Low Impact Development Consulting

Demolition & Construction Waste Management Plan

Multiunit Development

122-124 Queenscliff Road, Queenscliff NSW 2096

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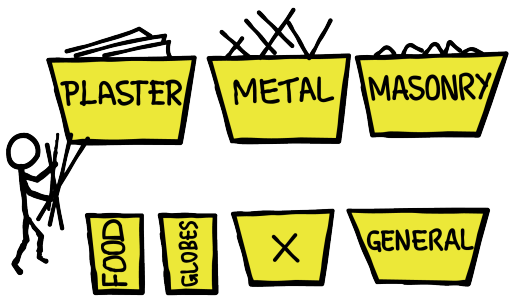

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1.0	15/2/2021	**prelim Issue**	**LR**	**LR**
2.0	23/3/2022	**Final**	**LR**	**LR**

Disclaimer

The content of this document represents the entirety of work output or recommendations offered by LID Consulting for this particular project. This content supersedes all other verbal discussions undertaken by LID Consulting representatives in relation to this project.

Commercial waste calculations are based on rates provided by government organisations and adopted and used as an industry standard. Bin numbers and spatial requirements have been calculated in accordance with these guidelines. The end user requirements may vary from this depending on the business use, type and operational practice.

Contents

LID acknowledges and pays respect to the Australian Aboriginal and Torres Strait Islander people, to their ancestors and elders, past, present and emerging, as the traditional custodians of the lands upon which we work and live. We recognise Aboriginal and Torres Strait Islander people's deep cultural and spiritual relationships to the water, land and sea, and their rich contribution to society.

1 Recycling & Waste Management Plan

Low Impact Development (LID) Consulting was engaged by Gemini Queenscliff Pty Ltd to assess the proposed development at 122-124 Queenscliff Road, Queenscliff NSW 2096 to provide a Waste Management Plan (as required by Northern Beaches Council's Statutory Planning).

A waste management analysis has been undertaken based on the following documents:

- Northern Beaches Council's Waste Management Guidelines October 2016;
- Northern Beaches Council's Pre-lodgement advice dated 11/8/2020.
- AS 2601 - 2001 Demolition of Structures, published by Standards Australia
- Code for the Control & Regulation of Noise on Building Sites NSW
- Environment Protection Authority Guidelines for Removal of Lead Paint & Asbestos
- Waste Avoidance and Resource Recovery Act 2001
- Contaminated Land Management Act 1997
- Refrigerant Handling Code of Practice 2007 (AIRAH/IRHACE)
- NSW Waste Avoidance and Resource Recovery Strategy 2014 – 2021

1.1 Waste Context

In 2016-17, the Australian economy generated or imported 68.9 megatonnes of waste, of which the largest contributors were:

- Construction (20.4 megatonnes, 29.6%)
- Households (13.8 megatonnes, 20.0%)
- Electricity, gas, water and waste services generation (12.7 megatonnes, 18.4%)
- Manufacturing (10.8 megatonnes, 15.6%).

The intent of demolition and construction waste management plans is to assist in reducing this.

1.2 Development Outline

Site Address:	122-124 Queenscliff Road, Queenscliff NSW 2096
Applicant:	Ethos Urban
Type:	Townhouse/multi-unit development
Dwellings:	6 apartments
Break up of units:	5 x 3 bed apartments, 1 x 2 bed apartments
Key Project Documents:	1. Site Survey Plan, Reference 70045 dated 6/9/2019 prepared by Ballenden Surveyors 2. A2201 – A2204, Revision C02, dated 18/5/2021 prepared by ESS. 3. Arboricultural Impact Appraisal & Method Statement dated 22 January 2022 prepared by Naturally Trees

Existing Buildings and other structures:

- The subject site is made up of 2 adjoining residential lots. Each lot contains 2 and 3 storey brick buildings with tiled roofs in residential use.
- No. 122 Queenscliff Road has no vehicular access set in a predominantly grassed site with 4 existing trees. A number of trees on the adjoining site line the boundary to the East and South.
- No 124 Queenscliff Road has a concrete driveway to the East that runs through to the rear and a large concrete parking area. There is minimal vegetation on this site.
- The site is sloped from the street level to the south with a drop of approximately 6.3m.
- The existing buildings do not appear to be of heritage value – Refer Appendix 1 for images.

Brief description of proposal:

- The proposed 3-storey development comprises of a single unit block containing 6 units over a shared basement carpark.
- The main vehicular access into the basement is from Queenscliff Road via a car lift.
- The proposed building consists of in situ concrete structure, brick and rendered masonry construction with aluminium windows.

The details provided in this report are the recommendations for better practice management of demolition and construction waste. Generally hand/manual demolition is proposed to effect better recycling and re-use rates. Separation of waste streams is also preferred for improved recycling of excess construction materials and is considered practical given the size of the site and project.

1.3 Actions for Good Waste Minimisation

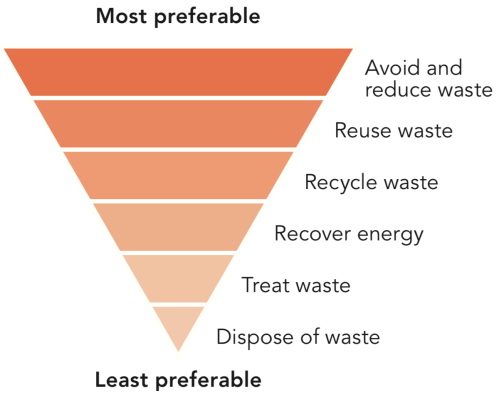
Where possible, the practice of the waste reduction hierarchy identified in the Environmental Protection Act 2017;

Further, a circular economy allows waste to be avoided in the first instance to reduce environmental impacts of production & consumption. This is now being implemented across Australia.

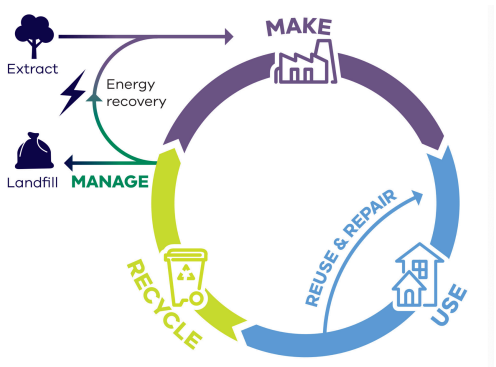
This starts and continues through the manufacturing processes.

More information can be found at: https://acehub.org.au

Linear Economy



Circular Economy



The following measures help to ensure reduced waste to landfill:

1. Selection of demolition, excavation and head construction contractor. Contractors waste minimisation strategies should be detailed and specific.
2. Selection of demolition contractor who undertakes significant hand demolition rather than demolition by excavator.
3. Selection of contractor and waste processing facilities used: A Greenstar experienced contractor and waste processing facility is preferred. The demolition contractor and waste receiving facility should hold a Green Star Compliance Verification Summary issued by a suitable qualified auditor, confirming compliance with the Green Star Construction and Demolition Waste Operational and Reporting Criteria.

4. Inclusion of a discussion of the intent to recycle and minimise waste in all site inductions.
5. Inclusion in contract conditions that plasterers supply their own plasterboard recycling bins.
6. Change of contractor behaviour by the inclusion in contract conditions that other trades such as studwork framers and electrical supply their own bins and clean up their own work at the end of the day, placing waste into their own bins – specifically timber of metal stud off cuts or cabling for recycling.
7. Commitment to keeping a waste register.
8. Supervision of waste bins and enforcement of separation of waste types
9. During construction ensuring the labourer stockpiles materials suitable for re-use in work locations daily.
10. Separate bins with lids on for workers food waste and wrappers. Reduces contamination of other recycling loads.

1.4 Risk Review

Per industry practice detailed, specific risk assessments should be prepared by the individual contractors responsible for demolition, excavation, the construction of the structure, services, fitout and finishes phases. The risk assessments should take into account but not be limited to waste related activities such as below:

- Worker, pedestrian and traffic hazards created by movement of waste to waste bins and movement of waste bins and vehicles on and off site.
- Excavation risks
- Safe handling of hazardous and toxic waste materials if they are identified on the site, such as asbestos.

2 Demolition & Construction Waste Details

2.1 Northern Beaches Council DCP 2016

In accordance with the DCP Waste Management Guidelines October 2016, the following demolition & Construction waste management is to address:

(a) details regarding how waste is to be minimised within a development;

(b) estimations of quantities and types of materials to be re-used or left over for removal from the site;

(c) details regarding the types of waste and likely quantities of waste to be produced;

(d) a site plan showing storage areas away from public access for reusable materials and recyclables during demolition and construction and the vehicle access to these areas;

(e) targets for recycling and reuse;

(f) nomination of the role/person responsible for ensuring targets are met and the person responsible for retaining waste dockets from facilities appropriately licensed to receive the development's construction and demolition waste;

(g) confirmation that all waste going to landfill is not recyclable or hazardous; and

(h) measures to reuse or recycle at least 80% of construction and demolition waste, either on site or diverted for reuse and recycling with receipts sufficient to demonstrate the target will be achieved.

2.2 Additional Council Permits

Waste bins are proposed to be fully within the fenced off-site boundary. Should additional waste skips be required outside of the property on the roadway or nature strip a permit would be required from council.

2.3 Waste Register

Council requires a register is to be kept for recording types and quantity of waste taken off site, waste contractor used and destination for the treatment or disposal of the waste.
Monthly waste and recycling contract reports provided by the waste processing facilities, indicating the amount of waste received, and a breakdown of materials recycled or sent to landfill will form the basis of the waste register.

The register should also include tracking of contaminated wastes generated on site that include but may not be limited to:

- Contaminated soils
- Materials containing asbestos or older electrical equipment including lighting controls containing PCBs (possible within garage building on site)
- Waste oils, oil and fuel filters from machinery used on site, oily water
- Solvents, paints and adhesives and their containers

2.4 Accurate Estimation

The design involves common construction methods and can be readily estimated with accuracy by experienced contractors for material take-offs.
Careful estimation, ordering and prefabrication offsite prior to site construction will ensure that minimal excess material is wasted and that variations on site that result in waste are minimised.

2.5 Waste Charges by Volume & Weight

Most demolition and construction waste is charged by volume (set price for the bin or per standard size truck), and also by weight. This means that even some lightweight voluminous products are expensive to be disposed of – which may improve the incentive to recycle more. For example PVC pipe can take up a large volume and fill bins quickly. Utilising recycling of good volumes of clean PVC pipe is a smart move to save on the number of waste bins or trucks.

2.6 Site Training in Waste Management

All contractors on site should be trained in the contents of this waste management plan as part of site induction procedures, to maximise the use of recycling storage provided on site and the diversion of demolition and construction waste from general landfill.

2.7 Pollution Control Measures

Pollution control measures should be identified and documented, prior to work commencing. This should identify where pollution control measures will be installed, and how erosion and loose waste will be managed.

- Examples of measures follow:
- Capping / properly sealing off all pipe ends to underground stormwater and sewer connections either at ground level, as the pipes leave the site or at the mains.
- Drain filters/sediment traps in front of side entry pits or over grated pits (see image below)
- Silt fences on the down slope side of the site where the site has a slope steeper than 1:20 (see image below)
- Silt bunds in swales to retain site erosion materials but allow water flow through
- Erosion control blankets over mounded earth
- Installation of tarps/coverings on site waste bins during non-work hours to prevent blown material leaving the site.

Example – Silt Fencing

Example – Drain Filtering / Sediment trap

2.8 Runoff, Spills, Siltation & other Pollutants

Suitable measures are to be taken to ensure the possibility of pollutant runoff from the site is contained and managed. Containment fencing and silt management measures at the boundaries are recommended.

Once excavation is below street level run-off externally from the site should not occur. Ground infiltration could still occur but should be minimised if onsite water is minimised.

2.9 Vehicle Spills

Spill and sediment tracking off the site from vehicles leaving the site should be managed to minimise pollutant and sediment loads that could otherwise enter street stormwater catchment.

2.10 Truck / Bin Clean-up

For the majority of the work, demolition will be carried out on a concrete pavement. Trucks will need to be inspected to ensure broken glass, shards of metal and brick rubble is not transported off-site on to the roadways.

During the excavation works trucks will potentially collect soil on wheels. The use of crushed rock on internal roadways will reduce this, as will the use of rumble grids. Washing down trucks and storage bins prior to leaving site is another method that may be required to prevent silt and pollutants leaving the site, All measures reduce the need to clean down roadways.

2.11 Demolition & Excavation Stage

The following outlines the general sequence and waste streams identified for the demolition and excavation phase and recommends appropriate methods for recovery and disposal.

2.11.1 Contractors

Separation on site is the simplest way to reduce recycling costs as it simplifies sorting of waste at the processing yard. In most cases mixed loads of recyclable and non-recyclable products that requires extensive sorting can incur a very significant premium price compared to a site pre-sorted load.

In NSW there is currently a requirement that waste operators and transporters that receipt more than 5,000 tonnes per year be EPA NSW licensed and therefore under greater EPA scrutiny. Accordingly larger waste transporters and operators are more likely to be living up to their commitments. (The Waste Management Association of Australia – WMAA is looking to also have this threshold reduced to 1000 tonnes).

The choice of demolition and excavation contractors and attitude to waste has a significant impact on the waste performance of a project site. Tendering contractors should identify their planned waste minimisation strategies. Waste minimisation strategies should identify which products are to be recycled and where they are to be taken to, and which are not to be recycled and where they will be sent.

The demolition and excavation contractors are to confirm or improve on re-use or recycling options in this plan, or document an explanation if otherwise.

The following larger waste transporters and operators are recommended:

- **Metro Demolitions -** http://www.metrodemo.com.au/demolition/
- **Benedict -** http://www.benedict.com.au/locations/

- **Bingo Industries -** https://www.bingoindustries.com.au/recycling-centres/nsw/
- **Suez -** http://www.recyclingnearyou.com.au/large-dropoff/FairfieldNSW
- **Fairfield City Council -** http://www.recyclingnearyou.com.au/large-dropoff/FairfieldNSW
- **Dial a Dump –** http://www.dadi.com.au/recycling-landfill/genesis-eastern-creek
- **Brandown -** http://www.brandown.com.au/
- **Hi Quality -** http://www.hiquality.com.au/resource-recovery/company-overview
- **Regroup -** http://www.municipalenvironmental.com/regroup/service/recycling
- **Concrete Recyclers -** http://www.concreterecyclers.com.au/location.html

For larger projects Green Star accredited and experienced demolition contractors would be expected to provide better recycling outcomes. This rating verifies that the Contractor has met the standards of the Green Building Council of Australia (GBCA). The CBCA's objective is to minimise Construction and Demolition Waste that is disposed of to landfill. The following Demolition Contractors have Green Star project experience:

Green Star Demolition Contractors

- **Liberty Industrial** – http://libertyindustrial.com.au/ Stephen Hartnett 0447 013 432 – Significant warehouse demolition experience. Recently demolished a 500,000m2 of warehouse spaces in Moorebank. Unrestricted demolition and asbestos removal licences.
- **Metropolitan Demolitions** - http://www.metrodemo.com.au/ Shane Morris 0450 788 845 Green. Unrestricted demolition and asbestos removal licences.
- **Matt Dalley Demolition** - http://www.dalleydemo.com.au/ Alan O'Neil 0497 849 183. Unrestricted demolition and friable asbestos removal licences.
- **Perfect Contracting** - https://perfectcontracting.com.au/ Luke Hamblyn 0452 249 271

2.11.2 Sequence

The general sequence to be followed for completing the demolition and excavation stages is as follows:

1. Installation of hoardings & fencing and boundaries to protect the public and significant vegetation.
   Checking to ensure existing residence fences are sufficient and complete to prevent un-authorised public access.
2. Installation/identification of temporary access points, washdown and other site safety protection measures
3. Asbestos and hazardous materials removal. A Hazmat report will be conducted and is to be reviewed and enacted prior to commencement.
4. Demolition methods
   - By hand or machine – vegetation – minimal.
   - By hand - Services - to be disconnected and terminated by licensed contractors
   - By hand - Windows and glass panels to be removed separately
   - By hand - Fixtures & fittings (doors, cabinets, sanitary-ware, skirting, architraves etc.) to be dismantled and removed
   - By hand or machine - Roof sheeting / tiling to be removed
   - By hand or machine- Plasterboard removed
   - By hand or machine - Roof timbers, floor & wall framing removed
   - By machine - Bricks and concrete dismantled and removed

5. Demolition of existing buildings
    - All demolished materials are to be moved to the waste bin storage area with subsequent separation and loading of material into separated bins for recycling as appropriate – See Table 1.
    - The bin storage area will need to initially be placed adjoining the driveway of 124 Queenscliff Road, Much of the demolition would occur mechanically as would separating demolished materials for loading into trucks and removal to recycling yards as appropriate – See Table 1.

6. Excavation
    - Top soil can be stockpiled in the south-west corner of the site.
    - A net of 3300m^3 cut is assumed (excluding a 30-50% bulking factor) based on finished levels shown but excluding over-excavation and ramps etc. The net cut on the site 500mm is expected to remove all of this fill material.
    - The fill material should be inspected with the hope that it can again be sent to a clean fill site for re-use.

2.11.3 Contaminated Land

At the time of writing this report, a soil contamination report has been undertaken, as the site is a suburban residential site. Should any contamination in the ground be found after demolition and excavation has commenced, it is to be reported, remediated and disposed of to an approved contaminated/remediated soil facility per the Contaminated Land Management Act as required by NSW EPA.

2.11.4 Contamination & Hazardous Materials

Any contaminated and hazardous materials found during demolition of the above ground structures should be report and removed and disposed of in the authorised manner.

An asbestos assessment has not been undertaken at this stage. Any unidentified suspected asbestos material identified during the demolition should halt works until such time the material can be inspected and classified by an experienced consultant.

If asbestos is found an approved licensed removal contractor will be engaged to remove the product with air monitoring undertaken throughout the process. Details of removal procedures and risk management will be detailed in an Hazardous Building Materials Assessment Report.

Asbestos is commonly contained in older buildings built prior to 1985 and may occur in the following locations:

- Cement sheet walls
- Backing to floor tiles
- Lagging insulation for hot water pipes
- Backing to old switchboards
- External cladding (Fibro)
- Corrugated cement sheet roofing

2.11.5 Refrigerant Removal

Air-conditioners on site are likely to have CFC (Chlorofluorocarbons), HCFC (HydroChloroFluouroCarbons) or HFC (HydroFluouroCarbons) as the refrigerant. These refrigerants are either very harmful to the ozone layer or very significantly greenhouse gas contributors. If units are not disposed of properly, refrigerant may escape into the atmosphere, contributing significantly to global warming. CFC and HCFCs have been banned for a while

now. The alternative, HFCs are being gradually phased out. The federal government has started to cap the amount of refrigerant using HFCs that enters Australia as a start to outlawing such refrigerants including the common R-410A.
http://www.environment.gov.au/protection/ozone/hfc-phase-down/hfc-phase-down-faqs
Before disposing of air conditioners, all units are to have the refrigerant 'recovered' by a licensed Australian Refrigeration Council (ARC) member technician https://www.arctick.org/. ARC members must hold a Full Refrigerant and Air-conditioning (Full RAC) licence or Restricted Refrigerant Recoverer licence (RRRL).
The recovered refrigerant is generally returned to a refrigerant gas retailer or wholesaler who will recycle the gas if possible. Where maintenance regimes have not used the manufacturers recommended gases or have used different gases over time, the refrigerant is less likely to be recyclable. If recycling is not possible, when enough gas is collected the retailer/wholesaler will forward the gas to the refrigerant gas product stewardship organisation Refrigerant Reclaim Australia (RRA) https://refrigerantreclaim.com.au/. RRA has a facility in Melbourne (the sole approved facility in Australia) for destroying refrigerant gases in an environmentally friendly manner. Gas is sent to this facility from all over Australia.
This scheme operates under the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989, and regulates the handling, trade and disposal of refrigerants which are ozone depleting and synthetic greenhouse gasses.
Without an appropriate licence, operators are operating illegally.

2.11.6 Trees

There are 2 trees at 122 Queenscliff Road to be removed as identified in the arborist report.

There are also a number of trees on the adjoining properties that are to be protected for the entirety of the works. The Arboricultural Impact Appraisal prepared by Naturally Trees outlines the method of tree protection and inspections required.

2.11.7 Window Audit

An audit must be taken of all windows to be removed for demolition, to enable the sale of windows not required. This should include:

- the outside dimensions of each window,
- confirmation of the frame type (aluminium, timber, PVC, or composite, domestic, semi commercial or commercial, fixed glazed, awning, sliding, bifold),
- glazing type (single or double glazed, clear, tinted or low e), and
- a picture for each window.

This audit must be undertaken two months before demolition is scheduled to commence and the items be placed on a marketplace website (such as Gumtree, Freecycle, Zilch, Oz Recycle etc) for sale or take away for free. This audit may need to be undertaken by the project design team.

2.11.8 Materials to be Recycled

Materials to be Recycled All building materials suitable for recycling must be forwarded to an appropriate registered business to the satisfaction of the Principal Certifying Authority.

Table 1 Demolition phase waste analysis – Site Establishment, Demolition, and Excavation

Materials on Site			Destination		Contractor#
Type of Material	**Location / examples**	**Estimated Qty – TBA by contractor**	**Reuse and recycling**	**Disposal**	**Operating in the local area**
Concrete	Ground slabs, suspended first floor slabs, driveways, paving, steps	140m^3 approx	• Removal and delivery to recycler for filling, levelling material, road base		Metro Demolitions, Boral, Concrete Recyclers, Bingo, Benedict Industries
Bricks / masonry / stone	Brick walls and blockwork.	540m^3 approx	• In the event that the mortar is able to be separated from the bricks then there is opportunity for reuse of the bricks in external construction. • Alternatively, in the event that the demolished brick cladding will not be in a feasible condition for re-use; there is opportunity to recycle crushed brick into other building materials. • Demolished brick walls will need to be broken down into suitable sized pieces (as accepted by recycling contractor) and transported to a concrete recycling facility.		Metro Demolitions, Boral, Concrete Recyclers, Bingo, Benedict Industries
Hardwood timbers	Studs, framing, hardwood floorboards	940m^3 approx	• Reclaimed for second hand timber suppliers OR reused on site as flooring, fencing, furniture. • The hardwood floorboards are a high value item and should be separated and sold. • Re-used on site as formwork, bridging, blocking & propping &/OR reclaimed by second hand timber suppliers • Floorboards in good condition to be hand recovered and	Woodchipping for mulch	Heritage Building Centre, Bingo,

			collected by recycled timber /building products contractor • Mulching by Waste contractors		
Other timbers	Architraves, skirtings, stud walls, timber bulkheads, cabinetry, balustrades	38m^3 approx	• Re-used on site as formwork, bridging, blocking & propping &/OR reclaimed by second hand timber suppliers • Mulching by Waste contractors		Benedict Industries
Metals	Roller doors, fences, sinks, baths, copper and brass pipes, chrome fixtures,	26m^3 approx	• Any metal from structures on the existing site and delivered to metal recyclers • Shop Fittings can be sold on second hand websites such as Gum Tree and Greys Online. • Copper and older iron piping in good condition to scrap metal merchant. Brass, stainless and chrome tap ware accepted by some merchants.		www.Gumtree.com www.Ziilch.com www.Greys.com One Steel, Sell & Parker, Veolia, Benedict Industies, Liverpool Scrap Metal
Other Metals	a/c ducting, light fittings, Metal Ceiling grid, A/C units, Rigid A/C Ducting	18m^3 approx	• Any metal from structures on the existing site and delivered to metal recyclers • Brass, stainless and chrome tapware accepted by some merchants. • Heating units can be recycled. • Non-ferrous metals is recyclable. • Corroded / poor condition piping, ductwork and other metals may need to be sent to either a mixed recycling waste facility or landfill as appropriate.	Disposal of Refrigerant from AC needs to meet EPA standards.	Onesteel, Benedict Industries Sell & Parker, Liverpool Scrap Metal
Windows	Timber and aluminium windows, shopfront windows	38m^3 approx	• Limited potential with second hand building suppliers.	Separation of glass and framing is generally not economic so not	Metropolitan Demolitions

			• Will be advertised on second hand market websites prior to demolition. • Potential re-use as glazing OR crushed for aggregate in concrete production. • Some windows are double glazed, the older windows are single glazed.	commonly undertaken.	
Timber Doors	Internal doors	28m^3 approx	• Limited potential with second hand building suppliers. • Muclhed up for use – eg BioGrow type use or painted MDF acceptable	•	
Lights	Fluorescent, Downlights, Oyster	50 No approx	• Lightweight Steel sheet in fixtures • Copper Cabling • PCB's • Fluorescent tubes • Non-ferrous metals • Steel sheet and castings recycled • Copper Cabling recycled • Mercury collected for medical industry.	Landfill. Disposal of Fluorescent tubes needs to meet EPA requirements,	Ecocycle, Liverpool Community Recycling Centre, Lamp Recyclers.
Vitreous china	Toilets, shower bases, vanities	16 No approx. toilets/vanities/showers	• Crushed up and mixed with masonry products		Bingo, SCE Recycling, KLF
Plasterboard	Internal Walls and ceilings	75m^3	• Plasterboard recycling service		ReGyp
Rigid PVC	Downpipes, conduit.	4m^3 approx	• Clean rigid PVC pipe and conduit can go be recycled. • PVC sheathing around electrical or data cabling not accepted	• Landfill	Ipex Pipelines
Foil Insulation	Roof Insulation	Roof Area 300m^2 approx	• If insulation is over 40 years old it is unlikely to be recyclable.	• Landfill	

Cabling	Electrical, IT	16m^3 approx	• Non-ferrous metals are accepted at recyclers.		Benedict
Floor, wall & window finishes	Carpet, carpet squares, underlay, tiles, lino floor tiles, Soundproofing panels.	36m^3 approx	• If in reasonable condition advertise on Gumtree for larger runs, make available to community groups • Curtains can be recycled as painter's rags and painter's furniture protection. •	• Landfill	www.Gumtree.com www.Ziilch.com
Excavated fill	Basement Carpark	• 3,500 m^3 approx	• Excavated fill is often able to be re-used so long as the fill is clean and uncontaminated. • Excavated fill can often be used on construction projects by the main contractor or external contractor, depending on the project subsequently occurring at the time.	If no avenues for re-use, or if the fill is unclean or an insufficient soil type, it may be disposed of in a commercial landfill site.	Liberty Industrial, Bingo,

For further information regarding each contractor refer to the Waste Contractors section of this report.

2.12 Construction Stage

For Bin Placement and Vehicle Collection Path see: Appendix 3 Demolition and Construction Waste Bin Collection Location Plan.

2.12.1 Contractors

The choice of head contractor and attitude to waste has a significant impact on the waste performance of a building site. Tendering contractors should identify their planned waste minimisation strategies. Waste minimisation strategies should identify which products are to be recycled and where they are to be taken to, and which are not to be recycled and where they will be sent to.

The construction contractor is to confirm or improve on re-use or recycling options in this plan, or document an explanation if otherwise.

Table 2 below outlines the waste streams identified for the construction stages and recommends appropriate methods for recovery and disposal to be followed, particularly where individual trades contractors are to be appointed.

2.12.2 Construction System & Take-offs

Items to be pre-fabricated off-site in controlled yards or factories and delivered complete to site will reduce on-site waste significantly. Pre-fabricated products include:

- Precast panels
- Roofing sheets cut to length
- Windows
- Lifts
- Joinery
- Screens

Further; waste is generally reduced at off-site fabricators for economic benefits.

2.12.3 Waste Recovery by the Public

Contractors can further reduce waste by the selected building system. Pre-cast panels generate less waste than blockwork structures. Prefabricated walls reduce waste in comparison to site built framed walls.
In-addition careful and accurate ordering of materials, along with clean-up and retention of re-useable materials will assist to reduce on-site waste.

2.12.4 Waste Container Guidelines

All waste containers / skip bins are to be clearly visible, accessible and labelled in a well-lit area to ensure use.
No hazardous, flammable or explosive materials are to be disposed of within skip bins.
Storage of skip bins is not to cause disturbance to normal stormwater flow.

2.12.5 Contamination of soil during construction

Contamination of soil, which then needs to be removed off site, often occurs and can be addressed in the following ways in *italics*

- small items such as discarded fasteners, food scraps packaging and straws – *locate small easy to find bins with lids around the site*
- broken polystyrene – *cut and sweep up immediately then place in bins with lids*

- rubble mixed into soil that might otherwise become a garden bed – ensure crushed rock for ground stabilisation is placed in locations that will be covered by paths and not garden beds.

2.12.6 Sequence

The general sequence to be followed for completing the construction stages is as follows:

1. Foundations and carpark construction

Expected to include in-situ poured concrete footings, columns and carpark slab

- Slab and column in situ concrete - Experienced concreters order loads accurately, ordering on a load by load basis near the end of the pour. Waste concrete would be a fraction of one load per pouring day i.e. approx. 1-2m^3 at most on the last delivery of the pour. Waste to be crushed and used for ground stabilisation, behind retaining walls as broken up aggregate, or removed and crushed for re-use in road base or similar.
- Any precast concrete retaining walls around the perimeter of the basement. No onsite waste anticipated from the use of precast wall panels.

2. Upper structure construction

Expected to include poured concrete suspended slabs and columns and blockwork walls, with metal stud internal framing

- Suspended slabs will be poured on site. Excess or trimmed reinforcing steel is to be sent off site to mixed metal recycler.
- Maximum waste anticipated from poured concrete slabs would be no more than 1m^3 per floor, to be crushed for re-use on site as base for pedestrian paving, road base or similar
- After stripping, formwork is cleaned in most cases and where possible, reused again. It is in concreters financial interests to re-use formwork. Residual formwork offcuts will be placed in general waste to landfill.
- Blockwork and brick mortar waste will be minimal and can be reused in other locations on site, or recycled off site.
- The lift core is to be in situ poured concrete walls, the structure will generate little waste from correct order of quantities of concrete. Waste to be crushed and used for ground stabilisation, behind retaining walls as broken up aggregate, or removed and crushed for re-use in road base or similar.
- Damaged or off-cut metal stud framing to be recycled in metals bin on site. If used timber stud offcuts will be re-used where possible (a good labourer stockpiling materials in work locations can help re-use of materials) or stockpiled for the public use, or recycled as timber mulch.

3. Roof

Concrete roofing is poured in situ.

- Any waste as per above.
- Installation of the ground level downpipes should be delayed until the end of the job to reduce the chance of damage. Temporary plastic downpipes reduce wastage of metal downpipes, and can be re-used.

4. Services installation

- Installation of electrical systems. Wire waste should not end up in general waste bins on site but should be removed, stored and sent for recycling of the copper.
- If installed, leftover steel pipe offcuts from the fire system can be recycled.
- Lifts will be prefabricated offsite and installed with minimal waste.
- Plumbing and drainage would include water, sewer piping, and PVC drainage pipe installation. Accurate ordering of quantities will ensure minimal pipe waste. If clean-up is thorough, some pipework can be recovered for use on other jobs. Significant volumes of clean PVC drainage pipe can be separated for collection and may be recovered for granulation and reuse. Otherwise it may be disposed to landfill.
- Waste solvents from PVC drainage gluing are to be tracked in the contaminated waste register and disposed to a suitable landfill for solvent container disposal.

5. Fitout and cladding

Application of internal and external linings: including façade glazing and features, awnings, cladding and plasterboard linings, lighting and insulation.

- The plastering contractor will generate an economically recyclable quantity of plasterboard waste from clean offcuts and damaged clean sheet, therefore a bin for recycling plasterboard offcuts should be provided on site. The bin should be clearly marked for clean plasterboard as it can be readily recycled (see 'Waste Contractors' section below).
- Lighting, cabinetry, aluminium windows and fittings will generate plastic and cardboard packaging waste. Separate cardboard and plastics bins or enclosures should be provided to capture this waste.
- Any large quantities of unframed damaged glass should be recycled
- Experienced insulation installers should be able to estimate quantities accurately, with small cut-offs being reused elsewhere on site in small gaps. Leftover insulation can also be taken offsite by the contractor for reuse in other jobs. Small amounts of damaged insulation may be generated and should be disposed of to landfill.
- Ceramic tile offcuts can be recycled with masonry waste. Carpet and carpet tile offcuts cannot be recycled.
- Flooring installed in units will result in small quantities of trimmed material. This should be sent to a mixed waste offsite processing centre where it can be disposed to landfill if not recoverable.
- Aluminium timber look battens will be fixed to the outside of the building. These will be pre-cut offsite and generate minimum waste on site.

6. Finishes

Work includes painting and rendering, detailing of architectural façade features, floor sealing and finishes, cleaning.

- Where specified, render waste generated by rendering contractors may be cement based or mixed with synthetic binder. As for mortar, cement render waste can be removed and crushed for re-use in road base or similar. Synthetic bound render waste will need to be disposed of to landfill.
- Paint and floor sealing contractors will produce waste containers that are contaminated solvent-based waste, requiring tracking and disposal to an approved landfill facility. A bin for paint, adhesive and solvent containers will be used to store this waste and movements should be recorded in the waste register for contaminated materials.

7. Restoration
Re-establishment of kerbing, vehicle crossings and footpaths. Involves concrete pouring, and paving.

Contract conditions on trades and subcontractors
Trades on site that are likely to produce waste as a result of their activity, for example the plastering contractor, should be required to recycle waste that is recoverable, through contract conditions requiring the use of marked bins provided by the primary contractor for recoverable material, and including the waste management plan content as part of the contractor site induction conditions.

Table 2 Construction phase waste analysis – Structure, Services, Fit-out and Finishes

Materials On Site and Collection Bin			Destination		
			Reuse and Recycling		Disposal
Type of Material	Bin / Container	Estimated Qty – TBA by contractor	On-site (Re-use / onsite recycling)	Off-site (Offsite Recycling)	(Contractor and landfill site)
Concrete Waste masonry / blockwork Paver offcuts, Breeze Blocks Waste cement render	Concrete / Masonry bin	16m^3 approx	The small volumes of waste concrete and blockwork expected may be reused onsite as ground stabilisation or binned for offsite recycling.	A concrete recycler can receive waste concrete and blockwork hauled off site. Separating masonry / concrete / bitumen attracts reduced charges from offsite recyclers compared with mixed materials.	AE Biggs, Boral, Concrete Recyclers, Bingo, Benedict Industries
Metals - ferrous steel framing	Metals - ferrous	10m^3 approx		Recycled building products contractor or scrap metal merchant	One Steel, Sell & Parker, Veolia, Benedict Industies
Metal – non ferrous. aluminium cladding, fencing, windows & door frames balustrading, copper pipes,	Metals – Non Ferrous	12m^3 approx	Much of the aluminium products will be prefabricated offsite which reduces waste.	Recycled building products contractor or scrap metal merchant. Non-ferrous metals are valuable.	One Steel, Sell & Parker, Veolia, Benedict Industries
Plasterboard clean wall and ceiling lining trimmings / damaged sheet	PB	15m^3 approx	Large off cuts can be readily used on site	Plasterboard recycling service	Sydney Gyprock Recycling, ReGyp,Veolia

Materials On Site and Collection Bin			Destination		
			Reuse and Recycling		Disposal
Type of Material	Bin / Container	Estimated Qty – TBA by contractor	On-site (Re-use / onsite recycling)	Off-site (Offsite Recycling)	(Contractor and landfill site)
Electrical cabling/wiring offcuts	Mixed metals or separate wiring bin	8m^3 approx		A copper wire recycling facility such as will accept quantities from 2kg upwards, with better prices for large quantities of wire.	
Plastic and cardboard packaging	Plastic / cardboard recycling	36m^3 approx		To general recycling waste as handled by council's recycling trade waste service	
Paint / Solvent / Adhesive waste tins	Solvents	60L approx		Paintback	Disposal to paint and solvent tin facility
Finishes	Carpet, carpet squares, underlay, tiles,	10m^3 approx	Carpet can be laid underneath mulch as a weedmat.	Generally cut to size on the job, waste is minimal.	Bingo
Plastic (PVC drainage pipe offcuts, plastic wiring cable reels)	Plastic / Mixed recycling	5m^3 approx		Can be processed by a mixed waste recycling contractor,	Benedict Industries

2.13 Recycling & Reuse of Materials

There are many ways that demolished building materials can be reused or recycled. Technology is developing constantly to increase and improve the options already available. Following are some of the ways that demolished building materials can be reused and recycled.

- **Concrete, blockwork, Bricks, Porcelain, Bitumen / Asphalt**
  Concrete slabs/panels and bitumen/asphalt paving can be readily recovered and recycled for reuse or reconstitution in other construction products. Bricks can be crushed for reuse as aggregate and other products.

- **Plasterboard / Gypsum**
  Clean plasterboard / paper lined gypsum board can be readily recovered and recycled for construction and agricultural use when crushed.

- **Metal**
  Metal recycling generally falls into ferrous and non-ferrous metal categories
  Numerous recyclers exist to handle both types in mixed and separated loads

- **Timber**
  Many re-use opportunities as well as recycling and at the very least chipping for gardening.

- **Rigid PVC pipework and conduit**
  Since PVC is a thermoplastic PVC pipe can simply be reground, pulverized and returned to the extrusion process to make new pipe.

- **Cardboard + Polystyrene**
  As with cardboard, polystyrene is completely recyclable and can be used to produce a number of plastic products.

- **Globes – Fluorescent and High Bay**
  Various elements of a light globe can be re-used which requires a more specialised process for separation. The mercury can be used for medical purposes, Lightweight Steel sheet in fixtures, copper cabling, castings can all be separated and recycled.

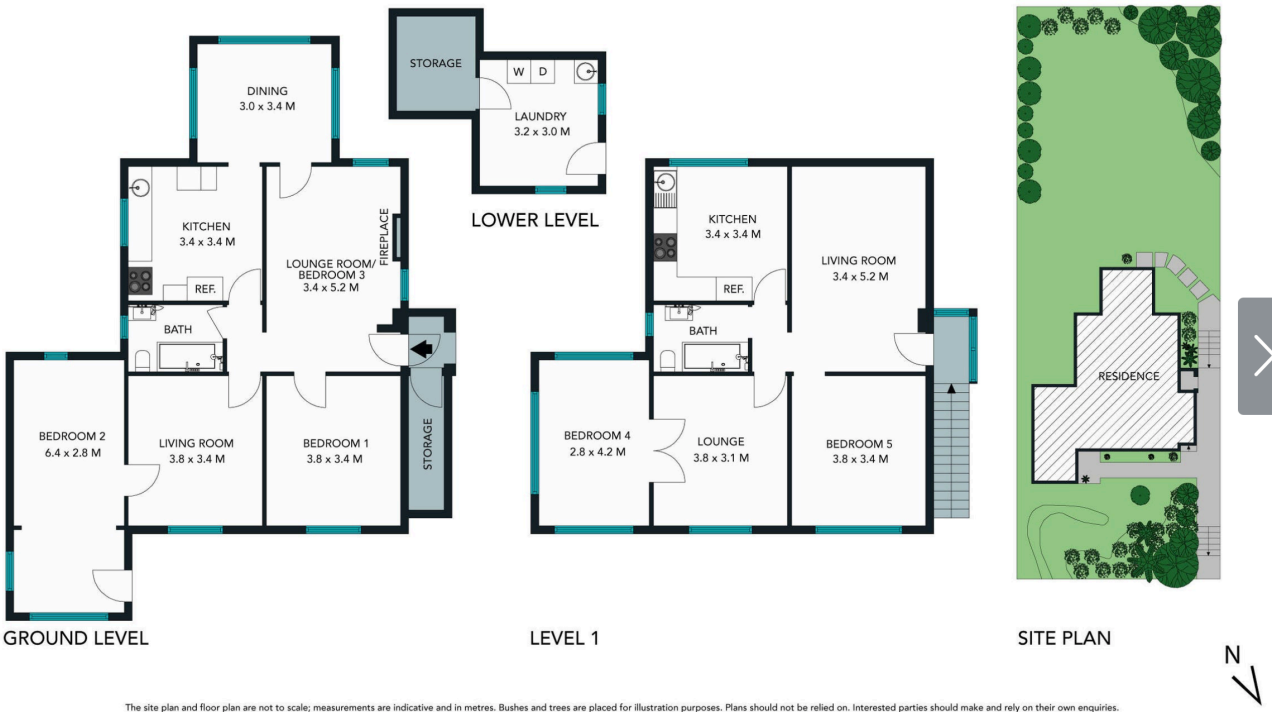
- **Finishes**
  Carpet can be used as a weed mat.

- **Glass**
  Some contractors will crush glass with concrete and/or bricks for road base. Due to poor prices for as well as an abundance of recycled glass, glass is generally currently not recycled separately. Window glass predominantly goes to landfill.

- **Green waste**
  Green waste is very recyclable and easy to do so. Depending on the composition of the green waste – it can be used as Mulch or compost in many different formats. Depending on the waste it may even be sought after by the local zoo!

- **MDF**
  Currently not known to be recyclable

Appendix 1 - Existing Site Conditions



The site plan and floor plan are not to scale; measurements are indicative and in metres. Bushes and trees are placed for illustration purposes. Plans should not be relied on. Interested parties should make and rely on their own enquiries.

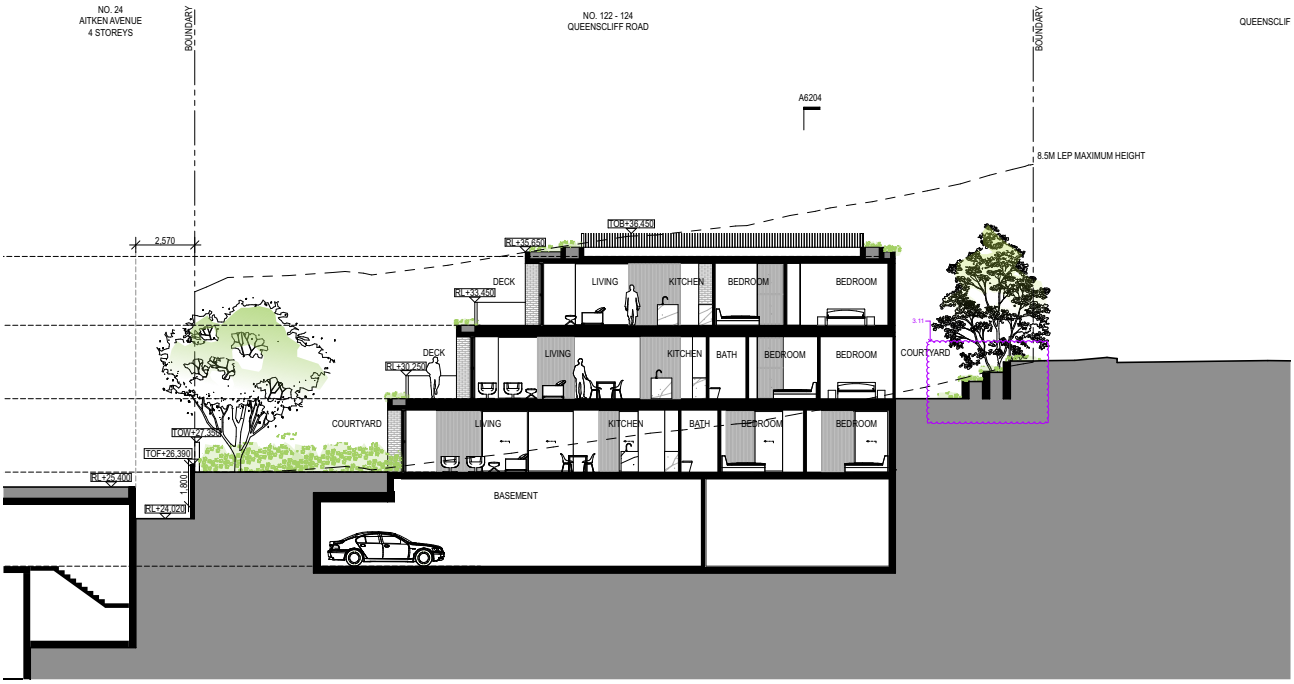

TERRACE
7.2 x 2.6m
BED 3
3 x 3.3m
BED 1
4.3 x 3.6m
WC
STORE
BATH
BED 2
3.2 x 3.6m
LINEN
ENTRY
KITCHEN
3.3 x 2.3m
LIVING
3.9 x 6.1m
DINING
3.3 x 4.1m
BALCONY
2.4 x 1.9m
ACCESS UNDER HOUSE
LOCK UP GARAGE
3.3 x 6.5m
LOCK UP GARAGE
3.9 x 6.1m
L'DRY
HW
UNDER GROUND FLOOR
GROUND FLOOR
BALCONY
4.9 x 1.7m
FIRST FLOOR
RESIDENCE
SITE PLAN (NOT TO SCALE)
SCALE (METRES)

Appendix 2 - Proposed Works

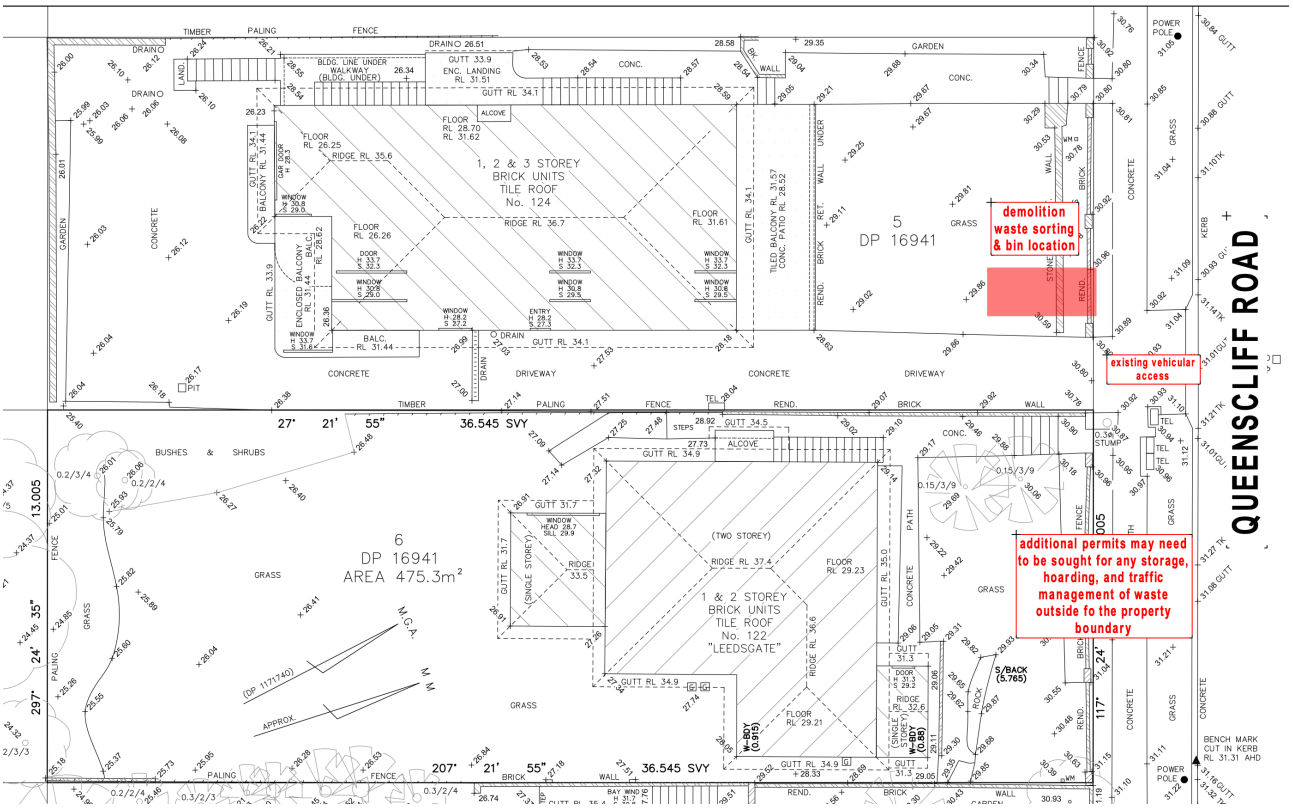
BA:01 Balustrade, Aluminium, dark finish.
BK:01 Brick, light colour.
CD:01 Aluminium cladding, dark finish.
CE:01 Concrete, render finish, light colour.
CE:02 Concrete, drive way
DR:01 Sliding door, Aluminium frame, dark finish, clear glass.
DR:02 Hinged Door, Glass, Aluminium frame, dark finish.

FE:01 Batten fence, Aluminium, dark finish.
RN:01 Render, light colour.
SF:01 External tile, Stone.
SF:02 Crushed stone.
TM:01 Fixed Batten Screen, Aluminium, dark finish.
TM:02 Operable Batten Screen, Aluminium, dark finish.
WD:01 Sliding window, Aluminium frame, dark finish, clear glass.

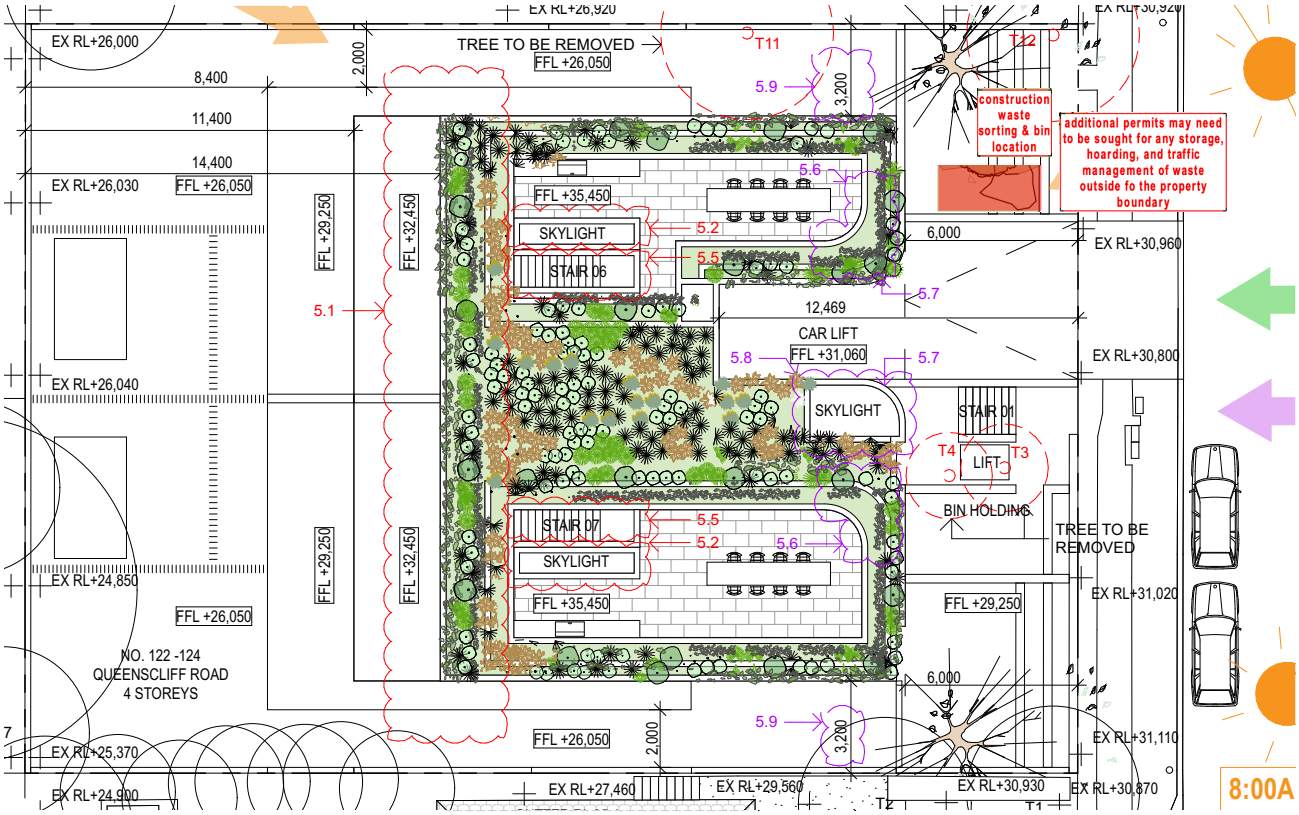
WD:02 Fixed window, Aluminium frame, dark finish, clear glass.
WD:03 Double hung window, Aluminium frame, dark finish clear glass.



Appendix 3 - Demolition & Construction Bin Locations



Demolition Bin Store Location.



Construction Bin Store Location.

Appendix 4 - Recycling, Reuse & Recovery Services Directory

The following is an indicative only list of Sydney based contractors that provide various services for handling the recycling, reuse and disposal of demolition and construction waste from the proposed project. This list has been assembled not in recommendation of any particular contractor but to demonstrate the general availability of recycling services around Sydney.

- **1300RUBBISH**
  www.1300rubbish.com.au, ph. 1300 78 22 47
  Bin only company - collects plasterboard for delivery to recycling centre.
- **AE BIGGS** Oxford Falls.
  02 9453 2990 sales@biggs.net.au
  A building and construction drop off recycling centre specialising in recycling bricks and concrete to make 10mm, 20mm & 40/70 aggregate, roadbase and crusher dust.+
- **Australian Native Landscapes** – Seven Hills, Terrey Hills, North Ryde,
  www.anlscape.com.au, ph. 131458
  Green waste off-site composting.
- **Benedict Industries** - Chipping Norton, Belrose, Banksmeadow

  www.benedict.com.au ph. 02 9986 3500. Contact Matthew Rooke 0431 737 444 matthew.rooke@benedict.com.au or Gay Willis 0427 087 897 for more details.
  Primarily a rubble recycling company but will manage a wider waste stream per below. Benedict will separate loads by hand or machine, screen some loads and crush masonry products. Non-recyclable elements will go to landfill.
  - Bitumen / Asphalt
  - Clean concrete, blockwork, brick, mortar (masonry), porcelain at Chipping Norton
  - Rubble+ soil – concrete/masonry and dirt mix
  - Mixed load – concrete rubble and mixed in non-recyclables (incl mixed demolition waste, vegetation, timber, plastics)
  - Steel loads – not mixed with other materials that requires sorting.(A One Steel bin is supplied in their yard and collected periodically by One Steel)
  - Electrical cable – not mixed with other materials that requires sorting.(A One Steel bin is supplied in their yard and collected periodically by One Steel)
  - Cardboard – not mixed with other materials that requires sorting. (A Remondis bin is supplied in their yard and collected periodically by Remondis)
  - Clean timber – pine or hardwood. Can contain nails or nail plates (no engineered timber such as laminated products, or MDR; no treated timber; no stumps). Timber is mulched at the Benedict Menangle plant.
  - Green waste – bushes, branches, ground covers, some soil ok - (vegetation but no manmade material or tree stumps) is mulched at the Benedict Menangle plant.
  - Clean and laminated MDF, laminated timbers, stumps and plastics will generally go to landfill.
  - Do not accept paints, liquids or food waste. Food waste on site should go into separate bins with lids. Delivery of any of these or other non-recyclable materials will ensure a load is considered a mixed load of potentially rejected.

Detailed information about the acceptable and non-acceptable materials can be found at http://benedict.com.au/wp-content/uploads/Benedict-Recycling_Acceptable_Waste_Streams.pdf

Benedict Industries do not provide a bin collection service. Materials need to be delivered to Benedict Industries. Benedict are regularly serviced by good (smaller) bin suppliers and transporters as recommended by them depending on the location of the job.

- **Bingo Industries –** Auburn
  www.bingoindustries.com.au 02 9737 0351 Daniel Spiteri 0409 900 743 (Recycling Sales Manager), Natasha 0406 182 626,Jean Yi 0450 081 600
  Concrete, blockwork, Bricks, Porcelain, Bitumen / Asphalt. Primarily a rubble recycling service similar to Benedict however they also provide their own bins.

- **Boral Recycling** – Wetherill Park
  https://www.boral.com.au/locations/boral-recycling-wetherill-park
  ph. 02 9604 9101. Concrete, asphalt, roof tiles, bricks and masonry blocks are accepted.
- **Bower Reuse & Repair Centre** – Parramatta
  https://bower.org.au ph (02) 9568 6280)
  The facility accepts materials, from small customers upwards. Leftover renovation and building materials are on-sold. Bin collection service is not provided. Collection fees are applicable in this case as Brookvale is just outside their pickup area.

- **CMA Eco Cycle** https://www.cmaecocycle.net 1300 32 62 92
  A full lighting recycling service – all lights and all volumes.

- **Concrete Recyclers** – Camellia www.concreterecyclers.com.au
  ph. 02 8832 7400
  Concrete, brick, asphalt

- **Ecocycle** – St Mary's www.ecocycle.com.au
  Lighting, eWaste and Battery collection service.

- **Greenwood Landfill** – St Ives ph.02 9450 2288
  A licensed waste facility that accepts building and demolition materials. Recycling as much as possible prior to committing not recylables to the soil. It accepts the following materials: Mixed waste, brick, concrete, raw timber, tiles, Asphalt, Bitumen, steel, trees and logs.

- **Gyprock** – Wetherill Park www.gyprock.com.au/Pages/About-us/Recycling.aspx, ph. 131744 Only new, clean Gyprock product plasterboard waste is accepted. They do not provide bins.

- **Heritage Building Centre** www.heritagebuilding.com.au/products/recycled-timber/
  02 9567 1322 Rear 432b, West Botany Street, Rockdale 2216
  Recycled Building materials

- **IPlex Pipelines** - http://www.iplex.com.au/. Simon Laffan on 07 3881 9246

IPex requirements:

  - clean rigid PVC pipe and conduit is accepted.
  - Large volumes can be recycled
  - Arrange an inspection of pipe prior to sending to IPex – contact Simon
  - Below ground PVC must be clean for recycling
  - Pipes manufactured pre 2005-06 may contain lead. Excessive lead will cause problems with recycling.
  - PVC sheathing around electrical or data cabling not accepted.

- **Kimbriki Resource Recovery Centre** – Terrey Hills http://www.kimbriki.com.au
- ph. (02) 9486 3512 The facility accepts materials, from small customers to large civil construction industries. Bin collection service is not provided. Tipping fees are applicable.

- **KLF Holdings** – Camellia and Asquith http://www.klfholdings.com.au/ –
- Porcelain, concrete and bricks

- **Lamp Recyclers –** Statewide https://www.lamprecyclers.com.au 1300 789 917
  Lamp Recyclers is both a Collector and a Recycler of globes, lamps and fluorescent tubes. The method of disposal is dependant on the volume to be recycled. In this case, the volume is relatively small, so a Corflute Ezy-Return™ reply-paid lamp recycling pack should be requested and disposed of as per the instructions.
- **Liverpool Scrap Metal** – Moorebank http://www.liverpoolscrapmetal.com.au
  ph. 02 9602 4330
  Mixed metals recycling,
- **Liverpool City Council Community Recycling Centre**
  99 Rose Street, Liverpool. Ph: 1300 362 170
  The centre accepts materials such as:
  - Cardboard
  - Polystyrene
  - Paints
  - Fluorescent globes and tubes
  - Green Waste

  - has an authorized collection point scheme to recycle architectural and decorative paint named 'Paintback'. The following is accepted:
    - ⇒ Interior and exterior architectural paint
    - ⇒ Deck coatings and floor paints
    - ⇒ Primers, undercoats and sealers
    - ⇒ Stains and shellacs
    - ⇒ Varnishes and urethanes (single component)
    - ⇒ Wood coatings

  Further information can be found at www.paintback.com.au

- **Metropolitan Demolitions Group** – St Peter's
  www.metrodemo.com.au.
  Concrete, blockwork, Bricks, Porcelain, Bitumen / Asphalt. Accept waste similar to Benedict Industries, but they have their own recycling facility. Glass is crushed in with brick and concrete. For larger projects Metro send bulk rubble for recycling overseas.
- **Onesteel Recycling** – Chipping North, Wetherill Park
  www.onesteel.com
  Mixed metals recycling, full site clean-up and bin services.

- **ReGyp – Kurnell**
  www.regyp.com1.au, ph.1300 473 497
  Regyp provide and collect their own bins for new and old plasterboard per below:
    - Plasterboard and cornice off-cuts
    - Plasterboard with paint or wallpaper
    - Non-laminated plasterboard tiles
    - Gypsum blocks, gypsum prefab wall panels eg RFC rapid wall
    - Chemical precipitate gypsum (eg FGD)
    - Suitable industrial gypsum waste
    - Detailed acceptable and non-acceptable waste information can be found at http://www.regyp.com.au/waste/

- **Sell and Parker** – Banksmeadow, Kings Park, Ingleburn
  www.sellparker.com.au
  Metal
- **Suez -** http://www.recyclingnearyou.com.au/large-dropoff/FairfieldNSW
  Soft plastics from packaging

- **Sustainable Resource Centre** – Fairfield City Council
  http://www.fairfieldcity.nsw.gov.au/directory_record/129/src
  ph. 02 9725 0750
  The facility accepts materials, from small customers to large civil construction industries.
  Materials recycled (nothing else):
    - Terracotta roof tiles, Clay bricks
    - Clean concrete (with or without steel), and
    - Asphalt - ripped and profiled

- **Sydney rubbish services** Surrey Hills
  http://sydneyrubbishservices.com.au/plasterboard-gyprock-waste-removal/
  02 9785 5526
  Bin only company - collects plasterboard for delivery to recycling centre

- **Veolia**
  http://www.veolia.com.au, ph. 132 955
  All waste metal in large volumes.