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Appendix A

Emissions Inventory

Proposed Waste Management Facility

The dust emissions from the Project have been estimated from the operational description of the proposed activities provided by the Proponent and have been combined with emissions factor equations that relate to the quantity of dust emitted from particular activities based on intensity, the prevailing meteorological conditions and composition of the material being handled.

Emission factors and associated controls have been sourced from the National Pollutant Inventory Emission Estimation Technique Manuals (**NPI 2012** and **NPI 2014**) and US EPA AP42 Emission Factors (**US EPA, 2011**)

Table A-1: Emission factor equations

Activity	Emission factor equation	Variable
Loading / emplacing material	$EF_{TSP} = k \times 0.0016 \times \left(\frac{U}{2.2}^{1.3} \Big/ \frac{M}{2}^{1.4}\right) kg/tonne$	K_{tsp} = 0.74 U = wind speed (m/s) M = moisture content (%)
Hauling on sealed surfaces	$EF_{TSP} = k \times (sL)^{0.91} \times (W)^{1.02} kg/VKT$	k_{TSP} = 3.23 (g/VKT) sL = road surface silt loading (g/m²) W = average weight of vehicles (tons)
Wind erosion	$EF_{TSP} = 0.4\, kg/ha/hour$	-

Table A-2: Emissions Inventory

Activity	TSP emission (kg/y)	PM10 emission (kg/y)	PM25 emission (kg/y)	Intensity	Units	Emission Factor TSP	Emission Factor PM10	Emission Factor PM25	Units	Variable 1	Units	Variable 2	Units	Variable 3	Units	Variable 4 - TSP	Variable 4 - PM10	Variable 4 - PM25	Units	Variable 5	Units
Hauling of waste/ materials (paved road)	178.1	34.2	8.3	30,000	tonnes/ year	0.0059	0.0011	0.0003	kg/t	19	tonnes/load	33	Vehicle gross (tonnes)	0.2	km/return trip	0.698	0.134	0.032	kg/VKT	7	road surface silt loading (g/m^2)
Hauling of waste/ materials (Max. per night)	139.0	27	6	23,400	tonnes/ year	0.0059	0.0011	0.0003	kg/t	19	tonnes/load	33	Vehicle gross (tonnes)	0.2	km/return trip	0.698	0.134	0.032	kg/VKT	7	road surface silt loading (g/m^2)
Unloading of materials from truck	6.9	3.3	0.5	30,000	tonnes/ year	0.0002	0.0001	0.0000	kg/t	0.70	average of (wind speed/2.2)^1.3 in m/s	5	moisture content in %								
Unloading of materials from truck (Max. per night)	5.4	3	0.4	23,400	tonnes/ year	0.0002	0.0001	0.0000	kg/t	0.70	average of (wind speed/2.2)^1.3 in m/s	5	moisture content in %								
Sorting	25.0	11.8	1.8	30,000	tonnes/ year	0.0008	0.0004	0.0001	kg/t	0.70	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
Transfer of material to stockpiles	25.0	11.8	1.8	30,000	tonnes/ year	0.0008	0.0004	0.0001	kg/t	0.70	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
Loading to feeder	25.0	11.8	1.8	30,000	tonnes/ year	0.0008	0.0004	0.0001	kg/t	0.70	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
Conveying	25.0	11.8	1.8	30,000	tonnes/ year	0.0008	0.0004	0.0001	kg/t	0.70	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
Screening	375.0	129.0	31.2	30,000	tonnes/ year	0.0125	0.0043	0.0010	kg/t												
Transfer of material to stockpiles	25.0	11.8	1.8	30,000	tonnes/ year	0.0008	0.0004	0.0001	kg/t	0.70	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
Unload materials to stockpiles	25.0	11.8	1.8	30,000	tonnes/ year	0.0008	0.0004	0.0001	kg/t	0.70	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
Loading to trucks for export off-site	25.0	11.8	1.8	30,000	tonnes/ year	0.0008	0.0004	0.0001	kg/t	0.70	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
Hauling material off-site	222.7	42.7	10.3	30,000	tonnes/ year	0.0074	0.0014	0.0003	kg/t	19	tonnes/load	33	Vehicle gross (tonnes)	0.2	km/return trip	0.698	0.134	0.032	kg/VKT	7	road surface silt loading (g/m^2)
Wind Erosion	297.8	148.9	22.3	0.085	ha	0.4	0.2	0.03	kg/ha/hour	8760	hours										
Total	**1,400**																				

Appendix B

Contemporaneous 24-hour PM_{10} and $PM_{2.5}$ assessment

Table B-1: 24-hour average PM_{10} concentration – Sensitive receptor location R1

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.0	53.0	-	-	-	-
27/11/2015	48.3	0.1	48.4	23/06/2015	11.9	1.1	13.0
26/11/2015	41.7	0.0	41.7	24/06/2015	12.2	1.0	13.2
17/10/2015	35.4	0.0	35.4	10/07/2015	15.1	0.9	16.0
12/12/2015	34.6	0.1	34.7	21/07/2015	12.1	0.8	12.9
21/08/2015	34	0.3	34.3	11/06/2015	18.4	0.8	19.2
7/10/2015	33.6	0.0	33.6	22/06/2015	12.6	0.8	13.4
9/02/2015	32.7	0.0	32.7	16/06/2015	9.5	0.8	10.3
9/03/2015	32.1	0.0	32.1	17/05/2015	10	0.8	10.8
13/12/2015	30.6	0.5	31.1	8/10/2015	28.2	0.8	29.0
17/12/2015	30.3	0.5	30.8	26/06/2015	9.4	0.7	10.1

Table B-2: 24-hour average PM_{10} concentration – Sensitive receptor location R2

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.0	53.0	-	-	-	-
27/11/2015	48.3	0.1	48.4	23/06/2015	11.9	1.8	13.7
26/11/2015	41.7	0.2	41.9	16/06/2015	9.5	1.5	11.0
17/10/2015	35.4	0.0	35.4	28/05/2015	17.7	1.4	19.1
12/12/2015	34.6	0.1	34.7	10/07/2015	15.1	1.4	16.5
21/08/2015	34	1.1	35.1	22/07/2015	13.9	1.3	15.2
7/10/2015	33.6	0.0	33.6	19/05/2015	10.5	1.2	11.7
9/02/2015	32.7	0.0	32.7	24/06/2015	12.2	1.2	13.4
9/03/2015	32.1	0.0	32.1	21/08/2015	34	1.1	35.1
13/12/2015	30.6	0.6	31.2	27/05/2015	13.8	1.1	14.9
17/12/2015	30.3	0.5	30.8	23/03/2015	11.8	1.0	12.8

Table B-3: 24-hour average PM_{10} concentration – Sensitive receptor location R3

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.0	53.0	-	-	-	-
27/11/2015	48.3	0.0	48.3	23/06/2015	11.9	1.7	13.6
26/11/2015	41.7	0.3	42.0	19/05/2015	10.5	1.7	12.2
17/10/2015	35.4	0.0	35.4	28/05/2015	17.7	1.6	19.3
12/12/2015	34.6	0.1	34.7	10/07/2015	15.1	1.4	16.5
21/08/2015	34	1.0	35.0	22/07/2015	13.9	1.3	15.2
7/10/2015	33.6	0.0	33.6	16/06/2015	9.5	1.3	10.8
9/02/2015	32.7	0.0	32.7	7/06/2015	17.5	1.2	18.7
9/03/2015	32.1	0.0	32.1	27/05/2015	13.8	1.1	14.9
13/12/2015	30.6	0.5	31.1	24/06/2015	12.2	1.1	13.3
17/12/2015	30.3	0.4	30.7	21/08/2015	34	1.0	35.0

Table B-4: 24-hour average PM_{10} concentration – Sensitive receptor location R4

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.0	53.0	-	-	-	-
27/11/2015	48.3	0.0	48.3	19/05/2015	10.5	1.5	12.0
26/11/2015	41.7	0.2	41.9	28/05/2015	17.7	1.2	18.9
17/10/2015	35.4	0.0	35.4	24/07/2015	11.7	1.2	12.9
12/12/2015	34.6	0.1	34.7	23/06/2015	11.9	1.1	13.0
21/08/2015	34	0.5	34.5	7/06/2015	17.5	1.1	18.6
7/10/2015	33.6	0.0	33.6	8/06/2015	15.3	0.9	16.2
9/02/2015	32.7	0.0	32.7	18/04/2015	12.3	0.9	13.2
9/03/2015	32.1	0.0	32.1	10/07/2015	15.1	0.9	16.0
13/12/2015	30.6	0.3	30.9	6/06/2015	16.4	0.9	17.3
17/12/2015	30.3	0.2	30.5	27/05/2015	13.8	0.8	14.6

Table B-5: 24-hour average PM_{10} concentration – Sensitive receptor location R5

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.1	53.1	-	-	-	-
27/11/2015	48.3	0.0	48.3	30/07/2015	12.6	0.9	13.5
26/11/2015	41.7	0.1	41.8	19/05/2015	10.5	0.8	11.3
17/10/2015	35.4	0.0	35.4	24/07/2015	11.7	0.8	12.5
12/12/2015	34.6	0.0	34.6	1/08/2015	14	0.7	14.7
21/08/2015	34	0.1	34.1	10/08/2015	15.7	0.7	16.4
7/10/2015	33.6	0.0	33.6	3/10/2015	15.6	0.7	16.3
9/02/2015	32.7	0.0	32.7	30/05/2015	13.8	0.7	14.5
9/03/2015	32.1	0.0	32.1	8/06/2015	15.3	0.7	16.0
13/12/2015	30.6	0.1	30.7	21/10/2015	16.7	0.7	17.4
17/12/2015	30.3	0.1	30.4	6/06/2015	16.4	0.7	17.1

Table B-6: 24-hour average PM_{10} concentration – Sensitive receptor location R6

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.1	53.1	-	-	-	-
27/11/2015	48.3	0.0	48.3	20/05/2015	9.2	0.6	9.8
26/11/2015	41.7	0.0	41.7	17/06/2015	8.2	0.6	8.8
17/10/2015	35.4	0.0	35.4	30/05/2015	13.8	0.5	14.3
12/12/2015	34.6	0.0	34.6	4/10/2015	17.1	0.5	17.6
21/08/2015	34	0.0	34.0	24/04/2015	11.3	0.5	11.8
7/10/2015	33.6	0.0	33.6	29/09/2015	15.4	0.4	15.8
9/02/2015	32.7	0.0	32.7	25/07/2015	7.4	0.4	7.8
9/03/2015	32.1	0.0	32.1	4/06/2015	11.6	0.4	12.0
13/12/2015	30.6	0.0	30.6	31/05/2015	15.7	0.3	16.0
17/12/2015	30.3	0.0	30.3	16/08/2015	15.2	0.3	15.5

Table B-7: 24-hour average PM_{10} concentration – Sensitive receptor location R7

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.3	53.3	-	-	-	-
27/11/2015	48.3	0.1	48.4	1/07/2015	9.5	1.2	10.7
26/11/2015	41.7	0.1	41.8	29/05/2015	13.5	1.1	14.6
17/10/2015	35.4	0.0	35.4	27/07/2015	9	1.1	10.1
12/12/2015	34.6	0.0	34.6	3/06/2015	9.1	1.1	10.2
21/08/2015	34	0.0	34.0	5/07/2015	15.2	1.1	16.3
7/10/2015	33.6	0.0	33.6	16/07/2015	6.6	1.0	7.6
9/02/2015	32.7	0.0	32.7	31/08/2015	9.1	1.0	10.1
9/03/2015	32.1	0.0	32.1	4/07/2015	12.7	0.9	13.6
13/12/2015	30.6	0.0	30.6	28/08/2015	6.6	0.9	7.5
17/12/2015	30.3	0.0	30.3	3/08/2015	9.9	0.9	10.8

Table B-8: 24-hour average PM_{10} concentration – Sensitive receptor location R8

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.3	53.3	-	-	-	-
27/11/2015	48.3	0.2	48.5	1/07/2015	9.5	1.7	11.2
26/11/2015	41.7	0.2	41.9	3/07/2015	10.3	1.6	11.9
17/10/2015	35.4	0.0	35.4	3/06/2015	9.1	1.5	10.6
12/12/2015	34.6	0.1	34.7	2/06/2015	8.1	1.5	9.6
21/08/2015	34	0.0	34.0	4/07/2015	12.7	1.3	14.0
7/10/2015	33.6	0.0	33.6	14/05/2015	9.6	1.3	10.9
9/02/2015	32.7	0.0	32.7	31/08/2015	9.1	1.3	10.4
9/03/2015	32.1	0.1	32.2	28/07/2015	12.7	1.3	14.0
13/12/2015	30.6	0.0	30.6	7/08/2015	10.1	1.3	11.4
17/12/2015	30.3	0.0	30.3	5/07/2015	15.2	1.3	16.5

Table B-9: 24-hour average PM_{10} concentration – Sensitive receptor location R9

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.2	53.2	-	-	-	-
27/11/2015	48.3	0.4	48.7	3/07/2015	10.3	2.4	12.7
26/11/2015	41.7	0.3	42.0	20/06/2015	7.1	2.1	9.2
17/10/2015	35.4	0.1	35.5	19/06/2015	5.8	2.1	7.9
12/12/2015	34.6	0.3	34.9	28/06/2015	16.2	2.0	18.2
21/08/2015	34	0.0	34.0	1/07/2015	9.5	2.0	11.5
7/10/2015	33.6	0.2	33.8	28/07/2015	12.7	2.0	14.7
9/02/2015	32.7	0.0	32.7	7/07/2015	12.2	1.9	14.1
9/03/2015	32.1	0.3	32.4	2/06/2015	8.1	1.9	10.0
13/12/2015	30.6	0.0	30.6	23/05/2015	9.4	1.8	11.2
17/12/2015	30.3	0.0	30.3	3/06/2015	9.1	1.8	10.9

Table B-10: 24-hour average PM_{10} concentration – Sensitive receptor location R10

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.0	53.0	-	-	-	-
27/11/2015	48.3	0.2	48.5	3/04/2015	17	1.2	18.2
26/11/2015	41.7	0.3	42.0	10/04/2015	10.6	1.1	11.7
17/10/2015	35.4	0.3	35.7	2/05/2015	9.7	1.0	10.7
12/12/2015	34.6	0.2	34.8	13/03/2015	18.3	1.0	19.3
21/08/2015	34	0.0	34.0	29/04/2015	10.1	1.0	11.1
7/10/2015	33.6	0.3	33.9	15/07/2015	9.9	1.0	10.9
9/02/2015	32.7	0.3	33.0	23/05/2015	9.4	1.0	10.4
9/03/2015	32.1	0.3	32.4	10/06/2015	15.2	1.0	16.2
13/12/2015	30.6	0.0	30.6	24/08/2015	7.2	1.0	8.2
17/12/2015	30.3	0.0	30.3	1/05/2015	7.9	1.0	8.9

Table B-11: 24-hour average PM_{10} concentration – Sensitive receptor location R11

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.0	53.0	-	-	-	-
27/11/2015	48.3	0.1	48.4	15/07/2015	9.9	0.6	10.5
26/11/2015	41.7	0.1	41.8	24/08/2015	7.2	0.6	7.8
17/10/2015	35.4	0.2	35.6	13/10/2015	12.7	0.6	13.3
12/12/2015	34.6	0.1	34.7	16/05/2015	11.1	0.5	11.6
21/08/2015	34	0.0	34.0	10/06/2015	15.2	0.5	15.7
7/10/2015	33.6	0.3	33.9	27/01/2015	6.1	0.5	6.6
9/02/2015	32.7	0.4	33.1	30/04/2015	8.1	0.5	8.6
9/03/2015	32.1	0.1	32.2	13/03/2015	18.3	0.5	18.8
13/12/2015	30.6	0.0	30.6	3/11/2015	ND	0.5	0.5
17/12/2015	30.3	0.0	30.3	19/07/2015	8.6	0.5	9.1

ND – No data

Table B-12: 24-hour average PM_{10} concentration – Sensitive receptor location R12

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/05/2015	53	0.0	53.0	-	-	-	-
27/11/2015	48.3	0.1	48.4	15/07/2015	9.9	0.5	10.4
26/11/2015	41.7	0.0	41.7	26/05/2015	ND	0.4	0.4
17/10/2015	35.4	0.1	35.5	3/11/2015	ND	0.4	0.4
12/12/2015	34.6	0.1	34.7	19/01/2015	20.1	0.4	20.5
21/08/2015	34	0.0	34.0	21/06/2015	14.1	0.4	14.5
7/10/2015	33.6	0.3	33.9	9/02/2015	32.7	0.4	33.1
9/02/2015	32.7	0.4	33.1	24/08/2015	7.2	0.4	7.6
9/03/2015	32.1	0.1	32.2	19/07/2015	8.6	0.4	9.0
13/12/2015	30.6	0.0	30.6	25/02/2015	12	0.4	12.4
17/12/2015	30.3	0.0	30.3	21/03/2015	17.5	0.4	17.9

ND – No data

Table B-13: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R1

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.0	24.5	23/06/2015	10.3	0.2	10.5
21/08/2015	24.4	0.1	24.5	24/06/2015	8.3	0.2	8.5
7/06/2015	23.8	0.1	23.9	10/07/2015	15.8	0.2	16.0
5/07/2015	23.2	0.0	23.2	11/06/2015	ND	0.2	0.2
28/06/2015	21.2	0.0	21.2	22/06/2015	13	0.2	13.2
22/08/2015	19.5	0.0	19.5	17/05/2015	7.3	0.2	7.5
14/06/2015	18.3	0.1	18.4	21/07/2015	13.3	0.2	13.5
23/08/2015	17.7	0.1	17.8	26/06/2015	7.9	0.2	8.1
29/06/2015	17.3	0.2	17.5	16/06/2015	9.3	0.2	9.5
4/07/2015	17.3	0.0	17.3	18/05/2015	8.2	0.2	8.4

ND – No data

Table B-14: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R2

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.0	24.5	23/06/2015	10.3	0.4	10.7
21/08/2015	24.4	0.2	24.6	16/06/2015	9.3	0.3	9.6
7/06/2015	23.8	0.2	24.0	28/05/2015	13.7	0.3	14.0
5/07/2015	23.2	0.0	23.2	10/07/2015	15.8	0.3	16.1
28/06/2015	21.2	0.0	21.2	24/06/2015	8.3	0.3	8.6
22/08/2015	19.5	0.1	19.6	22/07/2015	9.6	0.3	9.9
14/06/2015	18.3	0.0	18.3	19/05/2015	8.7	0.3	9.0
23/08/2015	17.7	0.1	17.8	27/05/2015	15	0.2	15.2
29/06/2015	17.3	0.1	17.4	18/05/2015	8.2	0.2	8.4
4/07/2015	17.3	0.0	17.3	21/08/2015	24.4	0.2	24.6

Table B-15: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R3

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.0	24.5	23/06/2015	10.3	0.4	10.7
21/08/2015	24.4	0.2	24.6	19/05/2015	8.7	0.4	9.1
7/06/2015	23.8	0.3	24.1	28/05/2015	13.7	0.4	14.1
5/07/2015	23.2	0.0	23.2	10/07/2015	15.8	0.3	16.1
28/06/2015	21.2	0.0	21.2	22/07/2015	9.6	0.3	9.9
22/08/2015	19.5	0.1	19.6	16/06/2015	9.3	0.3	9.6
14/06/2015	18.3	0.0	18.3	7/06/2015	23.8	0.3	24.1
23/08/2015	17.7	0.0	17.7	27/05/2015	15	0.3	15.3
29/06/2015	17.3	0.1	17.4	24/06/2015	8.3	0.3	8.6
4/07/2015	17.3	0.0	17.3	6/06/2015	14.6	0.2	14.8

Table B-16: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R4

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.0	24.5	19/05/2015	8.7	0.3	9.0
21/08/2015	24.4	0.1	24.5	28/05/2015	13.7	0.3	14.0
7/06/2015	23.8	0.2	24.0	23/06/2015	10.3	0.3	10.6
5/07/2015	23.2	0.0	23.2	24/07/2015	7.2	0.2	7.4
28/06/2015	21.2	0.0	21.2	7/06/2015	23.8	0.2	24.0
22/08/2015	19.5	0.2	19.7	6/06/2015	14.6	0.2	14.8
14/06/2015	18.3	0.0	18.3	10/07/2015	15.8	0.2	16.0
23/08/2015	17.7	0.0	17.7	27/05/2015	15	0.2	15.2
29/06/2015	17.3	0.0	17.3	8/06/2015	9	0.2	9.2
4/07/2015	17.3	0.0	17.3	4/06/2015	9	0.2	9.2

Table B-17: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R5

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.0	24.5	30/07/2015	11.5	0.2	11.7
21/08/2015	24.4	0.0	24.4	19/05/2015	8.7	0.2	8.9
7/06/2015	23.8	0.1	23.9	24/07/2015	7.2	0.2	7.4
5/07/2015	23.2	0.0	23.2	30/05/2015	ND	0.2	0.2
28/06/2015	21.2	0.0	21.2	6/06/2015	14.6	0.2	14.8
22/08/2015	19.5	0.1	19.6	1/08/2015	10.6	0.2	10.8
14/06/2015	18.3	0.0	18.3	10/08/2015	14.3	0.2	14.5
23/08/2015	17.7	0.0	17.7	4/06/2015	9	0.2	9.2
29/06/2015	17.3	0.0	17.3	3/10/2015	11.1	0.2	11.3
4/07/2015	17.3	0.0	17.3	16/08/2015	15.3	0.1	15.4

ND – No data

Table B-18: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R6

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.0	24.5	20/05/2015	2.7	0.1	2.8
21/08/2015	24.4	0.0	24.4	17/06/2015	6.6	0.1	6.7
7/06/2015	23.8	0.0	23.8	30/05/2015	ND	0.1	0.1
5/07/2015	23.2	0.0	23.2	24/04/2015	5	0.1	5.1
28/06/2015	21.2	0.0	21.2	4/10/2015	8.6	0.1	8.7
22/08/2015	19.5	0.0	19.5	29/09/2015	7.9	0.1	8.0
14/06/2015	18.3	0.0	18.3	4/06/2015	9	0.1	9.1
23/08/2015	17.7	0.0	17.7	25/07/2015	7.9	0.1	8.0
29/06/2015	17.3	0.0	17.3	31/05/2015	16.2	0.1	16.3
4/07/2015	17.3	0.0	17.3	16/08/2015	15.3	0.1	15.4

ND – No data

Table B-19: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R7

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.2	24.7	1/07/2015	ND	0.3	0.3
21/08/2015	24.4	0.0	24.4	5/07/2015	23.2	0.3	23.5
7/06/2015	23.8	0.0	23.8	29/05/2015	3.8	0.3	4.1
5/07/2015	23.2	0.3	23.5	3/06/2015	ND	0.2	0.2
28/06/2015	21.2	0.2	21.4	27/07/2015	6.2	0.2	6.4
22/08/2015	19.5	0.0	19.5	4/07/2015	17.3	0.2	17.5
14/06/2015	18.3	0.0	18.3	31/08/2015	4.7	0.2	4.9
23/08/2015	17.7	0.0	17.7	16/07/2015	ND	0.2	0.2
29/06/2015	17.3	0.1	17.4	28/08/2015	4.1	0.2	4.3
4/07/2015	17.3	0.2	17.5	3/07/2015	8.6	0.2	8.8

ND – No data

Table B-20: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R8

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.2	24.7	1/07/2015	ND	0.4	0.4
21/08/2015	24.4	0.0	24.4	3/07/2015	8.6	0.4	9.0
7/06/2015	23.8	0.1	23.9	3/06/2015	ND	0.3	0.3
5/07/2015	23.2	0.3	23.5	4/07/2015	17.3	0.3	17.6
28/06/2015	21.2	0.3	21.5	2/06/2015	ND	0.3	0.3
22/08/2015	19.5	0.0	19.5	5/07/2015	23.2	0.3	23.5
14/06/2015	18.3	0.1	18.4	28/06/2015	21.2	0.3	21.5
23/08/2015	17.7	0.0	17.7	31/08/2015	4.7	0.3	5.0
29/06/2015	17.3	0.2	17.5	29/05/2015	3.8	0.3	4.1
4/07/2015	17.3	0.3	17.6	28/07/2015	9.6	0.3	9.9

ND – No data

Table B-21: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R9

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.2	24.7	3/07/2015	8.6	0.5	9.1
21/08/2015	24.4	0.0	24.4	28/06/2015	21.2	0.5	21.7
7/06/2015	23.8	0.1	23.9	1/07/2015	ND	0.5	0.5
5/07/2015	23.2	0.4	23.6	20/06/2015	5.4	0.5	5.9
28/06/2015	21.2	0.5	21.7	19/06/2015	3.4	0.4	3.8
22/08/2015	19.5	0.0	19.5	28/07/2015	9.6	0.4	10.0
14/06/2015	18.3	0.2	18.5	7/07/2015	14	0.4	14.4
23/08/2015	17.7	0.0	17.7	3/06/2015	ND	0.4	0.4
29/06/2015	17.3	0.2	17.5	2/06/2015	ND	0.4	0.4
4/07/2015	17.3	0.4	17.7	4/07/2015	17.3	0.4	17.7

ND – No data

Table B-22: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R10

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.0	24.5	3/04/2015	6	0.3	6.3
21/08/2015	24.4	0.0	24.4	10/04/2015	3.4	0.2	3.6
7/06/2015	23.8	0.0	23.8	15/07/2015	7.2	0.2	7.4
5/07/2015	23.2	0.1	23.3	24/08/2015	7	0.2	7.2
28/06/2015	21.2	0.2	21.4	28/06/2015	21.2	0.2	21.4
22/08/2015	19.5	0.0	19.5	29/04/2015	4.8	0.2	5.0
14/06/2015	18.3	0.2	18.5	2/05/2015	3.7	0.2	3.9
23/08/2015	17.7	0.0	17.7	23/05/2015	5.2	0.2	5.4
29/06/2015	17.3	0.1	17.4	10/06/2015	ND	0.2	0.2
4/07/2015	17.3	0.1	17.4	13/03/2015	10.2	0.2	10.4

ND – No data

Table B-23: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R11

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.0	24.5	15/07/2015	7.2	0.2	7.4
21/08/2015	24.4	0.0	24.4	24/08/2015	7	0.1	7.1
7/06/2015	23.8	0.0	23.8	16/05/2015	5.5	0.1	5.6
5/07/2015	23.2	0.0	23.2	13/10/2015	5.2	0.1	5.3
28/06/2015	21.2	0.1	21.3	26/05/2015	10.5	0.1	10.6
22/08/2015	19.5	0.0	19.5	10/06/2015	ND	0.1	0.1
14/06/2015	18.3	0.1	18.4	3/11/2015	5	0.1	5.1
23/08/2015	17.7	0.0	17.7	19/07/2015	7	0.1	7.1
29/06/2015	17.3	0.0	17.3	3/04/2015	6	0.1	6.1
4/07/2015	17.3	0.0	17.3	30/04/2015	3.1	0.1	3.2

ND – No data

Table B-24: 24-hour average $PM_{2.5}$ concentration – Sensitive receptor location R12

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment	Total cumulative 24-hr average level
6/07/2015	24.5	0.0	24.5	15/07/2015	7.2	0.1	7.3
21/08/2015	24.4	0.0	24.4	26/05/2015	10.5	0.1	10.6
7/06/2015	23.8	0.0	23.8	21/06/2015	9.3	0.1	9.4
5/07/2015	23.2	0.0	23.2	3/11/2015	5	0.1	5.1
28/06/2015	21.2	0.1	21.3	19/01/2015	7.2	0.1	7.3
22/08/2015	19.5	0.0	19.5	24/08/2015	7	0.1	7.1
14/06/2015	18.3	0.1	18.4	19/07/2015	7	0.1	7.1
23/08/2015	17.7	0.0	17.7	25/02/2015	4.7	0.1	4.8
29/06/2015	17.3	0.0	17.3	9/02/2015	10.6	0.1	10.7
4/07/2015	17.3	0.0	17.3	8/08/2015	13.1	0.1	13.2

Appendix F

Noise and Vibration Impact Assessment

Noise Impact Assessment

Proposed Maclean's Waste Management Facility Upgrade North St Marys NSW.

Prepared for : KMH Environmental Pty Ltd

October 2017

Document Information

Noise Impact Assessment

Proposed Maclean's Waste Management Facility Upgrade, North St Marys NSW.

Prepared for: KMH Environmental Pty Ltd

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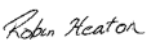
MAC170450RP1V3	Final	24 October 2017	Robin Heaton		Oliver Muller	

CONTENTS

1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by KMH Environmental Pty Ltd (KMH) on behalf of Macleans Waste Management (MWM) to prepare a Noise Impact Assessment (NIA) for the proposed upgrade of the established Waste Management Facility (WMF) located at 33 – 37 Plasser Crescent, North St Marys, NSW (the 'Project').

The NIA was completed to quantify potential acoustic impacts associated with the operation and construction of the project on the surrounding community and will accompany the Environmental Impact Statement (EIS) that is being prepared to assess the proposed development. The NIA has been prepared taking into consideration requirements outlined in the Secretary's Environmental Noise Assessment Requirements (SEARs) (ref:SEAR1142) issued by the NSW Department of Planning and Environment (2017) and in accordance with the following policies and guidelines:

- Environment Protection Authority (EPA) 2000, NSW Industrial Noise Policy (INP);
- Department of Environment and Climate Change (DECC) 2009, Interim Construction Noise Guideline (ICNG); and
- Department of Environment, Climate Change and Water NSW (DECCW), Road Noise Policy (RNP), 2011.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

1.1 SEARS Summary

Key conditions pertaining to noise and vibration raised by the NSW Environment Protection Authority and listed in Attachment A, Section E2 - EIS Requirements for Proposed Expansion of Waste Management Facility, 33-37 Plasser Crescent, St Marys are presented in **Table 1** along with the relevant section of the noise assessment where they are addressed.

Table 1 Secretary's Environmental Assessment Requirements – 1142		
Item	Section Addressed	Comment
Describe Baseline Conditions		
Determine the existing background (LA90) and ambient (LAeq) noise levels in accordance with the NSW Industrial Noise Policy.	Section 3	
Determine the existing road traffic noise levels in accordance with the NSW Environmental Criteria for Road Traffic Noise, where road traffic noise impacts may occur.	Section 6.4	Note, the Road Noise Policy (RNP) was used in lieu of the Environmental Criteria for Road
The noise impact assessment report should provide details of all monitoring of existing ambient noise levels including:	Section 3	
-details of equipment used for the measurements a brief description of where the equipment was positioned	Section 3.1.1	
-a statement justifying the choice of monitoring site, including the procedure used to choose the site, having regards to the definition of 'noise sensitive locations(s)' and 'most affected locations(s)' described in Section 3.1.2 of the NSW Industrial Noise Policy	Section 3.1.1	
-details of the exact location of the monitoring site and a description of land uses in surrounding areas	Section 3.1.1	
-a description of the dominant and background noise sources at the site	Section 3.1.2	
-day, evening and night assessment background levels for each day of the monitoring period	Table 6 Section 3.1.1	
-the final Rating Background Level (RBL) value graphs of the measured noise levels for each day should be provided	Table 6 Section 3.1.1 and Appendix B	
-a record of periods of affected data (due to adverse weather and extraneous noise), methods used to exclude invalid data and a statement indicating the need for any re-monitoring under Step 1 in Section B1.3 of the NSW Industrial Noise Policy	Section 3.1.1 and Appendix B	
-determination of LAeq noise levels from existing industry	Section 3.1.2	
Assess Impacts		
Determine the project specific noise levels for the site. For each identified potentially affected receiver, this should include:	Section 4.1 Table 8	
-determination of the intrusive criterion for each identified potentially affected receiver	Section 4.1 Table 8	
-selection and justification of the appropriate amenity category for each identified potentially affected receiver	Section 4.1 Table 8	
-determination of the amenity criterion for each receiver	Section 4.1 Table 8	
-determination of the appropriate sleep disturbance limit	Section 4.2 Table 9	

Table 1 Secretary's Environmental Assessment Requirements – 1142		
Item	Section Addressed	Comment
Maximum noise levels during night-time period (10pm-7am) should be assessed to analyse possible affects on sleep. Where LA1(1min) noise levels from the site are less than 15 dB above the background LA90 noise level, sleep disturbance impacts are unlikely. Where this is not the case, further analysis is required. Additional guidance is provided in Appendix B of the NSW Environmental Criteria for Road Traffic Noise.	Section 6.2	
Determine expected noise level and noise character (e.g. tonality, impulsiveness, vibration, etc) likely to be generated from noise sources during:		
-site establishment	N/A	
-construction	Section 6.3	
-operational phases	Section 6.1	
-transport including traffic noise generated by the proposal	Section 6.4	
-other services.	N/A	
Note: The noise impact assessment report should include noise source data for each source in 1/1 or 1/3 octave band frequencies including methods for references used to determine noise source levels. Noise source levels and characteristics can be sourced from direct measurement of similar activities or from literature (if full references are provided).	Appendix D	
Determine the noise levels likely to be received at the most sensitive locations (these may vary for different activities at each phase of the development). Potential impacts should be determined for any identified significant adverse meteorological conditions. Predicted noise levels under calm conditions may also aid in quantifying the extent of impact where this is not the most adverse condition.	Section 6.1	
The noise impact assessment report should include:		
-a plan showing the assumed location of each noise source for each prediction scenario	Figure 2	
-a list of the number and type of noise sources used in each prediction scenario to simulate all potential significant operating conditions	Section 5.1.2 Table 15	
-any assumptions made in the predictions in terms of source heights, directivity effects, shielding from topography, buildings or	Section 5.1.4	
-methods used to predict noise impacts including identification of any noise models used. Where modelling approaches other than the use of the ENM or SoundPlan computer models are adopted, the approach should be appropriately justified and validated	Section 5.1	
-an assessment of appropriate weather conditions for the noise predictions including reference to any weather data used to justify the assumed conditions	Section 5.1.1	

Table 1 Secretary's Environmental Assessment Requirements – 1142		
Item	Section Addressed	Comment
-the predicted noise impacts from each noise source as well as the combined noise level for each prediction scenario under any identified significant adverse weather conditions as well as calm conditions where appropriate	Section 6.1	
-for developments where a significant level of noise impact is likely to occur, noise contours for the key prediction scenarios should be derived	Appendix E	
-an assessment of the need to include modification factors as detailed in Section 4 of the NSW Industrial Noise Policy.	Section 5.1	
Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional mitigation measures.	Section 6.1, Section 7	
The noise impact assessment report should include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation.	Section 7	
Where relevant noise/vibration criteria cannot be met after application of all feasible and cost effective mitigation measures the residual level of noise impact needs to be quantified by identifying:	N/A	
-locations where the noise level exceeds the criteria and extent of exceedence	N/A	
-numbers of people (or areas) affected	N/A	
-times when criteria will be exceeded	N/A	
-likely impact on activities (speech, sleep, relaxation, listening, etc)	N/A	
-change on ambient conditions	N/A	
-the result of any community consultation or negotiated agreement.	N/A	
For the assessment of existing and future traffic noise, details of data for the road should be included such as assumed traffic volume; percentage heavy vehicles by time of day; and details of the calculation process. These details should be consistent with any traffic study carried out in the EIS.	Section 6.4.1	Note, existing road noise levels determined via direct measurement rather than calculated based on AADT data.
Where blasting is intended an assessment in accordance with the Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZECC, 1990) should be undertaken. The following details of the blast design should be included in the noise assessment: bench height, burden spacing, spacing burden ratio blast hole diameter, inclination and spacing, type of explosive, maximum instantaneous charge, initiation, blast block size, blast frequency.	N/A	Blasting not undertaken on this project

Table 1 Secretary's Environmental Assessment Requirements – 1142		
Item	Section Addressed	Comment
Describe management and mitigation measures		
Determine the most appropriate noise mitigation measures and expected noise reduction including both noise controls and management of impacts for both construction and operational noise. This will include selecting quiet equipment and construction methods, noise barriers or acoustic screens, location of stockpiles, temporary offices, compounds and vehicle routes, scheduling of activities, etc	Section 7	
For traffic noise impacts, provide a description of the ameliorative measures considered (if required), reasons for inclusion or exclusion, and procedures for calculation of noise levels including ameliorative measures. Also include, where necessary, a discussion of any potential problems associated with the proposed ameliorative measures, such as overshadowing effects from barriers. Appropriate ameliorative measures may include: -use of alternative transportation modes, alternative routes, or other methods of avoiding the new road usage -control of traffic (eg: limiting times of access or speed limitations) -resurfacing of the road using a quiet surface -use of (additional) noise barriers or bunds -treatment of the facade to reduce internal noise levels buildings where the night-time criteria is a major concern -more stringent limits for noise emission from vehicles (i.e. using specially designed 'quite' trucks and/or trucks to use air bag suspension -driver education -appropriate truck routes -limit usage of exhaust breaks -use of premium muffles on trucks -reducing speed limits for trucks -ongoing community liaison and monitoring of complaints -phasing in the increased road use.	Section 6.4.1	

1.2 Background

The WMF currently processes approximately 5,500 tonnes per annum (tpa) of construction waste. The facility handles both heavies (brick, soil and concrete) and lights (plastics, cardboard, timber and metal) predominantly from the construction of new homes and buildings.

The proposed upgrade of the facility would see the capacity increase from 5,500tpa to approximately 30,000tpa allowing more construction waste from the greater Sydney region to be recovered and recycled, diverting this waste away from landfill facilities.

The increase in waste processing will be achieved through the installation of new magnetic and ballistic separators in conjunction with a new conveyor system within the current process sheds. An additional site office will also be added on the south side of the current buildings.

The current operating hours for the project are 7am to 5pm Monday to Friday, 7am to 3pm Saturdays and 10am to 2pm Sundays. The project proposes to extend operations from 6am to 11pm Monday to Friday. Weekend operating hours are proposed to remain unchanged.

1.3 Vibration Impacts

The potential for vibration impacts have been qualitatively reviewed for this assessment. The review identifies that vibration impacts from the project site would be negligible.

For industrial receivers, the nearest offset distance to potential vibrating sources is >20m. Historic vibration measurements of tracking plant (excavator/dozers etc) show that the intermittent human comfort of 0.8mm/s (workshops) would be achieved at a distance of 15m. Additionally the nearest residential receiver is greater than 150m from the project site, therefore, vibration impacts are not considered to be an issue for the project and have not been considered further in this assessment.

1.4 Receiver Review

The project site is located in the industrial area in Plasser Crescent, North St Marys, NSW. The plant is surrounded by industrial sources including a smash repair workshop and heavy goods handling facility. The Main Western Railway is located approximately 120m south of the Project which provides a buffer between residential dwellings located further to the south. Kurrajong Road is located approximately 100m north of the facility with several dwellings located to the north east of the facility.

To represent the dwellings to both the north and south of the Project seven noise catchments have been established. Additionally, nine industrial receivers surrounding the Project have also been included in this assessment The MGA(56) coordinates for the nearest affected receivers to the project are summarised in Table 2. Figure 1 provides a locality plan identifying the position of receivers in relation to the project.

Table 2 Receivers and MGA(56) Coordinates			
Ref	Easting	Northing	Approximate Distance to Project Site (m)
NC1	294787	6262156	150
NC2	294733	6262224	200
NC3	294421	6261829	340
NC4	294575	6261840	220
NC5	294670	6261822	190
NC6	294801	6261810	230
I1	294649	6262076	65
I2	294627	6262013	67
I3	294637	6261979	70
I4	294715	6261955	75
I5	294739	6261987	60
I6	294705	6261992	35
I7	294673	6262066	43
I8	294762	6262113	110
I9	294621	6262183	135
AR1	294667	6262182	145

Note 1: Distance to centre of site.

FIGURE 1

LOCALITY PLAN

REF: MAC170450

0 100m

□□□

C1 R□C□□□R CATCHM□□T

L1 L□□□□R L□CAT□□

S□T□ L□CAT□□

MAC
Muller Acoustic Consulting

*Imagery Source : nearmaps

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2 Policy and Guidelines

The following section summarises relevant policy and guidelines pertinent to undertaking an industrial noise assessment. Key policies relevant to the Project include the INP, ICNG and RNP.

2.1 Industrial Noise Policy

The EPA released the NSW INP in January 2000. The INP provides a process for establishing noise criteria for consents and licences enabling the EPA to regulate noise emissions from scheduled premises under the Protection of the Environment Operations Act 1997.

The specific policy objectives of the INP are:

- to establish noise criteria that would protect the community from excessive intrusive noise and preserve amenity for specific land uses;
- to use the criteria as the basis for deriving project specific noise levels;
- to promote uniform methods to predict, quantify and assess noise impacts, including a procedure for evaluating meteorological effects;
- to outline a range of mitigation measures that could be used to minimise noise impacts;
- to provide a formal process to guide the determination of feasible and reasonable noise limits for consents or licences that reconcile noise impacts with the economic, social and environmental considerations of industrial development; and
- to carry out functions relating to the prevention, minimisation and control of noise from premises scheduled under the Act.

2.1.1 Assessing Intrusiveness

The intrusiveness criterion essentially means that the equivalent continuous noise level (L_{Aeq}) from the proposed Project should not be more than 5dB above the existing rating background level (RBL) in any assessment period. Therefore, when assessing intrusiveness, the background noise needs to be measured.

2.1.2 Assessing Amenity

The amenity assessment is based on noise criteria relevant to a specific land use or locality. The criteria relate only to limiting cumulative or combined levels of industrial noise in a locality. Where existing industrial noise approaches the criterion value, then noise levels from proposed industries need to meet the amenity criteria so that cumulative noise or 'industrial-creep' is minimised. The amenity assessment methodology takes into consideration areas of high traffic noise when assessing ambient industrial noise.

Private residences and other sensitive receivers potentially affected by the Project are safeguarded by the EPA's amenity categories as presented in Table 2.1 of the INP. Table 2.1 of the INP for residential receivers is reproduced in **Table 3**.

Table 3 Receiver Locations – Assessing Amenity

Type of Receiver	Indicative Noise Amenity Area	Period	Recommended LAeq(Period) Noise Level, dBA	
			Acceptable	Recommended Max
Residential	Urban	Day	60	65
		Evening	50	55
		Night	45	50
Industrial	All	When in use	70	75
Active Recreational Area	All	When in use	55	60

Note: Monday – Saturday Day 7am to 6pm; Evening 6pm to 10pm; Night 10pm to 7am. On Sundays and Public Holidays, Day 8am to 6pm; Evening 6pm to 10pm; Night 10pm to 8am.

2.2 Sleep Disturbance Criteria

The EPA via the INP and associated application notes, provides guidance on assessing sleep disturbance on residences from industrial and commercial sites. As the proposed hours of operation for the WMF are 6am to 11pm from Monday to Friday with several items of plant proposed to operate during that period, a sleep disturbance assessment will be undertaken in this report. It is noted that process operations may not have commenced at 6am however the transient nature of the impact noise associated with the delivery of unprocessed materials has the potential to cause sleep disturbance. The detailed criteria for sleep disturbance are described in detail in **Section 4**.

2.3 Interim Construction Noise Guideline

The assessment and management of noise from construction works is completed using the ICNG. The ICNG is specifically aimed at managing noise from construction works and is used to assist in setting statutory conditions in licences or other regulatory instruments.

The ICNG sets out procedures to identify and address the impacts of construction noise on residences and other sensitive land uses.

2.3.1 Standard Hours for Construction

Table 4 summarises the ICNG recommended standard hours for construction activities where the noise from construction is audible at residential premises.

Table 4 Recommended Standard Hours for Construction

Daytime	Preferred Construction Hours
Monday to Friday	7am to 6pm
Saturdays	8am to 1pm
Sundays or Public Holidays	No construction

These recommended hours do not apply in the event of direction from police, or other relevant authorities, for safety reasons or where required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

2.3.2 Construction Noise Management Levels

Table 5 reproduces the ICNG management levels for residential receivers. The construction noise management levels are the sum of the management level and relevant rating background level (RBL) for each specific assessment period.

Table 5 ICNG Residential Management Levels		
Time of day	Management level LAeq (15-minute)	How to apply
Recommended standard hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or public holidays.	Noise affected RBL + 10dB.[1]	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq(15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75dBA.	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: -times identified by the community when they are less sensitive to noise (such as before and after school for works near schools), or mid-morning or mid-afternoon for works near residences. -if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours.	Noise affected RBL + 5dB.	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dBA above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see section 7.2.2.

Note 1: The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period.

2.4 Road Noise Policy

The road traffic noise criteria are provided in the Road Noise Policy (RNP) (DECCW, 2011). The policy sets out noise criteria applicable to different road classifications for quantifying traffic noise impacts. Road noise criteria relevant to this assessment are presented in detail in **Section 4**.

3 Existing Environment

3.1 Background Noise Environment

3.1.1 Unattended Noise Monitoring

A review of the noise catchment areas surrounding the project site was completed to identify the nearest and potentially most affected sensitive receivers.

Two key residential receiver catchments, one located to the north of the project site along Kurrajong Road and another to the south on Australia Street were identified as the potentially most affected with respect to project noise emissions. The two monitoring locations were selected as representative of the surrounding noise environment. Noise logging data was not influenced by the current operations at the project site. Notwithstanding the noise environment was found to be dominated by industrial sources such as the Main Western Railway, smash repair facilities, factories and traffic from adjacent arterial roads.

To quantify the existing background noise environment of the area, unattended logging was conducted at each key receiver catchment. The selected monitoring locations are shown in **Figure 1**. The unattended noise survey was conducted in general accordance with the procedures described in Australian Standard AS 1055-1997, "Acoustics - Description and Measurement of Environmental Noise".

The measurements were carried out using one Svantek Type 1, 977 and one Svantek Type 1, 971 noise analysers from Thursday 4 May 2017 to Friday 12 May 2017. The monitoring locations are considered representative of the acoustic environment of noise catchments surrounding the project. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ±0.5dBA. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

Data affected by adverse meteorological conditions have been excluded from the results in accordance with methodologies provided in the INP. A summary of the calculated Rating Background Levels (RBL) based on the measured logging data is presented in **Table 6** with graphical results provided in **Appendix B**. The morning shoulder (between 6 am and 7 am) RBLs were calculated using the tenth percentile of all morning shoulder L_{A90s} over the monitoring period.

Ambient noise levels at the logging locations were dominated by road traffic noise and industrial/urban sources. Attended noise surveys verified that Project noise did not contribute to background measurements.

A summary of measured background noise levels and measured ambient LAeq levels are summarised in **Table 6** and plotted in graph format in **Appendix B**.

Table 6 Background Noise Monitoring Summary

Location	Measured background noise level, RBL, dBA					Measured LAeq, dBA				
	Day	Evening	Evening Shoulder	Night	Morning Shoulder[1]	Day	Evening	Evening Shoulder	Night	Morning Shoulder[1]
L1	45	42	39	37	41	65	62	60	58	62
L2	39	39	37	34	36	56	52	51	50	53

Note: Excludes periods of wind or rain affected data, meteorological data obtained from the Bureau of Meteorology for Penrith Lakes AWS 33.7195°S 150.6783°E 25m AMSL .

Note: Monday – Saturday Day 7am to 6pm; Evening 6pm to 10pm; Night 10pm to 7am. On Sundays and Public Holidays, Day 8am to 6pm; Evening 6pm to 10pm; Night 10pm to 8am.

Note 1: Morning shoulder is mid-point between day and night periods, evening shoulder is the mid-point between evening and night period.

3.1.2 Attended Noise Monitoring

To gain a better understanding of the existing noise environment, MAC conducted attended noise monitoring at the unattended locations during calm clear weather conditions. The purpose of the measurements were to ascertain dominant ambient noise sources and to quantify any existing industrial noise contributions. The results of attended noise measurements and observations are summarised in **Table 7**.

Table 7 Ambient Noise Monitoring Summary – Attended Monitoring

Location	Date/Time	Primary Noise Descriptor (dB(A) re 20 µPa)			Meteorology	Description and SPL, dB(A)
		LAmax	LAeq	LA90		
L1	04/05/17 10:12	78	61	47		Birds 42 -52 Traffic to 80
L2	04/05/17 11:36	80	63	47	Temp 21°C WS 0.5m/s Dir N	Birds 42 -66 Traffic to 80 Insects 58 – 64 Train passby to 79

Attended noise monitoring identified that L1 was dominated by road traffic and ambient urban noise, sources such as aircraft and birds. For L2, train passbys were dominant with urban hum and local and distant traffic audible. Industrial noise sources including the project site were just audible on occasion, although were generally masked by ambient sources including traffic and train movements.

4 Project Specific Noise Criteria

4.1 Operational Noise Criteria

The operational noise emission criteria for the proposed WMF have been set in accordance with Section 3.0 and 4.0 of the INP. The Project Specific Noise Levels (PSNLs) (project criteria) is the lower of the intrusive or amenity criteria. The PSNLs for the WMF are presented in **Table 8.**

Table 8 Project Specific Noise Criteria, dBA $L_{Aeq(15minute)}$ (re 20uPa)

Receiver Location	Period	RBL	Intrusiveness Criteria LAeq(15min), dBA	Amenity Criterion LAeq(period), dBA	PSNL, dBA
L1 (NC1 – NC2)	Day	45	50	60	**50**
	Evening	42	47	52[1]	**47**
	Evening Shoulder	39	44	48	**44**
	Night	37	42	48[1]	**42**
	Morning Shoulder	41	46	54	**46**
L2 (NC3 – NC6)	Day	39	44	60	**44**
	Evening	39	44	50	**44**
	Evening Shoulder	37	42	48	**42**
	Night	34	39	45	**39**
	Morning Shoulder	36	41	53	**41**
Industrial Receivers (I1 – I9)	When in use	N/A	N/A	70	**70**
Active Recreation (AR1)	When in use	N/A	N/A	55	**60**

Note 1: Traffic ANL as per the NSW EPA INP

4.2 Sleep Disturbance Criterion

An important aspect of intermittent noise, is the potential to disturb the sleep of nearby residents. The EPA provides guidance on assessing sleep disturbance on residences from industrial and commercial sites.

The EPA nominates that a screening criterion of background noise level (LA90) plus 15dB shall apply to maximum noise level events from the site which are to be calculated at one metre from the bedroom facade at the nearest residential properties.

If noise levels over the screening criterion are identified, then additional analysis should consider factors such as:

- how often the events would occur;
- the time the events would occur (between 10pm and 7am); and
- whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods).

A statistical approach to calculating the RBL for shoulder periods is not required by the INP, however the INP recommends that appropriate noise targets for the shoulder period be negotiated with the regulatory/consent authority on a case-by-case basis.

Additionally, the focus of the project should be to avoid or minimise noise of a high level and/or with intrusive characteristics, during the shoulder period, through the use of best practice.

The criteria are provided in **Table 9** and are based on the night-time RBL provided in **Table 8**. It is noted from noise logger charts and site observations that the morning shoulder period is dominated by a rise in ambient levels associated with peak hour road traffic along Kurrajong Road. Therefore, as the adopted criteria are based on the night RBL, they are considered conservative and should be considered worst case for assessing sleep disturbance impacts.

Table 9 provides the sleep disturbance criterion for the nearest residential receivers.

Table 9 Sleep Disturbance Noise Criterion

Location	Period[1]	Rating Background Level (RBL), LA90 dBA	Sleep Disturbance Noise Criterion LAmax, dBA
L1 (NC1 – NC2)	Night	37	52
L2 (NC3 – NC6)	Night	34	49

4.3 Construction Noise Management Levels (NMLs)

Construction activities within the project site include the installation of the new ballistic and magnetic separators will be undertaken at the project site. The construction noise management levels (NML's) (criteria), established in accordance with the ICNG for the project are presented in **Table 10**.

Table 10 Construction Noise Management Levels			
Location	Period	Rating Background Level (RBL), LA90 dBA	Noise Management Level LAeq(15min)
L1 (NC1 – NC2)	Day	45	55
L2 (NC3 – NC6)	Day	39	49
Industrial Receivers (I1- I9)	Day	N/A[1]	75
Active Recreation	Day	N/A[1]	65

Note: Monday – Saturday Day 7am to 6pm; Evening 6pm to 10pm; Night 10pm to 7am. On Sundays and Public Holidays, Day 8am to 6pm; Evening 6pm to 10pm; Night 10pm to 8am.

Note 1: Not applicable when establishing construction criteria for commercial / educational receivers.

4.4 Road Traffic Noise Criteria

The road traffic noise criteria are provided in the NSW EPA's Road Noise Policy (RNP) (2011). In accordance with Section 2.2 of the RNP, this assessment has adopted the 'Freeway/arterial/sub-arterial road' category for Kurrajong Road. **Table 11** reproduces the road traffic noise assessment criteria reproduced from the RNP relevant for this road type.

Table 11 Road Traffic Noise Assessment Criteria for Residential Land Uses			
Road category	Type of project/development	Assessment Criteria - dBA	
		Day (7am to 10pm)	Night (10pm to 7am)
Freeway/arterial/sub-arterial road	Existing residences affected by additional traffic on existing freeways/sub-arterial/roads generated by land use developments	60dBA, LAeq(15hr)	55dBA, LAeq(9hr)

Additionally, the RNP states where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to 2dB, which is generally accepted as the threshold of perceptibility to a change in noise level.

4.4.1 Relative Increase Criteria

In addition to meeting the assessment criteria, any significant increase in total traffic noise at receivers must be considered. Receivers experiencing increases in total traffic noise levels above those presented in **Table 12** due to the addition of project vehicles on Kurrajong Road should be considered for mitigation.

Table 12 Increase Criteria for Residential Land Uses

Road Category	Type of Project/Development	Total Traffic Noise Level Increase, dBA	
		Day (7am to 10pm)	Night (10pm to 7am)
Freeway/arterial/sub-arterial roads and transitways	New road corridor/redevelopment of existing road/land use development with the potential to generate additional traffic on existing road.	Existing traffic LAeq(15hr) +12 dB (external)	Existing traffic LAeq(9hr) +12 dB (external)

5 Noise Assessment Methodology

5.1 Operational Noise Modelling Methodology

Brüel and Kjær Predictor Type 7810 (Version 11.10) noise modelling software was used to assess potential noise impacts associated with the project. The model uses relevant noise source data, ground type, shielding such as barriers and/or adjacent buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers. Plant and equipment were modelled at various locations within representative positions internally and externally to the Project site.

The model incorporated three-dimensional digitised ground contours of the surrounding land base topography. The noise model predicts LAeq noise levels, although it should be noted that this assessment has assumed that all plant and equipment operate simultaneously. In practice, such an operating scenario would be unlikely to occur and the results should therefore be considered conservatively high. Where relevant, modifying factors in accordance with Section 4 of the INP have been applied to calculations.

The model calculation method used to predict noise levels was in accordance with ISO 9613-1 'Acoustics - Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere' and ISO 9613-2 'Acoustics - Attenuation of sound during propagation outdoors. Part 2: General method of calculation'.

5.1.1 Meteorological Analysis

Noise emissions from industry can be significantly influenced by prevailing weather conditions. Wind has the potential to increase noise at a receiver when it is at low speeds and is from the direction of the noise source. As the strength of the wind increases the noise produced by the wind masks the audibility of most industrial sources.

Meteorological conditions that enhance received noise levels include source to receiver winds and the presence of temperature inversions. To account for the potential for enhancements, the INP specifies that the source to the receiver wind component for speeds up to 3m/s for 30% or more of the time in any seasonal period (ie day, evening or night), are feature winds and must be assessed.

The NSW INP Section 5.3 Wind Effects states:

> *'Wind effects need to be assessed where wind is a feature of the area. Wind is considered to be a feature where source to receiver wind speeds (at 10m height) of 3m/s or below occur for 30 percent of the time or more in any assessment period in any season.'*

To determine the prevailing conditions for the project, weather data during the period January 2015 to June 2017 was obtained from the Bureau of Meteorology's (BOM) Penrith Lakes weather station (#67113). The data was analysed using the EPA's Noise Enhancement Wind Analysis (NEWA) program to determine the frequency of occurrence of winds of speeds up to 3m/s in each season.

Table 13 summarises the results of the wind analysis and includes the dominant wind directions and percentage occurrence for each season for the daytime, evening and night assessment periods (ie 'prevailing winds'). The prevailing winds (in bold) will be adopted as part of the noise modelling scenarios for the project. Appendix C presents a summary of the analysed NEWA data.

Table 13 Seasonal Wind Speed, Direction and Percentage Occurrence

Season	Wind Direction ±(45°)			% Wind Speeds 0.5 to 3 m/s		
	Day	Evening	Night	Day	Evening	Night
Summer	225	225	22.5	21	28	**46**
Autumn	135	22.5	22.5	23	34	**44**
Winter	180	22.5	22.5	24	30	**33**
Spring	225	22.5	22.5	21	26	**38**

Based on the results of this analysis, the relevant meteorological conditions adopted in the noise modelling assessment are summarised in Table 14.

Table 14 Modelled Prevailing Meteorological Parameters

Assessment Condition	Wind Speed /Direction	Stability Class
Calm (all periods)	n/a	n/a
Prevailing wind (night only)	3m/s/ 22.5°	n/a
Inversion (night only)	n/a	F

Note: Monday – Saturday Day 7am to 6pm; Evening 6pm to 10pm; Night 10pm to 7am. On Sundays and Public Holidays, Day 8am to 6pm; Evening 6pm to 10pm; Night 10pm to 8am.

5.1.2 Modelling Scenarios - Operation

A worst-case modelling scenario was adopted in this assessment to represent noise emissions during maximum operations of the Project. Plant and equipment items proposed to be used at the project site were provided by KMH Environmental Pty Ltd (18 July 2017).

The Project is anticipated to generate up to 30 hook-trucks per day (60 movements) with no more than four per hour. Hence, this assessment has adopted 1 truck in a fifteen-minute period which is representative of peak hourly flows assuming trucks would remain on-site for no more than fifteen minutes. Additionally, 20 car movement per day are expected associated with staff arrival and departure (ie 10 staff following the upgrade to the project).

Noise emission data for relevant WMF sources were obtained from the MAC noise database. The noise emission levels used in modelling are summarised in **Table 15**. **Appendix D** provides the octave sound power data of modelled plant. **Appendix E** provides the site layout plan for the project.

Table 15 Equipment Sound Power Levels - Operation

Item	$LA_{eq(15min)}$ Sound Power Level (SWL), dBA	Period of Operation			
Operational Noise Sources		Day	Evening	Evening Shoulder	Morning Shoulder
Ballistic separator and conveyors	105	✓	✓	✓	✓
Skid Steer	101	✓	✓	✓	✓
Loader	97	✓	✓	✓	✓
Road Truck Idle (x2) (one on weigh bridge and one in shed)	86	✓	✓	✓	✓
Excavator	97	✓	✓	✓	✓
Delivery Truck	102	✓	✓	✓	✓
Maximum Noise Sources (Sleep Disturbance), LA_{max}					
Impact Noise	102	Night Only			

Note: Monday – Saturday Day 7am to 6pm; Evening 6pm to 10pm; Night 10pm to 7am. On Sundays and Public Holidays, Day 8am to 6pm; Evening 6pm to 10pm; Night 10pm to 8am.

5.1.3 Modelling Scenarios - Construction

A worst-case modelling scenario was adopted in this assessment to represent maximum noise emissions during construction activities including installation of the new ballistic and magnetic separators will be undertaken at the Project. It is noted that there are potentially multiple and varied plant items which may be used in the construction phase of this project. Notwithstanding, the adopted fleet sound power level is considered representative of construction activities for this type of project.

Emission data for relevant WMF construction noise sources were obtained from the MAC noise database. The noise emission levels used in modelling are summarised in **Table 16**.

Table 16 Equipment Sound Power Levels - Construction

Item	LAeq(15min) Sound Power Level	Period of Operation
Forklift (x3)	87	Day Only
Scissor Lift (x2)	95	Day Only
20T Franna crane (x1)	109	Day Only
Hand tools	97	Day Only
Excavator	97	Day Only
Concrete Saw	112	Day Only

5.1.4 Noise Modelling assumptions

The noise model adopted the following noise controls:

- construction of a permanent impervious barrier at the south western boundary of the project site (see **Figure 2**). The barrier should be constructed to a minimum RL of 2.5m above the ground level and consist of materials with a surface density of at least 10kg/m^2, and not contain any gaps (ie lapped and capped timber or equivalent).

FIGURE 2

MODELLED PLANT

REF: MAC170450

0 25m

KEY

Internal sources include :
- Ballistic Separator
- Skid Steer
- Loader
- Excavator
- Road Truck

Road Truck (external source)

2.5m Noise Barrier

MAC
Muller Acoustic Consulting

*Imagery Source : nearmaps

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6 Noise Modelling Results and Discussion

6.1 Operational Noise Results

The predicted noise levels at each receiver during calm and noise enhancing meteorological conditions for Project operations are provided in **Table 17**. The results of the model show that noise emissions from the Project will satisfy the PSNL at all assessed privately owned receivers for worst case operations.

Appendix F provides noise contours for calm and inversion meteorological conditions.

Table 17 Predicted Operational Noise Levels, dBA $LA_{eq(15min)}$					
Receivers	Period[1]	Prediction for Calm	Predictions for Prevailing Wind[2]	Predictions for Inversion	PSNL
Residential Receivers					
NC1	Morning Shoulder	<35	<35	<35	46
	Day	<35	N/A	N/A	50
	Evening	<35	N/A	N/A	47
	Evening Shoulder	<35	<35	<35	44
NC2	Morning Shoulder	<35	<35	<35	46
	Day	<35	N/A	N/A	50
	Evening	<35	N/A	N/A	47
	Evening Shoulder	<35	<35	<35	44
NC3	Morning Shoulder	<35	<35	37	42
	Day	<35	N/A	N/A	44
	Evening	<35	N/A	N/A	44
	Evening Shoulder	<35	<35	37	42
NC4	Morning Shoulder	39	41	42	42
	Day	39	N/A	N/A	44
	Evening	39	N/A	N/A	44
	Evening Shoulder	39	41	42	42
NC5	Morning Shoulder	39	41	42	42
	Day	39	N/A	N/A	44
	Evening	39	N/A	N/A	44
	Evening Shoulder	39	41	42	42
NC6	Morning Shoulder	<35	<35	<35	42
	Day	<35	N/A	N/A	44
	Evening	<35	N/A	N/A	44
	Evening Shoulder	<35	<35	<35	42
Other Receivers					
I1	All – when in use	52	52	52	70
I2	All – when in use	50	50	50	70
I3	All – when in use	52	52	52	70
I4	All – when in use	52	52	52	70
I5	All – when in use	47	47	47	70
I6	All – when in use	56	56	56	70
I7	All – when in use	57	57	57	70
I8	All – when in use	<35	<35	<35	70
I9	All – when in use	<35	<35	36	70
AR1	All – when in use	39	38	40	55

Note 1: Day period is 7am to 6pm, Morning Shoulder period is 6am to 7am.

Note 2: Based on a 3m/s NNE wind.

6.2 Sleep Disturbance Results

In assessing sleep disturbance, the use of the L_{Amax} noise level provides a worst-case prediction since the $L_{A1(1minute)}$ noise level of a noise event is likely to be less than the L_{Amax}. For the sleep disturbance assessment, a sound power level of 102dBA has been adopted and is representative of the maximum noise emissions associated with impact noise from deliveries that may occur during the morning shoulder period. Predicted noise levels from L_{Amax} events for assessed receivers are presented in **Table** 18. Results identify that sleep the disturbance criterion will be satisfied for all assessed receivers.

Table 18 Predicted Sleep Disturbance Noise Levels, dBA LAmax

Receiver	Predicted LAmax noise level events, dBA[1]	Sleep Disturbance Noise Criterion LAmax, dBA
NC1	<40	52
NC2	<40	52
NC3	<40	49
NC4	44	49
NC5	49	49
NC6	<40	49

Note 1: Includes assessment of noise emissions during inversion meteorological conditions.

6.3 Construction Noise Results

This assessment has quantified potential noise emissions from the proposed construction activities undertaken at the project site. **Table 19** provides a summary of the construction noise emissions for the project. Noise Catchments NC4 and NC5 and Industrial receiver I6 exceeded the standard hours construction NML's. Notwithstanding, these exceedances is attributed to the use of the concrete saw which is expected to be used for a maximum of two shifts during modifications to the weighbridge.

Table 19 Predicted Noise Levels from Construction, dBA $LA_{eq(15min)}$		
Receiver	Noise Predictions	NML
NC1	36	55
NC2	35	55
NC3	46	49
NC4	55	49
NC5	57	49
NC6	41	49
I1	53	75
I2	68	75
I3	69	75
I4	68	75
I5	66	75
I6	76	75
I7	59	75
I8	40	75
I9	36	75
AR1	41	65

6.4 Traffic Noise Results

The United States (US) Environment Protection Agency's road traffic calculation method was used to predict the LA_{eq} noise levels from site trucks travelling past receivers along public roads. This method is an internationally accepted theoretical traffic noise prediction model and is ideal for calculating road traffic noise where relatively small traffic flows are encountered.

6.4.1 Operational Road Noise

The majority of truck movements to and from the Project for delivery or collection would be via Plasser Crescent from the north of the site via Kurrajong Road. For this assessment, the maximum proposed daily vehicles movements associated with the project is 30 hook trucks (60 movements) and 20 light vehicles movements associated with onsite staff (KMH, 2017). This assessment has assumed that all 80 vehicle movements (heavy and light), travel to site in each assessment period.

The results of the traffic noise calculations are presented in **Table 20** for receivers at the nearest offset distance of 15m which is the closest offset distance of residential dwellings situated adjacent to Kurrajong Road. Results demonstrate that existing traffic noise levels are below current road noise criteria, furthermore, Project related noise levels would remain below relevant criteria and not increase existing road traffic noise levels by more than 2dBA.

Table 20 Operational Road Traffic Noise Levels					
Distance to Nearest Receiver (m)	Assessment Criteria	Existing Traffic[1]	Future Project Traffic Noise[2]	Existing + Future Project Combined	Total Change
Day $LA_{eq(15hr)}$, dBA					
15	60	64.7	49.3	64.8	0.1
Night (Morning Shoulder vehicles) $LA_{eq(9hr)}$, dBA					
15	55	58.1	50.8	58.8	0.7

Note 1: Existing road noise levels based on measured levels at L1.

Note 2: Calculated value assuming 60 truck movements per day.

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7 Recommendations

7.1 Noise Recommendations

Noise predictions identify that compliance with relevant noise criteria is achievable. Notwithstanding, it is recommended that the WMF prepares a Noise Management Plan (NMP) to manage noise emissions from the Project. The management plan will be prepared with the purpose of providing a description of the measures to be implemented by the WMF to mitigate noise impacts and detail noise monitoring requirements associated with site operations, construction or maintenance.

In general, the purpose of the NMP is to:

- provide the WMF employees and contractors with a description of their responsibilities regarding the management of noise emissions from site;
- address any relevant conditions/requirements of consent/approval;
- describe the methodologies adopted to monitor noise emissions from the site against relevant criteria;
- provide a mechanism for assessing noise monitoring results against the relevant noise criteria; and
- provide a means for the establishment of best practice management with respect to minimising noise emissions/impacts to the broader community.

7.2 Construction Noise Recommendations

In addition to the NMP, it is recommended that during construction the contractor consider implementing the following ameliorative/management measures to reduce noise emissions within the surrounding community.

- implement boundary fences/noise barriers as early as possible to maximise their attenuation benefits to surrounding receivers;
- toolbox and induction of personnel prior to shift to discuss noise control measures that may be implemented to reduce noise emissions to the community;
- all plant should be shutdown when not in use. Plant to be parked/started at farthest point from relevant assessment locations;
- operating plant in a conservative manner (no over-revving);
- signage is to be placed at the front entrance advising truck drivers of their requirement to minimise noise both on and off-site;
- selection of the quietest suitable machinery available for each activity;

- avoidance of noisy plant/machinery working simultaneously where practicable;
- minimisation of metallic impact noise;
- all plant are to utilise a broadband reverse alarm in lieu of the traditional hi frequency type reverse alarm; and
- undertake letter box drops to notify receivers of potential works.

8 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has conducted a Noise Impact Assessment (NIA) for the proposed upgrade to the Macleans Waste Management Facility (WMF) located at 33 - 37 Plasser Crescent, North St Marys, NSW.

The assessment has quantified potential operational noise emissions pertaining to receival, processing, and off-site transportation of recycled products. The results of the NIA demonstrates that operational noise levels comply with the relevant INP criteria at all privately owned receivers during calm and prevailing meteorological conditions.

Furthermore, sleep disturbance is not anticipated, as emissions from transient noise events are predicted to remain below the EPA screening criterion for sleep disturbance.

Results identify that noise levels from the proposed construction works at the WMF are demonstrated to exceed the standard hours construction NMLs at receivers NC4, NC5 and I6. Recommendations to reduce noise emissions within the surrounding community are made in section 7.2.

Off-site road noise emissions from product transport for the Project are predicted to satisfy relevant day and night (ie during morning shoulder movements) road noise criteria and relative increase criteria specified in the RNP.

Based on the NIA modelling results which considers the current design and layout of the Project, compliance with the relevant EPA and sleep disturbance policies is expected. Notwithstanding, recommendations are provided to further minimise noise emissions from the Project. These recommendations include preparation of a Noise Management Plan and generic noise control and management techniques that may be adopted during construction to minimise noise impacts from site to the surrounding community.

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Appendix A – Glossary of Terms

Table A1 provides a number of technical terms have been used in this report.

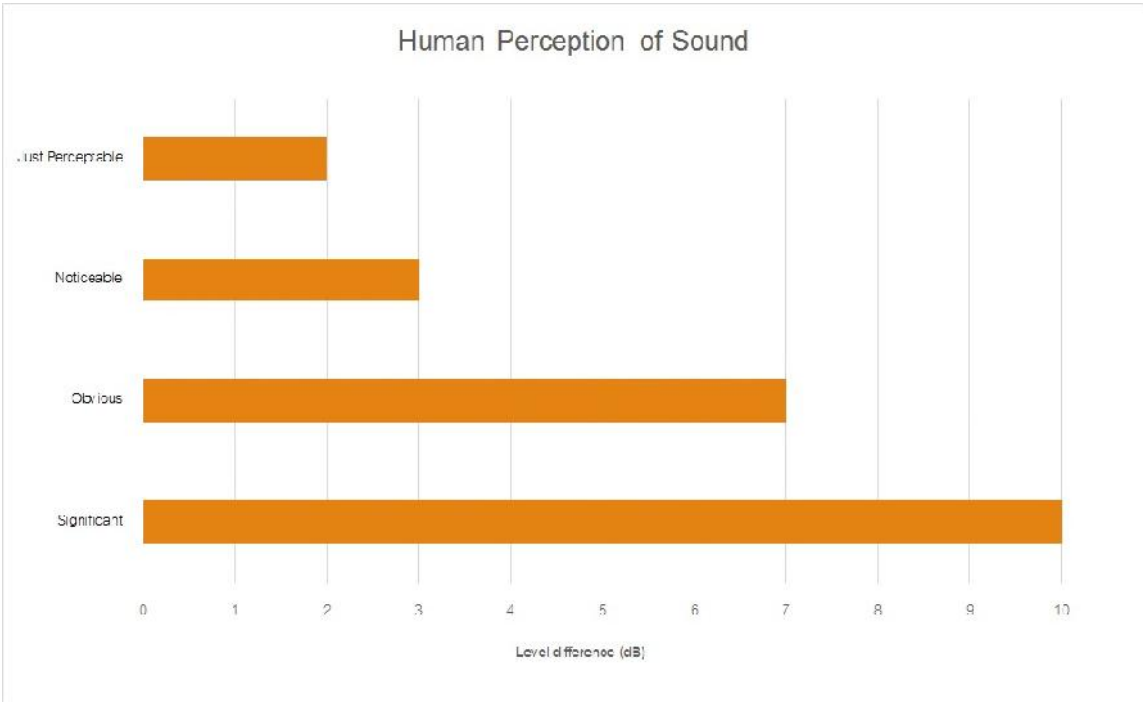
Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the INP as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear. In some cases the overall change in noise level is described in dB rather than dBA, or dBZ which relates to the weighted scale.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAmax	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
Noise Management Levels (NML's)	A guide that are to apply to work practices to minimise noise impacts, but legislation does not make compulsory, that is not mandatory to meet these nose levels.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : = 10.log10 (W/Wo) Where : W is the sound power in watts and Wo is the sound reference power at 10-12 watts.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound

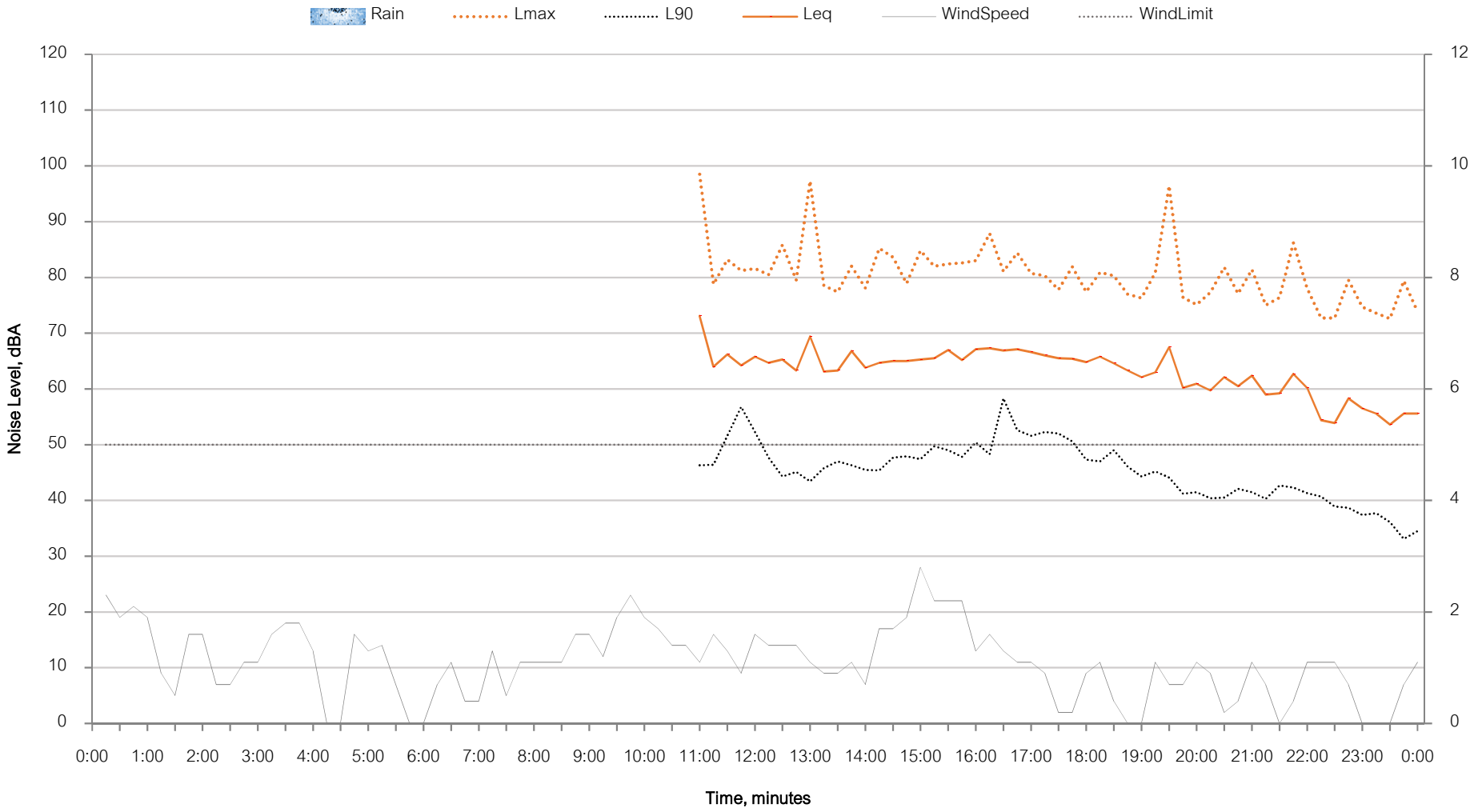


Appendix B – Unattended Noise Logging Charts

Measured Ambient Noise Levels

Logger 1 - 13 Kurrajong Road, St. Marys

Thursday, 04-05-17



Measured Ambient Noise Levels

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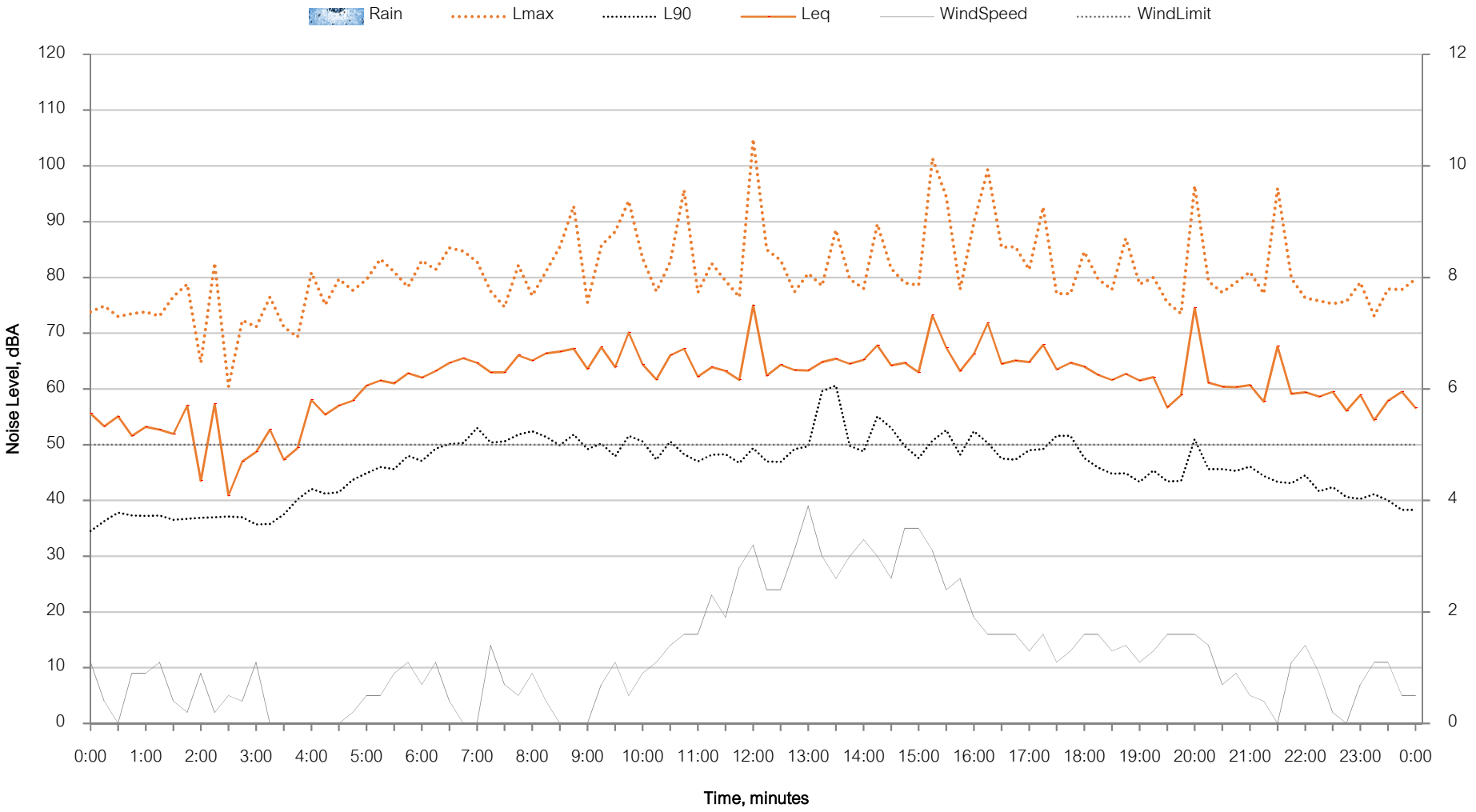
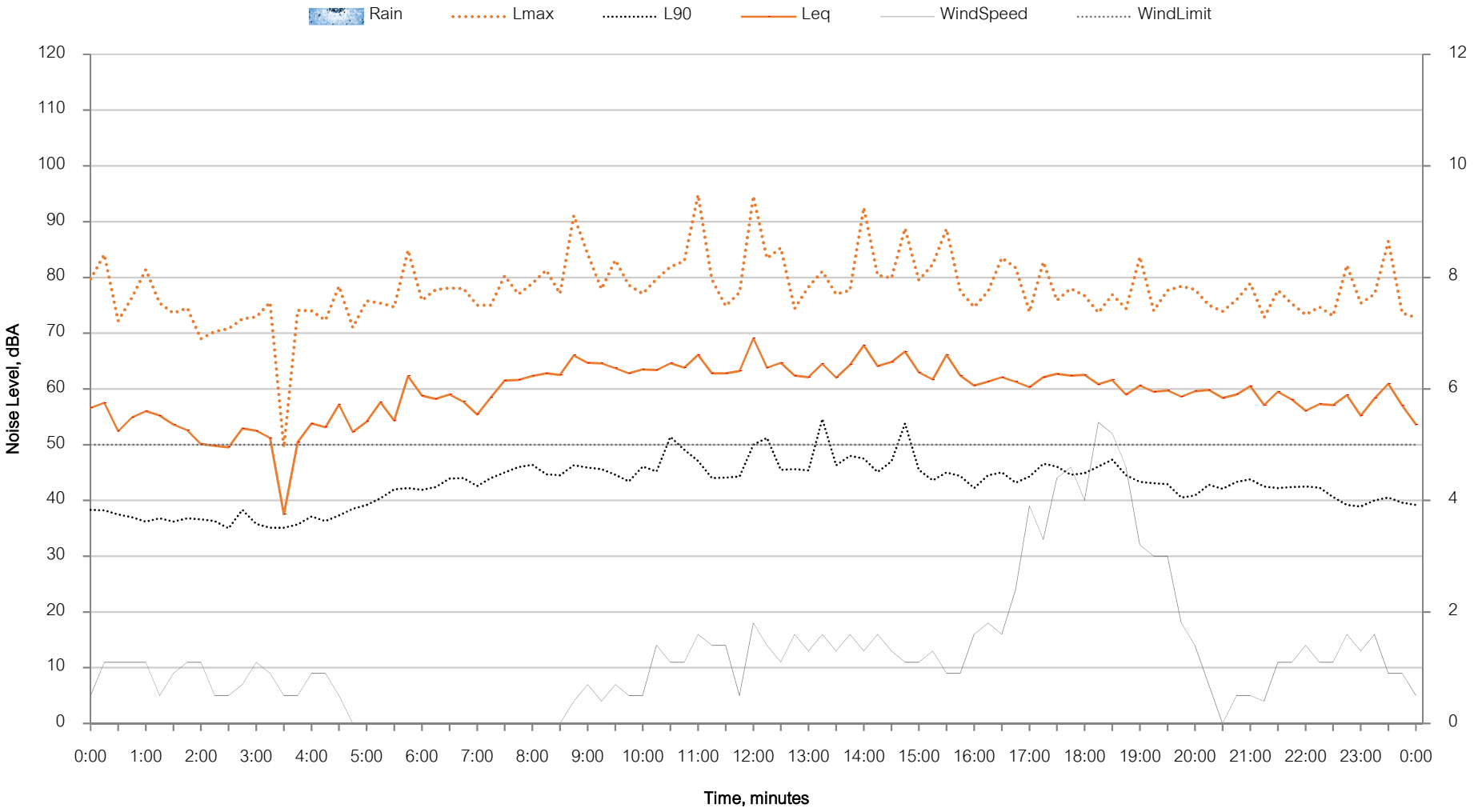
Friday, 05-05-17



Measured Ambient Noise Levels

Logger 1 - 13 Kurrajong Road, St. Marys

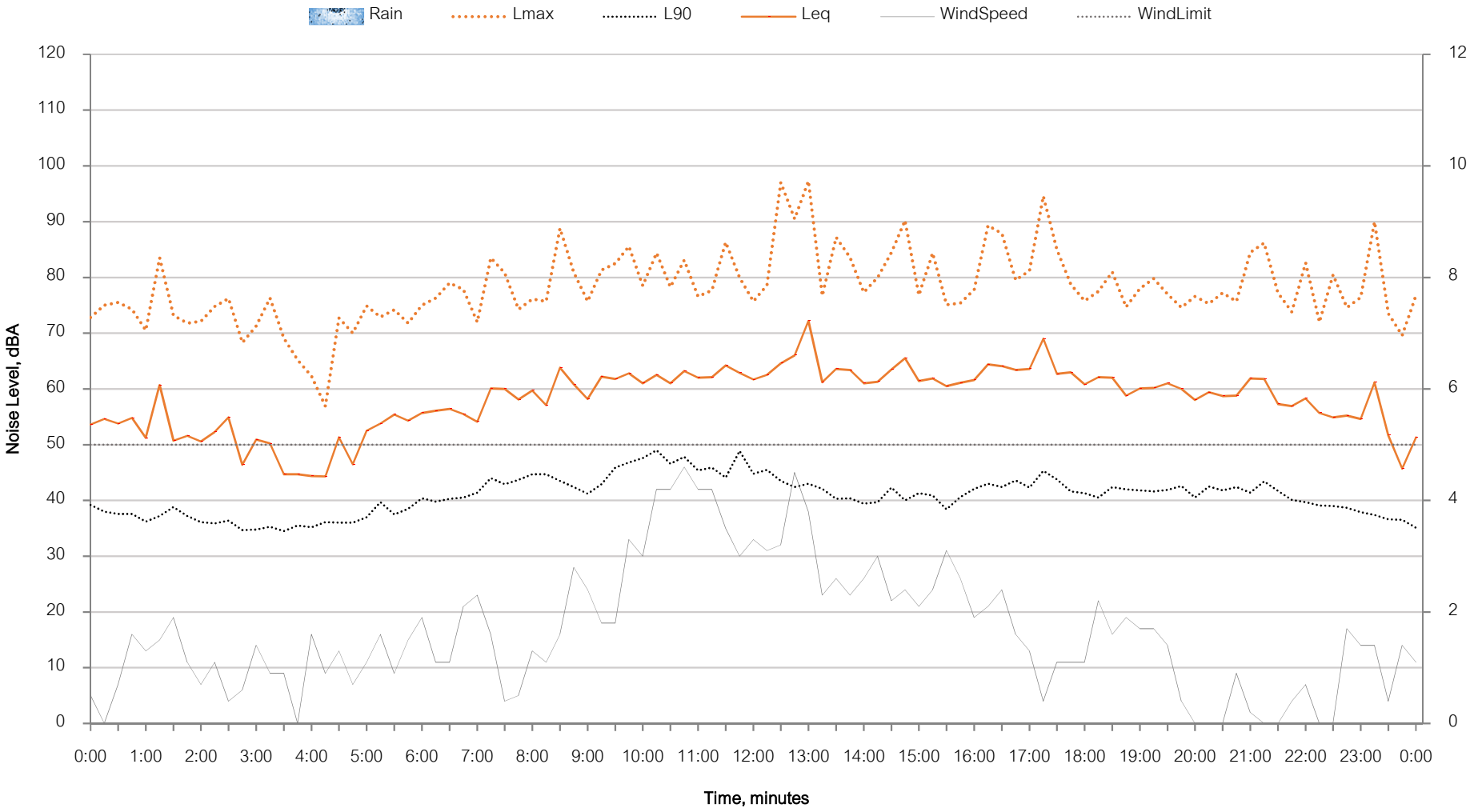
Saturday, 06-05-17



Measured Ambient Noise Levels

Logger 1 - 13 Kurrajong Road, St. Marys

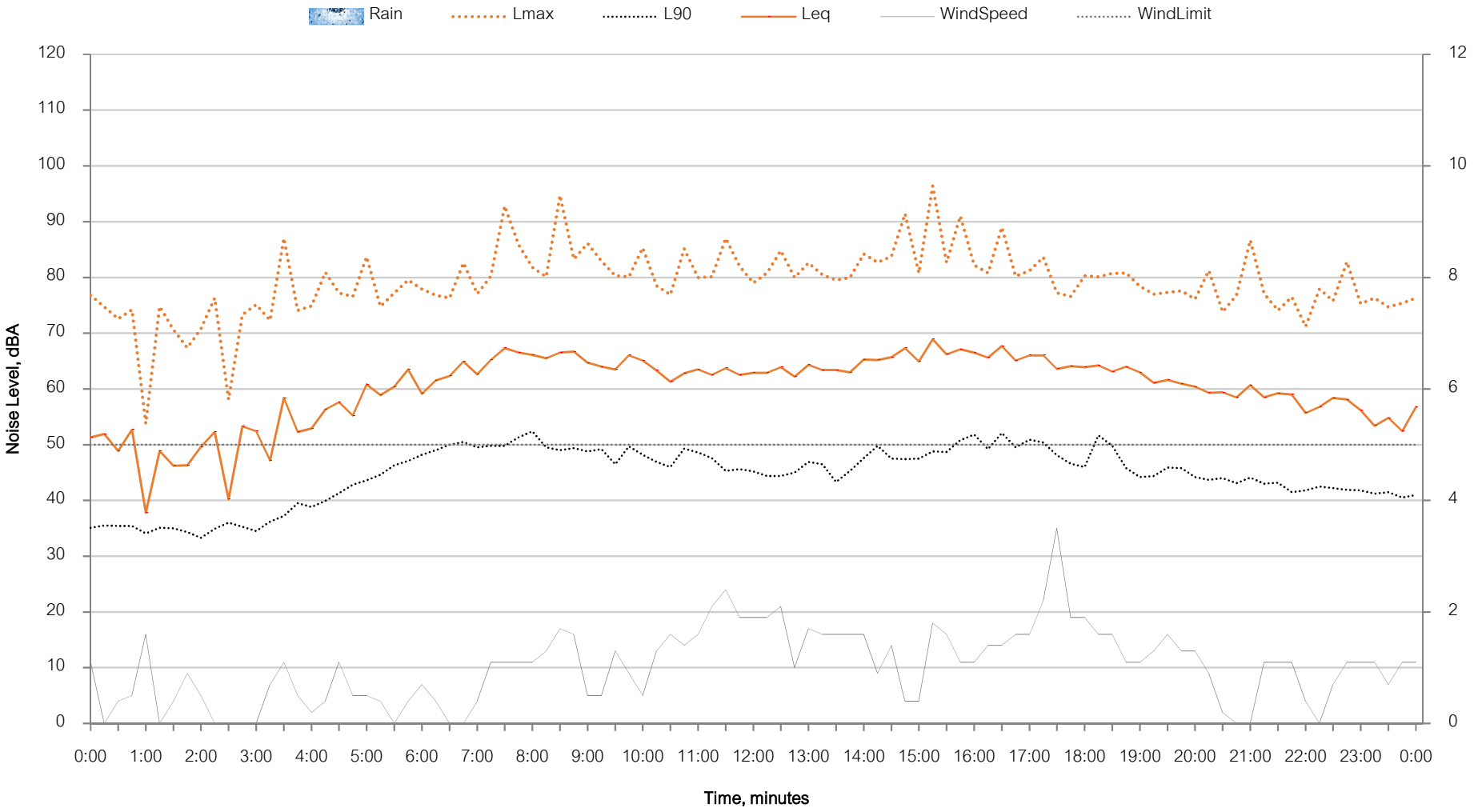
Sunday, 07-05-17



Measured Ambient Noise Levels

Logger 1 - 13 Kurrajong Road, St. Marys

Monday, 08-05-17



Measured Ambient Noise Levels

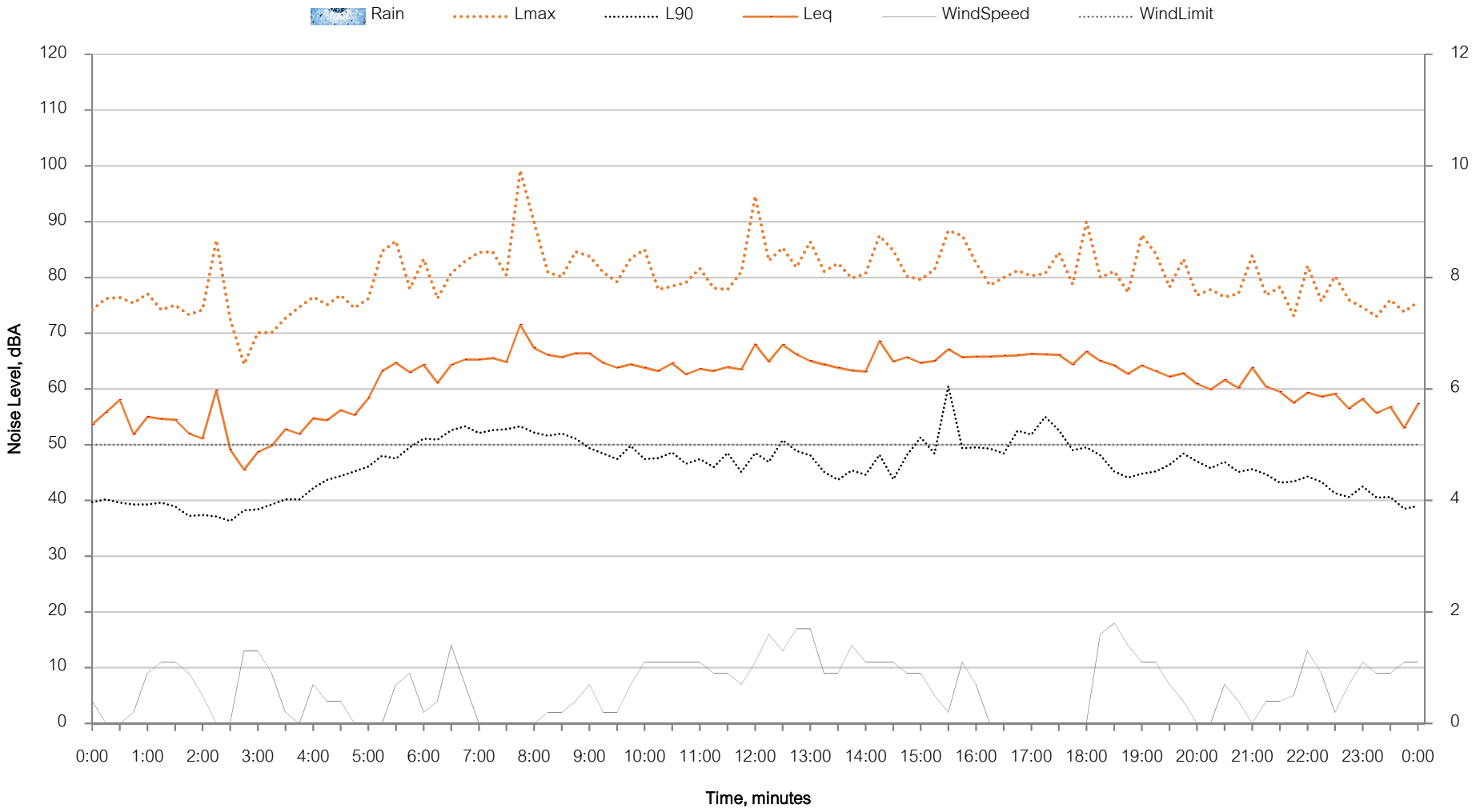
Logger 1 - 13 Kurrajong Road, St. Marys

Tuesday, 09-05-17

Measured Ambient Noise Levels

Logger 1 - 13 Kurrajong Road, St. Marys

Wednesday, 10-05-17



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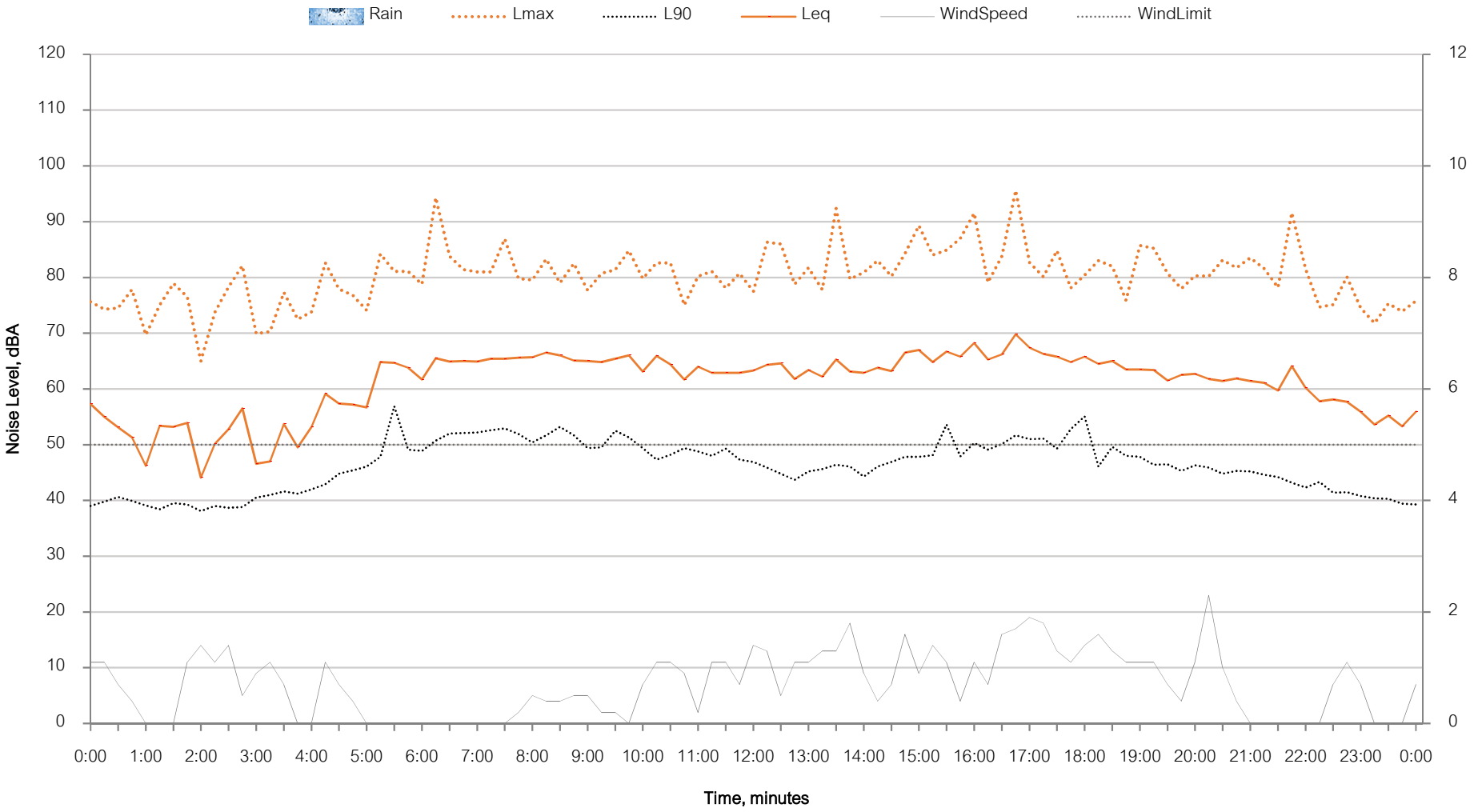

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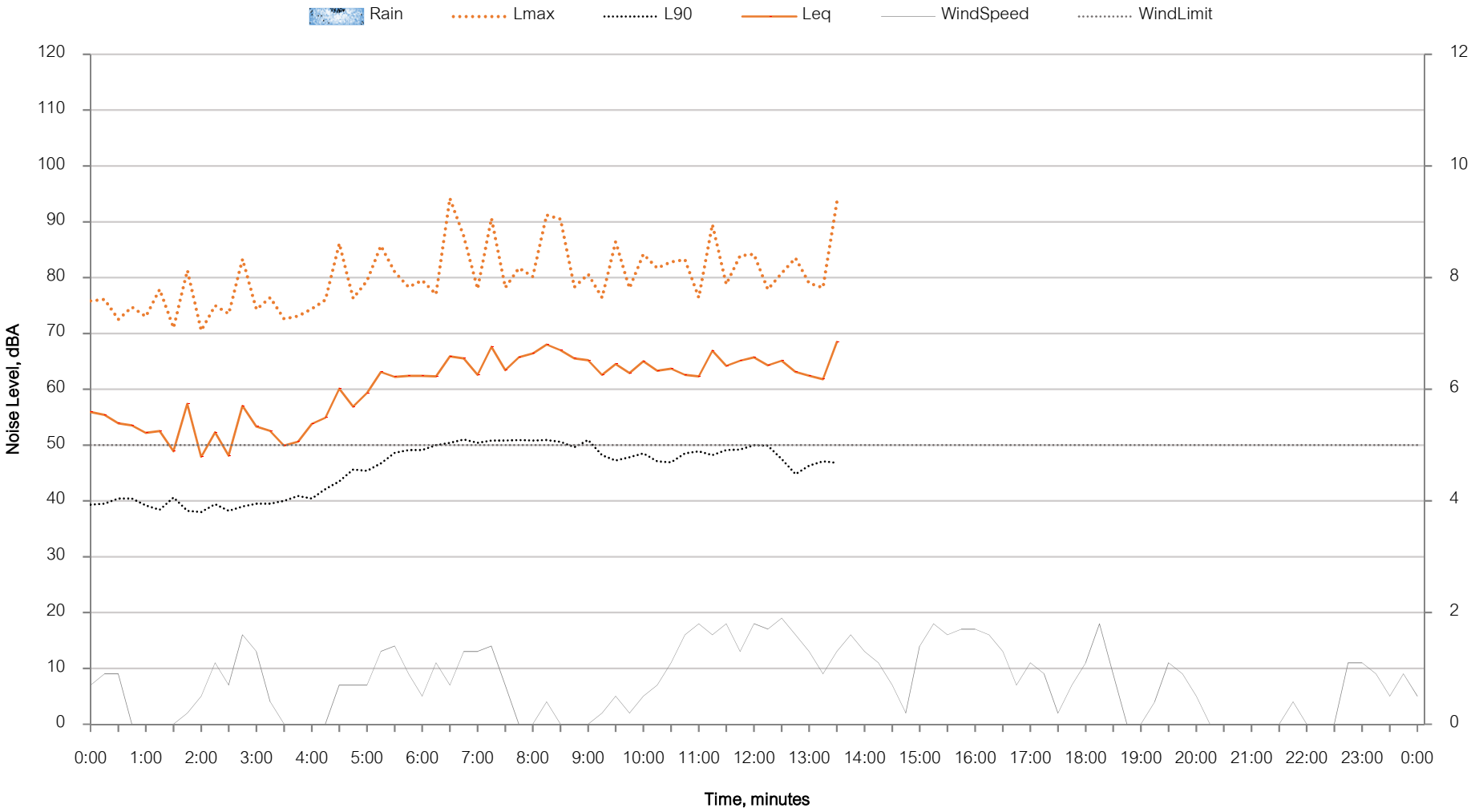

Measured Ambient Noise Levels

Logger 2 - 4 Australia Road, St. Marys

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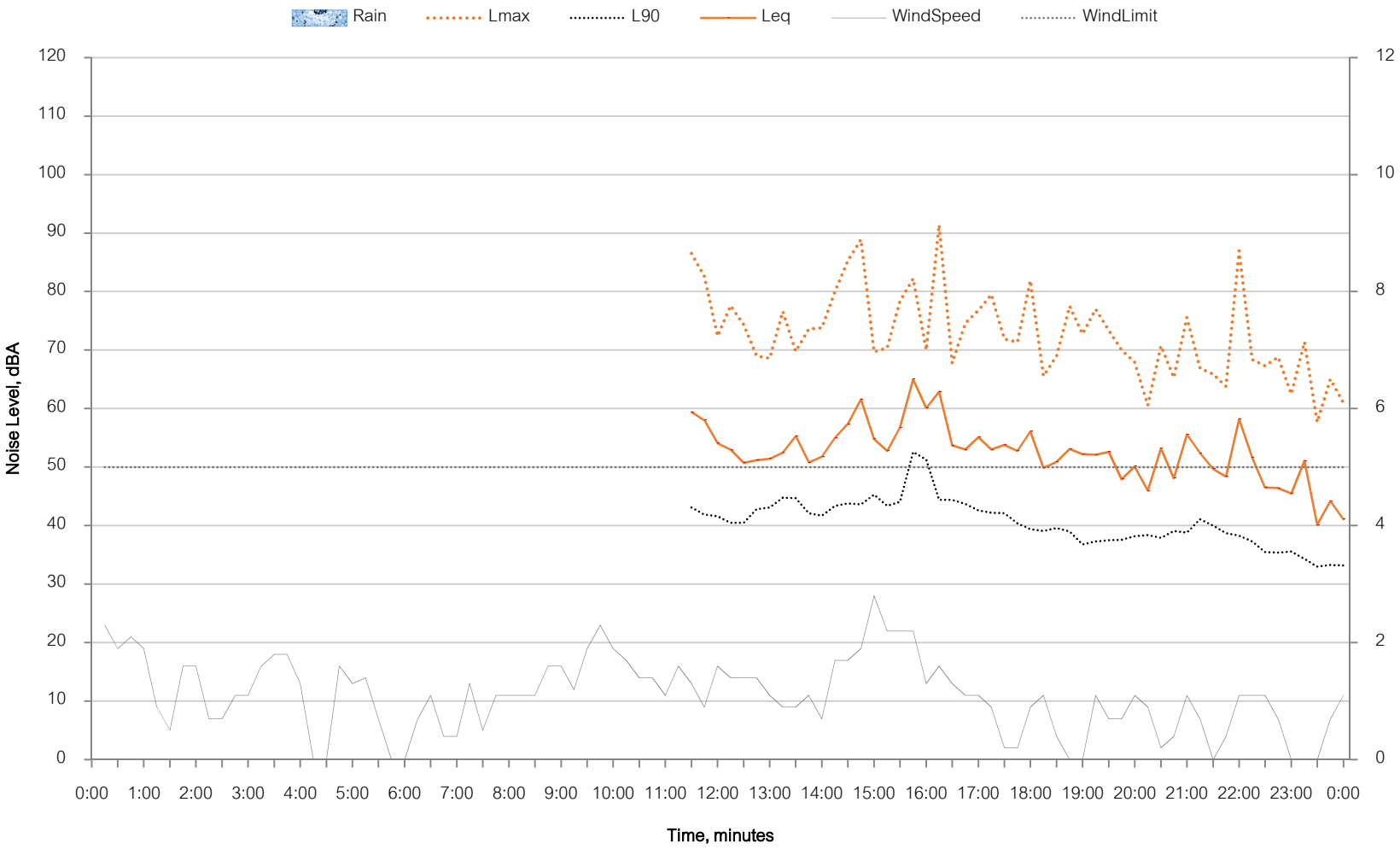

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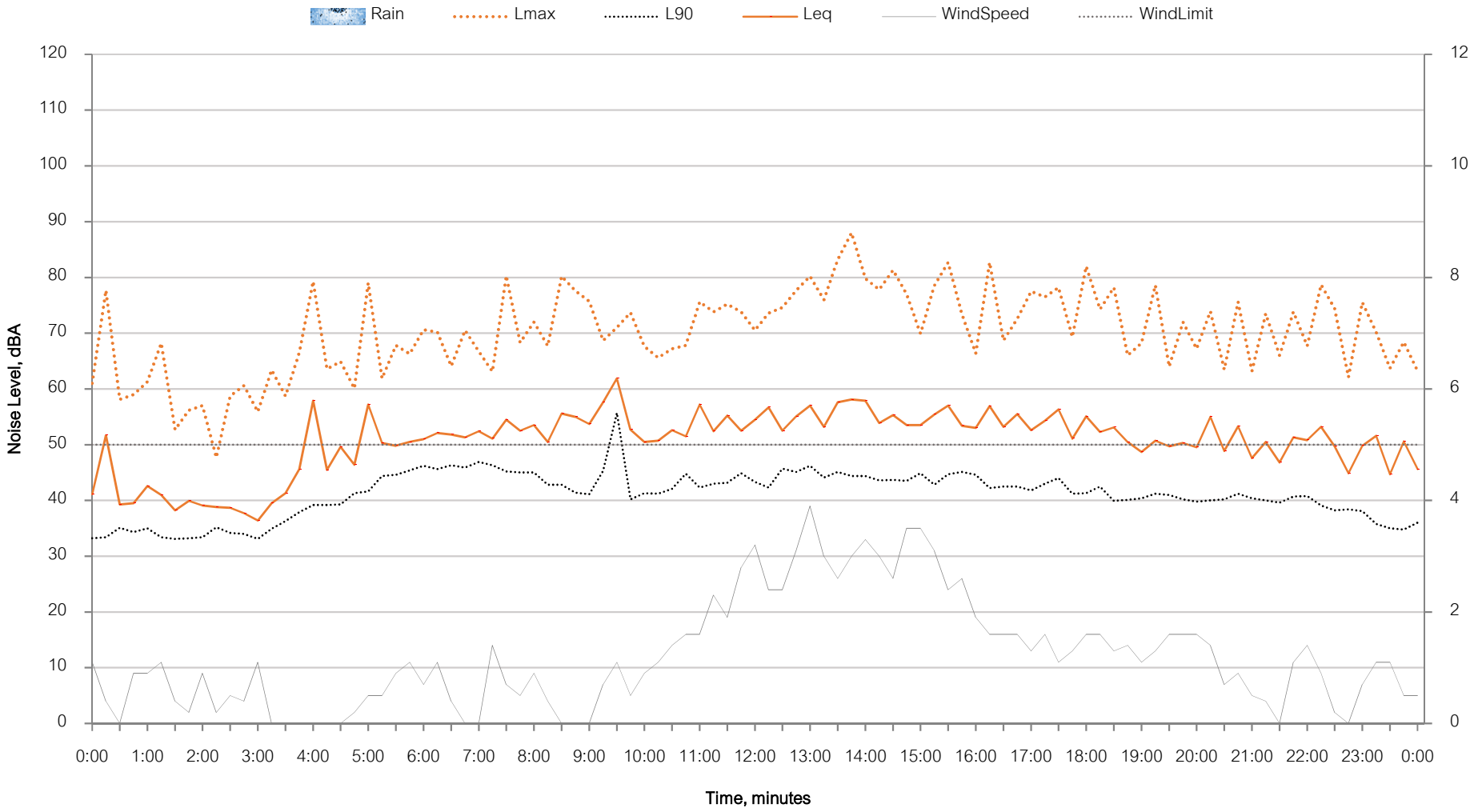

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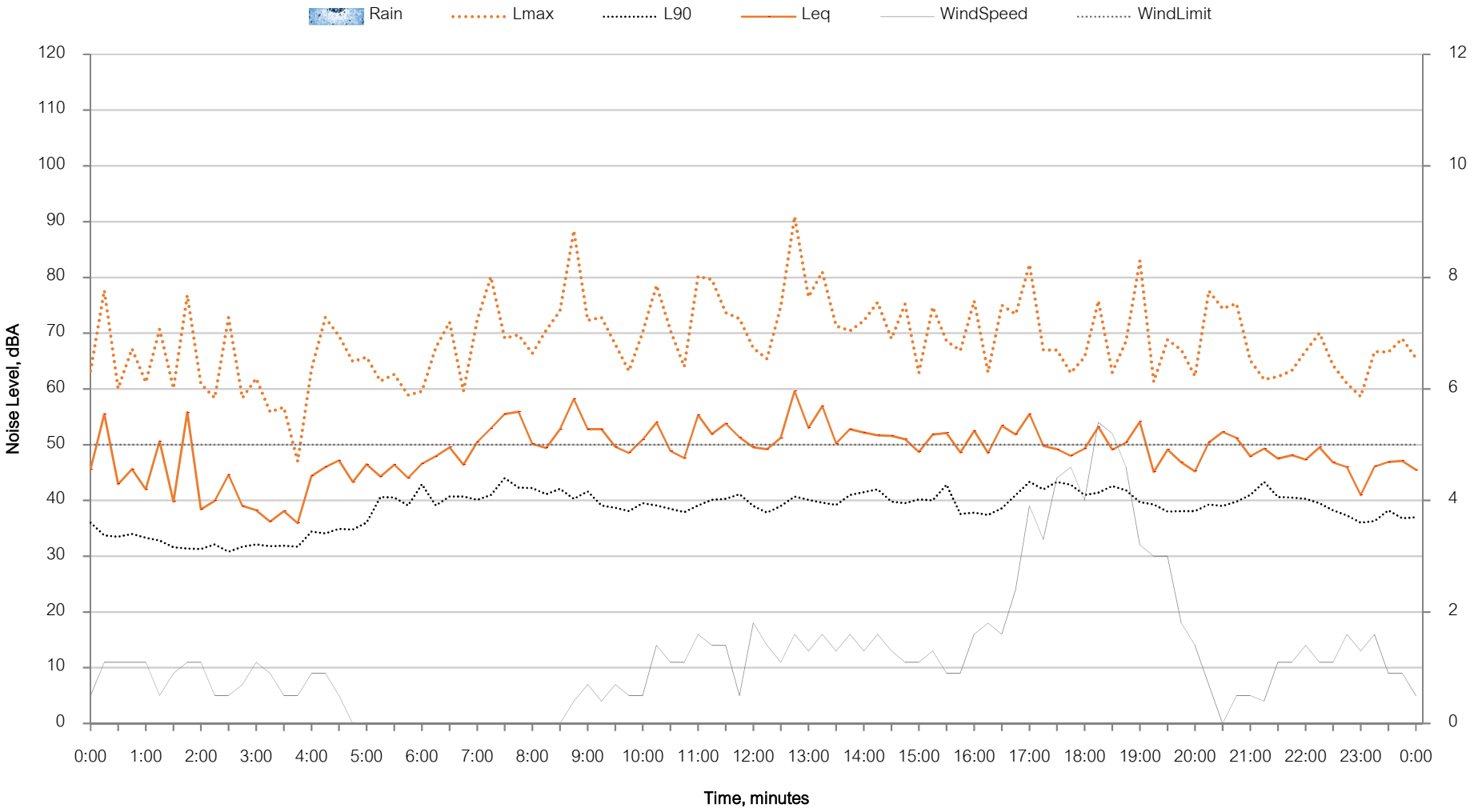
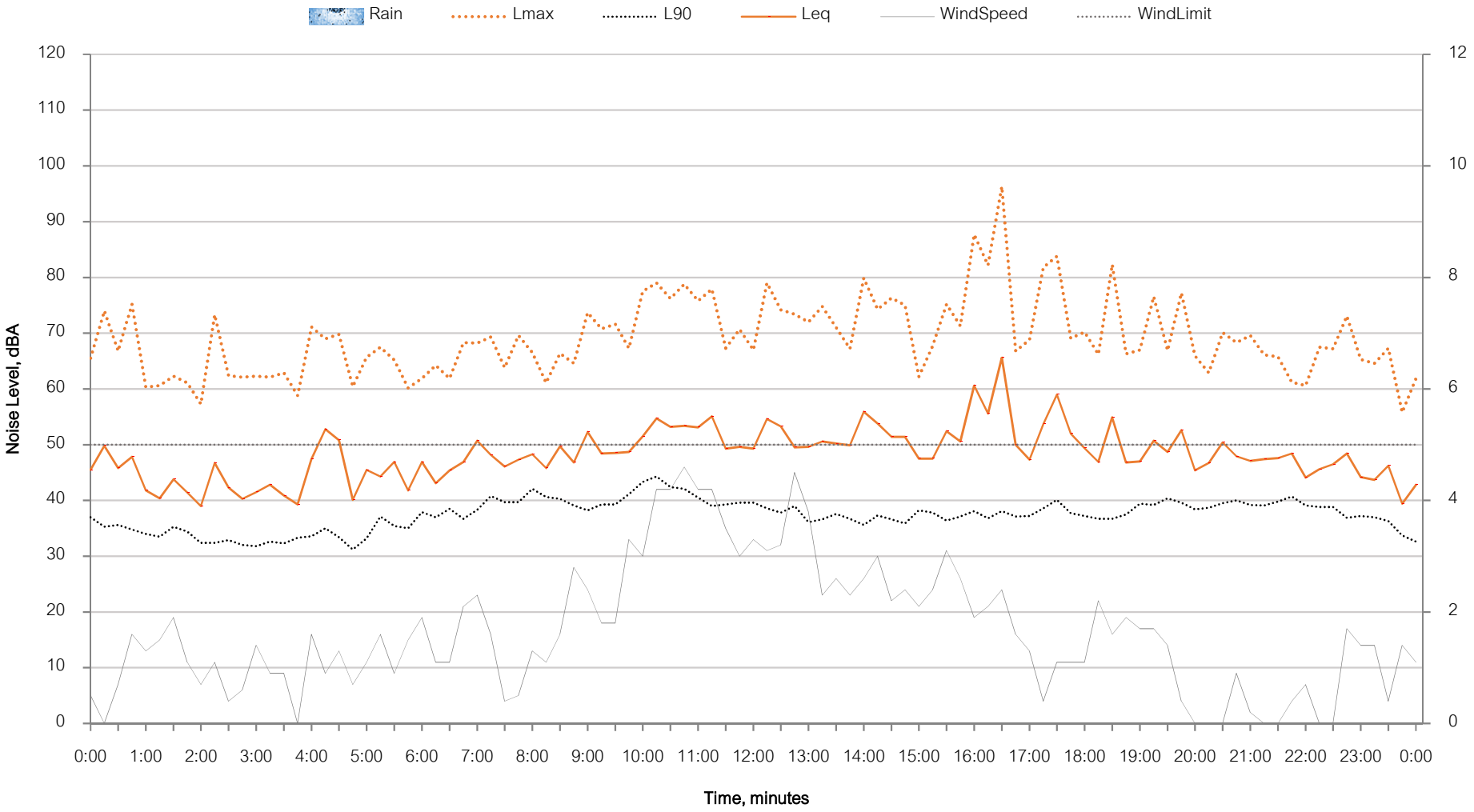


Measured Ambient Noise Levels

Logger 2 - 4 Australia Road, St. Marys

Sunday, 07-05-17



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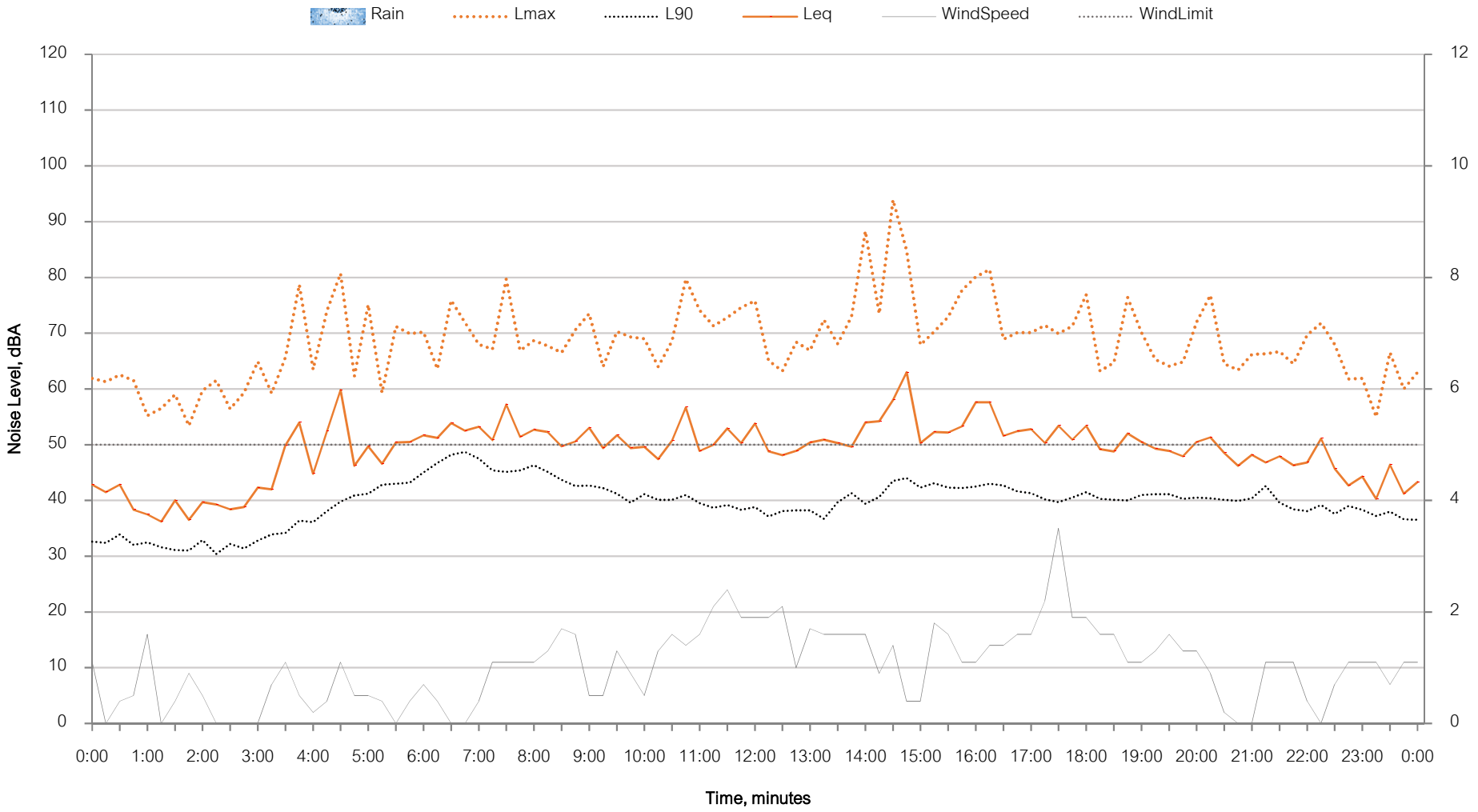

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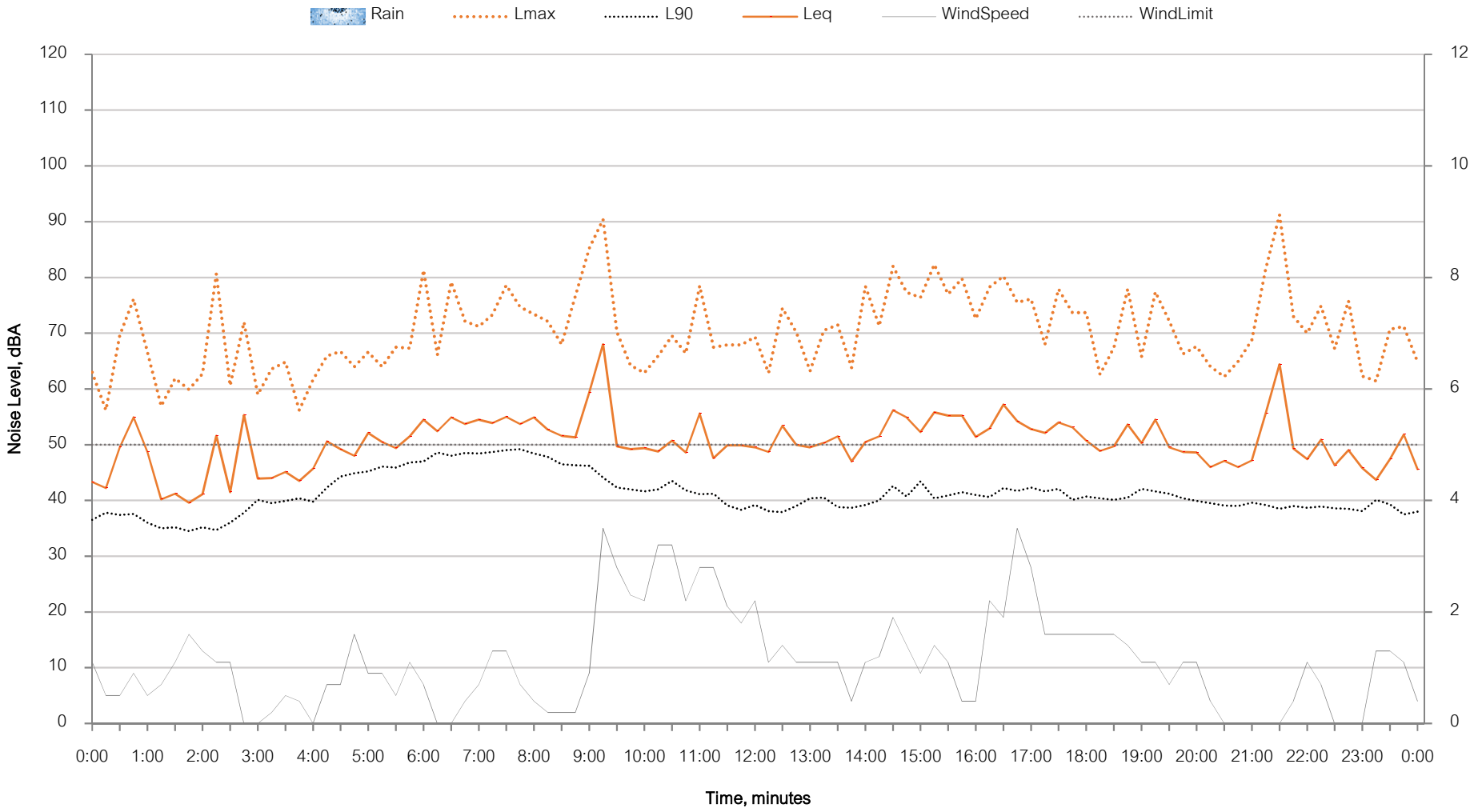

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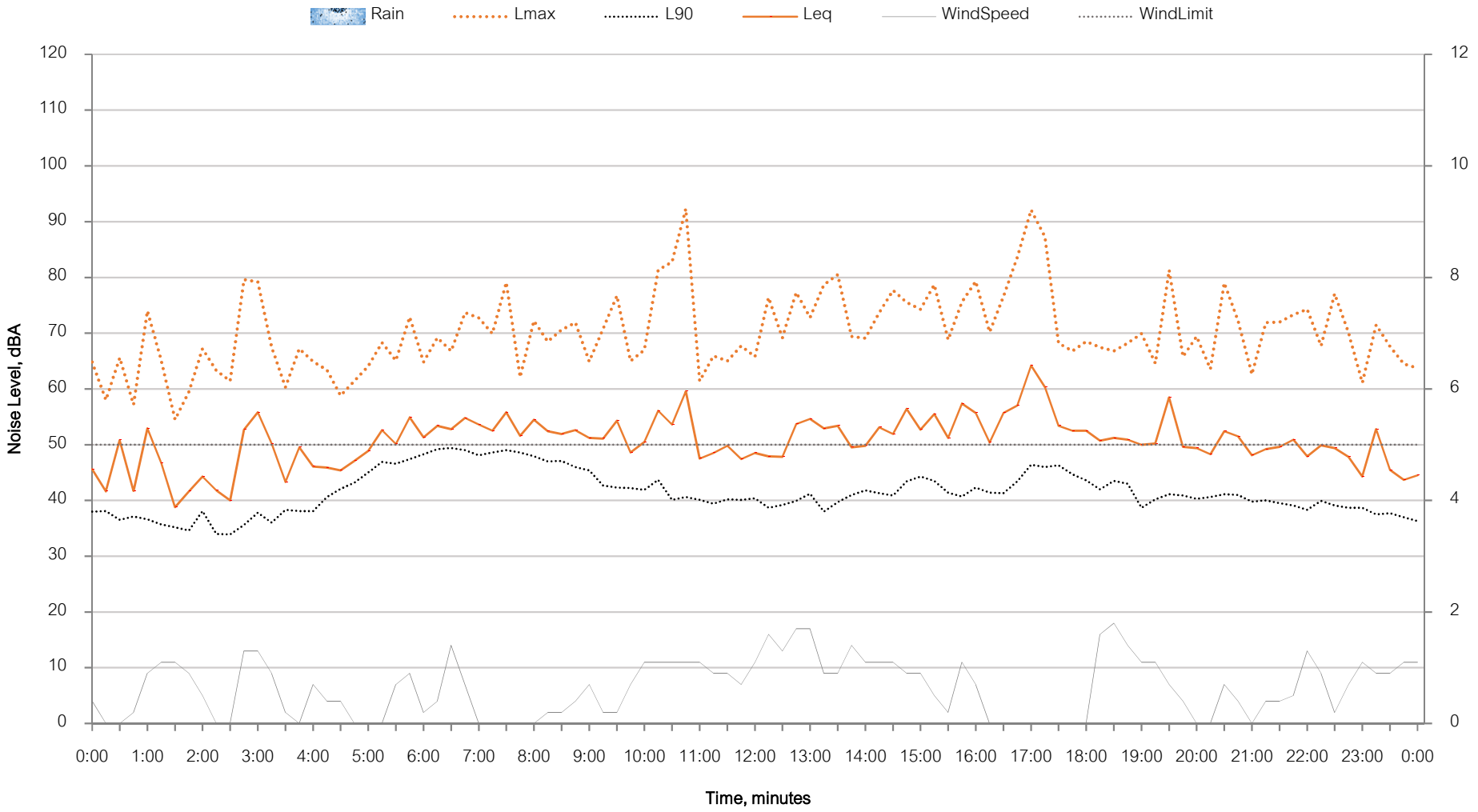

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Logger 2 - 4 Australia Road, St. Marys

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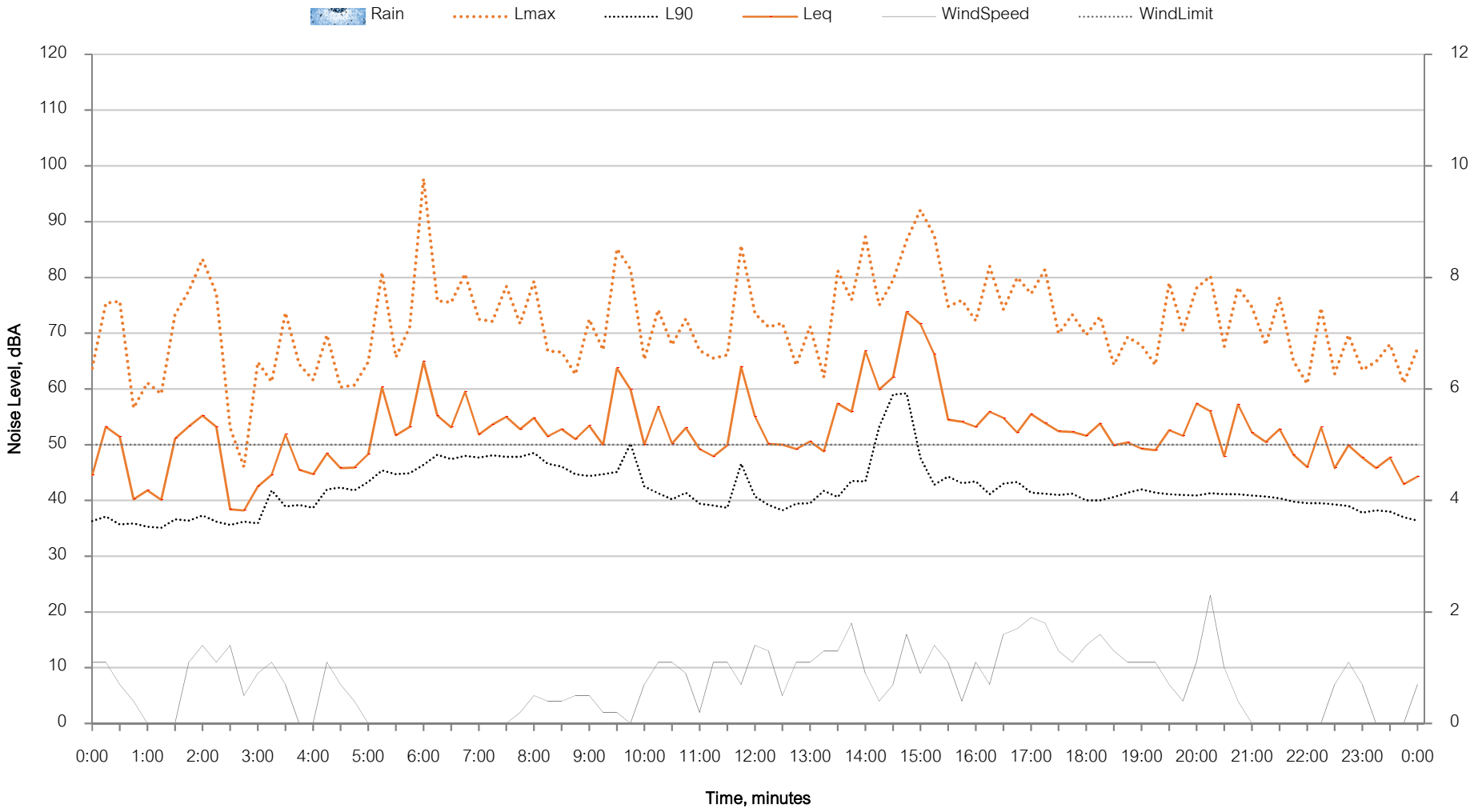

Measured Ambient Noise Levels

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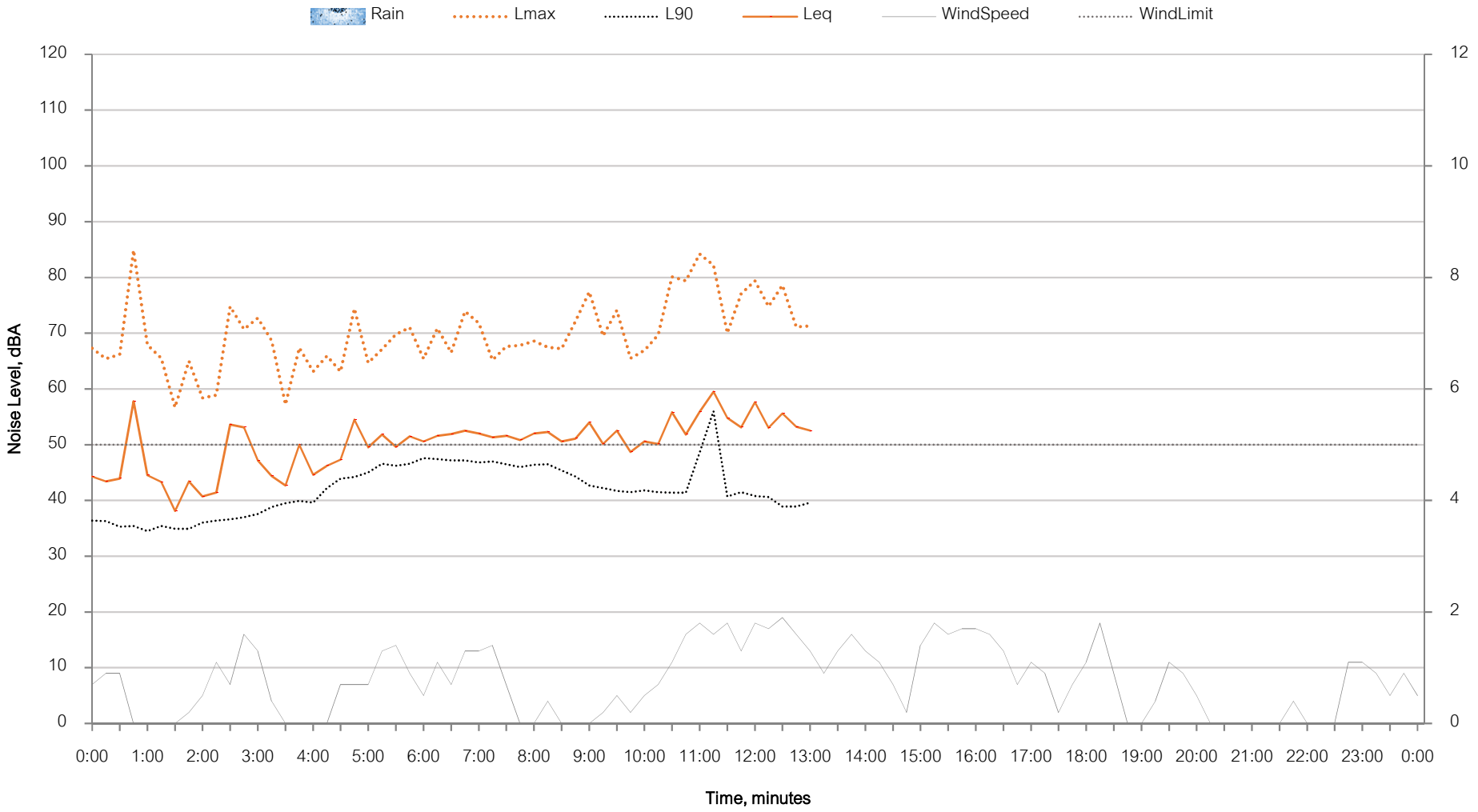


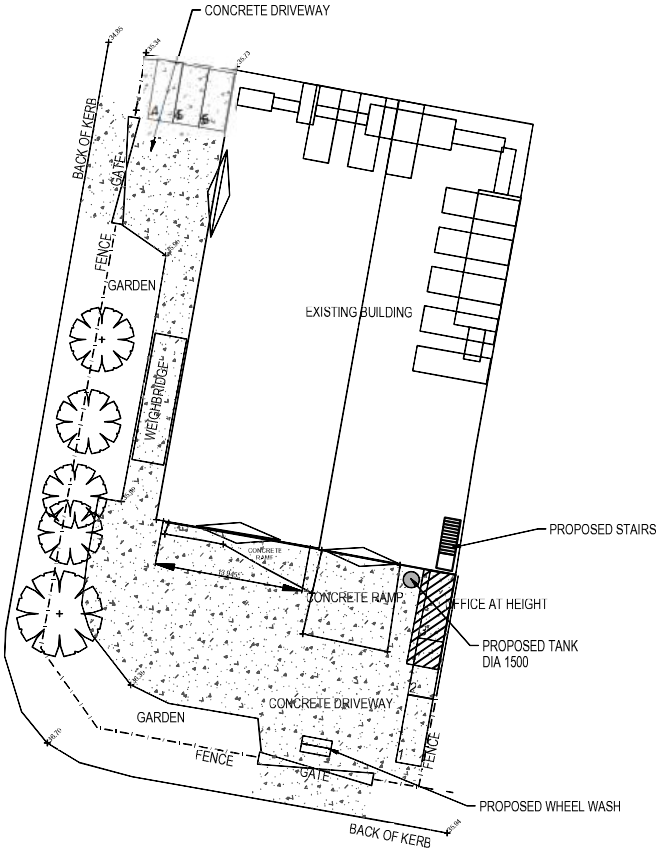
Appendix C – NEWA Meteorology Analysis Summary

Table C1 NEWA Analysed Meteorological Conditions, Penrith Lakes, NSW									
Direction	Season	Day	Evening	Night	Direction	Season	Day	Evening	Night
		Percentage Occurrence %					Percentage Occurrence %		
0	Summer	19	19	44	180	Summer	20	13	11
0	Autumn	23	31	44	180	Autumn	22	15	10
0	Winter	20	30	33	180	Winter	24	15	14
0	Spring	15	24	38	180	Spring	20	20	12
22.5	Summer	18	19	46	202.5	Summer	21	20	12
22.5	Autumn	23	34	41	202.5	Autumn	20	15	10
22.5	Winter	21	30	29	202.5	Winter	19	11	13
22.5	Spring	15	26	38	202.5	Spring	21	22	12
45	Summer	14	15	43	225	Summer	21	28	11
45	Autumn	19	32	35	225	Autumn	17	14	8
45	Winter	21	29	23	225	Winter	11	5	9
45	Spring	14	23	31	225	Spring	21	20	9
67.5	Summer	10	12	26	247.5	Summer	18	27	8
67.5	Autumn	14	24	21	247.5	Autumn	14	12	6
67.5	Winter	19	27	16	247.5	Winter	8	4	7
67.5	Spring	11	18	21	247.5	Spring	18	17	7
90	Summer	7	6	13	270	Summer	17	25	6
90	Autumn	11	15	11	270	Autumn	12	11	5
90	Winter	15	20	11	270	Winter	7	4	7
90	Spring	8	13	13	270	Spring	16	16	6
112.5	Summer	8	6	8	292.5	Summer	16	22	6
112.5	Autumn	12	13	9	292.5	Autumn	13	10	7
112.5	Winter	18	20	10	292.5	Winter	7	9	11
112.5	Spring	9	11	10	292.5	Spring	14	15	7
135	Summer	11	6	7	315	Summer	18	17	11
135	Autumn	23	20	12	315	Autumn	16	13	14
135	Winter	23	20	12	315	Winter	10	13	18
135	Spring	10	13	10	315	Spring	14	15	13
157.5	Summer	17	9	9	337.5	Summer	15	11	14
157.5	Autumn	21	14	10	337.5	Autumn	15	12	17
157.5	Winter	24	17	13	337.5	Winter	10	15	20
157.5	Spring	17	18	12	337.5	Spring	11	12	16

Appendix D – Octave SWL Data

Table D1 $LA_{eq(15min)}$, dBA Sound Power Level Spectrum									
Noise Source	Octave Band Centre Frequency (Hz), dBA								Total
	63	125	250	500	1000	2000	4000	8000	dBA
Operational Plant									
Delivery Truck	89	95	90	89	93	97	92	85	102
Ballistic & Magnetic Separator	90	89	90	102	99	97	90	82	105
Skid Steer	76	88	87	89	95	97	93	87	101
Loader/Excavator	91	90	89	93	91	85	80	76	98

Appendix E – Site Plans



REFERENCE FILES ATTACHED: 4/8/1_KMH_NORTH ST MARYS DETAIL_0'

PRINTFORMAT03.REV - 8

DRAWING REVISION HISTORY

No.	DESCRIPTION	DRAWN	DESIGNED	REVIEWED	DATE
		S.PARADISIS	A.PONIKKAR		14/09/17

APPROVED

ORIGINAL COPY ON FILE
"e" SIGNED BY

SIGNED

DATE

SCALE (PLOTTED FULL SIZE): 1:500

SHEET SIZE: A3

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SCALE IN METRES - 1:500

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ABN 67 140 184 309

CLIENT: MCLEANS WASTE MANAGEMENT

PROJECT: PLASSER CRESCENT
NORTH ST MARYS NSW

STATUS: **PRELIMINARY**

DRAWING TITLE: FACILITY
UPGRADE

DATUMS: AHD / MGA

CLIENT No.: -

DRAWING No: SY17065 - SK01 A3

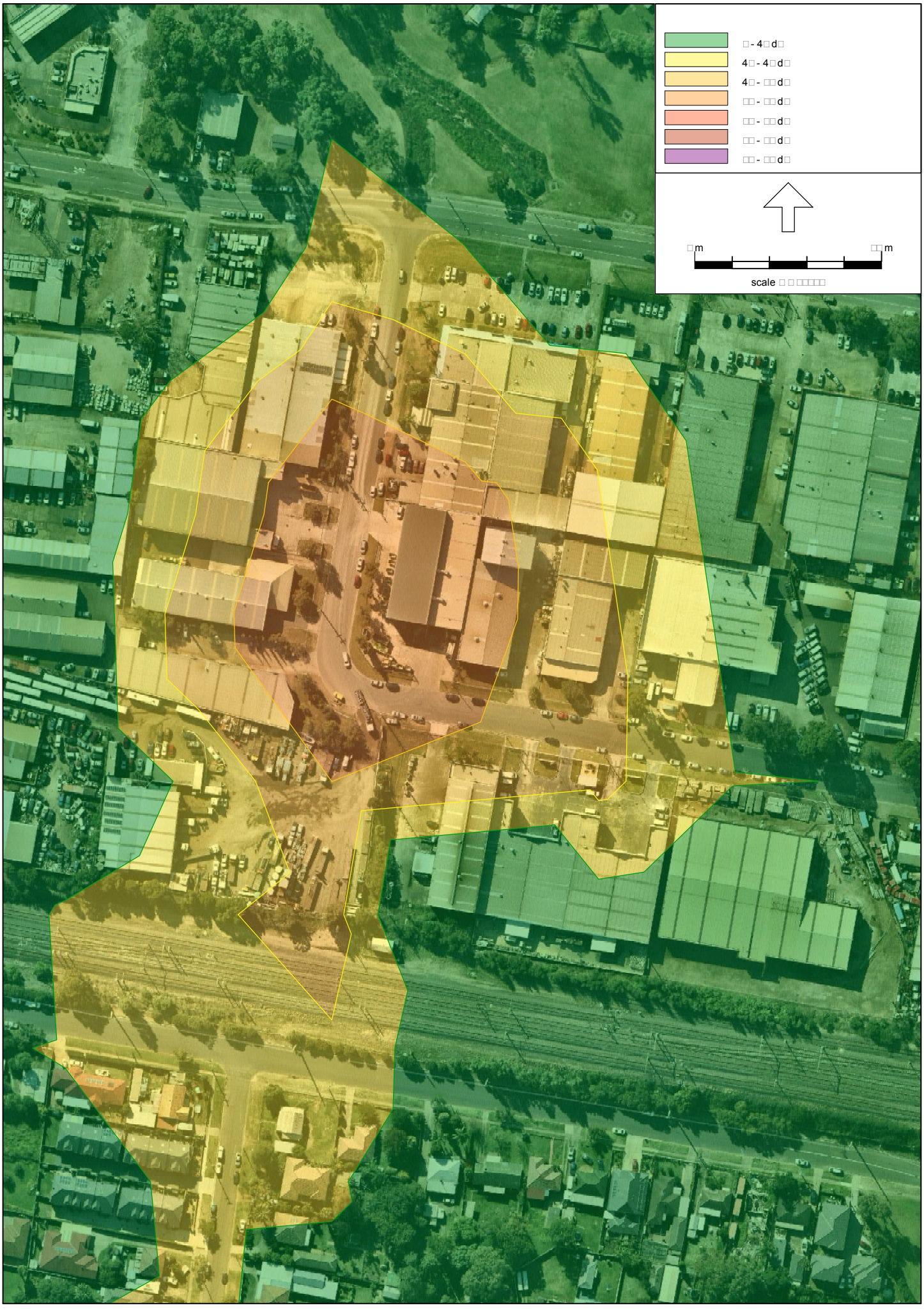
REVISION: -

Sep. 14, 17 - 16:03:20 Name: SY17065 - SK01 A3.dwg Updated By: Spiros Paradisis

Appendix F – Operational Noise Contours

Proposed Operations - Day Period

Muller Acoustic Consulting Pty Ltd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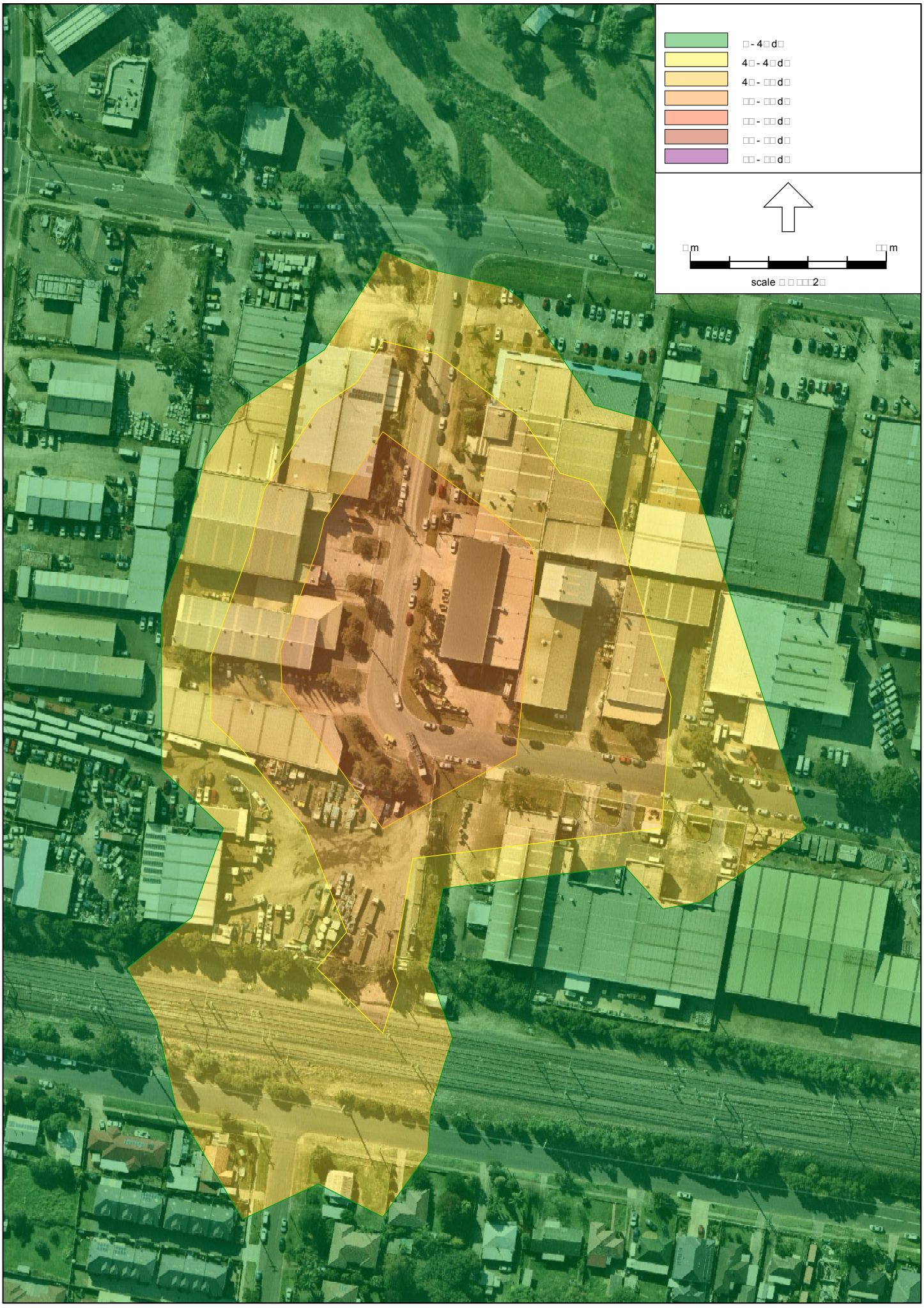
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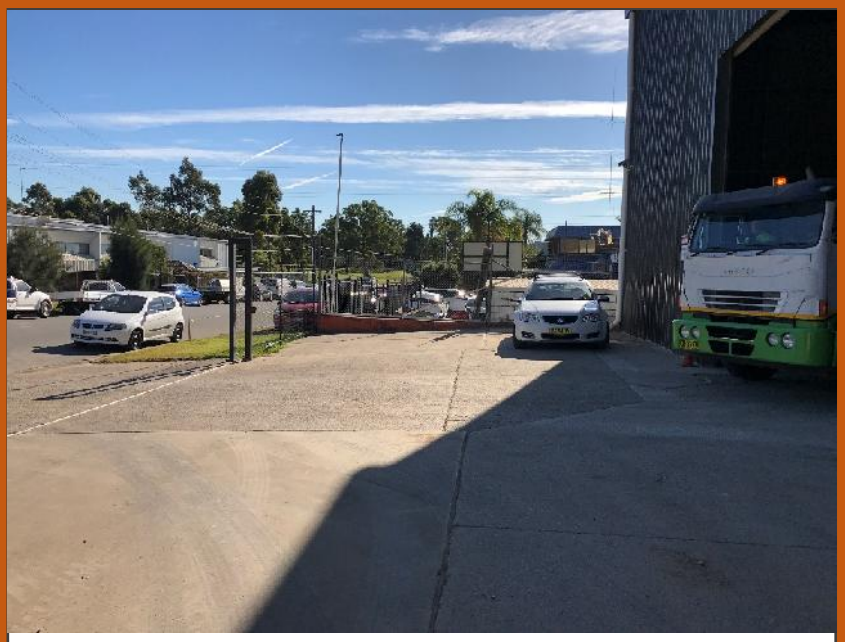
MAC
Muller Acoustic Consulting

Appendix G

Traffic and Transport Impact Assessment



McLeans Waste Management Facility,

North St Marys NSW

Pitt and Sherry

Traffic Impact Assessment

October 2017

SECAsolution

McLeans Waste Management – Proposed Expansion to existing facility, North St Marys

Traffic Impact Assessment

Author: Sean Morgan

Client: Pitt and Sherry

Issue: Final

Reference: P0860

1 November 2017

Quality Review and Document History

Version	Date	Description	Prepared By	Approved By
Ver01	22/6/17	Draft	S Morgan	C Thomas
Ver02	11/9/17	Draft	S Morgan	C Thomas
Final	24/10/17	Final	S Morgan	C Thomas

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Contents

1 Introduction

1.1 Background

Seca Solution was commissioned through KMH Environmental on behalf of Maclean Waste Management Pty Ltd to prepare a Traffic Impact Assessment for the proposed expansion of the existing waste management facility at St Marys, Sydney. This report will form part of the supporting documentation for an Environmental Impact Statement (EIS) being prepared for the project by KMH Environmental.

The project will be reviewed by Penrith City Council as part of their approval process for the project development application.

The site is located on Plasser Crescent, in North St Marys within an existing light industrial estate. Whilst Penrith City Council are the road authority the project will also be reviewed by the Roads and Maritime Services (RMS) due to the potential impacts on Glossop Road and the traffic signals on this road at Kurrajong Road. Vehicle access is to Plasser Crescent only for the project site and access to the greater road network is then via the traffic signals at Kurrajong Road and Glossop Road.

This traffic impact assessment has been prepared in accordance with Austroads Guidelines and the "RMS Guide to Traffic Generating Developments" and supplements published by the RMS.

1.2 Scope of Report

The scope of this report is to review the traffic and access impacts associated with the proposed development and to assess the access arrangements for the development. The report provides advice on road network capacity, access issues and a safety review.

1.3 Issues and Objectives of the study

The issues relevant to the development proposal are to:

- Determine the future traffic generation for the development;
- Assess impact on the local road network due to the additional flows;
- Review the access arrangements for the development;
- Assess any other transport impacts associated with the development including a safety review.

The objective of the report is to document the impacts of the proposed development and provide advice on any infrastructure work required on the external road network as part of the development.

1.4 Planning Context

In preparing this document, the following guides and publications were used:

- RMS Guide to Traffic Generating Developments, Version 2.2 Dated October 2002;
- RMS TDT 2013/04 "Update Traffic surveys August 2013"
- Department of Planning EIS Guidelines, Roads and Related Facilities
- Penrith City Council Development Control Plan (DCP).

1.5 Authority Requirements

The following issues were included in the SEARs issued for the development and are addressed in the following sections of this traffic impact assessment.

Table 1-1 SEARs Response

Comment	Report Inclusion
Details of road transport routes and access to the site	Section 2
Road traffic predictions for the development during construction and operation	Section 4
An assessment of impacts to the safety and function of the road network and detail of any road upgrades required for the development	Section 4
Preparation of the Traffic Impact Assessment in accordance with RMS guidelines, including:	This report
Daily traffic numbers and impact upon the local road network	Section 2.3.2 current Section 4.1 additional Section 4.3.1 impact
Peak hour traffic movements and impact on local road network	Section 2.3.1 (current) Section 4.1 additional Section 4.3.2 impact
Model impact upon signal controlled intersection of Glossop Street / Kurrajong Road / Forthorn Place	Section 4.3.2
Access requirements / controls with regard to Australian Standard	Section 4.1.2
Parking provision and compliance	Section 3.4
Type of vehicles and haulage routes	Section 3.1 Section 4.2
Service vehicle movements	Section 3.3.4
A transport and traffic study taking into account the cumulative study area traffic impacts associated with the development	Section 4

2 Existing Situation

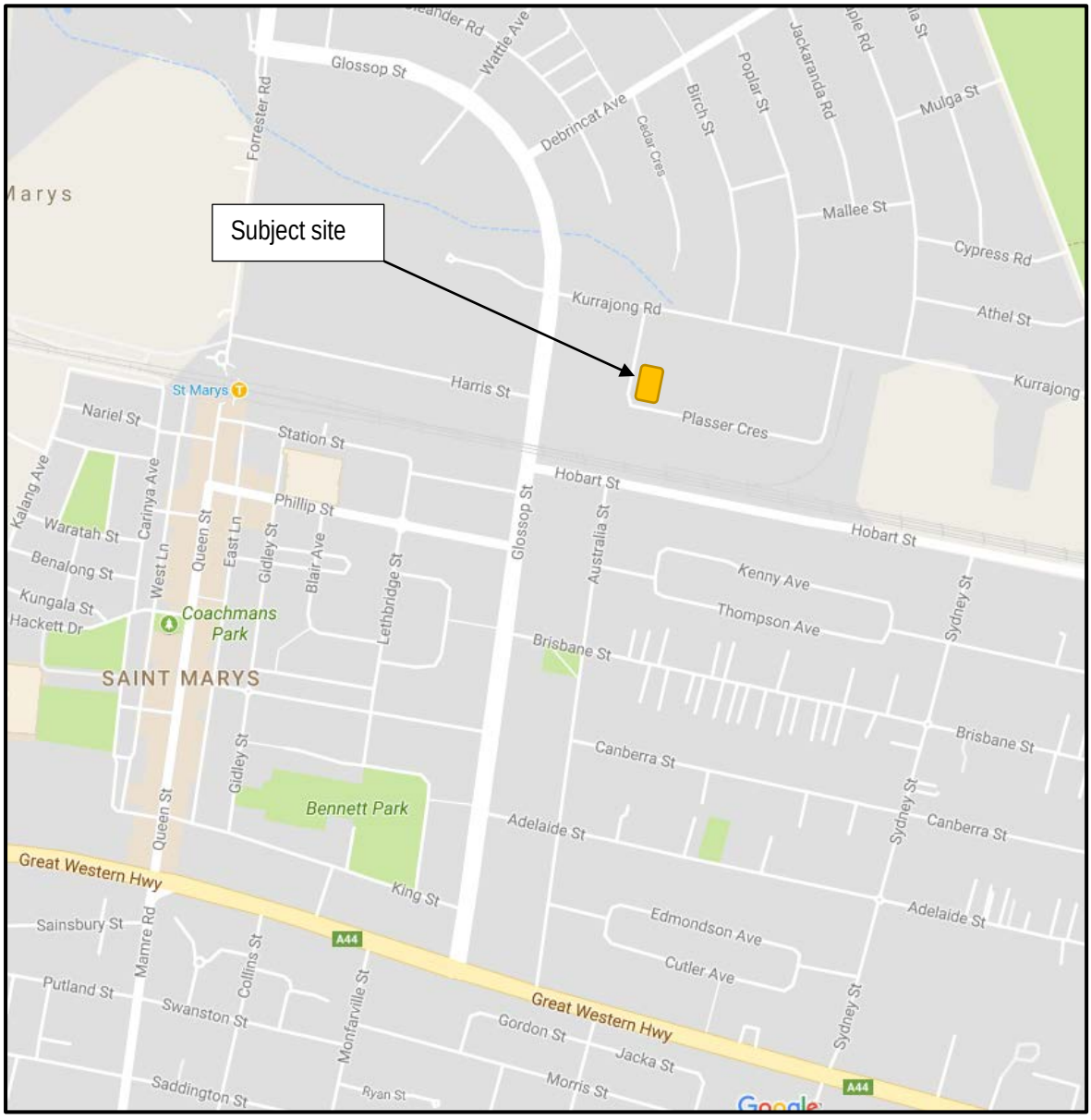
2.1 Site Description and Proposed Activity

2.1.1 Site Location and Access

The site is located in North St Marys with road frontage to Plasser Crescent only (Figure 2-1 below). Existing vehicle access to the site is available via two separate driveways off Plasser Crescent allowing for efficient one-way movement through the site for the existing truck movements. Access for light vehicles associated with the facility is via the same access option.

The site is currently occupied by the existing McLeans Waste Management facility with land use adjacent to the site being light industrial with a high number of trucks requiring access to this area as well as high car usage.

The location of the site is shown below in Figure 2-1.



Source: Googlemaps

■ *Figure 2-1 - Site Location within context of local road network*

2.2 Existing Traffic Conditions

2.2.1 Road Hierarchy

The major road through the immediate locality is Glossop Road which runs in a predominantly north-south direction to the west of the subject site. It provides an important road link through the locality, providing a connection between The Great Western Highway to the south (approximately 1.3 kms from site) and the increasing development to the north in St Marys and Marsden Park. It forms part of the regional road network in Sydney (Regional Road 7167). In the vicinity of the subject site, it provides two lanes of travel in both directions and provides access over the main railway line to the south of the site. There are additional turn lanes provided to allow for right turns into the side roads and the major intersections are controlled by traffic signals. It connects with the the Great Western Highway to the south via a 3-way signal controlled intersection. It operates under the posted speed limit of 60 km/h.

The Great Western Highway to the south provides a high standard of road access between Penrith to the west and Parramatta to the east. It provides three lanes of travel generally in both directions with additional lanes at the major intersections to maintain capacity. The major intersections are all controlled by traffic signals to ensure capacity is maintained as well as road safety. The Great Western Highway provides access to the greater road network allowing for access across the greater Sydney metropolitan area. These include connections to the M7 and the M4 further south of the Great Western Highway.

Access to the subject site is via Kurrajong Road and Plasser Crescent. Kurrajong Road connects with Glossop Road via a 4-way signal controlled intersection. Kurrajong Road provides a single lane of travel in both directions with parking permitted to both sides along most its length. There are non-continual pedestrian footpaths provided along its length and it provides access to the light industrial area along its southern side (where the subject site is located) and residential land to the north. It operates under the posted speed limit of 50 km/h.

Plasser Crescent provides access to the subject site and the adjacent light industrial area. It runs in a semi-circular pattern, connecting with Kurrajong Road at both ends. It provides a single lane of travel in both directions and provides for kerb side parking to both sides. There are no footpaths provided along its length and it operates under the posted speed limit of 50 km/h. It intersects with Kurrajong Road via simple give way control with Kurrajong Road being the priority road.

2.2.2 Roadworks

During the site work in May 2017 there were no road works occurring within the immediate vicinity of the subject site.

2.2.3 Traffic Management Works

No traffic management works noted along the length of Glossop Road. The road network in this location is well developed and the road corridor in this location is constrained, with development along both sides of Glossop Street restricting any additional travel lanes being provided. The key intersections along Glossop Road are signal controlled and the remaining intersections have restricting turn movements to improve safety and efficiency. Existing traffic flows are reasonable high so on-going monitoring by the road authority will identify any road upgrades as they are required.

2.2.4 Pedestrian and Cycling Facilities

There are no pedestrian footpaths or cycling facilities on the local streets in the vicinity of the subject site. Cyclists are able to ride on road as required whilst pedestrians are able to walk on the edge of the road where possible or

on the verge as required. There are footpaths to both sides of Glossop Road allowing for pedestrian access locally which would allow for pedestrian access to St Marys Station. There are no cycling facilities on Glossop Street and its environment does not encourage cycling use, due to the high traffic volumes, high percentage of heavy vehicles and the traffic speeds. No cyclists were observed using this road during the site work and less than 20 pedestrians were observed using Glossop Street.

2.3 Traffic Flows

2.3.1 Peak Hour Flows

As part of the study work, Seca Solution completed traffic surveys at the 4-way signal controlled intersection of Glossop Street and Kurrajong Road. These surveys were completed during the morning and afternoon peak periods on Friday 26th May 2017. The surveys provided the following summary of traffic flows:

Road	AM northbound	AM southbound	Two-way	PM northbound	PM southbound	Two-way
Glossop St south of Kurrajong Rd	1,195	1,338	2,533	1,456	1,664	3,120
Road	AM eastbound	AM westbound	Two-way	PM eastbound	PM westbound	Two-way
Kurrajong Road	282	279	561	287	429	716

2.3.2 Daily Traffic Flows

Normal traffic engineering practice allows for peak hour traffic flows to typically represent 10% of daily traffic flows. Based upon the data collected above this would indicate that the daily traffic flows on Glossop Street would be in the order of 28,000 vehicles per day whilst on Kurrajong Road the daily traffic flows would be in the order of 6,400 vehicles per day, at its western end. It is considered that a high portion of the traffic flows here would be generated by the light industrial area surrounding the subject site and that to the east of Plasser Crescent the daily traffic flows on Kurrajong Road would be much lower.

2.3.3 Daily Traffic Flow Distribution

The daily traffic volumes would be reasonably balanced in both directions, although the above data indicates a slight bias in traffic movements southbound in both the morning and afternoon periods on Glossop Street. The flows on Kurrajong Road show a bias westbound in the PM peak associated with commuter trips heading home at the end of the working day. The AM flows are reasonably well balanced.

2.3.4 Vehicle Speeds

No speed surveys were completed as part of the study work. The volume of traffic on Glossop Street combined with the vertical alignment of the road would seem to encourage drivers to travel at or above the posted speed limit and the heavy vehicles could be seen to be travelling at a reasonable speed to maintain momentum due to a slight up-grade in both directions on Glossop Street on both approaches. A review of the crash data for the area showed that of the 15 crashes, 4 involved speed.

2.3.5 Existing Site Flows

The site is currently used by the applicant for waste management in a similar manner to the proposal. The site currently operates between 7 am – 5 pm Monday to Friday, 7 am – 3 pm Saturday and 10 am – 2 pm Sunday. The current operations allow for 3 hook-lift trucks to deliver waste and collect sorted waste totalling 5-6 trucks movements per day per direction.

The existing site processes 5,500 tonnes of construction waste per annum.

2.3.6 Heavy Vehicle Flows

Heavy vehicle movements in the vicinity of the subject site on Glossop Street are high, reflective of its importance in the road network and also relating to construction work currently occurring to the north of the area. A large number of truck and dog combinations were observed with these typically associated with large earthwork operations. Other heavy truck movements included large semi-trailers associated with deliveries to industrial users in this area and beyond to the north, allowing for connection from the Great Western Highway or the M4 Motorway.

Heavy vehicles along Kurrajong Road were much lower and relate to the existing light industrial users off Plasser Crescent.

2.3.7 Current Road Network Operation

Observations on site during the peak periods showed that the road network currently operates well with no significant delays and congestion at the key intersection of Glossop Street and Kurrajong Road. These traffic signals operate well and provide priority to the heavy through traffic movements along Glossop Street. Queues developed at the red signals but disperse in each cycle and no congestion was noted during either the AM or PM peak periods.

Kurrajong Road operates very well with minimal delays and no congestion. The intersections of Plasser Crescent and Kurrajong Road both operate very well with no delays or congestion noted. It was noted that access to the various existing users along Plasser Crescent require reversing of heavy vehicles into or out of the sites, however the low traffic flows on Plasser Crescent mean that this can occur with minimal congestion for road users and be undertaken in a safe manner.

2.4 Traffic Safety and Accident History

Accident data was provided by the RMS for the intersection of Glossop Street and Kurrajong Road, including to the intersection with Plasser Crescent, for the period 1st July 2011 and 30th June 2016. During this period 15 accidents occurred through this section of the road network. Of these 6 involved rear end crashes whilst 5 involved opposing turning movements. There have been no fatalities recorded in the accident history reviewed.

This intersection is reasonably well laid out and allows for all turning movements. There are sheltered right turn lanes on Glossop Street to cater for the right turns and whilst it is noted that the phasing allows for leading right turns, the design also permits drivers to turn right from Glossop Street in both directions without a dedicated right turn arrow. These improve the capacity of the intersection and observations show that these right turns can occur in a safe manner, due to the good visibility available for drivers.

2.5 Parking Supply and Demand

2.5.1 On-street Parking Provision

Parking is permitted along both sides of Plasser Crescent and Kurrajong Road, allowing for normal controls at intersections and driveways. No kerb side parking is permitted along the length of Glossop Street in this location.

2.5.2 Off-Street Parking Provision

There is parking provided within the various lots in the general vicinity of the subject site on Plasser Crescent which caters for the individual needs of the lots.

2.5.3 Parking Demand and Utilisation

During the site work, it was noted that there was a high demand for parking on-street, along both Plasser Crescent and Kurrajong Road. This is associated with the various users along these roads including staff parking and parking of vehicles associated with the operations on these sites e.g. car repair shops with vehicles parked on street awaiting repair work.

2.5.4 Set down or pick up areas

No set-down or pick-up zones noted in the area.

2.6 Public Transport

2.6.1 Rail Station Locations

The subject site is approximately 1200 metres from St Marys train station allowing for pedestrian access. St Marys train station is located on the western train line and allows for connections to the Blue Mountains to the west and the centre of Sydney to the east, as well as a connection to the other Sydney train lines. This train station provides access to a high frequency of trains which appeal to commuters and potentially workers associated with the light industrial area off Plasser Crescent.

2.6.2 Bus Stops and Associated Facilities

There are bus stops located on both Glossop Street and Kurrajong Road which allow for access to buses for the staff associated with the project site. These bus stops are within 500 metres of the subject site. These stops provide a sign only with no seats or shelter.

2.7 Other Proposed Developments

There are no other major developments currently occurring in the immediate vicinity of the subject site. A review of the aerial photograph for the immediate locality shows that the area is well developed and there is limited opportunity for new development except by increasing dwelling density. Further to the north of the locality there is extensive residential development occurring that will increase traffic demands along Glossop Street.

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3 Proposed Development

3.1 The Development

The development proposal allows for the expansion of the existing waste management facility, with an increased capacity to process up to 30,000 tonnes per annum. The site will operate in a similar manner to the existing facility with access to remain off Plasser Crescent. The hours of operation are planned to increase to 6am to 11pm Monday to Friday and Saturday and Sunday times to remain as per the existing consent.

Staffing levels will increase to 10 full time from the current 3 full time staff.

Other staff associated with the facility are not based there throughout the day i.e. truck drivers.

The expansion of the site will continue to use 12.5 m long rigid trucks that carry waste bins to and from the site.

3.1.1 Phasing and Timing

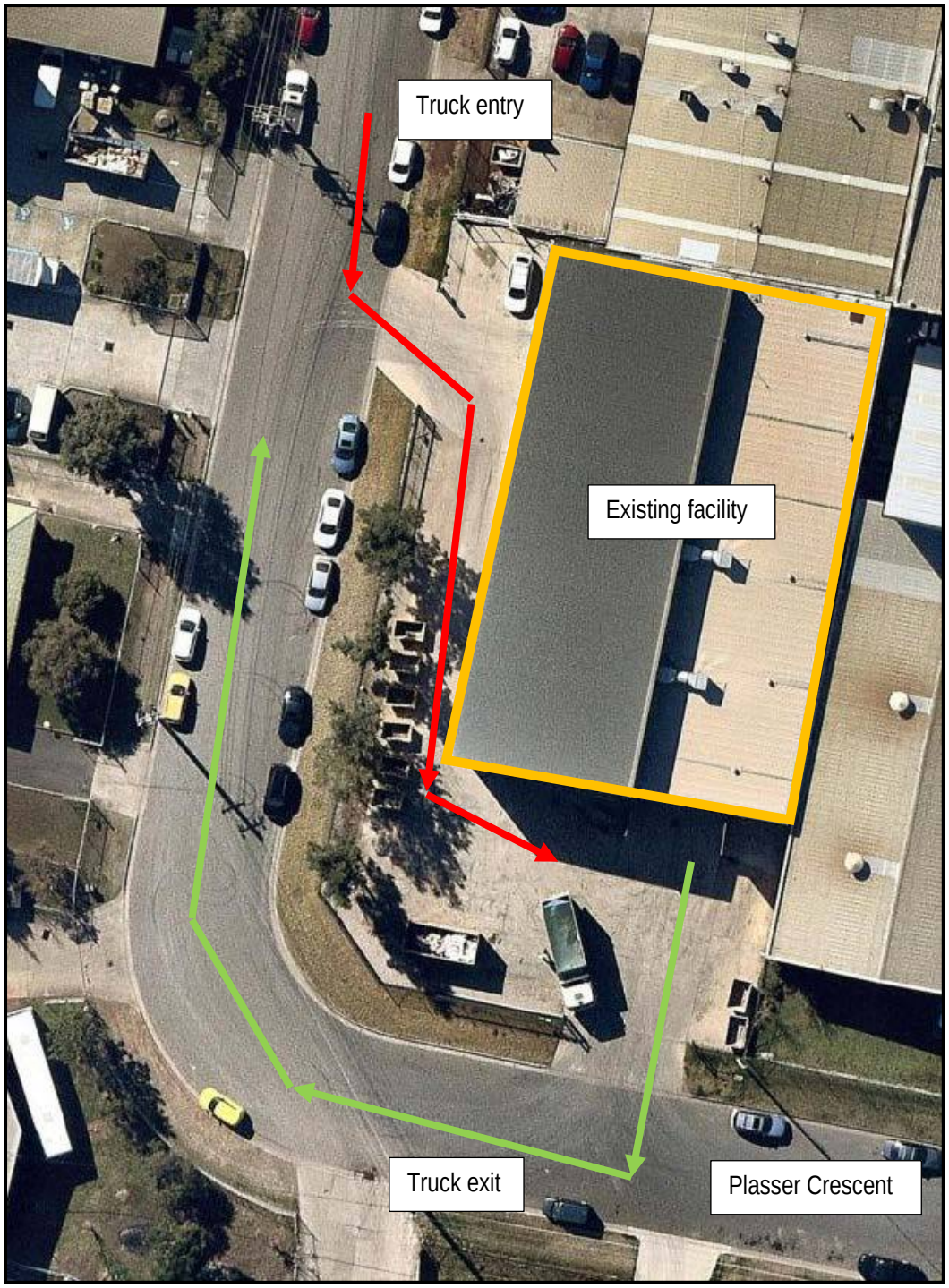
The development will be established in a single phase to allow for full processing of 30,000 tonnes per annum. No staging of the project has been allowed for in this assessment, although it is considered that the development may not generate full capacity at the commencement of the project.

3.1.2 Access and Circulation Requirements

The existing vehicle access point to the site is via Plasser Crescent with a separate entry point on Plasser Crescent in the north-west corner of the site and then an exit on Plasser Crescent on the southern boundary of the site. The two separate driveways allow the trucks to enter the site in a forward direction, manoeuvrer to the front of the building and then reverse into the building totally within the site. The trucks then exits the building and the site in a forward direction to either turn right or left onto Plasser Crescent to then exit the area.

Light vehicle access will be able to use both driveways as required, with a new parking area provided on the south-east corner of the site under the new office area. The staff arrive on site prior to any trucks having to access the site.

There is no general public access to the site and all staff vehicle movements will be managed via an on-site work safe plan that will be implemented for the site.



3.2 Access

The access to the site will remain as per the existing site access points on Plasser Crescent. All trucks enter via the access on the north-west corner and exit via the southern driveway.

3.2.1 Driveway Location

The existing driveways will be retained as part of the project with no proposed changes required.

3.2.2 Service Vehicle Access.

All service vehicle access will be the existing driveways to Plasser Crescent as per the existing servicing requirements. Servicing will be associated with vehicle and plant maintenance on site only. There will also be the requirement for fuel deliveries to the site for machinery.

3.2.3 Access to Public Transport

The site has limited access to public transport, being approximately 1200 metres from St Marys railway station. Buses are available on Kurrajong Road but provide limited access. Due to the site's location and the normal hours of work, it is considered that the proposed development will generate limited demand for public transport use.

3.3 Circulation

3.3.1 Pattern of circulation

All vehicles will be able to enter and exit the site in a forward direction from Plasser Crescent Lane having circulated through the site in a similar manner to the existing site operations. An Autoturn simulation has been prepared to confirm the current operations.

3.3.2 Road width

The existing layout of the site allows for one-way traffic movements through the site for the trucks and as part of the project work this will not be altered.

3.3.3 Internal Bus Movements

No internal bus movement required for this development.

3.3.4 Service Area Layout

No dedicated service area is provided. The delivery trucks for inbound and outbound material will generally be serviced off site (unless an issue occurs on site) and there will be no requirement for a dedicated service bay on the site. The machinery on site will require regular servicing and the existing building or hardstand area around the site will be utilised for this work to be completed.

3.4 Parking

The parking for the development is provided for the staff located on site with access via the existing driveways on Plasser Crescent. There are three existing parking spaces located on the northern boundary of the site adjacent to the driveway that will remain for staff parking. A new parking area will be provided in the south-east corner of the site that will allow for 3 cars to be parked underneath the new office building. This will provide a total of 5 parking spaces on site.

Under the Council DCP the parking rate for this type of development is 1 space per 2 employees or based upon the floor area. The site has a low number of employees and as such, the provision of 1 space per 2 employees is considered appropriate. For 10 staff on site the parking requirement is 5 spaces and with 5 provided on site, the parking requirements meet the requirements of the DCP.

3.5 Pedestrian and Bicycle Facilities

The site has poor access for pedestrians and observations on site showed that there are very few pedestrians in this area. The length of Glossop Street does not encourage cycling. Staff cycling to the site will be able to park their bikes within the site. Pedestrian access is available via the driveway off Plasser Crescent as required.

4 Transportation Analysis

4.1 Traffic Generation

Traffic associated with the development will be similar to the existing operations, but with the increase to the tonnage per year the overall truck numbers will increase. The current capacity of the site is 5,500 tonnes per annum and this will increase to 30,000 tonnes per annum. Therefore, the existing annual truck numbers will increase 5.5 times over the current demands.

The project will increase the number of trucks per day from 5-6 to 30 trucks per day. Due to on-site limitations in terms of emptying the bins and sorting, the maximum throughput on site is 4 truck deliveries per hour. This will give a corresponding 4 outbound trucks per hour, giving a total hourly flow of 8 trucks per hour 2-way during busy periods. Beyond 6 PM the trucks numbers will be much lower with a single truck per hour. Over 5 hours this gives 5 inbound and 5 outbound trucks between 6 PM and 11 PM. This will give daily average flows between 6 AM and 6 PM of 25 trucks giving an average of 2 trucks per hour.

Staff movements will all be inbound in the morning prior to the first truck arriving on site and then all departing at the end of the day when the last truck delivery has occurred. This would give 5 inbound cars in the morning and a corresponding 5 outbound cars in the afternoon / evening.

The facility will operate from 6.00 AM to 11 PM (17 hours per day) Monday to Friday giving potentially 96 truck movements between 6.00 AM and 6.00 PM, if running at full capacity between 6 AM and 6 PM. Beyond 6 PM, the volume of material and trucks numbers will decrease with a maximum of 5 trucks expected to arrive on site over 5 hours i.e. one per hour. Thus, if the facility ran at maximum throughput there could be 101 trucks inbound and 101 trucks outbound per day.

4.1.1 Daily and Seasonal Factors

The nature of the development will create some daily variation in operations, dependent upon the demands of the sites being serviced by the facility. There would also be quiet times over Christmas due to limited construction work occurring. It is considered that the weekend flows, especially of a Sunday would be much lower with the bulk of the activity occurring Monday to Friday.

4.1.2 Sight Distances

The site access points operate as simple driveways and the entry to the site is located on a straight section of road. Drivers can observe the driveway on the approach to the driveway and no drivers exit this point.

The exit driveway on to Plasser Crescent is located close to a 90-degree bend which significantly reduces vehicle speeds below the posted speed limit of 50 km/h. Drivers exiting the site at this location can see a distance of approximately 35 metres for a vehicle approaching from the west of the site exit point. From AS2890 this distance equates to a speed of 40 km/h which is considered appropriate in this location as vehicle speeds in this location are low.

It is noted that this section of the road has a large number of vehicles parked on it which can impact on sight lines. However, the trucks have a raised seating position which allow the driver to see over the top of parked cars in this location. Drivers of the facility are also regular drivers and as such will be fully familiar with the site layout and the access options.

Photo 1 – View to left for driver exiting subject site onto Plasser Crescent.

Photo 2 – View northbound on Plasser Crescent showing typical cross section and on-street parking near site entry driveway

The trucks associated with the development generally turn right out of the site and travel along Plasser Crescent to then turn left onto Kurrajong Road. This intersection is well laid out and offers good visibility for drivers using this intersection.

Photo 3 – View to right for driver exiting Plasser Crescent onto Kurrajong Road

4.1.3 Queuing at entrance to site

There are no vehicle queues expected at site entry / exit points. Given the low hourly traffic demands associated with the project together with on-site management to ensure a single vehicle only is at the site at any one time there are no queues associated with entry and exit movements to the site. The site can only unload or load a single waste bin at a time so the arrival of trucks is controlled to avoid more than one truck at a time on site.

4.1.4 Comparison with existing site access

There is no change to the existing site access arrangements or operations associated with the project.

4.1.5 Pedestrian Movements

The development is not expected to be a generator of pedestrian movements to the site as public access is not required.

4.2 Traffic Distribution and Assignments

Given the location of the site and based on discussions with the project team, all trucks accessing the site do so via the traffic signal controlled intersection of Glossop Street and Kurrajong Road. This gives the most direct

access to the greater road network. From here trucks can head north or south along Glossop Street to access all areas across greater Sydney as required.

4.2.1 Origin / destinations assignment

All traffic is expected to have an origin/destination via the signal controlled intersection of Glossop Street and Kurrajong Road. Based upon current operations it is expected that 2/3 of the trucks will have an origin / destination to the south along Glossop Street with 1/3 heading north.

Trucks heading south can then either use the Great Western Highway or connect to the M4 Motorway as required.

4.3 Impact of Generated Traffic

4.3.1 Impact on Daily Traffic Flows

It can be seen that the development will have a relatively low impact upon the overall daily traffic movements in the general locality of the subject site. At peak operations, there will could be 4 truck movements into the site per hour and a corresponding outbound value. The daily traffic flows could be 30 per day and if the site ran at full capacity all day, over 17 hours could generate 101 trucks movements equally split between 51 inbound and 51 outbound. This is a worst-case scenario and will probably not occur unless there was a significant construction site close to the facility which would allow for rapid turn-around in empty and full bins.

The value of 30 trucks per day is considered appropriate, based upon the current and expected operations. This is an increase of 24-25 trucks per day on average.

As a major road, under the Network Planning guidelines provided by the RTA (now RMS) Glossop Street would be classified as a Class 5U, typically providing undivided carriageways with 4 or more lanes of travel and carry high volumes of traffic including freight, public transport and commercial vehicle travel. These roads typically have daily traffic volumes in the order of 37,000 vehicles per day. It is considered that the additional 24 trucks per day associated with the expansion of the existing facility will have a minimal impact upon the overall operation of this road.

4.3.2 Peak Hour Impacts on Intersections

The peak hour traffic volumes associated with the development have been determined based upon peak hour flows being 4 inbound and 4 outbound trucks per hour, allowing for unloading of trucks. This is a maximum hourly generation and cannot be increased beyond this point due to operational constraints on site.

The key intersection that could be impacted upon by the proposed development would be the signal controlled intersection of Glossop Street and Kurrajong Road. The operation of the intersection has been assessed with Sidra to confirm the current operation and the impact of the additional trucks on the intersection.

The Sidra assessment is presented below.

Table 2 – Sidra results for current 2017 traffic flows

Approach	Level of service	Delay (seconds)	Queue (metres)
Glossop St south	A / A	9.3 / 11.0	72.5 / 111.8
Kurrajong Rd	B / C	27.6 / 38.4	58.5 / 109.9
Glossop St north	B / B	23.2 / 25.8	182.7 / 264.9
Forthorn Place	D / E	45.7 / 59.8	3.3 / 14.8

Note: results for AM / PM peak period

The above results confirm the site observations, with the overall level of operation very good for the intersection with no significant delays or congestion.

The intersection was then assessed with the additional truck movements associated with the subject site and the results are presented below.

Table 3 - Sidra results for current 2017 traffic flows plus additional traffic associated with subject site

Approach	Level of service	Delay (seconds)	Queue (metres)
Glossop St south	A / A	9.5 / 11.1	72.5 / 111.8
Kurrajong Rd	B / C	27.1 / 38.4	58.2 / 111.2
Glossop St north	B / B	25.0 / 25.9	190.6 / 265.4
Forthorn Place	D / E	45.7 / 59.8	3.3 / 14.8

Note: results for AM / PM peak period

It can be seen that the additional traffic movements associated with the expansion of the facility will have a minimal impact upon the operation of this intersection. The current traffic flows through this intersection are in the order of 2600 vehicles in the AM peak and 3282 in the PM peak hour. The additional 8 truck movements per hour associated with the development represent an increase of 0.3% in the AM peak and 0.2% in the PM peak.

Outside of the peak hour the traffic flows decrease significantly, and the intersection operation improves with reduced delays and congestion. Beyond 6 PM through to 11 PM the traffic flows on Glossop Street are signicantly lower and as such the signal controlled intersection will operate very well with delays and congestion lower than those occurring in the peak hours.

Overall it is concluded that the operation of the intersection will not alter considerably due to the additional 8 truck movements per hour associated with the expansion of the subject site. The impact during the peak hours is minimal and acceptable and no restriction in time is required for trucks accessing the subject site.

4.3.3 Background traffic and other developments

Normal RMS requirements allow for 10 years background growth for traffic. However, it is considered that the traffic movements in this area are mature and that there is limited opportunity for growth. Whilst traffic flows will increase in time, it is considered that the peak hour flows will remain similar and that the peak hour will expand beyond one hour. It can also be seen that as the traffic flows increase through this intersection, the development flows will remain at the same level and as such the impact will become relatively less.

No direct developments are noted in the immediate locality of the subject site that will impact upon the operation of this signal controlled intersection.

4.3.4 Impact of Construction Traffic

There will be minimal construction activity on site associated with the proposed development, as there is no construction activity required for the expansion of the operations. As part of the upgrade to the site, a new site office will be provided on site, but this will be a pre-fabricated building that will be located on site and will require minimal work on site associated with its installation.

4.4 Impact on Road Safety

The additional traffic flows associated with the project will have a low impact upon traffic safety. The site entry point operates in a safe manner and the low traffic speeds in this location ensure that the entry and exit movements can

occur in a safely. There have been no recorded incidents associated with the current entry and exit movements and the low increase in hourly flows will not alter the overall safe operations.

The intersections in the general locality of the subject site all offer a safe movement for all vehicles and currently cater for trucks associated with the subject site as well as other trucks that access this area. The intersection offers good visibility on Kurrajong Road and allows for safe movements. The key intersection impacted by the project is the signal controlled intersection of Kurrajong Road and Glossop Street and this intersection is well laid out and also operates in a safe manner. For work beyond 6 PM through to 11 PM, there are street lights along Plasser Crescent, Kurrajong Road and Glossop Street that ensure road safety is maintained.

4.5 Parking Analysis

The parking for the proposed development can all be accommodated on site. Whilst the DCP indicates the parking to be provided at a rate of 1 per 2 staff or based on floor area, the nature of the development allows for low staffing levels compared with the floor area and hence the provision of parking at a rate of 1 per 2 staff is considered appropriate. Allowing for 10 staff on site the provision of 5 spaces on site will cater for the parking demands consistent with the DCP requirements.

4.6 Public Transport

4.6.1 Options for improving services

It can be seen that the site is not well serviced by public transport and the nature of the development does not support public transport use. No improvements to public transport are considered necessary for the project.

5 Improvement Analysis

5.1 Improvements to Accommodate Existing Traffic

The existing road network in the immediate vicinity of the subject site is well developed and there are no road network upgrades currently occurring within the immediate vicinity of the subject site. It is considered that no upgrades to the capacity are required to accommodate the current traffic flows.

5.2 Improvements to Accommodate Background Traffic

Given the constrained nature of the road corridor along Glossop Street it is considered that no road upgrades can be provided along this road corridor and any increased demand will mean that the peak hour will need to spread in this location as no road upgrades can be provided.

5.3 Additional Improvements to Accommodate Development Traffic

Based on site observations and the Sidra assessment there are no road upgrades required to accommodate the additional traffic flows associated with the expansion of the subject site.

5.4 Alternative Improvements

No alternative improvements are put forward for the project.

6 Summary and Recommendations

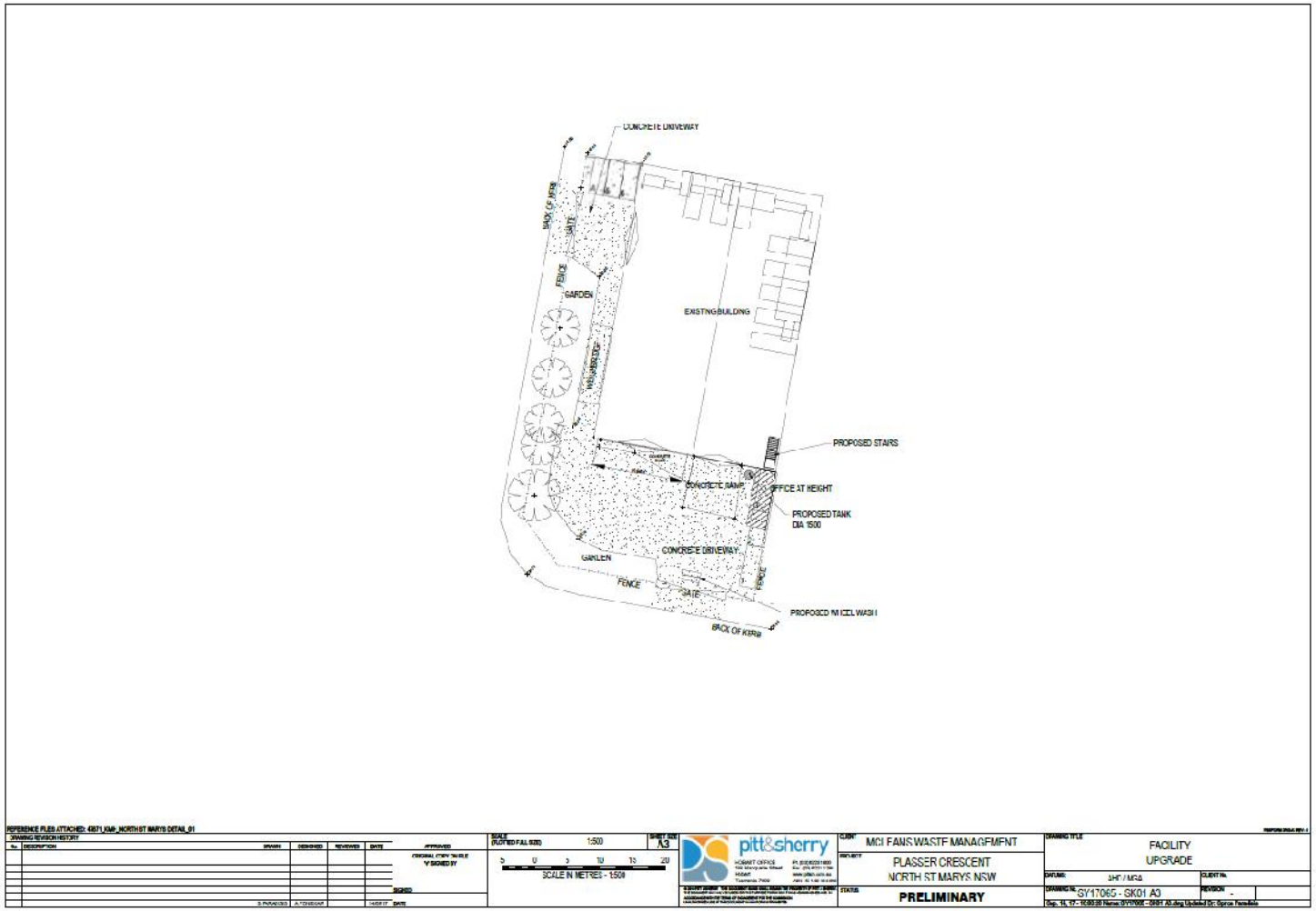
6.1 Summary

The following conclusions are drawn from the investigations into the proposed expansion of the waste management facility off Plasser Crescent, North St Marys:

1. The proposal allows for the expansion of the current facility from 5,500 tonnes per annum to 30,000 tonnes per annum, with adjustments to the hours of operation to 6 AM to 11 PM Monday to Friday and no change to weekend hours of operation. All access will remain as per the existing driveways on Plasser Crescent and allow for one-way entry and exit movements through the site.
2. The site is located within North St Marys and the major access route is via the signal controlled intersection of Glossop Street and Kurrajong Road.
3. All trucks will access the site from this intersection with 2/3 approaching from the south and 1/3 from the north. Trucks will travel along Kurrajong Road and access the site via Plasser Crescent.
4. Traffic data has been collected at the signal controlled intersection of Glossop Street and Kurrajong Road during a typical morning and afternoon peak period and the operation of the intersection has been confirmed with Sidra modelling. This intersection currently operates well.
5. The intersection has also been modelled with the additional 8 trucks movements per hour associated with the expansion of the site and the Sidra modelling shows that the intersection will continue to operate to a similar level and standard with minimal increases in delays or congestion.
6. Traffic data provided by the RMS shows that there have been 15 recorded accidents at this intersection over a 5 year timeframe. This intersection provides a good layout and can accommodate the additional trucks associated with the development.
7. All parking can be accommodated on site. Under the DCP the parking requirement would be 1 space per 2 employees and with 10 employees on site the parking requirement is 5, which compares with the 5 spaces provided on site. The trucks will be parked on site over-night within the building and there are no off-site parking impacts created by the project.

The overall conclusion from the investigations is that traffic and access arrangements for the project are satisfactory and that there are no traffic or access impediments to the development. The trucks access route has been reviewed based upon impacts for other road users and road safety and the proposed access route can operate in a safe and efficient manner with minimal delays for other road users.

Appendix A Site Plan



Appendix B Accident Data

Summary Crash Report

NSW Transport for NSW — Centre for Road Safety

Crash Type

Car Crash	12	80.0%
Light Truck Crash	4	26.7%
Rigid Truck Crash	1	6.7%
Articulated Truck Crash	1	6.7%
'Heavy Truck Crash	(2)	(13.3%)
Bus Crash	0	0.0%
"Heavy Vehicle Crash	(2)	(13.3%)
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	1	6.7%
Pedal Cycle Crash	1	6.7%
Pedestrian Crash	1	6.7%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type

*Intersection	13	86.7%
Non intersection	2	13.3%

* Up to 10 metres from an intersection

Collision Type

Single Vehicle	0	0.0%
Multi Vehicle	15	100.0%

Road Classification

Freeway/Motorway	0	0.0%
State Highway	0	0.0%
Other Classified Road	0	0.0%
Unclassified Road	15	100.0%

Contributing Factors

Speeding	4	26.7%
Fatigue	0	0.0%

Weather

Fine	14	93.3%
Rain	1	6.7%
Overcast	0	0.0%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition

Wet	1	6.7%
Dry	14	93.3%
Snow or ice	0	0.0%

Natural Lighting

Dawn	0	0.0%
Daylight	15	100.0%
Dusk	0	0.0%
Darkness	0	0.0%

Crash Movement

Intersection, adjacent approaches	3	20.0%
Head-on (not overtaking)	0	0.0%
Opposing vehicles; turning	5	33.3%
U-turn	0	0.0%
Rear-end	6	40.0%
Lane change	0	0.0%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	0	0.0%
Overtaking; same direction	0	0.0%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	1	6.7%
Permanent obstruction on road	0	0.0%
Hit animal	0	0.0%
Off road, on straight	0	0.0%
Off road on straight, hit object	0	0.0%
Out of control on straight	0	0.0%
Off road, on curve	0	0.0%
Off road on curve, hit object	0	0.0%
Out of control on curve	0	0.0%
Other crash type	0	0.0%

Speed Limit

40 km/h or less	0	0.0%	80 km/h zone	0	0.0%
50 km/h zone	5	35.7%	90 km/h zone	0	0.0%
60 km/h zone	9	64.3%	100 km/h zone	0	0.0%
70 km/h zone	0	0.0%	110 km/h zone	0	0.0%

~ 07:30-09:30 or 14:30-17:00 on school days ~ 40km/h or less 0 0.0% ~ School Travel Time Involvement 6 40.0%

Day of the Week

Monday	2	13.3%	Wednesday	5	33.3%	Friday	3	20.0%	Sunday	1	6.7%	WEEKEND	3	20.0%
Tuesday	2	13.3%	Thursday	0	0.0%	Saturday	2	13.3%	WEEKDAY	12	80.0%			

CRASHES 15

Fatal	0	0.0%
Serious inj.	3	20.0%
Moderate inj.	7	46.7%
Minor/Other inj.	2	13.3%
Uncategorised inj.	0	0.0%
Non-casualty	3	20.0%

Self Reported Crash 1 6.67%

Time Group

Time Group		% of Day	
00:01 - 02:59	0	0.0%	12.5%
03:00 - 04:59	0	0.0%	8.3%
05:00 - 05:59	0	0.0%	4.2%
06:00 - 06:59	0	0.0%	4.2%
07:00 - 07:59	2	13.3%	4.2%
08:00 - 08:59	2	13.3%	4.2%
09:00 - 09:59	0	0.0%	4.2%
10:00 - 10:59	2	13.3%	4.2%
11:00 - 11:59	2	13.3%	4.2%
12:00 - 12:59	0	0.0%	4.2%
13:00 - 13:59	2	13.3%	4.2%
14:00 - 14:59	2	13.3%	4.2%
15:00 - 15:59	1	6.7%	4.2%
16:00 - 16:59	1	6.7%	4.2%
17:00 - 17:59	1	6.7%	4.2%
18:00 - 18:59	0	0.0%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	0	0.0%	8.3%
22:00 - 24:00	0	0.0%	8.3%

Street Lighting Off/Nil % of Dark

0 of 0 in Dark 0.0%

CASUALTIES 14

Killed	0	0.0%
Seriously inj.	3	21.4%
Moderately inj.	7	50.0%
Minor/Other inj.	4	28.6%
Uncategorised inj.	0	0.0%
^ Unrestrained	0	0.0%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

Crashes		Casualties
2	2016	2
1	2015	1
2	2014	1
6	2013	6
2	2012	1
2	2011	3

McLean Periods % Week

A	4	26.7%	17.9%
B	0	0.0%	7.1%
C	5	33.3%	17.9%
D	2	13.3%	3.5%
E	1	6.7%	3.6%
F	3	20.0%	10.7%
G	0	0.0%	7.1%
H	0	0.0%	7.1%
I	0	0.0%	12.5%
J	0	0.0%	10.7%

#Holiday Periods

New Year	0	0.0%	Easter	0	0.0%	Queen's BD	0	0.0%	Christmas	0	0.0%	Easter SH	0	0.0%	Sept./Oct. SH	3	20.0%
Aust. Day	0	0.0%	Anzac Day	0	0.0%	Labour Day	0	0.0%	January SH	0	0.0%	June/July SH	1	6.7%	December SH	0	0.0%

Detailed Crash Report

NSW Transport for NSW

NOTES: 7284 - Glossop St Kurrajong Rd & Plasser CR Crash Data - 1 July 2011 to 30 June 2016

Crash No.	Data Source	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors	SF
Sydney Region																										
Penrith LGA																										
North St Marys																										
Glossop St																										
770555	P	04/10/2011	Tue	07:20		at	FORTHORN PL	XJN	STR	Fine	Dry	60	2	OMV	U U	N in GLOSSOP ST	Unk	Proceeding in lane	MC	0	0	1	0	0		
E45968661								RUM	10	Cross traffic				M/C	M36	W in FORTHORN PL	30	Proceeding in lane								
816420	P	07/11/2012	Wed	08:02		at	FORTHORN PL	XJN	STR	Fine	Dry	50	2	WAG	F45	S in GLOSSOP ST	20	Turning right	NC	0	0	0	0	0	S	
E49099270								RUM	21	Right through				CAR	M26	N in GLOSSOP ST	55	Proceeding in lane								
1099923	P	30/03/2016	Wed	16:30		at	FORTHORN PL	XJN	STR	Fine	Dry	60	2	P/C	M U	N in GLOSSOP ST		Proceeding in lane	MC	0	0	1	0	0		
E63178584								RUM	0	Ped nearside				PED	F22	E in GLOSSOP ST		Walk across carriageway								
1106864	P	11/05/2016	Wed	07:56		at	FORTHORN PL	XJN	STR	Fine	Dry	60	2	LOR	M24	N in GLOSSOP ST	55	Proceeding in lane	SC	0	1	0	0	0		
E61755067								RUM	30	Rear end				CAR	F22	N in GLOSSOP ST	0	Stationary								
1044586	P	26/09/2014	Fri	14:45	50 m	S	FORTHORN PL	DIV	STR	Fine	Dry	60	2	TRK	M21	N in GLOSSOP ST	50	Proceeding in lane	NC	0	0	0	0	0		
E58091464								RUM	31	Left rear				TRK	M53	N in GLOSSOP ST	25	Turning left								
1011570	P	19/08/2013	Mon	17:00		at	KURRAJONG RD	XJN	STR	Fine	Dry	50	2	CAR	M66	N in GLOSSOP ST	20	Turning right	SC	0	1	0	0	0	S	
E52197833								RUM	21	Right through				CAR	F20	S in GLOSSOP ST	60	Proceeding in lane								
856318	P	01/09/2013	Sun	13:15		at	KURRAJONG RD	XJN	STR	Fine	Dry	60	2	CAR	M30	N in GLOSSOP ST	5	Turning right	SC	0	1	0	0	0	S	
E52572159								RUM	21	Right through				TRK	M37	S in GLOSSOP ST	70	Proceeding in lane								
1001576	P	01/11/2013	Fri	13:10		at	KURRAJONG RD	XJN	STR	Fine	Dry	50	2	CAR	F23	N in GLOSSOP ST	5	Turning right	NC	0	0	0	0	0	S	
E52915272								RUM	21	Right through				VAN	F35	S in GLOSSOP ST	60	Proceeding in lane								
1039574	P	18/08/2014	Mon	10:45		at	KURRAJONG RD	XJN	STR	Raining	Wet	50	2	4WD	F56	E in KURRAJONG RD	20	Turning right	MC	0	0	1	0	0		
E56062471								RUM	11	Right far				4WD	F42	S in GLOSSOP ST	50	Proceeding in lane								
1088841	S	07/11/2015	Sat	10:05		at	KURRAJONG RD	XJN	STR	Fine	Dry	60	2	CAR	M54	N in GLOSSOP ST	Unk	Proceeding in lane	OC	0	0	0	1	0		
E59599314								RUM	30	Rear end				4WD	M60	N in GLOSSOP ST	0	Stationary								
829528	P	13/02/2013	Wed	14:30	5 m	N	KURRAJONG RD	XJN	STR	Fine	Dry	60	2	CAR	M U	S in GLOSSOP ST	60	Proceeding in lane	MC	0	0	1	0	0		
E50667348								RUM	30	Rear end				CAR	F64	S in GLOSSOP ST	0	Stationary								
Kurrajong Rd																										
819552	P	05/12/2012	Wed	15:43		at	PLASSER CRES	TJN	STR	Fine	Dry	50	2	CAR	M20	E in KURRAJONG RD	20	Turning right	OC	0	0	0	1	0		
E50030407								RUM	21	Right through				TRK	M54	W in KURRAJONG RD	50	Proceeding in lane								
St Marys																										
Glossop St																										

Detailed Crash Report

NSW Transport for NSW — Centre for Road Safety

Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash-Detailed	Killed	Seriously Inj.	Moderately Inj.	Minor/Other Inj.	Uncateg'd Inj.	Factors SF
848380	P	20/07/2013	Sat	11:45	50 m S	CURRAJONG RD	DIV	STR	Fine	Dry	Unk	4	CAR	M42	N in GLOSSOP ST	50	Proceeding in lane	MC	0	0	1	0	0	
E51497209							RUM	30	Rear end				CAR	M30	N in GLOSSOP ST	5	Proceeding in lane							
													CAR	M50	N in GLOSSOP ST	5	Proceeding in lane							
													CAR	M20	N in GLOSSOP ST	10	Proceeding in lane							
763305	P	08/07/2011	Fri	11:54	at	KURRAJONG RD	XJN	STR	Fine	Dry	60	2	CAR	M53	N in GLOSSOP ST	60	Proceeding in lane	MC	0	0	1	1	0	
E269343292							RUM	10	Cross traffic				CAR	M70	E in KURRAJONG RD	15	Proceeding in lane							
854703	P	01/10/2013	Tue	08:28	10 m S	KURRAJONG RD	XJN	STR	Fine	Dry	60	3	SEM	M31	N in GLOSSOP ST	50	Proceeding in lane	MC	0	0	1	1	0	
E53569808							RUM	30	Rear end				TRK	M58	N in GLOSSOP ST	0	Stationary							
													CAR	F63	N in GLOSSOP ST	0	Stationary							

Report Totals: Crashes: 15 Fatal Crashes(FC): 0 Serious Injury Crashes(SC): 3 Moderate Injury Crashes(MC): 7 Minor/Other Injury Crashes(OC): 2 Uncategorised Injury Crashes(UC): 0 Non-Casualty Crashes(NC): 3

Killed(K): 0 Seriously Injured(S): 3 Moderately Injured(M): 7 Minor/Other Injured(O): 4 Uncategorised Injured(U): 0

Crashid dataset 7284 - Glossop St Kurrajong Rd & Plasser CR Crash Data - 1 July 2011 to 30 June 2016

Note: *Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.*

Crash self reporting, including self reported injuries began Oct 2014. Trends from 2014 are expected to vary from previous yrs. More unknowns are expected in self reported data. Reporting yrs 1996-2004 and 2017 onwards contain uncategorised inj crashes.

Appendix H

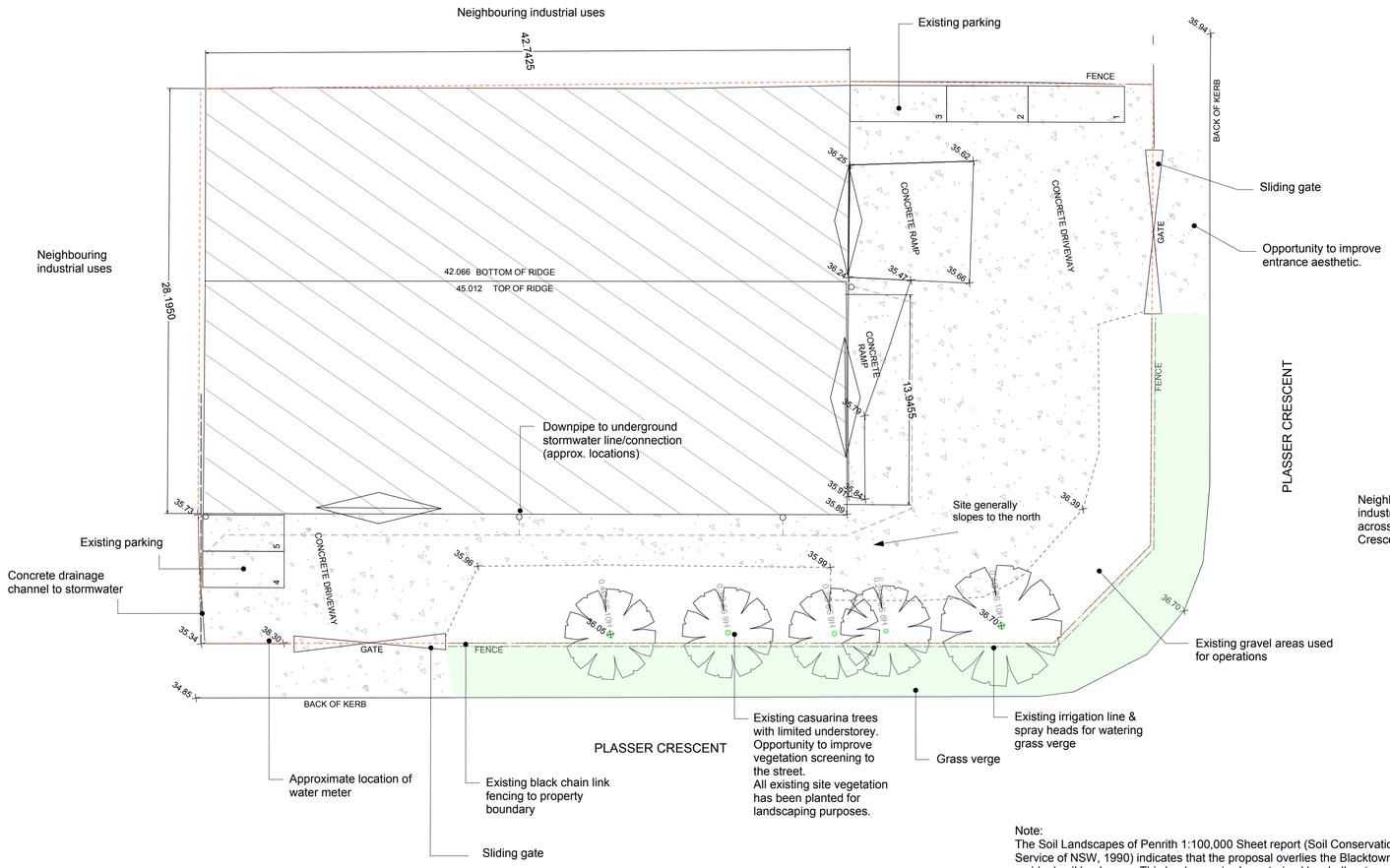
Landscape Plan

SITE CONTEXT: Not to scale

PHOTO 1: Entrance looking north from Plasser Crescent

PHOTO 2: Looking east from Plasser Crescent

PHOTO 3: Looking north along site boundary



Note:
The Soil Landscapes of Penrith 1:100,000 Sheet report (Soil Conservation Service of NSW, 1990) indicates that the proposal overlies the Blacktown residual soil landscape. This landscape is characterised by shallow to moderately deep hard setting soils. Soils are moderately reactive, with highly plastic subsoils, low soil fertility and poor drainage. Acid Sulfate Soils are not expected to be a risk for the site.
The majority of the Proposal site is hardstand with small landscaped areas. The site is located within an industrial area and the majority of the surrounding landscape is hardstand and roads with small landscaped areas.

SPECIFICATION NOTES:

L1.0 GENERAL

L1.1 RELATED DOCUMENTATION
These drawings are to be read in conjunction with other contract documents, specifications and engineering drawings. All discrepancies are to be verified with the Superintendant prior to proceeding with work.

L1.2 CONTRACTOR QUALIFICATIONS & RESPONSIBILITY
All landscape works shall be carried out by a Landscape Contractor Association affiliated member (LCA). The Contractor shall allow for all restriction to operations caused as a result of other Contractors and potential damage to existing structures, paving and installed works through operation of equipment or installation of materials & planting either within or outside the site. The Contractor shall be responsible for ensuring adequate protection measures are taken/installed to prevent damage, staining or other disfigurement of all finished surfaces and installed materials and shall be responsible for making good all damages and disfigurement.

L1.3 ORDERING
Within 14 days of acceptance of tender, furnish proof (receipts of or purchase order) of ordering the required materials and advise immediately if any supply difficulties are encountered. Substitutions shall not be approved unless signed by the Landscape Architect. The plant schedule shall be the accepted document for plant quantities and sizes to be installed.

L1.4 STANDARDS
To AS4419. Soils - Where able site top soil to be removed and stored on site for later use.
To AS 4454. Composts, soil conditioners and mulches.
The whole of the works are to be undertaken in accordance with the Building Code of Australia (BCA), Local Council Policies and Codes, Governing Statutory Authority Requirements and current Australian Standards

L1.5 SETOUT & DIMENSIONS
Critical design dimensions shall be obtained by the Landscape Contractor by survey before commencing work. Check architect's and engineer's drawings to determine extent of structures, earthworks, paving.

L2.0 SITE AND SOIL

L2.1 WEED ERADICATION
Herbicide: Eradicate weeds using environmentally acceptable methods, such as a non-residual glyphosate herbicide in any of its registered formulae, at the recommended maximum rate as nominated by the manufacturer. Submit a proposal, prior to carrying out any herbicide or pesticide spraying works on site.
Manual: Regularly remove, by hand, rubbish and weed growth throughout existing vegetation, planted and mulched areas. Continue eradication throughout the course of the works and during the planting establishment period. Revisit treated areas during plant establishment period to ensure regrowth has not occurred otherwise repeat as required.

L2.2 SUBSOIL PREPARATION
Decompact & excavate planting beds to bring the subsoil to at least 100mm below finished design levels. Shape the subsoil to fall to subsoil drains where applicable. Break up the subsoil to a further depth of 200mm.
Thoroughly mix in materials required to be incorporated into the subsoil. Cultivate manually within the dripzone of existing trees. Remove stones exceeding 25mm, clods of earth exceeding 50mm, and weeds, rubbish or other deleterious material brought to the surface during cultivation. Trim the surface to design levels after cultivation.

L2.3 TOPSOIL
Import topsoil that conforms with AS 4419 from an off-site source approved by the Superintendent unless the topsoil type can be provided from material recovered from the site.
Soil for landscape works shall be free of noxious weeds.
Spread the topsoil on the prepared subsoil and grade evenly, making the necessary allowances to permit the following:
- Required finished levels and contours may be achieved after light compaction. Compact lightly and uniformly in 150mm layers. Avoid differential subsidence and excess compaction and produce a finished topsoil surface which has the following characteristics:
- Finished to design levels.
- Smooth and free from stones or lumps of soil.
- Graded to drain freely, without ponding, to catchment points.
- Graded evenly into adjoining ground surfaces.
- Ready for planting.

Spread surplus topsoil on designated areas on site, if any; otherwise, dispose off site at an approved location.

L2.4 COMPOST
Incorporate compost to increase the organic matter of soil to 10% by mass. Compost is well rotted vegetative material or animal manure, or other approved material, free from harmful chemicals, grass and weed growth and with a neutral pH value.

L2.5 FERTILISER
Apply slow release fertiliser per manufacturer guidelines at the time of planting.

L2.6 MULCH
Use hardwood chips with no more than 5% fines by volume. Average size 30mm x 20mm x 5mm. Max. length of chip not to exceed 50mm. Spread mulch to a depth of 75-100mm depending on the size of the planting. Must be certified weed free and contaminant free and also be free of soil, stones, vermin, insects or other foreign material.

L3.0 PLANTS

L3.1 PLANTS
All plants are to be ordered as soon as the tender has been accepted. See Section 1.3.
Provide plants with the following characteristics:
- Large healthy root systems, with no evidence of root curl, restriction or damage.
- Vigorous, well established, free from disease and pests, of good form consistent with the species or variety.
- Hardened off, not soft or forced, and suitable for planting in the natural climatic conditions prevailing at the site.

No substitutions are to be made without the written approval of Landscape Architect.
Supply plants in weed-free containers of the required size.

L3.2 PLANTING
Plant trees, shrubs & groundcovers as shown on Drawing L2. Water plants in after planting.

L3.3 MULCHING GARDEN BEDS
Garden beds to be mulched with hardwood chips to a depth of 80mm and maintained during the maintenance period at this depth.

L4.0 TURF

L4.1 TURF PROTECTION
Ensure existing turf and associated irrigation is maintained and restored if damaged during landscaping works.

L5.0 COMPLETION & MAINTENANCE

L5.1 IRRIGATION
It is recommended that a manual or automated irrigation schedule be implemented for a 12 week maintenance period at the discretion of the owner. It may be possible to connect to existing system. Contractor to verify and ensure appropriate drip irrigation is provided to new planting as part of construction contract. Allow soil to dry out between waterings, to encourage deep rooting of plants.

L5.2 PLANTING ESTABLISHMENT
The planting establishment period commences at the date of practical completion.
Required period: 12 weeks
Throughout the planting establishment period, carry out maintenance work including, watering, weeding, rubbish removal, fertilising, pest and disease control, replanting, reinstatement of mulch, and keeping the site neat and tidy.
Continue to replace failed or damaged plants.
Keep a log book recording when and what maintenance work has been done and what materials, including toxic materials, have been used. Make the log book available for inspection on request.
Submit the supplier's written statement certifying that plants are true to the required species and type, and are free from diseases, pests and weeds.

L6.0 HARDSCAPE

L6.1 CONCRETE WORK
For all concrete work refer Structural Engineer drawings for reinforcing, footings, dimensions, fixings

N

SCALE: 1:200 @ A1

REVISION	DATE	DESCRIPTION	BY
A	29/8/17	For review	LHL

FOR pitt&sherry

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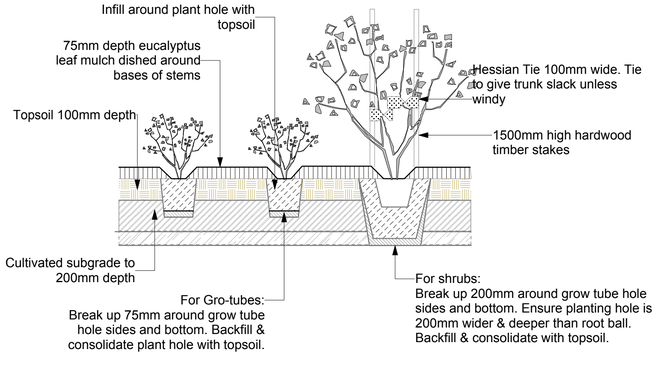
project: **Macleans Waste Facility Expansion St Marys, NSW**
date: **August 2017**
drawing: **SITE ANALYSIS**
scale: **1:100**
page: **L-1**

Plant List

ID	Qty	Common Name	Botanical Name	Scheduled Size	Mature Height	Mature Spread	Remarks
Trees							
Shrubs							
Cv SLIM	26	SLIM Bottlebrush	Callistemon viminalis SLIM 'CV01'	100mm	2.5 - 3m	1.3m	Certificate of authenticity must be provided
Gm	3	Moonlight Grevillea	Grevillea x 'Moonlight'	300mm pot	3 - 4m	2 - 2.5m	
Ground Covers							
In	116	Knobby Club-rush	Isolepis nodosa	tube stock	0.6 - 0.75m	0.3 - 0.6m	
Grasses							
LI'N'	25	Spiny-headed mat rush 'Nyalla'	Lomandra longifolia 'Nyalla' 'LM400'	140mm pot	0.5 - 0.7m	0.6m	Certificate of authenticity must be provided
LI'T'	49	Spiny-headed mat rush 'Tanika'	Lomandra longifolia 'Tanika' 'LM300'	140mm pot	0.45 - 0.6m	0.4m	Certificate of authenticity must be provided
Total	**219**						



1 Mass Planting Detail
Scale: 1:20

SCALE: 1:100 @ A1

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS AND DRAWINGS. DO NOT SCALE OFF DRAWINGS. PRECEDENCE IS TO BE GIVEN TO WRITTEN DIMENSIONS, VERIFY ALL DIMENSIONS ON SITE PRIOR TO CONSTRUCTION. REPORT ALL DISCREPANCIES TO THE LANDSCAPE ARCHITECT IMMEDIATELY. NO PLANT SUBSTITUTIONS ARE TO BE MADE WITHOUT WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT.. COPYRIGHT OF THIS DRAWING IS VESTED WITH THE LANDSCAPE ARCHITECT.

REVISION	DATE	DESCRIPTION	BY
A	29/8/17	For review	LHL

FOR pitt&sherry

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project: **Macleans Waste Facility Expansion St Marys, NSW**

date: **August 2017**

drawing: **LANDSCAPE PLAN**

scale: **1:100**

page: **L-2**

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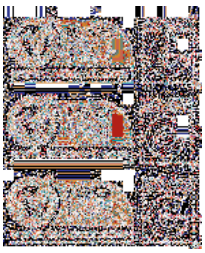
Pitt & Sherry (Operations) Pty Ltd
ABN 67 140 184 309

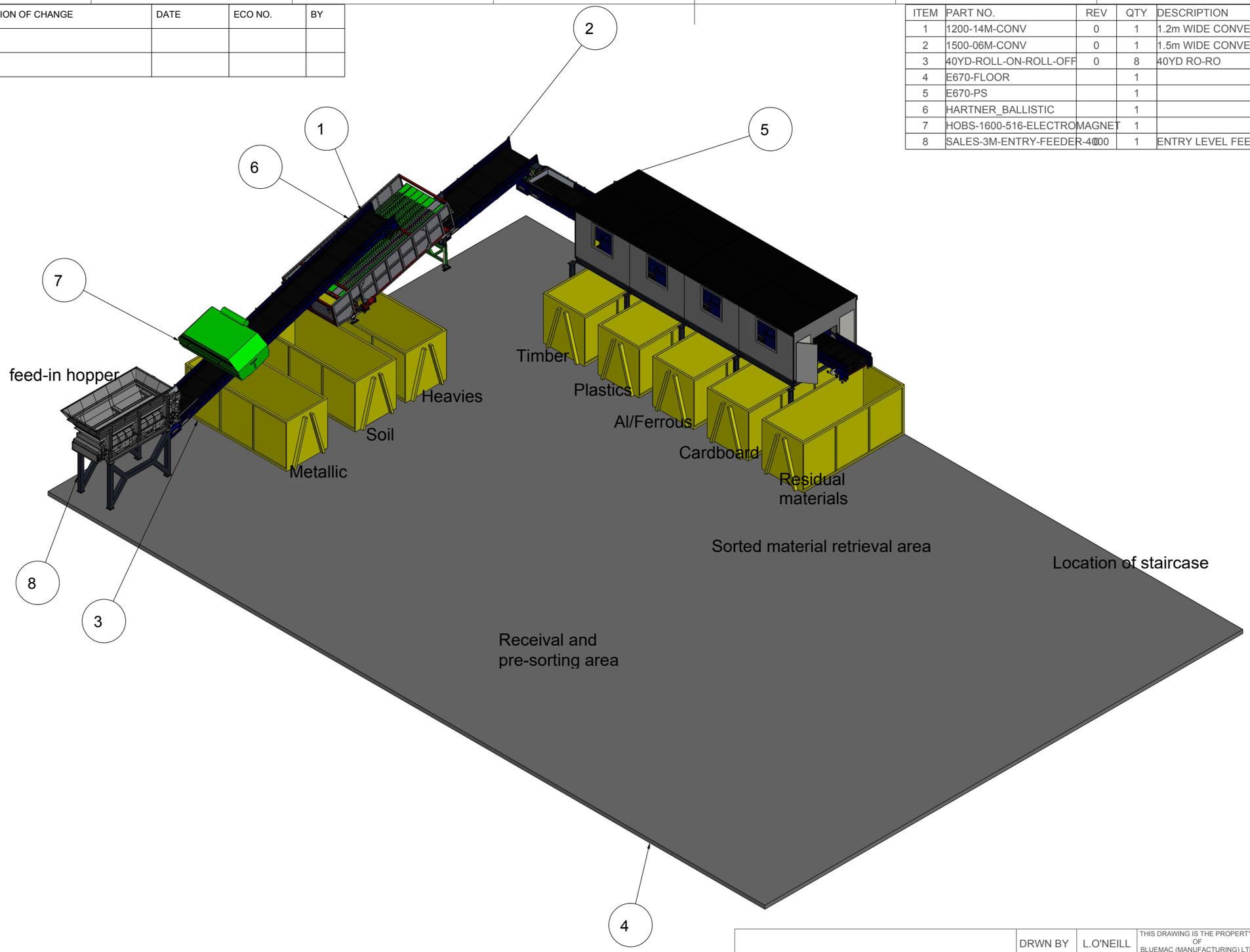


KMH ENVIRONMENTAL
Now part of the pitt&sherry group

pitt&sherry

REV	DESCRIPTION OF CHANGE	DATE	ECO NO.	BY

ITEM	PART NO.	REV	QTY	DESCRIPTION	MATERIAL
1	1200-14M-CONV	0	1	1.2m WIDE CONVEYOR	MM
2	1500-06M-CONV	0	1	1.5m WIDE CONVEYOR	MM
3	40YD-ROLL-ON-ROLL-OFF	0	8	40YD RO-RO	1000.0MM
4	E670-FLOOR		1		MM
5	E670-PS		1		MM
6	HARTNER_BALLISTIC		1		MM
7	HOBS-1600-516-ELECTROMAGNET		1		MM
8	SALES-3M-ENTRY-FEEDER-4000		1	ENTRY LEVEL FEEDER	MM



SKALA

BLUEMAC (MANUFACTURING) LTD
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CO. TYRONE
BT71 7EE

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sales@bluegroup.co.uk
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DRWN BY	L.O'NEILL	DRW NO.	E670-000
APP'D BY	DM	TITLE	
DATE	23-06-17	JOB REF	
SHEET	1 / 2	REV	0
SCALE	0.002	MASS	2107939.6 Kgs

TOLERANCES / FINISHES
DIMS 0-999 +1,-1
DIMS 1000-2499 +2,-2
DIMS >2500 +3,-3
ANGLE +1°,-1°
PROFILED HOLE +1,-0
MACHINE +1,-1
MACHINE FINISH 3.2
CAST +1,-1

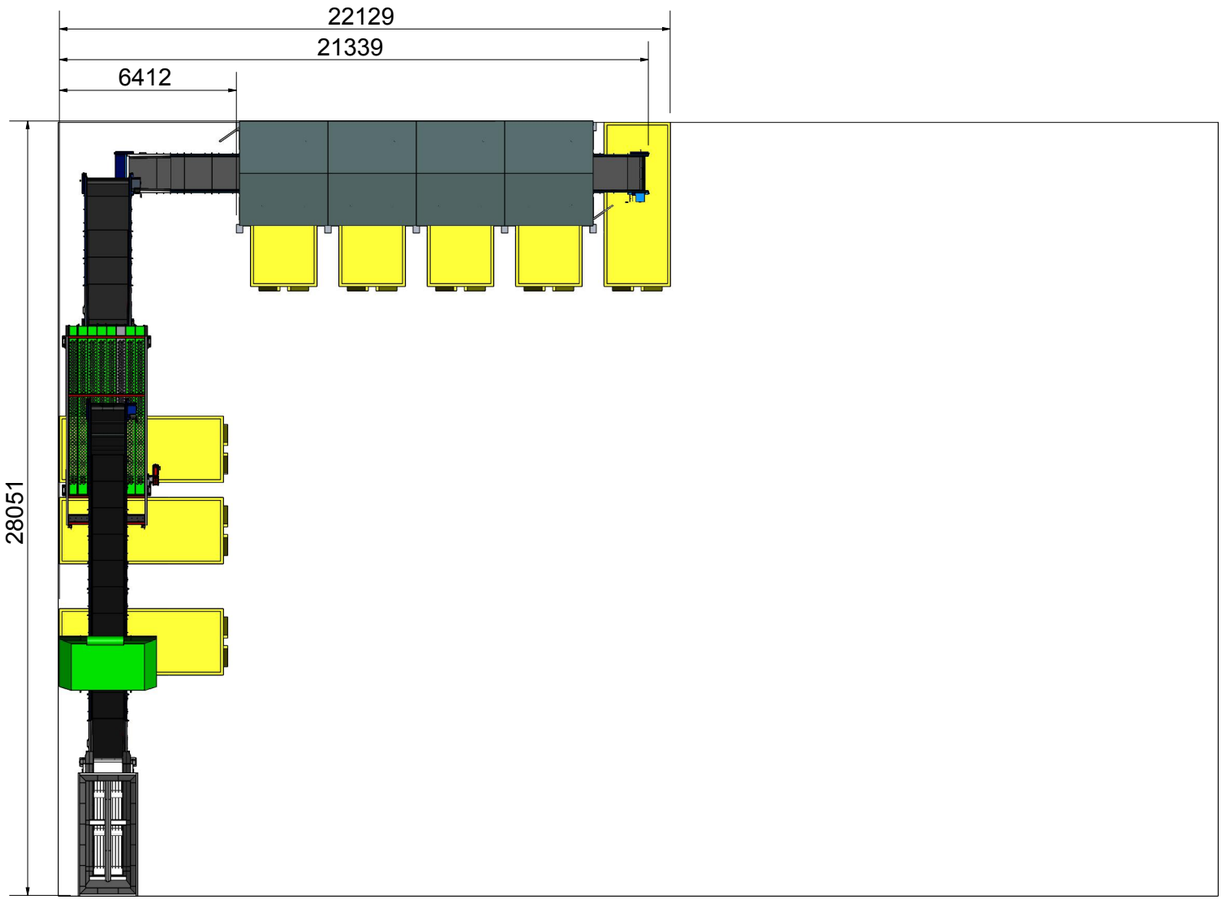
DEBURR & REMOVE ALL SHARP EDGES

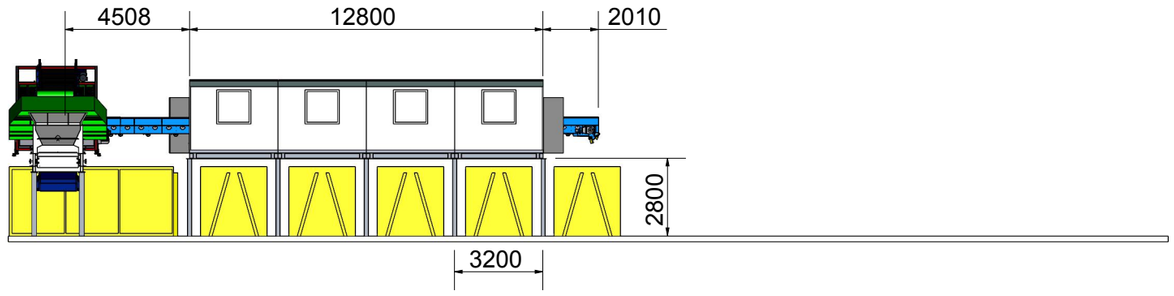
3RD ANGLE PROJECTION

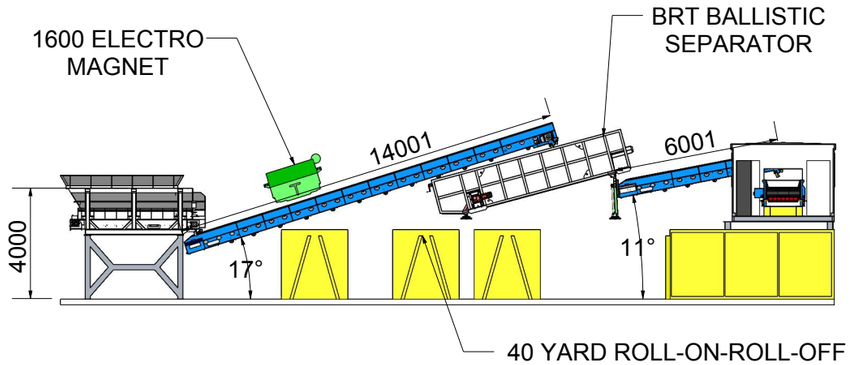
A3

REV	DESCRIPTION OF CHANGE	DATE	ECO NO.	BY

ITEM	PART NO.	REV	QTY	DESCRIPTION	MATERIAL
1	1200-14M-CONV	0	1	1.2m WIDE CONVEYOR	MM
2	1500-06M-CONV	0	1	1.5m WIDE CONVEYOR	MM
3	40YD-ROLL-ON-ROLL-OFF	0	8	40YD RO-RO	1000.0MM
4	E670-FLOOR		1		MM
5	E670-PS		1		MM
6	HARTNER_BALLISTIC		1		MM
7	HOBS-1600-516-ELECTROMAGNET		1		MM
8	SALES-3M-ENTRY-FEEDER-4000		1	ENTRY LEVEL FEEDER	MM







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DRWN BY	L.O'NEILL	THIS DRAWING IS THE PROPERTY OF BLUEMAC (MANUFACTURING) LTD & MUST NOT BE COPIED OR REPRODUCED. THIS DRAWING IS SUBJECT TO RETURN UPON DEMAND	DRW NO.	E670-000
APP'D BY	DM		TITLE	
DATE	23-06-17	TOLERANCES / FINISHES DIMS 0-999 +1,-1 DIMS 1000-2499 +2,-2 DIMS >2500 +3,-3 ANGLE +1°,-1° PROFILED HOLE +1,-0 MACHINE +1,-1 MACHINE FINISH 3.2 CAST +1,-1	JOB REF	
SHEET	2 / 2		REV	0
SCALE	0.002		MASS	2107939.6 Kgs
DEBURR & REMOVE ALL SHARP EDGES			3RD ANGLE PROJECTION	A3

NORTH

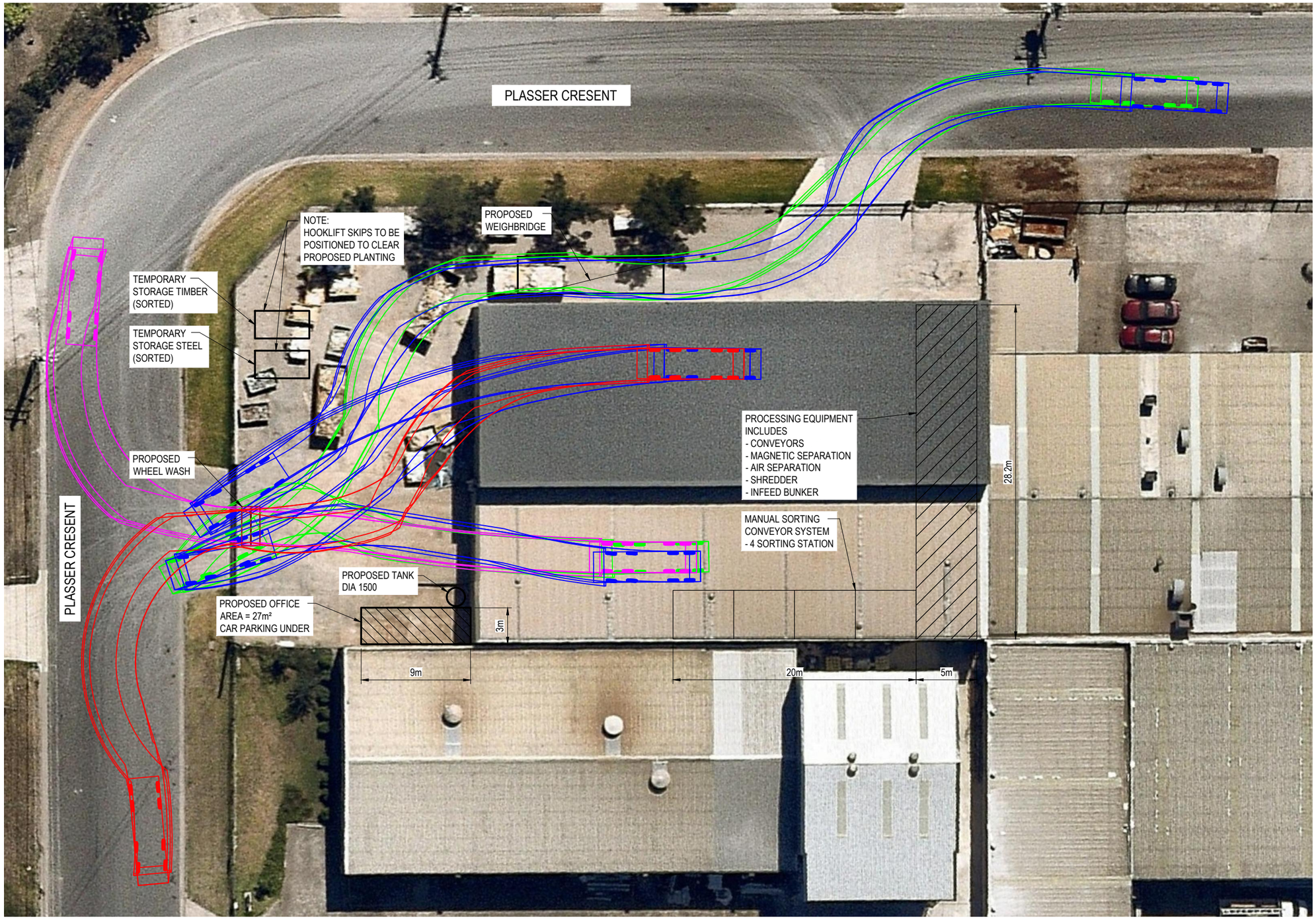
TRUCK MOVEMENTS

BLUE TRUCK - THE WASTE LADEN TRUCK ENTERS THROUGH THE WESTERN GATE, REVERSE ENTERS THE WESTERN SIDE OF THE SHED AND DROPS IT'S LOAD. IT THEN EITHER REVERSES INTO THE EASTERN SIDE OF THE SHED AND RELOADS, OR EXITS THROUGH THE SOUTHERN GATE SHOWN AS THE RED TRUCK.
GREEN TRUCK - THE UN-LADEN TRUCK ENTERS THROUGH THE WESTERN GATE, REVERSE ENTERS THE EASTERN SIDE OF THE SHED AND LOADS, THEN EXITS THROUGH THE SOUTHERN GATE SHOWN AS THE PINK TRUCK.

Actros Large Rigid Vehicle (8.8 m)

Overall Length	8.800m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.427m
Track Width	2.500m
Lock-to-lock time	4.00s
Wall to Wall Turning Radius	10.750m

ACTROS VEHICLE SPECIFIED FOR THE SITE HAS R10.75m WHICH IS IN BETWEEN THE AUSTROADS VEHICLE R12.5 (SKC01) & THE AS2890 VEHICLE R10 (SKC02)



REFERENCE FILES ATTACHED:

P&S FORM DRG-A3 REV - 8

DRAWING REVISION HISTORY

No.	DESCRIPTION	DRAWN	DESIGNED	REVIEWED	DATE
A	DRAWING REVISED	E.FANNING	A.PANIKKAR	A.PANIKKAR	10-01-18
		E.FANNING	A.PANIKKAR	A.PANIKKAR	02-11-17

APPROVED
ORIGINAL COPY ON FILE
'e' SIGNED BY
SIGNED
DATE

SCALE (PLOTTED FULL SIZE): AS SHOWN (A3)

SHEET SIZE: A3

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ABN 67 140 184 309

CLIENT: MCLEANS WASTE MANAGEMENT

PROJECT: 33-37 PLASSER CRESCENT
NORTH ST MARYS, NSW

STATUS: FOR APPROVAL

DRAWING TITLE: TURNING MOVEMENT
LARGE RIGID VEHICLE 8.8m (AS2890)

DATUMS: AHD / MGA

CLIENT No. -

DRAWING No. SY17065-P3

REVISION A

Jan. 15, 18 - 14:46:35 Name: SY17065-P3.dwg Updated By: Cameron Daniel

Memo

To: **Andy Carlile, Macleans Waste Management**

From: **Angus Johnston**

Date: **12/01/2018**

RE: **33-37 Plasser Crescent North St Marys – Site Development Application submission responses**

Agency Comment	Response/Action Taken
Penrith Council – letter dated 14 December 2017	
To assess the impact of the development in regards to stormwater management, a Stormwater Concept Plan (SCP) prepared by a suitably qualified person shall be submitted for the proposed works. The design shall generally be in accordance with council's Stormwater Drainage Specification for Building Developments – version 28 November 2016.	Stormwater documents submitted to Council via email correspondence 8th January 2018: • Site concept diagram with environmental controls such as overflow drains and grated drainage pits • Memo regarding Stormwater Concept Plan, referencing Penrith Council's Stormwater Drainage Specification for Building Developments
It is noted that in the Air Quality Impact Assessment (Appendix E of the Environmental Impact Statement (EIS), pg.7) that the nominated operating hours are different to those identified in the EIS. The EIS indicates that the proposed operating hours are Monday to Friday 6:00am to 11:00pm. The Air Quality Report indicates the operating hours are Monday to Friday 6:00am to 6:00pm. This is not consistent, and clarification is required to ensure that the conclusions made in the report accurately reflect the development.	In updating the report and for completeness the model was rerun with the extended operating hours, which has varied the results slightly but not the impact or overall conclusions relating to air quality.

Environmental Protection Authority (EPA) – letter dated 22 December 2017	
1. It is noted that current recycling and waste processing operations, outlined in the document *Environmental Management Plan* dated June 2017 (the EMP) and provided with the application have changed. As such, further information shall be provided to represent current, and proposed operations, including the following: a) A process diagram with details of specific waste streams received, and its processing and/or movement through the proposed mechanical sorting machine located within the current shed.	The EIS has been updated (Figure 5) to include a process diagram with details of movement of waste though the proposed mechanical sorting equipment. The updated floor plan provided by SKALA provides visual depiction of the proposed mechanical sorting machine and its process.
b) Details and plans showing the locations of all waste storage at the Premises including the provision for adequate stockpile separation and the proposed maximum storage limit. During the last EPA inspection, the nonrecyclable material was stored and stockpiled in the approximate location of the proposed internal stairs.	An updated floor plan has been provided by SKALA which indicates the location of all waste storage within the main shed. The Vehicle Path Diagram has been updated to demonstrate the location of outdoor skip bins for temporary storage of sorted steel and sorted timber. Further details regarding waste storage are detailed in section 3.7 of the EIS. All material is contained within the shed (except for two skips containing steel and timber to be stored outside) and is never stored on site for more than 24hrs. Macleans Waste Management will abide by the maximum storage limit as set out in the EPL.
c) The areas defined for unloading and loading of all waste material at the Premises.	An updated floor plan has been provided by SKALA which indicates the location of all waste storage within the main shed respective to internal infrastructure such as the stairs to site office. It also demonstrates the receival and pre-sorting area, and indicative movements for feeding the hopper and retrieval of sorted waste. The tipping and sorting area is also noted in the Environmental Controls diagram submitted to Council 8th January 2018. As shown in the updated Vehicle Path Diagram, waste-laden trucks enter the site through the western gate, pass over the weighbridge, reverse-enter the southern part of the shed, drop the weight then exit via the southern gate in a forward motion passing through a wheel wash (path

	indicated in blue). To collect sorted waste, trucks will enter via the Western gate and reverse-enter the shed via the Southern doors to pick up a full sorted skip, then exit in a forward motion through the Southern gate (path indicated in green).
d) Vehicle movements through the Premises including the weighbridge, the enclosed shed and the wheel wash.	Vehicle movements through the proposed wheel wash are depicted in an updated Vehicle Path Diagram.
e) A detailed design of the wheel wash and any additional impacts or demands on waste management at the Premises that may include increased sediment loading in the stormwater system due to increased traffic.	As outlined in section 3.8.2 of the EIS, the proposed wheel wash is a closed system with a water recycling option and therefore minimises the impact of truck-laden sediment on the stormwater network. The wash water is captured via drains and pumped to an above-ground filter recycling unit (1,000L) which reduces the amount of water used by the system. A detailed design of the wheel wash is not available at this point, but can be provided to the EPA upon request following confirmation of the supplier. We have confirmed that there is room to install a commercially available wheel wash in the location proposed.
2. A negative pressure system is considered best practice for controlling emissions and restricting dust movement within enclosed structures and is strongly recommended for the proposal.	Section 7.4 of the EIS outlines the existing and proposed air extraction systems in place to control emissions. The air filtration unit utilised by Macleans Waste Management is suitable for a negative pressure system as it uses induced draft fans. The EIS proposes that the western door to the sorting shed are closed while waste sorting activities are occurring, which will create negative pressure. A detailed Air Quality Impact Assessment was prepared and accompanies the EIS. It included assessment of potential air quality impacts and associated mitigation and management measures.
3. Additional information relating to stormwater management, including: a) Further details of the Premises capacity to manage and control all surface water and runoff at the Premises within the addition of a wheel wash.	Stormwater documents submitted to Council via email correspondence 8th January 2018: • Site concept diagram with environmental controls such as overflow drains and grated drainage pits

Consideration should be made in relation to the Premises being located in a flood prone area	• Memo regarding Stormwater Concept Plan, referencing Penrith Council's Stormwater Drainage Specification for Building Developments Following a flood study and updated flood levels for the Little Creek catchment, Penrith Council issued revised Flood Information for the site on 31st May 2017. Review of this information has identified that the site is not located on flood prone land.
b) Confirmation that all waste materials (other than Virgin Excavated Natural Material) are stored within the shed at the Premises	As outlined in section 3.7 of the EIS, all waste materials (other than sorted timber and steel) are stored within the shed at the premises. In adhering to Condition 9 within the DA, all waste materials stored on-site are contained within a designated area such as a waste bay or bin to ensure that no waste materials are allowed to enter the stormwater system or neighbouring properties. The Vehicle Path Diagram has been updated to demonstrate the location of temporary outdoor skip bins for sorted steel and sorted timber.

Roads and Maritime Services (RMS) - letter dated 22 December 2017	
1. The swept path of the longest vehicle entering and exiting the subject site, as well as maneuverability through the site, should be in accordance with AUSTROADS. In this regard, a plan is to be submitted to Council, which shows that the proposed development complies with this requirement.	The attached Vehicle Path Diagram includes reference to the Actros vehicle specified for the site.
2. A Construction Traffic Management Plan detailing construction vehicle routes, number of trucks, hours of operation, access arrangements and traffic control should be submitted to Council for determination prior to the issue of a Construction Certificate.	A Construction Traffic Management Plan will be prepared and submitted to Council prior to the issue of the Construction Certificate.
3. All vehicles are to enter and exit the site in a forward direction. Provision for vehicles to turn around must be provided within the property	There is inadequate space for trucks to turn around within the property with the only solution being demolition of the existing site shed. As can be seen in the Vehicle Path diagram, careful consideration has been made to utilise access and egress points so that trucks move in a forward direction when entering and existing the site and only reverse into the shed for material loading/unloading. As shown in the updated Vehicle Path Diagram, waste-laden trucks enter site through the western gate, pass over the weighbridge, reverse-enter the southern part of the shed, drop the weight then exit via the southern gate in a forward motion (passing through a wheel wash). To collect sorted waste, trucks will enter via the Western gate and reverse-enter the shed via the Southern doors to pick up a full sorted skip, then exit in a forward motion through the Southern gate (path indicated in green).