

Report to Northern Territory Environment Protection Authority

**Channel Island Power Station
Waste Discharge Licence WDL 212-02
Annual Report- April 2020 to May 2021**

Issued: 25 June 2021



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ISO 9001 | ISO 14001 | AS/NZS 4801



Document Control Form

TWS Report:	Channel Island Power Station, Waste Discharge Licence WDL 212-02, Annual Report- April 2020 to May 2021
Revision Number:	Version 1

Revision History

Revision Number	Date	Prepared By	Reviewed By	Approved By
Draft 1	14-Jun-2021	Dr Sandya Nanayakkara	Daniel Lane	
Draft 2	15-Jun-2021	Dr Sandya Nanayakkara	Jeannie McInnes	
Version 1	25-Jun-2021			Dr Sandya Nanayakkara Senior Scientist Trop Water Pty Ltd. 

Issue Register

Distribution List	Date Issued	Number of Copies Sent
Territory Generation- jeannie.mcInnes@territorygeneration.com.au	15 June 2021 25 June 2021	1
Northern Territory Environment Protection Authority- waste@nt.gov.au	25 June 2021	1

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EXECUTIVE SUMMARY

All sampling specified in WDL 212-02 for Channel Island Power Station (CIPS) was undertaken for the reporting period, April 2020 to May 2021.

- In total, CIPS has discharged 106.1 ML of wastewater for the 14 months period (April 2020 to May 2021).
- Based on the monitoring results under WDL 212-02, there were no non-compliances at CIPS during the period April 2020 to May 2021. However, occasional exceedances of Dissolved Oxygen and Total Suspended Solids were reported in the receiving environment (Darwin Harbour). It was found that CIPS discharge is not a contributing factor for these exceedances. Dissolved Oxygen and Total Suspended Solids are parameters that can be highly variable due to external factors such as tidal movements and presence of oxygen demanding materials in the surrounding environment. These exceedances are not required to notify NTEPA under condition 35, WDL 212-02 (WDL 212-02, 2020).

Based on the monitoring results for the reporting period, there was no evidence of impact from wastewater discharged from CIPS on the Darwin Harbour receiving environment.



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1 INTRODUCTION

Channel Island Power Station (CIPS) is the largest power station in the Northern Territory, Australia. It is located on Channel Island in the Middle Arm of Darwin Harbour. It is the main source of electricity for the Darwin - Katherine Interconnected system. The first units were commissioned at CIPS in 1986, and Channel Island now has 310MW of installed capacity.

Treated wastewater from CIPS facility is discharged into Darwin Harbour through the designated discharge points. CIPS facility has two discharge outlets to Darwin Harbour (Figure 1). These two outlets receive wastewater from different sources as indicated in Figure 2 (cooling towers, cooling ponds and stormwater). CIPS also consists of a sewage treatment plant licenced under the Department of Health's "wastewater work design approval" (WWDA, 2016).

Waste Discharge Licence, WDL 212, was first issued to CIPS on November 2015 to November 2017 by the Northern Territory Environmental Protection Authority (NT EPA). CIPS wastewater discharges to Darwin Harbour is currently managed under renewed Waste Discharge Licence WDL 212-02 from 18 June 2020. This licence is valid until 17 June 2022. The current licence, WDL 212-02 codifies operational practice for the management of waste discharges from the CIPS facility.

As per WDL 212-02, water, wastewater and sediment monitoring at designated sampling points is required. From December 2015 to March 2016, the monitoring for the WDL 212 was conducted by National Aluminate Corporation (NALCO) and ECOLAB. Tropical Water Solutions (TWS) was contracted by Territory Generation (TGen) in April 2016 to conduct the required monitoring program and to manage the waste discharge licence activities.

This annual report is prepared by TWS on behalf of TGen as a part of WDL 212-02 requirement. It provides details of the wastewater and sediment monitoring program and provides interpretation of *in-situ* and laboratory analysis results of physical, chemical and biological parameters. The reporting period for this report is from April 2020 (date of data reported in last annual return) to May 2021 (the most recent results available at the time of this report preparation). The CIPS wastewater discharge from April 2020 to June 2020 was managed under WDL 212-01 and from June 2020 – current it is managing under WDL 212-02. In Appendix A, monitoring data from April 2016 can be found as graphs and tables for easy reference to previous reporting periods.



Figure 1: CIPS discharge outlets

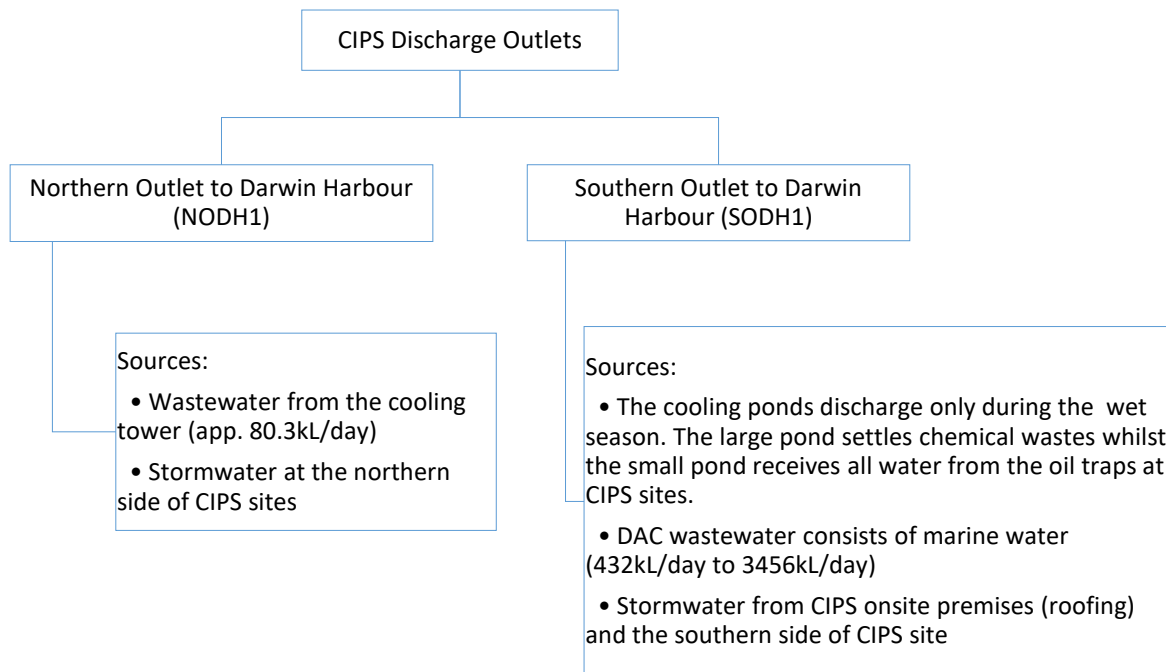


Figure 2: Stormwater and wastewater sources at CIPS discharge outlets

1.1 Wastewater discharge from Channel Island Power Station

Channel Island Power Station (CIPS) has two wastewater discharging sources (Figure 3); the first one is the cooling tower discharge point (ADP1). ADP1 receives wastewater from the cooling tower which then flows through the drainage line to the northern stormwater drainage to the Darwin Harbour. The sampling point is at the end of northern stormwater drainage (NODH1). The second discharge source is the cooling ponds wastewater discharge point (ADP2) that receives wastewater from two cooling ponds which then proceeds along the drainage line going to the southern stormwater drainage (SODH1) to the Darwin Harbour.

As shown in Figure 3, the cooling ponds receive water from the neutralization basin and oil and water separator plant.

SODH1 receives stormwater from CIPS onsite premises (roofing) and the southern side of CIPS site in addition to water from ADP2.

Discharge from the cooling tower that mixes with stormwater during rain events drains through the northern stormwater drain (NODH1) passing through rocks and mangroves before entering Darwin Harbour.

Mangrove population density around both the southern and northern stormwater drain is relatively low and the distance of the receiving water body from both storm water drains is no further than 30 m.

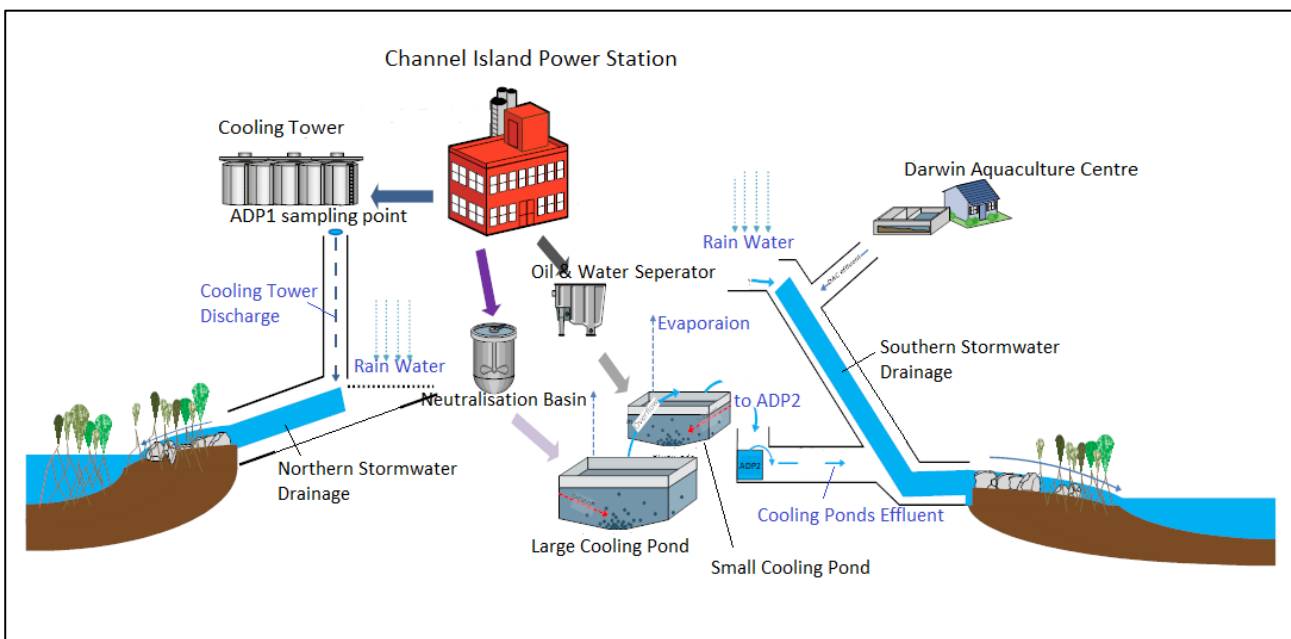


Figure 3 Channel Island Power Station wastewater discharge facility

2 METHODS

2.1 CIPS Monitoring sites under WDL 212-02

2.1.1 Water and wastewater monitoring sites

Wastewater discharge monitoring was carried out from seven (7) sites during April 2016 to May 2018 under WDL 212. Four additional marine water sites located in Darwin Harbour were introduced to the monitoring program beginning July 2018 with the waste discharge licence, WDL 212-01 and continued monitoring under WDL 212-02. All site codes, site descriptions and site coordinates included in the WDL 212-02 are shown in Table 1. Figure 4 shows the google map of the all the monitoring sites.

Table 1: Water and Wastewater Monitoring Sites

Site Code	Description	Coordinates (degrees)
SODH1	Southern Outlet to Darwin Harbor (Drain prior to mixing in receiving environment)	Lat: -12.560474 Long: 130.862878
NODH1	Northern Outlet to Darwin Harbor (Drain prior to mixing in receiving environment)	Lat: -12.554271 Long: 130.863497
ADP1	Cooling Tower Wastewater Discharge (Representative of discharge from cooling tower to drainage system that flows to NODH1)	Lat: -12.554760 Long: 130.864055
ILCP	Large Cooling Pond Influent	Lat: -12.555856 Long: 130.86405
ISCP	Small Cooling Pond Influent	Lat: -12.555856 Long: 130.864055
ADP2	Cooling Ponds Wastewater Discharge (Representative of discharge from cooling ponds to drainage system that flows to SODH1)	Lat: -12.556639 Long: 130.864559
SODH3	Southern Discharge Point Mixing Zone (marine)	Lat: --12.560221 Long: 130.864483
SODH4	Southern Receiving Environment Monitoring Point (marine)	Lat: -12.560540 Long: 130.864483
NODH3	Northern Discharge Point Mixing Zone (marine)	Lat: -12.555015 Long: 130.862802
NODH4	Northern Receiving Environment Monitoring Point (marine)	Lat: -12.555441 Long: 130.861803

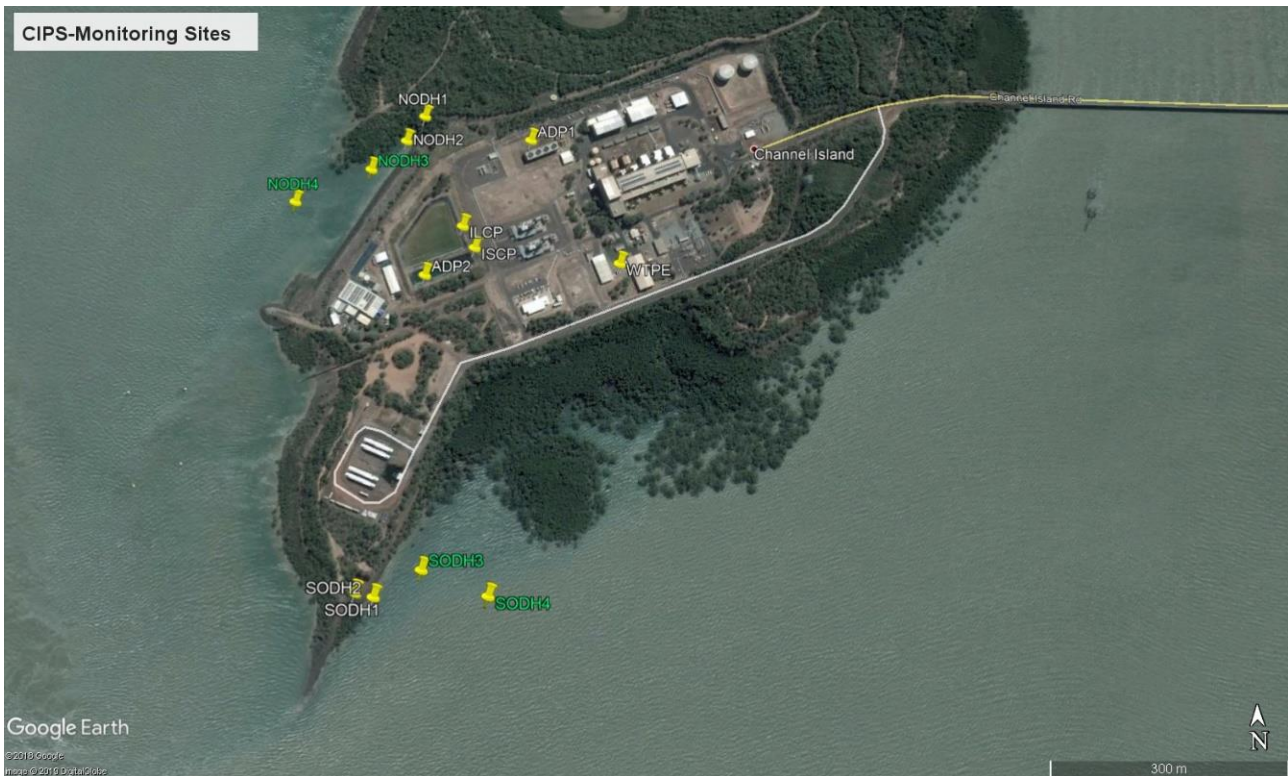


Figure 4: CIPS water, wastewater and sediment monitoring sites

Monitoring signs at the land-based sites are shown in Figure 5.



Figure 5: Monitoring signs at land-based sites

2.1.2 Sediment Monitoring sites

Sediment samples in the receiving environment were collected within the area of potential impact in Darwin Harbour, in the vicinity of the sites NODH1 and SODH1 (Figure 4). The monitored sites are as follows:

- NODH2 - outfall from NODH1 (Lat: -12.554453° and Long: 130.863358°)
- SODH2 - outfall from SODH1 (Lat: -12.6560485° and Long: 130.862941°)

2.2 Monitoring frequencies and parameters

2.2.1 Water and wastewater monitoring frequencies and parameters

Table 2 shows the water and wastewater monitoring frequencies and parameters analysed under WDL 212-02 monitoring program.

Table 2: Water and wastewater monitoring frequencies and parameters analysed.

Sites	Monitoring frequency	Parameters
SODH1 NODH1 ADP1 ADP2	Monthly	<ul style="list-style-type: none"> Total and Filtered Metals (Aluminium, Arsenic, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Nickel, Tin, Zinc) Nutrients (Filterable Reactive Phosphorous, Total Phosphorous, Total Nitrogen, Nitrogen Oxide (NOx), Ammonia NH₃-N)
ILCP ISCP SODH3 SODH4 NODH3 NODH4	Quarterly	<ul style="list-style-type: none"> <i>E. coli</i> Physical parameters (pH, Turbidity, Biological Oxygen Demand, Total Suspended Solids, Electrical Conductivity) In-situ (Free Chlorine, Temperature, Dissolved Oxygen % Saturation)

2.2.2 Sediment monitoring frequencies and parameters

Sediment monitoring was conducted on a quarterly basis at sites NODH2 and SODH2. Samples were analysed for metals (Aluminium, Arsenic, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Nickel, Tin, Zinc) and hydrocarbons (Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons, Benzene, Ethylbenzene, Xylenes and Toluene).

2.3 Sampling procedure

As stated in Waste Discharge Licence WDL 212-02, TWS undertook sampling and monitoring in accordance with Australian Guidelines for Water Quality Monitoring and Reporting (AS/NZS 5667; ANZECC/ARMCANZ, 2000).

2.3.1 In-situ measurements

For all in-situ readings taken at the discharge outlets, two cooling ponds, discharge mixing zones and receiving environment monitoring points, TWS staff used a Hydrolab Quanta multi parameter submersible probe to measure Temperature, Electrical Conductivity (EC), Dissolved Oxygen, pH and Salinity. A Hach 2100Q Turbidimeter was used for Turbidity measurements. Samples were collected from the water flow coming out of the designated sampling points in order to obtain the *in-situ* measurements. Field instruments are calibrated prior to each sampling event and post-field check are undertaken after each sampling event to ensure the instruments are operating within the manufacture's specifications. All calibration records are available upon request.

2.3.2 Sampling for nutrient and metal analysis

Monthly nutrient and metals samples from ADP1 and ADP2 sample points were obtained from the outflow through the installed v-notches, while samples from SODH1 and NODH1 were collected from the outflow of the drainage pipes. Samples at Darwin Harbour sites were obtained 0.2 m below the water surface using a peristaltic pump.

SODH1 intermittently had significant saltwater influence from the Darwin Aquaculture Centre and/or tidal influence of water pooling at the SODH1 sampling site. Hence, EC or Salinity of the water had to be determined prior to sample collection. This ensured that the appropriate analysis (marine or freshwater analysis) was conducted by the receiving laboratory.

All collected samples were delivered to the Australian Laboratory Services (ALS) in Darwin, where they were couriered overnight to their NATA-accredited Environmental Service Laboratory in Sydney for analysis.

2.3.3 Sampling for microbiological analysis

Microbiological samples from all sites for monthly and quarterly sampling were collected using a sample pole and manual scooping from flowing drainage pipes. Water samples from the Darwin Harbour sites were collected using a peristaltic pump. All microbiological samples were delivered to the NATA-accredited 'Water Microbiology Laboratory' at Berrimah within 3 hours of sampling.

Monthly and quarterly sampling also included obtaining samples for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) with analysis performed by ALS.

Figure 6 and Figure 7 show sampling at sites in compliance with CIPS WDL 212-02.



Figure 6: Sample collection at Influent Large Cooling Pond (ILCP)





Figure 7: Cooling Tower Discharge Collection Point (ADP1)

2.3.4 Sediment sampling

Samples were obtained using a stainless-steel grab sampler that can obtain approximately 700 g of sample and dig up to 15 cm of depth into the sediment. Samples obtained in one successful collection were mixed until the sample was homogenised. Samples were stored in a 250 mL glass jars provided by ALS.

Samples obtained were delivered to ALS in Darwin on the same day of collection to be analysed for hydrocarbons and metals at the ALS Sydney laboratory.

3 RESULTS

3.1 Wastewater Discharge Monitoring Results

Detailed discussion on results obtained during the current reporting period starting from Apr 2020 to May 2021 is included in this section. Monitoring results obtained since April 2016 are also presented.

Results were compared with the guideline values noted in the WQODH (2010), WDL 212-02 (WDL 212-02, 2020) or ANZECC (2000), where available. The guideline values defined are to maintain and protect ecological condition of marine and estuarine system of the Darwin Harbour region. Highlighting exceedances of guideline values in the monitoring results are required to identify and assess influence on water and sediment quality due to the CIPS discharge, if any.

It should be noted that concentrations below their Level of Reporting (LOR) were replaced with the LOR for reporting purposes (graphing). There were some missing data at some sites due to no flow at the times of sample collection. Particularly, there were no discharge at ADP2 for 8 out of 14 sampling events conducted during the reporting period. No flow/minor flow at ADP2 resulted in no flow at SODH1. The lack of flow from the cooling ponds can be attributed to the fact that the ponds are able to hold the discharge from the plant without overflow, especially during the dry season.

3.1.1 Results of in-situ parameters

Temperature

Figure 8 and Figure 9 show the results of Temperature measured at discharge sites and mixing zone/receiving environment (Darwin Harbour) respectively. Temperature was within the range of 23-33 °C at the drains prior to mixing in Darwin Harbour (SODH1 and NODH1) during the reporting period (Figure 8). As shown in Figure 9, water temperature at all Darwin Harbour sites varied between 25.5-32.1 °C for the same period. All the data including results at Cooling Ponds (ILCP and ISCP) are presented in tabulated form in Table A1 , Appendix A.

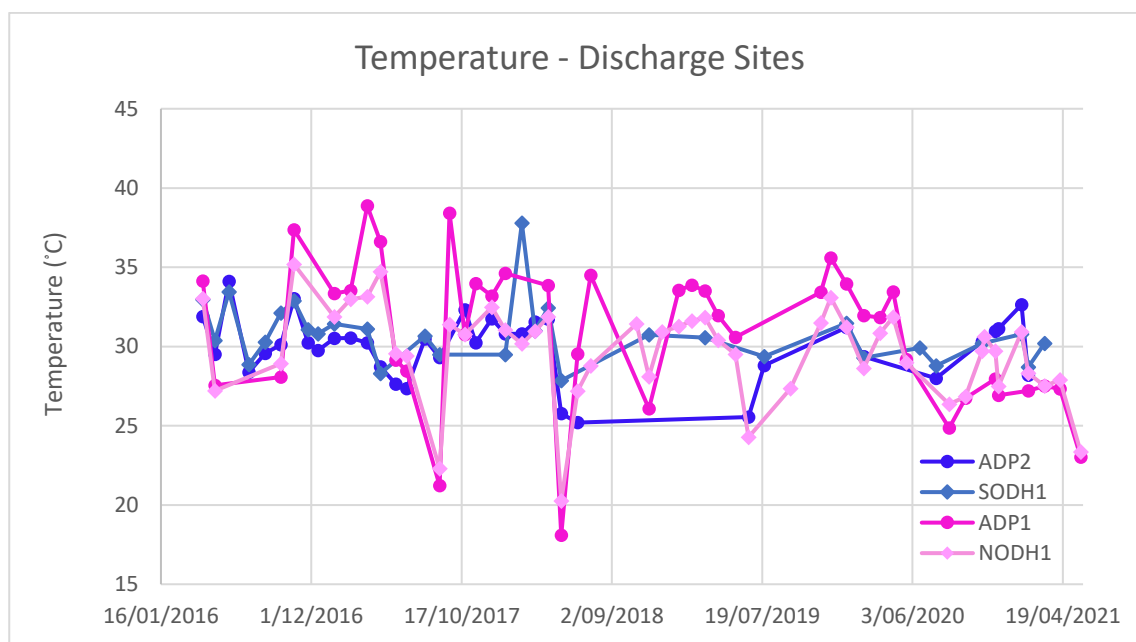


Figure 8: Temperature at discharge sites from April 2020 to May 2021 (Monthly monitoring)

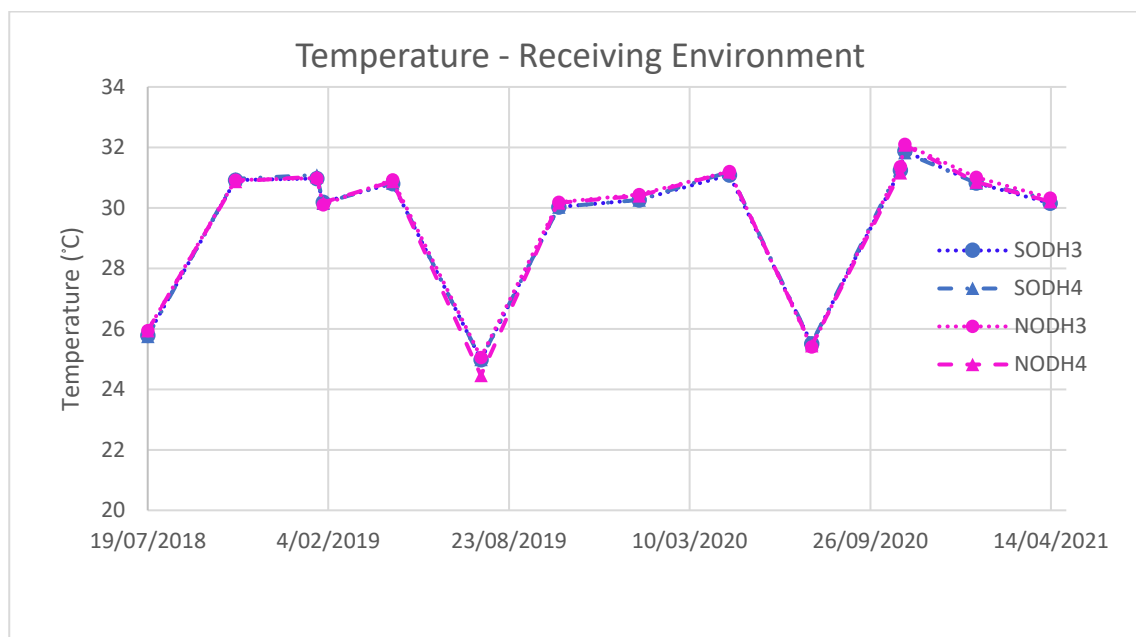


Figure 9: Temperature at sites in the mixing zone/receiving environment from July 2018 to April 2021 (Quarterly monitoring)

Dissolved Oxygen

Figure 10 and Figure 11 shows Dissolved Oxygen % Saturation (DO %Sat) at discharge sites and Darwin Harbour monitoring sites. DO % Sat was varied from 41 % to 93.4 % at discharge sites during Apr 2020 to May 2021.

Quarterly monitoring results at Darwin Harbour sites indicate that DO % Sat at all the sites are above the guideline value (80%) noted in WDL 212-02 (Figure 11) except on 13 April 2021. On 13 Apr 2021, DO % Sat at SODH3 and NODH3 was 79.7 % and 76 % respectively. There was no flow from CIPS southern discharge point, ADP2/SODH1 at the time of sampling, indicating that CIPS discharge is not a contributing factor for slightly lower DO %Sat at Darwin Harbour monitoring sites, SODH3. ADP1 (Northern discharge point) had DO %Sat of 86.2 % which is higher than the trigger value while ADP1’s downstream site NODH1 having DO %Sat of 72.1 % at the time of sampling. This indicates that even though high DO was present in the CIPS discharge point (ADP1), it can be varied in the downstream sites due to external factors such as presence of oxygen demanding organic materials and tidal movements in the Darwin Harbour. Table A2, Appendix 1 shows the DO % Sat data at all the CIPS monitoring sites.

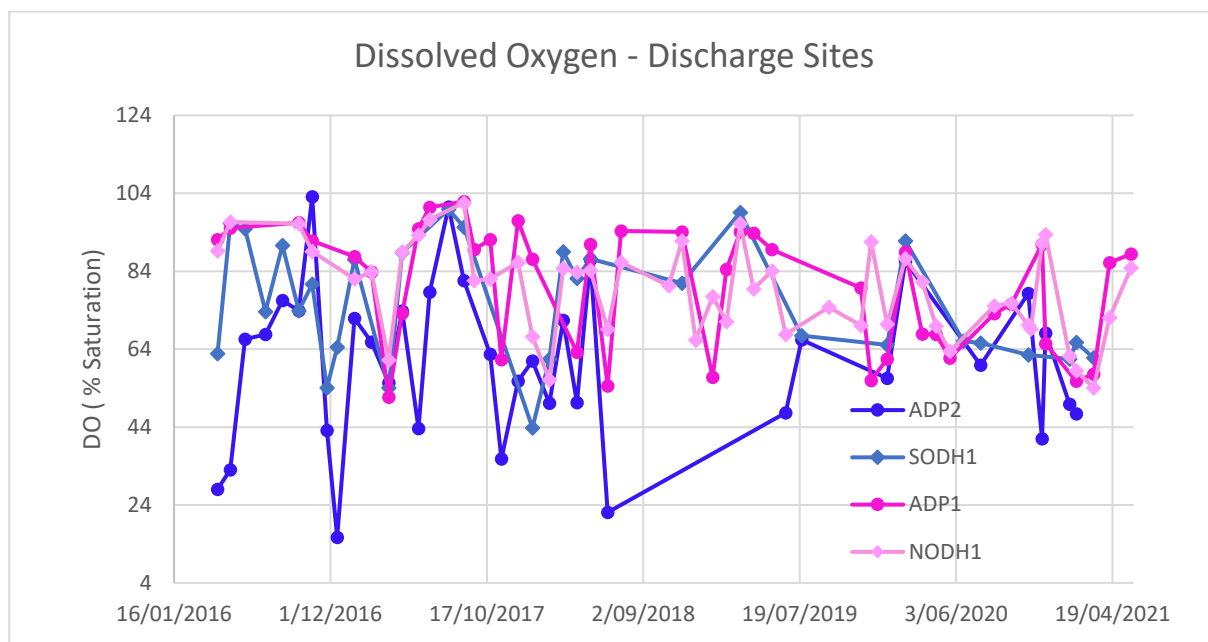


Figure 10: Dissolved oxygen (% Saturation) at discharge sites from April 2020 to May 2021 (Monthly monitoring)

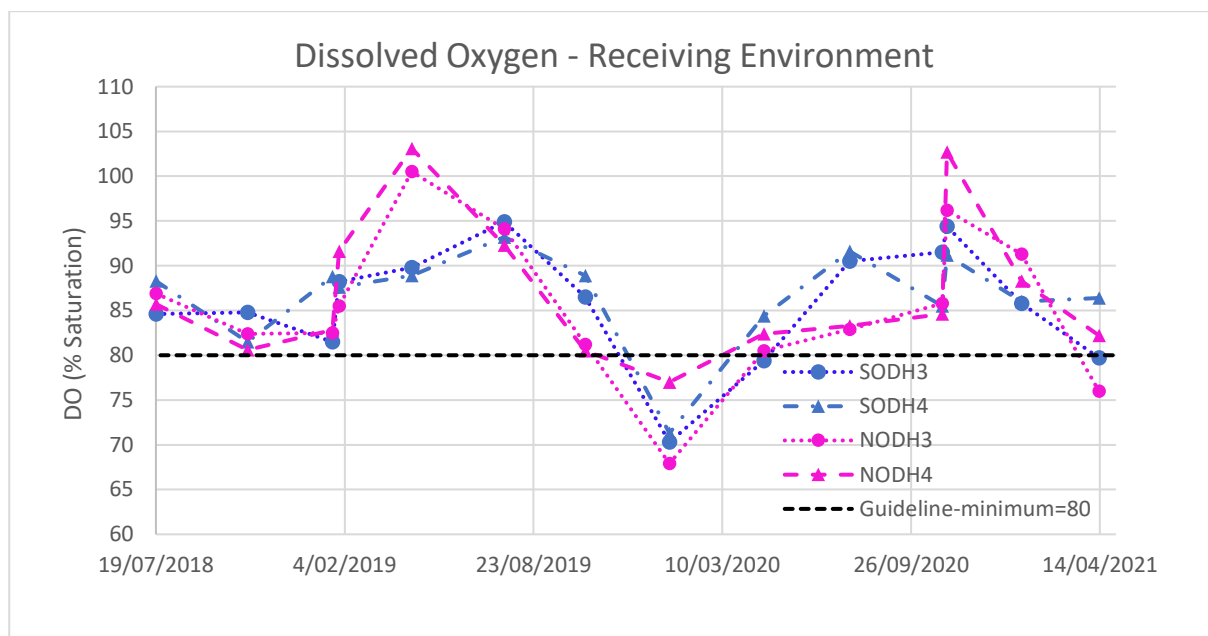


Figure 11: Dissolved Oxygen (% Saturation) at sites in the mixing zone/receiving environment from July 2018 to April 2021 (Quarterly monitoring)

Free Chlorine

Free Chlorine concentration at Darwin Harbour sites varied between 0.01-0.04 mg/L for current reporting period (See Appendix A7 for monitoring data). Site specific trigger values for Free Chlorine are to be developed as per Condition 40 of the WDL 212-02 (WDL 212-02, 2020).

3.1.2 Results of other physical parameters

pH and Total Suspended Solids (TSS) at Darwin Harbour sites for the sampling events from Jul 2018 to May 2021 are shown in Figure 12 and Figure 13 respectively. The results were compared with the guideline values specified in WDL 212-02 (WDL 212-02, 2020).

pH at discharge sites varied between 5.93 – 9.73 pH units (Figure A2, Appendix A) during the reporting period. At southern and northern mixing zones and further downstream sites, pH values are within the guideline range of 6.5 - 8.0 pH unit (WDL 212-02) for all sampling events (Figure 12).

TSS concentrations at site NODH3 (21 Jan 2021) and NODH4 (21 Jan 2021) was 19 mg/L and 27 mg/L, respectively (Figure 13) and are above the guideline value of 10 mg/L (WQODH, 2010, WDL 212-02). TSS concentration at CIPS discharge point NODH1 is <5 mg/L and there was no flow from ADP1 at the time of sampling; indicating that CIPS discharge is not a contributing factor for elevated TSS at Darwin Harbour monitoring sites, NODH3 and NODH4. Tidal water movement and stormwater run-off during the wet season could have caused wash-off and suspension of solids particles resulting in elevated TSS concentrations at monitored sites.

TSS at NODH4 was 14 mg/L on 13 Apr 2021 and exceeds the WDL 212-02 specified guideline values of 10 mg/L for the second consecutive quarterly monitoring event. As both ADP1 and NODH1 had TSS of < 5 mg/L on 13/04/2021, the exceedance at NODH4 is not a result of CIPS northern discharge. On the same day, TSS at SODH3 was 15 mg/L (> 10 mg/L WDL 212-02 guideline value). CIPS discharge is not a contributing factor this exceedance due to no flow at ADP2 and SODH1 at the time of sampling. For the rest of the sampling events, TSS concentrations were below the guideline value of 10 mg/L (WDL 212-02, 2020).

These exceedances were not required to notify NTEPA. Notifications are required only when (i) an exceedance of a trigger value on three consecutive sampling occasions or (ii) an exceedance of three times or more a trigger value as specified in the Water Monitoring Plan or Sediment Monitoring Plan (Condition 35, WDL 212-02).

Table A 3, Table A 4 and Table A5 in Appendix A provides results of Electrical Conductivity (EC), Turbidity and TSS at all monitoring sites, respectively. Biological Oxygen Demand (BOD) at all sites were in the range of 2 - 5 mg/L.

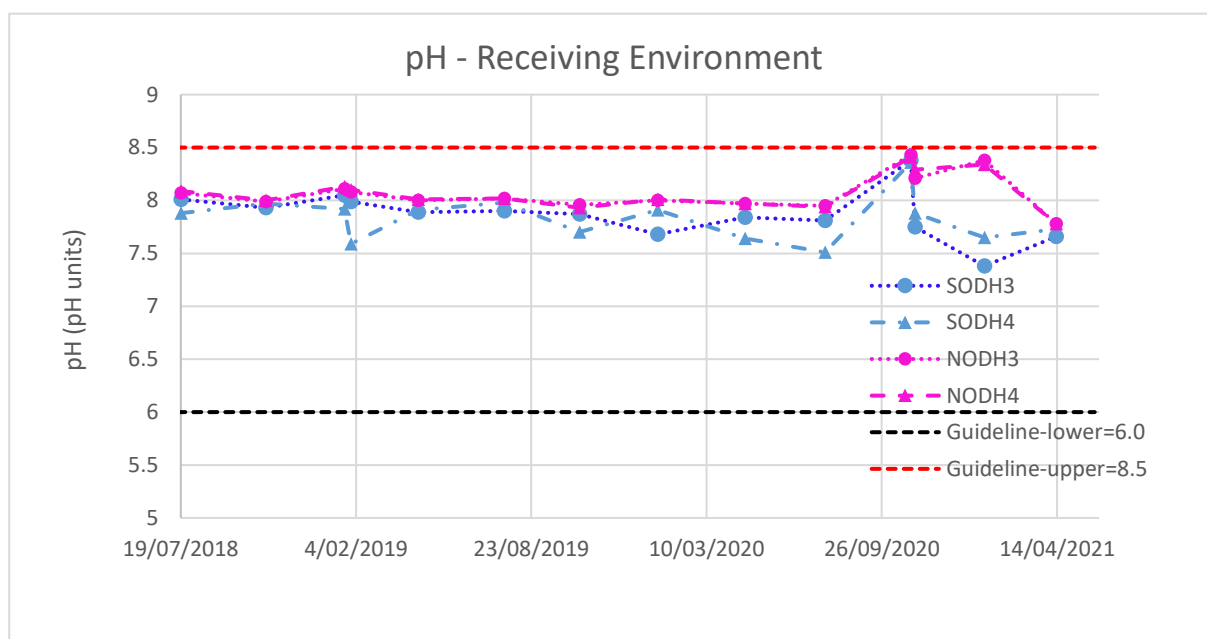


Figure 12: pH at sites in the mixing zone/receiving environment from July 2018 to April 2021 (Quarterly monitoring)

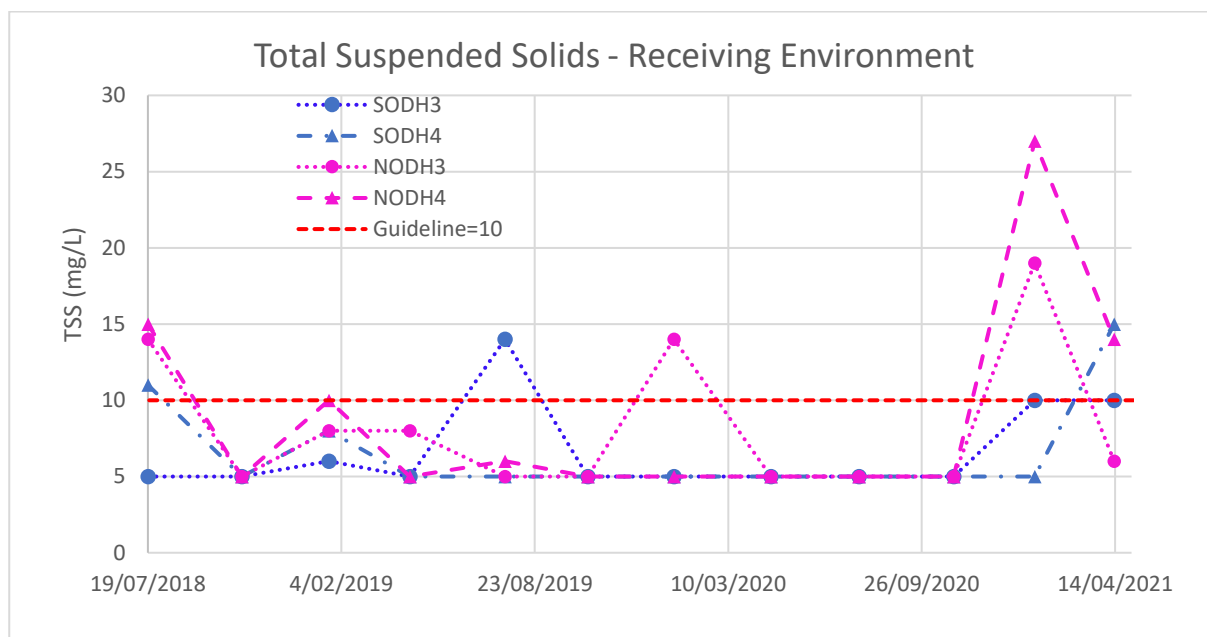


Figure 13: Total Suspended Solids (TSS) at sites in the mixing zone/receiving environment from July 2018 to April 2021 (Quarterly monitoring)

3.1.3 Results of nutrient analysis

Figure 14 to Figure 16 show concentrations of Filterable Reactive Phosphorous (FRP), Total Phosphorous (TP) and Total Nitrogen (TN) at sites in the mixing zone/receiving environment (NODH3, NODH4, SODH3 and SODH4). The concentrations were compared with guidelines values specified in the WDL 212-02. The rest of the results are shown in Figure A3 to A5, Appendix A.

FRP and TP concentrations at all four sites were <0.005 mg/L or 0.005 mg/L (Figure 14 and Figure 15) during the reporting period. The FRP and TP concentrations are below the WDL 212-02 specified guidelines of 0.01 mg/L (FRP) and 0.03 mg/L (TP).

TN concentration at all four sites varied between <0.05 and 0.278 mg/L and are less than the guideline value of 0.30 mg/L (WDL 212-02, 2020).

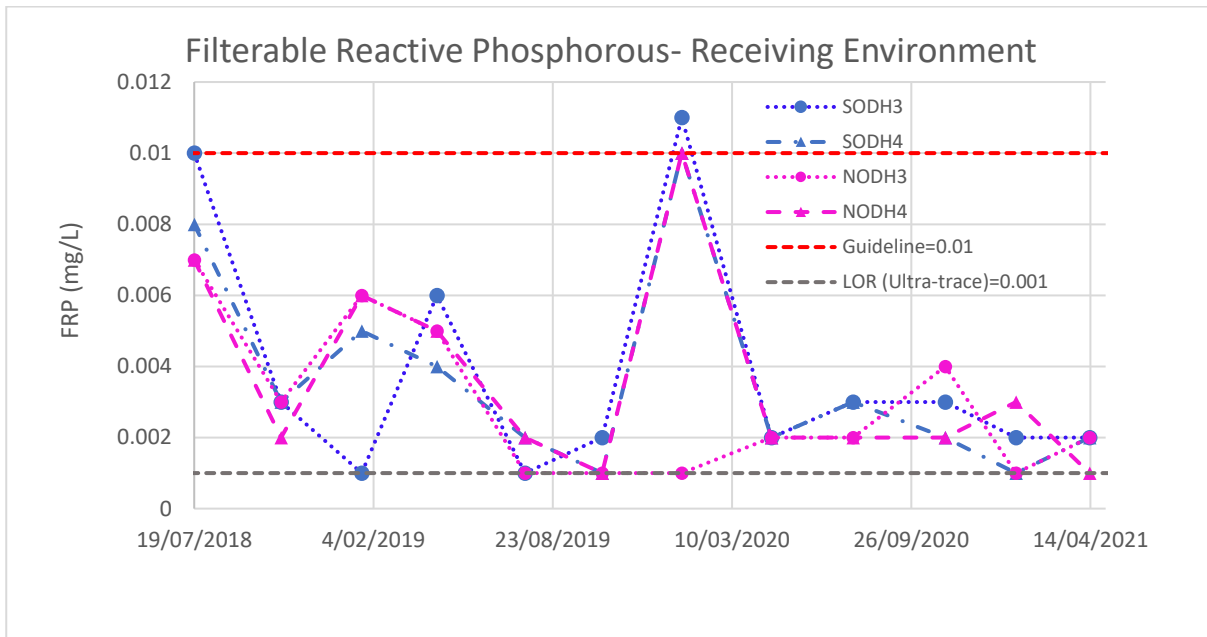


Figure 14 Filterable Reactive Phosphorous (FRP) concentration at sites in the mixing zone/receiving environment from July 2018 to April 2021 (Quarterly monitoring)

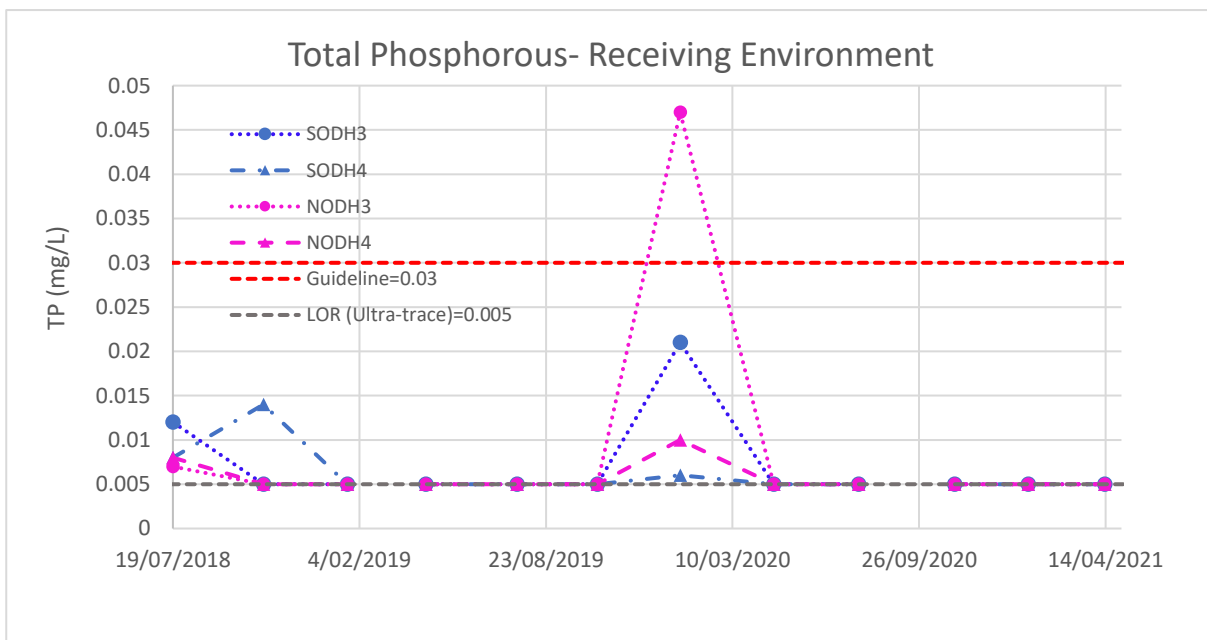


Figure 15 Total Phosphorous (TP) concentration at sites in the mixing zone/receiving environment from July 2018 to April 2021 (Quarterly monitoring)

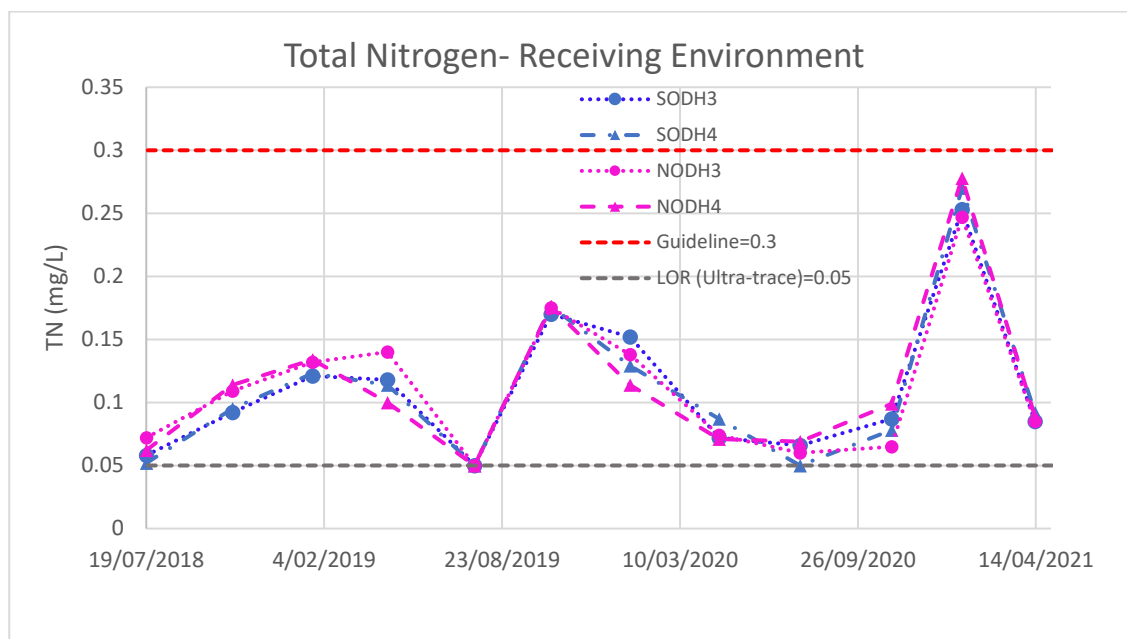


Figure 16 TN concentration at sites in the mixing zone/receiving environment from July 2018 to April 2021 (Quarterly monitoring)

3.1.4 Results of metal analysis

Collected water samples were analysed for 11 metal elements as part of monitoring program and are shown in Table A6 and A7, Appendix A. Metal concentrations at all the sites situated in Darwin Harbour are below ANZECC/ARMANZ (2000b) guideline values for most of the cases, which indicate that there is no evidence of metal contamination in Darwin Harbour caused by metals in CIPS’s discharged water through northern and southern outlets during the monitoring period. An incident of ANZECC/ARMANZ (2000b) trigger value exceedance can be seen at SODH3 on 22/01/2019 (previous reporting year) for Copper and Cobalt (Table A6). As a single exceedance these results are likely due to unknown factors and were not found on any other sampling occasion.

3.1.5 Results of microbiological analysis

E. coli concentrations at all the sites are given in Table A8, Appendix A. *E. coli* concentrations at CIPS discharge sites were highly variable across sampling events. The factors that would influence *E. coli* concentrations at sites SODH1 and NODH1 are stormwater runoff which carry microbes, the presence of cane-toads/birds around the sampling sites and sediment/sludge disturbances that could occur during sampling when the water flow is very low.

Figure 17 shows *E. coli* concentrations at Darwin Harbour sites SODH3, SODH4, NODH3 and NODH4. For most of the sampling events, *E. coli* concentrations at these sites were below the level of reporting. The highest recorded *E. coli* concentration was 26 MPN/100mL on 13/04/2021 indicating that the concentrations were well below the guideline value of 200 MPN/100mL (WDL 212-02, 2020).

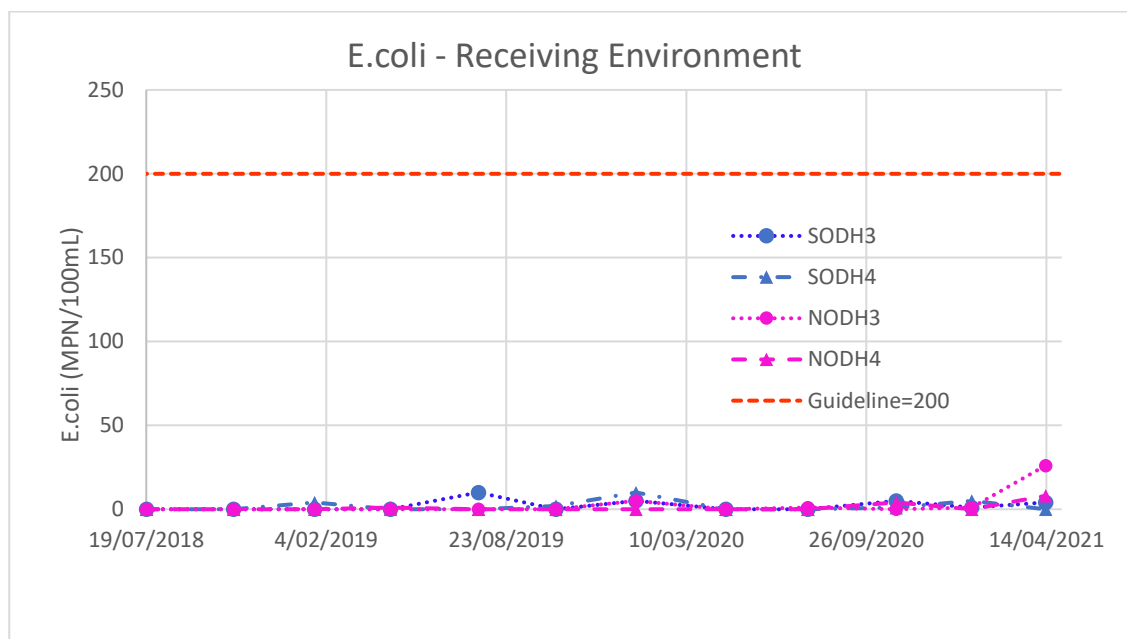


Figure 17: *E.coli* results (MPN/100mL) at sites in the mixing zone/receiving environment from July 2018 to April 2021 (Quarterly monitoring)

3.2 Sediment Monitoring Results

Sediment monitoring was conducted at sites NODH2 and SODH2 on quarterly basis. Laboratory results were compared with the ANZEC/ARMCANZ Interim Sediment Guidelines for environmental sediment monitoring (ISQG, 2000) or WDL 212-02 (WDL 212-02, 2020) trigger values when available.

3.2.1 Results of metal analysis

Metal concentrations of sediment at SODH2 and NODH2 are shown in Table 3 and Table 4 respectively. All the results for the current reporting year are below the ISQG (2000) specified guideline values indicating that water/sediment transport from the CIPS facility had not influenced metals concentrations in the sediment in Darwin Harbour.

Table 3: Sediment-Metal concentrations at SODH2 (Quarterly monitoring)

Metal	Aluminium	Copper	Lead	Nickel	Tin	Zinc	Arsenic	Cadmium	Chromium	Cobalt
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	50	5	5	2	5	5	5	1	2	2
ISQG trigger value-low	Develop SSTV	65	50	21	Develop SSTV	200	20	1.5	80	Develop SSTV
14/04/2016	16200	7	10	10	5	24	14	1	33	7
21/07/2016	8340	5	8	6	5	16	9	1	23	4
25/10/2016	13200	6	10	9	5	23	10	1	30	7
19/01/2017	7880	5	6	5	5	17	7	1	19	4
27/04/2017	10900	5	9	8	5	19	11	1	25	6
31/07/2017	3940	5	5	3	5	10	5	1	12	2
24/10/2017	13600	6	11	9	5	43	16	1	32	7
18/01/2018	19700	8	13	14	5	55	13	1	46	10
19/04/2018	5780	5	7	5	5	15	8	1	16	4
19/07/2018	11900	6	8	8	5	26	13	1	28	6
24/10/2018	12000	5	8	8	5	20	11	1	28	6
22/01/2019	7040	5	6	4	5	20	9	1	19	3
16/04/2019	9910	6	10	7	5	20	14	1	25	6
23/07/2019	10400	5	10	8	5	23	14	1	26	5
17/10/2019	11800	5	10	8	5	22	12	1	29	6
14/01/2020	12000	6	10	8	5	20	13	1	32	6
23/04/2020	10400	6	10	7	5	18	14	1	26	5
23/07/2020	4510	8	6	3	5	9	6	1	16	2
29/10/2020	16200	7	11	9	5	23	17	1	29	6
21/01/2021	6810	5	7	5	19	13	9	1	16	4
13/04/2021	4900	5	5	5	5	17	10	1	16	4

Table 4: Sediment-Metal concentrations at NODH2

Metal	Aluminium	Copper	Lead	Nickel	Tin	Zinc	Arsenic	Cadmium	Chromium	Cobalt
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	50	5	5	2	5	5	5	1	2	2
ISQG trigger value-low	Develop SSTV	65	50	21	Develop SSTV	200	20	1.5	80	Develop SSTV
21/07/2016	14000	7	12	10	5	70	14	1	35	8
25/10/2016	20400	9	13	14	5	81	15	1	44	9
19/01/2017	16100	8	12	12	5	108	15	1	39	8
31/07/2017	17200	8	12	13	5	86	15	1	42	9
24/10/2017	6400	5	6	4	5	13	9	1	17	3
18/01/2018	6480	5	7	5	5	15	10	1	27	3
19/04/2018	13400	8	12	11	5	162	15	1	36	8
19/07/2018	16100	9	11	11	5	207	15	1	38	8
24/10/2018	16200	7	11	11	5	35	13	1	38	7
22/01/2019	8520	5	8	5	5	28	6	1	16	4
16/04/2019	12500	7	12	10	5	38	16	1	34	8
23/07/2019	12800	7	12	10	5	36	18	1	33	8
17/10/2019	15300	8	12	12	5	65	17	1	40	8
14/01/2020	20000	9	14	13	5	47	20	1	50	9
23/04/2020	16300	7	10	10	5	25	15	1	35	7
23/07/2020	18500	7	11	11	5	28	13	1	35	7
29/10/2020	19300	8	10	11	5	42	13	1	34	7
21/01/2021	12500	7	10	9	5	28	13	1	28	6
13/04/2021	6440	6	8	9	5	32	11	1	27	7

3.2.2 Results of hydrocarbon analysis

Total Petroleum Hydrocarbons (TPHs), Polycyclic Aromatic Hydrocarbons (PAHs) and BTEX (Benzene, Toluene, Ethylbenzene, Xylenes) concentrations at SODH2 and NODH2 were below the level of reporting (LOR) or equal to the LOR indicating no evidence of influence in Darwin Harbour sediment quality in terms of hydrocarbons contamination from CIPS discharge. Results are given in Table A 9 and Table A 10, Appendix A.

3.3 Flow Rates/Total Discharge

Wastewater discharge from ADP1 (cooling tower) which flows into the NODH1 were monitored and monthly average flow rate (kL/hr) is shown in Figure 18. The flow rate during the reporting period (since Apr 2020) varied from 0.6 kL/hr to 15.9 kL/hr. Total discharge from ADP1 for the past 14 months (Apr 2020 to May 2021) was also calculated and is 93.02 ML. As shown in Figure 18, there was an increase in monthly average discharge from ADP1, particularly since Feb 2021, compared to similar time in the previous year. Following are the reasons for this notable increase in discharge from ADP1.

- Boiler was offline. It reduced the evaporation rate and up-cycle program in the cooling tower. Hence, the water level in the cooling tower was increased and overflowed after reaching the set point level.
- Cooling tower was required to be online during this time to maintain the cooling process of the closed loop system.

Maintenance on the system monitoring has also been performed (e.g. makeup valve) at the time of reporting and TGen is expecting a reduced water discharge in the coming months. Reductions of ADP1 discharge during last two years were a result of the increased number of cycles the cooling tower undergoes before discharge of water, hence saving water and in turn reducing discharge volumes.

Figure 19 shows the monthly average flow rate at ADP2 which flows into SODH1. The total discharge for the reporting period (14 months) from the ADP2 was 13.04 ML. ADP2 discharge for current reporting period of 14 months (13.04ML) is less than the discharge for previous reporting period of 11 months (16.3 ML).

In total, CIPS has discharged 106.05 ML of wastewater for the 14 months period (Apr 2020 to May 2021).

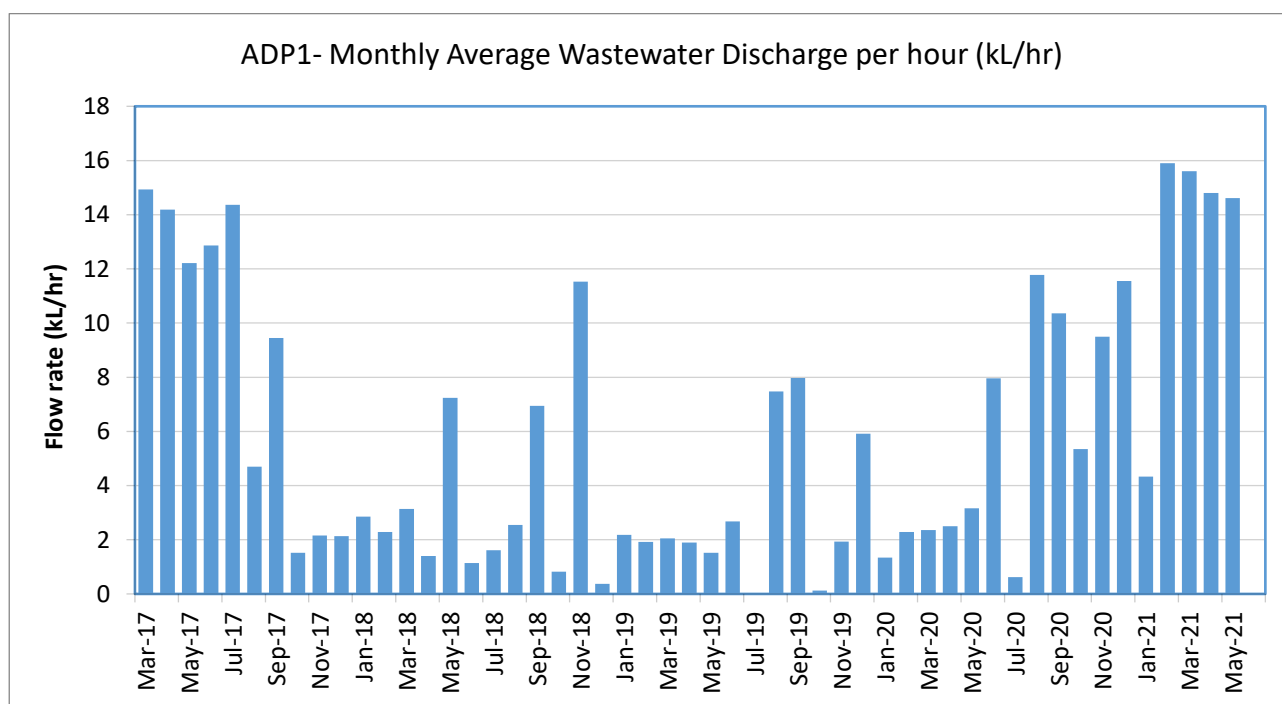


Figure 18: Monthly average wastewater discharge (kL/hr) from ADP1 (Cooling tower)

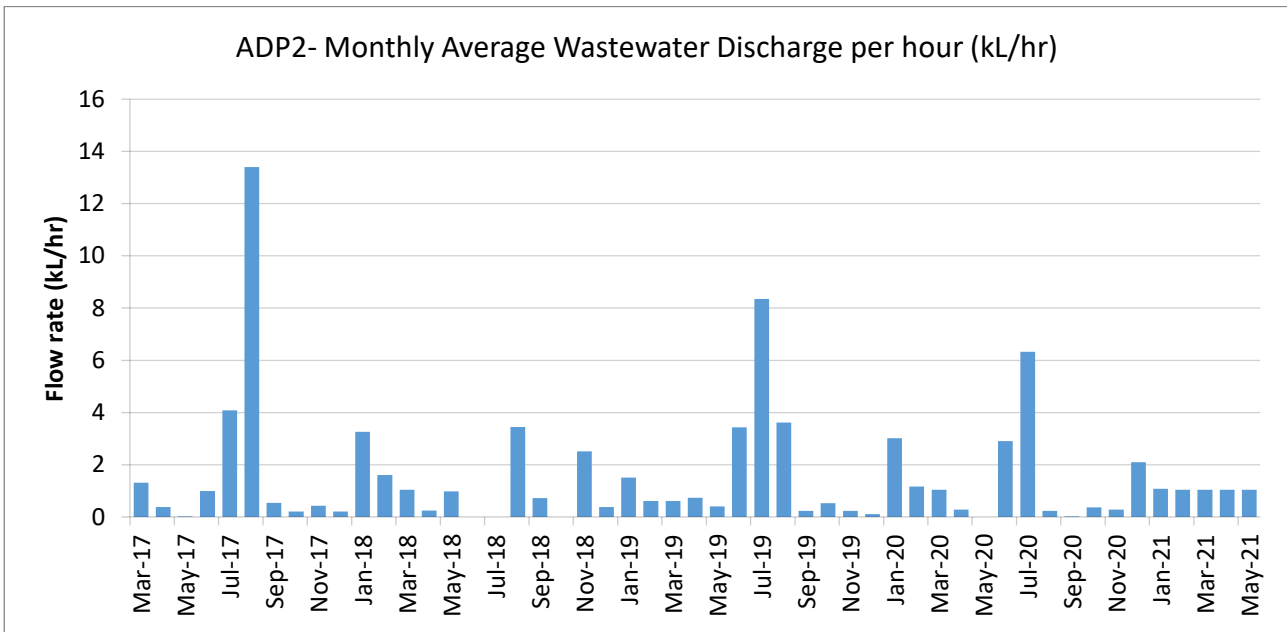


Figure 19: Monthly average wastewater discharge per hour from ADP2 (Cooling ponds outlet)

Given these discharge volumes, the influence on the Darwin Harbour is minimal with the inclusion of marine water. This was in fact evident with the results discussed above under the WDL 212-02 monitoring program.

4 CONCLUSIONS

Wastewater discharges from Channel Island Power Station (CIPS) and receiving water and sediment in Darwin Harbour were monitored in accordance with WDL 212-02 with the purpose of assessing preventing, reducing, controlling, rectifying, any environment harm resulting from wastewater discharged. This report primarily focused on the monitoring results of reporting period from April 2020 to May 2021. Data collected beginning in April 2016 is included in graphs and tables as found in Appendix A for easy reference to previous reporting periods.

The monitoring results from the receiving environment (Darwin Harbour) sites revealed that:

- There was no evidence for nutrients, metals and *E.coli* contamination at Darwin Harbour discharge mixing and receiving environment due to both southern and northern wastewater discharges from CIPS. All the nutrients, metals and *E.coli* concentrations at sites situated in the Darwin Harbour discharge mixing and receiving environment (NODH3, NODH4, SODH3 and SODH4) were below the trigger values defined in WDL 212-02, WQODH (2010) and/or ANZECC (2000).
- pH, Total Suspended Solids (TSS) and Dissolved Oxygen (% Saturation) were also within the specified guideline values at NODH3, NODH4, SODH3 and SODH4 except few occasional exceedances. These parameters are highly variable in the downstream sites due to external factors such as presence of oxygen demanding organic materials in the surrounding environment and tidal movements in Darwin Harbour. These exceedances are not non-compliances according to condition 35 of WDL 212-02.
- Metals and hydrocarbon concentrations of sediment at sites NODH2 and SODH2 were below the ANZECC/ARMCANZ Interim Sediment Quality Guideline values (ISQG, 2000) and the trigger values defined in WDL-212-02 (WDL 212-02, 2020).
- The total wastewater discharge volume from cooling tower and cooling ponds was 106.05 ML for 14 months period.

Based on the monitoring results for the reporting period, there was no evidence of impact resulting from wastewater discharged from CIPS on the Darwin Harbour receiving environment.



5 REFERENCES

ANZECC/ARMANZ (2000a): Australian and New Zealand Environment Council & Agriculture and Resource Management Council of Australia and New Zealand, Australian Guidelines for Water Quality Monitoring and Reporting.

ANZECC/ARMANZ (2000b): Australian and New Zealand Environment Council & Agriculture and Resource Management Council of Australia and New Zealand, Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

SMWW (2005): Standard Methods for the Analysis of Water and Wastewater, 21st Ed. (2005).

WDL 212-01 (2018): Channel Island Power Station-Waste Discharge Licence, June 2018

WDL 212-02 (2020): Channel Island Power Station-Waste Discharge Licence, June 2020

WQODH (2010): Water Quality Objectives for the Darwin Harbour Region- Background Document, NRETAS, Northern Territory Government.

http://territorygeneration.com.au/about_territory_generation/our_power_stations

6 APPENDIX A

A.1 Temperature

Table A 1: Water Temperature at CIPS monitoring sites

Temperature-Monthly monitoring					Temperature-Quarterly monitoring						
Units	ADP1 °C	NODH1 °C	ADP2 °C	SODH1 °C	Units	ISCP °C	ILCP °C	SODH3 °C	SODH4 °C	NODH3 °C	NODH4 °C
14/04/2016	34.14	33.03	31.9	32.96	14/04/2016	32.03	32.79				
10/05/2016	27.55	27.21	29.51	30.37	21/07/2016	29.99	27.4				
9/06/2016			34.12	33.45	25/10/2016	34.06					
21/07/2016			28.37	28.87	19/01/2017	32.12	32.04				
25/08/2016			29.56	30.27	27/04/2017	27.84	28.31				
27/09/2016	28.07	28.93	30.11	32.11	31/07/2017	31.1					
25/10/2016	37.37	35.19	33.03	32.89	24/10/2017	34.66	36.36				
24/11/2016			30.23	31.06	18/01/2018	32.25	31.12				
15/12/2016			29.75	30.81	19/04/2018	32.68	32.04				
19/01/2017	33.35	31.87	30.52	31.42	19/07/2018	31.1	29.53	25.79	25.95	25.95	25.94
23/02/2017	33.53	32.99	30.54		24/10/2018	33.11	33.33	30.92	30.92	30.92	30.88
30/03/2017	38.87	33.14	30.24	31.11	22/01/2019	32.53	31.42	30.19	30.1	30.1	30.18
27/04/2017	36.61	34.71	28.72	28.3	16/04/2019	31.97	31.61	30.8	30.93	30.93	30.88
30/05/2017	29.15	29.55	27.62		23/07/2019	30.04	27.89	24.98	24.99	25.06	24.46
22/06/2017	28.45	29.41	27.35		17/10/2019	33.11	32.22	30.03	30.03	30.19	30.17
31/07/2017			30.41	30.65	14/01/2020	34.13	33.52	30.26	30.26	30.44	30.4
31/08/2017	21.22	22.29	29.31	29.48	23/04/2020	33.46	32.6	31.09	31.19	31.21	31.2
21/09/2017	38.42	31.38			23/07/2020	29.17	26.77	25.51	25.51	25.4	25.45
24/10/2017	30.76	30.76	32.32		29/10/2020	34.45	35.68	31.25	31.38	31.36	31.16
16/11/2017	33.98		30.24		3/11/2020			31.88	31.83	32.11	32.08
20/12/2017	33.19	32.48	31.76		21/01/2021	34.4	33.04	30.82	30.82	31.01	30.86
18/01/2018	34.62	31.05	30.8	29.49	13/04/2021	34.1	33.03	30.16	30.28	30.33	30.21
22/02/2018		30.18	30.81	37.78							
22/03/2018		30.97	31.54	30.99							
19/04/2018	33.85	31.88	31.73	32.43							
17/05/2018	18.09	20.25	25.77	27.85							
21/06/2018	29.53	27.19	25.2								
19/07/2018	34.49	28.78									
23/08/2018											
20/09/2018											
24/10/2018		31.42									
20/11/2018	26.08	28.09		30.75							
18/12/2018		30.93									
22/01/2019	33.55	31.27									
19/02/2019	33.88	31.61									
19/03/2019	33.51	31.83		30.55							
16/04/2019	31.96	30.39									
23/05/2019	30.57	30.39									
20/06/2019		29.51	25.54								
23/07/2019		24.28	28.81	29.36							
26/08/2019											
17/09/2019		27.34									
17/10/2019											
21/11/2019	33.42	31.48									
12/12/2019	35.59	33.09									
14/01/2020	33.96	31.22	31.21	31.47							
20/02/2020	31.96	28.62	29.36	29.28							
26/03/2020	31.83	30.85									
23/04/2020	33.44	31.85									
21/05/2020	29.19	28.98									
18/06/2020				29.91							
23/07/2020			28	28.79							
20/08/2020	24.86	26.36									
24/09/2020	26.75	26.85									
29/10/2020		29.71	30.31	30.19							
3/11/2020		30.624									
26/11/2020	27.95	29.72	30.97								
3/12/2020	26.93	27.48	31.13								
21/01/2021		30.93	32.64	30.79							
4/02/2021	27.21	28.31	28.2	28.71							
11/03/2021	27.5	27.5		30.2							
13/04/2021	27.33	27.9									
27/05/2021	23.03	23.35									

*empty cells=no sampling conducted

A.2 Dissolved Oxygen

Table A 2: Dissolved Oxygen (% Saturation) at CIPS monitoring sites

Dissolved Oxygen % Saturation -Monthly monitoring						Dissolved Oxygen % Saturation -Quartely monitoring									
	SODH1	ADP1	NODH1	ADP2		ISCP	ILCP	SODH3	SODH4	NODH3	NODH4				
Units	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
14/04/2016	62.9	92.1	89.2	28											
10/05/2016	96.3	95.1	96.6	33											
9/06/2016	94.9			66.6											
21/07/2016	73.6			67.8											
25/08/2016	90.6			76.5											
27/09/2016	73.9	96.5	96.2	73.9											
25/10/2016	80.7	91.8	89.1	103.1											
24/11/2016	54.1			43.1											
15/12/2016	64.5			15.7											
19/01/2017	87	87.8	82	71.9											
23/02/2017		83.8	83.8	65.8											
30/03/2017	54.1	51.7	61.2	55.4											
27/04/2017	88.8	73.2	88.9	73.8											
30/05/2017		94.9	93.3	43.6											
22/06/2017		100.4	97.3	78.6											
31/07/2017	99.9			100.5											
31/08/2017	95.3	101.9	101.6	81.6											
21/09/2017		89.6	81.6												
24/10/2017		92.1	82	62.7											
16/11/2017		61.3		35.8											
20/12/2017		97	86.3	55.8											
18/01/2018	43.8	87.1	67.2	61											
22/02/2018	61.5		56.1	50.1											
22/03/2018	89		84.7	71.4											
19/04/2018	82.2	63.2	83.7	50.3											
17/05/2018	87.2	90.9	84.2	86.9											
21/06/2018		54.6	69.1	22.1											
19/07/2018		94.3	86.3												
23/08/2018															
20/09/2018															
24/10/2018			80.3												
20/11/2018	80.9	94.1	91.8												
18/12/2018			66.3												
22/01/2019		56.8	77.5												
19/02/2019		84.5													
19/03/2019	99.1	94.1	71.1												
16/04/2019		93.8	96.2												
23/05/2019	89.6	79.5													
20/06/2019		84.1	47.7												
23/07/2019		67.8	66.4	67.5											
26/08/2019															
17/09/2019		74.8													
17/10/2019															
21/11/2019	79.7	70.1													
12/12/2019	56	91.5													
14/01/2020	61.5	70.4	56.5	65.1											
20/02/2020	88.9	87.3	86.6	91.8											
26/03/2020	67.9	81.3													
23/04/2020	67.8	69.9													
21/05/2020	61.7	63.4													
18/06/2020				66.1											
23/07/2020			59.9	65.6											
20/08/2020	73.1	75.1													
24/09/2020	75.5	75.8													
29/10/2020		70.2	78.3	62.5											
3/11/2020		69.2													
26/11/2020	90.9	91.1	41												
3/12/2020	65.4	93.4	68.1												
21/01/2021		62.2	49.9	61.5											
4/02/2021	55.8	58.4	47.4	65.7											
11/03/2021	57.6	54.1		61.8											
13/04/2021	86.2	72.1													
27/05/2021	88.4	84.9													

*empty cells=no sampling conducted

A.3 Total Suspended Solids

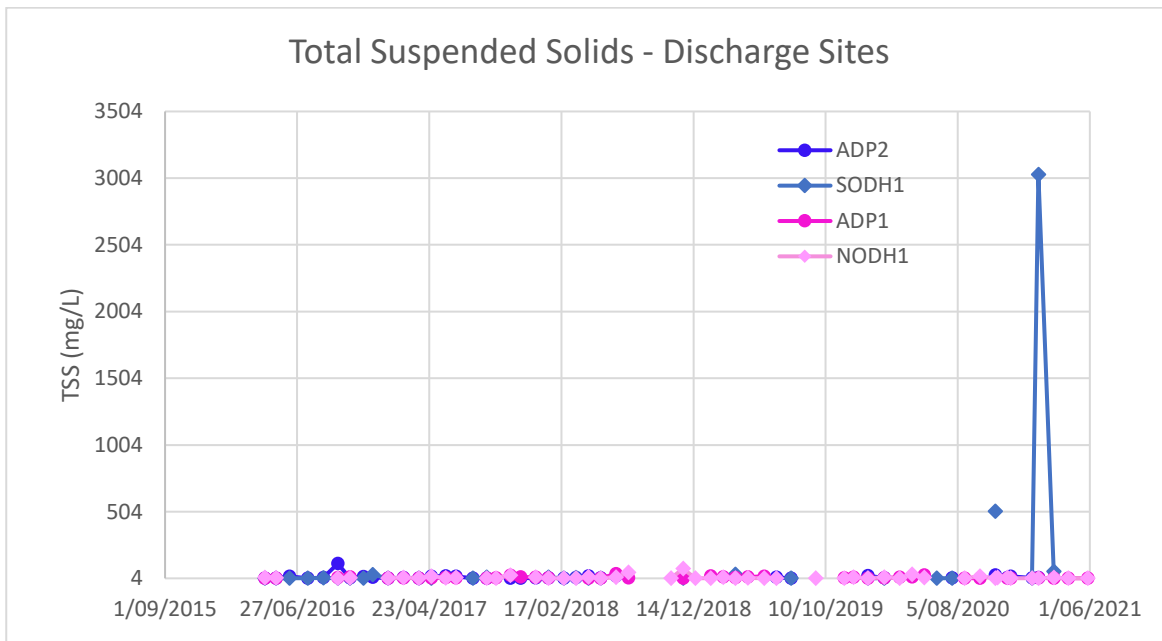


Figure A 1: Total Suspended Solids at CIPS discharge sites

A.4 pH

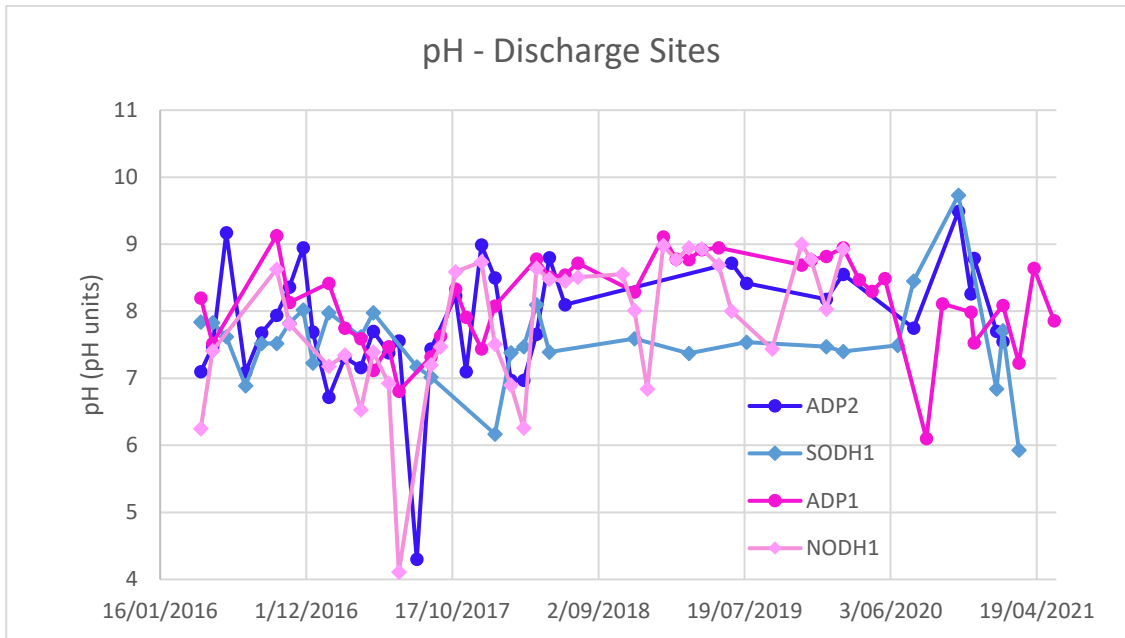


Figure A 2: pH at CIPS discharge sites

A.5 Electrical Conductivity

Table A 3: Electrical Conductivity at CIPS monitoring sites.

EC-Monthly monitoring					EC-Quarterly monitoring							
Units	ADP1 µS/cm	NODH1 µS/cm	ADP2 µS/cm	SODH1 µS/cm	Units	ISCP µS/cm	ILCP µS/cm	SODH3 µS/cm	SODH4 µS/cm	NODH3 µS/cm	NODH4 µS/cm	
14/04/2016	577	589	111	50000	14/04/2016	114	2810					
10/05/2016	105	206	107	19800	21/07/2016	214	3630					
9/06/2016			3610	49000	25/10/2016	803						
21/07/2016			242	209	19/01/2017	117	1173					
25/08/2016			106	108	27/04/2017	62	990					
27/09/2016	247	177	177	1453	31/07/2017	66						
25/10/2016	1042	1165	822	4550	24/10/2017	2120	1770					
24/11/2016			740	55100	18/01/2018	579	2460					
15/12/2016			561	164	19/04/2018	277	1044					
19/01/2017	724	647	122	484	19/07/2018	204	2270	52700	52600	52500	52600	
23/02/2017	134	707	51		24/10/2018	238	6910	55300	55400	55200	55100	
30/03/2017	647	305	54	632	22/01/2019	131	2200	53400	53300	53400	53400	
27/04/2017	642	661	53	4780	16/04/2019	109	1343	50200	50200	50800	50900	
30/05/2017	712	683	70		23/07/2019	71	3020	55100	55100	55100	55300	
22/06/2017	694	666	80		17/10/2019	201	5230	56900	56900	56600	56700	
31/07/2017			148	63	14/01/2020	166	1.409	51500	51600	52000	52000	
31/08/2017	183	182	1790	62	23/04/2020	140	1202	50800	51000	51200	51200	
21/09/2017	551	826			23/07/2020	75	1970	56100	56000	55700	55700	
24/10/2017	2250	2140	2300		29/10/2020	2.91	0.244	55500	55400	55200	55300	
16/11/2017	2060		1490		3/11/2020			54500	54800	54700	54700	
20/12/2017	2420	2450	1200		21/01/2021	0.084	1.011	46500	47300	48100	48400	
18/01/2018	1940	2220	531	790	13/04/2021	0.235	559	51000	51200	51000	51700	
22/02/2018		147	72	667								
22/03/2018		195	228	1407								
19/04/2018	2850	1960	263	6050								
17/05/2018	915	919	119	51								
21/06/2018	1490	1520	164									
19/07/2018	2340	2330										
23/08/2018												
20/09/2018												
24/10/2018		1064										
20/11/2018	676	323		96								
18/12/2018		98										
22/01/2019	1780	2310										
19/02/2019	3360											
19/03/2019	3200	1970		7350								
16/04/2019	3260	1830										
23/05/2019	3450	2200										
20/06/2019		2080	701									
23/07/2019		107	80	63								
26/08/2019												
17/09/2019		142										
17/10/2019												
21/11/2019	2930	1382										
12/12/2019	2990	1295										
14/01/2020	2490	330	169	542								
20/02/2020	2640	334	122	256								
26/03/2020	2620	2060										
23/04/2020	2580	2410										
21/05/2020	2450	2710										
18/06/2020				74								
23/07/2020			89	260								
20/08/2020	3760	3780										
24/09/2020	3580	3790										
29/10/2020		519	239	299								
3/11/2020		326										
26/11/2020	204	288	257									
3/12/2020	201	204	237									
21/01/2021		0.127	79	592								
4/02/2021	350	220	35	10670								
11/03/2021	303	207		20800								
13/04/2021	210	188										
27/05/2021	188	184										

*empty cells=no sampling conducted



A.6 Turbidity

Table A 4: Turbidity at CIPS monitoring sites

Turbidity -Monthly monitoring					Turbidity -Quarterly monitoring						
Units	ADP1	NODH1	ADP2	SODH1	Units	ISCP	ILCP	SODH3	SODH4	NODH3	NODH4
	NTU	NTU	NTU	NTU		NTU	NTU	NTU	NTU	NTU	NTU
14/04/2016	6.57	7.43	4.4	0.35	14/04/2016	6.57	12.3				
10/05/2016	3.66	4.99	4.38	1.18	21/07/2016	2.34	16.3				
9/06/2016			5.52	0.89	25/10/2016	7.92					
21/07/2016			2.14	1.68	19/01/2017	11.4	8.38				
25/08/2016			5.61	2.18	27/04/2017	12.7	2.67				
27/09/2016	2.18	2.02	19.6	2.25	31/07/2017	2.45					
25/10/2016	10.1	9.89	5.83	7.2	24/10/2017	13.3	21.5				
24/11/2016			43.2	1.05	18/01/2018	9.04	2.9				
15/12/2016			16.5	125	19/04/2018	20.2	0.97				
19/01/2017	13.8	11.1	11.2	1.05	19/07/2018	22.3	1.61	7.05	7.54	5.06	6.1
23/02/2017	5.16	9.22	6.57	0	24/10/2018	4.91	5.43	3.53	5.18	4.27	2.97
30/03/2017	7.9	12	8.3	3.94	22/01/2019	9.46	13	9.2	9.63	12.2	5.75
27/04/2017	5.46	5.18	9.27	0.52	16/04/2019	6.06	8.89	2.52	2.38	7.37	6.41
30/05/2017	7.35	4.53	13.5		23/07/2019	2.37	2.41	2.95	2.65	3.12	3.43
22/06/2017	5.9	13.1	13.4		17/10/2019	9.94	7.09	5.68	3.54	5.41	5.42
31/07/2017			2.41	1.27	14/01/2020	16.00	1.40	6.49	6.83	9.55	8.20
31/08/2017	1.68	1.38	2.99	8.18	23/04/2020	10.7	2.25	6.88	8.48	4.66	5.78
21/09/2017	6.1	2.65	0		23/07/2020	2.95	1.28	4.4	4.37	3.86	3.95
24/10/2017	4.16	16.4	1.5		29/10/2020	1.49	24.6	5.76	6.04	4.79	4.11
16/11/2017	7.52		2.91		3/11/2020			8.62	8.88	6.63	5.31
20/12/2017	3.57	3.17	3.85		21/01/2021	4.23	2.91	3.56	3.83	3.39	2.86
18/01/2018	4.95	3.74	8.21	3.94	13/04/2021	8.06	1.43	5.96	12.9	6.86	7.28
22/02/2018		10.4	3.53	6.26							
22/03/2018		6.27	6.39	6.86							
19/04/2018	5.61	8.67	11.6	0.8							
17/05/2018	2.02	3.8	7.25	1.73							
21/06/2018	9.85	18.8	19.9								
19/07/2018	6.21	23.2									
23/08/2018											
20/09/2018											
24/10/2018		4.27									
20/11/2018	2.13	52.2		1.42							
18/12/2018		1.9									
22/01/2019	3.59	1.9									
19/02/2019	4.02										
19/03/2019	3.93	1.55		1.54							
16/04/2019	5.76	2.15									
23/05/2019	12.5	2.46									
20/06/2019		4.32	8.12								
23/07/2019		3.1	2.18	1							
26/08/2019											
17/09/2019		2.98									
17/10/2019											
21/11/2019	5.64	7.23									
12/12/2019	8.05	23.6									
14/01/2020	5.47	18	14.9	22.1							
20/02/2020	6.76	27.6	15	8.86							
26/03/2020	5.92	2.5									
23/04/2020	7.74	19									
21/05/2020	9.3	131									
18/06/2020				1.37							
23/07/2020			2.49	1.11							
20/08/2020	0.72	0.62									
24/09/2020	0.95	8.92									
29/10/2020		1.45	23.4	>1000							
3/11/2020		1.22									
26/11/2020	1.25	8.89	9.55								
3/12/2020	1.12	2.96	16.4								
21/01/2021		6.78	4.08	8.3							
4/02/2021	3.84	8.26	8.54	>1000							
11/03/2021	1.62	9.6		4.4							
13/04/2021	0.95	1.13									
27/05/2021	0.61	0.62									

*empty cells=no sampling conducted



A.7 Free Chlorine

Table A 5: Free Chlorine at CIPS monitoring sites.

Free Chlorine -Monthly monitoring					Free Chlorine -Quartely monitoring						
Units	ADP1	NODH1	ADP2	SODH1	Units	ISCP	ILCP	SODH3	SODH4	NODH3	NODH4
	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
19/07/2018					19/07/2018						
23/08/2018					24/10/2018	0.05	0.03	0.02	0.01	0.01	0.02
20/09/2018					22/01/2019	0.07	0.06	0.04	0.04	0.06	0.06
24/10/2018		0.06			16/04/2019	0.01	0.02	0.03	0.03	0.03	0.03
20/11/2018	1.08	0.25		0.05	23/07/2019	0.03	0.02	0.05	0.04	0.04	0.04
18/12/2018		0.02			17/10/2019	0.03	0.04	0.02	0.03	0.02	0.03
22/01/2019	0.65	0.16			14/01/2020	0.06	0.01	0.04	0.04	0.01	0.03
19/02/2019	0.6	0			23/04/2020	0.04	0.04	0.02	0.02	0.03	0.01
19/03/2019	0.55	0.24		0.11	23/07/2020	0.02	0.03	0.03	0.03	0.02	0.03
16/04/2019	0.41	0.25			29/10/2020	0.01	0.01	0.01	0.02	0.02	0.03
23/05/2019	0.34	0.11			3/11/2020			0.02	0.02	0.04	0.02
20/06/2019		0.13	0.03		21/01/2021	0.01	0.02	0.02	0.02	0.02	0.03
23/07/2019		0.1	0.03	0.66	13/04/2021	0.05	0.03	0.01	0.03	0.02	0.03
26/08/2019											
17/09/2019		0.1									
17/10/2019											
21/11/2019	0.2	0.11									
12/12/2019	0.56	0.14									
14/01/2020	0.96	0.04	0.04	0.04							
20/02/2020	0.41	0.03	0.06	0.13							
26/03/2020	0.45	0.11	0.00	0.00							
23/04/2020	0.33	0.27	0.00	0.00							
21/05/2020	0.18	0.17	0.00	0.00							
18/06/2020		0.00	0.00	0.04							
23/07/2020		0.00	0.02	0.28							
20/08/2020	0.08	0.05									
24/09/2020	2.40	1.85									
29/10/2020		0.05	0.04	0.00							
3/11/2020		0.05	0.00								
26/11/2020	0.05	0.07	0.08								
3/12/2020	0.22	0.32	0.03								
21/01/2021		0.00	0.00	0.11							
4/02/2021	1.54	0.50	0.01								
11/03/2021	0.76	0.42	0.00	0.02							
13/04/2021	0.29	0.16	0.00	0.00							
27/05/2021	0.45	0.45	0.00	0.00							

*empty cells=no sampling conducted

A.8 Nutrients

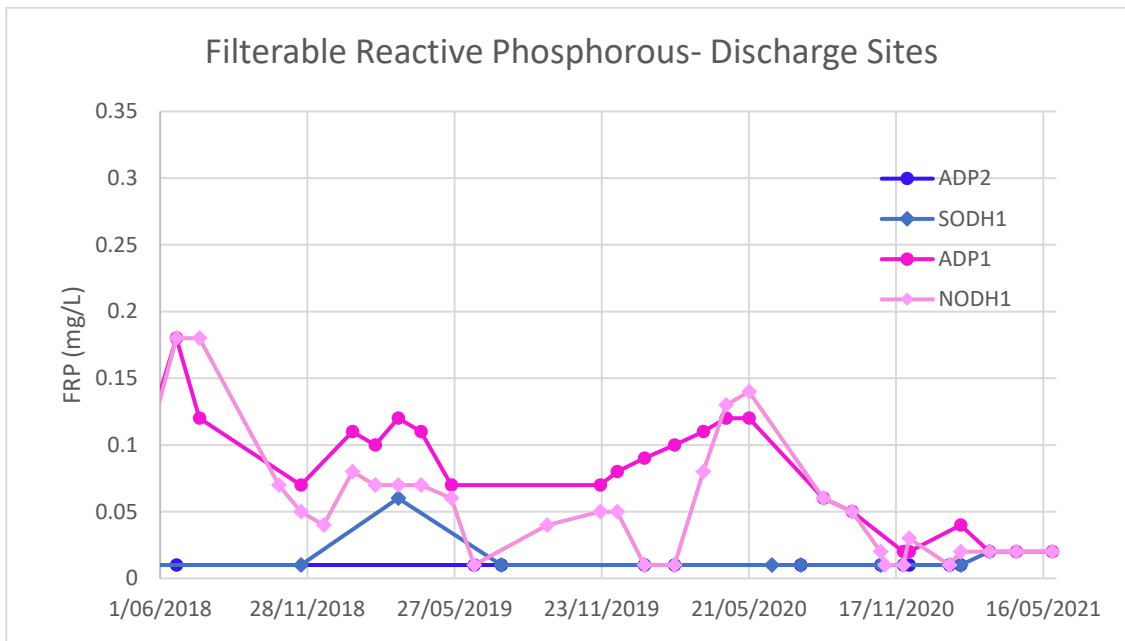


Figure A 3: Filterable Reactive Phosphorous at CIPS discharge sites

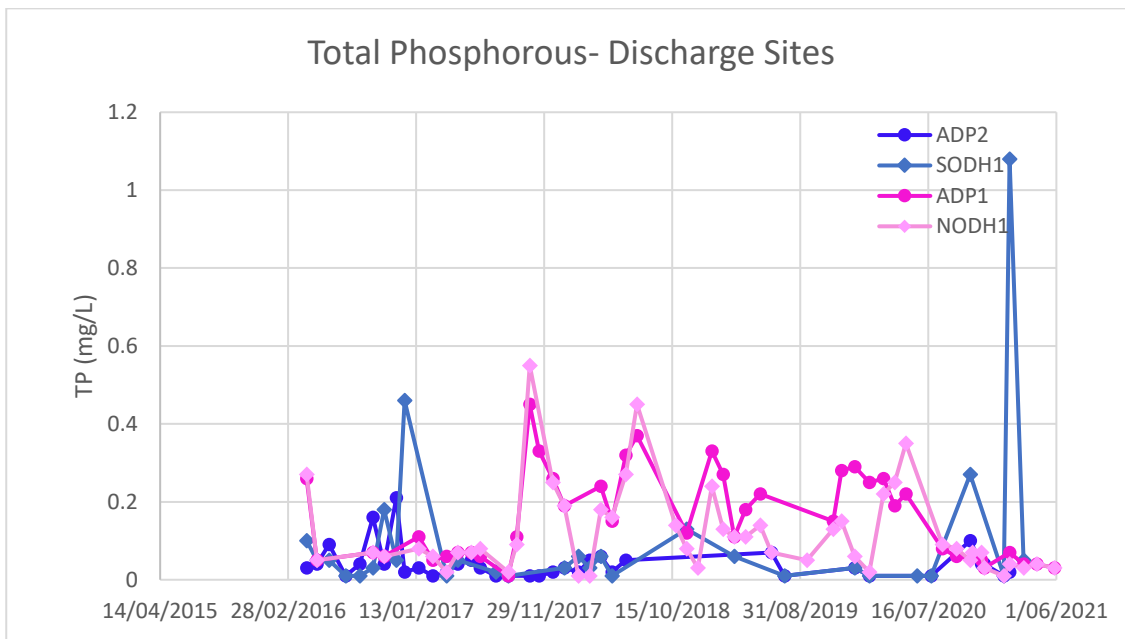


Figure A 4: Total Phosphorous at CIPS discharge sites

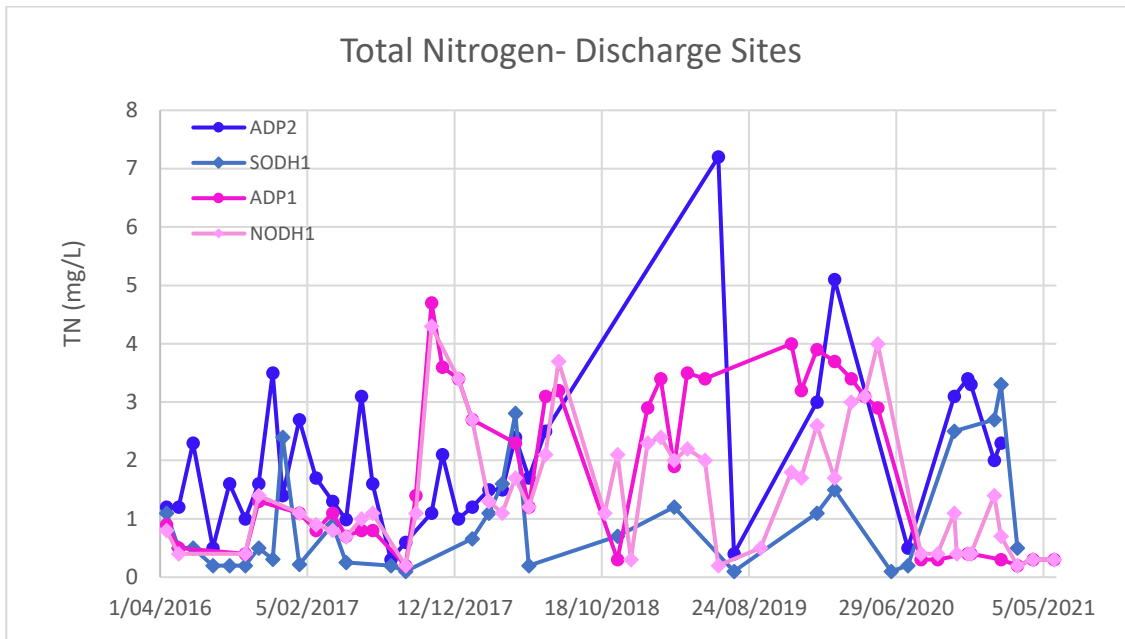


Figure A 5: Total Nitrogen at CIPS discharge sites

A.9 Metals

Table A 6: Metal Concentrations at Sites SODH3 and SODH4

SODH3	Filtered Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
19/07/2018	0.00004	164	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
24/10/2018	0.00004	5	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
22/01/2019	0.00004	5	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
16/04/2019	0.00004	45	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
23/07/2019	0.00004	5	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
17/10/2019	0.00004	5	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
14/01/2020	0.00004	5	0.5	0.2	1	0.2	2.2	0.5	5	5	0.2
23/04/2020	0.00004	5	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
23/07/2020	0.00004	32	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
29/10/2020	0.00004	60	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
3/11/2020											
21/01/2021	0.00004	5	0.5	0.2	1	0.2	1.1	0.5	5	5	0.2
13/04/2021	0.00004	5	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
SODH3	Total Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
ANZECC (2000) guideline value	0.00007		27.4	1	1.3	4.4		70		15	5.5
19/07/2018	0.00004	236	0.5	0.2	1	0.2	2.3	0.5	5	5	0.2
24/10/2018	0.00004	91	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
22/01/2019	0.00004	421	1.5	1.1	6	1.4	2.5	1.8	5	8	0.2
16/04/2019	0.00004	98	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
23/07/2019	0.00004	90	0.5	0.2	1	0.2	0.7	0.5	5	5	0.2
17/10/2019	0.00004	112	0.5	0.2	1	0.2	2.1	0.5	5	5	0.2
14/01/2020	0.00004	301	0.5	0.3	1	0.2	2.5	0.6	5	5	0.2
23/04/2020	0.00004	239	0.6	0.2	1	0.2	2	0.5	5	5	0.2
23/07/2020	0.00004	78	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
29/10/2020	0.00004	165	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
3/11/2020											
21/01/2021	0.00004	54	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
13/04/2021	0.00004	161	0.9	0.2	1	0.2	1.6	0.5	5	5	0.2
SODH4	Filtered Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
19/07/2018	0.00004	156	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
24/10/2018	0.00004	5	0.5	0.2	1	0.2	1.6	0.6	5	5	0.2
22/01/2019	0.00004	5	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
16/04/2019	0.00004	46	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
23/07/2019	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
17/10/2019	0.00004	5	0.5	0.2	1	0.2	1.9	0.5	5	5	0.2
14/01/2020	0.00004	5	0.5	0.2	1	0.2	2.1	0.5	5	5	0.2
23/04/2020	0.00004	5	0.5	0.2	1	0.2	1	0.5	5	5	0.2
23/07/2020	0.00004	31	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
29/10/2020	0.00004	65	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
3/11/2020											
21/01/2021	0.00004	5	0.5	0.2	1	0.2	1.1	0.5	5	5	0.2
13/04/2021	0.00004	5	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
SODH4	Total Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
ANZECC (2000) guideline value	0.00007		27.4	1	1.3	4.4		70		15	5.5
19/07/2018	0.00004	258	0.5	0.2	1	0.2	2.1	0.5	5	5	0.2
24/10/2018	0.00004	82	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
22/01/2019	0.00004	414	1	0.3	1	0.3	1.9	0.8	5	5	0.2
16/04/2019	0.00004	156	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
23/07/2019	0.00004	81	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
17/10/2019	0.00004	62	0.5	0.2	1	0.2	2.3	0.5	5	5	0.2
14/01/2020	0.00004	187	0.5	0.2	1	0.2	2.4	0.5	5	5	0.2
23/04/2020	0.00004	279	0.8	0.2	1	0.2	1.6	4.2	5	5	0.2
23/07/2020	0.00004	145	1.1	0.2	1	3.3	1.6	0.5	5	5	0.2
29/10/2020	0.00004	225	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
3/11/2020											
21/01/2021	0.00004	85	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
13/04/2021	0.00004	352	0.9	0.3	1	0.2	1.8	0.5	5	5	0.2

Table A 7: Metal Concentrations at Sites NODH3 and NODH4

NODH3	Filtered Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
19/07/2018	0.00004	75	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
24/10/2018	0.00004	11	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
22/01/2019	0.00004	5	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
16/04/2019	0.00004	115	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
23/07/2019	0.00004	5	0.5	0.2	1	0.2	0.7	0.5	5	5	0.2
17/10/2019	0.00004	5	0.5	0.2	1	0.2	2.1	0.5	5	5	0.2
14/01/2020	0.00004	5	0.5	0.2	1	0.2	2.4	0.5	5	5	0.2
23/04/2020	0.00004	5	0.5	0.2	1	0.2	0.9	0.5	5	5	0.2
23/07/2020	0.00004	36	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
29/10/2020	0.00004	65	0.5	0.2	1	0.4	1.8	0.5	5	5	0.2
3/11/2020											
21/01/2021	0.00004	5	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
13/04/2021	0.00004	5	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
NODH3	Total Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
ANZECC (2000) guideline value	0.00007		27.4	1	1.3	4.4		70		15	5.5
19/07/2018	0.00004	250	0.5	0.2	1	0.2	2.2	0.5	5	5	0.2
24/10/2018	0.00004	40	0.5	0.2	3	0.2	1.7	0.5	5	5	0.2
22/01/2019	0.00004	389	0.9	0.3	1	0.2	1.9	0.7	5	5	0.2
16/04/2019	0.00004	274	0.6	0.2	1	0.2	1.7	0.5	5	5	0.2
23/07/2019	0.00004	76	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
17/10/2019	0.00004	34	0.5	0.2	1	0.2	2.2	0.5	5	5	0.2
14/01/2020	0.00004	216	0.6	0.2	1	0.2	2.4	0.9	5	5	0.2
23/04/2020	0.00004	185	0.8	0.2	1	0.2	1.9	0.5	5	5	0.2
23/07/2020	0.00004	92	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
29/10/2020	0.00004	172	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
3/11/2020											
21/01/2021	0.00004	69	0.5	0.2	1	0.2	1.3	0.5	5	5	0.2
13/04/2021	0.00004	229	0.9	0.2	1	0.2	1.6	0.5	5	5	0.2
NODH4	Filtered Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
19/07/2018	0.00004	105	0.5	0.2	1	0.2	1.9	0.5	5	5	0.2
24/10/2018	0.00004	5	0.5	0.2	1	0.2	1.7	0.8	5	5	0.2
22/01/2019	0.00004	5	0.5	0.2	1	0.2	1.7	0.5	5	5	0.2
16/04/2019	0.00004	85	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
23/07/2019	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
17/10/2019	0.00004	6	0.5	0.2	1	0.2	1.9	0.5	5	5	0.2
14/01/2020	0.00004	5	0.5	0.2	1	0.2	2.3	0.5	5	5	0.2
23/04/2020	0.00004	5	0.5	0.2	1	0.2	1	0.5	5	5	0.2
23/07/2020	0.00004	26	0.5	0.2	1	0.2	1.4	0.5	5	5	0.2
29/10/2020	0.00004	42	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
3/11/2020											
21/01/2021	0.00004	5	0.5	0.2	1	0.2	1.1	0.5	5	5	0.2
13/04/2021	0.00004	5	0.5	0.2	1	0.2	1.5	0.5	5	5	0.2
NODH4	Total Metal Concentrations (µg/L)										
	Mercury*	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.00004	5	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
ANZECC (2000) guideline value	0.00007		27.4	1	1.3	4.4		70		15	5.5
19/07/2018	0.00004	220	0.5	0.2	1	0.2	2	0.5	5	5	0.2
24/10/2018	0.00004	74	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
22/01/2019	0.00004	227	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2
16/04/2019	0.00004	261	0.5	0.2	1	0.2	1.5	1	5	5	0.2
23/07/2019	0.00004	75	0.5	0.2	1	0.2	0.5	0.5	5	5	0.2
17/10/2019	0.00004	77	0.5	0.2	1	0.2	2.4	0.5	5	5	0.2
14/01/2020	0.00004	205	0.5	0.2	1	0.2	2.3	0.5	5	5	0.2
23/04/2020	0.00004	151	0.8	0.2	1	0.2	2	0.5	5	5	0.2
23/07/2020	0.00004	74	0.5	0.2	1	0.2	1.6	0.5	5	5	0.2
29/10/2020	0.00004	82	0.5	0.2	15	0.2	1.7	0.5	5	10	0.2
3/11/2020											
21/01/2021	0.00004	55	0.5	0.2	1	0.2	1.2	0.5	5	5	0.2
13/04/2021	0.00004	173	0.5	0.2	1	0.2	1.8	0.5	5	5	0.2

*Mercury Concentrations are in mg/L

Table A 8: Metal Concentrations at Site SODH1

SODH1	Filtered metal concentrations (mg/L)											
	Chemical Name	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
10/05/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
9/06/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
21/07/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.042	0.0001
25/08/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.04	0.0001
27/09/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.037	0.0001
25/10/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
24/11/2016	0.0001	5	0.5	0.2	1	0.2	1.8	1.1	5	10	0.001	
15/12/2016	0.0001	0.19	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.05	0.0001	
19/01/2017	0.0001	5	0.5	0.2	1	0.2	1.3	1.1	5	16		
23/02/2017												
30/03/2017	0.0001	0.03	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.026	0.0001	
27/04/2017	0.00004	5	0.5	0.2	1	0.2	1.5	0.9	5	28	0.2	
30/05/2017												
22/06/2017												
31/07/2017	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.011	0.0001	
31/08/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.036	0.0001	
21/09/2017												
24/10/2017												
16/11/2017												
20/12/2017												
18/01/2018	0.00004	6	0.5	0.2	2	0.2	0.5	0.5	5	54	0.2	
22/02/2018	0.0001	0.04	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.03	0.0001	
22/03/2018	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.043	0.0002	
19/04/2018	0.00004	9	0.5	0.2	2	0.2	1.2	0.5	5	22	0.2	
17/05/2018	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.029	0.0001	
21/06/2018												
19/07/2018												
23/08/2018												
20/09/2018												
24/10/2018												
20/11/2018	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.014	0.0001	
18/12/2018												
22/01/2019												
19/02/2019												
19/03/2019	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001	
16/04/2019												
23/05/2019												
20/06/2019												
23/07/2019	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001	
26/08/2019												
17/09/2019												
17/10/2019												
21/11/2019												
12/12/2019												
14/01/2020	0.0001	0.07	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.015	0.0001	
20/02/2020	0.0001	0.11	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.022	0.0001	
26/03/2020												
23/04/2020												
21/05/2020												
18/06/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001	
23/07/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001	
20/08/2020												
24/09/2020												
29/10/2020	0.0001	1.83	0.006	0.001	0.006	0.005	0.001	0.001	0.001	0.097	0.0001	
3/11/2020												
26/11/2020												
3/12/2020												
21/01/2021	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.012	0.0001	
4/02/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.021	0.0001	
11/03/2021	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.022	0.0001	
13/04/2021												
27/05/2021												



SODH1	Total metal concentrations (mg/L)										
Chemical Nam	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.052	0.001
10/05/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
9/06/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.001
21/07/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
25/08/2016	0.0001	3.36	0.017	0.012	0.027	0.008	0.022	0.034	0.001	0.097	0.0001
27/09/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
25/10/2016	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.052	0.001
24/11/2016	0.0001	12	0.5	0.2	1	0.2	1.8	1.1	5	8	0.001
15/12/2016	0.0001	0.84	0.002	0.001	0.006	0.002	0.001	0.001	0.001	0.09	0.0001
19/01/2017	0.0001	25	0.5	0.2	1	0.2	1.5	1.1	5	11	
23/02/2017											
30/03/2017	0.0001	0.1	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.014	0.0003
27/04/2017	0.00004	11	0.5	0.2	1	0.2	1.5	0.6	5	11	0.2
30/05/2017											
22/06/2017											
31/07/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.003	0.001	0.003	0.005	0.0001
31/08/2017	0.0001	0.05	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
21/09/2017											
24/10/2017											
16/11/2017											
20/12/2017											
18/01/2018	0.00004	112	0.5	0.2	2	0.2	0.5	0.6	5	33	0.2
22/02/2018	0.0001	0.17	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.014	0.0001
22/03/2018	0.0001	0.09	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.019	0.0001
19/04/2018	0.00004	39	0.5	0.2	2	0.2	1.3	0.5	5	13	0.2
17/05/2018	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
21/06/2018											
19/07/2018											
23/08/2018											
20/09/2018											
24/10/2018											
20/11/2018	0.0001	0.03	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.014	0.0001
18/12/2018											
22/01/2019											
19/02/2019											
19/03/2019	0.0001	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.052	0.001
16/04/2019											
23/05/2019											
20/06/2019											
23/07/2019	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
26/08/2019											
17/09/2019											
17/10/2019											
21/11/2019											
12/12/2019											
14/01/2020	0.0001	0.49	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.021	0.0001
20/02/2020	0.0001	0.2	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.03	0.0001
26/03/2020											
23/04/2020											
21/05/2020											
18/06/2020	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
23/07/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
20/08/2020											
24/09/2020											
29/10/2020	0.0001	4.43	0.011	0.001	0.008	0.006	0.001	0.003	0.001	0.104	0.0001
3/11/2020											
26/11/2020											
3/12/2020											
21/01/2021	0.0001	0.08	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.009	0.0001
4/02/2021	0.0001	1.56	0.003	0.001	0.004	0.003	0.001	0.008	0.001	0.067	0.0001
11/03/2021	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.024	0.0002
13/04/2021											
27/05/2021											



Table A 9: Metal Concentrations at Site ADP2

ADP2	Filtered metal concentrations (mg/L)											
Chemical Name	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium	
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001	
14/04/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.04	0.0001	
10/05/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.005	0.001	0.053	0.0001	
9/06/2016	0.0001	0.02	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.005	0.0001	
21/07/2016	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.04	0.0001	
25/08/2016	0.0001	0.01	0.001	0.001	0.014	0.001	0.001	0.002	0.001	0.036	0.0001	
27/09/2016	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.076	0.0001	
25/10/2016	0.0001	0.04	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.069	0.0001	
24/11/2016	0.0001	0.7	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.034	0.0001	
15/12/2016	0.0001	0.25	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.024	0.0001	
19/01/2017	0.0001	0.18	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.038	0.0001	
23/02/2017	0.0001	0.08	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051	0.0001	
30/03/2017	0.0001	0.06	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.022	0.0001	
27/04/2017	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.056	0.0001	
30/05/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.045	0.0001	
22/06/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.066	0.0001	
31/07/2017	0.0001	0.03	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.167	0.0001	
31/08/2017	0.0001	0.03	0.002	0.001	0.005	0.001	0.001	0.003	0.001	0.062	0.0001	
21/09/2017												
24/10/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.048	0.0001	
16/11/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.094	0.0001	
20/12/2017	0.0001	0.03	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.011	0.0001	
18/01/2018	0.0001	0.06	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.024	0.0001	
22/02/2018	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.046	0.0001	
22/03/2018	0.0001	0.04	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.086	0.0001	
19/04/2018	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.079	0.0001	
17/05/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.013	0.0001	
21/06/2018	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.025	0.0001	
19/07/2018												
23/08/2018												
20/09/2018												
24/10/2018												
20/11/2018												
18/12/2018												
22/01/2019												
19/02/2019												
19/03/2019												
16/04/2019												
23/05/2019												
20/06/2019	0.0001	0.02	0.001	0.001	0.004	0.001	0.002	0.001	0.001	0.013	0.0001	
23/07/2019	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.017	0.0001	
26/08/2019												
17/09/2019												
17/10/2019												
21/11/2019												
12/12/2019												
14/01/2020	0.0001	0.06	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.022	0.0001	
20/02/2020	0.0001	0.03	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.0001	
26/03/2020												
23/04/2020												
21/05/2020												
18/06/2020												
23/07/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.014	0.0001	
20/08/2020												
24/09/2020												
29/10/2020	0.0001	0.06	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.032	0.0001	
3/11/2020												
26/11/2020	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.013	0.0001	
3/12/2020	0.0001	0.03	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.02	0.0001	
21/01/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.037	0.0001	
4/02/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.093	0.0001	
11/03/2021												
13/04/2021												
27/05/2021												



ADP2	Total metal concentrations (mg/L)											
Chemical Nam	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium	
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001	
14/04/2016	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.026	0.0001	
10/05/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.006	0.001	0.014	0.0001	
9/06/2016	0.0001	0.03	0.001	0.001	0.001	0.001	0.003	0.003	0.001	0.005	0.0002	
21/07/2016	0.0001	0.04	0.001	0.001	0.007	0.001	0.001	0.002	0.001	0.057	0.0001	
25/08/2016	0.0001	0.02	0.002	0.001	0.025	0.001	0.001	0.003	0.001	0.048	0.0001	
27/09/2016	0.0001	0.4	0.001	0.001	0.003	0.005	0.002	0.002	0.001	0.115	0.0003	
25/10/2016	0.0001	0.06	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.018	0.0001	
24/11/2016	0.0001	0.6	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.05	0.0001	
15/12/2016	0.0001	0.21	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.028	0.0001	
19/01/2017	0.0001	0.17	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.028	0.0001	
23/02/2017	0.0001	0.18	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.05	0.0001	
30/03/2017	0.0001	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.035	0.0001	
27/04/2017	0.0001	0.02	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.042	0.0001	
30/05/2017	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.025	0.0001	
22/06/2017	0.0001	0.02	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.059	0.0001	
31/07/2017	0.0001	0.03	0.001	0.001	0.004	0.001	0.001	0.001	0.004	0.025	0.0001	
31/08/2017	0.0001	0.22	0.005	0.001	0.014	0.001	0.001	0.004	0.001	0.042	0.0001	
21/09/2017												
24/10/2017	0.0001	0.01	0.001	0.001	0.005	0.001	0.001	0.004	0.001	0.034	0.0001	
16/11/2017	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.024	0.0001	
20/12/2017	0.0001	0.04	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.016	0.0001	
18/01/2018	0.0001	0.04	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.018	0.0001	
22/02/2018	0.0001	0.08	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.039	0.0001	
22/03/2018	0.0001	0.06	0.001	0.001	0.021	0.001	0.001	0.002	0.001	0.06	0.0001	
19/04/2018	0.0001	0.04	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.041	0.0001	
17/05/2018	0.0001	0.05	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.024	0.0001	
21/06/2018	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.0001	
19/07/2018												
23/08/2018												
20/09/2018												
24/10/2018												
20/11/2018												
18/12/2018												
22/01/2019												
19/02/2019												
19/03/2019												
16/04/2019												
23/05/2019												
20/06/2019	0.0001	0.03	0.001	0.001	0.005	0.001	0.001	0.002	0.001	0.026	0.0001	
23/07/2019	0.0001	0.01	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.017	0.0001	
26/08/2019												
17/09/2019												
17/10/2019												
21/11/2019												
12/12/2019												
14/01/2020	0.0001	0.09	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.062	0.0001	
20/02/2020	0.0001	0.09	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.026	0.0001	
26/03/2020												
23/04/2020												
21/05/2020												
18/06/2020												
23/07/2020	0.0001	0.01	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.023	0.0001	
20/08/2020												
24/09/2020												
29/10/2020	0.0001	0.07	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.027	0.0001	
3/11/2020												
26/11/2020	0.0001	0.04	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.032	0.0001	
3/12/2020	0.0001	0.08	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.031	0.0001	
21/01/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.045	0.0001	
4/02/2021	0.0001	0.06	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.071	0.0001	
11/03/2021												
13/04/2021												
27/05/2021												

Table A 10: Metal Concentrations at Site NODH1

NODH1	Filtered metal concentrations (mg/L)											
	Chemical Name	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.01	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.67	0.0001
10/05/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.388	0.0001
9/06/2016												
21/07/2016												
25/08/2016												
27/09/2016	0.0001	0.01	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.345	0.0001
25/10/2016	0.0001	0.01	0.001	0.001	0.001	0.005	0.001	0.002	0.001	0.001	0.84	0.0001
24/11/2016												
15/12/2016												
19/01/2017	0.0001	0.02	0.001	0.001	0.001	0.004	0.001	0.001	0.001	0.001	1.16	0.0001
23/02/2017	0.0001	0.01	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.511	0.0001
30/03/2017	0.0001	0.04	0.001	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.474	0.0001
27/04/2017	0.0001	0.01	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.504	0.0001
30/05/2017	0.0001	0.01	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.662	0.0001
22/06/2017	0.0001	0.01	0.001	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.932	0.0001
31/07/2017												
31/08/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.368	0.0001
21/09/2017	0.0001	0.01	0.001	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.649	0.0001
24/10/2017	0.0001	0.01	0.002	0.001	0.001	0.008	0.001	0.006	0.001	0.001	0.064	0.0001
16/11/2017												
20/12/2017	0.0001	0.01	0.003	0.001	0.001	0.006	0.001	0.006	0.001	0.001	0.006	0.0001
18/01/2018	0.0001	0.01	0.002	0.001	0.001	0.002	0.001	0.005	0.001	0.001	0.005	0.0001
22/02/2018	0.0001	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.152	0.0001
22/03/2018	0.0001	0.09	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.149	0.0001
19/04/2018	0.0001	0.01	0.002	0.001	0.001	0.003	0.001	0.004	0.002	0.001	0.013	0.0001
17/05/2018	0.0001	0.01	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.013	0.0001
21/06/2018	0.0001	0.01	0.002	0.001	0.001	0.002	0.001	0.003	0.001	0.001	0.008	0.0001
19/07/2018	0.0001	0.01	0.003	0.001	0.001	0.005	0.001	0.004	0.001	0.001	0.007	0.0001
23/08/2018												
20/09/2018												
24/10/2018	0.0001	0.06	0.001	0.001	0.001	0.003	0.001	0.003	0.001	0.001	0.048	0.0001
20/11/2018	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.064	0.0001
18/12/2018	0.0001	0.02	0.001	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.021	0.0001
22/01/2019	0.0001	0.01	0.002	0.001	0.001	0.001	0.001	0.005	0.001	0.001	0.008	0.0001
19/02/2019	0.0001	0.03	0.002	0.001	0.001	0.004	0.001	0.004	0.001	0.001	0.015	0.0001
19/03/2019	0.0001	0.01	0.002	0.001	0.001	0.002	0.001	0.004	0.001	0.001	0.009	0.0001
16/04/2019	0.0001	0.02	0.002	0.001	0.001	0.002	0.001	0.004	0.001	0.001	0.008	0.0001
23/05/2019	0.0001	0.01	0.002	0.001	0.001	0.002	0.001	0.004	0.001	0.001	0.005	0.0001
20/06/2019	0.0001	0.02	0.001	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.012	0.0001
23/07/2019												
26/08/2019												
17/09/2019	0.0001	0.02	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.012	0.0001
17/10/2019												
21/11/2019	0.0001	0.01	0.002	0.001	0.001	0.002	0.001	0.003	0.001	0.001	0.01	0.0001
12/12/2019	0.0001	0.01	0.001	0.001	0.001	0.003	0.001	0.003	0.001	0.001	0.015	0.0001
14/01/2020	0.0001	0.36	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.072	0.0001
20/02/2020	0.0001	0.05	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.034	0.0001
26/03/2020	0.0001	0.02	0.002	0.001	0.001	0.002	0.001	0.004	0.001	0.001	0.015	0.0001
23/04/2020	0.0001	0.01	0.002	0.001	0.001	0.01	0.001	0.006	0.001	0.001	0.005	0.0001
21/05/2020	0.0001	0.01	0.003	0.001	0.001	0.013	0.001	0.006	0.001	0.001	0.005	0.0001
18/06/2020												
23/07/2020												
20/08/2020	0.0001	0.01	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
24/09/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
29/10/2020	0.0001	0.01	0.001	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.044	0.0001
3/11/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
26/11/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
3/12/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
21/01/2021	0.0001	0.06	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.082	0.0001
4/02/2021	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.026	0.0001
11/03/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.007	0.0001
13/04/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.011	0.0001
27/05/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001

NODH1	Total metal concentrations (mg/L)											
	Chemical Nam	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
	LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
	14/04/2016	0.0001	0.04	0.001	0.001	0.004	0.001	0.001	0.001	0.001	1.09	0.0001
	10/05/2016	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.714	0.0001
	9/06/2016											
	21/07/2016											
	25/08/2016											
	27/09/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.484	0.0001
	25/10/2016	0.0001	0.02	0.001	0.001	0.005	0.001	0.001	0.001	0.001	1.15	0.0001
	24/11/2016											
	15/12/2016											
	19/01/2017	0.0001	0.06	0.001	0.001	0.005	0.001	0.003	0.001	0.001	1.23	0.0001
	23/02/2017	0.0001	0.13	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.826	0.0001
	30/03/2017	0.0001	0.14	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.465	0.0001
	27/04/2017	0.0001	0.03	0.001	0.001	0.004	0.001	0.001	0.002	0.002	0.785	0.0001
	30/05/2017	0.0001	0.06	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.896	0.0001
	22/06/2017	0.0001	0.12	0.001	0.001	0.004	0.001	0.001	0.001	0.001	1.2	0.0001
	31/07/2017											
	31/08/2017	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.448	0.0001
	21/09/2017	0.0001	0.02	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.822	0.0001
	24/10/2017	0.0001	0.31	0.003	0.001	0.011	0.001	0.007	0.002	0.002	0.47	0.0001
	16/11/2017											
	20/12/2017	0.0001	0.01	0.003	0.001	0.006	0.001	0.006	0.001	0.003	0.007	0.0001
	18/01/2018	0.0001	0.02	0.002	0.001	0.002	0.001	0.005	0.001	0.001	0.012	0.0001
	22/02/2018	0.0001	0.2	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.135	0.0001
	22/03/2018	0.0001	0.12	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.115	0.0001
	19/04/2018	0.0001	0.09	0.002	0.001	0.003	0.001	0.004	0.001	0.001	0.035	0.0001
	17/05/2018	0.0001	0.03	0.001	0.001	0.004	0.001	0.002	0.001	0.001	0.028	0.0001
	21/06/2018	0.0001	0.05	0.002	0.001	0.003	0.001	0.003	0.001	0.001	0.049	0.0001
	19/07/2018	0.0001	0.53	0.004	0.001	0.01	0.001	0.005	0.001	0.001	0.261	0.0001
	23/08/2018											
	20/09/2018											
	24/10/2018	0.0001	0.09	0.001	0.001	0.003	0.001	0.002	0.001	0.001	0.062	0.0001
	20/11/2018	0.0001	0.33	0.001	0.001	0.006	0.002	0.001	0.002	0.001	0.166	0.0001
	18/12/2018	0.0001	0.03	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.029	0.0001
	22/01/2019	0.0001	0.02	0.002	0.001	0.002	0.001	0.005	0.001	0.001	0.012	0.0001
	19/02/2019	0.0001	0.03	0.002	0.001	0.004	0.001	0.005	0.001	0.001	0.025	0.0001
	19/03/2019	0.0001	0.02	0.002	0.001	0.003	0.001	0.005	0.001	0.001	0.016	0.0001
	16/04/2019	0.0001	0.03	0.002	0.001	0.002	0.001	0.005	0.001	0.001	0.013	0.0001
	23/05/2019	0.0001	0.03	0.003	0.001	0.001	0.001	0.004	0.002	0.001	0.01	0.0001
	20/06/2019	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.018	0.0001
	23/07/2019											
	26/08/2019											
	17/09/2019	0.0001	0.04	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.03	0.0001
	17/10/2019											
	21/11/2019	0.0001	0.03	0.002	0.001	0.002	0.001	0.004	0.001	0.001	0.03	0.0001
	12/12/2019	0.0001	0.01	0.001	0.001	0.003	0.001	0.003	0.002	0.001	0.01	0.0001
	14/01/2020	0.0001	0.34	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.078	0.0001
	20/02/2020	0.0001	0.26	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.056	0.0001
	26/03/2020	0.0001	0.04	0.002	0.001	0.003	0.001	0.005	0.001	0.001	0.024	0.0001
	23/04/2020	0.0001	0.03	0.003	0.001	0.017	0.001	0.006	0.001	0.001	0.012	0.0001
	21/05/2020	0.0001	0.67	0.004	0.001	0.034	0.002	0.006	0.002	0.001	0.115	0.0001
	18/06/2020											
	23/07/2020											
	20/08/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
	24/09/2020	0.0001	0.13	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.069	0.0001
	29/10/2020	0.0001	0.02	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.046	0.0001
	3/11/2020	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.039	0.0001
	26/11/2020	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.039	0.0001
	3/12/2020	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.0001
	21/01/2021	0.0001	0.07	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.085	0.0001
	4/02/2021	0.0001	0.13	0.002	0.001	0.002	0.001	0.001	0.002	0.001	0.032	0.0001
	11/03/2021	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.062	0.0004
	13/04/2021	0.0001	0.01	0.001	0.001	0.012	0.001	0.001	0.001	0.001	0.02	0.0001
	27/05/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.009	0.0001

Table A 11: Metal Concentrations at Site ADP1.

ADP1	Filtered metal concentrations (mg/L)										
Chemical Name	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.007	0.0001
10/05/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.371	0.0001
9/06/2016											
21/07/2016											
25/08/2016											
27/09/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.358	0.0001
25/10/2016	0.0001	0.01	0.001	0.001	0.005	0.001	0.002	0.001	0.001	0.768	0.0001
24/11/2016											
15/12/2016											
19/01/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.817	0.0001
23/02/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.002	0.001	0.001	0.472	0.0001
30/03/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.65	0.0001
27/04/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.527	0.0001
30/05/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.667	0.0001
22/06/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.911	0.0001
31/07/2017											
31/08/2017	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.438	0.0001
21/09/2017	0.0001	0.01	0.001	0.001	0.004	0.001	0.002	0.001	0.001	0.285	0.0001
24/10/2017	0.0001	0.01	0.004	0.001	0.01	0.001	0.008	0.001	0.001	0.005	0.0001
16/11/2017	0.0001	0.01	0.003	0.001	0.014	0.001	0.007	0.001	0.001	0.01	0.0001
20/12/2017	0.0001	0.01	0.003	0.001	0.004	0.001	0.006	0.001	0.001	0.005	0.0001
18/01/2018	0.0001	0.01	0.003	0.001	0.002	0.001	0.007	0.001	0.001	0.005	0.0001
22/02/2018											
22/03/2018											
19/04/2018	0.0001	0.01	0.004	0.001	0.002	0.001	0.006	0.001	0.001	0.007	0.0001
17/05/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.015	0.0001
21/06/2018	0.0001	0.01	0.002	0.001	0.002	0.001	0.003	0.001	0.001	0.007	0.0001
19/07/2018	0.0001	0.01	0.004	0.001	0.006	0.001	0.004	0.001	0.001	0.005	0.0001
23/08/2018											
20/09/2018											
24/10/2018											
20/11/2018	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.007	0.0001
18/12/2018											
22/01/2019	0.0001	0.01	0.003	0.001	0.001	0.001	0.007	0.001	0.001	0.005	0.0001
19/02/2019	0.0001	0.01	0.003	0.001	0.006	0.001	0.008	0.001	0.001	0.005	0.0001
19/03/2019	0.0001	0.01	0.004	0.001	0.002	0.001	0.008	0.001	0.001	0.005	0.0001
16/04/2019	0.0001	0.01	0.003	0.001	0.003	0.001	0.007	0.001	0.001	0.005	0.0001
23/05/2019	0.0001	0.01	0.004	0.001	0.002	0.001	0.007	0.001	0.001	0.005	0.0001
20/06/2019											
23/07/2019											
26/08/2019											
17/09/2019											
17/10/2019											
21/11/2019	0.0001	0.01	0.003	0.001	0.003	0.001	0.007	0.001	0.001	0.005	0.0001
12/12/2019	0.0001	0.01	0.002	0.001	0.003	0.001	0.008	0.001	0.001	0.005	0.0001
14/01/2020	0.0001	0.01	0.003	0.001	0.007	0.001	0.007	0.001	0.001	0.005	0.0001
20/02/2020	0.0001	0.01	0.002	0.001	0.006	0.001	0.006	0.001	0.001	0.005	0.0001
26/03/2020	0.0001	0.01	0.003	0.001	0.003	0.001	0.006	0.001	0.001	0.005	0.0001
23/04/2020	0.0001	0.01	0.003	0.001	0.012	0.001	0.006	0.001	0.001	0.005	0.0001
21/05/2020	0.0001	0.01	0.004	0.001	0.016	0.001	0.006	0.001	0.001	0.005	0.0001
18/06/2020											
23/07/2020											
20/08/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.009	0.0001
24/09/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
29/10/2020											
3/11/2020											
26/11/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
3/12/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
21/01/2021											
4/02/2021	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.01	0.0001
11/03/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
13/04/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
27/05/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001



ADP1	Total metal concentrations (mg/L)										
Chemical Nam	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.03	0.001	0.001	0.01	0.001	0.001	0.001	0.001	1.08	0.0001
10/05/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.596	0.0001
9/06/2016											
21/07/2016											
25/08/2016											
27/09/2016	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.502	0.0001
25/10/2016	0.0001	0.02	0.001	0.001	0.005	0.001	0.002	0.001	0.001	1.27	0.0001
24/11/2016											
15/12/2016											
19/01/2017	0.0001	0.05	0.001	0.001	0.005	0.001	0.002	0.001	0.001	1.36	0.0001
23/02/2017	0.0001	0.01	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.456	0.0001
30/03/2017	0.0001	0.03	0.003	0.002	0.006	0.001	0.004	0.002	0.001	1.01	0.0006
27/04/2017	0.0001	0.02	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.886	0.0001
30/05/2017	0.0001	0.05	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.935	0.0001
22/06/2017	0.0001	0.02	0.001	0.001	0.004	0.001	0.001	0.001	0.001	1.02	0.0001
31/07/2017											
31/08/2017	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.511	0.0001
21/09/2017	0.0001	0.03	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.848	0.0001
24/10/2017	0.0001	0.01	0.003	0.001	0.01	0.001	0.007	0.001	0.001	0.059	0.0001
16/11/2017	0.0001	0.02	0.003	0.001	0.018	0.001	0.006	0.001	0.002	0.152	0.0001
20/12/2017	0.0001	0.01	0.003	0.001	0.006	0.001	0.006	0.001	0.002	0.008	0.0001
18/01/2018	0.0001	0.02	0.003	0.001	0.004	0.001	0.006	0.001	0.001	0.064	0.0001
22/02/2018											
22/03/2018											
19/04/2018	0.0001	0.02	0.004	0.001	0.003	0.001	0.006	0.001	0.001	0.018	0.0001
17/05/2018	0.0001	0.05	0.001	0.001	0.004	0.001	0.002	0.001	0.001	0.014	0.0001
21/06/2018	0.0001	0.16	0.002	0.001	0.005	0.001	0.003	0.001	0.001	0.237	0.0001
19/07/2018	0.0001	0.09	0.004	0.001	0.009	0.001	0.005	0.001	0.001	0.088	0.0001
23/08/2018											
20/09/2018											
24/10/2018											
20/11/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
18/12/2018											
22/01/2019	0.0001	0.01	0.004	0.001	0.002	0.001	0.007	0.001	0.001	0.005	0.0001
19/02/2019	0.0001	0.02	0.004	0.001	0.007	0.001	0.008	0.001	0.001	0.005	0.0001
19/03/2019	0.0001	0.02	0.004	0.001	0.003	0.001	0.008	0.001	0.001	0.011	0.0001
16/04/2019	0.0001	0.01	0.004	0.001	0.003	0.001	0.009	0.001	0.001	0.005	0.0001
23/05/2019	0.0001	0.04	0.004	0.001	0.002	0.001	0.008	0.002	0.001	0.01	0.0001
20/06/2019											
23/07/2019											
26/08/2019											
17/09/2019											
17/10/2019											
21/11/2019	0.0001	0.02	0.003	0.001	0.003	0.001	0.007	0.001	0.001	0.005	0.0001
12/12/2019	0.0001	0.01	0.003	0.001	0.004	0.001	0.008	0.001	0.001	0.005	0.0001
14/01/2020	0.0001	0.01	0.003	0.001	0.011	0.001	0.007	0.001	0.001	0.075	0.0001
20/02/2020	0.0001	0.04	0.002	0.001	0.012	0.001	0.007	0.001	0.001	0.006	0.0001
26/03/2020	0.0001	0.06	0.003	0.001	0.004	0.001	0.006	0.001	0.001	0.012	0.0001
23/04/2020	0.0001	0.02	0.003	0.001	0.017	0.001	0.006	0.001	0.001	0.005	0.0001
21/05/2020	0.0001	0.1	0.004	0.001	0.024	0.001	0.006	0.001	0.001	0.011	0.0001
18/06/2020											
23/07/2020											
20/08/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.01	0.0001
24/09/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
29/10/2020											
3/11/2020											
26/11/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.006	0.0001
3/12/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.009	0.0001
21/01/2021											
4/02/2021	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.084	0.0001
11/03/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.006	0.0001
13/04/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
27/05/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001



Table A 12: Metal Concentrations at Site ISCP.

ISCP	Filtered metal concentrations (mg/L)										
	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.025	0.0001
21/07/2016	0.0001	0.08	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.045	0.0001
25/10/2016	0.0001	0.06	0.001	0.001	0.008	0.001	0.001	0.001	0.001	0.012	0.0001
19/01/2017	0.0001	0.22	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.017	0.0001
27/04/2017	0.0001	0.03	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.028	0.0001
31/07/2017	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.033	0.0001
24/10/2017	0.0001	0.03	0.001	0.001	0.005	0.001	0.001	0.002	0.001	0.067	0.0001
18/01/2018	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.012	0.0001
19/04/2018	0.0001	0.05	0.001	0.001	0.004	0.001	0.001	0.002	0.001	0.036	0.0001
19/07/2018	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
24/10/2018	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
22/01/2019	0.0001	0.09	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.029	0.0001
16/04/2019	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.0001
23/07/2019	0.0001	0.02	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.018	0.0001
17/10/2019	0.0001	0.03	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.007	0.0001
14/01/2020	0.0001	0.11	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.055	0.0001
23/04/2020	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
23/07/2020	0.0001	0.01	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.024	0.0001
29/10/2020	0.0001	0.03	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.005	0.0001
3/11/2020											
21/01/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.052	0.0001
13/04/2021	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.0001

ISCP	Total metal concentrations (mg/L)										
	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.04	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.02	0.0001
21/07/2016	0.0001	0.04	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.055	0.0001
25/10/2016	0.0001	0.09	0.001	0.001	0.008	0.001	0.001	0.002	0.001	0.029	0.0001
19/01/2017	0.0001	0.22	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.028	0.0001
27/04/2017	0.0001	0.04	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.046	0.0001
31/07/2017	0.0001	0.03	0.001	0.001	0.004	0.001	0.001	0.001	0.003	0.029	0.0001
24/10/2017	0.0001	0.05	0.001	0.001	0.006	0.001	0.001	0.003	0.001	0.1	0.0002
18/01/2018	0.0001	0.1	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.033	0.0001
19/04/2018	0.0001	0.08	0.001	0.001	0.003	0.001	0.001	0.002	0.001	0.071	0.0001
19/07/2018	0.0001	0.02	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.011	0.0001
24/10/2018	0.0001	0.03	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.008	0.0001
22/01/2019	0.0001	0.06	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.055	0.0001
16/04/2019	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.018	0.0001
23/07/2019	0.0001	0.02	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.017	0.0001
17/10/2019	0.0001	0.03	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.011	0.0001
14/01/2020	0.0001	0.15	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.148	0.0001
23/04/2020	0.0001	0.07	0.001	0.001	0.004	0.001	0.001	0.001	0.001	0.028	0.0001
23/07/2020	0.0001	0.01	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.021	0.0001
29/10/2020	0.0001	0.07	0.001	0.001	0.005	0.001	0.001	0.001	0.001	0.034	0.0001
3/11/2020											
21/01/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.047	0.0001
13/04/2021	0.0001	0.03	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.025	0.0001



Table A 13: Metal Concentrations at Site ILCP.

ILCP	Filtered metal concentrations (mg/L)										
	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0001	0.01	0.001	0.001	0.001	0.001	0.003	0.002	0.001	0.005	0.0001
21/07/2016	0.0001	0.01	0.002	0.001	0.003	0.001	0.004	0.006	0.001	0.044	0.0001
25/10/2016											
19/01/2017	0.0001	1.29	0.001	0.008	0.008	0.001	0.001	0.022	0.001	0.618	0.0009
27/04/2017	0.0001	0.31	0.001	0.002	0.004	0.001	0.002	0.008	0.001	1.44	0.0002
31/07/2017											
24/10/2017	0.0001	1.43	0.001	0.018	0.015	0.001	0.002	0.045	0.001	1.3	0.0009
18/01/2018	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.084	0.0001
19/04/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.038	0.0001
19/07/2018	0.0001	0.02	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
24/10/2018	0.0001	0.01	0.001	0.001	0.003	0.001	0.006	0.001	0.001	0.005	0.0001
22/01/2019	0.0001	0.05	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.005	0.0001
16/04/2019	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
23/07/2019	0.0001	0.03	0.001	0.001	0.004	0.001	0.003	0.002	0.001	0.005	0.0001
17/10/2019	0.0001	0.01	0.001	0.001	0.002	0.001	0.005	0.002	0.001	0.005	0.0001
14/01/2020	0.0001	0.02	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0001
23/04/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0001
23/07/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0002
29/10/2020	0.0001	0.01	0.001	0.001	0.003	0.001	0.004	0.001	0.001	0.005	0.0001
3/11/2020											
21/01/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
13/04/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001

ILCP	Total metal concentrations (mg/L)										
	Mercury	Aluminium	Chromium	Cobalt	Copper	Lead	Arsenic	Nickel	Tin	Zinc	Cadmium
LOR	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
14/04/2016	0.0003	0.01	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.005	0.0001
21/07/2016	0.0001	0.04	0.003	0.001	0.006	0.001	0.005	0.009	0.001	0.15	0.0001
25/10/2016	Relining of Ponds										
19/01/2017	0.0001	1.55	0.001	0.008	0.01	0.001	0.002	0.025	0.001	0.592	0.0009
27/04/2017	0.0001	0.34	0.001	0.002	0.003	0.001	0.001	0.007	0.001	1.47	0.0001
31/07/2017	Pond Empty										
24/10/2017	0.0001	1.54	0.002	0.019	0.017	0.001	0.003	0.051	0.001	1.34	0.0009
18/01/2018	0.0001	0.04	0.001	0.001	0.003	0.001	0.001	0.001	0.001	0.029	0.0001
19/04/2018	0.0001	0.01	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.005	0.0001
19/07/2018	0.0001	0.04	0.001	0.001	0.003	0.001	0.002	0.001	0.001	0.008	0.0001
24/10/2018	0.0001	0.02	0.001	0.001	0.003	0.001	0.005	0.001	0.001	0.005	0.0001
22/01/2019	0.0001	0.19	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.005	0.0001
16/04/2019	0.0001	0.01	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0001
23/07/2019	0.0001	0.02	0.001	0.001	0.004	0.001	0.003	0.002	0.001	0.008	0.0001
17/10/2019	0.0001	0.03	0.001	0.001	0.002	0.001	0.005	0.001	0.001	0.005	0.0001
14/01/2020	0.0001	0.01	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0001
23/04/2020	0.0001	0.01	0.01	0.001	0.001	0.001	0.002	0.001	0.001	0.005	0.0001
23/07/2020	0.0001	0.01	0.001	0.001	0.003	0.001	0.003	0.001	0.001	0.005	0.0001
29/10/2020	0.0001	0.01	0.001	0.001	0.002	0.001	0.003	0.001	0.001	0.005	0.0001
3/11/2020											
21/01/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001
13/04/2021	0.0001	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.0001

A.10 E.coli

Table A 14: E.coli concentrations at CIPS monitoring sites.

E.coli - Monthly monitoring					E.coli - Quarterly monitoring						
Units	ADP1 MPN/100mL	NODH1 MPN/100mL	ADP2 MPN/100mL	SODH1 MPN/100mL	Units	ISCP MPN/100mL	ILCP MPN/100mL	SODH3 MPN/100mL	SODH4 MPN/100mL	NODH3 MPN/100mL	NODH4 MPN/100mL
14/04/2016	<10	<10	41	10	Guideline-Max			200	200	200	200
10/05/2016	<1	<1	26	>2420	14/04/2016	288	10				
9/06/2016			<10	813	21/07/2016	63	31				
21/07/2016			20	<10	25/10/2016	233	0				
25/08/2016			31	<10	19/01/2017	41	<10				
27/09/2016	<10	10	10	<10	27/04/2017	546	10				
25/10/2016	<10	<10	<10	24196	31/07/2017	31	0				
24/11/2016			10	20	24/10/2017	0	0				
15/12/2016			74	12262	18/01/2018	216	<10				
19/01/2017	<10	63	121		19/04/2018	0	0				
23/02/2017	<10	<10	74		19/07/2018	2	1	<20	<20	<20	<20
30/03/2017	<10	94	520	256	24/10/2018	33	14	<20	<20	<20	<20
27/04/2017	<10	<10	4352	37	22/01/2019	6	1	<1	4	<1	<1
30/05/2017	<10	<10	30		16/04/2019	31	<10	<1	<1	<1	1
22/06/2017	<10	<10	20		23/07/2019	16	<1	10	<1	<1	<1
31/07/2017			187	<10	17/10/2019	8	<1	<1	2	<1	<1
31/08/2017	<10	<10	41	<10	14/01/2020	88	4	5	10	5	<1
21/09/2017	<10	<10			23/04/2020	12	<1	<1	<1	<1	<1
24/10/2017					23/07/2020	1	6	<1	<1	1	<1
16/11/2017					29/10/2020	<1	63	5	1	<1	4
20/12/2017	<10	<10	31		3/11/2020						
18/01/2018	<10	<10	624	366	21/01/2021	2	4	1	5	1	<1
22/02/2018	0	41	61	41	13/04/2021	14	5	4	<1	26	8
22/03/2018	0	1396	171	457							
19/04/2018	<10	171	20	1236							
17/05/2018	10	20	266	<10							
21/06/2018	<10	30	85								
19/07/2018	10	17329									
23/08/2018											
20/09/2018											
24/10/2018		537									
20/11/2018	<10	2755		748							
18/12/2018		432									
22/01/2019		86									
19/02/2019	<1										
19/03/2019	<10	<10		51							
16/04/2019	<10	10									
23/05/2019	<10	290									
20/06/2019		640	>24196								
23/07/2019		880	30	<1							
26/08/2019											
17/09/2019		2046									
17/10/2019											
21/11/2019	<10	<10									
12/12/2019	<10	<10									
14/01/2020	<1	219	517	435							
20/02/2020	<1	>2046	411	1733							
26/03/2020	<1	52									
23/04/2020	<1	<10									
21/05/2020	<1	30									
18/06/2020				<1							
23/07/2020			3	<1							
20/08/2020	<1	<1									
24/09/2020	<1	<1									
29/10/2020		35	12	63							
3/11/2020											
26/11/2020	6	8	20								
3/12/2020	<1	1	6								
21/01/2021		44	23	35							
4/02/2021	<1	<1	1046	866							
11/03/2021	<1	3		<2420							
13/04/2021	<1	<1									
27/05/2021	<1	<1									

*empty cells=no sampling conducted

A.11 Hydrocarbons-Sediment

Table A 15: Hydrocarbons concentrations at Site SODH2

Chemical Name	Units	LOR/EQL	14/04/2016	21/07/2016	25/10/2016	19/01/2017	27/04/2017	31/07/2017	24/10/2017	18/01/2018	19/04/2018	19/07/2018	24/10/2018	22/01/2019	16/04/2019	23/07/2019	17/10/2019	14/01/2020	23/04/2020	23/07/2020	29/10/2020	21/01/2021	13/04/2021
C10 - C14 Fraction	mg/kg	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
>C10 - C16 Fraction	mg/kg	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
C15 - C28 Fraction	mg/kg	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
>C16 - C34 Fraction	mg/kg	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
C29 - C36 Fraction	mg/kg	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
>C34 - C40 Fraction	mg/kg	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
C10 - C36 Fraction (sum)	mg/kg	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
>C10 - C40 Fraction (sum)	mg/kg	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
>C10 - C16 Fraction minus Naphthalene	mg/kg	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
C6 - C10 Fraction	mg/kg	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
C6 - C9 Fraction	mg/kg	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Naphthalene	mg/kg	1	0.8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Benzene	mg/kg	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Ethylbenzene	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
meta- & para-Xylene	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
ortho-Xylene	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total Xylenes	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sum of BTEX	mg/kg	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Toluene	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Table A 16: Hydrocarbons concentrations at Site NODH2

Chemical Name	Units	LOR	14/04/2016	21/07/2016	25/10/2016	19/01/2017	31/07/2017	24/10/2017	18/01/2018	19/04/2018	19/07/2018	24/10/2018	22/01/2019	16/04/2019	23/07/2019	17/10/2019	14/01/2020	23/04/2020	23/07/2020	29/10/2020	21/01/2021	13/04/2021
C10 - C14 Fraction	mg/kg	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
>C10 - C16 Fraction	mg/kg	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
C15 - C28 Fraction	mg/kg	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
>C16 - C34 Fraction	mg/kg	100	100	100	100	100	140	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
C29 - C36 Fraction	mg/kg	100	100	100	100	100	130	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
>C34 - C40 Fraction	mg/kg	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
C10 - C36 Fraction (sum)	mg/kg	50	50	50	50	50	130	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
>C10 - C40 Fraction (sum)	mg/kg	50	50	50	50	50	240	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
>C10 - C16 Fraction minus Naphthalene	mg/kg	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
C6 - C10 Fraction	mg/kg	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
C6 - C9 Fraction	mg/kg	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Benzene	mg/kg	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Toluene	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Ethylbenzene	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
meta- & para-Xylene	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
ortho-Xylene	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total Xylenes	mg/kg	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sum of BTEX	mg/kg	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Naphthalene	mg/kg	1	0.8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1