabricated elements constructed off site, onsite construction waste generation is anticipated to be minimal and likely to include small quantities of materials such as offcuts and trimmings. Construction activities are anticipated to produce less than 1 m^3 of waste per week. Waste from these activities are likely to fall into the streams identified in **Section 5.2** and should be managed as identified in **Table 2**.

While the estimated construction waste and recycling generation quantities are small, better practice waste management should still be practiced. In accordance with the Sydney Harbour Foreshores and Waterways Area DCP, all construction activities are to occur above the intertidal zone to prevent equipment entering the harbour and minimise any potential for marine waste. Additional better practice measures are addressed for both construction and demolition in the following sections.

5.4 Waste Avoidance

In accordance with the Sydney Harbour Foreshores and Waterways Area DCP, better practice waste management and the principles of ecologically sustainable development, the building contractor, or those undertaking equivalent roles, will identify opportunities for waste avoidance by:

- undertaking work above the intertidal zone
- providing pollution controls appropriate to GBM to prevent waste from entering the waterway
- appropriate sorting and segregation of demolition and construction waste to ensure efficient recycling
- selecting construction materials taking into consideration their long lifespan and potential for reuse
- ordering materials to size and ordering pre-cut and prefabricated materials
- reuse of formwork
- planned work staging
- use of prefabricated components for internal fit outs
- reducing packaging waste on-site by:
    - returning packaging to suppliers where possible and practicable
    - purchasing in bulk
    - requesting cardboard or metal drums rather than plastics
    - requesting metal straps rather than shrink wrap, and
    - using returnable packaging such as pallets and reels
- reducing the amount of materials used in construction where possible, such as:
    - exposing structures to reduce the use of floor, ceiling and wall cladding and finishes
    - ventilating buildings naturally to reduce use of ductwork
    - using prefabricated components for internal fit outs
- careful on-site storage and source separation
- subcontractors informed of site waste management procedures, and
- co-ordination and sequencing of various trades.

The building contractor is additionally able to identify opportunities for the reduction of embodied energy and resource depletion by advising on material selection. This includes:

- the use of recycled concrete and steel
- the reduction of PVC use
- the use of low VOC (volatile organic compounds) paints, floor coverings and adhesives
- the use of low formaldehyde wood products and post-consumer reused timber or Forest Stewardship Council certified timber where possible
- the use of fittings and furnishings that have been recycled, are made from or incorporate recycled materials, and have been certified as sustainable or environmentally friendly by a recognised third party certification scheme
- the use of building materials, fittings and furnishings including structural framing, roofing and façade cladding chosen with consideration to their longevity, adaptation, disassembly, reuse and recycling potential, and
- the use of materials that have been certified as environmentally friendly by a recognised third-party certification scheme.

5.5 Re-use, Recycling and Disposal

Effective management of construction materials and C&D waste, including options for reuse and recycling where applicable and practicable, will be conducted. Only waste that cannot be cost effectively reused or recycled is to be sent to landfill or appropriate disposal facilities.

Refer to **Table 2** for an outline of the proposed reuse, recycling and disposal methods for potential site preparation and construction waste streams generated by GBM.

In accordance with Council's DCP and better practice waste management, the following specific procedures should be implemented:

- Facilitate on-site source separation to ensure efficient recycling, as outlined in **Section 5.6**
- Concrete, tiles and bricks will be reused or recycled off-site
- Steel will be recycled off-site, and all other metals will be recycled where economically viable
- Framing timber will be recycled off-site
- Windows, doors and joinery will be recycled off-site, where possible
- Waste oil will be recycled or disposed of in an appropriate manner
- All glass that can be economically recycled will be recycled
- All solid waste timber, brick, concrete, rock that cannot be reused or recycled will be taken to an appropriate facility for treatment to recover further resources or for disposal to landfill in an approved manner
- Facilitate re-use of materials on-site
- Provide separate waste bins for recyclable and non-recyclable general waste
- Assess excavation spoil for contamination status and beneficial re-use
- Retain used crates for storage purposes unless damaged
- Recycle cardboard, glass and metal waste
- Provide sufficient space for storage of garden waste and other waste materials on-site
- Dispose of all asbestos, hazardous and/or intractable waste in accordance with SafeWork NSW and NSW EPA requirements
- Provision for the collection of batteries, fluorescent tubes, smoke detectors and other recyclable resources will be provided on-site
- Deliver batteries to drop off-site recycling facility, and
- Where source separation is utilised, materials are to be kept uncontaminated to guarantee the highest possible re-use value

5.6 Waste Storage and Servicing

5.6.1 Waste Segregation

Waste materials produced from demolition and construction activities are to be separated at the source and stored separately on-site. It is anticipated that GBM will provide enough space on-site for separate storage, for example, separate skip bins or appropriately managed stockpiles, of the following waste types if they are generated:

- Bricks, concrete and scrap metal
- Metal and steel, in a condition suitable for recycling at metal recycling facilities
- Timber
- Glass
- Hardstand rubble
- Uncontaminated excavation spoil
- Contaminated excavation spoil
- Hazardous waste
- Paper and cardboard
- General co-mingled recycling waste and
- Non-recyclable general waste.

If there is insufficient space on-site for full segregation of waste types, the site manager, or someone undertaking an equivalent role, should consult with the waste and recycling collection contractor to confirm which waste types may be mixed before removal from the site.

5.6.2 Space and Siting Requirements

SLR acknowledges potential space constraints at GBM however, the small quantity of waste estimated to be generated means that waste storage areas can and should be accessible and allow sufficient space for any storage and servicing requirements. The storage areas will be flexible in order to cater for change of use during the construction phase. Where space is restricted, dedicated stockpile areas are to be defined on the site, with regular transfers to dedicated skip bins for sorting.

The positions of the designated waste holding areas on-site will change according to building works and the progression of construction, but must consider visual amenity, safety and accessibility in their selection. Appropriate siting of waste stockpile locations will take into account slope and drainage factors to avoid contamination of the Harbour and stormwater drains during rain events.

All waste placed in skips or bins for disposal or recycling will be adequately contained to ensure that the waste does not fall, blow, wash or otherwise escape from the site. Waste containers and storage areas are to be kept clean and in a good state of repair.

5.6.3 Servicing and Record Keeping

The frequency of the waste removal will, in most cases, be dictated by the quantity of material being deposited into each of the dedicated bins. Skips and bins are to be checked daily by the Site Manager to ensure that no overflow occurs. If skips and bins are reaching capacity, removal and replacement should be organised as soon as possible.

All skips and bins leaving the site will be covered with a suitable tarpaulin to ensure that the spillage of waste from the skips while in transit is eliminated.

All site-generated building waste collected in skips and/or bins will leave the site and be deposited in the approved and appropriately licensed recycling centre, transfer station or landfill site.

In accordance with better practice waste management, the Site Manager is to:

- Arrange for suitable waste collection contractors to remove any construction waste from site
- Ensure waste bins are not filled beyond recommended filling levels
- Ensure that all bins and loads of waste materials leaving site are covered
- Maintain waste disposal documentation detailing, at a minimum:
    - Descriptions and estimated amounts of all waste materials removed from site
    - Details of the waste and recycling collection contractors and facilities receiving the waste and recyclables
    - Records of waste and recycling collection vehicle movements, for example, date and time of loads removed, licence plate of collection vehicles, tip dockets from receiving facility, and
    - Waste classification documentation for materials disposed to off-site recycling or landfill facilities.
- Ensure lawful waste disposal records are readily accessible for inspection by regulatory authorities such as Council, SafeWork NSW or the NSW EPA
- Remove waste during hours approved by Council.

5.7 Contaminated or Hazardous Waste

During the demolition and construction phases, SLR recommends that a qualified and certified contractor is engaged to remove all contaminated or hazardous materials, for example, asbestos, and dispose of all contaminated or hazardous waste at an appropriately licenced facility.

All asbestos and other hazardous waste must be handled according to appropriate legislation and regulation including the Work Health and Safety Regulation 2011.

5.8 Signage

For best practice, standard signage is to be posted in all waste storage and collection areas. All waste containers should be labelled correctly and clearly to identify stored materials.

Signs approved by the NSW EPA for labelling of waste materials are available online[16] and should be used where applicable. A selection of signs prepared by NSW EPA is provided in **Figure 3**.

Figure 3 Examples of NSW EPA labels for waste skips and bins

5.9 Site Inductions

All staff, including sub-contractors and labourers, employed during the demolition and construction phases of GBM must undergo waste management induction training for the site.

Induction training should cover

- an outline of this WMP
- emergency response procedures on-site
- waste storage locations and separation of waste
- litter management in transit and on-site
- the implications of poor waste management practices, and
- responsibility and reporting, including identification of personnel responsible for waste management and individual responsibilities.

If required, the Site Manager should notify Council of the appointment of waste removal, transport or disposal contractors.

5.10 Monitoring and Reporting

The following monitoring practices are to be undertaken to improve management of C&D waste and to obtain accurate waste generation figures:

1. Conduct waste audits of current projects where feasible
2. Note waste generated and disposal methods
3. Look at past waste disposal records

[16] NSW EPA approved waste materials signage http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm

4. Record information to track waste avoidance, reuse and recycling performance and to help in waste estimations for future waste management plans.

Records of waste quantities recycled, reused or removed should be maintained. SLR also recommends that documents verifying recycling and disposal in accordance with this WMP are kept and presented to regulatory bodies when required.

Daily visual inspections of waste storage areas should be undertaken by site personnel and inspection checklists and logs recorded for reporting to the Site Manager as required. These inspections will be used to identify and rectify any resource and waste management issues.

Waste audits should be carried out by the building contractor to gauge the effectiveness and efficiency of waste segregation procedures and recycling and reuse initiatives. Where audits show that procedures are not carried out effectively, additional staff training will be undertaken and signage re-examined.

5.11 Roles and Responsibilities

All personnel have a responsibility for their own environmental performance and compliance with all legislation. It will be the responsibility of the Site Manager, or someone performing an equivalent role, to implement the WMP, and the responsibility of employees and subcontractors to ensure that they comply at all times.

Suggested roles and responsibilities for waste management at the site are provided in **Table 5**. Where possible, a construction environmental manager, or equivalent role, should be appointed for the site preparation and construction work. An equivalent construction environmental manager will oversee environmental compliance and performance during construction and demolition. Where a construction environmental manager is not appointed, responsibilities in **Table 5** for the construction environmental manager should become those of the Site Manager.

Table 5 Suggested roles and responsibilities for site preparation and construction waste management

Role	Responsibilities
Site Manager	• Ensuring plant and equipment are well maintained • Ordering only the required amount of materials • Keeping materials segregated to maximise reuse and recycling • Ensuring that waste sorting and storage areas are maintained in a tidy and functional state and do not present hazards to human health or the environment • Ensure hazardous or contaminated materials are appropriately managed and disposed of • Ensure complete site records and documentation are kept • Ensure this WMP is implemented, and • Liaise with Council and regulatory authorities as required.

Role	Responsibilities
Construction Environmental Manager or equivalent	• Ensuring staff and contractors are aware of waste management site requirements • Establishing separate skips, stockpiles and bins for effective waste segregation and recycling purposes • Developing or identifying, and using, local commercial opportunities for re-use of materials where re-use on-site is impractical • Facilitate appropriate waste collection • Engage suitable waste collection and disposal contractors • Approving off-site waste disposal locations and checking licensing requirements • Arranging for the assessment of potentially hazardous or contaminated materials • Arranging for appropriate management of contaminated waste • Monitoring and maintaining site environmental controls and • Monitoring, inspecting and reporting requirements.

Daily visual inspections of waste storage areas may be delegated to other on-site staff. All contractors will be responsible for ensuring that their work complies with the WMP through the project induction and contract engagement process. If required, it will be the responsibility of the Site Manager to notify relevant regulatory authorities of the appointment of waste removal, transport or disposal contractors.

6 Operational Waste Management

6.1 Targets for Resource Recovery

The waste management performance of each new development should contribute to the overall NSW State targets for recycling outlined in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*. The targets include increasing waste diverted from landfill to 75% and recycling 70% of commercial, industrial and municipal solid waste[17]. Each commercial and industrial development has the ability to contribute to this NSW State target through an effective waste management plan.

SLR anticipates that the waste minimisation measures in the following sections will assist GBM to achieve this recycling rate. Waste reporting and audits should be undertaken to determine the actual percentage of waste that is being, or has been, reused or recycled during operation.

6.2 Waste Streams and Classification

The operation of GBM will generate the following broad waste streams:

- General non-recyclable waste
- Recyclable paper
- Food and drink containers
- Packaging waste, including cardboard
- Food waste
- Hazardous waste, including paints and cleaning chemicals
- E-waste, and
- Bulky waste items, such as furniture and marine fittings and equipment.

Potential waste types, their associated waste classifications, and management methods are provided in **Table 1.** For further information on how to determine a waste's classification, refer to the NSW EPA (2014) *Waste Classification Guidelines*[18]*.* Suggestions for recycling drop off locations and contacts can be found on https://businessrecycling.com.au/ for each waste type. Alternatively, see Council's My Waste App[19].

[17] https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wastestrategy/140876-warr-strategy-14-21.pdf?la=en&hash=EC6685E6624995242B0538B18C2E80C0CA2E51B3

[18] Available online from https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines

[19] https://www.canadabay.nsw.gov.au/residents/waste-and-recycling/My-Waste-App

Table 6 Potential waste types, classifications and management methods – operational waste

Waste Types	NSW EPA Classification	Proposed Management Method
Clean office paper	General solid (non-putrescible) waste	Paper recycling at off-site licensed facility
Cardboard including bulky cardboard boxes	General solid (non-putrescible) waste	Cardboard recycling at off-site licensed facility
Recyclable beverage containers, glass and plastic bottles, aluminium cans, steel cans	General solid (non-putrescible) waste	NSW container deposit scheme 'Return and Earn', container recycling at off-site licensed facility
Food waste	General solid (putrescible) waste	Donate, if suitable, alternatively compost off-site or dispose to landfill with general non-recyclable waste
Batteries	Hazardous waste	Off-site recycling. Contact the Australian Battery Recycling Initiative for more information
Mobile Phones	Hazardous waste	Off-site recycling. Contact MobileMuster for more information
Bulky polystyrene	General solid (non-putrescible) waste	Off-site recycling or disposal at landfill
Furniture	General solid (non-putrescible) waste	Off-site reuse or disposal to landfill
E-waste	Hazardous waste	Off-site recycling
General garbage, including non-recyclable plastics	General solid (putrescible and non-putrescible) waste	Disposal at a landfill lawfully able to accept it
Spent smoke detectors[20]	General solid (non-putrescible) waste OR Hazardous waste (some commercial varieties)	Disposal to landfill, or off-site disposal at licensed facility
Glass, other than containers	General solid (non-putrescible) waste	Off-site recycling
Light bulbs and fluorescent tubes	Hazardous waste	Off-site recycling or disposal, contact FluoroCycle for more information

[20] The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) require that when more than 10 smoke alarms (particularly americium-241 sources) are collected for bulk disposal they must be treated as radioactive waste and the requirements of the National Health and Medical Research Council's Code of practice for the near-surface disposal of radioactive waste in Australia (1992) must be met.

Waste Types	NSW EPA Classification	Proposed Management Method
Cleaning chemicals, solvents, area wash downs, empty oil or paint drums, chemical containers	Hazardous waste if containers used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid (non-putrescible) waste if containers cleaned by washing or vacuuming.	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility.
Garden organics - lawn mowing, tree branches, hedge cuttings, leaves	General solid (non-putrescible) waste	Reuse on-site or contractor removal for recycling at licenced facility
Marine growth	General solid (non-putrescible) waste	Disposed by a licenced contractor
Bulky waste including furniture, marine fittings and equipment	General solid (non-putrescible) waste	Sold, donated, collected by a licenced contractor for recycling or disposal at a facility lawfully able to accept it

6.3 Operational Waste overview

The primary sources of waste generation at GBM are the vessels on the water, the office and workshop operations, the commercial tenants and a food and beverage machine kiosk at the site. According to a study undertaken by GHD Pty Ltd [21] which examined the existing waste management system at the site, the operational waste generated at GBM consists mainly of food, paper, cardboard and drink containers.

The changes anticipated to be made to the existing building are the removal of the mezzanine offices and stair and the slipway rails. The remaining building will consist of a ground floor, and two floors above. On the ground floor, the building will continue to include the GBM office and a smaller workshop area. The level above will include several commercial tenants, and the top street level will include two residential dwellings. The commercial tenants are currently a boat sales business, boat charter business and an accountant. The waste from the two residential dwellings is handled separately by Council's kerbside waste and recycling collections and not included in this project.

An increase in the number of boats is expected to increase the quantity of waste generated. This increase can be accommodated by the existing operational waste management system, which will remain in its current configuration. No additional waste containers are proposed. Instead, there will be a slight increase in the collection frequency of existing waste containers.

6.4 Estimated Operational Waste Quantities

In accordance with the Sydney Harbour Foreshores and Waterways Area DCP, marinas that accommodate nine or more vessels are to have adequate and readily accessible facilities for the collection and disposal of waste for boat users.

As noted above, the existing waste management system for GBM adequately services waste currently generated from operations at the site, including from the existing building and the vessels at the marina. The existing waste collection system consists of:

- Two mixed waste bins - one 3 m^3 front lift bin and one 1,100 L front lift bin
- A collection frequency of twice a week in winter
- A collection frequency of three times a week in summer, and
- A collection frequency of four times a week during peak holidays such as Christmas, New Year and Australia Day.

[21] GHD Pty Ltd, Optimisation of Marina Layout, date 07 October 2016

Based on this existing system, the rate of waste generated per boat was calculated. This is shown in **Table 7** below.

Table 7 Existing operational waste generation rates

Season	Number of collections per week	Total weekly capacity	Existing boat capacity	Waste generation per boat (L / boat)
Winter	2	8,200 L	99	83
Summer	3	12,300 L	99	125
Peak Holidays	4	16,400 L	99	166

For a proposed capacity of 130 boats the anticipated waste generation and number of collections required was calculated. This is shown **Table 8** below.

Table 8 Anticipated operational waste generation rates

Season	Waste generation per boat (L / boat)	Proposed boat capacity	Total weekly waste generations	Number of collections per week
Winter	83	130	10,790 L	3
Summer	124	130	16,250 L	4
Peak Holidays	166	130	21,580 L	6

Based on the proposed increased in the number of boats, and the existing bin sizes of 3 m^3 and 1,100 L, one additional collection is anticipated to be required for most weeks of the year, with two additional collections per week anticipated during peak holidays.

6.5 Waste Storage

As mentioned above, the waste will be stored in two front-lift bins of 3 m^3 and 1,100 L capacity. The bin storage area will remain where it is currently located in East Howley Park, a small area of cleared ground, to the north of the curve of the driveway leading into GBM. GBM currently holds a permit that allows the operation of that space as a waste storage area.

A separate development application is currently being prepared that will seek approval for the construction of a waste bin enclosure. However the proposed location and number of bins is not proposed to be amended. Based on the calculations undertaken in **Section 6.4** above, if collection frequency is increased, no changes are required to the area for the waste collection bins. According to GHD's report, this space, in its current configuration, is also sufficient for the storage of additional bins if required.

The separate DA for Howley Park East will also provide opportunity to improve the visual amenity of the waste collection area. This is also in accordance with the NSW EPA's Environmental Actions for Marinas, Boatsheds and Slipways (2007), which notes that waste should be stored under cover to prevent wind and rain from reaching it, and to protect the surrounded environment and waters from windblown litter.

The Client advises that this waste storage location is convenient for the users of the marina, allowing them to dispose of their waste as they exit and enter the site. In addition, the Client reports no vermin or bird issues and has received no complaints about waste in the last 13 years it has been operating the marina. This complies with Council's DCP that states that waste storage areas are to be located in areas where negative noise, odour, visual and traffic impact to adjoining properties are minimised.

6.6 Waste Servicing

The servicing of the waste storage bins is anticipated to be undertaken by a private waste contractor. The bins are currently owned and emptied by the contractor Doyle Bros. Doyle Bros is familiar with the site and services the bins using a front lift vehicle by driving forward down the driveway onto the bins, tipping them over the cabin and into the body of the vehicle and then reversing up the ramp and onto the street.

The paths of access for the waste collection vehicles and site users are indicated in **Figure 4** below. The orange circle represents the location of the waste storage bins. The blue path of access represents the path of the waste collection vehicles and the red path of access represents the path of the site users.

Figure 4 Path of access to waste storage area

Source: Adapted from drawing by GHD Pty Ltd, 21-27558-K101, Revision F

Council's DCP encourages bins for different streams be used to encourage the separation of waste and recyclables. However, to make waste disposal more convenient for marina users as they exit the site, and to satisfy Council's requirements and ensure resource recovery is achieved, GBM has engaged Doyle Bros because it operates a mixed waste separation facility after which separated materials are then recovered. Doyle Bros claims that its facility achieves a recovery rate of between 75% and 80%. As a result no separation of recyclable materials is undertaken at the site. The outputs of Doyle Bros' facility includes separated recyclables and a material known as processed engineered fuel (PEF) which is made from the residual non-recyclable waste. PEF is used as fuel in cement kilns and is not disposed of to landfill.

Additionally, as stated in **Section 6.5**, GHD's report states that the current waste storage space allows for the storage of additional bins if required. Hence if a private contractor other than Doyle Bros is engaged for the collection of the waste storage bins, the waste storage area allows for the introduction of recycling bins.

Due to the likely increased frequency of waste collections, truck movements in Victoria Place are expected to increase slightly. SLR recommends that waste collections be undertaken at times of day that are the least inconvenient and have the lowest impact on traffic, residents and marina users.

Council's DCP states that drawings for the proposed development are to indicate the locations allocated to the waste management storage, the waste collections areas and the path of access for site users and waste collections vehicles. These are to be included in the Waste Management Plan. Detailed drawings for the waste storage area and collection point are to be undertaken in accordance with Council's requirements as part of the separate DA that focuses on the waste bin enclosure at East Howley Park.

6.7 Litter Management

6.7.1 Overview

Due to the proximity of Sydney Harbour, careful consideration has been given to litter management at GBM. Good practice litter management is encouraged to reduce the impact of the marina, increase amenity for residents and site users, and minimise the likelihood of vermin, flies and marine impact. In accordance with the Sydney Harbour Foreshores and Waterways Area DCP, appropriate controls are to be put in place and managed to prevent pollutants entering the environment.

According to the Statement of Environmental Effects prepared by Hyder[22] that relates to the existing site, the waste disposal system at the marina is sufficient to minimise the risk of litter or waste migrating to the water. The marina is managed by staff every day of the week, enabling good practice litter management to be carried out and monitored.

In accordance with the NSW EPA's Environmental Actions for Marinas, Boatsheds and Slipways (2007), and good practice waste management, recommended litter management controls include:

- The use of water refillers and bubblers on-site to discourage the use of single use plastic water bottles
- The sale of glass and aluminium drink cans and bottles instead of plastic containers
- The use of clear signage throughout GBM to label bins, direct customers to bin locations and encourage them to manage and dispose of their waste in an appropriate way. Signage is further discussed in **Section 6.11.**
- Training of employees and contractors on litter management issues and controls
- Regular litter collection and collection when seen on-site
- Advising marina users of the Doyle Bros facility and its benefits
- Using accessible communication platforms, including distributing e-newsletters, texts, messages on invoices to inform customers of GBM's commitment to the environment, and
- Sale of branded reusable items, such as Keep Cups and reusable bottles, to discourage the use of single-use plastic cups and bottles.

Further innovative litter management measures include the use of Seabins to manage the risk of waste migration to surroundings waters. This is discussed in **Section 6.7.2** below.

[22] Hyder (Australia) Pty Ltd, Proposed Extensions to Gladesville Bridge Marina, Statement of Environmental Effects, Hydrology, Aquatic Flora and Fauna and Hazard Assessment, dated February 1999

6.7.2 Seabins

Seabins[23] are part of an Australian-designed water-borne-litter collection system. They are positioned in the water and attached by a metal pole to a solid object such as a wall or wharf. This allows Seabins to be anchored and provide an access for power from land. Seabins can be converted to run on solar power.

Seabins work by sucking in water and any debris floating in it. The water passes through and the debris is captured. Seabins are 500 mm by 500 mm and weigh about 40kg. Their total capacity is 20 kg. The cost of Seabins varies depending on-site requirements and consultation with the supplier is required.

Figure 5 below shows three images of Seabins, including a Seabin operating in water, a Seabin unit out of the water, and a simple diagram showing how the Seabin works.

Figure 5 Seabins[24]

SLR recommends that Seabins be installed as part of the litter management system at GBM.

6.8 Waste Avoidance, Re-use and Recycling

The following measures for waste avoidance, re-use and recycling are in accordance with the NSW EPA Environmental Actions for Marinas, Boatsheds and Slipways (2007) document and good practice waste management.

6.8.1 Waste Avoidance

Waste avoidance measures recommended for GBM include:

- Participating in take-back services with suppliers to reduce waste further along the supply chain.
- Reviewing the packaging of sellable products, such as food items from the kiosk, to reduce waste potential.
- Avoiding printing where possible.
- Purchasing products with less packaging.
- Purchasing consumables in bulk to avoid unnecessary packaging.
- Servicing equipment regularly to reduce spoilage from malfunction.

[23] https://www.seabinproject.com/

[24] https://www.seabinproject.com/

- Providing ceramic cups, mugs, crockery and cutlery rather than disposable items in places such as offices or internal kitchens.
- Using products on a first-in-first-out basis to reduce the chance of expired products.
- Presenting all waste reduction initiatives to staff as part of their induction program.
- Leasing equipment and machinery rather than outright purchase and disposal.
- Investigating options for efficient machinery.
- Setting quantified reduction targets for resource efficiency savings, for example, raw materials, energy and water.
- Continued participation in the International Clean Marina Program, participating in other industry associations and taking advantage of the information on resource efficiency developed for the industry.

6.8.2 Reuse

Possible re-use opportunities that could be used at GBM include establishing systems with in-house and supply chain stakeholders to transport products in re-useable packaging where possible.

6.8.3 Recycling

Possible recycling opportunities include:

- Collecting and recycling e-waste.
- Developing a buy recycled policy to encourage staff to participate in the purchasing of recycled and recyclable products only.
- Returning empty drums to suppliers.
- Providing paper recycling trays in office spaces for scrap paper collection and recycling.
- Recycling old zinc anodes and other metal that scrap metal merchants will buy.
- Collecting printer toners and ink cartridges, if purchased, in allocated bins for appropriate contractor recycling, and
- Talking to suppliers about options for collecting and reusing containers.

6.9 Bulky or Hazardous Waste Management

An area is provided in GBM for the storage of large or bulky items and hazardous waste that cannot be disposed of in the waste storage bins for mixed waste. According to the NSW EPA's Environmental Action for Marinas, Boatsheds and Slipways 2007, this can include materials such as sweepings, filters, containers and rags, or other solid waste contaminated with chemicals such as fuel and paint, furniture, disused marine fittings and equipment and other bulky waste. The document recommends that these materials are transported to a facility that is lawfully able to receive or treat that type of waste.

Based on GHD's report, bulky waste collections are currently undertaken at the site monthly or less frequently if it is not required. The bulky waste collection is undertaken by a private waste contractor, other than Doyle Bros.

6.10 Communication Strategies

Waste management initiatives and management measures should be clearly communicated to users, customers, managers, employees and cleaners. Benefits of providing this communication include:

- Improved satisfaction with services
- Increased ability and willingness to participate in recycling
- Improved amenity and safety
- Increased knowledge and awareness through standardisation of services
- Increased awareness or achievement of environmental goals and targets
- Reduced contamination of recyclables stream
- Increased recovery of recyclables and other materials, and
- Greater contribution to targets for waste reduction and resource recovery, the environment and heritage conservation.

To realise the above benefits, GBM's recommended roles and responsibilities, as shown in **Section 6.13**, and the following communication strategies should be considered by the operators:

- Use consistent signage and colour-coding throughout GBM
- Ensure all staff are informed of correct waste separation and management procedures
- Provide directional signage to show locations and routes to waste storage areas
- Repair signs and labels promptly to avoid a breakdown in communication
- Clearly label bins to ensure they are used properly and to identify the types of waste that may be disposed of in each bin, and
- Educate all employees and site contractors, ensuring compliance with this WMP.

6.11 Signage

Signs which clearly identify waste management procedures and provisions to contractors, tenants and visitors should be distributed around GBM.

The design and use of safety signs for waste rooms and enclosures should comply with Australian Standard *AS 1319 Safety Signs for the Occupational Environment* and clearly describe the types of materials designated for each bin.

Colour-coded and labelled bin lids are necessary for identifying bins and the Australian Standard *AS 4123.7-2006 (R2017) Mobile waste containers Part 7: Colours, markings, and designation requirements* provides recommendations for the designated colours for waste bins depending on the type of waste the bins are to receive.

All bin signage should also follow the NSW EPA's standard signage[25].

Additionally, key signage considerations are:

[25] NSW EPA waste signs/posters http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm

- Clear and correct labelling on all waste bins, indicating the correct types of waste that can be placed into a given bin
- Signposts and directions to location of waste storage areas,
- Maintaining a consistent style colour scheme and system for signs throughout GBM, and
- Emergency contact information for reporting issues associated with waste or recycling management.

6.12 Monitoring and Reporting

Monitoring is to be undertaken to ensure that satisfactory environmental performance is achieved waste and recycling is managed effectively at GBM.

Visual assessments of bins and bin storage areas should be conducted regularly. In addition, audits should also be conducted to ensure that the provisions of this WMP are maintained.

Documentation associated with disposal and recovery of waste, including dockets, receipts and other physical records, should be kept by the operators to allow for reviews of the waste management arrangements and provisions at the site. Records of waste disposal should also be available to regulatory authorities such as the NSW EPA, Roads and Maritime Services and SafeWork NSW, if required.

Any deficiencies identified in the waste management system, such as unexpected waste quantities, are to be rectified by the operators as soon as practical. Where service reviews show that waste disposal is not carried out effectively, operators should carry out additional staff training, signage review and reviews of operational systems. If this waste management plan no longer sufficiently meets the needs of GBM, review and updates to maintain suitability must be undertaken.

6.13 Roles and Responsibilities

It is the responsibility of the managers of GBM to implement this WMP and a responsibility of all tenants, staff and users to follow the waste management procedures set out by the WMP. SLR recommends that all staff and subcontractors engaged by the Client have waste-related roles and responsibilities clearly identified and GBM's waste management system clearly explained. A summary of recommended roles and responsibilities are provided in **Table 9**.

Table 9 Delegated waste-related roles and responsibilities for GBM.

Responsible Person	General Tasks
Marina Managers	Ensure the WMP is implemented throughout the life of the operation.
	Update the WMP as needed to ensure the plan remains applicable to the site.
	Undertake liaison and management of contracted waste and recycling collections with Council, contractors and any relevant authorities.
	Regularly conduct waste audits to review system performance and identify any additional materials that could be recovered.
	Identify cost saving opportunities and manage any complaints and non-compliances reported through waste audits and other sources.
	Ensure all monitoring and audit results are well documented and conducted as specified in this WMP.
	Set quantified waste reduction targets, in volume, weight or costs.

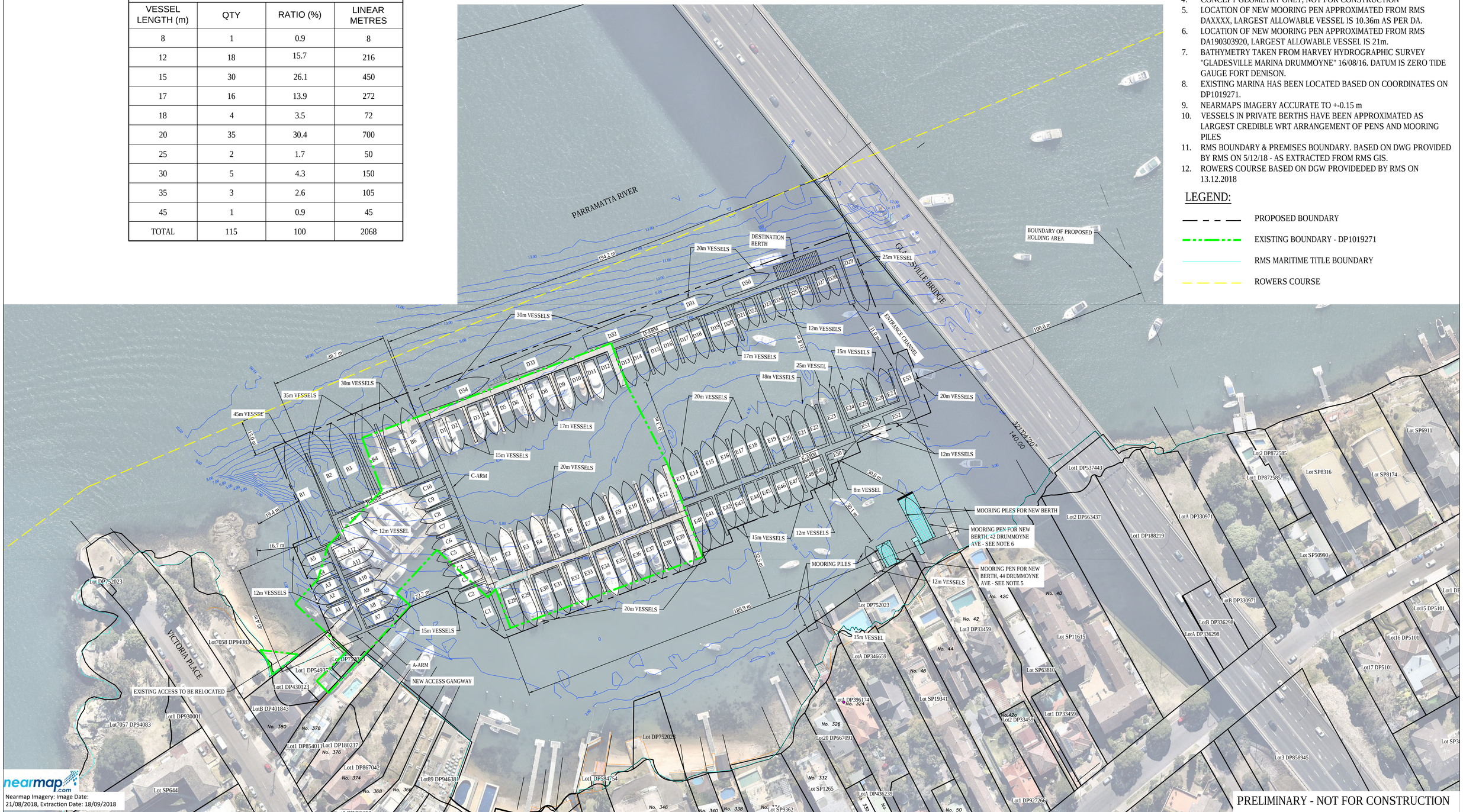
Responsible Person	General Tasks
	Conduct regular waste sorting, physical condition and cleanliness inspections of bins, waste storage rooms and all other waste management equipment for functionality, hygiene and safety.
	Organise cleaning and maintenance requirements for waste management equipment as required
	Ensure waste and recycling storage rooms are kept tidy.
	Monitor bins to ensure no overfilling occurs and manage unexpected waste quantities to mitigate waste overflow in storage areas
	Ensure effective signage, communication and education is provided to alert users, employees, site management staff and cleaners about the provisions of this WMP and waste management equipment use requirements.
	Monitor and maintain signage to ensure it remains clean, clear and applicable.
	Manage ongoing education on correct source separation and waste management at least every three months.
	Ensure that regular cleaning and daily transfer of bins is correctly being undertaken by the cleaners.
	Ensure all waste equipment, such as Seabins, are well maintained and operational.
	Ultimately responsible for the management of all waste management equipment, cleaning requirements, waste transfer and collection arrangements.
Cleaners and caretakers	Monitor bins to ensure no overfilling occurs.
	Monitor the marina and clean up any litter as it occurs.
	Ensure bins and waste storage areas are kept tidy and clean.
	Compliance with the provisions of this WMP.
Tenants	Adhere to all waste management directions as given by the site manager.

APPENDIX A

Architectural Drawings

N

BERTH SCHEDULE			
VESSEL LENGTH (m)	QTY	RATIO (%)	LINEAR METRES
8	1	0.9	8
12	18	15.7	216
15	30	26.1	450
17	16	13.9	272
18	4	3.5	72
20	35	30.4	700
25	2	1.7	50
30	5	4.3	150
35	3	2.6	105
45	1	0.9	45
TOTAL	115	100	2068



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PRELIMINARY - NOT FOR CONSTRUCTION

NOTES:

1. CADASTRAL INFORMATION FROM NSW DEPARTMENT OF LANDS, DCDB, 2012
2. ALL BERTH WIDTHS, FINGER LENGTHS, FAIRWAYS & CHANNEL WIDTHS AS PER AS 3962.
3. THE BERTH SCHEDULE IDENTIFIES PROPOSED VESSEL SIZES. THE MARINA STRUCTURE (ARMS AND FINGERS) DIMENSIONS ARE AS PER AUSTRALIAN STANDARD AS 3962.
4. CONCEPT GEOMETRY ONLY, NOT FOR CONSTRUCTION
5. LOCATION OF NEW MOORING PEN APPROXIMATED FROM RMS DAXXXX, LARGEST ALLOWABLE VESSEL IS 10.36m AS PER DA.
6. LOCATION OF NEW MOORING PEN APPROXIMATED FROM RMS DA190303920, LARGEST ALLOWABLE VESSEL IS 21m.
7. BATHYMETRY TAKEN FROM HARVEY HYDROGRAPHIC SURVEY "GLADESVILLE MARINA DRUMMOYNE" 16/08/16. DATUM IS ZERO TIDE GAUGE FORT DENISON.
8. EXISTING MARINA HAS BEEN LOCATED BASED ON COORDINATES ON DP1019271.
9. NEARMAPS IMAGERY ACCURATE TO +-0.15 m
10. VESSELS IN PRIVATE BERTHS HAVE BEEN APPROXIMATED AS LARGEST CREDIBLE WRT ARRANGEMENT OF PENS AND MOORING PILES
11. RMS BOUNDARY & PREMISES BOUNDARY. BASED ON DWG PROVIDED BY RMS ON 5/12/18 - AS EXTRACTED FROM RMS GIS.
12. ROWERS COURSE BASED ON DGW PROVIDEDED BY RMS ON 13.12.2018

LEGEND:

- PROPOSED BOUNDARY
- EXISTING BOUNDARY - DP1019271
- RMS MARITIME TITLE BOUNDARY
- ROWERS COURSE

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
F	REVISED DRAWING NOTES		MR	SG	JN	03.09.19
E	PRELIMINARY - NOT FOR CONSTRUCTION - REVISED MOORING PEN 42 DRUMMOYNE AVE		MR	SG	JN	01.05.19
D	PRELIMINARY - NOT FOR CONSTRUCTION		MR	SG	JN	20.12.18
C	PRELIMINARY - NOT FOR CONSTRUCTION		MR	SG	JN	14.12.18
B	PRELIMINARY - NOT FOR CONSTRUCTION		MR	SG	JN	05.12.18

0 7.5 15 22.5 30 37.5m
SCALE 1:750 AT ORIGINAL SIZE

gladesville bridge MARINA

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DO NOT SCALE

Drawn	M.ROBERTSON	Designer	A.CHAN
Drafting Check		Design Check	C.ALFRED
Approved (Project Director)			
Date			
Scale	1:750	This Drawing must not be used for Construction unless signed as Approved	

Client: GLADESVILLE BRIDGE MARINA
Project: MARINA EXPANSION
Title: CONCEPT LAYOUT

Original Size: A1
Drawing No: 21-27558-K101
Rev: F

Plot Date: 3 September 2019 - 4:48 PM
Plotted by: Michael Robertson
Cad File No: N:\AU\Sydney\Projects\21\27558\CADD\Drawings\21-27558-K001.dwg

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