Port of Gladstone Marina Maintenance Dredging 2020

Tailwater Discharge Monitoring Program

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O2 MARINE

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1. Introduction

1.1. Background

O2 Marine (O2M) were engaged by Hall Contracting Pty Ltd (Hall) to undertake the tailwater discharge monitoring program (TDMP) at the RG Tanna (RGT) reclamation area throughout the maintenance dredging period for the Port of Gladstone Marina Maintenance Dredging (the Project). The proponent for the Marina Maintenance Dredging is the Gladstone Ports Corporation (GPC).

Hall's environmental management responsibilities as the 'Contractor' on this Project are described within the following three documents:

- Port of Gladstone Marina Maintenance: Dredging Environmental Management Plan (DEMP). V3 updated 18 March 2020. Gladstone Ports Corporation (Ref: 1139693);
- Procedure: Port of Gladstone Marina Maintenance Dredging: Environmental Monitoring (Procedure). V1 updated 19 March 2020. Gladstone Ports Corporation (Ref: 1561976);
- Environmental Protection Act (1994) Permit: Environmental Authority (EA) EPPR00570813, Department of Environment and Heritage Protection.
- Coastal Protection and Management Act (1995). Allocation of Quarry Material (renewal) (AQM) 0057, Effective 15 April 2020.

O2 Marine implements the TDMP to facilitate management of discharge water relevant to the placement of dredge spoil into the RGT reclamation area.

1.2. Objectives

The EA Condition GPMR1 requires a report to be submitted to the administrating authority within 40 business days of completion of all monitoring. The report must include all monitoring results with summaries, graphic interpretation and an assessment of these results in relation to the conditions of the EA and environmental impacts.

This report provides an overview of the monitoring results collected during the TDMP to meet compliance obligations for reporting in the EA.

2. Dredging and Disposal Works

2.1. Dredging Summary

The Marina Maintenance Dredging project (Figure 1) comprises of the following activities:

1. Removal of approximately 186,055 m^3 of material to -4.5 m LAT from the Marina using the Cutter Suction Dredge (CSD) Saibai (Table 1), and
2. Delivery via pipeline to the RGT Reclamation Area.
3. Tailwater Management.

Figure 1 Marina Dredge Footprint and RGT Reclamation Area

Table 1 Disposal Operations

Start	Finish	Volume
18 May 2020	13 June 2020	70,775m3
13 June 2020	18 July 2020	84,966m3
17 October 2020	7 November 2020	30,314 m^3

2.2. Tailwater Management

2.2.1. Tailwater Discharge Monitoring and Triggers

GPC prepared the Procedure to maintain compliance with the relevant permits and approvals by outlining an appropriate environmental monitoring program. Adaptive management actions based on monitoring results are in place to ensure no environmental harm occurs to the receiving environment and/or sensitive receptors.

As a result of the small nature of the operation, the monitoring associated with maintenance dredging of the Gladstone Marina is solely composed by tailwater discharge monitoring.

Tailwater quality will meet the specifications is provided in the Procedure in order to be released from the approved discharge locations into the receiving environment.

Adaptive management steps shown in Table 2 have been developed to ensure appropriate procedures and actions are undertaken when WQ parameters, telemetry and grabs, at the tailwater discharge locations exceed the listed thresholds.

Table 2 Adaptive Management steps

Trigger	Physico-Chemical	Contaminants	Adaptive Management
Trigger 1	For a period >24 hrs Turbidity – 45[1] OR 95[2] NTU DO - <3 mg/L pH - <7 & >8.5	Above limit for 1 or 2 consecutive weeks	Field inspection Internal investigation Measures to rectify issue
Trigger 2	For a period >24 hrs Turbidity – 75[1] OR 125[2] NTU DO - <2 mg/L pH - <6.5 & >9	Above limits for 3 weeks	Cease discharge Notify GPC Investigation Report within 5 days Report to DES

[1] Growing season
[2] Senescent season

3. Methods

3.1. Telemetered Water Quality Stations

3.1.1. Field Sampling

Data was collected from two telemetered water quality monitoring stations (WQMSs) shown in Table 3 between the 18 June and 12 November 2020 to coincide with the commencement and cessation of tailwater discharge from the RGT reclamation area. A summary of the installation, transfer and removal of WQMSs during the TDMP is provided in Table 4. The WQMSs were disassembled and placed in storage onsite following removal from Discharge location 2 on the 7 August 2020. The WQMSs were subsequently re-installed on 2 November to undertake additional maintenance dredging works for the project to provide siltation insurance. Therefore, data was not collected from the WQMSs between the period 8 August and 1 November 2020.

Table 3 Approved tailwater discharge locations for the RGT dredge cell utilised for the Gladstone Marina MD.

Discharge location	Coordinates	Description
1	23°49'58.2"S 151°14'06.0"E	Cell 4 discharge point into Ken's Drain through two (2) steel pipes. A weir box is installed at the discharge point weir box
2	23°49'54.6"S 151°14'04.2"E	Cell 3 discharge point into Ken's Drain through reinforced PVC pipe. The IL of the discharge point is lower than discharge point 1 allowing full drainage of the reclamation area

Table 4 Summary of installation, transfer and removal of WQMSs from the two approved discharge locations

Date	Discharge location	Activity Description
18 June 2020	1	2 x WQMSs installed
29/30 June 2020	1 and 2	2 x WQMSs transferred from Cell 4 to Cell 3
7 August 2020	2	2 x WQMSs removed
2 November 2020	2	2 x WQMSs installed
12 November 2020	2	2 x WQMSs removed

The water quality instruments used are Hydrolab DS5X multiparameter sondes. The sondes are fitted with sensors to measure pH, dissolved oxygen, turbidity, conductivity, depth and temperature. The sonde is connected to a Campbell Scientific telemetry unit fitted with a CR300 data logger and a 4G cellular communications module. The data is presented on an Eagle IO website interface. The data

logger and website are programmed to collect and communicate a sample every 15 minutes to be displayed in real-time online.

During the TDMP, the Eagle IO platform was configured to present:

- Battery power for the telemetry units and sondes;
- The raw data of each parameter for both WQMSs;
- Automated Quality Assurance/Quality Control checked data for both WQMSs;
- Average of the data collected from the two instruments; and
- Indicative results for Total Suspended Solids (TSS) using the TSS versus turbidity (NTU) relationship established within the Port of Gladstone during the Western Basin Dredging and Disposal Project: TSS=1.65xNTU (Aurecon 2019).

The data was presented as automated graphical images generated using the Eagle IO platform.

3.1.2. Quality Assurance/Quality Control

Both Hydrolab sondes were calibrated by O2 Marine personnel prior to and regularly during the TDMP. The dates calibration are provided in Table 5 and data supplied with delivery of this document.

Table 5 Dates sondes were serviced and calibrated

Date	Parameters	Sonde
18 June 2020	DO, pH, NTU, Cond	48158, 48159
19 June 2020	NTU	48819
25 June 2020	DO, pH, NTU, Cond DO (only)	48158 48819
1 July 2020	DO, pH, NTU, Cond	48158, 48159
2 July 2020	NTU	48158
22 July 2020	DO, pH, NTU, Cond, Temp, Depth	48157
29 July 2020	DO, pH, NTU, Cond	48158, 48159
07 August 2020	DO, pH, NTU, Cond	48157,48819
2 November 2020	DO, pH, NTU, Cond	48157,48819

The following QA/QC process for each parameter was applied to remove erroneous data. Whilst this processing did not entirely remove all spikes, it was effective in eliminating the majority of the erroneous dataset.

Turbidity

- If any individual measurement is >50 NTU and >100% higher than the previous measurement (e.g. brief spike).
- If any individual measurement is >100 NTU and previous value was removed using the above criteria.

- If turbidity is outside the bounds of typical readings: negative turbidity (<0 NTU) or turbidity higher than 250 NTU.
- All data from WQMS 1 was removed between 18 June and 7 August 2020 due to confirmation from the Australian Distributor of the sonde that the turbidity sensor was faulty and needed replacement on 15 July 2020.

pH

- If values recorded outside the surface water criteria range (<6.5 & >9.0), any change in an individual measurement >2 pH units above/below the previous measurement (e.g. brief spike).
- If pH is outside the bounds of typical readings: <2 and >12

Dissolved Oxygen

- If values recorded outside the surface water criteria range (<3.3 & >9 mg/L), any change in an individual measurement >50% above/below the previous true measurement (e.g. brief spike).
- If Dissolved Oxygen is outside the bounds: ≤0 mg/L and >20 mg/L

3.2. Water Sampling

3.2.1. Field Operations

The dates water samples were collected, including the parameters tested for and discharge locations, is provided in Table 6.

In accordance with the EA, water samples were collected weekly from the relevant approved discharge locations between 18 June and 7 August 2020, with two additional samples collected from Cell 3 between 2 – 12 November 2020 as part of additional maintenance dredging works for the Project. The samples were processed and delivered to ALS Environmental laboratory in Gladstone to be analysed for metals, ammonia, tributyltin (TBT) and total suspended solids (TSS).

Three (3) water samples were also collected daily during the first two weeks and analysed for TSS. This sampling was undertaken to develop a calibration dataset to establish an ad-hoc TSS-NTU relationship, thus inferring TSS levels from NTU readings collected via telemetry.

Samples were collected using a pre-rinsed Perspex pole sampler to which an acid-washed interim container is attached in accordance with standard protocols. Water was decanted directly into laboratory provided containers on collection for all TSS, Ammonia and TBT samples. Dissolved metals were filtered *in-situ* using sterile 0.45 µm filters and syringes. All containers were labelled with the job, sampler, unique sample identifier, date and time.

Table 6 Dates, parameters and locations of the collection of water samples

Date	Parameters	Discharge location
18 June 2020	metals, ammonia TBT & TSS	1
19 June- 2 July 2020	3x TSS daily	1
25 June 2020	metals, ammonia & TBT	1
2 July 2020	metals, ammonia & TBT	1
9 July 2020	metals, ammonia TBT & TSS	1
16 July 2020	metals, ammonia TBT & TSS	1
23 July 2020	metals, ammonia TBT & TSS	1
30 July 2020	metals, ammonia TBT & TSS	2
6 August 2020	metals, ammonia TBT & TSS	2
2 November 2020	metals, ammonia TBT & TSS	2
9 November 2020	metals, ammonia TBT & TSS	2

3.3. Quality Assurance/Quality Control

A field blank control sample comprised of deionised water was collected during each weekly event for analysis of the parameters ammonia, TBT and metals. New syringes and filters were used for each sample.

ALS Environmental is a NATA accredited laboratory for the specified parameters. Samples were delivered to the laboratory with a Chain of Custody (CoC) form following collection to ensure holding times for all analytes were met. The sample bottle was acid-washed between the weekly collection of chemical samples.

4. Results

4.1. Telemetered Water Quality Stations

4.1.1. Turbidity

A summary of the turbidity data collected from the WQMSs between the 18 June and 12 November 2020 is presented in Table 7 and Figure 2.

Continuous turbidity readings were recorded from WQMS2 during the project. The mean and median values during discharge are 3.1 and 2.2 NTU, respectively. With the exception of a few outliers, turbidity remained below 20 NTU, and the small standard deviation indicates readings were predominantly in the low range (<5 NTU). The outliers are likely attributable to fouling of the sensor that was not automatically removed from the QA/QC process.

The turbidity data recorded from WQMS1 between 18 June and 7 August 2020 was discarded and tailwater discharge was managed entirely from turbidity recorded at WQMS2. During this period, the sonde recorded erroneous readings of predominantly 0 NTU, interspersed between occasional above normal readings (e.g. 1000 NTU). Maintenance and calibration of the turbidity sensor was implemented on multiple occasions during this period to investigate the erroneous readings. On removal and inspection by the Australian distributor, the sensor was confirmed to be faulty.

Turbidity statistics at WQMS1 between 2-12 Nov 2020 indicates lower turbidity than recorded over the entire program at WQMS2, with a mean and median of 2.3 and 1.6 NTU, respectively. Results from WQMS1 indicate slightly less suspended sediment in decant water released during the additional dredging undertaken.

Turbidity readings did not increase above the Trigger 1 threshold.

Table 7 Summary statistics for turbidity data collected at WQMSs between 18 June and 12 Nov 2020

Descriptive Statistics	WQMS1	WQMS2
Mean	2.3	3.1
Standard Error	0.1	0.1
Median	1.6	2.2
Mode	1.3	0
Standard Deviation	4.3	4.5
Sample Variance	18.8	20.0
Range	81	115.6
Minimum	0	0
Maximum	81	115.6
Count	866	5161

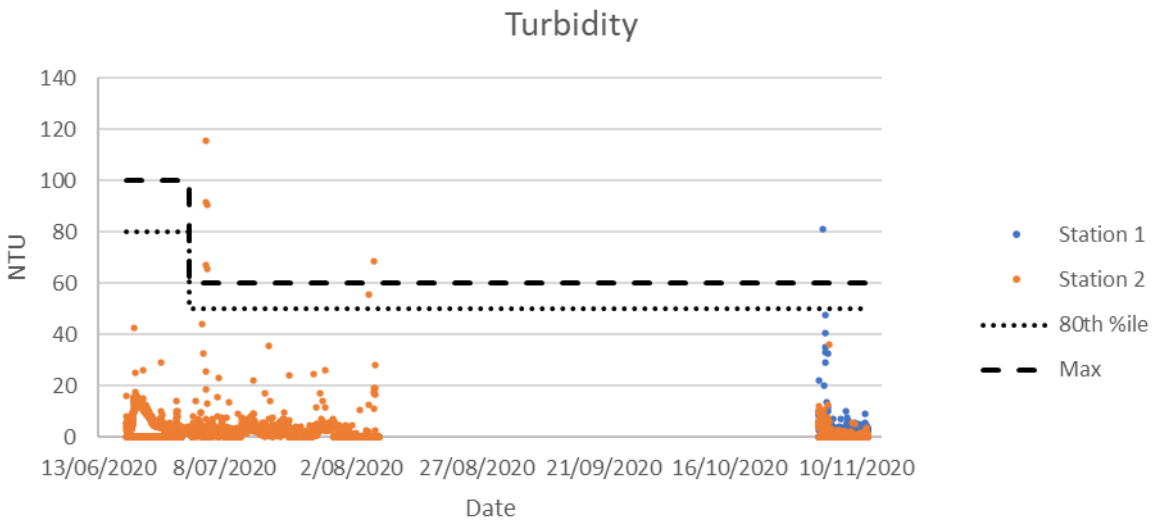

Figure 2 Turbidity data collected between 18 Jun and 12 Nov 2020

4.1.2. Dissolved Oxygen

A summary of the dissolved oxygen (DO) data collected from the WQMSs between the 18 June and 12 November 2020 is presented in Table 8 and Figure 3.

Continuous DO readings were recorded from both WQMSs during the Project. Mean and median values from WQMSs were 7-7.6 mg/L and 6.2-6.8 mg/L, respectively. High diurnal fluctuations of DO were common during the TDMP, with low readings recorded in the morning just after sunrise and highest readings late afternoon, reflecting net production of oxygen by plants and algae during the daytime when photosynthesis occurs and respiration of plants and algae at night. The large diurnal fluctuations are indicative of a highly productive system, exacerbated by limited flow conditions within the cells. Images collected on 7 August 2020 at the end of the primary dredging tailwater discharge identified conditions had promoted proliferation of *Spirogyra* type marine macroalgae forming slimy green mats within the cells.

Dissolved Oxygen readings did not decrease below the Trigger 1 threshold. Near hypoxic concentrations recorded on some early mornings occasionally dropped temporarily below the release limit, although under the observed diurnal patterns it was known dissolved oxygen would rapidly increase again during the day.

Table 8 Summary statistics for dissolved oxygen data collected at WQMSs between 18 June and 12 Nov 2020

Descriptive Statistics	WQMS1	WQMS2
Mean	7.6	7.0
Standard Error	0.1	0.1
Median	6.8	6.2
Mode	4.5	2.3
Standard Deviation	4.1	3.8
Sample Variance	16.5	14.7
Range	18.5	19.3
Minimum	0.2	0.0
Maximum	18.7	19.3
Count	5058.0	4948.0

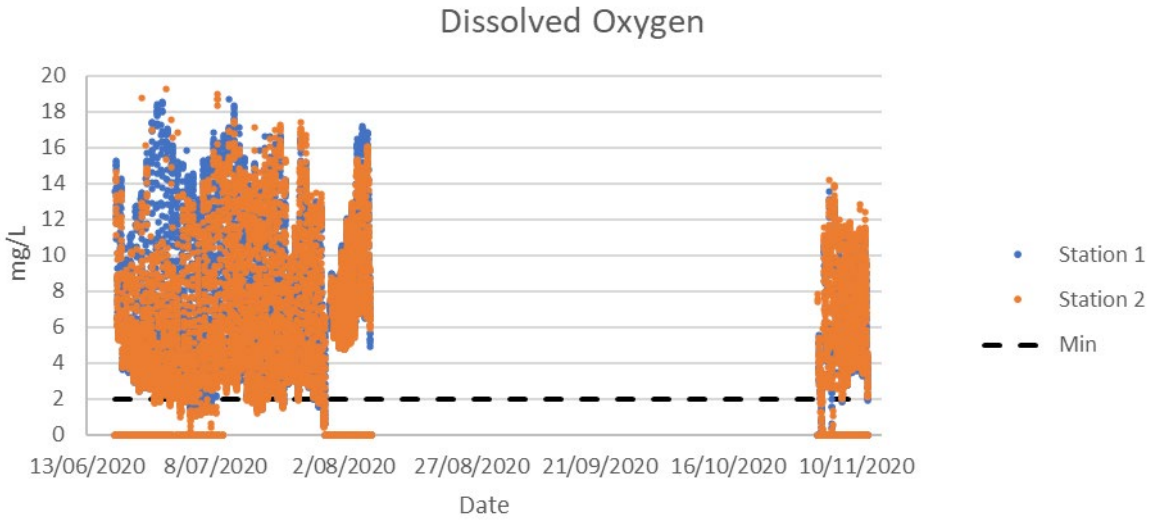

Figure 3 Dissolved oxygen data collected between 18 Jun and 12 Nov 2020

4.1.3. pH

A summary of the pH data collected from the WQMSs between the 18 June and 12 November 2020 is presented in Table 9 and Figure 4.

Continuous pH readings were recorded from both WQMSs during the Project. Both WQMSs recorded mean and median pH values of 8.4. This is reflective of the pH of marine waters which is typically close to 8.2 (Ozcoasts 2020). Diurnal fluctuations in pH were observed which were similar to DO, with lowest concentrations in the morning and highest concentrations late afternoon, indicative of increased CO_2 from respiration at night which is conversely fixed by plants and algae during daylight hours. However, the diurnal change was less apparent at ~0.2 pH units.

Highest pH was recorded on initial deployment of the WQMSs on 18 June and prior to removal on 7 August and 12 November 2020. Elevated pH at this time is likely attributable to increased salinity from evaporation, in particular on deployment the evaporation of fresh rainwater which has much higher pH

if it evaporates to the same salinity (Ozcoasts 2020). Data ranged between 7.0 to 9.2, although was predominantly between 7.5 and 8.9.

pH rose above Trigger 1 thresholds at WQMS2 between 9:15 am 5 August and removal on 7 August 2020 where pH levels rose above a value of 8.5 for a period of 24 hours. pH again rose above Trigger 1 threshold values at WQMS2 between 10:30 am 6 November and removal on 12 November, as well as at WQMS1 between 10:15 am 10 November and 11:45 am 11 November 2020. Elevated pH during these times were only recorded at both WQMSs for slightly over a 24 hour period. Inspection of the data following Trigger 1 alerts identified slightly elevated salinity as the cell levels dropped (see Section 4.1.4) which was considered to be a natural trend in pH with changing water quality. However, data was monitored closely during this time and pH did not increase above the Trigger 2 threshold.

Table 9 Summary statistics for pH data collected at WQMSs between 18 June and 12 Nov 2020

Descriptive Statistics	WQMS1	WQMS2
Mean	8.4	8.4
Standard Error	0.0	0.0
Median	8.4	8.4
Mode	8.5	8.4
Standard Deviation	0.2	0.3
Sample Variance	0.1	0.1
Range	1.9	2.1
Minimum	7.3	7.0
Maximum	9.2	9.1
Count	5602.0	5609.0

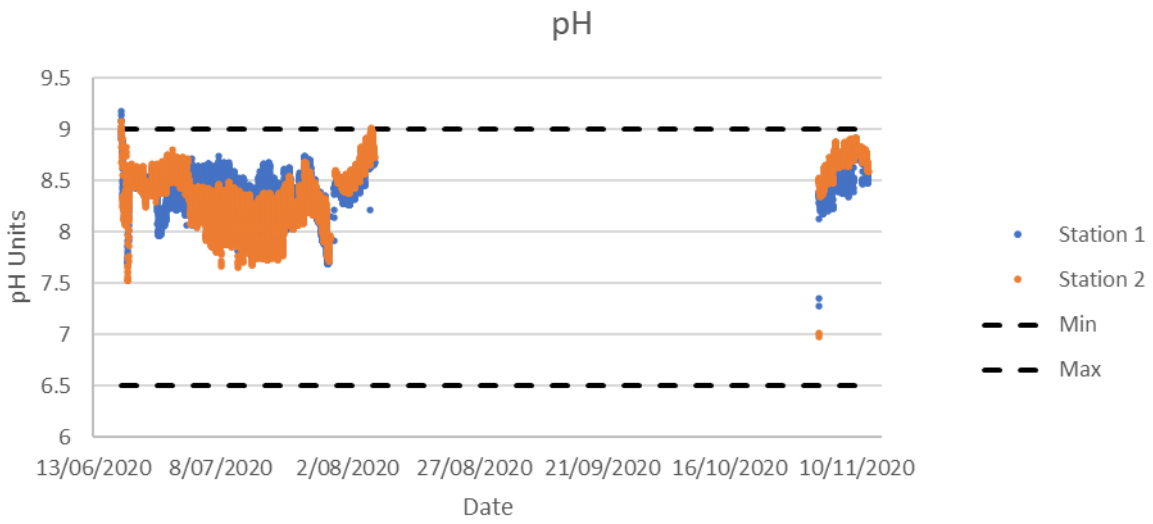

Figure 4 pH data collected between 18 Jun and 12 Nov 2020

4.2. Water Sampling

4.2.1. Chemical Sampling

The laboratory results for water samples collected weekly from the relevant approved discharge locations between the 18 June and 12 November 2020 are presented in Table 10.

One sample for Nickel collected on 30 July 2020 (36.8 µg/L) was recorded above the water release limit of 21 µg/L. Elevated results above the water release limit were also recorded for the control sample at 29 µg/L (see Section 4.2.3), indicating the result is likely associated with sample or laboratory error. Nickel was not recorded during consecutive surveys and therefore reporting to the administrating authority was not required.

All TSS concentrations recorded well below the water release limits as indicated by the very low turbidity recorded throughout the TWDP. The results indicate the cells were effective in allowing suspended sediments to settle prior to tailwater discharge. During the first two weeks, samples for TSS were collected three times daily and results are presented and discussed further in Section 4.2.2. Cadmium, Mercury and TBT results were below the LoR during all samples collected. Remaining samples and analytes recorded some minor detection levels above the LoR throughout the TDMP, although remained below the water release limits.

Table 10 Laboratory testing results of water samples collected from the cells

Parameter	Suspended Solids	Ammonia	Aluminium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc	TBT
Unit	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	ng Sn/L
Limit	80/100	1	165	2.1	13.2	3.9	13.2	0.3	21.0	4.2	45.0	-
19/06/2020	2 to 12	0.08	<5	<0.2	0.5	3	<0.2	<0.0001	0.6	<0.1	16	<2
25/06/2020	2 to 32	0.41	<5	<0.2	<0.5	2	<0.2	<0.0005	1.6	<0.1	<5	<2
2/07/2020	<1-6	0.15	<5	<0.2	1.3	1	<0.2	<0.0005	8	<0.1	<5	<2
9/07/2020	2	0.13	<5	<0.2	<0.5	<1	<0.2	<0.0001	0.5	<0.1	11	<2
16/07/2020	3	0.28	<5	<0.2	<0.5	<1	<0.2	<0.0001	<0.5	<0.1	<5	<3
23/07/2020	5	0.14	<5	<0.2	<0.5	<1	<0.2	<0.0001	0.8	<0.1	<5	<2
30/07/2020	6	0.13	8	<0.2	7.5	<1	<0.2	<0.0001	36.8	<0.1	<5	<2
6/08/2020	<1	0.14	<5	<0.2	<0.5	<1	<0.2	<0.0001	0.5	<0.1	<5	<2
2/11/2020	<5	0.19	10	<0.2	<0.5	1	<0.2	<0.0001	0.6	0.2	<5	<2
9/11/2020	3	0.02	<5	<0.2	<0.5	2	<0.2	<0.0001	0.9	<0.1	19	<2

4.2.2. Total Suspended Solids

The linear relationship between TSS samples collected between 18 June and 02 July 2020 and the corresponding turbidity (NTU) concentrations recorded from the WQMS 2 sonde are shown in Figure 5. A weak positive relationship (R^2=0.049) exists between Suspended Solids Concentration (SSC) and turbidity at a ratio of approximately 1:1. Higher variability occurs between backscatter turbidity units and TSS samples at low concentrations. This result in very clear water is not unexpected.

The SSC to turbidity linear relationship derived from sampling three times daily at the weir during the first two weeks is:

$$NTU = 1.0004 \times SSC + 0.417$$

Based on this relationship, growing season suspended solid release limits of 50 mg/L (80th percentile) and 60 mg/L (maximum) equate to turbidity values of 50.437 NTU and 60.441 NTU, respectively. These NTU turbidity values were then applied as the trigger for the remainder of the TDMP.

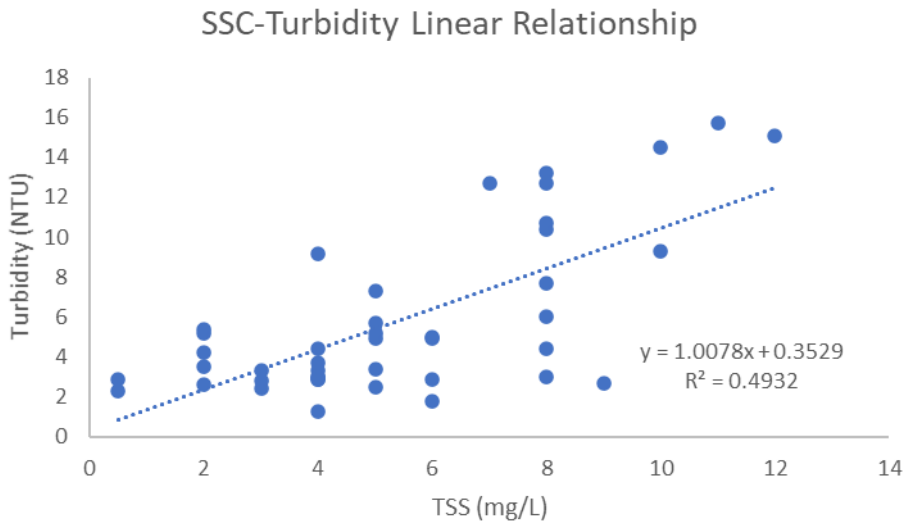

Figure 5 Relationship between Suspended Solids and turbidity (NTU) following two weeks sampling

4.2.3. Quality Assurance/Quality Control

The laboratory results for field control water samples delivered with collected samples each week between the 18 June and 12 November 2020 are presented in Table 11.

One field control sample for Nickel delivered to the laboratory on 30 July 2020 recorded concentrations above the water release limits of 21 µg/L. This elevated concentration of 29 µg/L corresponds with the only field sample shown in Table also recorded above the water release limits (36.8 µg/L) during the same testing week, indicating the result is likely associated with sample or laboratory error.

Aluminium, Cadmium, Lead, Mercury, Silver and TBT results were below the LoR for all weekly field control samples. Remaining samples and analytes recorded some minor detection levels above the LoR throughout the TDMP, although remained below the water release limits.

ALS Laboratories are NATA accredited for the samples tested and therefore adhere to QA/QC testing procedures. A summary of the QA/QC compliance assessment reports provided with each certificate of analysis is provided in Table 12.

No method blank or duplicate outlier non-conformances were reported for all submitted samples during the TDMP. The laboratory control spike recoveries for Zinc in the field control sample from the 2 July, and for Copper from 9 July, were greater than the upper control limit. Matrix spike recoveries were not determined for Ammonia in samples from 16 July and 9 November due to background level being greater than or equal to four times the spike level. Surrogate recovery for Organotin from 25 June sample was greater than the upper data quality objective. The analysis holding time outlier of one day was recorded for a TSS sample collected on 9 July.

With the exception of Nickel results in field and control samples from the 30 July 2020, the QA/QC results indicate that laboratory and field procedures are of acceptable quality to draw meaningful conclusions.

Table 11 Laboratory testing results of field control water samples

Parameter	Ammonia	Aluminium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc	TBT
Unit	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	ng Sn/L
Limit	1	165	2.1	13.2	3.9	13.2	0.3	21.0	4.2	45.0	-
19/06/2020	<0.01	<5	<0.2	<0.5	<0.5	<0.1	<0.0001	<0.5	<0.1	2	<2
25/06/2020	0.01	<5	<0.05	0.4	<0.5	<0.1	<0.0005	1.1	<0.1	5	<2
2/07/2020	0.02	<5	<0.05	<0.2	<0.5	<0.1	<0.0005	<0.5	<0.1	<1	<2
9/07/2020	0.02	<5	<0.05	<0.2	<0.5	<0.1	<0.0001	<0.5	<0.1	<1	<2
16/07/2020	0.06	<5	<0.05	<0.2	<0.5	<0.1	<0.0001	<0.5	<0.1	<1	<2
23/07/2020	0.06	<5	<0.05	<0.2	<0.5	<0.1	<0.0001	<0.5	<0.1	5	<2
30/07/2020	<0.01	<5	<0.05	6.1	<0.5	<0.1	<0.0001	29	<0.1	2	<2
6/08/2020	<0.01	<5	<0.05	<0.2	<0.5	<0.1	<0.0001	<0.5	<0.1	<1	<2
2/11/2020	0.04	<5	<0.2	<0.5	3	<0.2	<0.0001	<0.5	<0.1	<5	<2
9/11/2020	<0.01	<5	<0.05	<0.2	<0.5	<0.1	<0.0001	<0.5	<0.1	<1	<2

Table 12 Laboratory QA/QC Compliance Assessment

Outliers	Method Blank	Duplicate	Laboratory Control	Matrix Spike	Surrogate Recovery	Analysis Holding Time	QC Sample Frequency
19/06/2020	✓	✓	✓	✓	✓	✓	×
25/06/2020	✓	✓	✓	✓	×	✓	×
2/07/2020	✓	✓	×	✓	✓	✓	×
9/07/2020	✓	✓	×	✓	✓	×	×
16/07/2020	✓	✓	✓	×	✓	✓	×
23/07/2020	✓	✓	✓	✓	✓	✓	×
30/07/2020	✓	✓	✓	✓	✓	✓	×
6/08/2020	✓	✓	✓	✓	✓	✓	×
2/11/2020	✓	✓	✓	✓	✓	✓	×
9/11/2020	✓	✓	✓	×	✓	✓	×

5. Conclusions

The Port of Gladstone Marina Maintenance Dredging was undertaken by Hall Contracting in compliance with the approved GPC Environmental Monitoring Procedure. This report is intended to summarise all monitoring results and provide an assessment of these results in relation to Condition GPMR1 of the EA.

In accordance with the Procedure, pH rose above the Trigger 1 threshold (internal investigation step) on three discrete occasions and no parameters rose above the Trigger 2 threshold.

All other water quality data collected during the TDMP remained within the dredge decant water release limits.

The TDMP was undertaken in compliance with the approved Procedure and EA conditions and all reasonable and practicable measures were employed. Water quality variability was not attributed to dredging and disposal activity and therefore no environmental impacts were identified as a result of the campaign.

6. References

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