

Appendix 11: Acoustic Assessment – Tonkin and Taylor



Waste Management NZ - Manor Park

Acoustic assessment

Prepared for
Waste Management NZ

Prepared by
Tonkin & Taylor Ltd

Date
31 October 2022

Job Number
1015081 v1



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Document control

Title: Waste Management NZ - Manor Park					
Date	Version	Description	Prepared by:	Reviewed by:	Authorised by:
19/10/22	1	DRAFT	A Healy	D Humpheson	
31/10/22	1	FINAL	A Healy	D Humpheson	C Hillman

Distribution:

Waste Management NZ

Tonkin & Taylor Ltd (FILE)

1 PDF copy

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Table of contents

1	Introduction	1
2	Performance standards	2
2.1	Hutt City District Plan	2
2.2	NZS 6803:1999	3
3	Project criteria	3
3.1	Noise	3
3.2	Vibration	4
4	Existing environment	4
5	Operations	5
5.1	Site details	5
5.2	Noise level data	7
6	Construction	8
7	Predicted noise levels	9
7.1	Operation	9
7.2	Construction	9
8	Summary	10
9	Applicability	10

1 Introduction

Waste Management New Zealand Ltd (Waste Management) is proposing to construct and operate a waste transfer facility off Benmore Crescent, Manor Park, Lower Hutt.

Tonkin & Taylor Ltd (T+T) has been engaged to provide an acoustic assessment for the construction and operation of this facility. The work is conducted in accordance with our agreement dated 18 July 2022.

The planned Waste Management site will include operational facilities, office and maintenance buildings, and carparking for Waste Management trucks and staff vehicles. The operational facilities include a recycling transfer station, a construction and demolition waste recycling facility, and a materials recovery facility.

These services are currently offered at two sites in Seaview, Lower Hutt. The development of this facility will combine all services in a single location.

The site location is shown in Figure 1.1.



Figure 1.1: Location of proposed Waste Management site

2 Performance standards

2.1 Hutt City District Plan

The area to be occupied by Waste Management NZ is zoned General Rural in the HCDP. Properties nearby are zoned General Residential, General Recreational, General Business, and General Rural.

The relevant noise standards are set out in Rule 14C of the HCDP. The objective of the noise rules is stated as:

To maintain or enhance the amenity value of all activity areas by ensuring that the adverse effects of excessive noise on the environment are avoided or mitigated.

The policies guiding the development of the HCDP rules are:

- a To recognise that background noise levels are markedly different throughout the city.
- b To recognise that acceptable noise levels will vary according to the nature of the principal activities occurring within activity areas.
- c To ensure that residential activity areas are protected by establishing appropriate noise levels at the interface between residential activity areas and non-residential activity areas.
- d That maximum noise levels are established within each activity area to ensure that amenity values are protected.
- e To make provision for those situations where there has already been considerable history to the establishment of specified noise conditions.
- f To recognise that noise levels may be different through a construction phase.
- g To recognise that Noise Management Plans may be appropriate to manage matters beyond those addressed in this District Plan.

The noise standards of Rule 14C are:

14C 2.1 Permitted Activity – Conditions

In all Activity Areas

(c) The noise levels shall be measured in accordance with NZS 6801:1991 “Measurement of Sound”, and assessed in accordance with NZS 6802: 1991 “Assessment of Environmental Sound”. The noise level is the L_{10} descriptor, as defined in NZS 6801:1991.

(d) The lower levels shall apply between the commencement of the lower level on a Saturday evening and Monday morning, and Public Holidays, unless otherwise specified.

(f) All construction, demolition, and maintenance work shall comply with NZS 6803P ‘Measurement and Assessment of Noise from Construction, Maintenance and demolition work’.

The site is zoned as General Rural, therefore the following permitted activity noise standards apply:

14C 2.1.10 General Rural Activity Area

All non-residential activities must not exceed the conditions as specified, measured anywhere beyond the site on which the activity takes place:

Maximum 50 dBA 7:00 am – 10:00 pm

Maximum 40 dBA 10:00 pm – 7:00 am

2.2 NZS 6803:1999

HCDP permitted activity noise standard 14C 2.1(f) requires that all construction, demolition, and maintenance work shall comply with NZS 6803P “*Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work*”. The provisional version of NZS 6803 has been replaced with the 1999 version of the Standard.

The construction noise limits of NZS 6803:1999 are detailed in Table 2.1 and apply at 1 m from the façade of residential dwellings. Normal construction hours are highlighted. It would be unusual for construction work to occur outside these hours.

Table 2.1: Construction noise limits for residential dwellings taken from Table 2 of NZS 6803:1999

Time of week	Time period	Duration of work					
		Up to 14 calendar days		Between 2 weeks and 20 weeks		Greater than 20 weeks	
		LAeq	L _A max	LAeq	L _A max	LAeq	L _A max
Weekdays	6:30 am – 7:30 am	65	75	60	75	55	75
	7:30 am – 6:00 pm	80	95	75	90	70	85
	6:00 pm – 8:00 pm	75	90	70	85	65	80
	8:00 pm – 6:30 am	45	75	45	75	45	75
Saturdays	6:30 am – 7:30 am	45	75	45	75	45	75
	7:30 am – 6:00 pm	80	95	75	90	70	85
	6:00 pm – 8:00 pm	45	75	45	75	45	75
	8:00 pm – 6:30 am	45	75	45	75	45	75
Sundays and public holidays	6:30 am – 7:30 am	45	75	45	75	45	75
	7:30 am – 6:00 pm	55	85	55	85	55	85
	6:00 pm – 8:00 pm	45	75	45	75	45	75
	8:00 pm – 6:30 am	45	75	45	75	45	75

3 Project criteria

3.1 Noise

Construction is anticipated to last longer than 20 weeks and be undertaken throughout the hours of 7:30 am – 6:00 pm Monday to Saturday. The applicable construction noise limits are included in Table 3.1. Construction noise limits apply at the 1 m from the façade of any occupied dwelling.

Table 3.1: Construction noise limits during regular hours

Hours of construction	Noise limit
Monday to Saturday 7:30 am to 6:00 pm	70 dB L _{Aeq} (15min)
	85 dB L _A max

Works outside of these hours will be required to comply with the limits for works greater than 20 weeks in duration in Table 2.1.

Operation of the facility will be required to comply with the rural zone limits in the HCDP. The permitted activity limits for this zone are included in Table 3.2. Operational noise limits apply at the notional boundary of any occupied dwelling. The notional boundary is up to 20 m from the closest point of the dwelling, but not beyond the property boundary.

Table 3.2: Operational noise permitted activity limits

Zone	Noise limit	Hours
<i>General Rural</i>	50 dB	7:00 am – 10:00 pm
	40 dB	10:00 pm – 7:00 am

3.2 Vibration

There are no vibration limits in the HCDP. Standard practice in New Zealand is to use the vibration guideline levels in German vibration standard DIN 4150-3:1999. These guidelines, as reproduced in Table 3.3, when applied to residential buildings relate to the potential for vibration to cause cosmetic damage. Vibration is only a concern during construction of the proposed development.

Table 3.3: Project vibration limits

Line	Type of structure	Vibration at the foundation at a frequency of			Vibration at horizontal plane of the highest floor
		1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz	All frequencies
2	Dwellings and buildings of similar design and/or occupancy	5 mm/s	5 to 15 mm/s	15 to 20 mm/s	15 mm/s

4 Existing environment

The existing noise environment is dominated by SH2 (sometimes referred to as the Western Hutt Road, or the Hutt Expressway). Trains on the Hutt rail line will create isolated noise events with elevated noise levels at the residential properties on Mary Huse Grove.

The nearest residential receivers are on Mary Huse Grove, to the east of the site. The closest being number 27; approximately 45 m from the nearest corner of the site. The nearest receivers to the south are on High Street, approximately 230 m from the southern border of the site. There are no sensitive receivers in the vicinity to the west or north.

The nearest sensitive receivers on Mary Huse Grove, and two receivers representative of the closest receivers on High Street are identified in Figure 4.1.

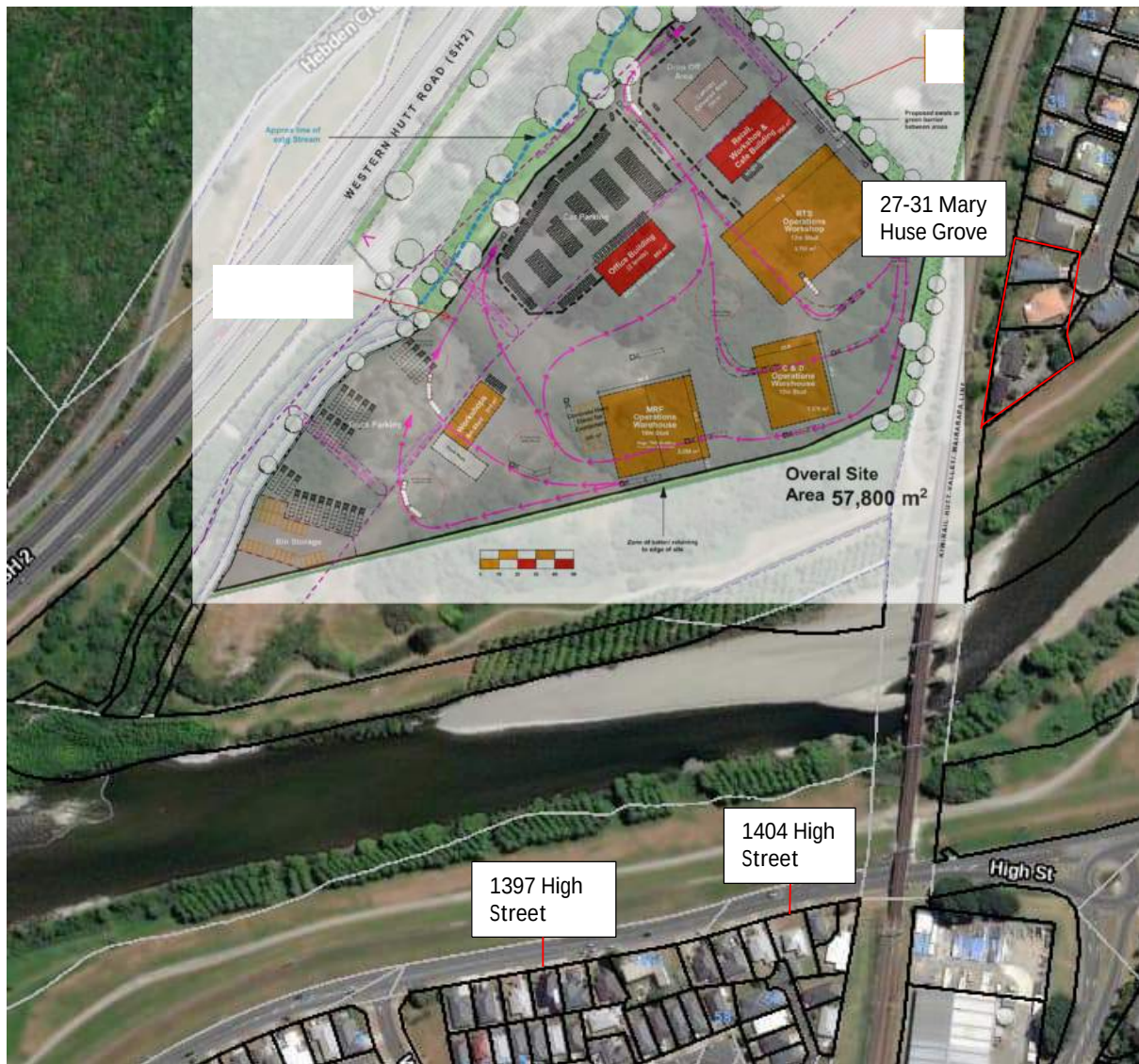


Figure 4.1: Location of nearest receivers

5 Operations

5.1 Site details

A plan of the facility is shown in Figure 5.1 and includes:

- Recycling transfer station
- Materials recovery facility
- Construction and demolition waste recycling
- Workshop
- Office facilities
- Truck wash
- Parking

The Transfer Station will operate between 7 am and 6 pm 7 days per week. Outside of those hours some heavy vehicles will leave site from the parking area. The bulk of heavy vehicle movements

5.2 Noise level data

Likely operational noise levels are listed in Table 5.1 and Table 5.2.

Table 5.1: Noise levels from site operations

Activity	Noise source	Source data		
		Data source	Sound pressure level at 10 m - L_{pA}	Modelled sound power - L_{WA}
Transfer Station	Front-end loader	Technical datasheet (Case 521G)	74 dB	102 dB
	Small excavator (24t)	BS5228-1 Table C.8 (10)	59 dB	87 dB
Materials recovery facility	Baler	BS5228-1 Table C.8 (4)	80 dB	108 dB
	Electric materials handler	Technical datasheet (Liebherr)	74 dB	102 dB
Construction and demolition waste recycling	Incline conveyer	BS5228-1 Table C.10 (21)	76 dB	104 dB
	Electric materials handler	Technical datasheet (Liebherr)	74 dB	102 dB
Workshop	Internal - General operation areas	Sherwin, 1996. Accessed from ACC.co.nz	55 – 71 dB ¹	99 dB
Truck wash and bin wash	Pressure washer	Technical datasheet (Karcher HD 6/15)	62 dB	90 dB
General site activities	Electric forklift	BS52280-1 Table D.7 (96)	77 dB	Not modelled, likely operating in buildings
	Electric bobcat	T+T Library	76 dB	

¹Internal sound pressure level

Table 5.2: Noise levels from vehicles on site

Period	Activity	Noise source	Source data		
			Data source	Sound pressure level at 10 m - L_{pA}	Modelled sound power - L_{WA}
daytime	Trucks accessing RTS	WM truck at 24/hour	Measured	74 dB (per truck) (max from passby) L_{WA} 107 dB	116 dB @ 10km/h
	Light vehicles accessing RTS	Utes at 17/hour	T+T Library	70 dB (per ute) L_{WA} 98 dB	110 dB @10km/h
	Trucks accessing parking	WM trucks at 7/hour	Measured	74 dB (per truck) (max from passby) L_{WA} 107 dB	110 dB @10km/h

	Light vehicles accessing parking	Utes at 7/hour	T+T Library	70 dB (per ute) L _{WA} 98 dB	106 dB @10km/h
Night-time	Trucks leaving parking	WM trucks at peak of 12 movements between 6am and 7am	Measured	74 dB (per truck) (max from passby) L _{WA} 107 dB	116 dB @10km/h
	Light vehicles accessing parking	Utes at 8/hour	T+T Library	70 dB (per ute) L _{WA} 98 dB	107 dB @10km/h

6 Construction

The site will need to be cleared, new buildings constructed, and parking areas paved. The expected phases of construction, plant used, and predicted noise levels are detailed in Table 6.1.

Table 6.1: Phases and associated noise levels

Stage or Phase	Noise source	Source data		
		Data source	Sound pressure level at 10 m - L _{pA}	Duty cycle over 15-minutes
Site clearance	Excavator 20t	Library	74 dB	80%
	Trucks	Library	72 dB	80%
	Bulldozer	Library	76 dB	80%
	Chainsaw	Library	68 dB	50%
Earthworks	Bulldozer	Library	76 dB	80%
	Excavator 20t	Library	74 dB	80%
	Trucks	Library	72 dB	80%
	Roller	Library	78 dB	80%
Paving	Asphalt paver + tipper lorry	BS5228	75 dB	100%
Construction of buildings	Hand tools (rattle gun)	Library	65 dB	80%
	General works	Library	67 dB	100%
	Mobile crane	Library	73 dB	50%

The two largest sources of vibration during general construction projects are piling and vibratory rolling. Piling is not anticipated for this site. If it is required as part of foundation construction, it is unlikely to be perceptible at any receivers due to the distance of the site buildings from the nearest residences.

Vibratory rolling may be required during earthworks. Prior measurements showed the vibration on a concrete foundation from a vibratory roller was approximately 1.6 mm/s Peak Particle Velocity (PPV) at 20 m from the works.

7 Predicted noise levels

7.1 Operation

Operational noise levels have been modelled using the industry standard software SoundPlan 8.2. In order to assess compliance during the daytime and night-time hours two scenarios were assessed:

- Daytime operation – All plant operating including transfer station and vehicles on site.
- Night-time peak operation – limited Waste Management vehicles leaving/parking and light vehicles of staff arriving and parking.

The daytime scenario accounts for all mobile plant in the operational buildings operating continuously over a full daytime period alongside vehicle movements on site.

The night-time scenario is based on the expected number of workers arriving on site by light vehicle during the busiest 15-minutes between 6 am and 7 am, and the advised number of heavy vehicles leaving site parking between 6 am and 7 am.

Noise levels were calculated at the closest three properties on Mary Huse Drive and two indicative properties on High Street, as shown in Table 7.1.

Table 7.1: Worst-case operational noise levels at nearby receivers

Address	27 Mary Huse Grove	29 Mary Huse Grove	31 Mary Huse Grove	1397 High Street	1404 High Street
Daytime	46 dB	48 dB	46 dB	36 dB	37 dB
Night-time	25 dB	27 dB	26 dB	30 dB	28 dB

Operational noise levels are compliant with Rule 14 C 2.1.10 during both the daytime and night-time period.

A noise survey undertaken by T+T in March 2022 showed that background noise levels on and around Mary Huse Grove fluctuated around 45-51 dB(A) when measured during one of the quietest periods of the day for motorway traffic (12.40pm - 1.40 pm).

The anticipated noise levels due to operation of the site during the day will be similar to the existing noise environment and the effects of the proposed development on nearby residential receivers are considered reasonable.

7.2 Construction

Construction noise levels at the closest sensitive residential receiver, 27 Mary Huse Grove, have been predicted. All works in each phase of construction are assumed to be operating concurrently at the closest location to the property and therefore this represents a conservative estimate of the maximum noise level which may be experienced.

All groundwork and site preparation phases are assumed to be active over the entirety of the site and may be as close as 45 m to the property. Construction of the site buildings will be 90 m from the property at the closest point.

The estimated noise levels from each phase are provided in Table 7.2.

Table 7.2: $L_{Aeq(15\text{ min})}$ at the closest sensitive receiver (27 Mary Huse Grove) during construction

Phase of construction	Site clearance	Earthworks	Paving	Construction of buildings
$L_{Aeq(15\text{ min})}$ at facade	67 dB	69 dB	65 dB	54 dB

Construction noise levels are compliant with NZS 6803 as experienced at the closest property during all phases of work. All more distant receivers will also comply with the 70 dB daytime noise limit.

Calculated noise levels do not account for topographical features. Therefore, actual noise levels are likely to be lower due to the noise screening from the rail bund.

It is unlikely that vibration from the construction activities will be perceptible at the nearest residential properties.

8 Summary

Waste Management is proposing to construct and operate a waste transfer facility off Benmore Crescent, Manor Park, Lower Hutt.

Construction of the facility is required to comply with the noise limits contained within NZS 6803:1999. A conservative assessment of noise during the expected construction phases demonstrated that the noise levels will comply with these limits at the closest property. All other properties will experience lower noise levels.

This site is currently zoned General Rural and to be a permitted activity the operations have to meet the rural zone noise limits during the day and at night. A noise model of the site operation was developed and modelled noise levels at all nearby residential properties comply with the General Rural zone noise limits. Operation of the site complies with the permitted activity noise standards.

9 Applicability

This report has been prepared for the exclusive use of our client Waste Management NZ, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Hutt City Council as the consenting authority will use this report for the purpose of assessing that application.

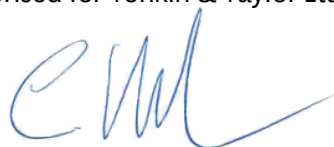
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