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14th April 2022

Attention: Mr Simon Chapman

Dear Sir

New Nambucca Waste Management Facility Landfill Monitoring Program EPA Annual Return – 01 March 2021 to 28 February 2022

The EPA Annual Return for the landfill monitoring program at the New Nambucca Waste Management Facility (NNWMF) is provided below. The Annual Return covers the period 01 March 2021 to 28 February 2022, and has been prepared in accordance with the requirements set out in the Environmental Protection Authority (EPA) Annual Return correspondence forwarded to Nambucca Valley Council for the subject period.

A. LICENCE DETAILS

A1. Licence Holder

Licence Number	11386
Licence Holder	Nambucca Valley Council
ABN	71 323 535 981

A2. Premises to which Licence Applies

New Nambucca Waste Management Facility Cnr Wirrimbi Road and Old Coast Road, Nambucca Heads, NSW, 2448

A3. Scheduled Activities to which Licence Applies

Waste Disposal (Application to Land) Waste Storage Waste Processing (Non-Thermal Treatment)

A4. Other Activities

Not Applicable

A5. Fee Based Activity Classification

Waste Disposal – Application to Land Waste Storage – Other Types of Waste Non-Thermal Treatment of General Waste

A6. Assessable Pollutants

Not Applicable

B. MONITORING AND COMPLAINTS SUMMARY

B1. Number of Pollution Complaints

Discussions with Mr Simon Chapman from Nambucca Valley Council confirmed that no pollution complaints have been received for the New Nambucca Waste Management Facility during the subject Annual Return period.

B2. Concentration Monitoring Summary

Water-Based Concentration Monitoring

A summary of the water-based concentration monitoring results for the site is provided in Attachment A.

The summary data is generally in the same format as shown in the EPA Annual Return correspondence, except for the following differences:

- The results from each monitoring round are also included in the summary tables to provide a single reference point for any future review of the results.
- The order of the parameters given in the summary sheets has been established to assist in the analysis of the parameters, and may not be in the same order as the EPA correspondence.

The monitoring regime for surface water was changed on 01/04/2009 from a quarterly fixed date to a quarterly special frequency event, so as to ensure samples could be consistently taken at the surface water monitoring sites. The surface water monitoring is now carried out for the first rainfall event each quarter, where at least 30 mm of rain falls over a 24 hour period.

There are no requirements to take the leachate and groundwater samples based on specific events (e.g. rainfall periods), and the leachate and groundwater samples have typically been taken at different times to the surface water samples. If a borehole is dry during a monitoring round, then groundwater samples can not be taken at that site, and this is reflected in the summary sheets as blank entries for the subject monitoring period. In addition, if there was insufficient water in a borehole for the full range of tests to be carried out, then some parameters for the subject monitoring period may be blank.

Air-Based Concentration Monitoring

A summary of the air-based concentration monitoring results (i.e. methane monitoring) for the site is provided in Attachment B.

The methane sampling is carried out using a landfill gas meter operated in accordance with Sections 17 and 18 of the *EPA Environmental Guidelines : Solid Waste Landfills (1996)*. Testing is carried out on a twice-yearly basis at Monitoring Points 6, 7 and 8.

Individual ppm or % methane V/V results for every location were not recorded due to the numerous sites tested. Instead, the meter was constantly monitored, and if methane levels approached or exceeded the threshold levels, then these incidences were recorded. It is confirmed that the threshold levels were neither approached nor exceeded at any location during the Annual Return period.

C. COMPLIANCE WITH LICENCE CONDITIONS

C1. Compliance with Licence Conditions

1. Were all conditions of the licence complied with (including monitoring and reporting)?

The following conditions of the licence were not fully complied with:

- i). Number of monitoring rounds at Monitoring Point 3 (SW5)
- ii). Exceedance of various constituents at Monitoring Points 1 (BH9), 2 (BH10), 4 (SW2), 5 (Wetland Outlet) and 13 (BH13).
- iii). There were exceedances of TSS levels at Monitoring Points 5 (Wetland Outlet) and 11 (Bypass Structure).
- iv). Miscellaneous non-compliances.

Each of these is discussed below.

C2. Details of Non-Compliance with Licence

i) Number of Monitoring Rounds at Various Monitoring Points

Only three (3) monitoring round was undertaken at Monitoring Point 3 (SW5), instead of the required four (4) monitoring rounds, as specified in the Licence Condition M2.1. This was due to the monitoring point being dry during the sampling round of 03/08/2021, and is therefore considered to not be a non-compliance.

ii) Exceedance of Various Constituents at Monitoring Points

Trigger levels for groundwater and surface water were determined for the NNWMF, based on the detailed analysis of historical water quality data for the NNWMF site, and presented in the "Leachate Characterisation Study", "Surface Water Characterisation Study" and "Surface Water Characterisation Study" and "Surface Water Characterisation Study" and 2010.

The trigger levels for groundwater and surface water at the NNWMF are provided below in Table 1.

Constituent	TRIGGER L	EVELS (mg/l)
	Median	Maximum
рН	-	5.1 - 8.0
Ammonia	0.9	1.4
Nitrate	0.7	3.4
Potassium	4.1	6.2
BOD	15	20
TSS	-	50
Arsenic	0.024	0.094
Dissolved Oxygen	-	> 6.0

 Table 1 : Trigger Levels for Groundwater and Surface Water at NNWMF

Due to the environmental attributes for the creek downstream of the NNWMF, including its intermittent nature and limited aquatic ecosystem, it was not considered necessary to impose the most restrictive trigger levels on all discharges. Instead, trigger levels based on the median and maximum values of the subject constituents in the downstream creek flows were considered more appropriate:

- The proposed "median trigger level" applies the most restrictive trigger value for a constituent, so as to ensure the median value of the discharges in the creek result in minimal potential downstream environmental impacts.
- The proposed "maximum trigger level" allows for occasional discharges which exceed the median trigger levels, but due to the short-term duration of the discharge, are unlikely to cause any potential long-term downstream environmental impacts.

The exceedances of the maximum trigger levels for the individual monitoring events are summarised below. Exceedances of the median trigger values are not included, as they are used for the analysis of longer term time periods, rather than specific individual events.

The maximum trigger levels were exceeded for various constituents at the following monitoring points:

- Monitoring Point 1 (BH9)
 - Ammonia on 14/04/2021 (2.87 mg/l)
- Monitoring Point 2 (BH10)
 - Ammonia on 14/04/2021 (2.53 mg/l), 13/07/2021 (3.31 mg/l) and 23/02/2022 (7.93 mg/l)
- Monitoring Point 4 (SW2)
 Potassium on 03/08/2021 (8.2 mg/l) and 12/10/2021 (6.8 mg/l)
- Monitoring Point 5 (Wetland Outlet)
 - Potassium on 16/03/2021 (7.0 mg/l) and 03/08/2021 (7.5 mg/l)
 - Dissolved Oxygen on 16/03/2021 (4.5 mg/l)
- Monitoring Point 13 (BH13)
 - Ammonia on 14/04/2021 (1.72 mg/l), 13/07/2021 (1.56 mg/l) and 23/02/2022 (1.96 mg/l)
 - Potassium on 14/04/2021 (11.0 mg/l), 13/07/2021 (8.1 mg/l), 09/09/2021 (14.0 mg/l) and 23/02/2022 (6.9 mg/l)

Monitoring Points 2 (BH10), 3 (SW5) and 13 (BH13) are upstream groundwater and surface water monitoring sites and, hence, exceedances at these sites do not need to be considered further. However, any exceedances at these sites are likely to indicate that elevated levels of the subject constituent may be a background characteristic of the groundwater or surface water from the catchment.

<u>Potassium</u>

Potassium levels up to 19.9 mg/l (i.e. greater than the maximum trigger value of 6.2 mg/l) have been previously measured at the upstream groundwater sites BH10 (i.e. NNLF 2) and BH13 (i.e. NNLF 13), confirming elevated potassium can be a background characteristic of the groundwater within the catchment. Similarly, elevated potassium levels up to 7.5 mg/l have been previously measured at the upstream surface water site SW5 (i.e. NNLF 3), also confirming that elevated potassium can be a background characteristic of the surface water within the catchment.

During the subject Annual Return period, there were exceedances up to 14.0 mg/l for potassium at the upstream groundwater site BH13.

However, the only exceedances of potassium at the onsite and downstream groundwater and surface water monitoring sites at the NNWMF during the subject reporting period were two marginal readings at both:

- Monitoring Point 5 (i.e. the Wetland Outlet) on 16/03/2021 (7.0 mg/l) and 03/08/2021 (7.5 mg/l); and
- Monitoring Point 4 (i.e. SW2) on 03/08/2021 (8.2 mg/l) and 12/10/2021 (6.8 mg/l).

During the reporting period, all other potassium readings at the Wetland Outlet ranged between 4.6 and 5.8 mg/l, and all other potassium readings at the SW2 ranged between 2.7 and 3.6 mg/l, thereby satisfying the maximum trigger level.

The potassium levels at all other groundwater and surface water monitoring sites at the NNWMF, including the Groundwater Trench Sump (i.e. NNLF 12), were satisfactory during the subject reporting period, with potassium levels ranging between 0.4 and 3.6 mg/l.

<u>Ammonia</u>

Ammonia levels up to 4.2 mg/l (i.e. greater than the maximum trigger value of 1.4 mg/l) have been previously recorded at the upstream groundwater sites BH10 (i.e. NNLF 2) and BH13 (i.e. NNLF 13), confirming elevated ammonia levels can be a background characteristic of the groundwater within the catchment.

These occasional elevated ammonia levels at the upstream groundwater sites indicate an offsite mechanism exists which can result in high ammonia levels. This process is likely to be the breakdown of high organic loads (from plant material deposited into the creek from the adjoining forested catchment) in the intermittent pools that form along the creek during low flow periods, which then generate elevated ammonia loads which subsequently percolate into the underlying groundwater lenses.

During the subject Annual Return period, there were ammonia exceedances up to 7.9 mg/l at the upstream groundwater site BH10, and up to 2.0 mg/l at BH13.

The only exceedance of ammonia at the onsite and downstream groundwater and surface water monitoring sites at the NNWMF during the subject reporting period was a marginal reading of 2.87 mg/l at Monitoring Point 1 (i.e. BH9) on 14/04/2021. All other ammonia readings at BH9 during the monitoring period ranged between < 0.05 and 0.1 mg/l, thereby satisfying the maximum trigger level.

The ammonia levels at all other groundwater and surface water monitoring sites at the NNWMF, including the Wetland Outlet (NNLF 5) and the Groundwater Trench Sump (i.e. NNLF 12), were satisfactory during the subject reporting period, with ammonia levels typically less than 0.1 mg/l, with occasional readings up to 0.5 mg/l.

iii) Exceedance of TSS Levels

Exceedances of the 50 mg/l trigger level for TSS (total suspended solids) during the special frequency monitoring rounds occurred at the following surface water monitoring sites during the subject Annual Return period:

- Monitoring Point 5 (Wetland Outlet) on 17/12/2021 (72 mg/l)
- Monitoring Point 11 (Bypass Structure) on 03/08/2021 (402 mg/l)

It is noted that exceedance of the trigger value of 50 mg/l is allowable if greater than 74 mm of rain falls over the 5-day period up to and including the monitoring round.

Table 2 summarises the daily and 5-day rainfall totals for the quarterly special frequency surface water monitoring rounds carried out during the subject Annual Return period.

Tuble 2 + Dully und e Duy F	winnun Totuis ion Quurterig speen	i i requency monitoring nounds
Monitoring Day	Daily Rainfall (mm)	5-Day Rainfall (mm)
16/03/2021	0	77
03/08/2021	30	30
12/10/2021	38	40
01/12/2021	33	71

Table 2 : Daily and 5-Day Rainfall Totals for Quarterly Special Frequency Monitoring Rounds

Notes : Quarterly special frequency surface water monitoring rounds during subject Annual Return period

All the quarterly special frequency surface water monitoring rounds were therefore associated with a 5-day rainfall event of less than 74 mm of rain, except the monitoring round on 16/03/2021.

The only TSS exceedance associated with a quarterly special frequency surface water monitoring round where the associated 5-day rainfall event was less than 74 mm of rain was:

• 03/08/2021 : Bypass Structure (402 mg/l).

The upstream site SW5 (i.e. NNLF 3) was dry for the monitoring round of 03/08/2021, indicating only very low flows would have occurred along the creek downstream of this monitoring site for this rainfall event, including at the Bypass Structure (NNLF 11) which is immediately downstream of SW5. The TSS levels at both the Wetland Outlet (i.e. NNLF 5) and the downstream site SW2 (i.e. NNLF 4) were satisfactory for the 03/08/2021 monitoring round, being respectively 0.52 and 0.54 mg/l.

There is also a requirement to monitor pH and TSS on a daily basis at the Wetland Outlet (i.e. NNLF 5) whenever there is a discharge from the constructed wetland. The TSS exceedance at the Wetland Outlet on the 17/12/2021 (i.e. 72 mg/l) was associated with the daily monitoring requirements during a discharge event from the wetland. However, the 5-day rainfall for the monitoring round on 17/12/2021 was 96 mm and, hence, the exceedance of the TSS trigger value was allowable.

Based on the above data, the following comments are provided:

- There was nil (0) exceedances of the TSS trigger level (i.e. 50 mg/l) at the Wetland Outlet (i.e. NNLF 5) during the subject reporting period where the 5-day rainfall event was less than 74 mm.
- During the subject reporting period, the TSS levels at the Wetland Outlet ranged between < 2 and 40 mg/l (i.e. satisfied the TSS trigger level).
- The TSS levels at the downstream surface water site SW2 (i.e. NNLF 4) during the subject reporting period (including the round of 16/03/2021, where the 5-day rainfall event exceeded 74 mm) ranged between 3 and 42 mg/l (i.e. satisfied the TSS trigger level).
- This data indicates there were no potential downstream surface water impacts from TSS during the subject reporting period.

It is confirmed that Council has carried out various mitigation measures at the NNWMF over the past few years to reduce potential sources and transport of sediment from the landfill site, including rock lining steep drains, installing rock filter check dams across main drains, and enlarging the temporary sediment pond at the excavated future Cell 4 area.

Review of the monitoring data shows there has been significant improvements in the TSS levels at the onsite and downstream surface water monitoring points during the subject return period, which implies the recent mitigation works have been successful in reducing the number of TSS exceedances from the site.

It is proposed that Council continue regular assessments of the onsite erosion and sediment control works at the NNWMF site, so as to maintain and improve (where possible) the current erosion and sediment control measures.

iv) Miscellaneous Non-Compliances

There were no other miscellaneous non-compliances which occurred at the New Nambucca Waste Management Facility during the subject Annual Return period.

D. LOAD-BASED FEE CALCULATIONS

D1 to D8 Not Applicable

E. POLLUTION INCIDENT RESPONSE MANAGEMENT PLAN (PIRMP)

The compliance questions regarding the Pollution Incident Response Management Plan (PIRMP) have been entered directly in the relevant EPA Annual Return website fields.

The monitoring, inspection and reporting procedures and requirements for the PIRMP was reviewed and updated by Enginuity Design in 2019.

F. PUBLISHING OF POLLUTION MONITORING DATA

The compliance questions regarding the Publishing of Pollution Monitoring Data have been entered directly in the relevant EPA Annual Return website fields.

G. ENVIRONMENTAL MANAGEMENT SYSTEMS AND PRACTICES

The compliance questions regarding Environmental Management Systems and Practices have been entered directly in the relevant EPA Annual Return website fields.

H. SIGNATURE AND CERTIFICATION

The Signature and Certification requirements have been undertaken in accordance with the EPA Annual Return website requirements.

If you have any questions regarding the information presented in this letter, please do not hesitate to contact me on 6655 0141.

Yours faithfully

Richard Green BEng(Civil) MIE(Aust) CPEng

ATTACHMENT A : Water-Based Concentration Monitoring Summary

Period : 01 March 2021 to 28 Feb 2022 Monitoring Point : 1 (NNLF-1) Location : BH9 (Refer LEMP 2000 – Fig 12) Type : Groundwater Sampling Frequency : Quarterly

						No of Samples	No of Samples			
Parameter	Unit of		Date Sampled			Required by	Collected &	Lowest	Mean of	Highest
	Measure	14/04/21	13/07/21	09/09/21	23/02/22	Licence	Analysed	Sample Value	Samples	Sample Value
pH		6.7	6.3	6.3	6.5	4	4	6.3	6.5	6.7
Alkalinity	mg/l	73	165	170	111	4	4	73	130	170
Conductivity	mS/cm	0.63	1.80	1.74	1.26	4	4	0.63	1.36	1.80
Ammonia	mg/l	2.87	< 0.05	< 0.05	0.10	4	4	< 0.05	0.74	2.87
Nitrate	mg/l	< 0.05	< 0.05	0.05	0.05	4	4	< 0.05	0.05	0.05
TKN	mg/l	4.07	0.55	0.18	0.50	4	4	0.18	1.33	4.07
Nitrogen (Total)	mg/l	4.07	0.59	0.23	0.55	4	4	0.23	1.36	4.1
Potassium	mg/l	2.4	1.9	0.4	2.0	4	4	0.4	1.7	2.4
Boron	mg/l	< 0.03	< 0.03	0.03	< 0.03	4	4	< 0.03	0.03	0.03
Temperature	С	10.3	17.8	21.4	15.8	4	4	10.3	16.3	21.4

Period : 01 March 2021 to 28 Feb 2022 Monitoring Point : 2 (NNLF-2) Location : BH10 (Refer LEMP 2000 – Fig 12) Type : Groundwater Sampling Frequency : Quarterly

						No of Samples	No of Samples			
Parameter	Unit of		Date Sampled			Required by	Collected &	Lowest	Mean of	Highest
	Measure	14/04/21	13/07/21	09/09/21	23/02/22	Licence	Analysed	Sample Value	Samples	Sample Value
pH		5.9	6.3	6.1	6.2	4	4	5.9	6.1	6.3
Alkalinity	mg/l	27	99	79	38	4	4	27	61	99
Conductivity	mS/cm	0.59	2.70	2.63	0.37	4	4	0.37	1.57	2.70
Ammonia	mg/l	2.53	3.31	0.63	7.93	4	4	0.63	3.60	7.93
Nitrate	mg/l	0.32	< 0.05	< 0.05	0.45	4	4	< 0.05	0.19	0.45
TKN	mg/l	7.47	4.84	1.01	11.60	4	4	1.01	6.23	11.60
Nitrogen (Total)	mg/l	7.89	4.88	1.03	12.00	4	4	1.03	6.45	12.00
Potassium	mg/l	2.8	3.0	0.5	1.6	4	4	0.5	2.0	3.0
Boron	mg/l	< 0.03	< 0.03	0.03	< 0.03	4	4	< 0.03	0.03	0.03
Temperature	Ċ	14.5	18.0	21.0	15.7	4	4	14.5	17.3	21.0

Period : 01 March 2021 to 28 Feb 2022 Monitoring Point : 3 (INILF-3) Location : SW5 - Upstream Monitoring Point (Refer LEMP 2000 – Fig 12) Type : Surface Water Sampling Frequency : Quarterly Special Frequency (first R/F event in each quarter with over 30mm of rainfall in 24 hrs)

Parameter	Unit of		Date Sampled			No of Samples Required by	No of Samples	Lowest	Mean of	Highest
	Measure	16/03/21	03/08/21	12/10/21	01/12/21	Licence	Analysed	Sample Value	Samples	Sample Value
pH		5.7		5.8	5.7	4	3	5.7	5.7	5.8
Alkalinity	mg/l	6		4	6	4	3	4	5	6
Conductivity	mS/cm	0.12		0.08	0.10	4	3	0.08	0.10	0.12
Ammonia	mg/l	< 0.05		< 0.05	< 0.05	4	3	< 0.05	< 0.05	< 0.05
Nitrate	mg/l	< 0.05		< 0.05	< 0.05	4	3	< 0.05	< 0.05	< 0.05
TKN	mg/l	0.77		0.78	0.70	4	3	0.70	0.75	0.78
Nitrogen (Total)	mg/l	0.77		0.78	0.70	4	3	0.70	0.75	0.78
Potassium	mg/l	1.3		0.8	1.6	4	3	0.8	1.2	1.6
Boron	mg/l	< 0.03		< 0.03	< 0.03	4	3	< 0.03	< 0.03	< 0.03
Total Suspended Solids	mg/l	< 2		2	6	4	3	< 2	3	6
Dissolved Oxygen	mg/l	6.0		8.5	7.9	4	3	6.0	7.5	8.5
Temperature	С	20.7		18.9	16.5	4	3	16.5	18.7	20.7

Period : 01 March 2021 to 28 Feb 2022 Monitoring Point : 4 (NNLF-4) Location : SW2 – Downstream Monitoring Point (Refer LEMP 2000 – Fig 12) Type : Surface Water

Sampling Frequency : Quarterly Special Frequency (first R/F event in each quarter with over 30mm of rainfall in 24 hrs)

						No of Samples	No of Samples			
Parameter	Unit of		Date Sampled			Required by	Collected &	Lowest	Mean of	Highest
	Measure	16/03/21	03/08/21	12/10/21	01/12/21	Licence	Analysed	Sample Value	Samples	Sample Value
pH		6.8	7.5	7.3	6.9	4	4	6.8	7.1	7.5
Alkalinity	mg/l	31	147	74	41	4	4	31	73	147
Conductivity	mS/cm	0.18	0.48	0.32	0.19	4	4	0.18	0.29	0.48
Ammonia	mg/l	< 0.05	0.54	0.06	< 0.05	4	4	< 0.05	0.15	0.54
Nitrate	mg/l	< 0.05	0.08	0.18	< 0.05	4	4	< 0.05	0.07	0.18
TKN	mg/l	0.87	1.35	1.11	0.86	4	4	0.86	1.05	1.35
Nitrogen (Total)	mg/l	0.87	1.43	1.29	0.86	4	4	0.86	1.11	1.43
Potassium	mg/l	2.7	8.2	6.8	3.6	4	4	2.7	5.3	8.2
Boron	mg/l	0.04	0.07	0.05	0.04	4	4	0.04	0.05	0.07
Total Suspended Solids	mg/l	3	21	42	18	4	4	3	21	42
Dissolved Oxygen	mg/l	7.5	7.8	7.4	6.9	4	4	6.9	7.4	7.8
Temperature	C	20.8	18.1	18.7	17.2	4	4	17.2	18.7	20.8

Period : 01 March 2021 to 28 Feb 2022 Monitoring Point : 5 (NNLF-5) Location : Wetland Outlet Point – Overflow from Wetland (Refer LEMP 2000 – Fig 12 [SW4]) Type : Surface Water Sampling Frequency : Quarterly Special Frequency (first R/F event in each quarter with over 30mm of rainfall in 24 hrs)

						No of Samples	No of Samples			
Parameter	Unit of			Date Sampled		Required by	Collected &	Lowest	Mean of	Highest
	Measure	16/03/21	03/08/21	12/10/21	01/12/21	Licence	Analysed	Sample Value	Samples	Sample Value
pH		7.1	7.6	7.2	7.0	4	4	7.0	7.2	7.6
Alkalinity	mg/l	94	147	56	66	4	4	56	91	147
Conductivity	mS/cm	0.29	0.47	0.27	0.28	4	4	0.27	0.33	0.47
Ammonia	mg/l	0.07	0.52	< 0.05	< 0.05	4	4	< 0.05	0.15	0.52
Nitrate	mg/l	< 0.05	< 0.05	0.12	< 0.05	4	4	< 0.05	0.06	0.12
TKN	mg/l	1.94	1.53	0.97	0.90	4	4	0.90	1.34	1.94
Nitrogen (Total)	mg/l	1.97	1.53	1.09	0.90	4	4	0.90	1.37	1.97
Potassium	mg/l	7.0	7.5	5.8	4.6	4	4	4.6	6.2	7.5
Boron	mg/l	0.05	0.07	0.04	0.05	4	4	0.04	0.05	0.07
Total Suspended Solids	mg/l	37	2	40	7	4	4	2	22	40
Dissolved Oxygen	mg/l	4.5	6.3	7.4	6.9	4	4	4.5	6.3	7.4
Temperature	С	20.8	18.5	18.9	17.1	4	4	17.1	18.8	20.8
Daily Rainfall	mm	14	56	30	30					
Total Rainfall	mm	25	56	42	30					
No of Days	days	5	1	5	1					
Period :		11/03 - 15/03	10/06 - 10/06	25/10 - 29/10	11/12 - 11/12					

Period 01 March 2021 to 28 February 2022 Monitoring Point : 5 (NNLF-5) Location : Wetland Outlet Point – Overflow from Wetland (Refer LEMP 2000 – Fig 12 [SW4]) Type : Surface Water Sampling Frequency : Daily Monitoring During Discharge

Date Sampled	рН	Total Suspended Solids (mg/l)	Rainfall to 8am (mm)	Note
12/10/21	7.2	40	38	
13/10/21	7.1	37	112	
14/10/21	6.9	23	14	Sample not req'd (> 74mm rain over 5 days)
31/10/21				Sample not req'd (weekend)
01/11/21	7.4	11	31	
02/11/21	7.4	5	0	
03/11/21	7.3	< 2	0	Discharged ceased
09/11/21	7.4	5	9	
10/11/21				Discharged ceased
21/11/21			20	Sample not req'd (weekend)
22/11/21	7.1	40	31	
23/11/21	7.1	18	8	
24/11/21			28	Sample not req'd (> 74mm rain over 5 days)
17/12/21	7.1	72	96	Sample not req'd (> 74mm rain over 5 days)
20/01/22	7.2	15	34	
03/02/22	7.2	22	52	
07/02/22	7.1	< 2	32	
08/02/22	7.1	5	1	Sample not req'd (> 74mm rain over 5 days)
09/02/22	6.9	< 2	0	
23/02/22	7.5	18	50	
24/02/22			34	Sample not req'd (> 74mm rain over 5 days)
28/02/22	7.2	15	82	Sample not req'd (> 74mm rain over 5 days)
No of Samples	17	17		
Lowest Sample Value	6.9	< 2		
Mean of Sample Values	7.2	19		
Highest Sample Value	7.5	72		

Period : 01 March 2021 to 28 Feb 2022

Monitoring Point : 9 (NNLF-9) Location : Leachate Pond Overflow (Refer Water Management Works – Concept Design Report 2000 – Fig 1) Type : Leachate Sampling Frequency : Twice a Year

Parameter	Unit of		Date Sampled			No of Samples Required by	No of Samples Collected &	Lowest	Mean of	Highest
	Measure	23/03/21	17/05/21	09/09/21	23/02/22	Licence	Analysed	Sample Value	Samples	Sample Value
Alkalinity	ma/l	10	54	75	67	2	1	10	54	75
Ammonia	mg/l	0.05	0.58	< 0.05	< 0.05	2	4	< 0.05	0.16	0.58
Arsenic	mg/l	< 0.00	< 0.00	< 0.00	< 0.027	2	4	< 0.027	< 0.10	< 0.00
BOD	mg/l	0.021	- 0.021	< 4	< 4	2	2	< 4	< 4	< 4
Boron	mg/l	< 0.03	0.04	0.09	0.05	2	4	< 0.03	0.05	0.09
Calcium	mg/l	6	13	18	15	2	4	6	13	18
Chloride	ma/l	4	13	63	46	2	4	4	32	63
Chromium	mg/l	-		< 0.005	< 0.005	2	2	< 0.005	< 0.005	< 0.005
Copper	mg/l			< 0.005	< 0.005	2	2	< 0.005	< 0.005	< 0.005
Fluoride	mg/l	< 0.10	< 0.10	< 0.10	< 0.10	2	4	< 0.10	< 0.10	< 0.10
Iron	mg/l	5.8	2.1	2.2	1.6	2	4	1.6	2.9	5.8
Lead	mg/l			< 0.01	< 0.01	2	2	< 0.01	< 0.01	< 0.01
Magnesium	mg/l	1.3	3.0	6.7	6.4	2	4	1.3	4.4	6.7
Manganese	mg/l	0.09	0.12	0.26	0.15	2	4	0.09	0.16	0.26
Nitrate	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	2	4	< 0.05	< 0.05	< 0.05
Nitrogen (Total)	mg/l	0.54	1.16	0.97	0.54	2	4	0.54	0.80	1.16
pH		6.8	7.2	7.7	7.5	2	4	6.8	7.3	7.7
Phosphorus (Total)	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	2	4	< 0.05	< 0.05	< 0.05
Potassium	mg/l	1.6	2.8	3.6	1.7	2	4	1.6	2.4	3.6
Sodium	mg/l	4	12	48	40	2	4	4	26	48
Sulphate	mg/l	3	2	12	4	2	4	2	5.3	12
TKN	mg/l	0.54	1.13	0.94	0.54	2	4	0.54	0.79	1.13
TOC	mg/l			12	10	2	2	10	11	12
Total Phenols	mg/l	0.001	0.001	0.001		2	3			
Zinc	ma/l	0.02	< 0.01	< 0.01	0.01	2	4	< 0.01	< 0.01	< 0.01

Period : 01 March 2021 to 28 Feb 2022 Monitoring Point : 10 (NNLF-10) Location : Leachate Tank (Refer LEMP 2000 – Fig 6) Type : Leachate Sampling Frequency : Daily

				No of Samples	No of Samples			
Parameter	Unit of	Date Sampled		Required by	Collected &	Lowest	Mean of	Highest
	Measure			Licence	Analysed	Sample Value	Samples	Sample Value
Volume	l/d							

Note : Not applicable as Leachate Tanks not operational yet

Period : 01 March 2021 to 28 Feb 2022 Monitoring Point : 11 (NNLF-11) Location : Bypass Structure – Weir and Offtake Pipe (Refer Water Management Works – Concept Design Report 2000 – Fig 1) Type : Surface Water Sampling Frequency : Quarterly Special Frequency (first R/F event in each quarter with over 30mm of rainfall in 24 hrs)

Parameter	Unit of Measure	16/03/21	Date Sampled 03/08/21	12/10/21	01/12/21	No of Samples Required by Licence	No of Samples Collected & Analysed	Lowest Sample Value	Mean of Samples	Highest Sample Value
pH		6.0	6.4	5.7	5.7	4	4	5.7	6.0	6.4
Total Suspended Solids	mg/l	6	402	25	5	4	4	5	110	402

Period : 01 March 2021 to 28 Feb 2022 Monitoring Point : 12 (NNLF-12) Location : Groundwater Trench / Sump – Collection Manhole (Refer to Plan attached to NSC letter dated 08/08/01) Type : Groundwater Sampling Frequency : Quarterly

						No of Samples	No of Samples			
Parameter	Unit of			Date Sampled		Required by	Collected &	Lowest	Mean of	Highest
	Measure	14/04/21	13/07/21	09/09/21	23/02/22	Licence	Analysed	Sample Value	Samples	Sample Value
pH		6.8	6.7	7.5	6.9	4	4	6.7	7.0	7.5
Alkalinity	mg/l	42	170	75	66	4	4	42	88	170
Conductivity	mS/cm	0.12	0.09	0.37	0.27	4	4	0.09	0.21	0.37
Ammonia	mg/l	0.31	< 0.05	< 0.05	< 0.05	4	4	< 0.05	0.11	0.31
Nitrate	mg/l	< 0.05	< 0.05	< 0.05	0.19	4	4	< 0.05	0.08	0.19
TKN	mg/l	0.91	0.66	0.96	0.54	4	4	0.54	0.77	0.96
Nitrogen (Total)	mg/l	0.91	0.68	0.99	0.73	4	4	0.68	0.83	0.99
Potassium	mg/l	2.6	3.3	3.6	2.9	4	4	2.6	3.1	3.6
Boron	mg/l	< 0.03	0.04	0.09	< 0.03	4	4	< 0.03	0.04	0.09
Temperature	С	12.1	18.0	21.2	17.0	4	4	12.1	17.1	21.2

Period : 01 March 2021 to 28 Feb 2022 Monitoring Point : 13 (NNLF-13) Location : BH13 – New Upstream Bore (Refer to Plan attached to NSC letter dated 19/09/07) Type : Groundwater Sampling Frequency : Quarterly

Samping	 equenc	y .	Quarterry	

						No of Samples	No of Samples			
Parameter	Unit of			Date Sampled		Required by	Collected &	Lowest	Mean of	Highest
	Measure	14/04/21	13/07/21	09/09/21	23/02/22	Licence	Analysed	Sample Value	Samples	Sample Value
pH		6.2	6.1	6.0	6.2	4	4	6.0	6.1	6.2
Alkalinity	mg/l	110	94	92	121	4	4	92	104	121
Conductivity	mS/cm	0.87	1.31	1.57	0.92	4	4	0.87	1.17	1.57
Ammonia	mg/l	1.72	1.56	1.00	1.96	4	4	1.00	1.56	1.96
Nitrate	mg/l	0.18	< 0.05	< 0.05	0.09	4	4	< 0.05	0.09	0.18
TKN	mg/l	2.69	2.17	3.26	1.96	4	4	1.96	2.52	3.26
Nitrogen (Total)	mg/l	2.87	2.17	3.26	2.05	4	4	2.05	2.59	3.26
Potassium	mg/l	11.0	8.1	14.0	6.9	4	4	6.9	10.0	14.0
Boron	mg/l	0.05	0.04	0.06	0.12	4	4	0.04	0.07	0.12
Temperature	C	12.6	18.0	21.9	18.6	4	4	12.6	17.8	21.9

ATTACHMENT B : Air-Based Concentration Monitoring Summary

Period : 01 March 2021 to 28 February 2022

Type : Methane

EPA Licence MONITORING POINT 6

NNLF-6 :- All enclosed buildings within 250 metres of waste filled areas									
Parameter	Unit of Measure	No of samples required by licence	No of samples collected and analysed	Lowest sample value	Mean sample value	Highest sample value			
Methane	% by volume	2	2	Nil	Nil	Nil			

Dates monitoring undertaken : 14/06/2021 13/12/2021

Monitoring locations : Gatehouse, Machinery Shed, House at Kango Concrete, Main Shed at Kango Concrete, Workshed at Kango Concrete

EPA Licence MONITORING POINT 7

NNLF-7 :- Surface of all waste-filled areas which have been capped									
Parameter	Unit of Measure	No of samples required by licence	No of samples collected and analysed	Lowest sample value	Mean sample value	Highest sample value			
Methane	% by volume	2	2	Nil	Nil	Nil			

Dates monitoring undertaken : 14/06/2021 13/12/2021

Monitoring locations : Cell 1 of Stage 1, Cell 2 of Stage 1

EPA Licence MONITORING POINT 8

NNLF-8 :- All accessible groundwater monitoring bores north of main access road									
Parameter	Unit of Measure	No of samples required by licence	No of samples collected and analysed	Lowest sample value	Mean sample value	Highest sample value			
Methane	ppm	2	2	Nil	Nil	Nil			

Dates monitoring undertaken : 14/06/2021 13/12/2021

Monitoring locations : Groundwater bores NNLF-1, NNLF-2, NNLF-12, NNLF-13