



porirua city

Construction and Demolition Waste Minimisation

Report 8 – Consolidated Report

June 2021

Document status

Job #	Version	Approving Director	Date
2613	Draft V1	Alice Grace	18 June 2021

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1 Report summary

Porirua City Council (PCC), and its partners (Kāinga Ora, Hutt City Council (HCC) and Kapiti Coast District Council (KCDC)) are seeking to put forward a business case to utilise, repurpose and sell resources arising from construction and demolition activities in the region. To inform the business case, seven reports have been commissioned (Figure 1), ultimately culminating in one consolidated report (Report 8). This is Report 8, the Consolidated Report, the purpose of which is to provide an executive summary which may be read alone or in conjunction with the other reports.

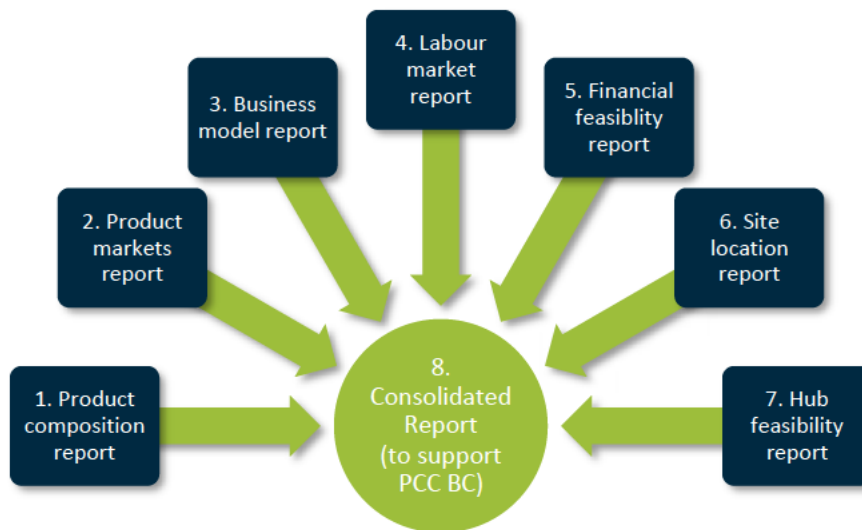


Figure 1 Report structure to inform the business case

1.1 Material composition

Analysis of material composition and quantities took into consideration SWAP data analyses and limited data available from industry. Table 1 summarises the percentages and categories adopted for analysis. The following key areas of uncertainty were encountered:

- Inconsistent categorisation of material. For example rubble, hardfill and cleanfill are used interchangeably with no definition of what each contains.
 - Plasterboard in particular falls into each to an unknown extent
- Limited quantities of steel are measured in Council's own data, indicating diversion prior to waste arriving at the landfills and transfer stations. Conversely, industry data indicated a relatively high percentage, this is assumed to be a result of the fact the industry data is collected for the purpose of eco rating on new builds and therefore it is desirable to capture and record all diverted tonnage.
- Categorisation of timber as treated versus untreated indicates a very high proportion of treated material which is likely due to the unacceptable risk of incorrect categorisation.
- Lack of distinction in any data available between material arising from construction or demolition related activities and therefore, no reliable data regarding the quality of material.

Table 1 Adopted C&D material composition (% by weight)

Material type	Adopted percentage composition
Cardboard	4%
Glass	1%
Hardfill	15%
Plasterboard	5%
Plastic	2%
Ferrous metal	18%
Non-ferrous metals	1%
Timber – treated	32%
Timber – untreated	2%
General waste	20%

1.2 Product markets

The material categorisations adopted from Report 1 were assessed for proximity, capacity, and reliability of product cycles. The term product cycle is used to reflect the fact that the waste hierarchy favours reuse over downcycling and certainly over disposal.

Table 2 summarises the outcomes of this assessment. Native timber and salvageable fixtures were also investigated, and the conclusion was that existing salvage companies meet the demand for diversion of these materials.

Treated timber and plasterboard present the greatest risks. The only known end use for treated timber domestically is incineration for energy at Golden Bay Cement in Whangarei. Despite its assumed capacity to receive material, the cost of transport from the lower North Island is high.

There is no local processing capability for plasterboard, furthermore, the ability for agricultural markets to receive processed gypsum are prone to saturation and the initiative of ‘plasterboard to plasterboard’ is not established.

While product cycles for metals are available, commercial operations for collection and reprocessing are well established. The ability for a new C&D facility to command any processing fee would be dependent on the nature of the customer and would need to be carefully managed; for example, those seeking an eco-label for a new build or to demonstrate diversion targets in the case of Kāinga Ora.

Discussion with industry indicates capacity for acceptance and processing of flat glass to various products including insulation, and hardfill for crushing to use as fill material. The key constraints for these, which is the same as those for plastics and cardboard, is management of contamination, material quality and guaranteed supply.

Table 2 Product cycle proximity, capacity, and reliability

Key: Red = Restricted, yellow = limiting, green = available

C&D material	Processing or market proximity	Anticipated capacity	Reliability
Timber (untreated)	Green	Green	Green
Timber (treated)	Red	Green	Yellow
Timber (native)	Green	Green	Green
Hardfill	Green	Green	Yellow
Plaster board	Red	Red	Red
Flat glass	Red	Green	Green
Metals (ferrous and non-Ferrous)	Green	Green	Green
Paper, cardboard	Green	Green	Yellow
Plastics	Yellow	Yellow	Red
Salvageable fixtures	Green	Red	Red

1.3 Business Model

Three business models, small, medium and large, were investigated and took an iterative process as various outputs of the other reports became available. For example, the conclusions of Report 6 and 7 Site Location and Hub Feasibility were required to refine the specific details of the operations.

The small, medium and large-scale models each have relative advantages and disadvantages. Table 3 provides a comparison against the considerations assessed.

Ultimately it was considered that regardless of the scale of the operation it is the relationship between the owning entity and the operator of any facility that influences complexity in a business model. For example, the more parties there are to a formalised joint venture, the greater the opportunity for risk sharing, and conversely the greater the demand on governance and management.

Table 3 Comparison of model considerations

Key: Red = Restricted, yellow = limiting, green = No restrictions

Consideration	Small scale entity: each council alone	Medium scale entity: coordinated network	Large scale entity: specialised waste sorting facility
Range of materials accepted:	Yellow	Green	Green

Consideration	Small scale entity: each council alone	Medium scale entity: coordinated network	Large scale entity: specialised waste sorting facility
Capacity:	Red	Yellow	Green
Users of the facility:	Red	Yellow	Green
Ownership of the facility:	Green	Yellow	Red
Operation of the facility:	Green	Yellow	Red
Targeted markets for end products:	Red	Yellow	Yellow
Diversion:	Red	Yellow	Green
Ability to expand or adapt:	Red	Yellow	Yellow

1.4 Labour market

A broad range of skills are required to deliver a C&D waste diversion operation. The entire suite of skills describes a fully resourced, commercial enterprise with varying degrees of commitment in skill areas from labour and administration through to management and machine operation. Highly skilled commercial management expertise is found in the private sector and an engaged workforce is required to effectively deliver the diversion outcomes sought.

Waste minimisation is an area receiving increasing public attention and is underpinned by a sense of responsibility to the environment. Feedback from recruitment agencies is that the workforce is generally motivated and drawn to employment where there is an ability to make a positive impact. Such is the case for employment in a waste diversion facility and therefore, it is possible that the workforce will come via the environmental sector rather than the construction and freight sectors which are traditionally targeted by the waste industry.

Working with the local Skills Hub initiative to promote the waste sector and the C&D diversion operation has the potential to attract a range of labour resources who are engaged in the waste and environmental industries. This may help to off-set the risk of not being able to attract the resources required for the operation because of the significant labour shortage being experienced throughout New Zealand.

1.5 Financial feasibility

The medium sized option is considered the preferred option from a financial perspective as it offers potentially positive cash flows, while minimising the downside risk of being unable to find end markets for high-risk materials such as treated timber.

This result reflects the balance between scale and cost. The costs of running a medium scale facility are only marginally higher than those required to run a small-scale facility, however the increase in volumes improves the overall viability of the model.

A large facility, on the other hand, requires the acquisition of more land, which is accompanied with lease costs as well as potential additional consenting and compliance costs to enable waste operations. While there is a large uplift in volumes processed, the volume uplift is not sufficient to offset the increase in costs that comes with scale.

1.6 Site location

Investigation into possible locations for establishing a C&D facility identified opportunities and constraints within the study area (defined as the local authority boundaries of Porirua City Council, Hutt City Council and Kāpiti Coast District Council). It also delved into greater detail across six sites which included the Spicer, 9(2)(b)(ii) and 9(2)(b) sites along with privately owned sites.

The most favourable site for the establishment of a C&D waste processing facility based off the analysis undertaken in Report 6 is 9(2)(b)(ii). This conclusion was drawn for the following reasons:

- The site is vacant
- It is of an appropriate size
- Zoning is appropriate
- Access is acceptable

Although this site is advertised for lease, the aspirations of the owner in terms of the type of operation they would consider leasing the site for are unknown from this desktop assessment.

Whilst resource consents would need to be obtained for the site, it is considered that this would be a relatively straight forward given the zoning and lack of sensitive features. It was also determined that 220 Otaihanga Road and the Silverstream landfill would be appropriate to act as 'satellite sites' which could feed to a larger, main site given the constrained size of available areas and competing land uses.

Detailed planning assessment of the Spicer Landfill site was undertaken as part of Report 7 and concluded that, while constrained and not featuring all the favourable elements of the 9(2)(b)(ii) location, development of a smaller scale facility is possible on that site. Furthermore, the Spicer site possesses the advantage of being Council owned and consented for waste handling activities. No site with that advantage combined with the size, access and vacancy advantages of the 9(2)(b)(ii) site was identified within the study area.

The conclusion of this assessment, together with that of the hub feasibility assessment (Report 7), resulted in the small model considering use of the Spicer site only, the medium model considering use of the Spicer site together with the 9(2)(b)(ii) and 9(2)(b) sites. The large model then considered use of a stand-alone large site such as that at 9(2)(b) which would require acquisition or lease of land.

1.7 Hub feasibility

The Hub Feasibility Report informs the opportunities available to PCC for the relocation of their existing transfer station to the current site occupied by Trash Palace at the front of the Spicer Landfill facility. The relocation of the transfer station to that site is linked to the development of a C&D facility as, if a Resource Recovery Hub were deemed feasible, it would make space available for a C&D operation on the Spicer site.

Though commissioned independently of Report 1 to 6, the outcomes of Report 7 are relevant as they demonstrate at a high level the following:

- A Resource Recovery Hub facility may be established at the current Trash Palace site that delivers at least the level of service available at the current transfer station facility inclusive of bespoke resource recovery initiatives.
- Relocation of the transfer station will enable commercial customers for Spicer Landfill and the C&D facility to have dedicated access, separated from domestic customers using the new Resource

Recovery Hub.

- The space made available by the relocation of the transfer station facilitates, enables development of an adaptable C&D facility as described by the Medium Scale Model on the Spicer Landfill site.

2 Risks and mitigation opportunities

Table 4 summarises the risks identified in the research undertaken to establish Reports 1 to 7. Possible mitigations strategies are intended to facilitate an understanding for the best way to proceed and inform a pragmatic risk allocation approach between the parties to any partnership including capital and operational commitments.

Table 4 Risks and mitigation opportunities

Risk	Possible mitigation
Lack of data results in:	
Fewer tonnes than expected	<ul style="list-style-type: none"> • Establish a known programme initially, for example with Kāinga Ora. • Set gate rate to the same value as landfill disposal rate.
Greater tonnes than expected	<ul style="list-style-type: none"> • Expand operation to HCC or KCDC sites earlier if necessary
Incorrect tonnage assumption results in:	
Processing equipment sized too large	<ul style="list-style-type: none"> • Lease equipment in the first instance until tonnage is certain. • Establish a known programme • Opt for smaller or lower tech in the first instance and scale up if necessary
Processing equipment sized too small	<ul style="list-style-type: none"> • Lease equipment in the first instance until tonnage is certain. • Establish a known programme. • Scale up if necessary • Move small equipment to ancillary site
Processing area and covered storage too large	<ul style="list-style-type: none"> • Opt for a flexible building arrangement in the first instance • Look for alternative uses of the area
Processing area and covered storage too small	<ul style="list-style-type: none"> • Opt for a flexible building arrangement in the first instance • Scale up and expand operation to HCC or KCDC sites if appropriate
Markets are unavailable because:	
Insufficient volume	<ul style="list-style-type: none"> • Work with the market to understand the volume required and target that material from other sources.

Risk	Possible mitigation
Poor quality product	<ul style="list-style-type: none"> Understand the quality requirements required for the product to be accepted and establish a handling system to achieve this.
Market is not established	<ul style="list-style-type: none"> Material is sent to landfill until a product cycle is established through developing specifications, affecting change to building and product stewardship practices and encouraging public infrastructure builds to establish uses for materials.
Private operation is set up in competition	<ul style="list-style-type: none"> Allow procurement for the C&D facility to be flexible enough to shift operation and the MfE/PCC/partner investment to a commercial site. For example, the large-scale model where the facility has the ability to process more than just C&D material.
Availability of funding is restrictive, or timing is wrong	<ul style="list-style-type: none"> Establish a project plan that includes for go/no go situations or decisions to be made. For example, the above situation where the private market is looking to establish and funding can be directed to an alternative site.

3 Conclusion

The inputs required to inform investment in a C&D operation are multifaceted and there are several key areas of uncertainty specifically:

- Unknown material quantities and composition
- Unstable or unavailable product cycles for materials

While the degree of uncertainty is not ideal, there are opportunities available to allow management of this uncertainty to facilitate progress.

Council and its partners can positively impact the capability and capacity for C&D waste diversion in the wider Wellington Region if a pragmatic, planned approach is taken. Specifically with consideration of the following:

- Leverage of Kāinga Ora’s known works programmes for site clearance and development
- Establishing constraints and removal of these for acceptance of material into product cycles
- Staged development of any operation to facilitate expansion or reduction if necessary