Porirua City Council

Spicer Landfill: Resource Recovery Hub Feasibility

04 June 2021

The Power of Commitment

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1. Introduction

Several large-scale housing redevelopment and construction projects are occurring in Porirua City. It is anticipated that significant amounts of construction and demolition material will be generated from these development activities. Porirua City Council (PCC) and its partners (Kāinga Ora, Hutt City Council (HCC) and Kāpiti Coast District Council (KCDC)) are seeking to put forward a business case to utilise, repurpose and sell resources that may otherwise be landfilled. PCC will prepare the business case, with Morrison Low in partnership with GHD (the consultants) providing professional advice.

As part of this project, PCC wish to understand how the Spicer Landfill site could be used to accommodate a construction demolition waste facility and repurpose the public recycling and waste transfer station features.

This report assesses the suitability of Spicer Landfill for the establishment of a Resource Recovery Hub (RRH) which would include:

- A commercial Construction and Demolition (C&D) waste processing facility; and
- A new public Waste Transfer Station (WTS) which includes, a range of waste handling services for domestic customers.

1.1 Scope

This report seeks to:

- Provide a concept-level site layout and proposed rearrangement of existing site functions to incorporate C&D waste processing facilities, and a new public WTS facility.
- Identify site demolition, extension and engineering (earthworks and development) requirements
- Provide concept drawings identifying infrastructure requirements and transport layout options
- Continue to provide for landfill access, transport and waste handling requirements (e.g. loading/unloading, storage, B-train access)
- Outline the likely resource consent requirements

1.2 Limitations

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The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

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Porirua City Council's Vision

"The project aims to support establishing a commercially viable social enterprise in Eastern Porirua. The project has the potential to deliver a range of environmental, employment, training, and community wealth building benefits"

Project Objectives

- Diverting high volumes of C&D materials from Spicer landfill
- Reducing the need to build another costly landfill cell in the short term, extending the life of the landfill
- Supporting the city and region's waste minimisation target to reduce waste going to landfill by 200 kg/person/year by 2026. Current amounts are over 600 kg/person/year and rising.
- Delivering carbon emission mitigation benefits by reducing landfill emissions
- Creating new construction and building education and training pathways for young people not currently in employment, education and training (NEETs)
- Growing community wealth and wellbeing, aligning with Kainga Ora's regeneration objectives for Eastern Porirua.

2. Spicer Landfill

Spicer Landfill is a Class 1 Landfill and is the primary waste repository for the Porirua district. Spicer Landfill is jointly owned by Porirua City Council (78.5%) and Wellington City Council (21.5%), with the oversight and management being provided by Porirua City Council (PCC). EnviroWaste Services Limited is contracted by PCC for the daily operations and management of the site.

Access to Spicer Landfill is via Broken Hill Road. The publicly accessible northern parts of the landfill site incorporate a Waste Transfer Station (WTS) and the 'Trash Palace' Recycling Store, in what is known as the 'bottom end' of the site. The location of these site facilities is shown on Figure 2.1 with site features and details provided in Table 2.1.

Table 2.1 Site details

Feature	Commentary
Address:	Broken Hill Road, Kenepuru
Legal Description:	Lot 1 DP 52949, Lot 1 DP 77503, Section 409 Porirua DIST, Section 1 SO 304101, Section 2 SO 304101
Site Area:	60,5770 hectares
Zoning:	Operative District Plan: Rural Zone Designation K1052 (Refuse Disposal, Landfill -including landfill, recycling, refuse transfer station and resource recovery) Proposed District Plan: Rural Zone, Open Space Zone, General Industrial Zone Designation PCC-23 Spicer Landfill
Overlays:	Landscape protection Flood Hazard - Stream Corridor Flood Hazard - Ponding Ohariu Fault Rupture Zone
Current use:	Landfill, waste transfer station and Trash Palace

Figure 2.1 Spicer Landfill Features

2.1 Spicer Landfill Development Opportunities

Spicer Landfill (Spicer) is identified as infrastructure of regional importance. The landfill is a critical component of Wellington Region's waste network and currently provides for an essential community service to Porirua City and the wider region. Spicer is strategically located close to State Highway 1 and the proposed Transmission Gully Kenepuru interchange. This provides good linkages to CentrePort and north to Kāpiti Coast. Furthermore, the landfill is also located near Cannons Creek and the Kāinga Ora Housing site clearance and redevelopment project.

Good accessibility also provides the ability to use Spicer as a central resource recovery hub with 'feeder' recovery hubs located within PCC's partner districts. Further advantages of co-locating a Construction and Demolition (C&D) waste processing facility and Resource Recovery Hub (RRH) at Spicer include:

1. Advantages and logistical benefits associated with the use of existing waste transport corridors.
2. Direct access to the tip-face for the disposal of waste that cannot be recycled through the hub.

2.2 Consenting Opportunities

The site is designated for "Refuse Disposal, Landfill - including landfill, recycling, refuse transfer station and resource recovery" which reduces the need to apply for district level resource consents for the land use. The site is used for refuse disposal and recovery activities and so the use is already established within the environment. Further, the site's topography (being located in a 'basin') assists with providing dust and noise mitigation. This is essential when considering the effects that activities such as crushing concrete, aggregate and gypsum, chipping wood waste and processing steel and glass might have in terms of dust generation and noise levels.

The resource recovery facility concept plan further attempts to beneficially utilise existing paved areas and associated surface water management and treatment systems. Hence, there is an opportunity to utilise or adapt existing regional resource consents in relation to the assessment and control of potential water, air and noise impacts.

The location of the site at the end of Broken Hill Road also limits traffic effects in terms of passing sensitive landuses. A planning assessment is provided in Section 5.

3. Realising the Resource Recovery Hub Concept Plan

The Resource Recovery Hub concept plan includes the following features which have been realised through a series of workshops with the project partners, review of the city's SWAP [1]data[2], and data from 'Report 1 – Material Composition'[3]:

- Relocation of the public WTS to the bottom site entrance area to provide further separation between public access areas and operational areas of the landfill and proposed C&D facility.
- Development of the C&D facility within the current WTS site.
- Redevelopment of the lower area to accommodate a new, best practice WTS.
- Realignment of internal roads to separate commercial and public traffic.

3.1 Waste Transfer Station Data

In February 2020, "Organic Wealth" conducted a waste audit at Spicer Landfill[4]:, which included an assessment of waste materials received at the Tip-Head and at the existing Waste Transfer Station (WTS).

From that assessment it was found that the WTS receives public and non-routine commercial wastes, and in the week of the audit, 168 vehicle loads were assessed over a (Monday-Saturday) 6-day period. The summary results for wastes received into the WTS are re-produced and further adapted from the Organic Wealth report in Table 3.1 below. It is important to note that the data presented in Table 3.1 is exclusive of:

- Self-segregated recyclable wastes dropped off by the public into the recycling bins located at the landfill entrance, including:
  - paper
  - cardboard
  - glass bottles and jars (green, clear & brown)
  - cans (aluminium and steel)
  - clean rags
- Green-waste that may have been dropped directly to the green-waste receiving area and not the WTS push-pit (i.e. the green-waste received at the WTS and included in Table 3.1 is likely co-mingled or otherwise unsuitable for green-waste processing, perhaps due to invasive weed content or it being unsuitable for mulching).

[1] Solid Waste Analysis Protocol
[2] Porirua City Waste Audit Report, Organic Wealth, February 2020
[3] Construction and Demolition Waste Minimisation, Report 1 – Materials Composition, April 2021
[4] Porirua City Waste Audit Report, Organic Wealth, February 2020

Table 3.1 Organic Wealth Waste Audit - WTS

Refuse Transfer Station (only) Waste Stream Type	% of Waste (by weight)	Tonnes (T) Per Week	Tonnes (T) Per Year	Assumed density at WTS kg/m³	Volume (m³) Per Week	Volume (m³) Per Year	% of Waste (by volume)	Potential Diversion - Recycling (incl. green waste)		Potential Diversion - C&D Facility	
								m³ / wk	m³ / yr	m³ / wk	m³ / yr
Paper (Mixed)	*7.8 %*	*19*	*999*								
Paper (Cardboard)	*1.3 %*	*3*	*166*								
Subtotal Paper	9.1 %	22	1,166	150	147	7,773	13.2 %	147	7,773		
Plastics (1-7)	2.1 %	5	268	50	100	5,360	9.1 %				
Putrescibles (Food Waste)	*5.1 %*	*13*	*661*	*240*	*54*	*2,754*	*4.7 %*				
Putrescibles (Green Waste)	*6.1 %*	*15*	*785*	*90*	*167*	*8,722*	*14.8 %*	*167*	*8,722*		
Subtotal Putrescibles	11.2	28	1,446								
Ferrous Metals (Steel)	6.3 %	16	807	900	18	897	1.5 %	18	897		
Non-Ferrous Metals (Aluminum)	0.3 %	1	33	150	7	220	0.4 %	7	220		
Glass	1.9 %	5	241	250	20	964	1.6 %			20	964
Textiles	8.6 %	21	1,113	90	233	12,367	21.0 %				
Sanitary	0.5 %	1	66	80	13	825	1.4 %				
Rubble (Concrete, plasterboard)	*27.5 %*	*68*	*3,536*								
Rubble (Cleanfill, soil, gravel, asphalt)	*0 %*	*0*	-								
Subtotal Rubble	27.5 %	68	3,536	700	97	5,051	8.6 %			97	5,051
Timber	32 %	79	4,120	300	263	13,733	23.3 %			263	13,733
Rubber	0.4 %	1	49	150	7	327	0.6 %				
Potentially Hazardous	0.2 %	1	26	1000	1	26	0.0 %				
Total	100.1 %	248	12,870				100 %				
Waste potentially diverted	81 %	201	10,446				62 %				
Waste not diverted	19 %	47	2,424				38 %				

Audit conducted by Organic Wealth on Monday 17 to Saturday 22 February 2020 and included the audit of 168 vehicle loads at the public Refuse Transfer Station (WTS).

- Timber waste was estimated to contribute 32% (by weight) of the WTS waste stream and was assessed as being the largest component of waste received into the public WTS. Approximately 80% of the timber waste was described as timber pallets and planks, with the remaining 20% being predominantly timber furniture.
- The rubble component of waste was the second highest waste stream received into the WTS (27.5% by weight) and included predominantly plasterboard type materials as well as concrete and masonry waste. Notably (for C&D facility feasibility), the audit also found that 'rubble' (including concrete, plasterboard, asphalt, gravel, soil and cleanfill) also accounted for 53% by weight of the waste received to the Tip Head.
- Organic waste was the third largest waste stream received into the WTS, incorporating food waste (5.1% by weight) and green-waste (6.1% by weight).
- In assessing the spatial requirements of drop-off areas for different wastes at the new WTS, the relative densities and overall volumes of each waste stream must be considered. Table 3.1 applies assumed waste densities to the Organic Wealth waste audit data and demonstrates the importance of considering weight to volume conversion factors.
- Timber remains a significant target for diversion, representing 32% of the WTS waste stream by weight and 23.3% by volume. Whereas rubble becomes potentially a less significant diversion priority, with its 27.5% proportion by weight reduced to only 8.6% by volume. Despite this, the importance of diverting and sorting the rubble waste stream is increased due to the immediate re-use value of rubble components, either within the landfill itself, or in the re-use of gypsum and recycled aggregate products.
- The new WTS concept allows space for up to 6 Huka[5] bins to allow public self-sorting of timber, rubble (concrete and plasterboard), glass, steel and aluminium.
- Based on the 2020 WTS audit data, approximately 80% by weight or 62% by volume of WTS waste is theoretically divertible. This figure is however expected to be lower due to the practicalities of segregating co-mingled and highly mixed waste loads. But waste diversion to recycling facilities and the proposed co-located C&D recovery facility at Spicer Landfill will clearly provide waste minimisation and diversion synergies.

3.2 Proposed Waste Transfer Station

Relocation of the waste transfer station is necessary to create a sufficient area for commercial C&D waste processing operations on areas that are free from capped landfill spaces. A key favourable outcome of the proposed site re-development is that all public interaction with Spicer Landfill will now occur at the site entrance area. All waste activities in the upper operational area of the landfill will be of a commercial nature. As part of this relocation, new weighbridge facilities are proposed at the re-designed entrance for public general waste, green waste and hazardous waste disposals.

The overall proposed redevelopment of the site entrance is shown in Figure 3.2 of the concept plan and incorporates:

- Redevelopment of the site currently occupied by Trash Palace
- Construction of new site entrance road layouts and facilities to the south of the current landfill access road to include:
  - A set of weighbridges dedicated to public traffic for green-waste, general waste and hazardous wastes
  - A two-way 10 m wide bypass road for commercial traffic
  - A dedicated two-way 8 m public access road separated from commercial traffic
- New waste transfer station including:
  - A separate recycling area which is accessed before the weighbridges to allow for:
    - Walk up public recycling bins dedicated to plastics (1 and 2), cans, bottles, cardboard/paper and textiles. The existing bins and stairs located within the recycling drop-off area can be reused and moved to this area. It is noted that this existing arrangement and size of bins easily caters for recycling that is surplus to the current kerbside service.

[5] A Huka bin has a door at one end which can be opened, making it easy to fill.

Figure 3.1 Existing recycling bins can be relocated to the new recycling area

  - Up to six Huka bins for public recycling of construction and demolition waste. These will allow the public to pre-sort their waste into the dedicated waste types.
  - The public C&D drop off facility is proposed to be located before the weighbridges to allow free drop off of these materials to incentivize the public using this facility. The location of this area could easily allow for it to be fenced off and included within the paid waste drop off area if PCC require payment from the public for this waste stream. Note that this drop off area is for public use only with the intention of commercial C&D waste drop off at the C&D facility.
- This area has been designed for ample turning and drop off space, including reversing of trailers and one-way circular movement around the site. This area is also large enough for commercial trucks to load the bins, to remove the C&D waste bins to either the C&D facility or regional bulk recycling facility at the end of each day or when required.

♻ A separate paid section after the new weighbridges which includes:

- A drop-off zone for green-waste. It is intended that processing of this green-waste would be undertaken elsewhere, either on the wider Spicer site or off site all together
- A drop-off zone for e-waste, appliances, end-of-life tyres, batteries and allowable liquid or hazardous wastes. This area would need to be bunded to avoid any runoff from hazardous wastes.
- A dedicated area for general waste drop-off. This area is large enough to interchange between the above waste streams and general waste given demand changes over time
- As with above recycling zone, this area has been designed for ample turning and drop off space, including reversing of trailers and one-way circular movement around the site to allow for entry to the second weighbridge and payment at the new kiosk. This area is also large enough for commercial trucks to load the bins to remove to the C&D facility, the Tip-Head or a regional bulk recycling facility at the end of each day or when required.

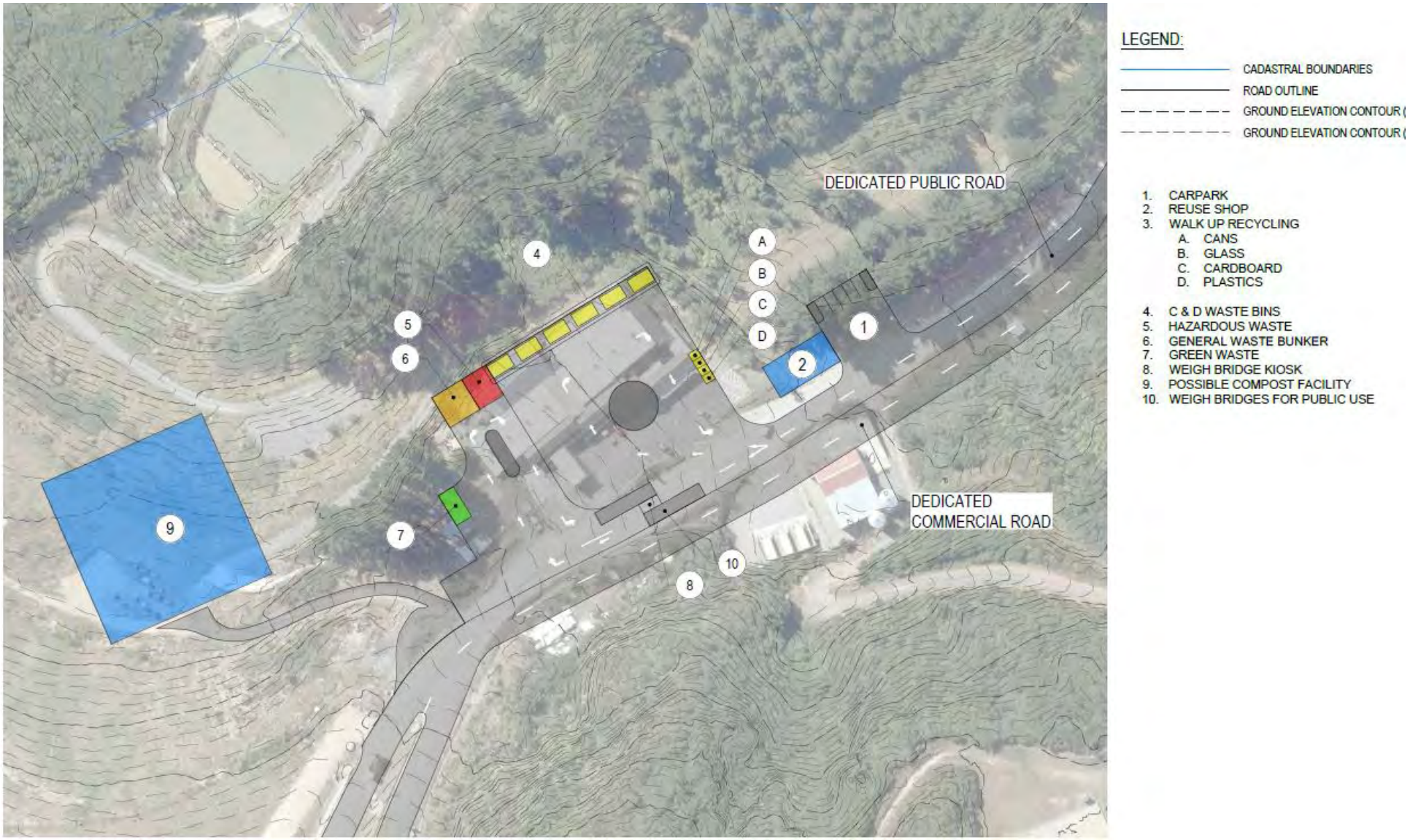

Figure 3.2 ***Waste Transfer Station Concept***

3.2.1 Development requirements

3.2.1.1 Demolition

To develop the proposed WTS, the Trash Palace buildings (see Figure 3.3 below) and minor buildings near the current recycling station south of the entrance road (see Figure 3.3 below) will need to be demolished or removed.

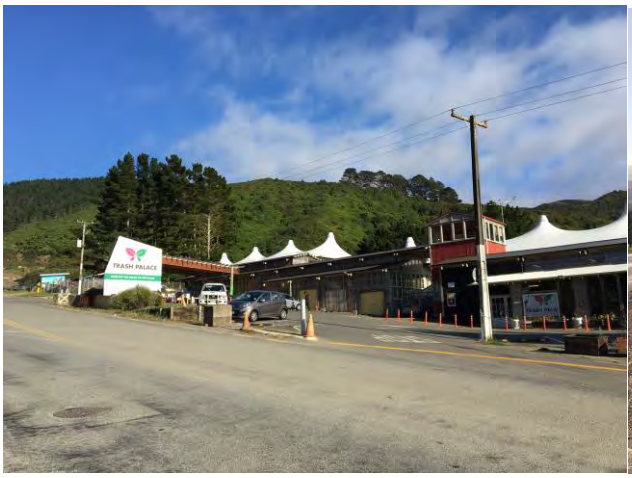

Figure 3.3 Trash Palace

Figure 3.4 Existing public C&D building

Existing hardstand areas will also need to be removed to allow for level pavements.

3.2.1.2 Earthworks and structures

The following works will be required, but are not limited to:

- The Trash Palace buildings are located on a considerable slope. A critical objective in re-designing the new WTS will be to ensure that flat areas are provided to allow safe and reasonable car-trailer access and manoeuvrability by the public. Therefore, to provide a level platform for the new facilities additional fill will be needed. In addition, shallow grade ramps may also be required for access from the road.
- The proposed public green-waste drop off platform will likely require substantial works to create a level platform and will likely need to include retaining walls structures. This platform location in the concept plan has been selected to utilise as much at grade area as possible to reduce earthwork volumes.
- Roof/cover will need to be installed to protect the C&D waste (namely plasterboard), general waste, hazardous substances and green-waste from rainfall and wind, which will also reduce contaminated runoff.
- Existing public utilities will need to be identified and reinstalled to fit the new layout.

3.2.1.3 Roading

The concept design allows for four traffic lanes to be provided at the site entrance to provide two-way traffic for both public and commercial traffic. The following is likely to be required to realise this proposed layout:

- Cut into the existing hillside to the south of the existing recycling area to allow for the southern commercial traffic lane.
- Earthworks to create the new commercial lanes at appropriate grade and new pavement.
- Remediating existing pavement to tie into new pavement required for the two public traffic lanes and to tie into the existing road to the landfill.
- Installation of the two public weighbridges (in/out system) and weighbridge kiosk.
- Installation of kerb and channel (and swales where possible).

3.3 C&D waste composition and quantity forecasts

The C&D processing facility concept and layout has been based on the outputs of Morrison Low's 'Report 1 – Material Composition' and are detailed in Table 3.2 below.

Further to the information provided in Table 3.2, the following points are noted:

- C&D waste streams within the Wellington Region are likely to be more than the 32,800 – 37,800 T/yr described in below if more concrete and timber can be redirected out of Clean and Managed Fills (Class 2-4).
- Rates of C&D waste generation are likely to vary considerably in response to the rates of activity of regional demolition and construction projects. The C&D concept has been designed to allow for these variabilities with each dedicated area able to respond to increases in material and change in storage use.

Table 3.2 C&D waste streams considered and disregarded

Component		Adopted % (by weight)	Estimated tonnes/yr		Notes
			2018	2030	
C&D components to be processed	Ferrous metals	18%	5,900	6,800	Considerable quantities of metal and glass are already pre-diverted and recycled by waste generators via established recycling practices. Residual steel, aluminium and glass quantities may be expected from comingled C&D waste sorting, rubble processing (particularly concrete) and timber processing.
	Non-ferrous metals	1%	300	400	
	Glass	1%	300	400	
	Rubble (cleanfill, soil, gravel, asphalt)	-	-	-	As described in Report 1, various 'rubble' classifications are used in different jurisdictions and industries. The percentages researched and adopted here for hardfill and plasterboard are based on currently available Council and industry data. Greater segregation of concrete, brick and aggregate fractions may be necessary to justify the crushing and screening operations proposed in conceptual facility layouts described in this report. Typically, 20% of the overall 'rubble' volume is converted to clean fill.
	Rubble (Plasterboard)	5%	1,600	1,900	
	Rubble (Concrete, brick)	-	-	-	
	Rubble (Hardfill)	15%	4,900	5,700	
	Timber (treated)	32%	10,500	12,100	Segregation of treated and untreated timber not justifiable based on these quantities but will depend on end-market / re-use options.
	Timber (untreated)	2%	700	800	
	Residual waste	20%	6,600	7,600	Likely to be suitable for disposal to managed fill / clean fill sites
Pre-diverted components	Cardboard	4%	1,300	1,500	Small components of the C&D waste stream due to the presence of existing recycling practices and markets for these materials.
	Plastic	2%	700	800	
	Excess building components	-	-	-	New or salvaged building materials and components (windows, doors, framing etc) are generally separated at source or diverted to existing salvage operators.
	Soil (topsoil and cleanfill)	-	-	-	Not usually comingled with other C&D. Likely to be delivered in source-segregated loads directly to landfill, clean fill or managed fill operations.
	Garden waste	-	-	-	Most green waste generated from C&D operations is already diverted to composting operations or chipped and mulched for re-use on development sites.
Minor/negligible	Left-over paints, coating products, adhesives etc.	-	-	-	Minor component of C&D waste, typically requires special handling as a hazardous waste and can be returned directly to paint suppliers.
	Insulation materials	-	-	-	this is not identified separately in the C&D waste data available. The quantity is unable to be estimated small component of the C&D waste stream that is not specifically identified in the SWAPs (due to its small volume).
	Textiles	-	-	-	these are not identified separately in the C&D data available to allow the quantity to be estimated
TOTAL		100%	32,800	37,800	

3.4 Proposed Construction and Demolition Facility

Optimal resource recovery focuses on higher value waste streams which includes timber, gypsum, and metals (ferrous and non-ferrous). The proposed concept plan focuses on re-directing the proportionally largest components of the C&D waste stream, being timber (30-35%) and rubble (35% comprising brick, concrete, soil/rock), as well as gypsum from plasterboard (5%), due to its relatively high value.

It is expected that recycled materials such as metals (ferrous and non-ferrous), glass, plastics and paper/cardboard are recovered in the initial C&D waste sorting area and from timber and rubble processing. The proposed C&D facility includes the following features and is shown on Figure 3.6 and within the attached concept plans:

- One directional traffic flow around the site to avoid delays and miscommunication between drivers and facility operators.
- Allows for single-tray articulated trucks to reverse and manoeuvre onto the various drop-off areas around the one-way traffic circuit; and for B-train (truck and trailer) sized trucks to reverse into load-out areas, to collect processed timber and aggregate products.
- Incorporates four container sheds – (referred to as “Big Bertha” sheds) that provide a covered floor-space of 16m x 12m per shed and a working height of between 5.6 m (at the sides) and 8.7 m (in the centre of the arched roofline). These units provide covered storage for processed (chipped/shredded) timber and processed gypsum or other dry-store wastes generated from the sorting area.
- These buildings are considered well suited to the establishment of the processing facilities due to their relatively low-cost, versatile and modular nature. They also have the advantage of adaptability and ability to be relocated as the operation of the facility changes.

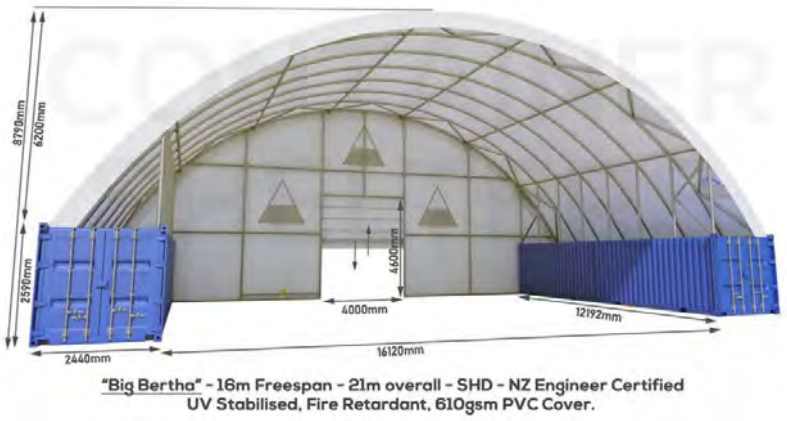

Figure 3.5 ***“Big Bertha”***

- The location and layout of the sheds is expected to optimise the use of existing power and water feeds coming into sheds and facilities already positioned in these areas.

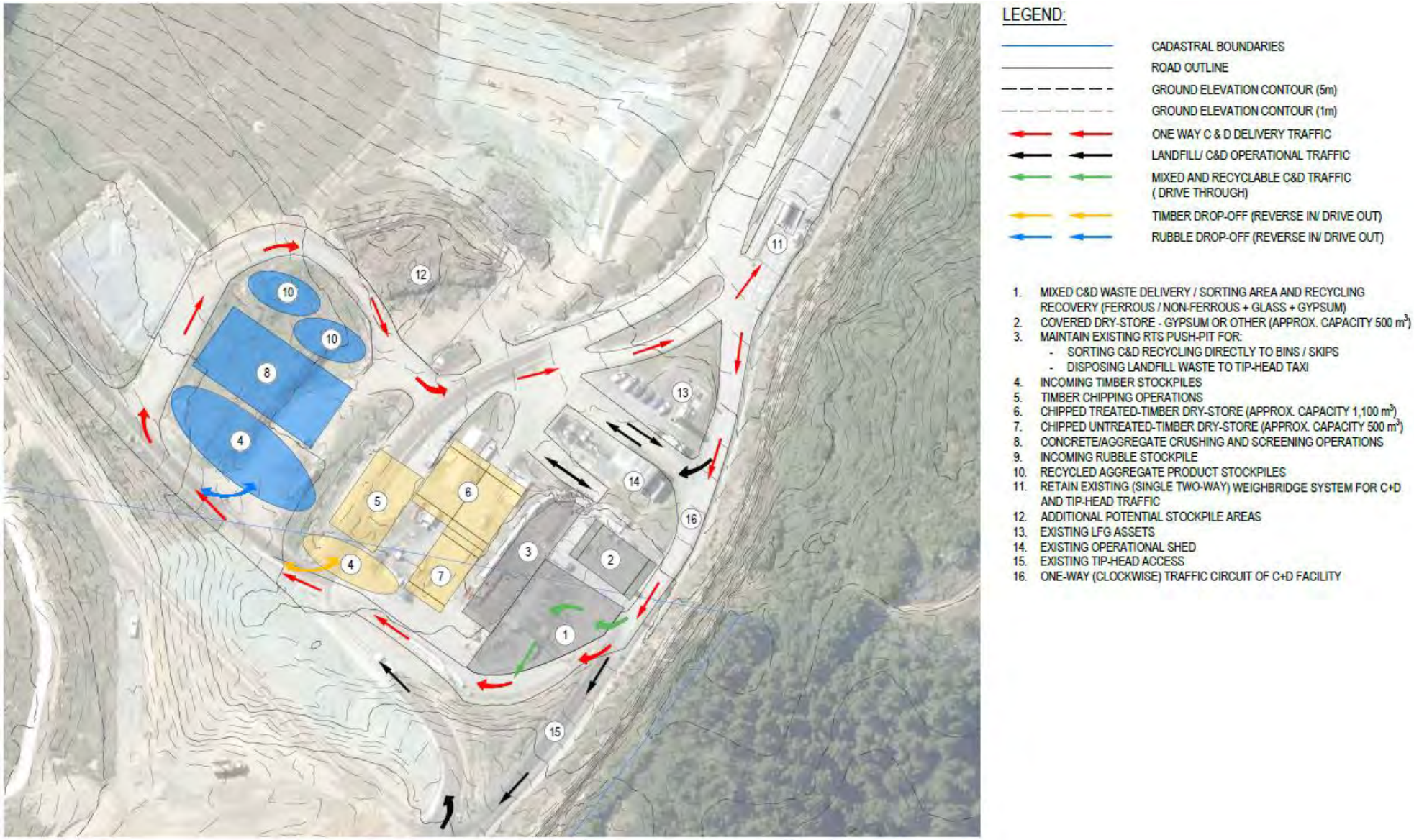

Figure 3.6 C&D Concept Layout

3.4.1 Mixed C&D waste delivery and sorting area

The hardstand area located south east of the current public general waste tipping area is proposed to be converted to receive incoming loads of mixed C&D waste, as well as loads that contain primarily recyclable materials (metal, glass, plastic and cardboard). It is envisaged this area may be used to receive and process plasterboard, which requires covered storage.

Recyclable materials would be sorted into Huka bins positioned in the current public waste tip-trench / push-pit, to improve the accessibility and ease of sorting operations.

The C&D sorting area could be expected to provide:

- Receipt of C&D via large rigid trucks to a hard stand area
- Coarse sorting of metal, glass, wood and gypsum (in the form of plaster board) with telehandler
- Movement/loading of materials with wheeled loaders
- Covered dry-store (approx. capacity 500 m^3) – for plasterboard processing and gypsum bagging; or for the storage of other materials requiring enclosed storage
- Transfer of segregated materials to covered storage or hook-bins (in drop-off trench) or onwards to timber or rubble processing areas.

More comprehensive or specialised waste processing equipment may be considered at some point in the future but is not yet justifiable based on projected C&D waste quantities. Depending on the success of initial operations, it may later become viable to increase the complexity of initial C&D waste sorting and processing areas, including items such as:

- Conveyors, shaking tables or manual sorting tables
- Sequential crushing and electromagnet processing
- Gib crusher and gypsum trommel
- Dust extraction/filtration

Alternatively, independent contractors may be used that own the above equipment.

3.4.2 Timber processing area

The area presently occupied by landfill operator support areas is proposed for conversion to the timber processing area. Timber loads (pre-segregated timber only) are received into stockpiles in the south of this area and processed through chipping and shredding operations to be stockpiled in adjacent container sheds. Processed timber must remain dry after chipping, to avoid contaminated stormwater runoff.

Three container sheds are provided for within this area. However, it is noted that Big Berthas can be used instead at first to reduce costs. The larger structure (formed by two container sheds being joined end-to-end) would store processed treated timber and the single (southern) shed may be used for untreated timber – or other materials depending on throughput. Chipped / shredded timber would be loaded out to the north of the timber processing area or possibly through the rear of the Big Berthas into truck trays reversed into the lower elevation platform of the current public waste push-pit.

The timber processing area could be expected to provide:

- Incoming timber stockpile
- Wood waste processed outside through crusher and chipper (and including magnetised recovery of metal fixings), then conveyed to drystore
- Chipped treated-timber dry-store (approx. capacity 1,100 m^3)
- Chipped untreated-timber dry-store (approx. capacity 500 m^3)
- Surface water from the activity may require treatment prior to discharge to existing site stormwater systems, unless appropriate adsorption is provided through the existing stormwater system.

3.4.3 Concrete and rubble processing area

Further on from the timber processing area, incoming loads of concrete and rubble will be unloaded to a receiving stockpile. This area is located on the existing landfill and would not be paved. Process equipment would be positioned to progressively transfer the incoming material through screening and crushing operations to produce various grades of aggregate, soil or residual mixed hardfill waste to the load-out stockpile area.

The concrete and rubble processing area is envisaged to provide:

- Incoming C&D concrete and rubble stockpile
- Concrete and rock crushing and simple aggregate screening to produce re-engineered waste aggregates suitable for on-site use for structural fill and/or road construction (sub-base)
- Stockpile areas and load out areas for processed aggregate and waste soils

Contaminated residual soils will need to be disposed to landfill or alternative managed fill sites.

3.4.4 Development requirements

3.4.4.1 Relocation of existing structures

The landfill operator facilities (see Figure 3.7 below) will need to be relocated. These do not occupy a large space, and sufficient space for these facilities and associated parking spaces is available at the site entrance area or the C&D processing area. These buildings are prefabricated Portacom type buildings and would be straightforward to relocated, noting potential service connection requirements (power, water and sewer).

Figure 3.7 Landfill operator facilities

3.4.4.2 Earthworks and structures

The proposed C&D layout has aimed to minimise the degree of additional earthworks and ground engineering. However, several of the proposed work platforms will require some infilling to create the timber processing area, where landfill operator facilities are presently located.

Big Berthas are considered an economical and dynamic structure to keep materials dry and also to assist with dust and noise suppression.

Aside from the proposed concrete and rubble processing areas, the proposed development is understood to mostly lie beyond the existing extent of landfilled waste. Factors that would need to be considered during future stages of the project design lifecycle include:

- differential settlement risk
- protection of existing landfill cap
- interaction with existing landfill infrastructure (LFG systems, leachate systems and stormwater diversions).

3.4.4.3 Roading and weighbridges

Minimal works are required to upgrade the existing access and roads to the new C&D facility. An additional weighbridge could be installed adjacent to the existing weighbridge and kiosk to allow for a dual weighbridge system which would aid the maintenance of one-way traffic flows and may provide additional efficiency in busy periods. The northern unsealed access road should then be sealed to cater for increased traffic movements.

4. Further features and options

4.1 Community reuse/educational facility

The concept plan provides a space for a small 10m x 20m kitset building and five carparking spaces to the north east of the new WTS. This building could be used for a variety of uses which are now typical of current waste transfer station upgrades around the country that focus on user experience. The concept is to develop a community asset which not only provides for waste disposal and recycling, but the ability to reuse waste and provide a destination point for the community. The building could be used as a permanent space or become quite versatile with a range of potential uses set out below.

4.1.1 Reuse shop

A small scale retail shop that focuses on selling reusable goods and those suitable for upcycling could be successful if niche markets were identified and focused on. A small, more focused retail experience would prevent the need for long term storage of goods.

Wellington's 'Tip Shop' has been successful through focussed social media campaigns and partnerships with community groups to increase awareness of the shop.

4.1.2 Upcycle retail space

Goods made from upcycled materials are currently sought after. The space could be used for periodic sales from local artisans that sell upcycled goods which would promote both reuse and their business. An example of local artisans include 'Made it Better' who create earrings out of bicycle inner tubes.

4.1.3 Educational/community facility

An educational facility would provide a space for school visits, community functions and workshops. The intent would be to use the space for informal education on the waste life cycle including reuse/recycling etc and a space for groups to participate in projects, workshops and craft activities using waste recovered from the WTS. This space could also provide a starting point for tours of the landfill site or deployment of focus groups to the C&D facility.

4.1.4 Upcycled art installations/exhibitions

PCC could also use this space for local artists, schools or community groups to use to exhibit upcycled art and sculptures to promote C&D reuse and recycling.

4.1.5 Vintage and second-hand textiles and clothing

The popularity of the sale of second-hand clothing has steadily increased. A second-hand clothing retailer could use the building temporarily for campaigns to promote recycled and vintage clothing. This also could include clothing swap campaigns or use of the space by organisations that promote buying of, swapping and recycling of second-hand clothing.

4.2 Partnerships

The WTS does provide enough space within the middle of each zone to feature regular or one off recycling campaigns such as:

- End of life battery collection
- Electronic upcycling collection (e.g. E-Cycle)
- Mobile phone recycling (e.g. remobile)

4.3 Compost facility

There is opportunity to use an area located just to the north of the existing Trash Palace site (shown in Figure 4.1 below) as a small-scale composting facility. This space is approximately 2,000m² - 4,000m² in area. As a comparison, Timaru City Council are currently in the process of upgrading their composting facility at Redruth Landfill using the Engineered Compost System' (ECS) bunker system where an area of approximately 6,750m² and is intended to process 27,000 tonnes of green and food waste per annum.

An opportunity to locate either 'Engineered Compost System' (ECS) bunkers or a GORE compost system in this area is possible if access to this area were maintained. Composting facilities do however require:

- a closed system to contain leachate;
- a power system to run the aeration system within the bunkers; and
- an adequate area for a waste reception building to be located to receive waste that could be composted. A 'Big Bertha' may be used as a reception building.

Figure 4.1 Possible composting location

This space does also include capped landfill areas and so settlement could be an issue if hardstand areas or bunkers were constructed on capped areas. The use of Big Berthas or moveable buildings could alleviate this issue. A GORE system would also be more suitable on these areas. However, concrete pads are still required which could also settle over time.

Access to the site is also at a steep grade via an existing unsealed driveway which would need to be upgraded.

A survey of the existing capped areas would provide insight to where composting infrastructure could be best located. It is however considered that the space is limited to small-scale operations.

5. Statutory approvals

5.1 Existing resource consents

Spicer Landfill is operated under a range of resource consents which are outlined below in Table 5.1.

Table 5.1 Existing resource consents

Consent number	Purpose
WGN940046(01) [21367], new ID [34927]	To discharge contaminants onto or into land for the purpose of landfill wastes
WGN940046(2) [1381] new ID [34928]	To discharge landfill gas, odour and dust to air from the Spicer Landfill site
WGN940046(3) [4964]	To divert and discharge stormwater run-off from above and around the site of the Spicer Landfill to Mitchell Stream
WGN940046(4) [5975]	To take water as leachate for offsite disposal from the Spicer Landfill
WGN940046(127)	Change of conditions to [21367] Conditions 6, 12, 17, 31, 32 and 44 Change of conditions to [1381] Purpose description and conditions 6, 14, 16, 19, 20, 22 and 23

5.2 Outline Plan of Works

The site is designated as the Spicer Landfill (K1052) and PCC is the requiring authority. The purpose of the designation is for *'Refuse Disposal, Landfill - including landfill, recycling, refuse transfer station and resource recovery'*. C&D processing facilities would fall within the purpose of the designation and would therefore not be subject to the underlying district plan zone rules.

An outline plan of works would need to be submitted to PCC outlining:

- the height, shape, and bulk of the public work, project, or work
- the location on the site of the public work, project, or work
- the likely finished contour of the site; the vehicular access, circulation, and the provision for parking
- the landscaping proposed
- any other matters to avoid, remedy, or mitigate any adverse effects on the environment, including noise, traffic and dust effects.

PCC may request changes to the Outline Plan which is then a consideration of the Requiring Authority (in this instance, PCC also).

5.3 Resource consenting

Whilst the site is designated and not subject to the district plan rules, the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011 (NES CS) is applicable along with the relevant regional rules covering discharge to air, earthworks and stormwater discharge. These consenting elements are detailed in the following sections.

5.3.1 NES CS

The site is known to be a landfill. Landfills are identified on the Hazardous Activities and Industry List (HAIL – activity G3). A preliminary site investigation (PSI) would need to be undertaken to establish if the NES CS is applicable and a Detailed Site Investigation (DSI) may then also be required, which would include soil testing to establish the level of contamination on site. The PSI and DSI would determine if a resource consent would be required under the NES CS, which is more likely than not.

5.3.2 Greater Wellington Regional Council Plans

The site is located within the Greater Wellington Regional Council boundaries and is therefore subject to the following plans:

- Greater Wellington Regional Council - Proposed Natural Resources Plan (Appeals Version) (NRP).

  Decisions on submissions relating to the NRP have now been notified and this plan now has legal effect pursuant to s86F of the Resource Management Act 1991 (RMA). The NRP will not be fully operative until all appeals are resolved. Where a rule of a proposed Plan has not been appealed, in accordance with Section 86F it must be treated as operative (and any previous rule as inoperative). Where a rule is subject to an appeal, the relevant operative plan must be considered.

The operative plans are:

- Greater Wellington Regional Council – Soil Plan
- Greater Wellington Regional Council – Discharges to Land

A high-level planning assessment has been completed based on the concept plans attached within Appendix A. This is not an exhaustive assessment and additional consenting requirements may be needed once more detailed designs are considered.

Table 5.2 Wellington Regional Council consenting requirements

Relevant Plan	Assessment
Greater Wellington Regional Council - Proposed Natural Resources Plan (Appeals Version)	**Air Quality** Rule 27 - The discharge of contaminants into air from the handling of bulk solid materials including from the activities of quarrying, mining, cleanfilling, blasting, extraction, crushing, screening, processing, stockpiling, handling, conveying, sorting, and storage is a permitted activity provided they do not result in discharges that would result in odour, gas or vapour which is noxious, dangerous, offensive or objectionable at or beyond the boundary of the property. An air quality assessment would need to be undertaken to assess the effects of dust and odour including cumulative effects from the landfill use. If this assessment concludes that there would be odour or dust effects beyond the boundaries of the property, a Discretionary Activity resource consent would need to be applied for and would need to include written approvals from affected persons (as identified through the assessment). A change of conditions to WGN940046(2) (to discharge landfill gas, odour and dust to air from the Spicer Landfill site) may be considered a viable option to include the C&D activities. This is discussed further below in section 5.3.2.1. **Discharges to Land** Stormwater discharges to land is a permitted activity under Rule 49 as long as stormwater is passed through an interceptor and the discharge does not contain more than 15 milligrams per litre of total petroleum hydrocarbons prior to release. It is however noted that Spicer has a discharge and diversion permit to divert and discharge stormwater run-off from above and around the site of the Spicer Landfill to Mitchell Stream. In this instance, it may be preferable to vary the consent conditions of this permit to include the proposed discharge and diversion of stormwater from the C&D facility including runoff from the proposed road upgrades. This is discussed further below in section 5.3.2.1. **Earthworks and vegetation removal** The use of land, and the associated discharge of sediment-laden runoff into water or onto or into land where it may enter water from earthworks up to a total area of 3,000 m² per property per 12-month period is a permitted activity under Rule 99 as long as sediment and erosion controls are in place. It is anticipated that this rule would not be met given that the proposed realignment, upgrading and widening of the road would require extensive earthworks which would exceed 3,000 m². Resource consent would therefore be required as a Discretionary Activity under Rule 101. An erosion and sediment control plan would need to be submitted with the application.
Greater Wellington Regional Council – Soil Plan	This plan remains applicable, as Rule 101 (earthworks) of the Natural Resources Plan is still under Appeal. Works on the site would not trigger any rules under this plan as the site is not located within an erosion prone area and no vegetation will be removed.

Relevant Plan	Assessment
Greater Wellington Regional Council – Discharges to Land	This plan remains applicable, as Rule 49 of the Natural Resources Plan is still under Appeal. The discharge of contaminants from, onto or into land used for the disposal of waste materials, with the exception of land used exclusively for cleanfill disposal, but including disposal at a landfill, rubbish dump or tip, is a Discretionary Activity under Rule 10. A resource consent application would need to be accompanied by details of stormwater containment, treatment and disposal. A change of conditions to the existing discharge permit may be preferred in this instance as discussed below.

5.3.2.1 Change of conditions to existing resource consents

Under s127 of the RMA, a consent holder may apply to a consent authority for a change or cancellation of a condition of a resource consent. Such applications are a Discretionary Activity. The site holds numerous resource consents as outlined in section 5.1 above. The following of these consents are preferable to change under s127:

- WGN940046(3) [4964], which allows for the diversion and discharge of stormwater run-off from above and around the site of the Spicer Landfill to Mitchell Stream would be preferable to change to include stormwater runoff and diversion from the new C&D hardstand facilities rather than apply for a new resource consent. This is because, stormwater runoff would be considered holistically and discharge from these areas would also lead to the Mitchell Stream and would be subject to the same water quality standards.
- WGN940046(2) [1381] new ID [34928], to discharge landfill gas, odour and dust to air from the Spicer Landfill site could also be changed under s127 to include the discharge of dust and odour to air from RRH operations.

Other considerations would need to be made if any of the proposed site works change any of the existing consented activities (i.e. changes to leachate collection or landfill gas infrastructure).

5.3.3 Third party approvals

Consultation with the following third parties is recommended:

- Iwi – earthworks and discharges to water are of a cultural interest to iwi. Engagement with iwi at an early stage is encouraged to seek their views.
- Affected persons – the technical assessments (noise, air and traffic) may identify potentially affected persons. Written approvals from these persons should be obtained.

5.4 Statutory approvals conclusion

An outline plan of works and regional consents will be required if a C&D facility were to be established on site. Whilst the resource consents would be a Discretionary Activity and council would not be limited in their discretion when assessing the effects of such an activity, it is considered that with supporting technical assessments, good mitigation and management measures (i.e. erosion and sediment control) and third party approvals, a resource consent could be obtained. Consideration of existing consented infrastructure would also need to be considered and how the proposed changes would fit within the existing suite of resource consents.

6. Conclusion

The proposed concept plan indicates that there is ample space and opportunity on Spicer Landfill to set up a thriving Resource Recovery Hub which provides for a dynamic C&D facility which can respond to market demands, easily cater for Kāinga Ora's site clearance requirements at Cannons Creek and increased throughput over time. The facility has been designed to cater for approximately 37,800 tonnes/annum of C&D waste by 2030.

In addition to this, a dedicated separate and improved Waste Transfer Station can be provided for within the current footprint of the Trash Palace operations, with a design capable of improving rates of public recycling, adding self-segregation of C&D waste and ultimately minimising the amount of waste disposed to landfill by the public. The layout also allows for changeable spaces to cater for demand and allow for spaces to be used for partnership campaigns. There is also space for a community or retail facility which could lend itself to a range of uses to attract the public to Spicer Landfill and promote reuse and recycling.

There is also an opportunity to establish a small composting facility to the north of the Waste Transfer Station.

The concept plan identifies that extensive earthworks and the construction of new internal roads will likely be required, including the installation of new weighbridges at the entrance of the site for the Waste Transfer Station and to bypass commercial traffic. Cost savings are available by using existing paved surfaces, which appears particularly practical for the new C&D facility, where more detailed design should aim to minimise earthworks volumes and new pavement areas.

Spicer Landfill is regionally well positioned with good transport links to Wellington City, Hutt City and Kāpiti Coast, which naturally lends the site towards being a central hub for the receipt and processing of C&D waste, whilst maintaining critical landfill asset functionality and diverting waste streams such as green-waste to regionally centralised processing facilities developed in other Wellington Districts.

7. References

Department of Environment and Conservation (NSW) 2006. *Handbook for the Design and Operation of Rural and Regional Transfer Stations*

GHD. April 2021. *Construction and Demolition Waste Minimisation: Report 6 – Site Selection*

Morrison Low. April 2021. *Construction and Demolition Waste Minimisation: Report 1 – Materials Composition*

Morrison Low. April 2021. *Construction and Demolition Waste Minimisation: Report 2 –Markets*

Organic Wealth. February 2020. *Porirua City Waste Audit Project*

U.S. Environmental Protection Agency - Office of Resource Conservation and Recovery April 2016. *Volume-to-Weight Conversion Factors*

Appendix A

Conceptual Site Layout Figures

LEGEND:

- CADASTRAL BOUNDARIES
- ROAD OUTLINE
- GROUND ELEVATION CONTOUR (5m)
- GROUND ELEVATION CONTOUR (1m)

N

0 20 40 60m

SCALE 1:2000 AT ORIGINAL SIZE

PORIRUA CITY COUNCIL
CONSTRUCTION AND DEMOLITION WASTE MINIMISATION PROJECT

OVERALL CONCEPTUAL SITE LAYOUT

Job Number 12547278
Revision A
Date 05/04/2021

Figure 01

Level 3, GHD Centre, 27 Napier Street, Freemans Bay, Auckland 1011 New Zealand **T** 64 9 370 8000 **F** 64 9 370 8001 **E** auckland@ghd.com **W** www.ghd.com

Plot Date: 4 June 2021 - 1:52 PM Plotted by: Maria Russel Pasbotin Cad File No: C:\Users\mapastorin\OneDrive - GHD\Desktop\12547278\12547278-FIG01.dwg

LEGEND:

- CADASTRAL BOUNDARIES
- ROAD OUTLINE
- GROUND ELEVATION CONTOUR (5m)
- GROUND ELEVATION CONTOUR (1m)

1. CARPARK
2. REUSE SHOP
3. WALK UP RECYCLING
   - A. CANS
   - B. GLASS
   - C. CARDBOARD
   - D. PLASTICS
4. C & D WASTE BINS
5. HAZARDOUS WASTE
6. GENERAL WASTE BUNKER
7. GREEN WASTE
8. WEIGH BRIDGE KIOSK
9. POSSIBLE COMPOST FACILITY
10. WEIGH BRIDGES FOR PUBLIC USE

N

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

PORIRUA CITY COUNCIL
CONSTRUCTION AND DEMOLITION WASTE MINIMISATION PROJECT

C & D WASTE (AND GREEN WASTE) PROCESSING FACILITIES

Job Number 12547278
Revision A
Date 05/04/2021

Figure 02

Level 3, GHD Centre, 27 Napier Street, Freemans Bay, Auckland 1011 New Zealand **T** 64 9 370 8000 **F** 64 9 370 8001 **E** auckland@ghd.com **W** www.ghd.com

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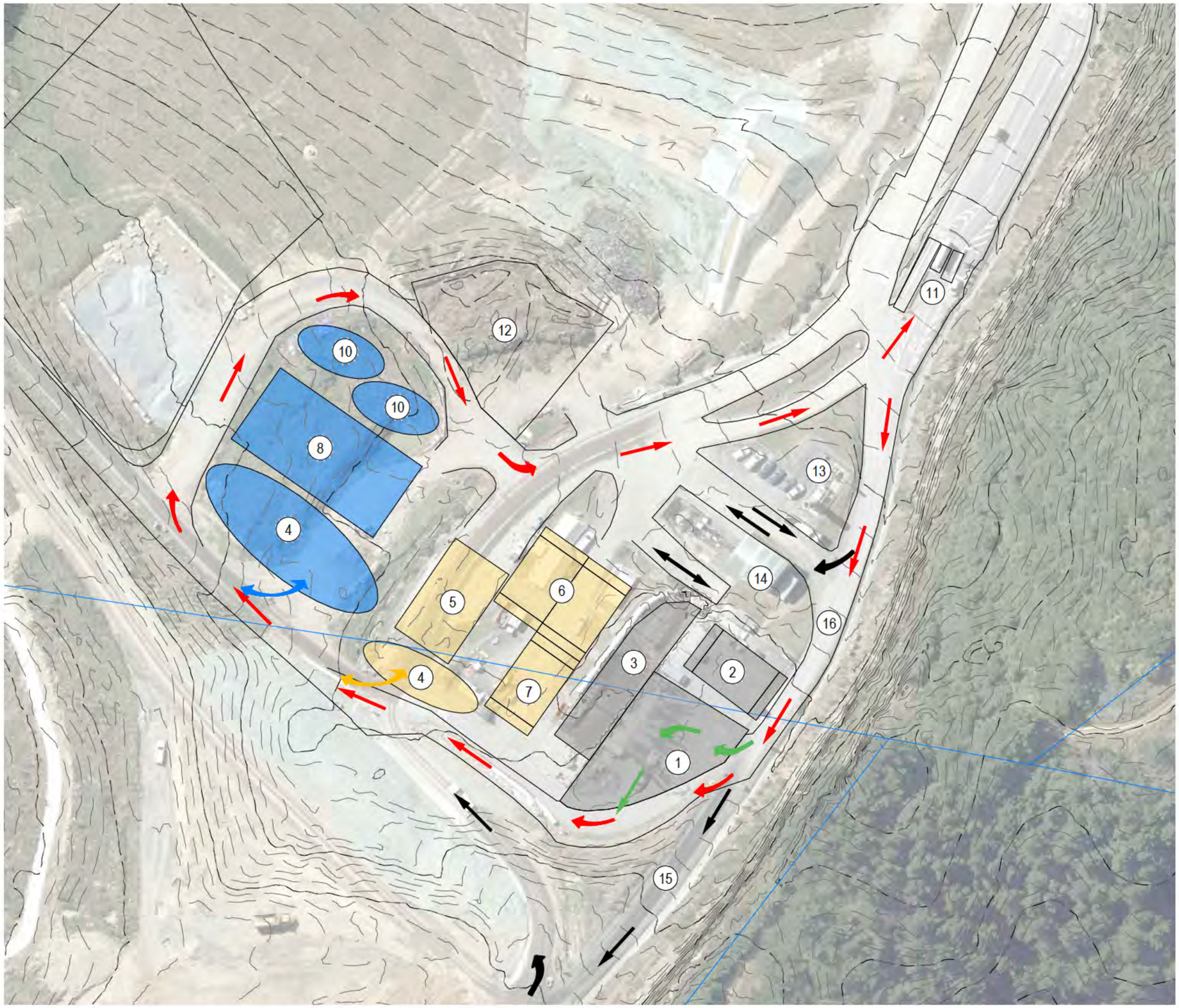

LEGEND:

- CADASTRAL BOUNDARIES
- ROAD OUTLINE
- GROUND ELEVATION CONTOUR (5m)
- GROUND ELEVATION CONTOUR (1m)
- ONE WAY C & D DELIVERY TRAFFIC
- LANDFILL/ C&D OPERATIONAL TRAFFIC
- MIXED AND RECYCLABLE C&D TRAFFIC (DRIVE THROUGH)
- TIMBER DROP-OFF (REVERSE IN/ DRIVE OUT)
- RUBBLE DROP-OFF (REVERSE IN/ DRIVE OUT)

1. MIXED C&D WASTE DELIVERY / SORTING AREA AND RECYCLING RECOVERY (FERROUS / NON-FERROUS + GLASS + GYPSUM)
2. COVERED DRY-STORE - GYPSUM OR OTHER (APPROX. CAPACITY 500 m^3)
3. MAINTAIN EXISTING RTS PUSH-PIT FOR:
   - SORTING C&D RECYCLING DIRECTLY TO BINS / SKIPS
   - DISPOSING LANDFILL WASTE TO TIP-HEAD TAXI
4. **INCOMING TIMBER STOCKPILES**
5. TIMBER CHIPPING OPERATIONS
6. CHIPPED TREATED-TIMBER DRY-STORE (APPROX. CAPACITY 1,100 m^3)
7. CHIPPED UNTREATED-TIMBER DRY-STORE (APPROX. CAPACITY 500 m^3)
8. CONCRETE/AGGREGATE CRUSHING AND SCREENING OPERATIONS
9. INCOMING RUBBLE STOCKPILE
10. RECYCLED AGGREGATE PRODUCT STOCKPILES
11. RETAIN EXISTING (SINGLE TWO-WAY) WEIGHBRIDGE SYSTEM FOR C+D AND TIP-HEAD TRAFFIC
12. ADDITIONAL POTENTIAL STOCKPILE AREAS
13. EXISTING LFG ASSETS
14. EXISTING OPERATIONAL SHED
15. EXISTING TIP-HEAD ACCESS
16. ONE-WAY (CLOCKWISE) TRAFFIC CIRCUIT OF C+D FACILITY

N

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

PORIRUA CITY COUNCIL
CONSTRUCTION AND DEMOLITION WASTE MINIMISATION PROJECT

C & D WASTE (AND GREEN WASTE) PROCESSING FACILITIES

Job Number 12547278
Revision A
Date 05/04/2021

Figure 03

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The Power of Commitment