Appendix 13: Waste Futures - Green Island Resource Recovery Precinct - Integrated Transport Assessment

Waste Futures – Green Island – Resource Recovery Park Precinct

Integrated Transport Assessment

Dunedin City Council (DCC)
28 February 2024

→ **The Power of Commitment**

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1. Introduction

1.1 Background

1.1.1 Waste futures programme

As part of Dunedin's wider commitment to reducing carbon emissions and reducing waste going to landfill, the Dunedin City Council (DCC) has embarked on the Waste Futures Programme to develop an improved comprehensive waste management and diverted material system for Ōtepoti Dunedin. The programme aligns with DCC's responsibility under the Waste Minimisation Act 2008 to *'promote effective and efficient waste management and minimisation within its district'.*

Improving Dunedin's whole waste system includes enhancing collection services for reuse and recycling, and safe disposal of residual waste to landfill.

The Waste Futures Programme includes provision of an enhanced kerbside recycling and waste collection service for Dunedin from July 2024. The new kerbside collection service will include collection of food and green (organic) waste.

To support the implementation of the new kerbside collection service, the DCC is planning to make changes to the use of Green Island landfill site (Figure 1) in coming years including:

– Developing an improved Resource Recovery Park Precinct (RRPP) for food and green waste and to process recycling
– Providing new waste transfer facilities to enable the safe disposal of any residual waste to landfill

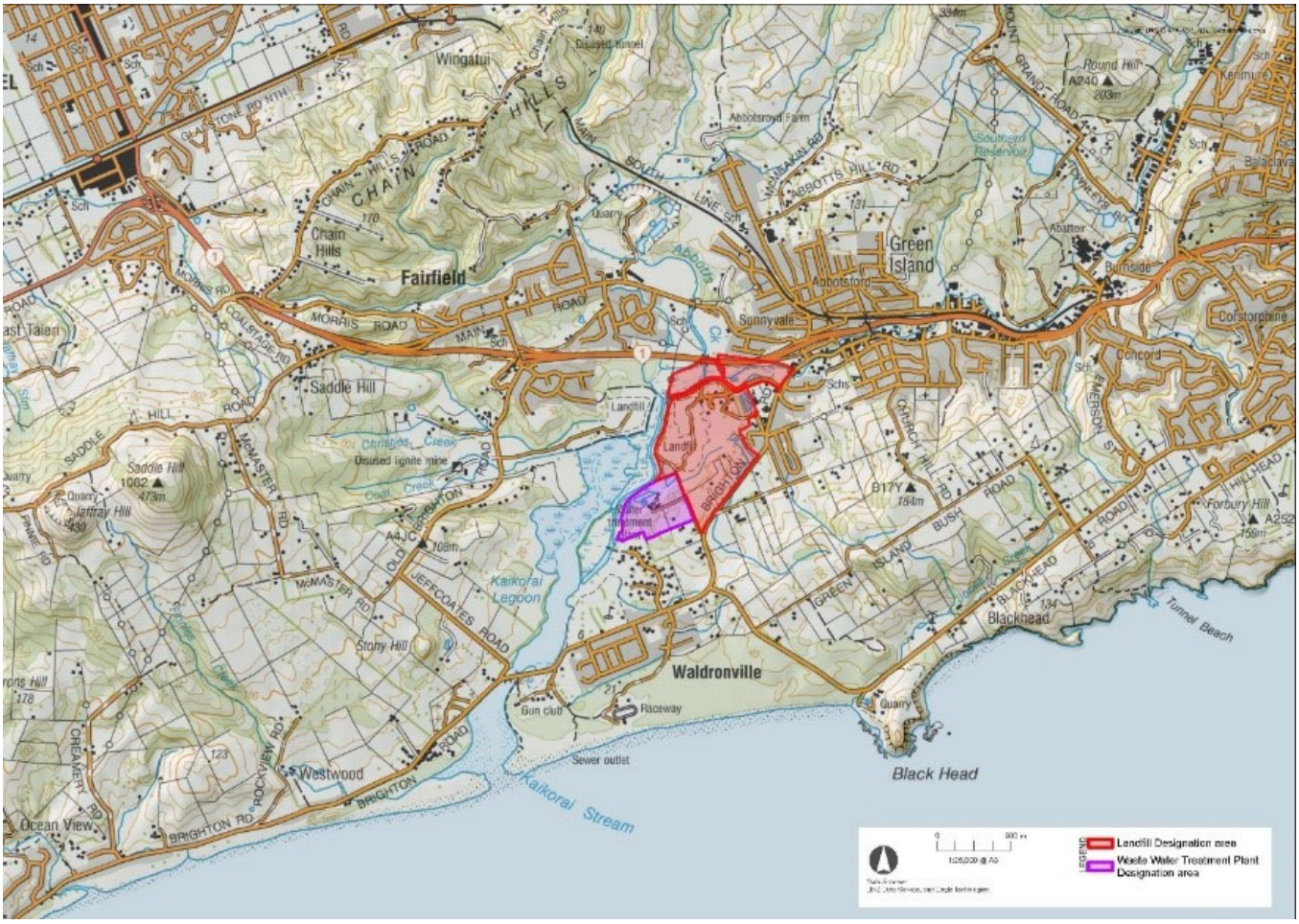

Figure 1 ***Green Island Landfill and Resource Recovery Park Precinct Site (Designation D658)***

In addition, the DCC is planning for the ongoing operation and closure of the Green Island landfill, which is coming to the end of its operational life. The existing Otago Regional Council (ORC) resource consents, required to operate a landfill at Green Island, expired in October 2023. In March 2023, DCC applied to ORC for replacement resource consents to continue to use the landfill until it closes completely, and waste disposal can be transferred to a new landfill facility. These consent applications are in the process of being considered by ORC.

1.1.2 Green Island Resource Recovery Park Precinct (RRPP)

To meet the requirements of the new kerbside collection service the DCC is investing in improvements and expansion to the existing resource recovery area at Green Island landfill site. Proposed new facilities are shown on Figure 2 and include:

– organic receivals building (ORB) and processing facilities to support the organic waste kerbside collection
– materials recovery facility (MRF) to sort and bale items collected from kerbside mixed recycling bins
– bulk waste transfer station (BWTS) to facilitate the compaction and trucking of waste to landfill

Additional facilities also include new glass bunkers, staff offices, parking, and breakrooms and associated access roads and truck parking areas. Several existing facilities are to be retained including the Rummage shop, public drop-off areas and the education centre.

The resource consents for the development and operation of the new facilities relate to ground disturbance, and discharges to land and air. The Green Island landfill site is subject to an operative designation (D658) in the Proposed Second-Generation Dunedin City District Plan (2GP) for the purpose of Landfilling and Associated Refuse Processing Operations and Activities.

The RRPP will be run by EnviroNZ on behalf of DCC and will start operating in July 2024 following construction of the ORB, which is currently underway. Resource consent to operate the ORB was granted by ORC in September 2023 under the existing landfill consents.

The other new RRPP facilities are planned to start operating from mid to late 2025.

1.2 Purpose of this report

This report is an Integrated Transport Assessment to support resource consent applications to Otago Regional Council (ORC) and Dunedin City Council (DCC), for a new Resource Recovery Park Precinct (RRPP) at the Green Island Landfill. The purpose of this report is to describe the existing land use, the existing transport environment, the proposed changes to land use, and to assess the transport effects arising from these changes.

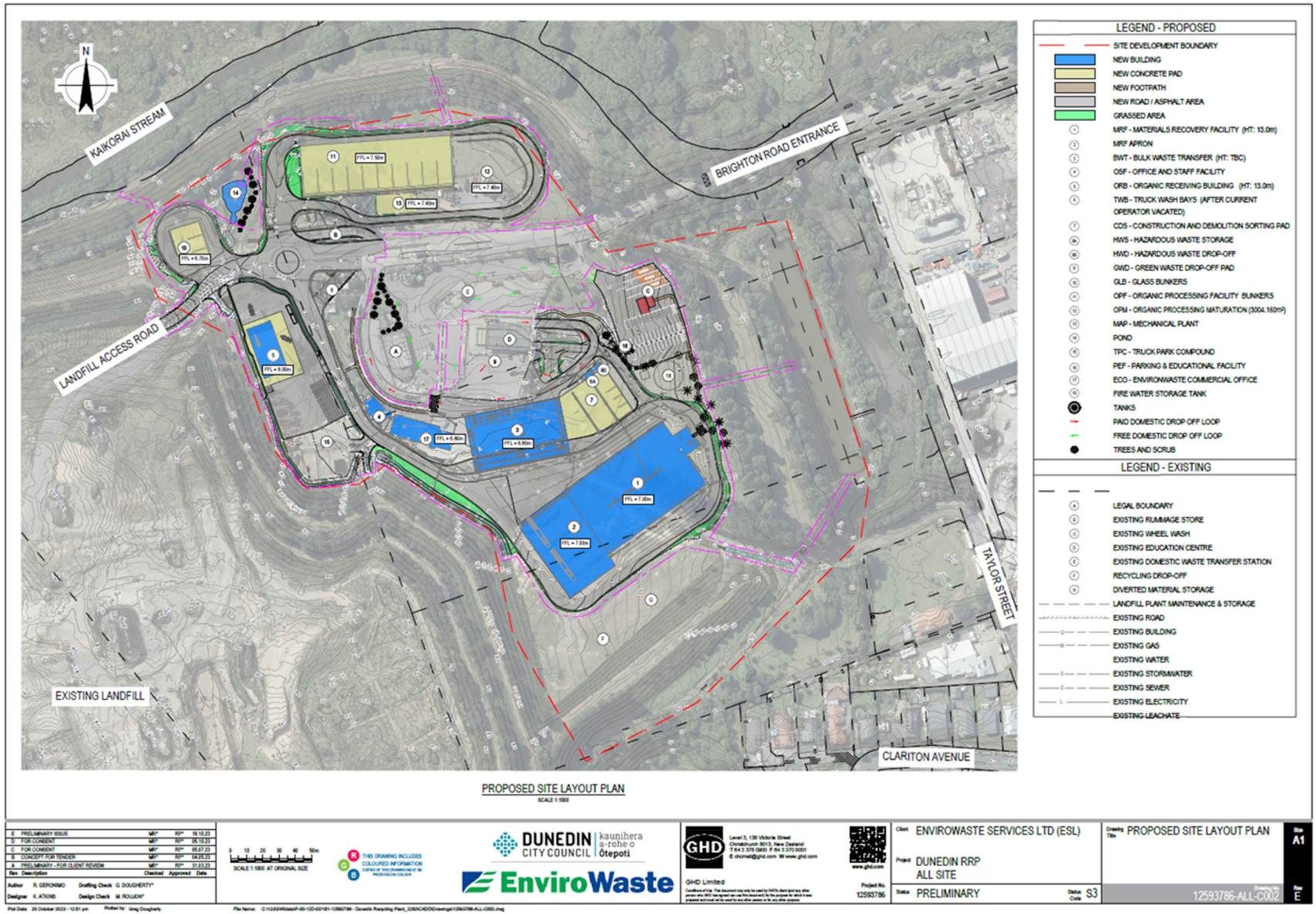

Figure 2 *Green Island resource recovery park development area proposed layout*

2. Baseline environment

2.1 Current use of the site

The Green Island site is currently designated as a landfill and is actively used for waste disposal and resource recovery operations. The site area is shown on Figure 1. It is operated by the DCC and serves as the primary disposal facility for the region. As a landfill, its primary function is to receive, store, and manage solid waste generated from various sources, including residential, commercial, and industrial activities. This includes current resource recovery operations which are located to the north-east of the landfill footprint.

The landfill is designed to accommodate different types of waste, including household waste, construction debris, and other non-hazardous materials. It follows specific waste acceptance criteria and waste segregation practices to ensure proper waste handling and disposal.

2.2 Site location and access

The site is located approximately 9 km south west of the central city of Dunedin in Green Island. The site is designated for landfill purposes, and is adjoined by Kaikorai Stream and Estuary to the north and west, industrial land to the east, and residential land to the south. Access to the site is via the Dunedin Southern Motorway (State Highway 1) at the Westland Street on-ramp and Main South Road off-ramp, which connect to the surrounding local road network via three closely connected roundabouts. The site and surrounding road network are shown in Figure 3.

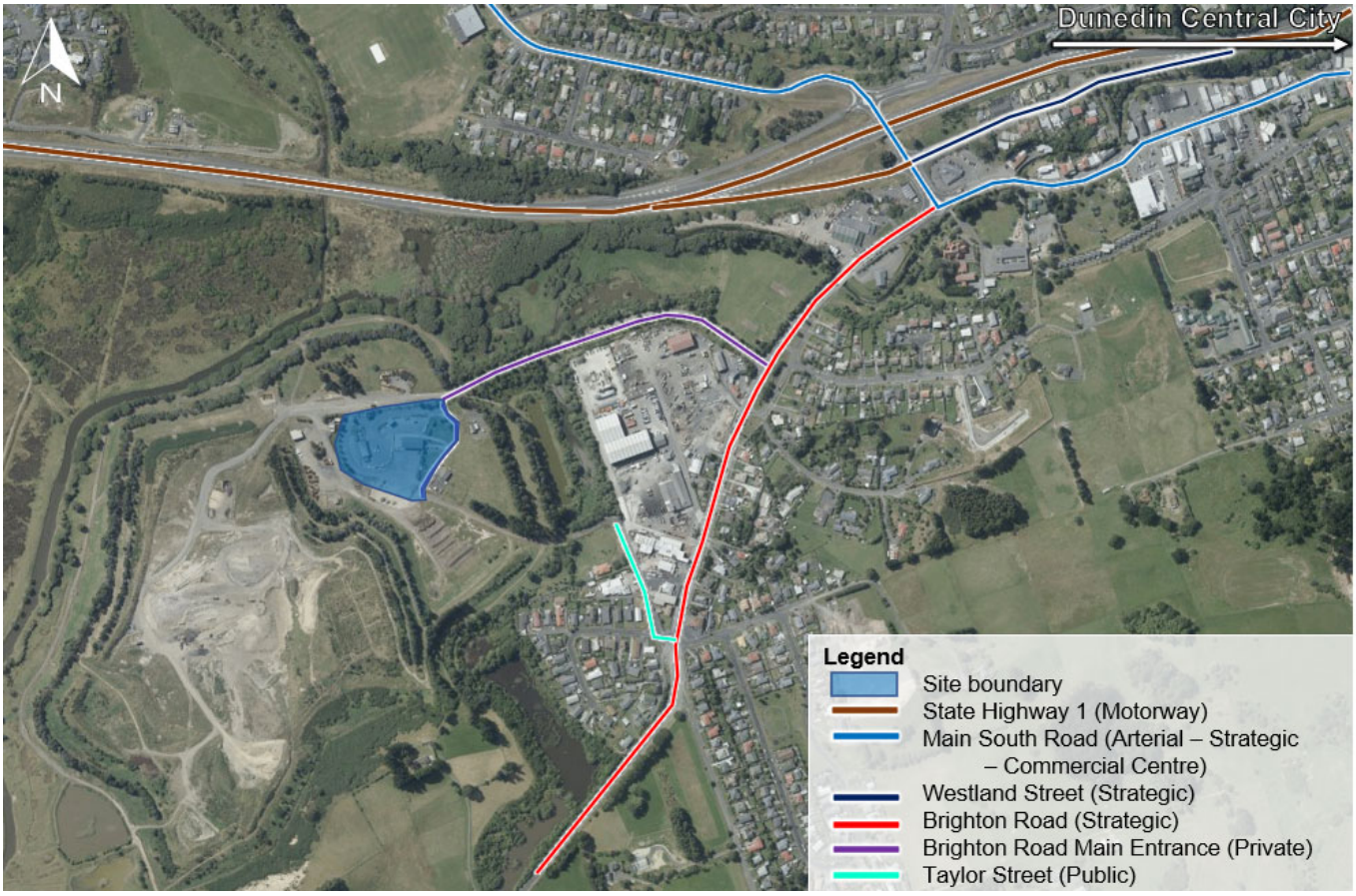

Figure 3 Green Island Resource Recovery Park Location

These roundabouts connect to Brighton Road, which provides the main access into the surrounding residential and industrial area.

Brighton Road connects with the main site entrance to the proposed Green Island Resource Recovery Park Precinct via a priority controlled T-intersection.

2.3 Surrounding road network and land use

Existing land use descriptions are based on the Dunedin City Second Generation District Plan (2GP). Road types are described in both the context of the 2GP and the One Network Framework (ONF). ONF recognises that streets not only keep people and goods moving but they are also places for people to live work and enjoy. ONF is designed to contribute to improving road safety and build more vibrant and liveable communities.[1]

2.3.1 State Highway 1

Dunedin Southern Motorway (State Highway 1) is classified as Motorway in the 2GP and has an estimated average daily traffic volume of 26,000 vehicles per day (MobileRoad 2023). The ONF categorises the section of State Highway 1 as a Transit Corridor.

2.3.2 Brighton Road

Brighton Road is classified as Strategic in the 2GP and has an estimated average daily traffic volume of 8,000 vehicles per day (MobileRoad 2023). Brighton Road intersects with the main entrance to the proposed Green Island RRPP. Brighton Road also provides access to residential beach suburbs to the south and the industrial and residential areas around the existing Green Island landfill site. The surrounding land use is predominately General Residential 1 and Industrial. St Peter Chanel School is located on the northern end of Brighton Road, and Shand Park (a dog exercise area) is located on the east of Brighton Road. The ONF categorises the section of Brighton Road from Main South Road to Weir Street as an Urban Connector.

Figure 4 shows a cross section of Brighton Road looking south, and Figure 5 shows a typical cross section of Brighton Road.

Figure 4 Brighton Road looking south (Source: GHD video survey June 2023)

[1] From Waka Kotahi (New Zealand Transport Agency) ONF Overview. **https://www.nzta.govt.nz/planning-and-investment/planning/one-network-framework/overview/**

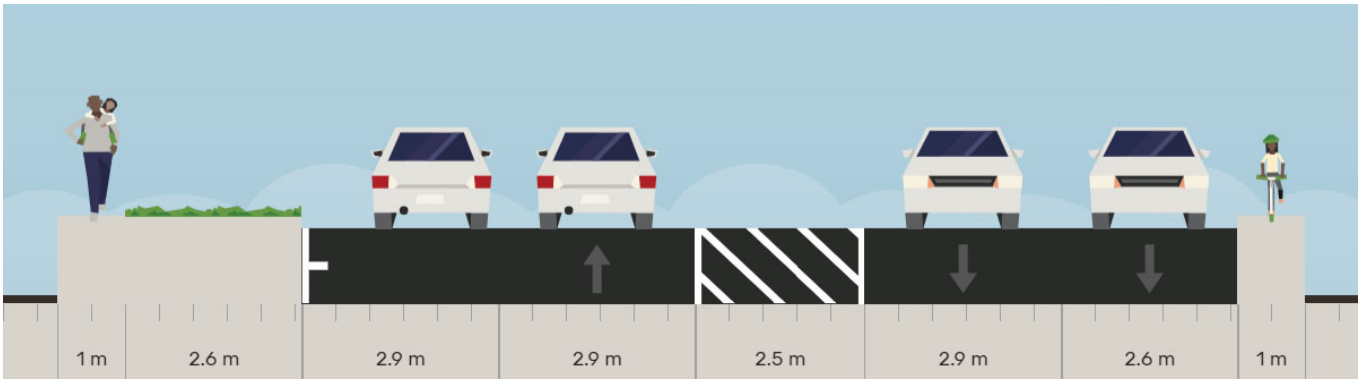

Figure 5 Brighton Road typical cross section – increasing direction looking south

Brighton Road typically has a kerb-to-kerb width of 13.8 m that allows for 2.9 m traffic in both directions, a 2.5 m central flush median and kerbside parking on both sides of the road.

2.3.3 Brighton Road main entrance and Taylor Street (south)

The Brighton Road main entrance and Taylor Street (south) are shown on Figure 8. The portions of road are not connected being unformed paper road between each portion. The main entrance connects to the wider transport network via a priority controlled intersection with Brighton Road. This entrance is classified as a private road in the 2GP. Figure 6 shows a cross section of the Brighton Road main entrance facing west.

Figure 6 Brighton Road main entrance (private road) – looking west (Source: video survey)

Taylor Street (south) is classified as local road in the 2GP and has an estimated Annual Average Daily Traffic (AADT) volume of 500 vehicles per day (MobileRoad, 2023). Figure 7 shows a cross section of Taylor Street (south) entrance facing northwest from Google Street view (latest available in August 2019).

Figure 7 Taylor Street Southern entrance (local road) – looking northwest (Source: Google Maps street view, August 2019)

The ONF categorises the public section of Taylor Street as a Local Street. The surrounding land use is industrial as defined in the 2GP and shown in Figure 8 below.

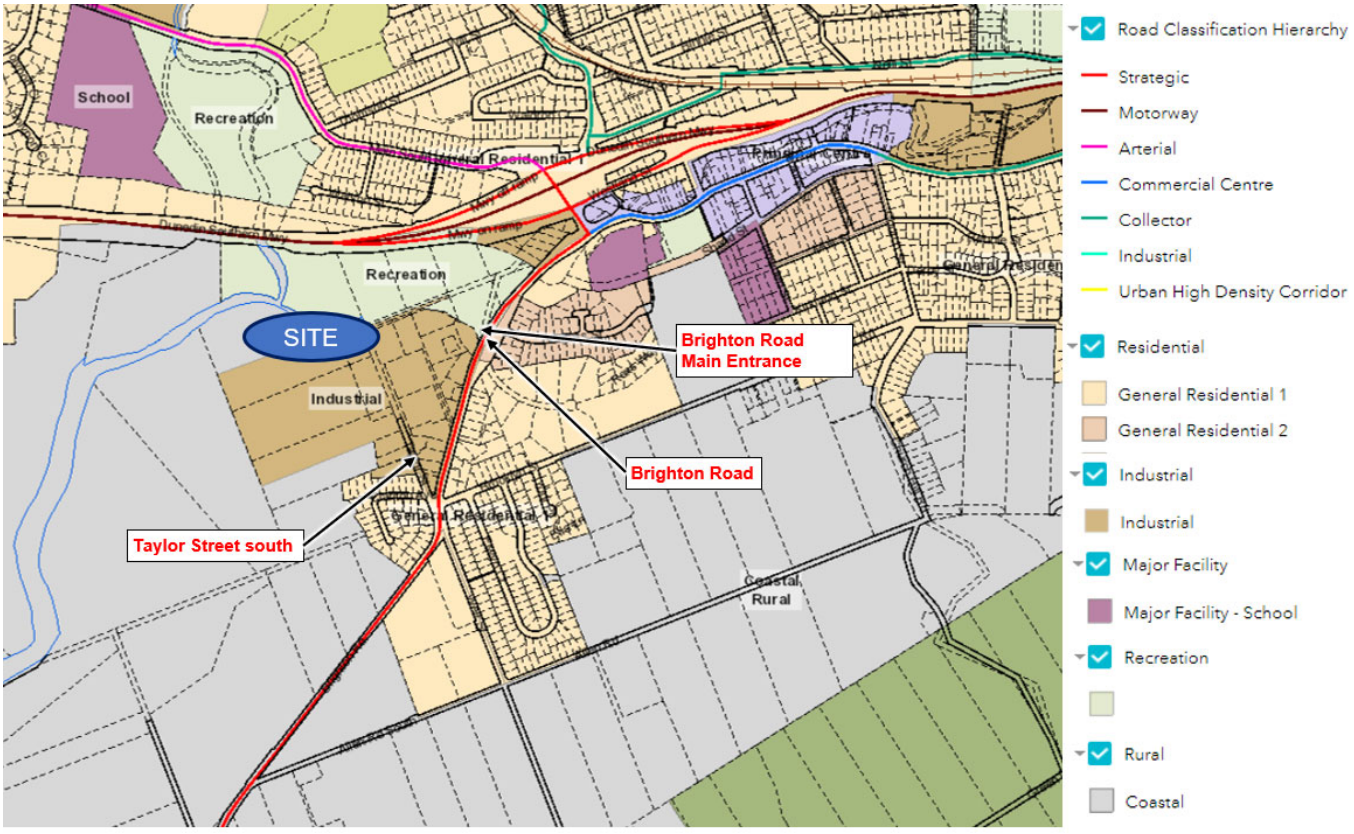

Figure 8 DCC District plan map

The Taylor Street southern access to the subject site was until the early 1990's the primary entrance to the landfill site, prior to the current Brighton Road entrance being established. It is normally locked, and only opened on the very odd occasion, with the express permission of the DCC and Landfill Contractor. The temporary fences shown in Figure 9 are no longer present. A locked gate in this location.

Figure 9 *Taylor Street Southern access blocked off (Source: Google Maps street view, August 2019)*

2.4 Existing transport environment

2.4.1 Strategic freight network

In accordance with DCC Strategic Framework – Dunedin City Integrated Transport Strategy, DCC aims to promote and provide the separation of heavy freight vehicles and vulnerable users through designated heavy freight corridors and bypasses. The strategic freight routes near the site are shown in Figure 10 below.

Figure 10 *Indicative High Productivity Motor Vehicle and over-dimension routes (Source: DCC Strategic Framework – Dunedin City Integrated Transport Strategy – The Strategic Approach – 9.4 Focus on Freight)*

Brighton Road is identified as an indicative high productivity motor vehicle route; and an alternative over dimension route.

2.4.2 Public transport

Public transport routes 70 and 77 operate within the vicinity of the site, these routes are shown on Figure 11.

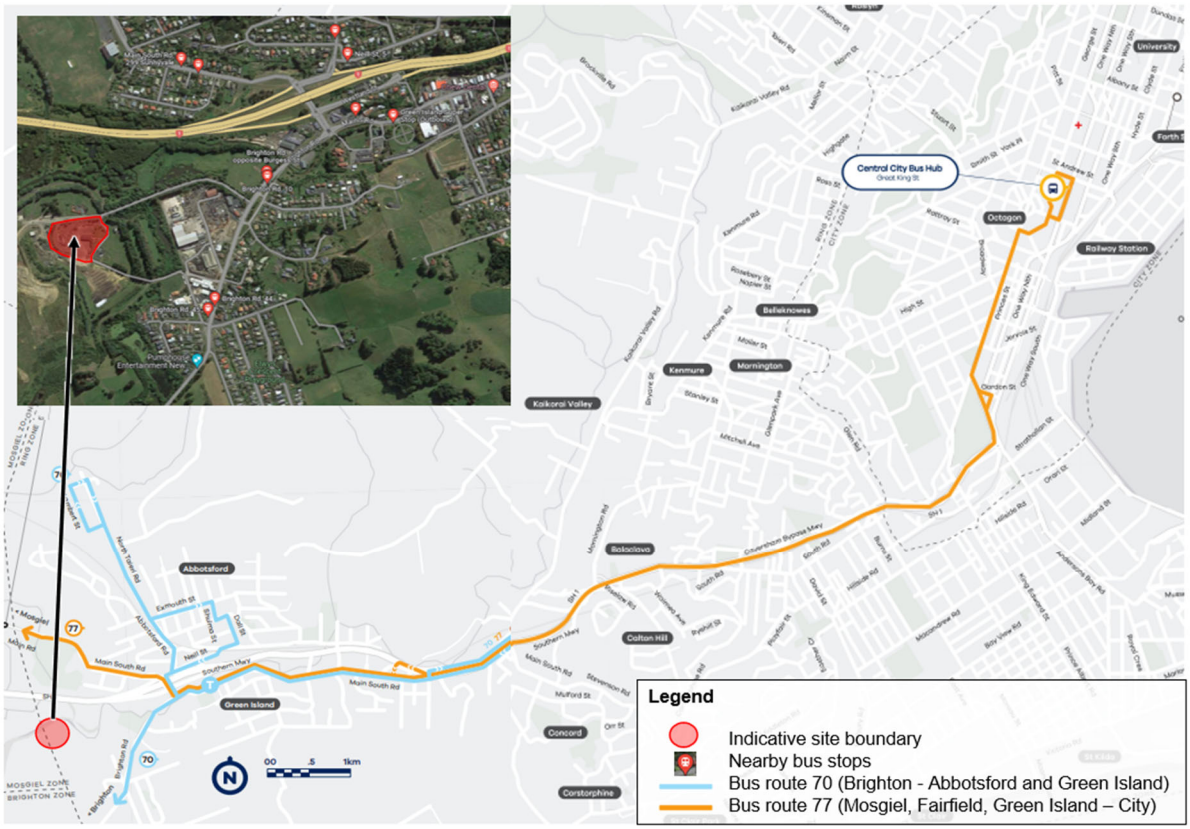

Figure 11 Bus services around study location

The nearest bus stops on Brighton Road are located within a seven minute (550m) walking distance to the site. These bus stops are serviced by route 70 that travels between Brighton and Green Island, as shown on Figure 12.

Another bus service route 77 travels between Dunedin Central and Mosgiel. The bus stops are located further from the site, approximately 12 minutes (940 m) walking distance from the Brighton Road main entrance.

Both bus routes and walking distance from the subject site are shown in Figure 12 below.

Figure 12 Nearest bus stops on Brighton Road and Main South Road

Table 1 summarises the bus frequencies for the existing services during the weekdays and weekends. Route 70 is a low frequency bus route with a morning peak hour bus frequency of two buses per hour, and off-peak frequency of one bus per hour. Route 77 is also a low frequency bus route with an all-day bus frequency of two buses per hour.

Table 1 Existing bus services

Bus Route	Travel Direction	Peak Frequency	Off Peak / Weekend Frequency
70 (Westbound)	Green Island – Abbotsford and Brighton	30 minutes (7:00 am – 8:00 am)	60 minutes
70 (Eastbound)	Brighton - Abbotsford and Green Island	30 minutes (6:25 am – 8:25 am)	60 minutes
77 (Westbound)	City - Green Island, Fairfield, Mosgiel	30 minutes (7:12 am – 7:12 pm)	30 minutes (8:42am – 3:42pm) 4:42pm, 6:12pm, 8:12pm, 9:42pm, 11:42pm
77 (Eastbound)	Mosgiel, Fairfield, Green Island – City	30 minutes (6:00 am – 6:30 pm)	30 minutes (8:00am – 4:30pm) 5:30pm, 7:30pm, 9:00pm, 10:30pm

Along bus route 70, between Brighton and Green Island, existing bus shelters are provided for Green Island-bound bus stops, outside 41 Brighton Road and opposite 10 Brighton Road, as shown in Figure 13. There are no existing shelters installed for Brighton-bound bus stops.

Figure 13 Bus shelters along bus route 70 – outside 41 Brighton Road and opposite 10 Brighton Road

Along bus route 77, between Dunedin City and Green Island, existing bus shelters are provided for both directions. These shelters are located opposite 246 Main South Road and outside 236 Main South Road, as shown in Figure 14.

Figure 14 Bus shelters along bus route 77 – opposite 246 Main South Road and outside 236 Main South Road

2.4.3 Walking and cycling

Brighton Road provides access to the site. The existing cross section on Brighton Road as described in section 2.3.2 allows for approximately 3.5 m of effective lane width in each direction. The available lane width is insufficient to include marked cycle lanes.

The Waka Kotahi Traffic Control Devices Manual[2] recommends a minimum cycle lane width of 1.8 m adjacent to parallel parking. Austroads [3] guide to geometric design recommends a lane width of 3.5 m to be used on all roads, this width can be reduced to between 3 m to 3.4 m on low-speed roads with low truck volumes.

A minimum traffic lane width of 3.5 m and a cycle lane width of 1.8 m requires 5.3 m of traffic lane width in each direction. The existing available lane widths are not wide enough to safely accommodate cyclists, and it is an unattractive option for travel demand generated in the area.

An approximately 1 m wide sealed footpath is available on both sides of Brighton Road as described in section 2.3.2. It is noted that 1 m of sealed width is unlikely to be adequate for a pedestrian to pass another pedestrian, or a wheelchair user or a pram and is less than the minimum footpath width of 1.5m.

2.4.4 On street parking

Two video surveys were undertaken along Main South Road and Brighton Road. The weather for both survey days was recorded as fine.

There is unrestricted kerb side parking located on both sides of Brighton Road, video survey shows approximately 30-40% of kerb side parking is occupied, and most of the cars are parked on the western side of Brighton Road.

[2] https://www.nzta.govt.nz/roads-and-rail/traffic-control-devices-manual/part-5-traffic-control-devices-for-general-use-between-intersections/cycling-facilities/cycle-lanes/
[3] AGRD03-16_Guide_to_Road_Design_Part_3_Geometric_Design_Design_Ed3.4 – Table 4.3

This survey was undertaken on a weekday in June 2023. The video survey shows that no on-street parking is available along the site main entrance off Brighton Road, which is shown as a private road on DCC District Plan.

There was no video survey available along the Taylor Street Southern entrance, which is shown as Local Road on the 2GP. Google Street View from August 2019 shows there is on-street parking along the eastern side, and yellow no-stopping lines along the western side. Vehicles are shown parking over unsealed footpath on both sides of the road.

2.4.5 Speed limits and interim speed management plan

The existing posted speed limits on the road network that provide access to and from the subject site are summarised in Table 2.

Table 2 Existing Posted Speed Limits

Road	Posted Speed Limit (km/h)
Dunedin Southern Motorway (SH1)	100
Main South Road	50
Brighton Road	50
Taylor Street	30

The operating speeds along these routes are unknown.

The DCC have developed an Interim Speed Management Plan (ISMP) in accordance with the setting of speed limits rule 2022. Speed management supports improvements to road safety and is one of the four strategic priorities of the Government Policy Statement (GPS) on land transport.

The ISPM includes planned changes to posted speed limits as shown on Figure 15.

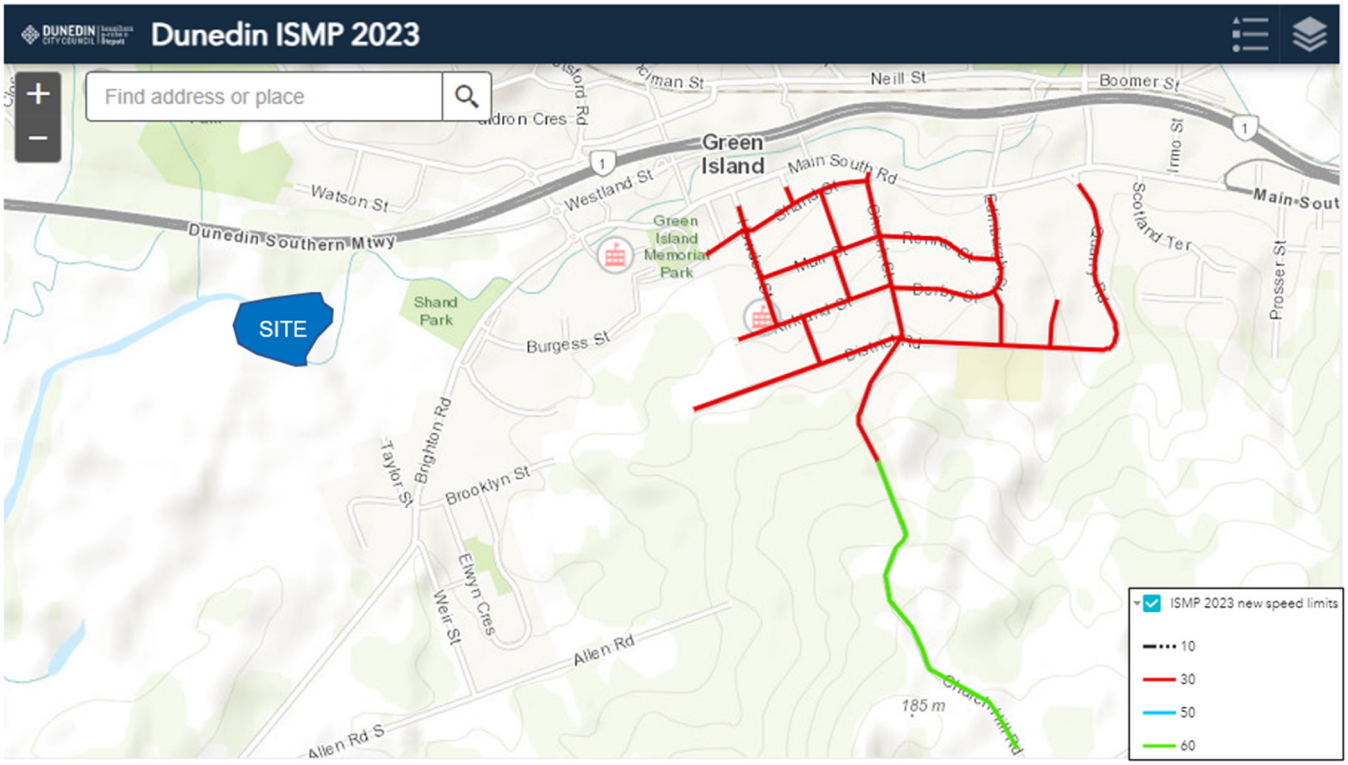

Figure 15 Proposed speed change (Source: DCC Interim Speed Management Plan)

The Interim Speed Management Plan sets speed limits around school zones to meet a regulatory interim target of 40% of schools in a reduced speed zone by 2024. St Peter Chanel School and Green Island School are located to the east of the subject site, and Green Island School is located within a proposed permanent 30 km/h speed limit.

2.4.6 Road safety

The most recent five year Police-reported crash data (2018 to 2023) has been extracted from the Waka Kotahi (New Zealand Transport Agency) Crash Analysis System (CAS) at the below locations:

1. Intersection of Brighton Road and the site main entrance – 50 m along each approach
2. Intersection of State Highway 1, Main South Road and Abbotsford Road – 50 m along each approach
3. Intersection of State Highway 1, Westland Street, and Main South Road – 50 m along each approach
4. Intersection of Main South Road and Brighton Road – 50 m along each approach
5. Brighton Road from the main site entrance to Main South Road

A summary of the crash findings is outlined in Table 3. One serious injury crash was recorded over the analysis period and was an isolated incident involving a motorcyclist losing control on a slippery surface. The remaining crashes are minor injury and non-injury.

Table 3 CAS Summary

Location	Crash Summary
Whole site extent	**1 Serious injury crash** 3 Minor injury crashes 10 Non-injury crashes Majority right angle crashes due to red light running. Some rear end crashes
Intersection of Brighton Road and the site main entrance – 50 m along each approach	No recorded crashes within the most recent five-year analysis period.
Intersection of State Highway 1, Main South Road and Abbotsford Road – 50 m along each approach	**1 Serious injury crash** 2 Non-injury crashes Two recorded bend-lost control/head on crashes and one crossing/turning crash. The serious injury crash involved a motorcyclist striking a patch of diesel on road and lost control. The other two non-injury crashes were both a result of a driver failing to give-way at roundabout.
Intersection of State Highway 1, Westland Street, and Main South Road – 50 m along each approach	3 Minor injury crashes 4 Non-injury crashes Majority of the crashes were crossing/turning, followed by bend-lost control/head on, then straight-lost control/head on. One cyclist (non-injury) and one motorcyclist (minor-injury) were involved in the crashes. Crash results showed that crashes at this intersection are generally vehicle lost control or drivers failed to give way at roundabout due to poor visibility or lack of attention.
Intersection of Main South Road and Brighton Road – 50 m along each approach	2 Non-injury crashes One bend-lost control/head on crash and one crossing/turning crash. Both crashes were a result of a driver failing to give way or failing to stay within the lane.
Brighton Road from the site main entrance to Main South Road	2 Non-injury crashes Two recorded rear end/obstruction non-injury crashes, one crash involved a vehicle doing a U-turn colliding with another moving vehicle, the other crash involved a stolen bus driven by 12-year-old crashing into a parked van on street.

2.4.7 Existing road traffic volumes

Traffic count data is shown in Table 4 and is based on estimates provided by MobileRoad (estimates for 2023[4]).

Table 4 Existing average daily traffic volumes (Mobile Road)

Road	Location	Average daily traffic (ADT)	Heavy vehicle portion (HV %)	Estimated peak hour traffic (veh/hr)
Brighton Road	From the main site entrance to Brighton/Main South roundabout	8,825	3%	900
Main South Road	From Brighton/Main South roundabout to Howden Street	9,516	1.6%	950
Main South Road	From Brighton/Main South roundabout to Main South/Westland roundabout	10,996	4.2%	1,100
Main South Road	From Main South/Westland roundabout to Main South/Main South roundabout	9,387	4.5%	950
SH1 on and off ramps	Approaches to Main South/Westland roundabout to Main South/Main South roundabouts	2,029 to 3,625	2-4%	200 to 370

Brighton Road and its roundabout connections to State Highway 1 have an average volume of approximately 9,000 to 11,000 vehicles per day. The on and off ramps to these roundabout connections have average volumes of approximately 2,000 to 3,700 vehicles per day.

Peak hour traffic has been estimated by applying a rule of thumb. Typically peak hour volumes are about 8-10% of the average daily traffic in urban situations and 11-16% in rural situations (Austroads Guide to Traffic Management, Part 6, section 3.3.6). Thereby adopting 10% of daily traffic as peak hour traffic is an acceptable approach, in the absence of actual traffic count data. The estimated average daily traffic and peak hour volumes are in both directions of travel.

Traffic data provided by Google Maps shows that traffic typically flows well during the AM peak from 8 am to 9 am (see Figure 16) and during the PM peak from 5 pm to 6 pm (see Figure 17).

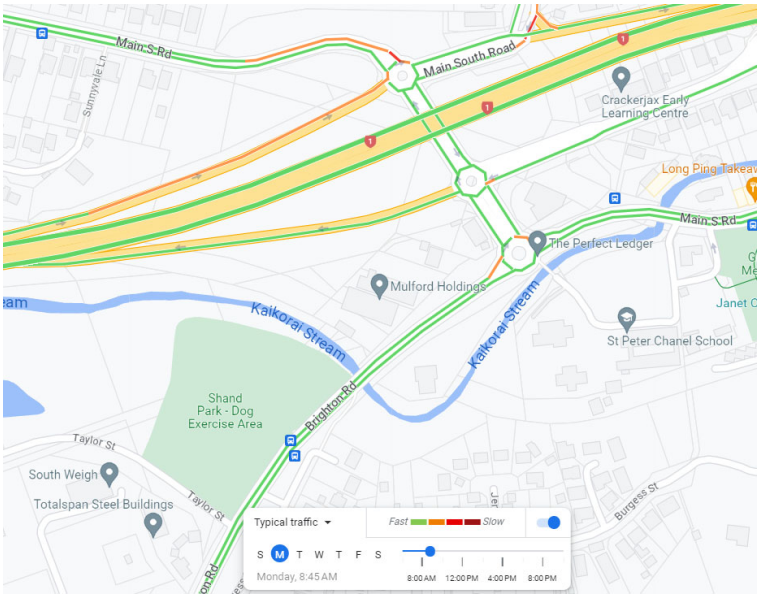

Figure 16 Google maps traffic data AM peak

[4] Waka Kotahi, Mobile Road application. Retrieved online July 2023, via: https://mobileroad.org/

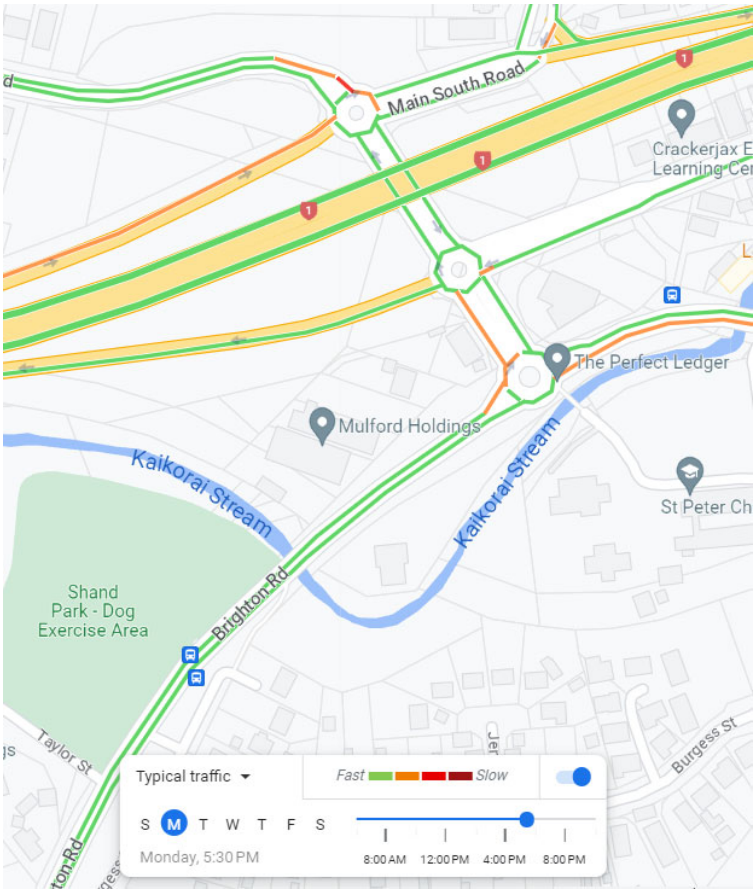

Figure 17 Google maps traffic data PM peak

Austroads Guide to Transport Study and Analysis Methods [5] sets out typical mid-block capacities for urban roads with interrupted flow. In this case Brighton Road from the main entrance to the Main South Road roundabout is the mid-block urban section that is interrupted by the roundabout.

Traffic lanes adjacent to existing parking have a reported mid-block capacity of approximately 900 vehicles per hour. [6]Brighton Road has one lane in each direction so a total capacity of 1,800 vehicles per hour. The estimated peak hour traffic shown in Table 4 on Brighton Road is no more than 900 vehicles per hour, which is well within the theoretical capacity of 1,800 vehicles per hour.

2.5 Existing site traffic volumes

The proposed Green Island RRPP will change the services offered at the existing transfer station. Traffic is currently generated from the activities relating to:

1. Domestic and commercial waste drop-off
2. Domestic and small business recycling and green waste drop off
3. Commercial recycling pickup
4. Staff working on site and associated service vehicles
5. Domestic rummage store customers and reusable goods drop-off

The existing site does not currently process recycling from kerb side collections. Kerbside recycling is processed at a temporary off-site facility, on Brighton Road adjacent to the main site entrance.

Existing site traffic volumes are based on weighbridge data and information supplied by DCC as described in following sections. Existing site traffic volumes are reported in trips per day and trips per year.

[5] Austroads, Guide to Traffic Management Part 3, Transport Study and Analysis Methods, 2020 (AGTM03-20)
[6] Table 6.1 - AGTM03-20

For this report, one vehicle trip is an inbound movement to the site or an outbound movement from the site. For example, two trips are generated by a vehicle that arrives and drops of rubbish then leaves the site. The reported trip volumes include inbound and outbound movements.

2.5.1 Existing staff traffic volumes

DCC have confirmed that a total of 14 to 16 staff work at the existing landfill and associated facilities. It is conservatively assumed that:

– All staff travel to work in a single occupancy light vehicle;
– All 14-16 staff are on site during landfill operating hours.

Existing staff generate a total of 11,584 vehicle trips per year or approximately 32 vehicle trips per day.

2.5.2 Existing domestic rummage store and recycling drop off traffic volumes

DCC have confirmed that on average a total of around 300 people visit the domestic rummage store and recycling drop off per day, and that the daily volume is subject to seasonal variations. It is assumed that:

– All visits are in a single occupancy light vehicle;
– The rummage store and recycling drop off is open 362 days per year[7];
– The estimated yearly trip generation follows the same seasonal variations as the existing Green island landfill activities captured by weighbridge data.

The domestic rummage store generates approximately 220,000 vehicle trips per year or approximately 600 vehicle trips per day. These customers are not logged via the existing Green Island landfill weighbridge system.

The remaining traffic volumes generated by existing Green Island landfill activities are captured from weighbridge data described in section 2.5.3.

2.5.3 Existing weighbridge data

DCC have provided all weighbridge transactions for the calendar year 2022. In summary the existing landfill activity generates some 175,000 vehicle trips per year or approximately 475 vehicle trips per day. In addition to the vehicle trips reported in section 2.5.1 and 2.5.2, approximately 30% of the weighbridge trips are estimated to be heavy vehicles. The distribution of weigh bridge trips over 2022 is shown in Figure 18

[7] The landfill is closed Easter Friday, Christmas Day and on ANZAC day until 1pm. For the purposes of this study the number of days has been rounded down to 362.

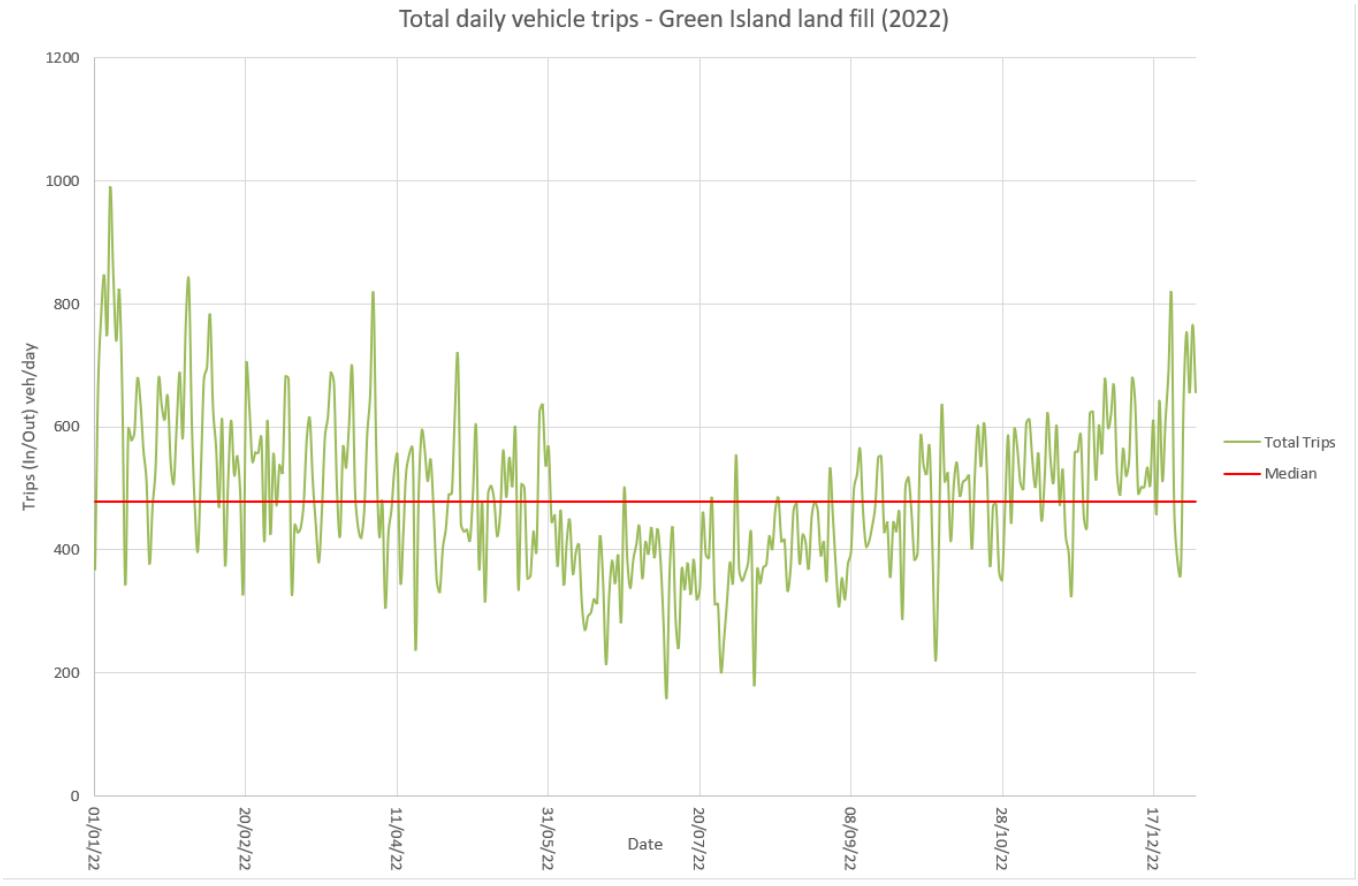

Figure 18 2022 profile of total daily vehicle trips from Weighbridge data

The weighbridge data captures an individual vehicle's weight coming into and out of the site, this is recorded as a single entry in the data set. This data was multiplied by two to calculate the total trips into and out of the site. The Figure 18 graph shows total trips into and out of the site over an entire year.

Heavy vehicles (HVs) have been defined as all vehicles with a gross vehicle mass (GVM) greater than or equal to 3.5 tonnes. Over one year the total HV volume is approximately 30% of the total vehicle trips generated.

Daily trip data fluctuates seasonally over the year. The highest trip volumes are from January to May and October to December. There is a notable decrease in volumes through the colder winter months. This seems understandable given the lower volume of construction activity during the winter, and domestic waste being reduced due to lower volumes of garden waste being produced and generally less trips to the landfill due to inclement weather. Figure 19 shows this trend by month.

2.5.4 Total site traffic volumes

The existing staff, rummage store and recycling drop off and weighbridge data have been combined to give a total existing site traffic volume over one year. The total site traffic volume is shown on Figure 19 as trips per month across one year.

The estimated 11,584 vehicle trips generated by staff per year is assumed to be spread evenly across the year. The estimated 220,000 vehicle trips per year generated by the domestic rummage store and recycling drop off is assumed to follow the yearly weighbridge profile as shown on Figure 18. The estimated 177,000 vehicle trips per year captured by weighbridge data follows the profile as shown on Figure 18.

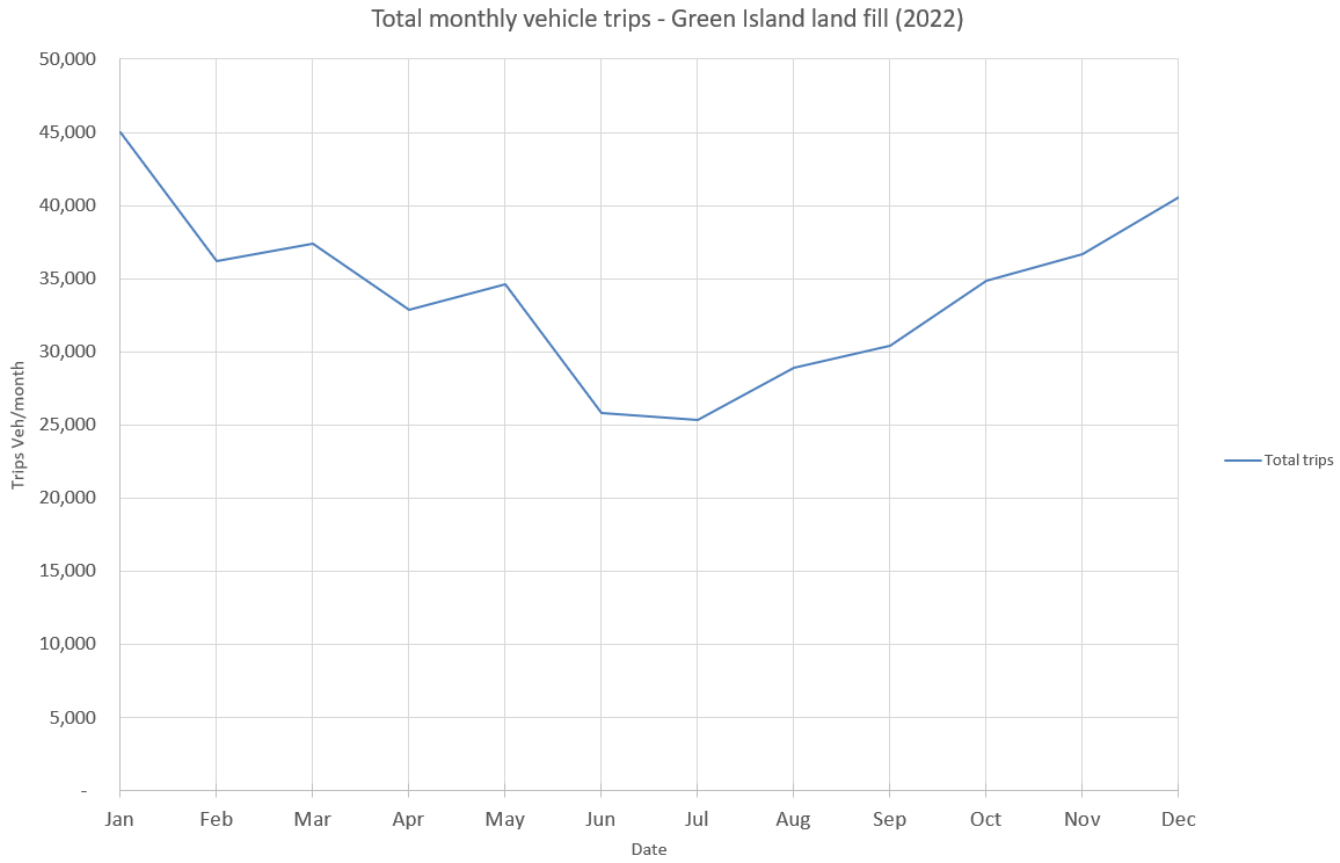

Figure 19 Total monthly vehicle trips – Green Island landfill

Traffic volumes on the surrounding road network are also subject to seasonal variations and typically reduce around the summer holiday period when schools and universities are closed and a high portion of employees take leave over this period. Traffic volumes typically return to normal around February/March when all schools, tertiary education institutions have resumed for the year and the majority of employees have returned to work.

The busiest week of weighbridge data from February to May was analysed to provide details of hourly trip generation. Daily traffic generated by staff, domestic rummage store and recycling drop off has been added to this week of weighbridge data. These hourly trip rates are shown on Figure 20 and coincide with traffic on the surrounding network operating at peak levels.

The daily traffic generated by staff is assumed to arrive between 7 am and 8 am prior to the landfill opening at 8 am and leave from 5 pm to 6 pm. The landfill closes at 5:30 pm for the day and operates 362 days per year.

The daily traffic generated by the domestic rummage store and recycling drop off is assumed to follow the same hourly profile as reported from the weighbridge data.

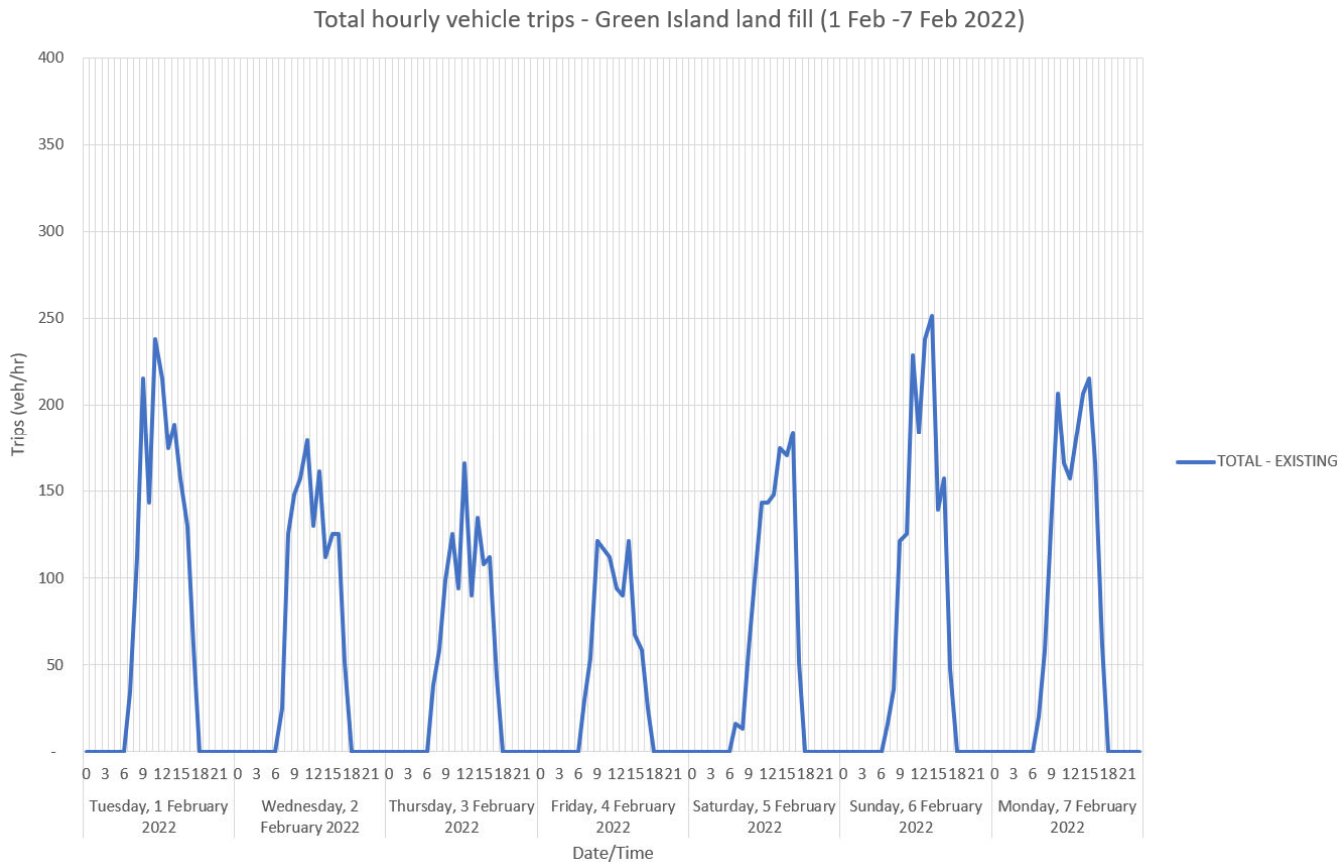

Figure 20 Total hourly vehicle trips – Green Island landfill

The weekday peak hourly flow at the landfill of 238 trips per hour occurs around the middle of the day. Average landfill traffic flows during typical weekday peak periods are:

– 82 trips per hour in the morning peak (8 am to 9 am)
– 48 trips per hour in the evening peak (5 pm to 6 pm)

These peak hour trip rates are the average weekday values across the busiest week from February to June 2022 and coincide with peak traffic volumes on the surrounding road network.

2.5.5 Existing traffic volumes by waste type

The weighbridge transaction data is separated into product groups and names that generally describe the type of waste being weighed. This data has been interpolated to provide a summary of the trips generated and volume of material (tonnes) by type of waste. This data is shown on Table 5 together with existing staff traffic volumes, domestic rummage store and recycling drop traffic volumes. Table 5 can be used to estimate the distribution of vehicle trips to the proposed RRPP activities.

Table 5 Inbound traffic volumes and weight by product group (per year)

	Recycling and Waste					Non Waste			TOTAL
	A - Recycling	B - General Waste	C - Green Waste	D - Hazardous Waste	E - Inert Waste	F - EnviroNZ Services Limited (ESL) Compound	G - Site offices, staff facilities and other	H - Rummage store and recycling drop off	
Total Inbound Trips	6,037	55,346	16,509	2,929	7,657	0	5,792	110,048	204,318
Total Trips	12,074	110,692	33,018	5,858	15,314		11,584	220,096	408,636
Total tonnes	13,33	48,338	3,531	10,091	52,677		0	Unknown	115,970
% Total trips	3%	27%	8%	1%	4%	0%	3%	54%	100%
% Total tonnes	1%	42%	3%	9%	45%		0%		100%

The majority of waste in tonnes is B – General waste and E - Inert waste and the majority of trips are generated by B -General waste and H - Rummage store and recycling drop off.

The majority of inert waste is used as cover material for landfill operations. The existing Green Island landfill operation is expected to operate until 2029, and at this time inert waste will not come to site. The proposed development trip generation described in section 4, includes inert waste as the landfill operates concurrently with the fully developed RRPP and also reports trip generation beyond 2029 when inert waste no longer is transported to site.

3. Proposed development

3.1 Proposed activities

The proposed layout of the RRPP is shown in Figure 21, which describes each activity and its location.

A number of the proposed activities function together and can generally be described as:

A. **Recycling –** Materials Recovery Facility (MRF) to process recyclable material collected kerbside from household recycling (Yellow Bins). **Area 1 and 2 on Figure 21.** Glass bunkers to collect recyclable glass are located in **Area 10.**

B. **General waste** - A Bulk Waste Transfer Station (BWTS) to process general waste collected kerbside from household (Red bins), general commercial waste and domestic waste transported on private light vehicles. **Area 3 and 7 on Figure 21.**

C. **Green waste** - **Organics Receival Building (ORB), Organics Processing Facility (OPF),** OPF bunkers and space for an extension, OPF maturation area – to process green waste collected kerbside from household (Green bins), commercial green waste and domestic green waste transported on private light vehicles. **Areas 9, 5, 11, 12, 13 and 18**

D. **Hazardous waste** - drop off and storage areas. **Areas 8a and 8b**

E. **Inert waste**. Includes: clean fill, rubble and topsoil. The majority of inert waste is used as cover material for landfill operations. The existing Green Island landfill operation is expected to operate until 2029, at this time inert waste will not come to site. **Area 7 on Figure 21.** Area 7 is a large concrete pad for sorting of Construction and Demolition Waste.

F. **EnviroNZ Services Limited (ESL) compound** – This allows for rubbish truck parking, and servicing. **Areas 15 and 6**

G. **Site offices, staff facilities and other** - The remaining areas have been allocated for worker facilities, site offices, educational facility and parking areas for staff and visitors. **Areas 4,16,1**7

H. **Domestic rummage store and recycling drop-off** – This is an existing activity and provides an area for customers to drop off recycling and re purchase recyclable items at the rummage store. **Area A on Figure 21.**

Figure 21 ***Proposed Resource Recovery Park Activities – Green Island landfill***

3.2 Proposed vehicle access and circulation

All vehicles will enter the site via the Brighton Road main entrance and will go through the existing weighbridge and exit the site via the weighbridge. The majority of commercial heavy vehicles access and egress the various activities on site via a proposed roundabout to the west of the existing weighbridge.

Smaller domestic vehicles are provided access and egress to recycling, green waste and general refuse areas via a priority controlled T intersection that is located to the immediate west of the weighbridge. Domestic vehicles (mostly light vehicles) egress via a right turn at this intersection.

Figure 22 illustrates the overall site access, where light vehicles are typically restricted to the area shown in red and heavy vehicles are typically restricted to the area shown in green, and these vehicles only interact when egressing via the proposed roundabout.

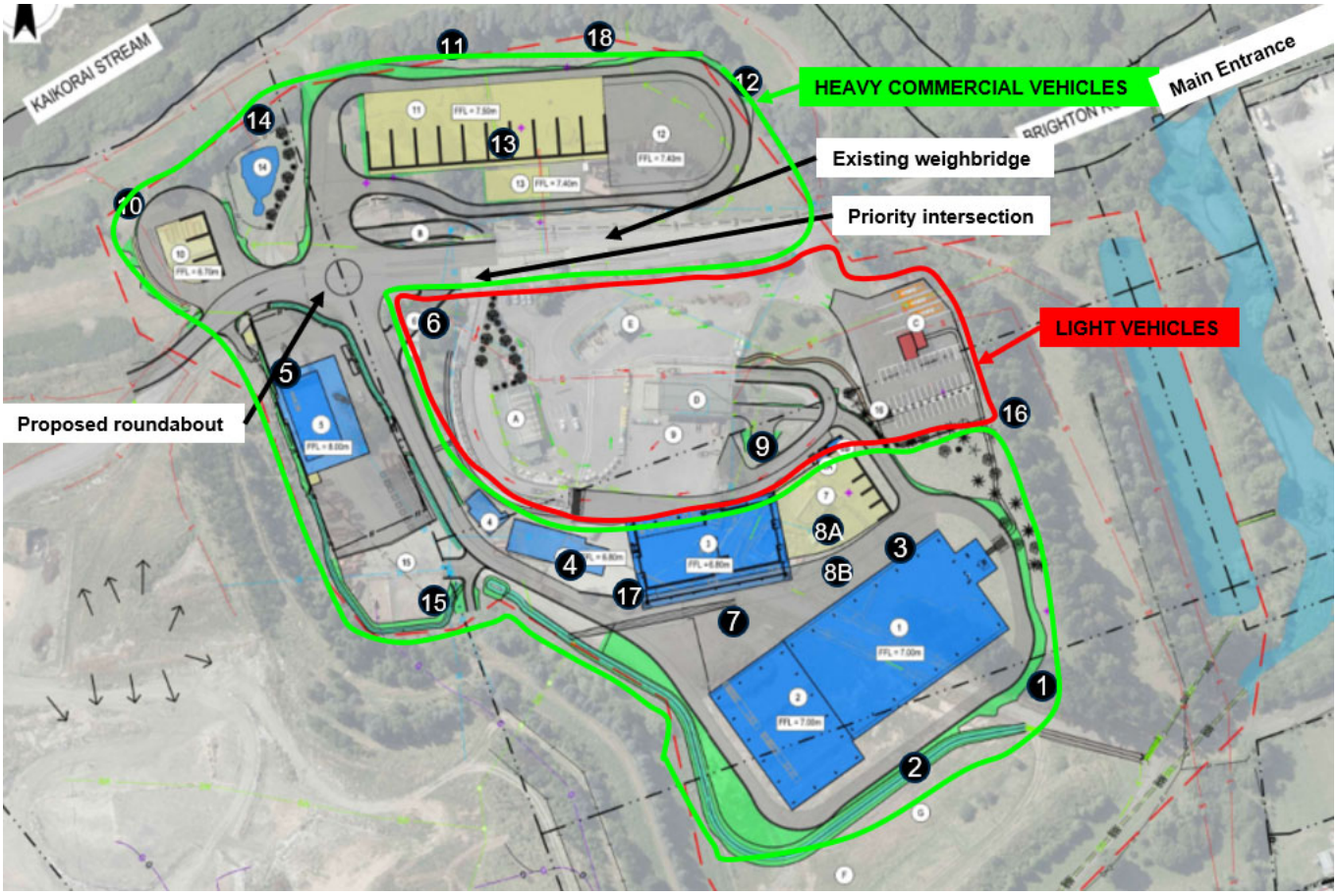

Figure 22 Heavy commercial vehicles and light vehicle access areas

A small volume of heavy vehicles are occasionally required to interact with smaller domestic vehicles (mostly light vehicles) to move recyclable materials from the existing domestic recycling drop off area and green waste drop off area to other processing areas on site.

Indicative vehicle circulation routes corresponding to each activity on-site are shown on Figure 23.

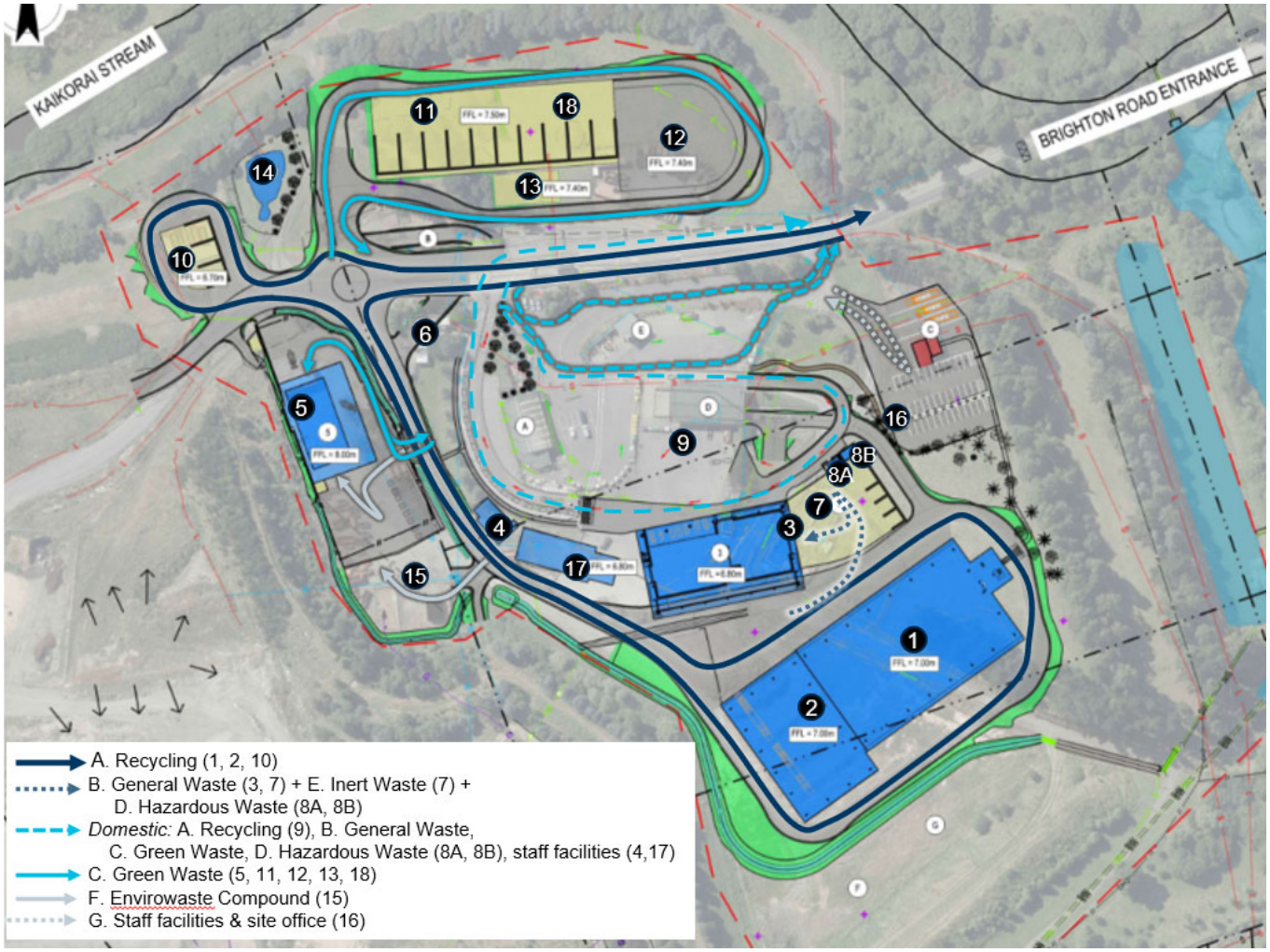

Figure 23 Indicative vehicle circulation

3.3 Pedestrian access and connections

The internal pedestrian connections have been highlighted on Figure 24.The education centre has adequate connections to the MRF building, workers facilities and proposed carparking area. The proposed parking area adjacent to the workers facilities **(Area 4 and 12)** provides a pedestrian connection to the ESL compound.

The existing recycling rummage store **(Area A)** and surrounding existing recycling area has a number of carparks and pedestrians walk between the rummage store and car parks. This entire area is proposed to be separated from heavy traffic. A small volume of heavy vehicles is occasionally required to enter this area and remove recyclable materials to other processing areas on site or remove from site. This infrequent and low volume of heavy traffic can be managed by closing off the particular lane being collected, while adjacent lanes remain open for customers to use. It is assumed that existing pedestrian access and movement in this area will not change.

Pedestrian access from Brighton Road to the site is not formally available adjacent to the main entrance and along the accessway to the main site. The existing carriageway width of the main entrance is not wide enough to include dedicated cycle lanes, so cyclists and general traffic share the single traffic lane. Cyclists and pedestrians typically use the grass verges adjacent the road-edge or use the left side of the traffic lane. There are no known road safety concerns with regard to cyclists and pedestrians.

It is understood that DCC plan on some minor widening of the existing Brighton Road accessway in the short term, before planned longer term investment in upgrading the entire entrance and accessway to the site. This planned investment aims to improve pedestrian and cycle accessibility.

Figure 24 Internal pedestrian connections (shown as dashed cyan lines)

3.4 On-site parking

Table 6 summarises the proposed parking spaces for a number of operational activities on site and for staff. The parking areas are shown on Figure 25. It is noted that there is no cycle parking identified to be provided in the proposed development.

Table 6 Proposed development on-site parking

Area	Proposed development car park spaces	Proposed car parking design
A – Recycling (Area 1, 2 and 10)	No car parking available, for commercial access and domestic vehicles only.	N/A
B - General Waste (Area 3 and 7)	No car parking available, for commercial access and domestic vehicles only. Trucks and trailers can access Area 3 to off-load.	N/A
C - Green Waste (Areas 9, 5, 11, 12, 13 and 18)	No car parking available, for commercial access and domestic vehicles only.	N/A
D - Hazardous waste (Areas 8a and 8b)	No car parking available. Area 8A is for hazardous public drop off (Large Rigid Truck, 12.5m radius)	N/A
E – Inert Waste	No carking required. These vehicles come to and from the landfill, and will continue to do so until 2029.	N/A
F – ESL Compound	8 proposed truck park spaces in Area 15.	90° parking angle Stall width: 3.3m Stall depth: 9.5m Aisle width: 13.6m minimum
G – Site Offices, staff facilities and other (Area 4,16,17)	North of Area 4 – 14 parallel spaces.	Parallel parks Approx. 45° parking angle, along access Stall width: 2.3m Stall length: 6m
	East of Area 16 – 33 angle spaces, 3 mobility spaces. 39 spaces in total. Three tour coach spaces	90° parking angle Stall width: 2.5m Stall depth: 5.0m Aisle width: 5.2m minimum Tour coaches spaces: 5m wide, 20m long
H - rummage and domestic recycling drop-off.	Existing activity car parking spaces remain.	Existing activity car parking spaces remain

Figure 25 shows layout of the proposed vehicle parking areas.

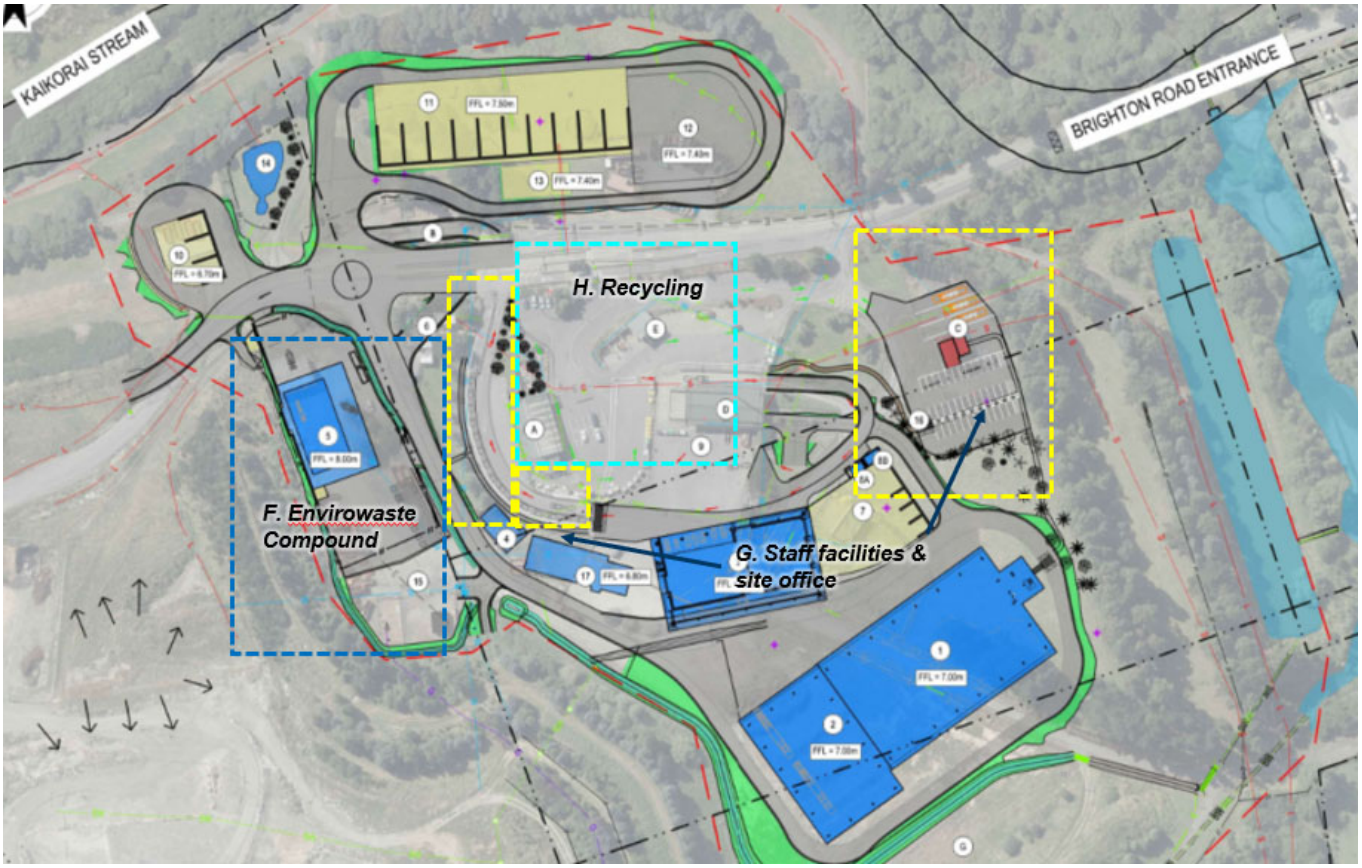

Figure 25 Proposed vehicle parking areas

Table 7 lists car parking design minimum dimensions requirements in accordance with DCC Second Generation District Plan – Rule 6.6 Parking, Loading and Access Standards.

Table 7 DCC car parking design requirements – minimum dimensions

Parking type	Parking angle	Stall width	Aisle width	Stall depth
Parking spaces provided for all other activities (expect for residential activities)	90°	2.5m	6.2m	5.2m
	45°	2.5m	4.2m	5.5m

Area G – Site Offices, staff facilities and other: There is a total width of approximately 30.5m across the tree rows of parking. This width allows for; 5.2m stall, 6.2m aisle, 5.2m stall, 2.5m path, 5.2m stall and 6.2m aisle and meets the DCC 2GP parking requirements for a 99th percentile vehicle. There is a total parking area width of approximately 38m that allows for; 6.2m aisle width, 27m parking (11 x 2.5m parks), 3.6m mobility park. This width is available across all three rows of parking and meets the DCC 2GP parking requirements for a 99th percentile vehicle.

The 14 parallel parking spaces to the north of area 4 are 6m long and greater than 2.3m wide and meets the DCC 2GP parking requirements.

Area F – ESL Compound: It is noted that DCC 2GP does not provide requirements for truck parking. However, parking spaces shall be designed for trucks to be able to turn into a park in a single movement and exit a park in a single reverse and forward movement, to avoid creating occasional operational issues or having impacts on the surrounding road environment.

3.5 Vehicle loading arrangements

Heavy vehicles are categorised into two design vehicle types, based on their purpose:

– Offloading incoming waste, typically on a rigid truck with a maximum haulage weight of 11 tonnes

– Outgoing processed waste, typically on a truck and trailer with a maximum haulage weight of 27 tonnes.

Occasionally larger High Production Motor vehicles (HPMV) with a maximum haulage weight of 30-33 tonnes are used to remove outgoing waste. The smaller truck and trailer produces more vehicle trips and is a conservative assumption. It is assumed the HPMV vehicles are based on Waka Kotahi pro forma designs and is assumed to fit within the RTS18 – 18m long semitrailer design vehicle.

Table 8 summarises the design vehicles adopted for the vehicle tracking that has been assessed for the incoming and outgoing waste.

In accordance with the DCC District Plan – Rule 19.5 Land Use Performance Standards, industry activity types must provide a minimum on-site vehicle loading of 1 loading space to accommodate an 8m long rigid truck. The design vehicle used is an 11.5m long Large Rigid Truck as defined in RTS18, which conservatively allows for a larger tracking path than the DCC 8m rigid truck design vehicle.

Table 8 Proposed development design vehicles

Area	Offloading incoming waste	Outgoing processed waste
A – Recycling (Area 1, 2 and 10)	Design Vehicle: RTS18 – 11.5m long Large Rigid Truck DCC District Plan: 8m long Rigid Truck	Design Vehicle: RTS18 – 18m long Semitrailer DCC District Plan: 20m long B-train Truck
B - General Waste (Area 3 and 7)	Design Vehicle: RTS18 – 11.5m long Large Rigid Truck DCC District Plan: 8m long Rigid Truck	Design Vehicle: RTS18 – 18m long Semitrailer DCC District Plan: 20m long B-train Truck
C - Green Waste (Areas 9, 5, 11, 12, 13 and 18)	Design Vehicle: RTS18 – 11.5m long Large Rigid Truck DCC District Plan: 8m long Rigid Truck	Design Vehicle: RTS18 – 18m long Semitrailer DCC District Plan: 20m long B-train Truck
D - Hazardous waste (Areas 8a and 8b)	Design Vehicle: RTS18 – 11.5m long Large Rigid Truck DCC District Plan: 8m long Rigid Truck	Design Vehicle: RTS18 – 18m long Semitrailer DCC District Plan: 20m long B-train Truck
E – Inert Waste	Design Vehicle: RTS18 – 11.5m long Large Rigid Truck DCC District Plan: 8m long Rigid Truck	Design Vehicle: RTS18 – 18m long Semitrailer DCC District Plan: 20m long B-train Truck
F – ESL Compound	Design Vehicle: RTS18 – 11.5m long Large Rigid Truck and a specific Environmental Services hook bin truck and trailer unit. DCC District Plan: 8m long Rigid Truck	
G – Site Offices, staff facilities and other (Area 4,16,17)	Design Vehicle: 90th percentile design motor vehicles, 4.6m DCC District Plan: 99th percentile design motor vehicles, 5.2m Design Vehicle: RTS 18 – 12m long Tour Coach	
H – Domestic rummage store and recycling	Typically: DCC District Plan: 99th percentile design motor vehicles, 5.2m with a trailer. Design Vehicle: RTS18 – 11.5m long Large Rigid Truck This is an existing activity, tracking paths have not been shown. .	

RTS 18 identifies other heavy vehicles such as a B-Train truck as defined in Figure 6B.11 in the DCC District Plan and truck-and-trailer units as described in the proposal that are planned to remove waste from the site. RTS18 confirms that both of these heavy vehicles track within the RTS18 Semi Trailer turn path. Although these vehicles are longer, they have more points of articulation so can track within the semitrailer path.

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As shown above, the vehicle tracking was completed for design vehicles from the Waka Kotahi RTS 18 guidelines for vehicle tracking curves.[8]. This guideline has a greater space requirement for turning, than the required DCC District Plan design vehicle standard. On this basis, adequate space for the design heavy vehicles has been provided that allows for incoming waste on typically smaller vehicles, and outgoing waste on larger truck-and-trailer units or semitrailers. All design heavy traffic movements are shown on Attachment 2 Heavy Vehicle Turn Paths. The vehicle tracking checks allow for clearance envelope of 500mm, to allow for tolerance to obstructions.

4. Proposed development trip generation

For the purposes of forecasting future traffic demand, the proposed activities have been grouped into three broad categories. Assumptions made and the estimated traffic volume for all activities within each category is described in Attachment 1 and summarised in Table 9.

[8] https://www.nzta.govt.nz/assets/resources/road-traffic-standards/docs/rts-18.pdf

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Table 9 Estimated future traffic generation (trips per year, where a trip is an inbound or outbound movement)

Waste stream	Category 1 - Inbound Waste			Category 2 - Supporting Commercial Activities			Category 3 - Outbound Waste
	1) Existing waste volumes and staff volumes	2) All kerbside recycling	3) All kerbside green waste	4) ESL truck compound	5) Staff and visitors	6) Rummage store and recycling drop off	7) Waste off site
A - Recycling	12,074						5,251
B - General Waste	110,692						4,444
C - Green Waste	33,018		32,760				1,074
D - Hazardous Waste	5,858						
E - Inert Waste	15,314						390
F - ESL Compound				22,880	14,480		
G - Site offices, staff facilities and other	11,584				6,516		
H – Domestic rummage & recycling drop-off						220,096	
SUBTOTAL (existing in grey)	**188,540**	**0**	**32,760**	**22,880**	**20,996**	**220,096**	**11,159**
% HVs	**28%**	**100%**	**100%**	**100%**	0%	**0%**	**100%**
Existing Trips/year	**188,540**					**220,096**	
Total Existing Trips/year	**408,636**						
TOTAL TRIPS/YEAR (existing + proposed)	**496,431**						
TOTAL HGV TRIPS/YEAR (existing + proposed)	**115,819**						
%HGV	**23%**						

The estimated future traffic generation shown on Table 9 allows for a fully operational Green Island RRPP and assumes the adjoining landfill has reached the end of its life.

The traffic generation assumptions in Attachment 1 notably show zero traffic being generated by the kerbside recycling activity (2 - All Kerbside recycling). This activity is currently located adjacent to the existing Green Island Landfill. The traffic generated from this activity is included within the base traffic on Brighton Road. Moving this activity to the permanent MRF building within the site does not generate any additional traffic on the surrounding road network. The only change is an increase in the number of turning movements at the existing Brighton Road main entrance. This increase is estimated to be 114 trips per day or 57 right turns in and 57 left turns out.

The volume of outbound inert waste (7 - Waste off site, E – Inert Waste) has been reduced significantly as noted in Attachment 1. The majority of inert waste is used as cover material for landfill operations. The existing Green Island landfill operation is expected to operate until 2029, at this time inert waste will not come to site. This is a reduction from around 11 trips per day to around 2 trips per day.

Annual traffic generation is spread across the assumed number of work days per year for each activity, these assumptions are included in Attachment 1 and total trips per day are summarised in Table 10.

Table 10 Estimated future traffic generation (where a trip is an inbound or outbound movement)

Waste stream	Category 1 - Inbound Waste			Category 2 - Supporting Commercial Activities			Category 3 - Outbound Waste
	1) Existing waste volumes and staff volumes	2) All kerbside recycling	3) All kerbside green waste	4) ESL truck compound	5) Staff and visitors	6) Rummage store and recycling drop off	7) Waste off site
Trips / year	188,540	0	32,760	22,880	20,996	220,096	11,159
Workdays / year	362	260	260	260	362	362	362
Trips / day	521	0	126	88	58	608	31
Existing Trips / day	**521**					**608**	
Total Existing Trips / day	**1,129**						
Total trips / year (existing + proposed)	**496,431**						
Total trips / day (existing + proposed)	**1,432**						

Traffic volumes are estimated to increase from approximately 408,636 to 496,431 trips per year and from around 1,129 trips per day to 1,432 trips per day on an average weekday. The increase in daily trips is approximately 303 trips per day and meets the definition of a high traffic generator described in the DCC 2GP.

The traffic generated from the proposed activity is predominately heavy vehicles. The existing heavy traffic volumes are approximately 13% of the total existing landfill traffic. The portion of heavy vehicles are estimated to increase to approximately 23%.

The increase in traffic generated is estimated to typically follow the annual pattern of existing traffic demand. The existing annual pattern of traffic generation and the forecast increase in traffic generation is shown on Figure 26.

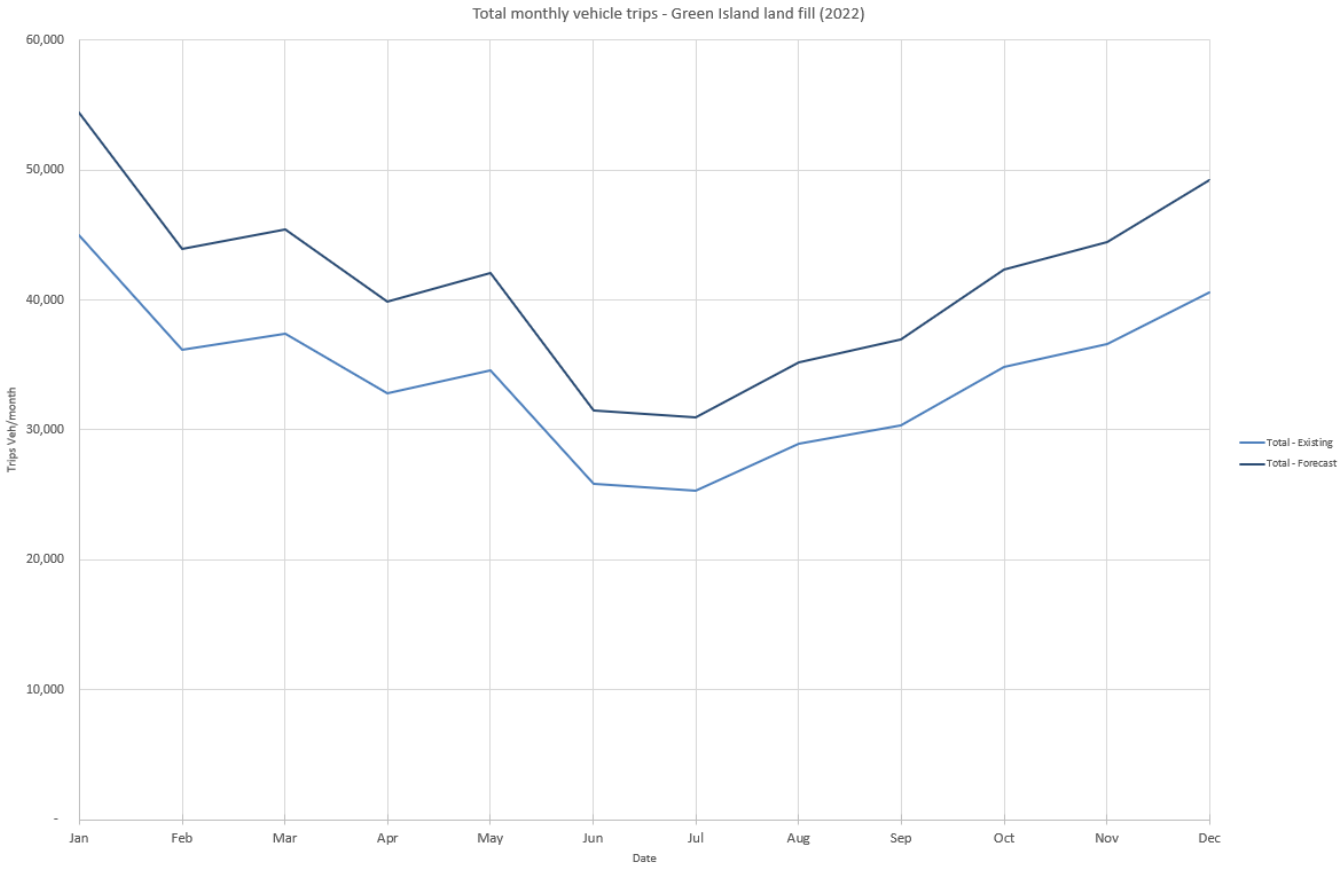

Figure 26 Total forecast monthly vehicle trips – Green Island landfill

The busiest week of existing site traffic volume in the period from February to May 2022 was analysed to provide conservative details of hourly trip generation and is shown on Figure 20 The forecast traffic generation has been analysed over this same period that coincides with traffic on the surrounding network operating at peak levels. The forecast hourly trip rates are shown on Figure 27.

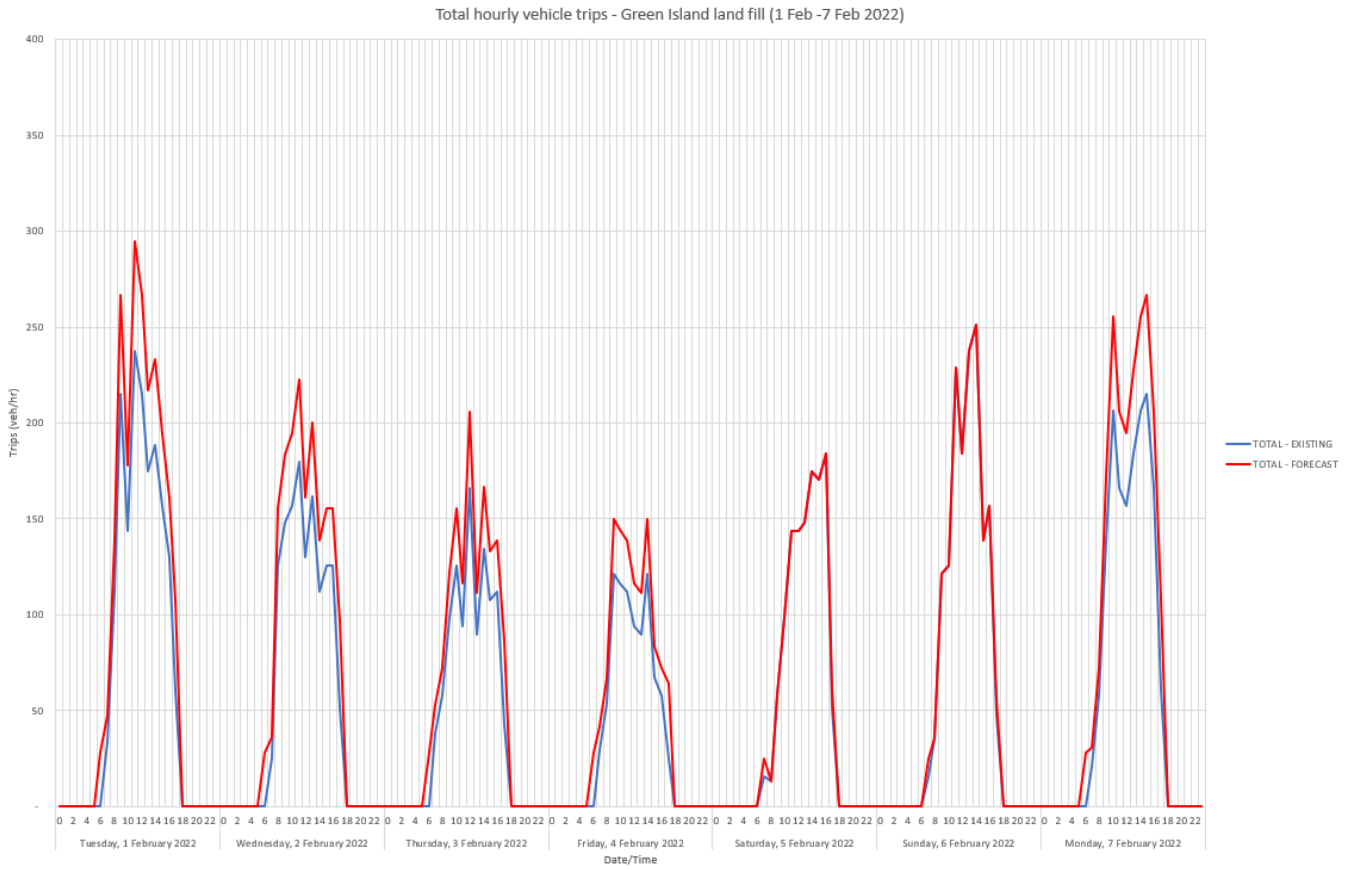

Figure 27 Total forecast hourly vehicle trips – Green Island landfill

The existing peak hourly flow at the landfill occurs around the middle of the day. Existing and forecast landfill traffic flows during typical weekday peak periods are summarised in Table 11.

Table 11 Existing and forecast total traffic trips

Time	Existing (trips)	Forecast (trips)	Forecast Increase (trips)	Existing Brighton Road Traffic	Forecast Brighton Road Traffic	% traffic increase on Brighton Road
Average Weekday AM Peak – 8am to 9am	82	101	19	900	919	2%
Average Weekday PM Peak – 5pm to 6pm	48	93	45	900	945	5%
Average Weekday Traffic	1,310	1,689	379	8,825	9,204	4.3%

Morning peak traffic is estimated to increase from 82 trips per hour to 101 trips per hour. Evening peak hour traffic is estimated to increase from 48 trips per hour to 93 trips per hour. Trip totals include all inbound vehicles and outbound vehicles.

Average daily trip volumes (during the forecast peak week) to and from the Green Island landfill increase from 1,310 trips per day to 1,689 trips per day (+29%).

The forecast increase in average daily traffic volumes generated by the proposed Green Island RRPP corresponds to an approximate increase of 4.3% in average weekday traffic volumes along Brighton Road. Peak hour traffic is estimated to increase by between 2% and 5% (in the morning and evening peaks respectively). This small

increase in traffic volume is estimated based on the busiest week in the period from February to June when the landfill traffic demand is high and the surrounding road traffic volumes are high. The percentage increase in traffic on Brighton Road is estimated to reduce from 4.3% between June and September when landfill traffic generation is relatively low. Peak landfill traffic generation from around December to February is when the surrounding road traffic is typically lower due to the summer holiday period and when schools and universities are closed. During this period the percentage increase in traffic on Brighton Road will likely be higher than 4.3%, but the overall traffic volume will be less. It is noted that this increase is well within the estimated capacity of Brighton Road as described in section 2.4.7 Existing road traffic volumes.

A significant portion of the forecast increase in traffic is heavy vehicles, this is estimated to increase the portion of heavy traffic on Brighton Road from around 3% to 4%. This is an acceptable increase on a strategic heavy freight route, and the resulting proportion is typical (or even fairly low) for freight routes.

This small increase in traffic on Brighton Road and the surrounding road network is estimated to have a negligible to small effect on existing vehicle delays at intersections. This effect is considered to be less than minor.

5. Construction stage trip generation

Construction of the proposed development is planned to be completed in stages that typically include one of the proposed activities and the associated areas that support it. The staging will allow the construction area to be separate from the on-site operational activities.

The separate construction areas are assumed to allow for space to complete construction activities, store materials, provide site facilities and parking for construction staff. Such areas are expected to be separate from the landfill and resource recovery operational activities, and would typically be controlled by site sign-in and access requirements.

Construction activity generates a concentrated high demand for travel during the construction period that typically includes heavy traffic required for construction, heavy traffic to transport materials and light vehicles to transport construction staff to and from the site. These heavy construction vehicles are all assumed to be road-legal heavy vehicles that would normally be operating within the RRPP, some oversize cranes and delivery vehicles may be required and will likely need an accompanying operation plan on how and when to safely access and egress the site.

The heavy traffic generated by construction is unlikely to exceed the estimated heavy traffic generation of the activity once construction is complete. The construction heavy traffic will have less of an effect than the operational heavy traffic.

The majority of construction staff are expected to travel to and from their work site in light vehicles and park their vehicles within the construction areas, separated from the landfill and resource recovery operational facilities.

The number of construction staff that will be on site at any time is difficult to estimate without input from a preferred contractor. To give an indication of an upper limit of construction traffic generated, we can consider the below assumptions and information:

– Existing volumes are approximately 8,825 vehicles per day on Brighton Road
– When fully operational, the RRPP increases Brighton Road traffic to approximately 9,204 vehicles per day. This is around a 4.3% increase in existing traffic, or about 379 vehicle trips per day, or 190 vehicles in and 190 vehicles out.
– As a comparison, a 10% increase in traffic on Brighton Road would be approximately 880 vehicle trips per day or 440 vehicles in and 440 vehicles out.
– Brighton Road is a collector road. Based on typical urban lane capacities it is estimated that Brighton Road has a capacity in the order of around 18,000 vehicles per day. An additional 880 vehicle trips per day is well within the estimated capacity of Brighton Road as described in section 2.4.7
– Conservatively assuming that at the Brighton Road main entrance, construction traffic is mixed with fully operational RRPP traffic. Then a 10% increase in traffic volume (880 trips) includes all additional RRPP

generation (379 in/out) plus a further 501 trips in and out, or 250 vehicles in and 250 vehicles out from construction traffic.

The increase is therefore considered to be less than minor in terms of effects noticeable to other road users.

Overall it is assumed that the traffic generated by construction will be contained within areas that are generally separate from landfill and RRPP. It is assumed that the staged approach to construction will allow adequate space to store materials, provide site facilities and parking for construction staff that is separate from the operational activities.

Given the capacity of Brighton Road and the surrounding road network, the conservative estimates of increased traffic from construction is estimated to have a small to negligible impact on the existing road network. The effects are considered to be less than minor.

6. Accessibility of proposed development

The proposed RRPP increases the demand for travel compared to the existing landfill activity. The increase is primarily made up of increased heavy vehicle traffic due to the changes in kerbside collection and the requirement to remove waste off site once the existing landfill operation ceases to operate.

The proposed RRPP will increase the number of staff on site from about 16 to around 44 (as per data supplied by DCC). The majority of staff are expected to arrive and leave the site in light vehicles and a smaller portion may choose to walk, cycle or use the public transport service that operates on Brighton Road.

Transport mode share for public transport and cycling is assumed to be in the order of about 2.5% for public transport and 5% for cycling. Based on the existing staff and likely future staff, the below mode split is estimated:

– Existing Staff estimated mode split: 1 public transport, 1 cycle and 14 private use vehicle;
– Future Staff estimated mode split: 1-2 public transport, 2-3 cycle and 39-41 private use vehicle.

It is also possible that some staff may choose to walk to and from their workplace. Overall, the likely pedestrian, cyclist and public transport mode split to this site is low.

6.1 Vehicle and pedestrian access

Vehicles access and egress the site via the existing Brighton Road main entrance. No new access ways or intersections are proposed to connect with the existing road network. Section 3.2 summarises the proposed access and egress to the site. Heavy vehicles and light vehicles are typically separated except along the Brighton Road main entrance and the roundabout entrance to the main commercial areas of the proposed development. Adequate space is provided for design vehicles to manoeuvre around the site. Section 3.5 summarises the design vehicles used on site.

Pedestrian access from Brighton Road to the site is not formally available adjacent to the main entrance and along the accessway to the main site. The existing main entrance does not include a footpath. Pedestrians typically use the grass verges adjacent the road-edge or walk on the left side of the traffic lane. There are no known road safety concerns with regard to pedestrians.

DCC plan on some minor widening of the existing Brighton Road accessway in the short term, before planned longer term investment in upgrading the entire entrance and accessway to the site. This planned investment aims to improve pedestrian and cycle accessibility.

6.2 On-site parking

Section 3.4 summarises the proposed on site parking. On site vehicle parking connects well to proposed footpaths that connect carpark areas to places of work.

Carparking spaces are available around the existing rummage store **(Area A).** It is assumed the existing number of carparking spaces will not change and that they are adequate to service this area.

The existing on site staff of 16 is proposed to increase to 44. Approximately 20 staff are expected at the proposed ESL transport compound **(Area 15)** and the remaining 24 staff are spread around the various operations and offices on site.

Area 15 allows for some 43 truck parking spaces. Staff will have access to 14 parallel parks along the exit road for the proposed BWTS adjacent to area 15. The 43 truck parking spaces are not all occupied during the day and this space can be pragmatically utilised to accommodate any overspill parking not catered for along the exit road. Good pedestrian access is provided alongside the parallel parks and a pedestrian crossing point is proposed across the main RRPP commercial access before connecting to area 15

The remaining 24 staff will be able to park in the 36 angle parking spaces to the east of the offices and educational facility **(Area 16).**

Pedestrian access is provided from Area 16 to the MRF **(Area 1)** and wider operational areas.

No cycle parking is shown. There is adequate space around the site offices and educational facility **(Area 16)** to install cycle parking.

6.3 Public transport and cycling facilities

6.3.1 Public Transport

It is reasonable to expect that some on site staff will travel to and from work on the public transport service that operates buses at about 30 minute intervals along Brighton Road. Staff are required to walk into the site from Brighton Road. The current Brighton Road main entrance has no dedicated provision for pedestrians, so pedestrians would have to use the roadside verge or walk in the carriageway.

6.3.2 Cycling Facilities

No more than 1-3 staff are estimated to cycle to work per day. The existing carriageway width at the main entrance does not include dedicated cycle lanes. Cyclists typically use the grass verges adjacent the road-edge or use the left side of the traffic lane. There are no known road safety concerns, with regard to cyclists.

No cycle parking is shown. There is adequate space around the site offices and educational facility **(Area 16)** to install cycle parking racks.

6.4 Site access safety

Vehicles access and egress the site via the existing Brighton Road main entrance. This entrance is a priority controlled T-intersection. No new access ways or intersections are proposed to connect with the existing road network.

The Brighton Road main entrance has adequate visibility along Brighton Road in both directions for all turning movements and provides for a flush median that allows for heavy vehicles to turn right into the site. The majority of traffic turns are left out. Right turns out occur infrequently. There are no recorded crashes at this intersection over the most recent five year period.

There is low demand for pedestrians and cyclists to enter the site via the Brighton Road main entrance. The existing carriageway width at the main entrance does not include dedicated footpaths or cycle lanes either side of the main entrance.

It is understood that Dunedin City Council plan on some minor widening of the existing main entrance frontage in the short-term to provide a shared use space for pedestrians and cyclists. Longer term investment is planned to upgrade the entire main entrance, that would include a separated shared for pedestrian and cyclists. This planned investment aims to improve pedestrian and cycle accessibility.

7. Assessment of effects

The proposed activity supports Objective 6.2.2, 6.2.3 and relevant associated policies, in relation to the accessibility of the land use activity by a range of travel modes. The relevant DCC 2GP objectives and policies are listed below, with note on the proposal compliance below.

> **Policy 6.2.2.1** - *Require land use activities whose mobility parking demand either cannot be met by the public parking supply, or would significantly affect the availability of that supply for surrounding activities, to provide mobility parking either on or near the **site** at an amount that is adequate to:*
>
> *a. avoid or, if avoidance is not practicable, adequately mitigate adverse effects on the availability of publicly available mobility parking in the vicinity of the **site** (including on-street parking and off-street facilities); and*
>
> ***b.** ensure accessibility for residents, visitors, customers, staff and students (as relevant) who have limited mobility, including disabled people, the elderly and people travelling with young children.*

Compliance: - The proposed parking area adjacent the educational facility and ESL office provides for three mobility carparks.

> **Policy 6.2.2.2 -** *Enable the sharing of parking areas by different land use activities, where adequate accessibility for all users is maintained*.

Compliance: - The proposed parking area adjacent to the educational facility allows for staff and visitor parking. All other parking areas are specifically for staff or for dropping off recycling waste.

> **Policy 6.2.2.3 -** Not applicable.
>
> **Policy 6.2.2.4 -** *Only allow activities that are likely to generate a significant number of trips by walking, cycling or public transport where:*
>
> *a. for activities likely to generate trips by cycling, there will be safe access for cyclists into and through the **site** and sufficient secure cycle parking;*
>
> *b. for activities likely to generate trips by walking, there will be safe access for pedestrians into and through the site; and*
>
> c. *for activities likely to generate trips by public transportation, the activity will be located a reasonable walking distance from a frequent public transportation route with safe access for pedestrians from a bus stop to the site*.

Compliance: - The existing Brighton Road main entrance does not provide designated space to allow for cycling or pedestrians that links to a public transport service on Brighton Road.

Dunedin City Council plan on some minor widening of the existing main entrance in the short term to provide a shared use space for pedestrians and cyclists. Longer term investment is planned to upgrade the entire main entrance, that includes a separated shared use space for pedestrian and cyclists. This planned investment aims to improve pedestrian and cycle accessibility.

> **Policy 6.2.2.X –** Not applicable.
>
> **Objective 6.2.3 -** *Land use, development and subdivision activities maintain the safety and efficiency of the transport network for all travel modes and its affordability to the public.*

Policy 6.2.3.8 - *Only allow high trip generators where they are designed and located to avoid or, if avoidance is not practicable, adequately mitigate adverse effects on the safety and efficiency of the transport network.*

Compliance: It is estimated that existing traffic on Brighton Road and the surrounding road network will increase by about 4.3% and will likely have a negligible to small impact on existing vehicle delays at intersections. This impact is assessed to be less than minor. Refer to section 4 for further details.

There are no specific changes proposed to the existing road network that could potentially create or exacerbate an existing road safety issue. It is acknowledged that the minor increase in traffic does increase exposure to road safety risk. The existing reported crash history on Brighton Road and key intersections that connect to the site and the state highway network is generally considered low in crash number and severity (refer to section 2.4.6). The impact on road safety is assessed to be less than minor.

8. Mitigation and options to influence travel choice

The proposed site does not provide formal connections for pedestrians accessing the site from the external road network (e.g. staff travelling via public transport and/or cycling).

It is understood that Dunedin City Council plan on some minor widening of the existing main entrance in the short-term to provide a shared use space for pedestrians and cyclists. Longer term investment is planned to upgrade the entire main entrance, that includes a separated shared path for pedestrian and cyclists. This planned investment aims to improve pedestrian and cycle accessibility.

No cycle parking is shown. There is adequate space around the site offices and educational facility **(Area 16)** to install cycle parking (e.g. basic racks or covered cycle parking).

Improving pedestrian and cycle access to the RRPP site will remove barriers to the uptake of active transport modes.

9. Conclusion

The new complex is estimated to generate approximately 427 vehicle trips per day more than the current vehicle trips generated by existing activities at the Green Island Landfill. This volume of trip generation meets the DCC District Plan definition of a high trip generator.

It is estimated that existing traffic on Brighton Road and the surrounding road network will increase by about 4.3% and will likely have a negligible to small impact on existing vehicle delays at intersections. These effects are assessed to be less than minor.

There are no specific changes proposed to the existing road network that could potentially create or exacerbate an existing road safety issue. The impact on road safety is assessed to be less than minor.

The proposed activity does not require any additional accessways or intersections with the existing road network. All traffic generated by the proposed activity will continue to access the site via the existing Brighton Road main entrance.

A large portion of the traffic generated is heavy vehicles. The proposed activity typically provides separation between heavy vehicles and light vehicles and provides adequate space for heavy traffic to safely and efficiently unload and load waste.

Pedestrian access is provided for within the site and connects proposed staff and visitor carparking with on-site worker facilities, offices, and visitor/education centre.

Formal and dedicated pedestrian access from Brighton Road to the site is not available adjacent to the main entrance. There is a low demand for pedestrians and cyclists to enter the site via the main entrance. The existing carriageway width of the main entrance is not wide enough to include dedicated cycle lanes and footpaths, so cyclists and general traffic share the single traffic lane and pedestrians typically use the grass verges adjacent the road-edge or use the left side of the traffic lane. There are no known road safety concerns, with regard to cyclists and pedestrians. The lack of pedestrian facilities is likely to deter people from using the public transport services and reduces the travel choice for site staff.

Dunedin City Council plan on some minor widening of the existing main entrance in the short-term to provide a shared use space for pedestrians and cyclists. Longer term investment is planned to upgrade the entire main entrance, that includes a separated shared use space for pedestrian and cyclists. This planned investment aims to improve pedestrian and cycle accessibility.

The proposed parking area adjacent to the educational facility allows for staff, visitor parking and buses. All other parking areas are specifically for staff or for dropping off recycling or reusable items, and are adequate to support the number of on-site staff and expected visitors to the site.

Overall the transport effects are assessed to be less than minor.

This report is subject to, and must be read in conjunction with, the limitations set out in section 9.1 and the assumptions and qualifications contained throughout the Report.

9.1 Scope and limitations

This report: has been prepared by GHD for Dunedin City Council and may only be used and relied on by Dunedin City Council for the purpose agreed between GHD and Dunedin City Council as set out in this report. GHD otherwise disclaims responsibility to any person other than Dunedin City Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible. 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. The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared. The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

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Attachment 1

Assumptions - Proposed development trip generation

Assumptions - Proposed development trip generation

For the purposes of forecasting future traffic demand, the proposed activities have been grouped into three broad categories. Assumptions made and the estimated traffic volume for all activities within each category are described below.

Category 1 – Inbound waste

Category 1 includes all existing inbound, re-diverted kerbside recycling and the introduction of kerbside green waste collection.

1) **Existing waste volumes and staff numbers** - delivered to the various activities described in the above section.

- Staff numbers and weighbridge data has been provided by DCC.

2) **All kerbside recycling** - will re-divert from a temporary MRF to the proposed MRF shown on Figure 21. ESL have provided the below traffic generation information:

- Kerbside glass – Five trucks, five offloads per day
- Kerbside recycling – Four trucks, eight offloads per day
- It is assumed that kerbside recycling operates five days per week and will work on public holidays or a weekend equivalent. (260 days per year)
- Kerbside glass - 13,000 trips per year (inbound and outbound)
- Kerbside recycling – 16.640 trips per year (inbound and outbound)
- Total - 29,640 trips per year (inbound and outbound)
- Total – 114 trips per day

The temporary MRF is located adjacent to the existing Green Island Landfill. The traffic generated from this activity is included within the base traffic on Brighton Road. Moving this activity to the permanent MRF building within the site does not generate any additional traffic on the surrounding road network. The only change is a small increase in the number of turning movements at the existing Brighton Road main entrance. The estimated traffic generation shown in Table 9 Estimated future traffic generation (trips per year, where a trip is an inbound or outbound movement) is shown as zero for this activity.

3) **All kerbside organics** – the introduction of kerbside mixed food and green waste will increase the volume of organic waste and likely result in a decrease in general waste volumes. ESL have provided the below traffic generation information:

- Kerbside organics – Seven trucks, nine offloads per day
- Is it assumed that kerbside greenwaste operates five days per week and work on public holidays or a weekend equivalent. (260 days per year)
- 32,760 trips per year (inbound and outbound)
- It is unclear what the corresponding reduction in general waste volume is. For the purpose of this assessment, a conservative approach has been taken and the reduction is general waste is assumed to be zero.

Category 2 – Supporting commercial activities

Category 2 includes onsite activities that support the onsite processing of waste and kerbside collection of waste.

4) **Truck compound** – ESL truck compound onsite for storing and servicing vehicles as shown in Figure 12 includes 44 truck parks. The below traffic generation assumptions have been made:

- All 44 truck parks are occupied and each truck leaves and returns once during the day;

- All other truck movements are captured in existing waste volumes, kerbside recycling and kerbside green waste;
- It is assumed that the truck compound supports all kerbside waste collection and operates five days per week and work on public holidays or a weekend equivalent. (260 days per year);
- 22,880 trips per year (inbound and outbound);'
- 88 trips per day (inbound and outbound); and
- Approximately 20 staff are expected at the proposed enviro waste transport compound **(Area 15);**
  - Enviro waste compound staff numbers have been provided by DCC;
  - 14,480 trips per year (inbound and outbound);
  - 40 trips per day (inbound and outbound); and
  - 362 workdays per year.

5) **Staff and Visitors** - Approximately 24 staff are expected to work at the various RRPP facilities excluding the ESL transport compound **(Area 15)**

- Staff numbers have been provided by DCC;
- A total of 24 staff is an increase from current 16 staff on site;
- Nine extra staff per day;
- 6,516 trips per year (inbound and outbound) ;
- 18 trips per day (inbound and outbound);
- 362 work days per year.

Category 3 – Outbound waste

Category 3 includes all waste processed at the fully operational resource recovery site that will eventually be removed from site. The existing landfill operation is estimated to reach capacity within the next six to seven years. Once the landfill has reached capacity all material processed at the proposed facility will be transported off site, as generally described below:

7 Recycling – Following processing. Recyclable material is compacted, loaded into containers for export via Port Chalmers. The below traffic generation assumptions have been made:

- Existing recycling activities that include processed material leaving the site are captured in the weighbridge data and existing traffic generation; and
- No information on the change in volume from inbound kerbside recycling to outbound recycling is available;
- It is assumed that inbound kerbside recycling truck volumes are reduced significantly after processing - the volume is assumed to be reduced by 70%;
- Kerbside recycling – 8,320 inbound trips per year, 16.640 trips per year (inbound and outbound);
- 4,992 trips per year (inbound and outbound) of compacted recycling for export;
- ESL have confirmed that approximately 3,500 tonnes of glass are processed and removed from site per year. This volume is transported on truck and trailer units with an assumed maximum capacity of 27 tonnes per trip; and
- 260 trips per year (inbound and outbound) of glass.

7 General Waste – Compacted waste is loaded into heavy transport vehicles for haulage to a remote landfill destination. The below traffic generation assumptions have been made:

- 48,000 tonnes per year of general waste is processed, from 2022 weighbridge data;
- All inbound general waste is processed and removed to smooth hill landfill in truck and trailers with a maximum capacity of 27 tonnes per trip;
- All truck and trailers are assumed to be at 80% capacity;

- Is it assumed that removal of general waste operates during the landfill operational hours. (362 days per year);
- 4,444 trips per year (inbound and outbound); and
- 12 trips per day (inbound and outbound).

7 Mixed Organics – Co-mingled food and greenwaste from kerbside collections is mixed with greenwaste, shredded and composted before being sold as compost. ESL have provided the below traffic generation information:

- Initially 14,500 tonnes per annum of greenwaste will be transported to Timaru in truck and trailer units with a maximum assumed capacity of 27 tonnes per trip.
- Is it assumed that green waste removal operates five days per week and will work on public holidays or a weekend equivalent. (260 days per year)
- Once the organics processing facilities (Areas 9, 5, 11, 12, 13 and 18) are fully operational – 40% of 14,500 tonnes per annum will leave the site in truck and trailer units;
- 430 to 1,074 trips per year (inbound and outbound)
- 1,074 trip per year has been used as a conservative estimate

7 Hazardous waste – Hazardous waste will continue to be processed and removed off site. All traffic generation is captured in existing traffic generation based on 2022 weighbridge data.

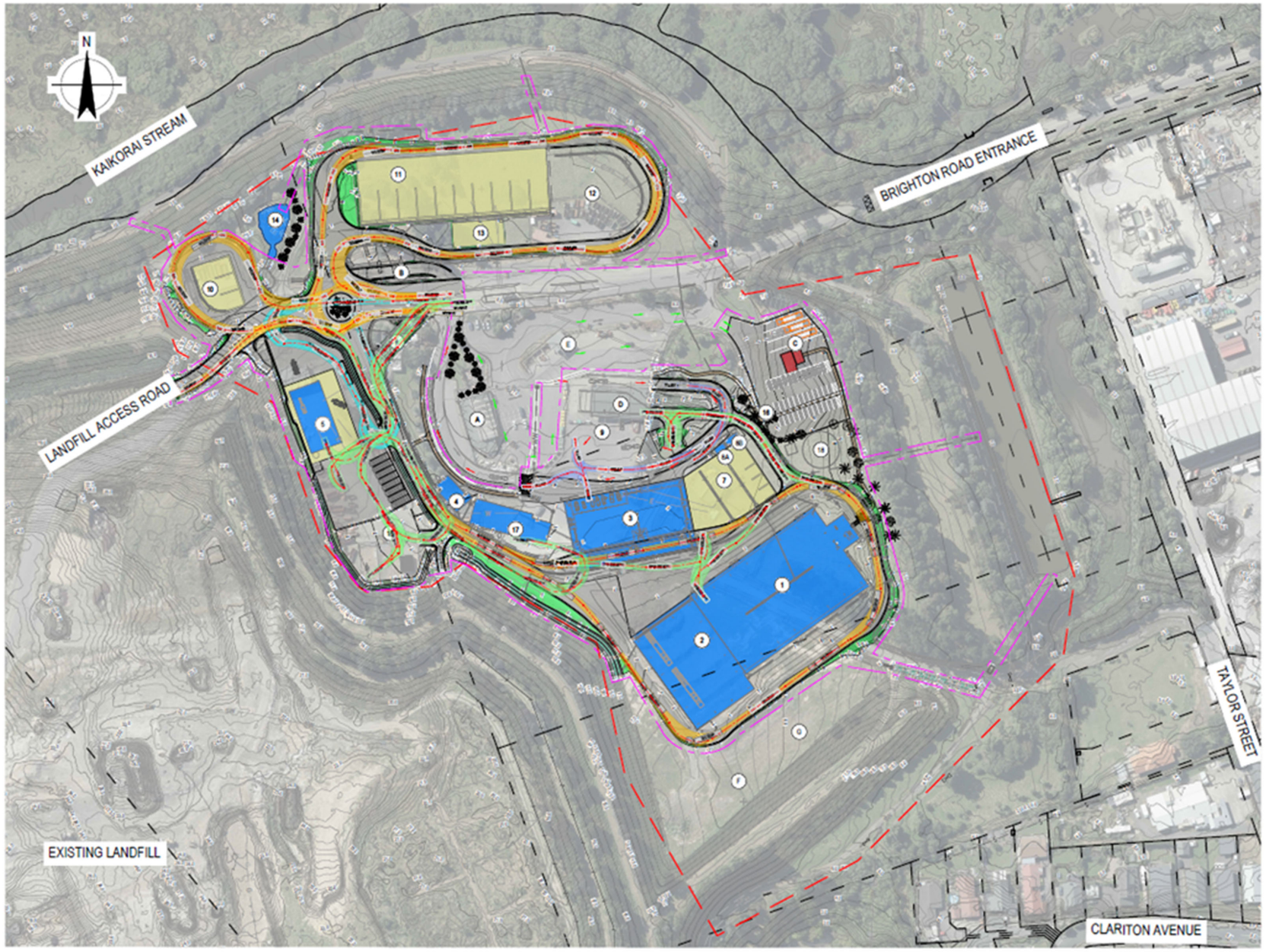
7 Inert Waste. Includes clean fill, rubble and topsoil. This material is loaded onto truck and trailers for transport to smooth hill landfill.

- 52,677 tonnes per year of inert waste is processed, from 2022 weighbridge data;
- All inbound inert waste is processed and removed to smooth hill landfill in truck and trailers with a maximum capacity of 27 tonnes per trip;
- All truck and trailers are assumed to be at 100% capacity;
- Is it assumed that removal of inert waste operates during the landfill operational hours. (362 days per year);
- 3,902 trips per year (inbound and outbound);
- 11 trips per day (inbound and outbound);
- 90% of total tonnes (52,677) will not come to site from 2029.
  - Reduction of 47,409 tonnes per year
  - Reduction of 3512 trips per year
  - 1-2 trips per day

The majority of inert waste is used as cover material for landfill operations. The existing Green Island landfill operation is expected to operate until 2029, at this time inert waste will not come to site. It is assumed that 90% of existing inert tonnes delivered to the landfill will no longer come to the site after 2029. The estimated traffic generation shown in Table 9 Estimated future traffic generation (trips per year, where a trip is an inbound or outbound movement)is shown as the reduced volume from 2029.

Attachment 2

Heavy Vehicle Turn Paths



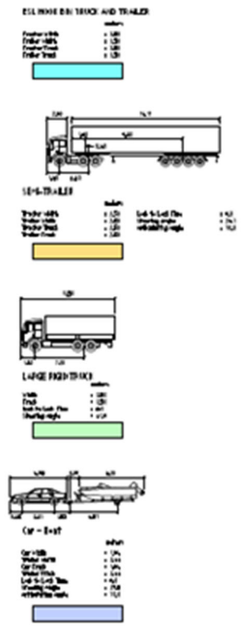
LEGEND - PROPOSED

- SITE DEVELOPMENT BOUNDARY
- NEW BUILDING
- NEW CONCRETE PAD
- NEW FOOTPATH
- NEW ROAD / ASPHALT AREA
- GRASSED AREA

NOTES:

1. VEHICLE BODY SHOWN WITHOUT CLEARANCE.

LEGEND - VEHICLE TRACKING:



VEHICLE TRACKING PLAN

SCALE 1:1000

Rev	Description	Checked	Approved	Date
B	PRELIMINARY ISSUE	MP*	RP*	18.10.23
A	PRELIMINARY	MP*	RP*	05.10.23

Author R. GERONIMO Drafting Check G. DOUGHERTY*
Designer K. ATKINS Design Check M. ROUJON*

0 10 20 30 40 50m
SCALE 1:1000 AT ORIGINAL SIZE

THIS DRAWING INCLUDES COLOURED INFORMATION

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Client ENVIROWASTE SERVICES LTD (ESL)

Project DUNEDIN RRP
ALL SITE

Status PRELIMINARY Status Code S3

Drawing Title VEHICLE TRACKING PLAN

Size A1

Drawing No. 12593786-ALL-C003

Rev B

Plot Date: 20 October 2023 - 12:08 pm Plotted by: Greg Dougherty

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