



SITE AND WASTE MANAGEMENT GUIDE

for builders at Mullum Creek

1. INTRODUCTION

The Mullum Creek development is being undertaken in accordance with a vision based on the core principles of environmental sensitivity and sustainability. To support this vision, a set of objectives and requirements have been developed as outlined in the Mullum Creek Design Guidelines (MCDG). This Site and Waste Management Guide explains the objectives and requirements in the MCDG that are relevant to building contractors, and presents strategies towards satisfying these objectives and requirements.

In Australia we rely heavily on landfill to deal with our waste. And despite increased recycling efforts, our per capita contribution to landfill continues to rise. 42% of the waste ending up in landfill originates from the construction industry¹. As the Mullum Creek project involves construction of 56 new homes, it is crucial that we minimise construction waste generated on the estate, particularly waste destined for landfill.

In preparing this Site and Waste Management Guide, we have attempted to balance the environmental objectives of the Mullum Creek development with practicalities and time constraints faced by contractors in the building industry. We have undertaken an extensive review of construction and demolition (C&D) waste contractors and recycling facilities as are available in the Melbourne region. We have identified common wastes that accumulate on construction sites, have confirmed which of these can currently be recycled, reclaimed, or re-purposed, and have weighed up the environmental and financial cost-benefit of doing so. Some materials can only be disposed of to landfill, and the costs of doing so are increasing. Other wastes like concrete can be disposed of at designated recycling depots² without tipping fees, provided they are kept clean.

This Guide concerns itself firstly with minimising the amount of waste arising from the construction of dwellings, as even the reclamation of "recyclables" from a waste stream is expensive and not without environmental impacts. Secondly, it considers pathways for waste re-use and recycling where possible, and it concerns itself with reducing the volume and toxicity of non-recyclable waste that goes to landfill.

For quick reference, the crucial requirements and goals associated with the guide are highlighted in RED type.

The advantages for the contractor in managing waste as outlined in this Guide include:

- Saving money otherwise spent in over-ordering or materials, with flow-on savings in transport and disposal of waste.
- Improving efficiency; identifying materials that end up in your skip or waste pile can tell you a lot about the accuracy of your materials estimating.
- Conservation; you can play a significant role in conservation of natural resources and minimising landfill.
- Marketing; clients are becoming ever more conscious of our dwindling environmental reserves, and many are actively choosing products, contracts and services that respect this.

2. MULLUM CREEK OBJECTIVES AND REQUIREMENTS

The MCDG objectives relevant to construction waste management apply as follows:

- Reduce the amount of construction waste that ends up as landfill.
- Maximise the amount of construction material that can be reused or recycled.
- Minimise contamination of soil with construction material, including small items, that are so difficult to remove from soil (such as discarded fasteners and insulation foam shavings).
- Minimise run-off, soil erosion and movement of silt.

¹ Australian Bureau of Statistics 2008

² SoilWorx, Pakenham (Phone: 03 9361 1300 Website: www.soilworx.com.au) OR Alex Fraser (Phone: 136 135 Website: alexfraser.com.au)

Two detailed requirements in the MCDG are directed towards achieving the above objectives:

Detailed Requirements

R66 *Owners must ensure that builders:*

- *provide general waste and recycling facilities.*
- *empty stockpiles and skips on a regular basis.*
- *do not place non-recyclable materials in the recycling bins.*
- *place waste directly into skips to avoid litter, broken glass and rubble spreading through soil.*
- *close bin lids at the end of every work shift.*
- *engage a waste-recycling contractor who fulfills the specifications detailed in the Construction Waste Management Guide on the Mullum Creek website.*
- *install silt barriers, absorptive bales or similar measures to prevent sediments in run-off entering the storm water and creek systems.*

R67 *A site and waste management plan must be submitted to the Design Review Committee (DRC) for approval prior to the commencement of construction.*

This site and waste management plan details how Requirement R66 will be achieved.

3. WASTE MINIMISATION

The most important contribution a building contractor can make to reducing the long term environmental impact of a building is by ensuring good design detailing and trade workmanship in order to optimise the service life of building materials. Poor workmanship leads to accelerated rates of failure of building elements, leading to premature repair and often replacement of those elements. For instance, poor roof detailing can lead to downstream water damage to the building's structure and interior fitout.

Reducing the amount of waste resulting from construction is another important objective for contractors and tradespeople committed to environmentally responsible building practice.

You can minimise waste produced on site by:

- Ensuring that materials are tightly quantified, responsibly sourced, and of a format and quality that inherently minimise discards and wastage. This is as much the responsibility of the designer in material selection/specification, as it is the responsibility of the head building contractor and sub-contractors in tight quantification of materials to be ordered. Once materials have been delivered to site, it is often not economical to relocate them to a different site for reuse.
- Planning where materials will be stored so as to provide easy access for workers and free movement around the site.
- Carefully securing and protecting material stockpiles from unintentional damage.
- Mulching any vegetation that needs to be cleared, and retaining it on site for future landscape use.
- Ensuring that soils on site are not contaminated during the building process, as contaminated soils may need to be removed from site at considerable cost. Typical soil contaminants include crushed rock brought in to stabilise ground for vehicular access, fasteners, silicon, adhesives, tile and timber remnants.

4. WASTE HANDLING

Mullum Creek's goal and requirement for waste management is to ensure that a minimum 80% of waste generated on site can be reused, recycled or repurposed. We have identified four main approaches to achieving this³. In a nutshell, building contractors can either employ a reputable specialist materials recovery firm to deal with all aspects of waste management on site (such as Mobius Material Recovery⁴ or Konstruct Recycling & Waste Management Solutions⁵), or they must follow best practice construction waste management procedures as outlined below with the objective that no more than 20% of waste generated on site ends up as landfill.

Labour-efficient and environmentally responsible waste handling will see:

a) Waste separation planned around construction stages

Different waste types occur at different stages of the building project, so organise waste containers on site based on project stages.

Stage	Likely waste streams
Base	timber, concrete, PVC pipe, soil, vegetation...
Frame	concrete, steel, timber...
Cladding	metal and fibre cement sheet, brick, concrete, timber, sarking...
Services rough-in	bulk and foil insulation, PVC and HDPE pipe, flexiduct, electrical cable, soft plastic wrap, sweepings...
Internal fit-out	plasterboard, timber, ceramic tile, PVC and HDPE pipe, soft plastic wrap, cardboard, sweepings...
Finishing/clean	paint, render, soft plastic wrap, cardboard, toxic chemicals, sweepings, road base (potentially mixed with soil) used to provide vehicular access during construction phase ⁷

b) The establishment of one designated waste storage area

In general, tradespeople will use the most conveniently located skip or bin regardless of whether it is designated as recyclable or otherwise. Locating many smaller bins across a site encourages people to use the nearest bin. Having one waste storage area makes for better waste sorting and also helps keep the site orderly.

c) Placement of construction waste always and directly into a skip/bin

To avoid litter spread through soil, do not place waste on ground. All bins on site should be closed each night to prevent wildlife from getting into them⁸.

³ (i) Provide one central bin where all items are dumped and then sorted out at a waste transfer station. This is generally an easier method requiring far less monitoring and diligence from the site manager. However with this approach there is a risk of not achieving the desired waste recovery rates. We have identified two companies operating in Melbourne that sort and reclaim an acceptable amount of construction waste in an unsorted cage. If you choose to have one central bin for all waste, you must employ a company that will sort the waste for you achieving minimum 80% recovery of materials.

(ii) Provide a number of bins for the site and have waste sorted by the builder. Our concern (and waste disposal companies' experience) is that with more bins introduced to site, the risk of cross-contamination increases. The site manager will be required to enforce responsible waste management practices throughout the construction period (via threat of penalties for poor practice). Higher waste recovery rates (exceeding 80%) can be achieved as a result.

(iii) Provide centralised waste recycling bin compound(s) for use by all Mullum Creek contractors. This would rely on builders delivering waste to the compound. This approach has been rejected for a number of reasons. It would be inconvenient for builders, and could also lead to an increase in litter spillage between the building site and the compound. There are also logistical issues with central funding and management.

(iv) Provide two bins at the site. One is for clean recyclable items, and the other for waste which will go to landfill. The success of this approach depends upon clear signposting, oversight and instruction of tradespeople by the site manager.

⁴ Mobius Materials Recovery Phone: 03 8756 0400 Email: admin@mobiusmr.com.au

⁵ Konstruct Recycling and Waste Management Solutions Phone: 1300 566 787 Email: Simon@konstructrecycling.com.au

⁷ See Section 5: Vehicular Access to Site

⁸ Note that if you use a materials recovery specialist as recommended above, you will be provided with a large caged area where all wastes can be disposed of. All sorting of waste will be undertaken off site.

d) Appropriate signposting of skips and bins

Include information about types of materials and any instructions for protection of waste (e.g. 'keep plasterboard dry'). A wet concrete disposal area enclosed by earth filter banks should be located near the designated waste storage area and be well signposted. An even better alternative to simply disposing of excess concrete, is to use excess wet mix concrete to create pavers for later landscaping use. To do so, roughly constructed timber forms (made from 70x35 pine) can be premade ready for making up 600 x 600 x 70 pavers (as an example).

e) Spot auditing of waste management

Ensure that waste is being appropriately sorted and that contamination of recycling bins is not occurring. This should be the responsibility of the head building contractor.

f) Adequate fencing of site

Reduce the risk of illegal soil and rubbish dumping.

g) Skips with secure lids at all times

Fit skip lids with combination locks to prevent illegal dumping of material, whilst allowing uncomplicated access to all trades. Skips should be constructed with solid walls and a sealed floor to contain dust and liquid run-off. They should be sized to comfortably cover waste volumes generated between collections.



Figure 1: Skips and bins with secure lids

5. VEHICULAR ACCESS TO SITE

We appreciate that providing safe access for vehicles on site is crucial. Traditionally, and on sloping sites in particular, this is achieved by importing and spreading crushed rock road base where/as required to provide a stable footing and traction for vehicles. After months of driving around on this road base, particularly through the wetter months, it becomes embedded in the soil profile, and often requires top-dressing. Its final removal invariably requires removal also of a significant amount of soil from site. Its disposal also incurs significant transport and landfill costs for the contractor. To avoid this, Mullum Creek strongly recommends that one of the three following options be chosen:

The areas where road base is to be applied shall be restricted to those that will ultimately be covered by driveways and hardstand as part of final external works and landscape design proposal, so where the road base won't need to be removed prior to completion of works.

OR

When temporary vehicular access is required over areas that will ultimately have soft landscaping, geotextile fabric shall be laid as a barrier between the soil and introduced road base⁹.



Figure 2: Geotextile fabric laid between natural ground and the road base reduces the amount of road base required, and the underlying soil profile is not disturbed or contaminated

OR

Lay down high density polyethylene (HDPE) driveway and hardstand mats such as 'Foretech Plas' or 'Euromats'¹⁰.



Figure 3: 'Foretech Plas' mats

Note that Mullum Creek requires that recycled crushed concrete and bricks be used for temporary road base in lieu of virgin crushed rock¹¹. Recycled road base will not impose additional costs on the contractor. It is readily available as 20-40mm road base. We recommend using maximum 40mm sieved product due to the steep nature of some sites.

5. SOIL AND SILT MANAGEMENT

During the period of building construction at Mullum Creek, it is a requirement of the MCDG and your planning permit that sediment control measures are established and maintained in order prevent sediment run-off into neighbouring sites, stormwater and the Mullum Mullum Creek.

Even a small amount of pollution introduced to waterways from a construction site can cause significant environmental damage. The hilly terrain at Mullum Creek, combined with the proximity of wetlands and the Mullum Mullum Creek, have us especially mindful of the damage that sediment from upslope erosion can cause to the health of the waterways. Poor sediment control can result in blocked stormwater pipes and culverts, bank erosion and channel instabilities, weed infestation of creeks, and fine sediment run-off adversely increasing turbidity in permanent pools and affecting aquatic life.

⁹ Geofabric Australia (<http://www.geofabrics.com.au>) supplies non-woven geotextiles that are inexpensive. This method will: reduce the amount of road base required to create stable vehicular access. Typically, instead of having to spread road base to a thickness of 100mm, the use of a geotextiles reduces this to 40-50mm. facilitate site drainage due to their permeable nature, so preventing loose soil migration. allow the removal of uncontaminated road base for potential reuse without disturbing the ground.

Recycled road base can usually be reused by the contractor on a subsequent building site, or can be returned to its supplier at no cost. In practice, this option involves rolling the geofabric onto the ground (with corners can be pegged using 'tent pegs' fashioned from concrete reinforcement offcuts), tipping the road base onto the geofabric and spreading it to 40-50mm thickness. When construction is completed, the majority can be scraped off with a backhoe or bobcat bucket, and the geofabric can be rolled up for potential reuse.

¹⁰ These provide excellent vehicle traction on sloping sites without contaminating the underlying soil, and are available through Mabey Equipment Hire or similar. www.mabey.com Phone: 1800 622 394

¹¹ SoilWorx, Pakenham (Phone: 03 9361 1300 Website:www.soilworx.com.au) OR Alex Fraser (Phone: 136 135 Website: alexfraser.com.au)

Proper silt management on site includes the following:

- Avoiding the washing of sealed roads and pathways, unless sweeping has failed to remove sufficient sediment and there is a compelling need to remove the remaining sediment.
- Being prepared for approaching storms and high rainfall events with the same alertness we hold for days of high bushfire risk.
- Ensuring that an appropriate sediment control system is located downslope of any sediment stockpile. It is important to take into account any changes in topography that occur as a result of excavation associated with the construction of ground slabs and their associated footing systems. Cleaning up and rehabilitating areas that have been damaged by sediment run-off from your site is a costly exercise.

This could be a constructed filter fence, installed along the lowest lying site boundary, with its ends returning upslope. At Mullum Creek, we envisage that woven sediment fences will be sufficient. Sediment fences need only be 700mm high and attached to stakes or posts. The woven fabric allows water to pass through, but will filter sediment from the run-off. The bottom edge of this fabric should be nominally buried to avoid wash-out under the fence in the case of a sudden downpour. Alternatively, where catchment areas are small, a sediment basin can be constructed where water flows can collect and sediment can settle/separate before the water is eventually discharged.



Figure 4: Woven sediment fence at lowest lying boundary to prevent sediment run-off from site.

- Steep, unvegetated batters should be secured with jute or coir mesh that will bio-degrade within 3-6 months. Recently exposed earth surfaces can be somewhat protected from soil erosion in the short term by roughening the soil surface, which increases water infiltration and delays the formation of rutting. Straw bales can be used to form temporary diversion banks, protecting exposed soils and sediment from imminent storms. These should be staked firmly in place and should not be used for longer than a week.

If topsoil is to be removed from any part of the site, it should be stockpiled for no more than one year and in mounds no higher than 2 metres. These mounds should not be located in a position where they could be washed into a gutter, drain or waterbody during a heavy rainfall event. Ensure where necessary that a flow diversion bank or catch drain is positioned upslope of a stockpile to direct excessive overland flows around the stockpile. This is particularly important when the upslope catchment area exceeds 1,500 sq.m. Topsoil stockpiles should ideally be covered with an impervious sheet or mulch, then a jute or coir mesh to stabilise. Please avoid using fine synthetic meshes, as ground dwelling animals (skinks, lizards and snakes) and seed eating birds can get caught in them. Seeding stockpiles with grass to stabilise may contaminate future garden soil with unwanted grass seed.



Figure 5: Topsoil stockpiles.

6. SITE AND WASTE MANAGEMENT PLAN

The Mullum Creek Site and Waste Management Plan attached to the end of this Guide must be completed by the head building contractor or owner-builder and submitted to the DRC for review and approval prior to construction commencing on site.

Part A of the Plan addresses waste management on site. Either a materials recovery firm¹² that recycles a minimum 80% of all waste must be nominated, or you must document how waste streams will be handled on site so that the same result is achieved. That is, a maximum 20% of waste generated may end up as landfill.

Part A elicits the following information:

- Name and contact details for the person responsible for managing waste on site?
- Main construction materials to be used on site, and the estimated quantities of waste associated with each.
- Targets for the reduction of these waste quantities. This might be achieved through careful handling and storage of materials on site before they are to be used (e.g. careful protection of materials from damage due to weather or the carelessness of other tradespeople on site).
- A list of materials that can be reused or repurposed on site. (e.g. Excess wet-mix concrete might be cast into modular paving slabs for later use. Or it could be poured quite thin, then broken up and used as a pavement sub-base or drainage medium).
- A description of how waste will be handled on site, where it will be stored to prevent soil contamination, and how it will be protected to preserve its condition as suitable for recycling by your waste contractor.
- End destinations for each waste stream.
- Measures that will be taken to inform all tradespeople on site (including sub-contractors) of the waste minimisation objectives and requirements under this SWMP.
- Silt management strategies to be employed on site as required (see Part 3 of this Guide for more information).
- Measures to be taken to maintain good access for vehicles required on site.
- Measures to be taken to dispose responsibly of consumables on site (e.g. assorted building product packaging and strapping, site workers' drink bottles and fast food wrappers, etc.)

Part B of the Plan details site and silt management strategies to be employed on site. This section must also include detailed tree protection measures that will be undertaken to prevent damage to existing protected trees. Show the extent and location of temporary fencing that will be erected referring to the Tree Protection Guide on the Mullum Creek website (<http://mullumcreek.com.au/app/uploads/2016/04/Tree-Protection-Zone-Guide-.pdf>)

Disclaimer

While considerable effort has been made to ensure the accuracy of the information provided in this Site and Waste Management Guide, neither Mullum Creek nor the author accept liability for any consequences arising from reliance on the information published. If you have doubts about acting on any of the information, please seek independent professional advice.

¹² Mobius Materials Recovery Phone: 03 8756 0400 Email: admin@mobiusmr.com.au

Mullum Creek Site and Waste Management Plan

Site address:

Owner(s) name:

Designer's name:

Contractor's name:

Contractor's telephone number:

Contractor's email:

Contractor's address:

Construction commencement date:

Expected construction completion date:

Lot size (m²):

Constructed floor space / building size (m²):

Person responsible for construction waste and site management:

Contact mobile number:

Contact email:

Goals and objectives for waste avoidance or reduction:

- Prioritise waste reduction.
- Prefer suppliers who have waste minimisation and environmental plans and credentials.
- Use materials and products that are low maintenance.
- Use salvaged / second hand materials where practicable.
- Prefer prefabricated materials and materials prepared off site.
- Schedule works to minimise time between delivery and installation.
- Establish a dedicated waste area on site that is clearly signposted and well maintained.
- Provide detailed instructions outlining waste handling strategies to staff and subcontractors.
- Build with a view to dismantling of materials and products at the end of the building's service life.

Mullum Creek Site and Waste Management Plan

Part A: WASTE MANAGEMENT



I will employ the services of a specialist waste recovery firm to manage all waste produced on site.*

Company name: _____

Contact: _____

Phone / email: _____

* This firm must recycle/reclaim minimum 80% of all construction and site waste. Mullum Creek knows of two reputable materials recovery specialists that operate in Donvale. Should you choose another firm, the DRC will be keen to consider it for inclusion in its list of recommended materials recovery specialists.

(i) Mobius Materials Recovery Phone: 03 8756 0400 Email: admin@mobiusmr.com.au

(ii) Konstruct Recycling Phone: 1300 555 787 Email: simon.france@bingoindustries.com.au

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Or



I will ensure that maximum 20% of all waste generated on site ends up in landfill sites.

If you choose this option, you must complete the following **Waste Minimisation Record** to propose and then log how this is achieved.

Mullum Creek Site and Waste Management Plan

WASTE MINIMISATION RECORD Analysis of the proposed job site waste to be generated, including reusable, recyclable and waste materials (by volume or weight).

MATERIAL	Normal % waste	Target % waste	On-site recycling method or reuse	Waste destination – contacts and information	Actual quantity reused or recycled	Actual % sent to landfill	Actual cost or saving (optional)
Metals							
aluminium							
steel							
copper							
other metals							
TOTAL							
Concrete & Masonry							
concrete							
clay bricks							
terracotta & ceramics							
other							
TOTAL							
Plasterboard							
TOTAL							
Plastics							
uPVC pipe							
HDPE pipe							
plastic film/sheeting							
spent silicon, gap filler tubes, etc.							
other							

Mullum Creek Site and Waste Management Plan

MATERIAL	Normal % waste	Target % waste	On-site recycling method or reuse	Waste destination – contacts and information	Actual quantity reused or recycled	Actual % sent to landfill	Actual cost or saving (optional)
TOTAL							
Timber							
sawn treated							
sawn untreated							
engineered							
composite							
TOTAL							
Soil							
TOTAL							
Fixings & Fastenings							
TOTAL							
Miscellaneous							
cardboard and paper							
glass							
organic material							
paint							
insulation							
polystyrene							
vegetation							
other							
TOTAL							

**Dark red text above refers to material that must not end up in landfill, and instead must be reused or recycled.*

Mullum Creek Site and Waste Management Plan

Please attach a site map showing:

- land slope,
- extent (footprint) of proposed building,
- proposed skip/bin location,
- extent of temporary fencing around site.

Skip/bin contractor (name and contact details): _____

Anticipated volume of rubbish: _____

Types and size of skips/bins to be used: _____

Part B: SITE MANAGEMENT

Please attach a site map showing:

- proposed position of topsoil stockpile (if foreseen) and associated silt management fencing where needed.
- proposed vehicle access and hardstand areas.

If road base* is to be spread to enable vehicular access in areas other than eventual driveway or hardstand areas, document the proposed method for forming and surfacing temporary driveways and hardstand areas for construction vehicles on site, and for repatriation of these areas at the end of construction (see Section 5 of the Site and Waste Management Guide).

* It is a requirement that recycled aggregate of crushed concrete and/or bricks be used for temporary road base in lieu of virgin crushed rock.