

# WESTERN AUSTRALIAN LOCAL GOVERNMENT USE OF RECYCLED CONSTRUCTION AND DEMOLITION MATERIALS

## INTRODUCTION AND BACKGROUND

Recycling construction and demolition materials minimises the energy associated with manufacturing virgin building supplies and the waste accumulated from the construction, refurbishment and demolition industries.

The Department of Environment and Conservation has developed Guidelines for managing asbestos at construction and demolition (C&D) waste recycling facilities. In response to these Guidelines, the Municipal Waste Advisory Council (MWAC) for the Western Australian Local Government Association (WALGA) prepared a Submission detailing additional information to be considered. The Submission commented on behalf of Local Government, which is primarily concerned with these guidelines as potential customers of C&D recyclers and in using these recycled waste materials from its own sources.

This Report has been developed in addition to the Submission to present to MWAC details of current use of C&D materials by Local Governments to inform advocacy efforts.

## CONSULTATION METHODOLOGY

In January 2013 WALGA surveyed Local Government and Regional Councils to determine which Local Governments were currently using recycled C&D materials. The survey developed was informal and minimally structured to allow respondents to provide information as they saw relevant.

The survey asked respondents to indicate whether or not recycled C&D materials were used by their Local Government. If recycled materials were currently or previously used, respondents were asked to specify:

- Where the materials were sourced;
- What sort of materials were used; and
- What areas were the materials used in.

If recycled C&D materials were not used in the respondent's Local Government, the survey requested details of:

- What were the barriers to using these materials.

Survey respondents were also encouraged to include any comments or concerns regarding recycled C&D material processing and use.

## CONSULTATION RESULTS

WALGA contacted 116 metropolitan and non-metropolitan Local Governments and six Regional Councils. 42 representatives provided responses to the survey. The range of respondents included 17 metropolitan, 24 non-metropolitan Local Governments and one Regional Council (see **Error! Reference source not found.** for the full list).

Survey Respondents			
Metropolitan Local Governments			
Vincent	Cambridge	Mundaring	Gosnells
Melville	Belmont	Cockburn	Perth
Swan	Wanneroo	Kwinana	Cottesloe
Kalamunda	South Perth	Rockingham	Stirling
Fremantle			
Non-Metropolitan Local Governments			
Shark Bay	Manjimup	Bruce Rock	Wagin
Pingelly	Wyndham East Kimberley	Irwin	Geraldton
Koorda	Narrogin (Shire)	Bridgetown	Kalgoorlie-Boulder
York	Woodanilling	Dundas	Murray
Broome	Warooka	Merredin	West Arthur
Kondinin	Derby/West Kimberley	Broomehill-Tambellup	Ravensthorpe
Regional Councils			
Eastern Metropolitan Regional Council			

**Table 1: List of C&D Survey Respondents**

15 respondents indicated C&D materials were used while 26 responded that they did not use recycled C&D materials. One respondent did not provide a response.

58% of metropolitan Local Governments respondents used recycled C&D materials, while only 20% of non-metropolitan Local Governments respondents used these materials. **Error! Reference source not found.** shows the number of users of recycled C&D material within metropolitan and non-metropolitan Local Government and Regional Council catchment areas.

Zone	Uses recycled C&D	Does not use recycled C&D	No response
Metropolitan	10	6	1
Non-metropolitan	4	20	0
Regional Councils	1	0	0

**Table 2: Local Government use of C&D Materials**

## Using Recycled Construction and Demolition Materials

The Local Governments and Regional Councils that used recycled C&D materials sourced these materials from several different suppliers. These suppliers fall under three categories:

- Local, small-scale suppliers
- Specialised wide-servicing companies (e.g.: All Earth, Capital Demolition)
- Local Government generated and stored.

Survey results indicated that the most commonly utilised material is crushed concrete sourced from road base, footpaths, kerbing and slabs. Stone road base, asphalt, bricks and sand are also widely used. These materials are reused in a range of projects including:

- Road construction and extension
- Road subbase
- Verge and kerbing construction
- Cycle paths/ shared paths
- Car park construction
- Leech drainage works
- Land contouring and restoration.

Comments throughout the survey indicated that recycled C&D materials are effective alternatives to new products. Several respondents specified crushed concrete was an appropriate material for road subbase as well as cycle/shared pathway development.

*“The City has successfully recycled [C&D materials]... on an extensive cycle only pathway on Sir James Mitchell Park [and] on a number of right of way (laneway) constructions and to date have been very satisfied with the outcome.”*

*“The City's experience with recycled concrete road base material is that it can be easily worked and compacted. It produces smooth surface finish ready for kerbing and asphalt.”*

Respondents also approved of these materials as a cost effective choice.

*“Broken rubble of suitable size is used in and around leech drains as a cost effective replacement for aggregate (expensive stuff).”*

Comments throughout the survey also highlighted some disadvantages to working with recycled C&D materials.

*“Crushed concrete road base material appears to be superior to crush rock road base in strength and compactability. One problem is that [crushed concrete] tends to form large shrinkage cracks about 4m apart because it has a high cohesive (tensile) strength. This is overcome by rolling it again to form "micro-cracks" before it is asphalt surfaced. Another problem is that it has to be worked with a uniform and exact moisture content which means that only large areas can be properly constructed and worked.”*

*“The City experienced difficulties when using C&D on "minor works" as the product does require considerable attention to ensure moisture content is right.”*

*“The only disadvantage with recycled concrete road base material is that it required additional water than limestone or rock base to bind the material. Recycled concrete road*

*base material should only be used in dry conditions as it is difficult to maintain shape and/or compaction once the material is saturated."*

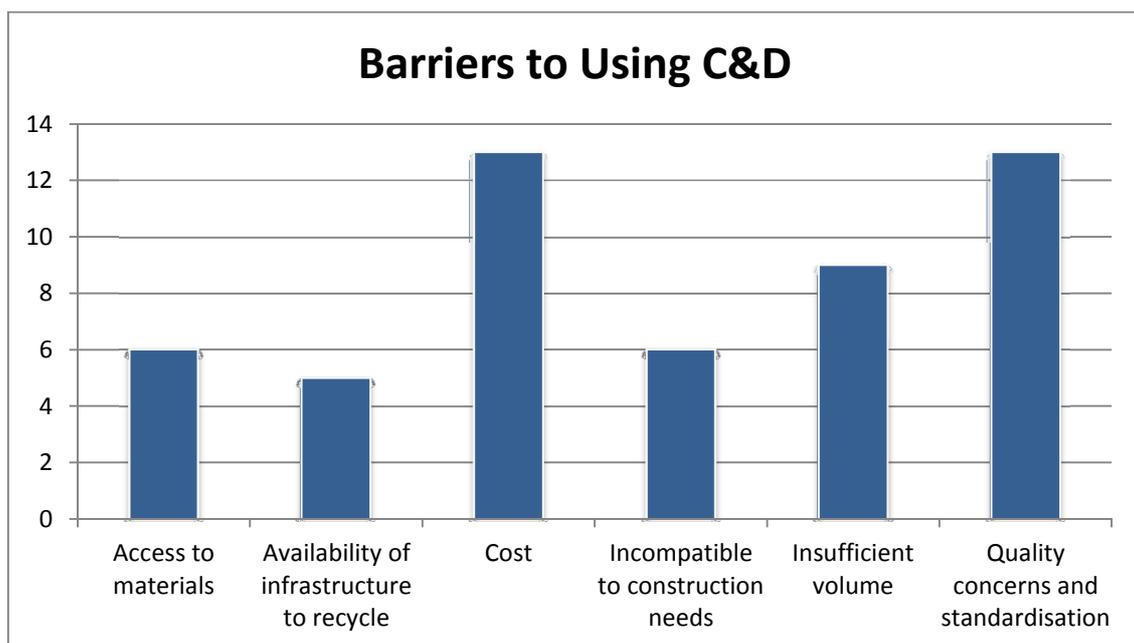
In some conditions, recycled C&D materials were found to not produce satisfactory results.

*"Used once on a cycle path but was not too happy on the quality due to contaminants e.g. wood particles, making it difficult for compaction."*

*"The City also used the "recycled sand" as backfill material but has stopped this practice as the material contained a high proportion of -3mm +1mm "rock" that caused "concern" with property owners maintaining the street lawns."*

### **Barriers to Using Recycled Construction and Demolition Materials**

Of the 42 survey respondents, 42% of metropolitan and 80% of non-metropolitan Local Governments did not use recycled C&D materials. Both users and non-users of recycled materials drew attention to a range of barriers that limited or prevented their integration into infrastructure development (see Figure 1). The most commonly cited barriers to using recycled C&D materials are cost (13) and quality standards (13). The second most common barrier is insufficient volume of recycled materials (9).



**Figure 1: Barriers to using C&D Materials**

#### **Cost**

Survey responses concerned with financial impediments to using recycled C&D materials can be categorised within two themes: competitive market prices and cost of developing local infrastructure to recycle materials.

*"The costs associated with [C&D] materials were exceeding Swan's costs being paid for natural materials used."*

*“Crushing costs as opposed to available materials.”*

*“The purchase of limestone still remains competitive in price.”*

*“The cost of the initial purchase of equipment plus labour cost may not make this a feasible option for small Local Governments.”*

*“Would not be in a position to finance the setup of crushing, screening, etc. plant required.”*

### **Quality concerns and standardisation**

Survey responses indicated a need for clear standardisation of recycled material quality. Comments suggested that guidelines of acceptable testing procedures and accreditation would be beneficial for ensuring materials met industry specifications. Several survey respondents specified that long-term testing to demonstrate materials as suitable for use in essential infrastructure, particularly roads, were necessary.

*“There were no comprehensive test results promoting [recycled] materials as suitable road building materials.”*

*“Need test results over a duration of time to ensure road will not fail. When test results have been successful we need data and design specifications.”*

*“The current barriers to using C&D material are the uncertainty regarding specifications for all classes of C&D materials and knowing who are the approved materials testing laboratories with approved testing procedures accreditation as a NATA laboratory to ensure construction creditability is achieved to provide a road with a known expectancy and life cycle.”*

Asbestos contamination in particular was a priority concern.

*“Need to be aware that asbestos contamination is a very real risk.”*

### **Insufficient volume**

For some Local Governments, there has not been an adequate supply of C&D waste to present it as a viable alternative to new products.

*“There is very little suitable material deposited at the Shire's refuse site so at this stage none is used.”*

*“There is uncertainty regarding the continuous supply of the material to the agreed specified standard for road construction.”*

*“The Shire doesn't receive adequate levels of C&D waste to warrant the plant needed to process it to an adequate level.”*

### **Access to materials**

Survey responses from some non-metropolitan governments indicated that having to transport recycled C&D materials is also a deterrent to substituting new products that can be sourced local to construction sites.

*"[The Shire] can source materials closer to the remote locations where most of the road construction jobs are."*

*"Transporting materials to site versus utilising materials from local pits."*

*"There is none available within a close proximity."*

### ***Incompatibility with construction needs***

Some survey respondents indicated that the recycled C&D materials available for use were inappropriate for majority of projects undertaken in the catchment area. Responses may be categorised under two themes: wrong product or product does not meet project specification requirements.

*"Most of [the City's] construction work is rehabilitation using a wet mixing process where additional material is added to the existing, which is generally gravel. To add a different material to this process would not produce a homogenous pavement."*

*"The Town crushed limestone for constructing small road works projects. These small projects are difficult to do with crushed rock or crushed concrete because of the issues achieving uniform moisture content for compaction, risk of over wetting, risk of stones being flicked up by traffic, and rain affecting the works. The crushed limestone has none of these problems."*

*"Minimal use within the City as the majority of road rehabilitation work consists of treatment using bituminous concrete."*

### ***Availability of recycling infrastructure***

Some survey respondents, particularly from non-metropolitan government, do not have access to infrastructure to stockpile and process C&D waste. In some cases, their catchment areas did not produce enough waste to justify the cost of developing processing infrastructure.

*"The cost of the initial purchase of equipment plus labour cost may not make this a feasible option for small Local Governments."*

One respondent noted that there was limited space to stockpile C&D material.

*"The site the Shire is operating within is coming to a close and the space available to stockpile and process the material for reuse is limited, therefore the waste is being landfilled."*

For one respondent, a growing quantity of C&D waste could be processed if there were alternative processing infrastructure available.

*“The Shire’s Transfer Station has a large quantity of C&D material which will only continue to grow. A mobile crushing unit would perhaps overcome this.”*

## **Future Use of Construction and Demolition Materials**

Despite a relatively low number of Local Governments within the survey sample currently use recycled C&D materials, many respondents presented ideas for minimising the currently faced as well as plans for future use.

Several Local Governments surveyed are currently planning or carrying out processing testing, as well as trialling different materials to fit project needs.

*“Currently the Shire doesn’t use recycled C&D but this is about to change; at the moment they are looking into costing of crushing all the Shire’s concrete and bricks at the tip to use as decorative fill in areas around [the] town site.”*

*“[The City] are planning on undertaking some preliminary analysis on the possibility of crushing their C&D waste at their landfill to use on their roads. This will most likely be done next [financial year], when [the City] will have the budget to crush a small amount of material to be used as a trial.”*

*“Consider using it down ‘on the flat lands’ as subgrade or subbase materials vary from soft sands to swampy areas. [Recycled materials are] ideal for subgrade or subbase in swampy areas.”*

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Survey respondents also presented ideas for minimising barriers to incorporating recycled materials into local projects. Some respondents suggested that a lack of information regarding opportunities for waste processing and integration was a significant deterrent to substituting new products. Respondents suggested that the option of using recycled C&D materials needed to be better communicated to the community and construction industry, as well as to Local Government representatives.

*“There is a broad lack of knowledge and information for all parties to drive the growth of this C&D material recovery recycling and reuse.”*

*“Some education at elected member forums about the possibility of using the material.”*

*“The concept of using recycled C&D materials need to be better communicated using all media and communication patterns and avenues... to ensure all know of the system changes, practices and procedures for the reuse to happen within a controlled environment for beneficial outcomes.”*

## **Conclusion**

Recycling C&D materials is essential to minimising the waste amassed from construction, refurbishment and demolition industries. Survey responses by Local Governments indicate that these recycled materials make up only a small portion of materials currently used in Local Government projects. Comments specified that concerns relating to costs and quality standardisation are the most common barriers to reusing C&D waste.

Responses indicate that developing quality guidelines for recycled materials based on industry specifications is necessary to improve integration of these materials in community and industry infrastructure developments. Survey results suggested that these guidelines should be readily accessible to community and industry stakeholders in order to change current models of C&D material recovery, recycling and reuse.