



29 July 2019

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Dear Hugh

Cleanaway New Chum Environmental Monitoring 2018 Annual Environmental Monitoring Summary 2018

1 Introduction

GHD Pty Ltd (GHD) was commissioned by Cleanaway Solid Waste Pty Ltd (Cleanaway) to conduct environmental monitoring and reporting for the January 2018 to December 2018 reporting period at the licensed waste disposal facility (WDF) at 100 Chum Street, New Chum (Lots 268 and 227 on SP 103913). A site plan identifying the site boundary and monitoring locations included in this monitoring program is provided as Appendix A.

The monitoring program has been established to assess compliance with the relevant conditions of the Environmental Authority (licence) EPPR00445713. This licence was issued by the Department of Environment and Science (DES) on 1 May 2019, under the provisions of the *Environmental Protection Act 1994*.

This report summarises the environmental monitoring undertaken by Cleanaway's third party consultants during the January 2018 to December 2018 reporting period. It is noted that a discussion of the field and analytical results is provided in the relevant quarterly monitoring reports for this reporting period as shown in the report register Table 2).

2 Regulatory compliance

This annual reporting summary is in compliance with the requirements of Schedule H4 of the licence as outlined below:

- *Any monitoring data compiled, collected or recorded as required by conditions of this environmental authority must be evaluated, summarised and reported to the administering authority on an annual basis with the annual return. Each annual monitoring report must be given to the administering authority with the annual report in a clear summarised format...*

3 Environmental monitoring events and reports

3.1 Environmental monitoring conducted by GHD

The environmental monitoring conducted by GHD at the New Chum WDF during the January 2018 to December 2018 reporting period is summarised in Table 1.

Table 1 Summary of monitoring events

Monitoring Date	Groundwater	Surface Water	Leachate	Landfill Gas
4 to 5 June 2018 and 2 July 2018	✓	✓	✓	
6 June 2018				✓
13 to 15 August 2018	✓	✓	✓	
31 October to 2 November 2018	✓	✓	✓	
1 November 2018				✓
18 to 19 December 2018	✓	✓	✓	

A summary of the reports generated by GHD during the January 2018 to December 2018 reporting period are provided in Table 2.

Table 2 Report register

Monitoring Event	Report Title	Document Reference
4 to 5 June 2018 and 2 July 2018	New Chum Waste Disposal Facility Environmental Monitoring June / July 2018 Monitoring Event	4131825-REP-0-June 2018 New Chum Monitoring Report.docx
	Exception Reporting Form	4131825-REP-0_Exception Report June and July 2018.docx
6 June 2018	New Chum Waste Disposal Facility Landfill Gas Monitoring Report - June 2018	4131825-LET-1 New Chum Landfill Gas Letter June 2018.docx
13 to 15 August 2018	New Chum Waste Disposal Facility Environmental Monitoring August 2018 Monitoring Event	4131825-REP-0-August 2018 New Chum Monitoring Report-1.docx
	Exception Reporting Form	4131825-REP-A_Exception Report August 2018.docx
31 October to 2 November 2018	New Chum Waste Disposal Facility Environmental Monitoring November 2018 Monitoring Event	4131825-REP-0-November 2018 New Chum Monitoring Report.docx
	Exception Reporting Form	4131825-REP-A_Exception Report November 2018.docx

Monitoring Event	Report Title	Document Reference
1 November 2018	New Chum Waste Disposal Facility Landfill Gas Monitoring Report - November 2018	4131825-LET-0 New Chum Landfill Gas Letter November 2018.docx
18 to 19 December 2018	New Chum Waste Disposal Facility Environmental Monitoring December 2018 Monitoring Event	4131825-REP-0-December 2018 Monitoring Report.docx
	Exception Reporting Form	4131825-REP-A_Exception Report December 2018.docx
January to December 2018	New Chum Waste Disposal Facility Environmental Monitoring 2018 Annual Groundwater Surface Water and Leachate Monitoring Report	4131825-REP-A-Groundwater Surface Water and Leachate Annual Report-2018.docx

3.2 Environmental monitoring and reporting by other parties

A summary of environmental monitoring and reporting undertaken by other parties in the January 2018 to December 2018 monitoring period is presented in Table 3.

Table 3 Additional monitoring and reporting register

Monitoring Event/Report	Date/Reference	Relevant EA Condition
Waste Composition Survey Report	Waste Composition Survey Report – September 2018 (Letter Report by Epic Environmental BE180201.01_ltr_CWM - Waste Composition Survey - Sep 2018 dated 30 October 2018)	Not specified
Waste Composition Survey Report	Waste Composition Survey Report – December 2017 (Letter Report by Epic Environmental BE180201.01_ltr_CWM - Waste Composition Survey - Dec 2018 dated 19 December 2018)	Not specified
Dust and Particulate Monitoring	Cleanaway New Chum Landfill: Dust Monitoring Report (Report D17095-8 by Katestone Environmental Pty Ltd . dated 28 September 2018)	A2 to A5
Airborne Contaminant Exposure Testing	Airborne Contaminant Exposure Testing conducted at the Cleanaway New Chum Landfill Site (Test Report No. DEC18226.1 by Air Labs Environmental Pty Ltd date of testing 05 and 06 December 2018, report dated 9 January 2019)	H1
Dust Deposition Monitoring	Compliance monitoring conducted at the New Chum Landfill Landfill conducted on 12 December 2018 by Epic Environmental	A2 to A5

4 Environmental monitoring summary

The field and analytical parameters measured for groundwater, surface water and landfill gas during the January 2018 to December 2018 reporting period were generally consistent with the respective datasets and as such typically complied with the licence criteria. Exceptions to these consistent results and a brief description of the respective monitoring events are outlined sections 4.1 to 4.4 below.

4.1 Groundwater

A groundwater statistical assessment is undertaken following each monitoring event. In order to assess whether there has been a statistically significant increase in any groundwater parameter above background water quality data, the result for each well is compared to the mean (\bar{x}) and standard deviation(s) of historical results for that parameter. The adopted Site Criteria are:

- 5 consecutive exceedances of the $\bar{x}+s$ control line (Site Criteria 1)
- 2 consecutive exceedances of the $\bar{x}+2s$ control line (Site Criteria 2)
- 1 exceedance of the $\bar{x}+3s$ control line (Site Criteria 3).

Exceedances of the above site criteria (statistically significant results) for the January to December 2018 reporting period are summarised in Table 4.

Table 4 Statistically Significant Groundwater Results

Monitoring Event	Monitoring Location	Parameter	Concentration	Exceedance
4 to 5 June 2018 and 2 July 2018	Up gradient well BH06	Zinc	0.434 mg/L	Site Criteria 3
13 to 15 August 2018	Up gradient well BH06	Zinc	0.172 mg/L	Site Criteria 2 and 3
31 October – 2 November 2018	No statistically significant groundwater results			
18 to 19 December 2018	Boundary well BH11	Nitrate as N	0.27 mg/L	Site Criteria 3
	Down gradient well BH12	Nitrate as N	1.3 mg/L	Site Criteria 3

A discussion of the statistically significant groundwater monitoring results measured during the respective quarterly groundwater monitoring events are included in the relevant reports summarised in the report register in Table 2. Key trends are summarised in the following sections.

The inferred groundwater contours and flow direction was relatively consistent with historical observations, with a relatively shallow groundwater gradient across the site. It is noted that the standing groundwater at all locations have been following a general increasing trend since 2011. Inferred groundwater contours established following the completion of each monitoring round typically showed

groundwater in the northern portion of the site was flowing in a general north easterly direction whilst groundwater in the southern portion of the site was flowing in a general south easterly direction.

Field results throughout the 2018 reporting period were generally within historical variations, with the exception of electrical conductivity (EC) results at up gradient well BH06, which reported an EC concentration of 2,860 $\mu\text{S}/\text{cm}$ in June 2018, the lowest EC result reported since March 2008. EC at this location has been following a decreasing trend since December 2016, consistent with gradually decreasing chloride concentrations at this location.

A gradual increase was noted for iron and a decrease for zinc noted across all monitoring locations. Zinc concentrations appear higher at the up gradient wells, particular BH06, compared to the other well locations. Zinc results at up gradient BH06 have been following a decreasing trend since September 2015, however remained above Site Criteria 2 and 3 during the June/July and August 2018 reporting periods. It is noted that zinc at BH06 has typically displayed some fluctuation in concentrations over the historical groundwater dataset. The elevated zinc concentrations at this location are likely attributed to geological conditions rather than an indication of recent impact from the landfill, as:

- While results were statistically significant in the June/July and August 2018 monitoring events, the zinc concentration increases were reported within historical variation at this location and decreased in subsequent monitoring events (November and December 2018).
- Statistically significant results were not reported for any other parameter at BH06 in the June/July and August 2018 monitoring events.
- The highest zinc concentrations at the site typically detected BH06, which is considered to be up hydraulic gradient of the landfill.

Organic indicator results were generally consistent with historical concentrations, with a slight decreasing trend noted for nitrate and nitrite noted across all well monitoring locations. Statistically significant results were reported for nitrate at cross gradient / boundary well BH11 and down gradient well BH12 in December 2018, with a peak in concentrations also noted at both locations. It is noted that nitrate as N concentrations have fluctuated across the historical groundwater datasets and whilst the nitrate results are statistically significant, all other analytes at these wells were reported within historical variation (including ammonia). It is further noted that the actual nitrate concentrations were relatively low (0.27 mg/L and 1.3 mg/L). Based on the above, these results are not considered to be indicative of recent deterioration of groundwater quality from impact by the landfill, however nitrate results at these locations will be reviewed in subsequent monitoring events.

Upon review of these key trends and on the basis of the scope of the current monitoring program, there does not appear to be a demonstrable deterioration in groundwater quality or increasing trends in contaminant concentrations that require further investigation or management action at this point in time. Nitrate concentrations at BH11 and BH12 should be reviewed following the next monitoring event. Should elevated nitrate concentrations persist at these locations further assessment may be required.

4.2 Surface water

Two nominated discharge points are present at New Chum: CHUM POND and SED-1. Discharge was observed by GHD at SED-1 during the 31 October to 2 November 2018 monitoring event. Whilst all

exceedances of the EA condition WT1 have been presented for completeness, exceedances of the water quality conditions are only considered to be non-compliant with the EA if releases / discharge was noted at the time of sampling. Therefore the surface water discharge location results only exceeded the WT1 criteria of the EA in the monitoring event conducted between 31 October and 2 November 2018.

Table 5 presents a summary of the results from the nominated discharge points which were elevated above the criteria noted in condition WT1 of the EA.

Table 5 Surface water licence criteria exceedances

Monitoring Event	Monitoring Location	Parameter	Concentration	Quality characteristic limit / exceedance	Discharge Noted	Exceedance of EA criteria
4-5 June 2018 and 2 July 2018	CHUM POND	pH	9.11 pH units	6.5-9.0 pH units	No	No
		Total suspended solids	362 mg/L	50 mg/L	No	No*
	SED-1	Specific Conductance	3,501 µS/cm	10% greater than upstream location (SMC)	No	No*
14-15 August 2018	SED-1	Specific Conductance	3,800 µS/cm	10% greater than upstream location (SMC)	No	No*
31 October-2 November 2018	CHUM POND	Dissolved oxygen	4.62 mg/L	>6 mg/L	No	No*
	SED-1	Specific Conductance	3,049 µS/cm	10% greater than upstream location (SMC)	Yes	Yes
18-19 December 2018	CHUM POND	Dissolved oxygen	5.24 mg/L	>6 mg/L	No	No*
		Specific conductivity	1,167 µS/cm	More than 10% of the up current receiving waters (SMC)	No	No*
	SED-1	Dissolved oxygen	5.6 mg/L	>6 mg/L	No	No*
		Specific conductivity	3,685 µS/cm	More than 10% of the up current	No	No*

Monitoring Event	Monitoring Location	Parameter	Concentration	Quality characteristic limit / exceedance	Discharge Noted	Exceedance of EA criteria
				receiving waters (SMC)		

Notes

- * = Exceedances of the water quality conditions are only considered to be non-compliant with the EA if releases / discharge was noted at the time of sampling.

Water was noted to be discharging from SED-1 (to Void 10 via a pipe which runs between the two locations) in the November 2018 monitoring event. The specific conductivity at SED-1 (3,049 $\mu\text{S}/\text{cm}$) was greater than 10% of the up current receiving waters (SMC, 1,049 $\mu\text{S}/\text{cm}$) during this monitoring event.

A review of DIS (Void 10 sampling location, downstream of SED-1) results indicates that specific conductivity (1,599 $\mu\text{S}/\text{cm}$) was within 10% of upstream location SMC in the November 2018 sampling event. All other analytes at DIS were also comparable with that reported at upstream sampling location SMC. Based on these water quality results, the exceedance of the quality characteristic limit at SED-1 in November 2018 does not suggest an impact to the receiving environment as a result of routine discharge from the site. No other discharges were noted during sampling in the current reporting period. As such, the remainder of exceedances of the quality characteristic limits are not considered to be exceedances of the EA.

Exceedances of the adopted guideline values occurred for pH, dissolved oxygen, specific conductivity, total iron, zinc, ammonia as N and nitrate as N at one or more surface water sampling locations throughout the 2018 reporting period. Exceedances of the adopted guideline values at downstream sampling location DWN occurred for total iron, ammonia as N and nitrate as N. These analytes were all reported at lower or similar concentrations ranges to the upstream sampling location SMC in the monitoring events in question.

Surface water analytical results were generally consistent with historically reported concentrations and trends, with the exception of a reduction in major ions, TDS and specific conductivity concentration and a gradual increasing TOC trend at downstream sampling location DWN. In addition to a peak ammonia concentration reported at SED-1 (discharge location) was recorded in December 2018. Whilst it is noted that downstream location DWN reported some variation in major ions and TOC, the reported values were similar to other sampling locations at the site (including upstream location SMC). It is also noted that major ions have historically fluctuated at this location. The elevated ammonia concentration at SED-1 in December 2018 was not evident at downstream location DWN, which reported results within historical variation and at a similar concentrations to the upstream location SMC.

4.3 Leachate

At present six data points are available for leachate ponds LPond1 and LPond2 and two data points are available for leachate sumps L Cell 5A, LCell 4A/5B and LCell99. Therefore limited assessment of leachate data and commentary regarding trends is currently able to be undertaken.

Analytical results from the leachate ponds continue to fluctuate. Notable trends at both leachate ponds include a decrease in pH, DO, sulfate; and an increase in potassium, chloride and total iron concentrations. A peak in ammonia as N, total oxidised nitrogen, nitrate as N and nitrite as N was noted at both ponds during the reporting period. Rising ammonia as N levels are to be expected as the landfill matures.

4.4 Landfill Gas

Annual landfill gas monitoring was conducted at the New Chum WMF by GHD on 6 June and 1 November 2018. Each monitoring event included monitoring at the following locations:

- Ambient landfill gas monitoring across the surface of Cell 1, Cell 5 and the northern portion of Cell 2.
- Ambient landfill gas monitoring at 18 boundary locations (BDY-01- BDY-18).

Based on observations during the June and November 2018 monitoring events and the monitoring data obtained, the following conclusions were made:

- Ambient methane concentrations across the surface of Cell 1 and Cell 5 were below the licence criteria.
- Methane concentrations at the boundary locations were generally less than the adopted site criteria with recorded concentrations less than the detection limit of the Eagle gas meter. Boundary monitoring locations BDY-13 was the only location which returned a value of 5 ppm in June 2018. In November 2018; six out of the eighteen boundary monitoring locations returned methane positive values ranging between 5 ppm (BDY-18) and 75 ppm (BDY-2).

4.5 Dust and particulate monitoring

Katestone Environmental Pty Ltd (Katestone Environmental) and Epic Environmental Pty Ltd (Epic Environmental) were engaged by Cleanaway to undertake dust and particulate monitoring at the New Chum WDF in 2018. The following considers information and monitoring data presented in the following reports:

- Katestone Environmental report dated 29 September 2018 titled "*Cleanaway New Chum: Dust Monitoring Report*".
- Epic Environmental dust and silica monitoring results dated 12 December 2018.

The dust and particulate monitoring events conducted during the 2018 reporting period are as follows:

- Three consecutive months of dust and particulate matter PM₁₀ monitoring were undertaken between 21 May 2018 and 20 August 2018. This monitoring was undertaken by Katestone Environmental for dust deposition and particulate matter PM₁₀, in response to communications from the Department of Environment and Science (DES) dated 15 March 2018 regarding dust complaints.

- Monitoring Event # 21.5.18-19.6.18
- Monitoring Event # 19.6.18-19.7.18
- Monitoring Event # 21.8.17-26.9.17.
- One monitoring event conducted by Epic Environmental between November and December 2018:
 - Monitoring Event # 12.11.18-11.12.18.

4.5.1 Dust and particulate monitoring (May – August 2018) Katestone Environmental

The dust deposition sample methodology detailed by Katestone Environmental were in accordance with Schedules A2 to A5 of the EA and were generally in accordance with the requirements of *Australian Standard AS 3580.10.1 Methods for sampling and analysis of ambient air, Method 10.1: Determination of particulate matter – Deposited matter – Gravimetric method* (2003). Monitoring was undertaken at monitoring locations as follows (Figure 3, Appendix A);

- Twelve dust deposition gauges (ND1 to ND12) located within and near the New Chum landfill.
- An additional dust deposition location (CP01) located with particulate matter instruments to the east of the landfill, near sensitive receptors (i.e. residential properties).
- Two PM₁₀ real-time samplers (DMP6150 and DMP6200) located to the east and west of the landfill in close proximity with sensitive receptors (i.e. residential properties)
- One PM₁₀ high volume sampler colocated with PM₁₀ real-time sampler (DMP6150) to the east of the landfill.

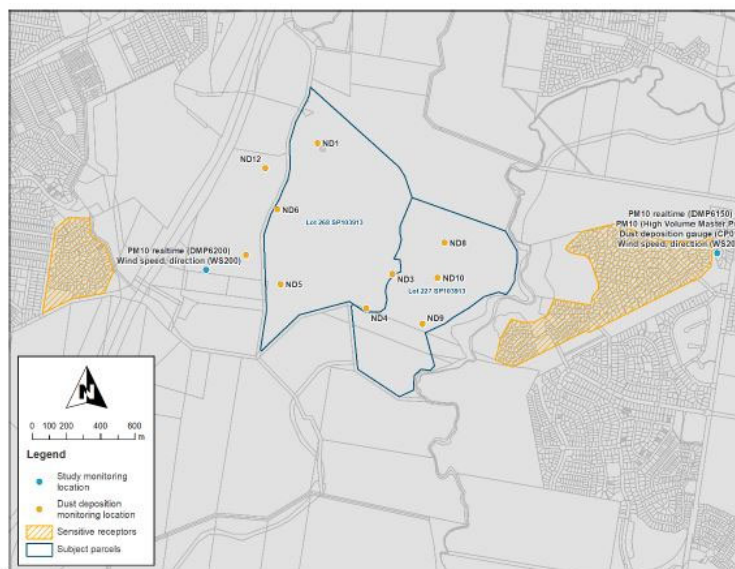


Figure 1 Sensitive receptors, dust and PM₁₀ monitoring locations (Katestone 2018, Cleanaway New Chum Landfill: Dust Monitoring Report – Final, P.3)¹

¹ Dust monitoring location ND11 not presented on figure; refer to Appendix A Figure 3 for ND11 location.

The sample bottles were submitted to Simtars (Safety in Mines Testing and Research Station) and ALS Environmental (both NATA accredited) for depositional dust analysis which included; total solids, soluble matter, total insoluble matter, combustible matter, ash content, silica and calculated rainfall/volume.

In the absence of specified licence criteria, the results were compared to a guideline value of 120 mg/m²/day. This value is sourced from the Queensland Department of Environment and Heritage Protection (EHP) *Guideline, Application requirements for activities with impacts to air, Version 2, April 2014* which incorporates trigger levels consistent with the environmental objectives of the QLD, Environmental Protection Policy (Air) 2008. This has been adopted as a trigger value, which if exceeded may cause nuisance at a sensitive receptor such as a residence or sensitive commercial land use. Total insoluble solids results that exceeded the above adopted guideline criteria are summarised in Table 6.

Table 6 Dust (as total insoluble solids) that exceeded adopted guideline levels

Monitoring Event	Location	Result (g/m ² /day)
21.5.18-19.6.18 (May – June)	ND05	191
	ND06	191
	ND11	166
19.6.18-19.7.18 (June – July)	ND06	167
	ND11	144
21.8.17-26.9.17 (July – August)	ND05	194
	ND06	231
	ND11	197

Notes: Results shaded as thus **BOLD** represent total insoluble matter results greater than adopted guideline level of 120 mg/m²/day.

Results indicate the following:

- Monitoring was conducted in general accordance in the frequency required by EA condition A4; dust deposition for a frequency of 30 days + / - 2 days with monthly collection and data analysis; and a frequency of 24-hour for a duration of 3 months for particulate matter PM₁₀.
- Dust deposition trigger level of 120 mg/m²/day was exceeded at gauge ND05 in two instances (May-June and July-August), and at ND06 and ND11 in all three monitoring events.
- Gauges ND05 and ND06 are located within the site boundary, within the immediate landfill works area and external dust sources (e.g. ND5 is approximately 15 m from Chum Street). According to Katestone the trigger level exceedance does not constitute a breach of EA.
- Dust deposition rates at ND11 exceeded the 120 mg/m²/day for all three monitoring events. Cleanaway advised that earthworks were occurring within 5 metres of this dust monitoring gauge location, thus the elevated dust results.

- Dust deposition results at CP01, located near sensitive receptors (i.e. residential properties) east of the landfill were below the trigger level (120 mg/m²/day) during the monitoring period.
- The 24 hour average PM₁₀ concentration recorded at DMP6150 and DMP6200 photometers (east and west of the landfill respectively) were below the 24-hour average trigger level of 50 µg/m³.

4.5.2 Dust and silica monitoring results (November – December 2018) Epic Environmental

Dust as total insoluble and silica deposition results were provided by Epic Environmental in December 2018, reflective of the November – December 2018 monitoring period. Exceedances of the trigger level of 120 mg/m²/day was observed at dust gauge monitoring locations ND05, ND06 and ND12 as shown in Table 7.

Table 7 Dust (as total insoluble solids) that exceeded adopted guideline levels

Monitoring Event	Location	Result (g/m ² /day)
12.11.18-11.12.18.	ND5	283
	ND6	293
	ND12	859

Notes: Results shaded as thus **BOLD** represent total insoluble matter results greater than adopted guideline level of 120 mg/m²/day.

4.6 Waste composition surveys

Epic Environmental was engaged by Cleanaway to undertake waste composition surveys at the New Chum WDF on 5 and 6 September 2018, and 3 and 4 December 2018.

The September 2018 survey results reported that the greatest portion of waste material received at the facility was construction and demolition waste dominated by brick waste. A total of 15 of 115 loads received at the facility over the September survey period were observed to contain regulated waste comprising of asbestos material and asbestos contaminated soil coming.

The December 2018 waste survey results reported that the greatest portion of waste material received at the facility was construction and demolition waste comprising predominantly wood and bricks. A total of 26 loads of regulated waste (22.6% by total load numbers received) was received during the December 2018 survey period was predominantly containing asbestos and mineral fibre waste and asbestos contaminated soil.

No non-compliances of waste acceptance criteria was reported during both the September and December 2018 surveys.

5 Conclusion

The frequency of the environmental monitoring conducted at the New Chum WDF during the January to December 2018 reporting period was in accordance with the relevant Schedules of the Environmental

Authority. This included quarterly groundwater and surface water monitoring and annual leachate, landfill gas monitoring and dust monitoring; additional to waste composition and an airborne contaminant exposure testing survey.

The field and analytical results measured during these environmental monitoring events were generally consistent with the respective datasets at individual monitoring locations and therefore typically complied with the licence criteria. The only exceptions to the consistent results were the statistically significant groundwater results highlighted in Table 4, surface water results presented in Table 5 and dust monitoring results presented in Table 6 and Table 7.

Groundwater

On the basis of the current monitoring program, there does not appear to be any previously unidentified deterioration in groundwater quality or increasing trends in contaminant concentrations that require further investigation or management action at this point in time.

Fluctuating zinc results during 2018 are considered to be attributed to regional geological conditions and not a result of impacts from the landfill based on multiple lines of evidence outlined in this report.

Other statistically significant results this reporting period (Nitrate as N at BH11 and BH12) are not currently considered to present a cause for concern at this point in time. Nitrate at these wells should be closely scrutinised during future monitoring events.

Surface Water

In summary, surface water results for the 2018 monitoring period were generally consistent with historically reported concentrations and trends. The major exception to this is a reduction in major ions, TDS and specific conductivity concentration and a gradual increasing TOC trend at downstream sampling location DWN, in addition to a peak ammonia concentration reported at SED-1 (discharge location). Whilst it is noted that downstream location DWN reported some variation results were at a lower or similar concentrations to those reported at upstream location SMC. Based on the aforementioned, the 2018 reporting period surface water results are not considered to be indicative of any recent deterioration in surface water quality in the receiving environment (as a result of routine discharge from the site).

The nominated discharge locations (SED-1 and CHUM-POND) were assessed against the EA requirements. Both locations reported exceedances of water quality characteristic limits for specific conductivity and dissolved oxygen. With the exception of the November 2018 event, no discharge was observed to be occurring from either location during sampling, therefore these results are not considered to be an exceedance of the EA (and have been presented for completeness only). In November 2018, water was noted to be discharging from SED-1 (to Void 10 via a pipe which runs between the two locations), therefore the exceedance of the specific conductivity criteria at SED-1 was non-compliant with the EA conditions. However, no impact to the receiving environment was noted.

Leachate

Analytical results from the leachate ponds continue to fluctuate. Notable trends at both leachate ponds include a decrease in pH, DO, sulfate; and an increase in potassium chloride and total iron concentrations. A peak in ammonia as N, total oxidised nitrogen, nitrate as N and nitrite as N was noted

at both ponds during the reporting period. Rising ammonia as N levels are to be expected as the landfill matures.

Landfill Gas

Landfill gas monitoring complied with the licence criteria in both landfill gas monitoring events in 2018. It is noted that this landfill gas monitoring was undertaken at ambient surface locations around the perimeter of the landfill and at ambient landfill gas monitoring across the surface of Cell 1, Cell 5 and the northern portion of Cell 2 and did not include any sub-surface landfill gas monitoring. Future consideration should be given to monitoring the recently installed network of perimeter landfill gas monitoring wells to monitor landfill gas at depth, rather than continuing to undertake ambient boundary landfill gas monitoring in the future. This will provide an indication on the potential for sub-surface landfill gas migration.

Dust

Dust results (reported as insoluble matter) exceeding the adopted guideline levels were reported at a number of monitoring locations over the 2018 reporting period. Exceedances of the adopted guideline level of 120 mg/m²/day was observed at a number of locations; however guideline/trigger value exceedances do not necessarily indicate non-compliance with the licence conditions as nuisance is measured at the receiver not at the point of generation. The results of the dust monitoring locations positioned closer to the potential sensitive receptors typically did not exceed the adopted criteria during the reporting period.

Waste composition

A waste composition survey was undertaken twice in the reporting period (September and December 2018) for an eight-hour period within four consecutive days in accordance with condition 1-H18 and 1-H19 of the New Chum WDF EA requirements. Waste survey results for both September and December 2018 survey periods, that the greatest portion of waste material received at the facility was construction and demolition waste. No non-compliances of waste acceptance criteria was observed during both (September and December 2018) survey periods.

Other Environmental Monitoring

In addition to environmental monitoring undertaken by GHD and the dust monitoring undertaken by Katestone Environmental and Epic Environmental during the 2018 reporting period, Cleanaway also commissioned an airborne contaminant exposure testing survey.

Overall Conclusion

On the basis of the nature, extent and frequency of the current monitoring program, there does not appear to be any previously unidentified deterioration in groundwater or surface water quality or increasing trends in contaminant. Nitrate concentrations at BH11 and BH12 following the next monitoring event should be reviewed and if trends continue, additional assessment undertaken. Should elevated nitrate concentrations persist at these locations it would be worthwhile considering additional analysis of nitrogen species to assist in determining the cause of these elevated results.

Cleanaway should maintain the vegetation and other growth from the batters as vegetation with deep roots have the potential to undermine the capping layer. Vegetation also makes determination of cracking or other undesirable outcomes such as erosion more difficult to determine. Grasses, kept to a reasonable height is the recommended covering crop

Sincerely
GHD

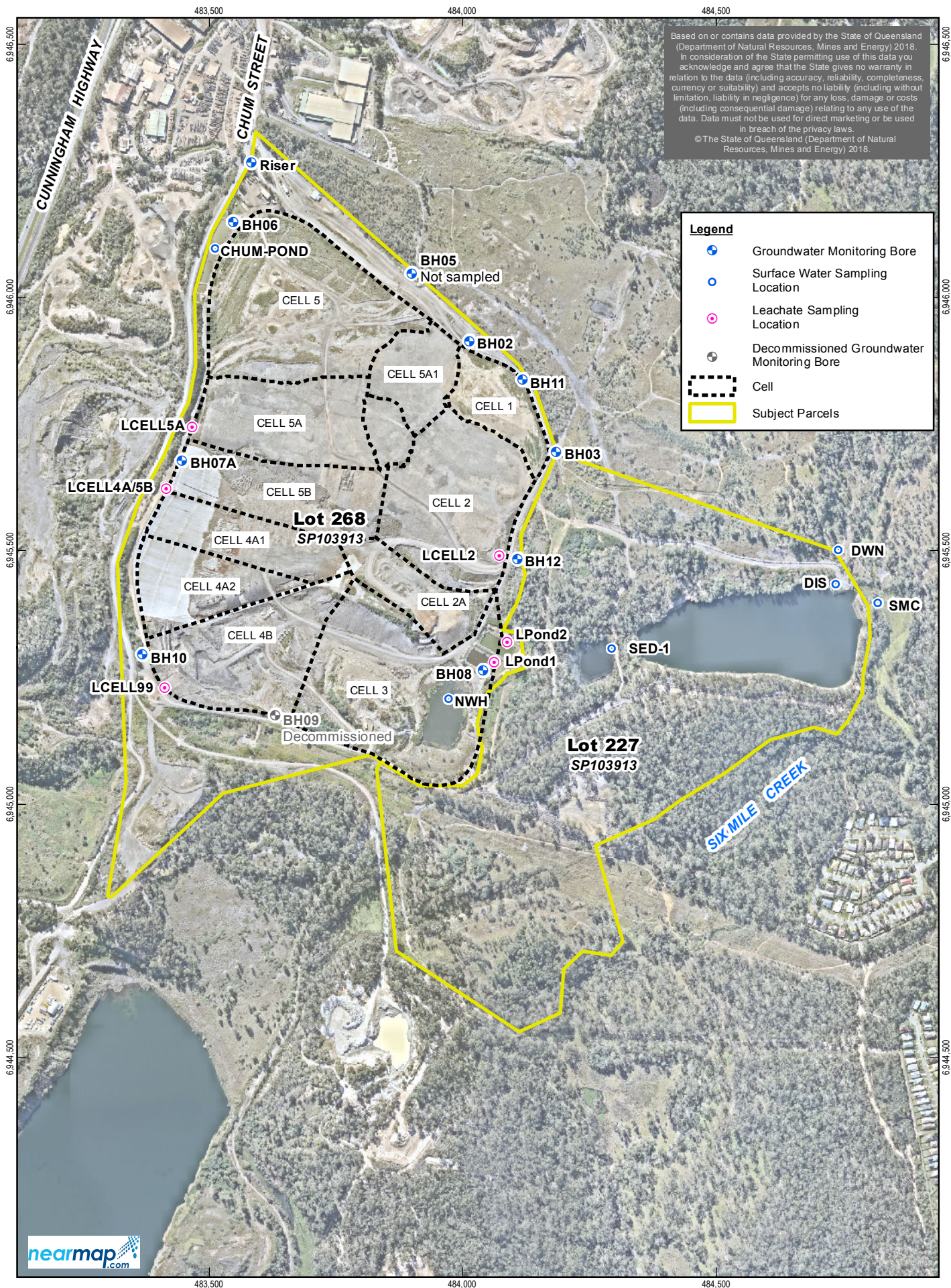


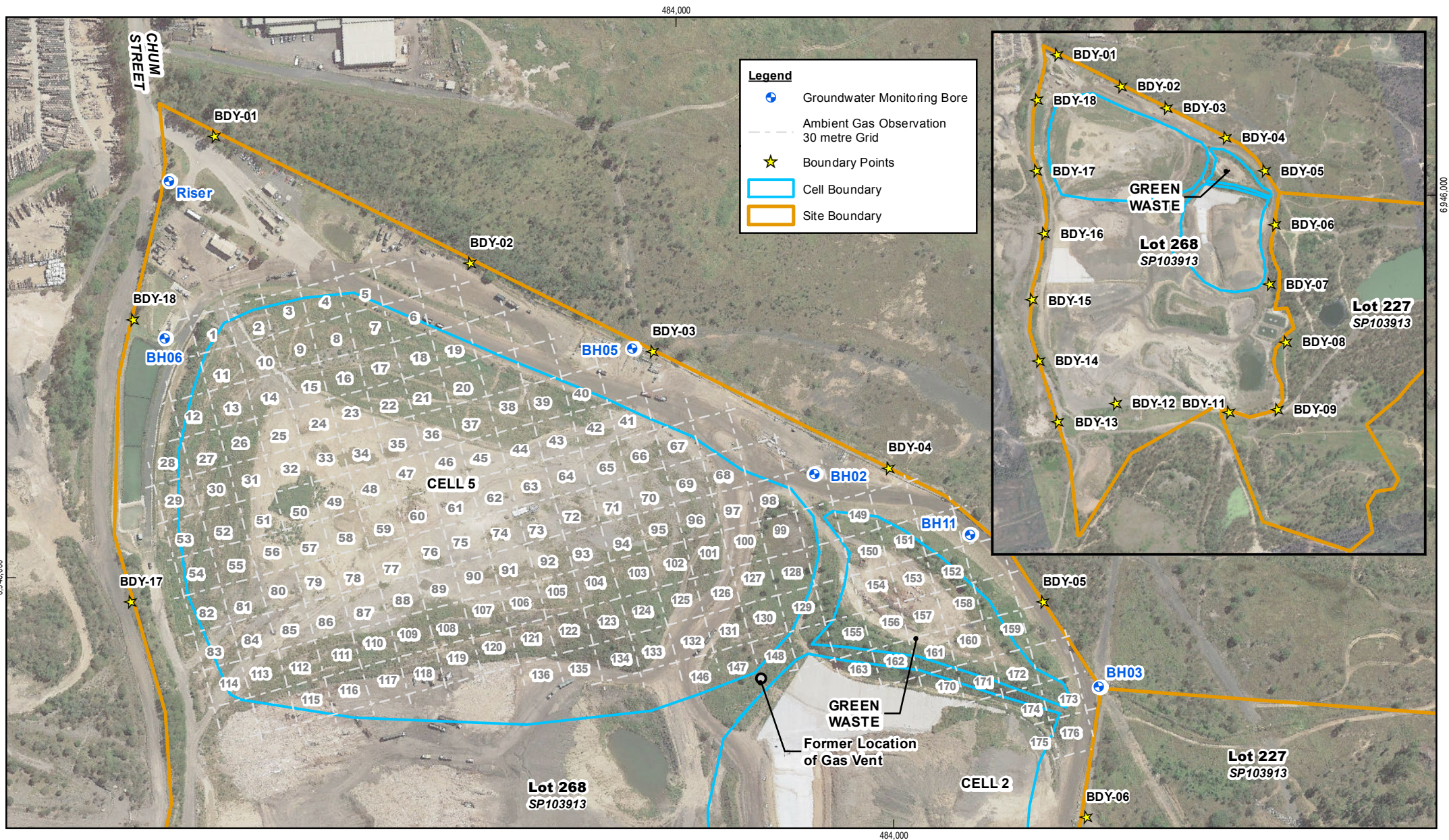
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Appendix A – Figures





Cleanaway Waste Management Limited
Lot 268 & 227 on SP103913,
100 Chum Street, New Chum, 4303.

Job Number	41-31825
Revision	A
Date	07 Aug 2018

Ambient Gas Monitoring Locations (2018)

Figure 2

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Data source: DNRME: cadastre (2016), NearMap: aerial imagery (Feb, 2016, extracted May 2016). Created : tngavranic

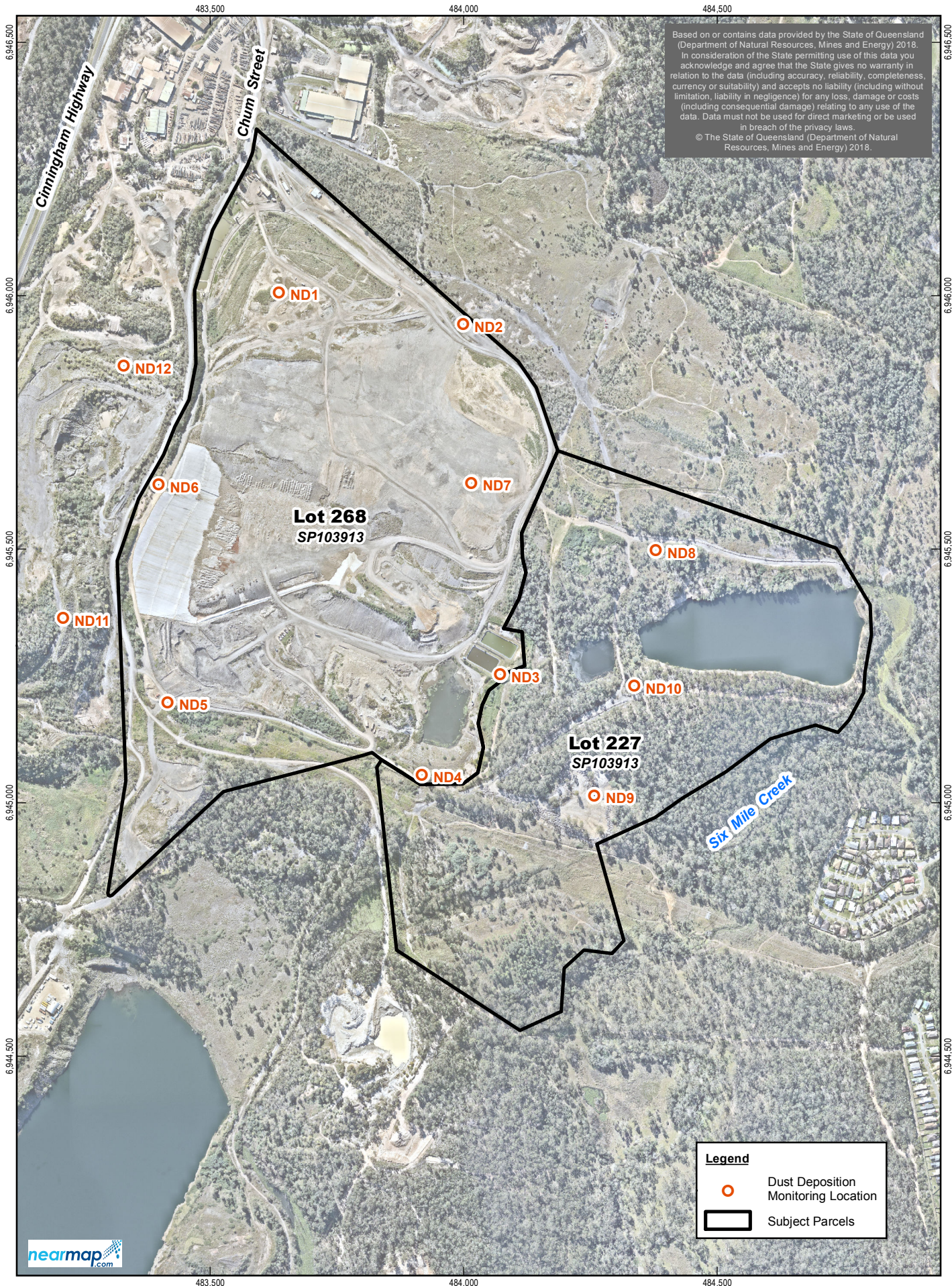


Figure 3