

2 August 2019

Dr Cherry Martin  
PO Box 7173  
SHENTON PARK WA 6008

Dear Cherry,

**RE: LSP9 – 660 LA PEROUSE COURT, GOODE BEACH – ANALYSIS OF GROUNDWATER AND VANCOUVER LAKE QUALITY**

This letter provides a summary of the water quality monitoring results for samples taken at Lot 660 La Perouse Court, Goode Beach between 21 August 2018 and 16 April 2019. The sampling program was outlined in a scoping document developed for consideration by the City of Albany and Department of Water and Environmental Regulation (DWER) in January 2019 (Attachment 1). Groundwater level data has been collected and is being modelled by Rockwater Pty Ltd.

Seasonal monitoring has been undertaken for one year at five locations (CHE001/FB2, CHE006, CHE002/Lake, CHE009 and CHE003 (as shown in Attachment 2). Sample sites are described in Attachment 3 and include a surface water collection point in Lake Vancouver (CHE002/ Lake), a bore (CHE001/FB2), piezometers (CHE006 and CHE003) and a road side sump (CHE009).

The sample sites were chosen to satisfy the objective of measuring inputs to Lake Vancouver from La Perouse Road and the existing residential area (CHE009), water quality in the lake (CHE002), locations between the lake and the proposed development (CHE003 and CHE006) and a location between the proposed development and Goode Beach (CHE001/FB2). These locations allow for differentiation between key input risk areas in relation to Lake Vancouver.

Measurement of the following parameters was undertaken:

- pH, EC, TDS, alkalinity
- Full nutrient suite (Ammonia-N, Nitrate-N, Nitrite-N, NOx-N, TKN, TN, Reactive P, Total P)

The following analytes were measured in the first round:

- Metals (Total Al & Fe; dissolved Al, As, Cd, Cr, Hg, Cu, Fe, Mn, Ni, Pb and Zn)
- Hydrocarbons
- Pesticides

Sampling results are included in Attachment 4 with comparison to ANZECC (2000) trigger values for Fresh Waters – Wetlands, Fresh Waters – Lakes and Reservoirs SW Australia, Freshwater (Metals) and Acid Sulfate Soil Indicators, where applicable. Results are discussed in detail in Attachment 5 with laboratory certificates in Attachment 6.

Overall, the results indicate:

**pH:** pH for almost all results is lower than the desired range of 7.5 – 8.5 for Fresh Waters – Wetlands. One result in April 2019 for Lake Vancouver exceeds the trigger maximum for Fresh Waters - Lakes & Reservoirs SW Aust with a value of 8.3. (desired range: 6.5 – 8.0 ).

**Conductivity:** The highest conductivity was consistently determined at CHE003 (east of Lake Vancouver 3.3 – 4.3 mS/cm) which equates to ‘brackish’ (noting that seawater is around 53 mS/cm). The lowest conductivity was 0.08 mS/cm at CHE009 (downgradient of the development and runoff from La Perouse Road) which equates to ‘low salinity water’. Lake Vancouver had consistently higher conductivity compared to CHE006 and CHE001 and ranged between 1.8 mS/cm and 3.3 mS/cm (brackish).

**Total Dissolved Solids:** The lowest TDS was consistently measured at CHE009 (48 – 230 mg/L) which is located down gradient of the existing residential area and La Perouse Road. The highest TDS was recorded at CHE003 (east of Lake Vancouver in November 2018 at 2,400 mg/L) and CHE002/Lake (2000 mg/L in April 2019). Lake TDS was generally higher than groundwater at CHE006 and CHE001/FB2.

**Alkalinity:** The lowest alkalinity result was associated with CHE009 (17 mg/L for water coming from the existing residential area and La Perouse Road), reflecting a lower ability to buffer acids. The highest alkalinity was for CHE003 (east of Lake Vancouver) which ranged from 670 to 990 mg/L, indicating a high buffering ability.

**Total Nitrogen:** Results exceeded both trigger values at all sampling locations with the highest levels of 65 mg/L at CHE003 in April 2019 and 38 mg/L at CHE006 in August 2018.

**Ammonia-N:** Samples collected generally exceeded triggers for Freshwater – Wetlands (0.04 mg/L) and Lakes and Reservoirs SW Australia (0.01 mg/L). Results were particularly high at CHE009 (reflective of runoff and groundwater downgradient from the existing residential area and La Perouse Road – 0.54 – 3 mg/L) and CHE001/FB2 during August and November 2019 (2.1 and 1.6 mg/L respectively).

**Nitrite-N:** Most samples returned results below the detection limit of 0.01 mg/L. However, a high result of 0.73 mg/L was recorded at CHE001/FB2 in November 2018.

**Nitrate-N:** The trigger value for Freshwater is 0.70 mg/L. Nitrates were either lower than the detection limit (0.01 mg/L) or trigger value in all locations except CHE001/FB2 which recorded values between 2.6 and 3.6 mg/L.

**NOx-N:** NOx levels were generally above the trigger for Fresh Water – Lakes and Reservoirs and on some occasions above the trigger for Freshwater – Wetlands. CHE001/FB2 recorded the highest values of 2.6 to 3.6 mg/L.

**Total Kjeldahl Nitrogen:** The highest results were recorded at CHE003 (64 mg/L in April 2019) and CHE006 (38 mg/L in August 2018). The lowest values were generally recorded at CHE002/Lake and CHE001/FB2.

**Total Phosphorus:** Results for all samples exceeded the trigger values with the highest value of 4.9 mg/L at CHE003. CHE001/FB2 also had elevated levels between 2.2 and 2.5 mg/L.

**Filterable Reactive Phosphorus:** Results were generally higher than the trigger values with the highest values at CHE001/FB2 with a range between 2.1 and 2.5 mg/L.

## Metals

Metals were sampled on 21 August 2018. Overall, for metals with trigger values, only three samples exceeded trigger values. These include: Aluminium at CHE006 (0.38 mg/L; trigger 0.055 mg/L) and Copper (trigger: 0.0014 mg/L) at CHE001/FB2 (0.019 mg/L) and CHE002/Lake (0.002 mg/L).

## Pesticides and Hydrocarbons

Pesticides and hydrocarbons were sampled on 21 August 2018. No pesticides were detected in any of the samples with all results below detection limits. For hydrocarbons, most parameters were below detection limits.

Only CHE009, which measured groundwater and surface water downstream of the existing residential area and La Perouse Road had measurable levels of toluene (0.021 mg/L compared to trigger for Freshwater of 950 mg/L ) and TRH <sub>C6-10</sub> (0.02 mg/L – no trigger value). The result for TRH <sub>C>10-16</sub> and TRH <sub>C>34-40</sub> was 0.5 mg/L (no trigger value). The result for TRH <sub>C>16-34</sub> was 0.9 mg/L (no trigger value).

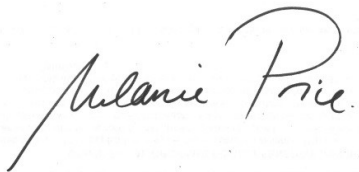
## Conclusion

These results provide a baseline level for groundwater quality prior to the development of the proposed holiday accommodation on Lot 660 La Perouse Court. Therefore, where triggers are exceeded in baseline results, these results can be used as the basis for the development of a set of site specific trigger values in the post development timeframe. It is recommended that exceedance of the baseline data by 20% over three or more occurrences in any post development monitoring be the trigger for discussions regarding management or remedial action.

Post development ground and surface water monitoring is proposed to determine if water quality objectives, such as no net deterioration in the quality of Lake Vancouver, are being met. Site specific methodology and trigger values will be developed as part of the planning approval process.

Please contact Melanie Price regarding queries on 0447 446 343 or [melanie.price@auroraenvironmental.com.au](mailto:melanie.price@auroraenvironmental.com.au).

For and on behalf of Aurora Environmental



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Melanie Price  
Principal Environmental Scientist (Director)  
Aurora Environmental

### Attachment:

1. Scope of Monitoring
2. Sampling Locations
3. Description of Sampling Locations
4. Result Summary
5. Description of Results
6. Laboratory Certificates

**Attachment 1**  
**Scope of Monitoring**

<b>Perth</b>	<b>Albany</b>
Dilhorn House	76 Festing Street
2 Bulwer Street	ALBANY WA 6330
PERTH WA 6000	T 0447446343
T (08) 9227 2600	
F (08) 9227 2699	

**MEMORANDUM**

<b>DATE</b>	<b>15 January 2019</b>
<b>TO</b>	<b>Karen McKeough, Department of Water and Environmental Regulation</b>
<b>FROM</b>	<b>Melanie Price, Aurora Environmental Phil Warton, Rockwater</b>
<b>PROJECT NUMBER</b>	<b>CHE2016-002 Local Structure Plan No. 9, Lot 660 La Perouse Crt, Goode Beach</b>
<b>SUBJECT</b>	<b>Hydrological Study V3</b>

This memo outlines the updated scope for the hydrological study to be undertaken at Lot 660 La Perouse Court based on input from the Department of Water and Environmental Regulation (email 20 September 2018) which supports the scope of the investigation with the highlighted inclusions, below. The modelling will characterise the groundwater dynamics associated with Lake Vancouver and surrounds and allow for consideration of potential impacts and potential management related to the development of a tourist resort (the subject of Local Structure Plan No. 9).

On 18 July 2018, the City of Albany Council resolved to support the Local Structure Plan with the following clause:

*16. Prior to the submission of a Scheme Amendment, Lake Vancouver water level data and adjacent groundwater data shall be collected as required to measure the depth of groundwater and direction and rate of flow of the groundwater.*

*The updated data needs to be collected from existing and additional bores and piezometers as required at appropriate times of the year to establish the extent and period of flow, if any, toward Lake Vancouver.*

Management and/or mitigation measures shall be determined by a qualified hydrologist in response to findings from this monitoring and shall be incorporated into the LPS provisions.

Dr Cherry Martin has engaged Rockwater to undertake a hydrological study to satisfy Clause 16. In 1986 and 1987, Rockwater Pty Ltd undertook groundwater (and lake level) monitoring of the site to characterise groundwater flow (Attachment 1). Aurora Environmental has collected groundwater (and lake) level data between November 2016 and August 2018 at CHE001, CHE002, CHE005, CHE006, CHE007 and CHE010/FBa (Attachment 2).

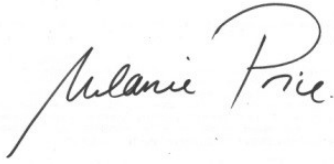
In response to the City of Albany Council resolution and previous comments from Department of Water and Environmental Regulation (DWER) the following is proposed:

- Supplement existing groundwater and lake level information by collection of data (manual and via loggers), including capture of data for seasonal groundwater highs (September, October and November) and lows (March, April and May). Capture of seasonal data was recommended by Andrew Maughan of DWER at a meeting in October 2017.
- Rockwater will review data (1986 to present) with data yet to be collected (January to May 2019) to determine sufficiency for modelling. If data is adequate for modelling, monitoring will cease in June 2019. However, if Rockwater indicates that further data is required to inform modelling manual modelling will be undertaken to the end of November 2019.
- Locations for data collection include 12 sites (Attachment 2): CHE001/FB2, CHE002/Lake, CHE003, CHE004, CHE005, CHE006, CHE007, CHE008, CHE010/FBa, FB3, FBe and FBi. Rockwater has confirmed that the monitoring sites are sufficient in number and location to characterise the site's hydrology. Each site has a logger deployed to take measurements, with manual groundwater level collection on a monthly basis.
- Detailed design of the development will assist in identifying bores/ piezometers which will be suitable for retention and post development performance/compliance monitoring. Bores or piezometers may need to be constructed to allow for post development monitoring.
- Details of bores and piezometers are included in Attachment 3. All bores have been surveyed in to allow for comparisons of relative levels.
- The groundwater model will be calibrated to the maximum and minimum groundwater levels, and will be run to assess groundwater movement (distance and directions) to and from Vancouver Lake. It will also be used to assess the impacts of water infiltrated at the planned development.
- A seasonal (quarterly) water quality sampling program is proposed (initially) for four rounds to determine baseline levels for:
  - pH, EC, TDS, alkalinity
  - Full nutrient suite (Ammonia-N, Nitrate-N, Nitrite-N, NOx-N, TKN, TN, Reactive P, Total P)

The following analytes will be measured for one round:

- Metals (Total Al & Fe; dissolved Al, As, Cd, Cr, Hg, Cu, Fe, Mn, Ni, Pb and Zn)
- Hydrocarbons
- Pesticides
- Sample sites for water quality monitoring were chosen based on inputs to Lake Vancouver from La Perouse Road (CHE009), water quality in the lake (CHE002), a location between the lake and the proposed development (CHE003 and/or CHE006) and a location between the proposed development and Goode Beach (CHE001). These locations allow for differentiation between key input risk areas in relation to Lake Vancouver.
- Slug testing will be carried out to measure hydraulic conductivity, to provide data for the groundwater flow analysis and modelling.

Please do not hesitate to contact the undersigned, should you have any queries. For and on behalf of Aurora Environmental



Melanie Price

Associate Environmental Scientist (Director)

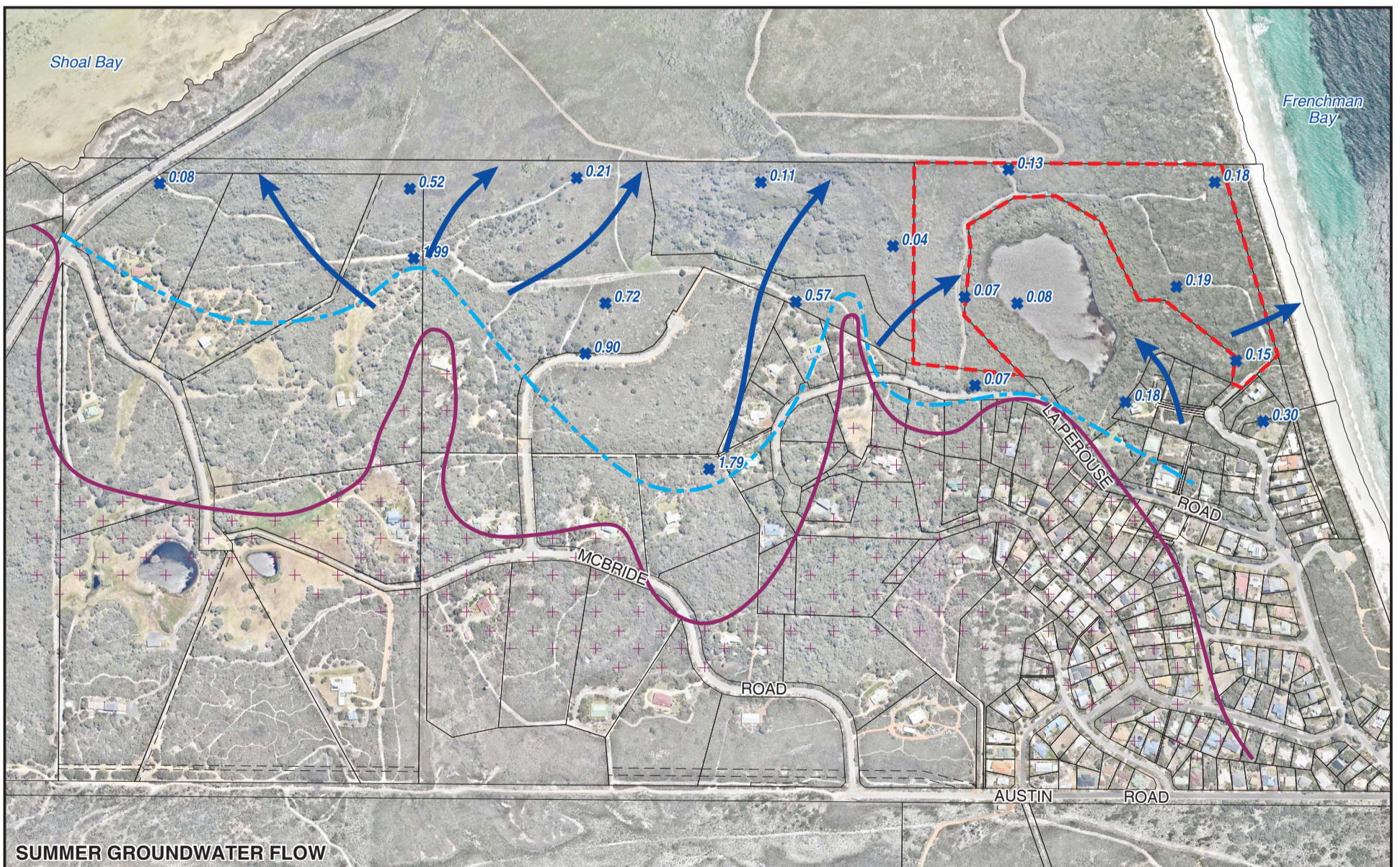
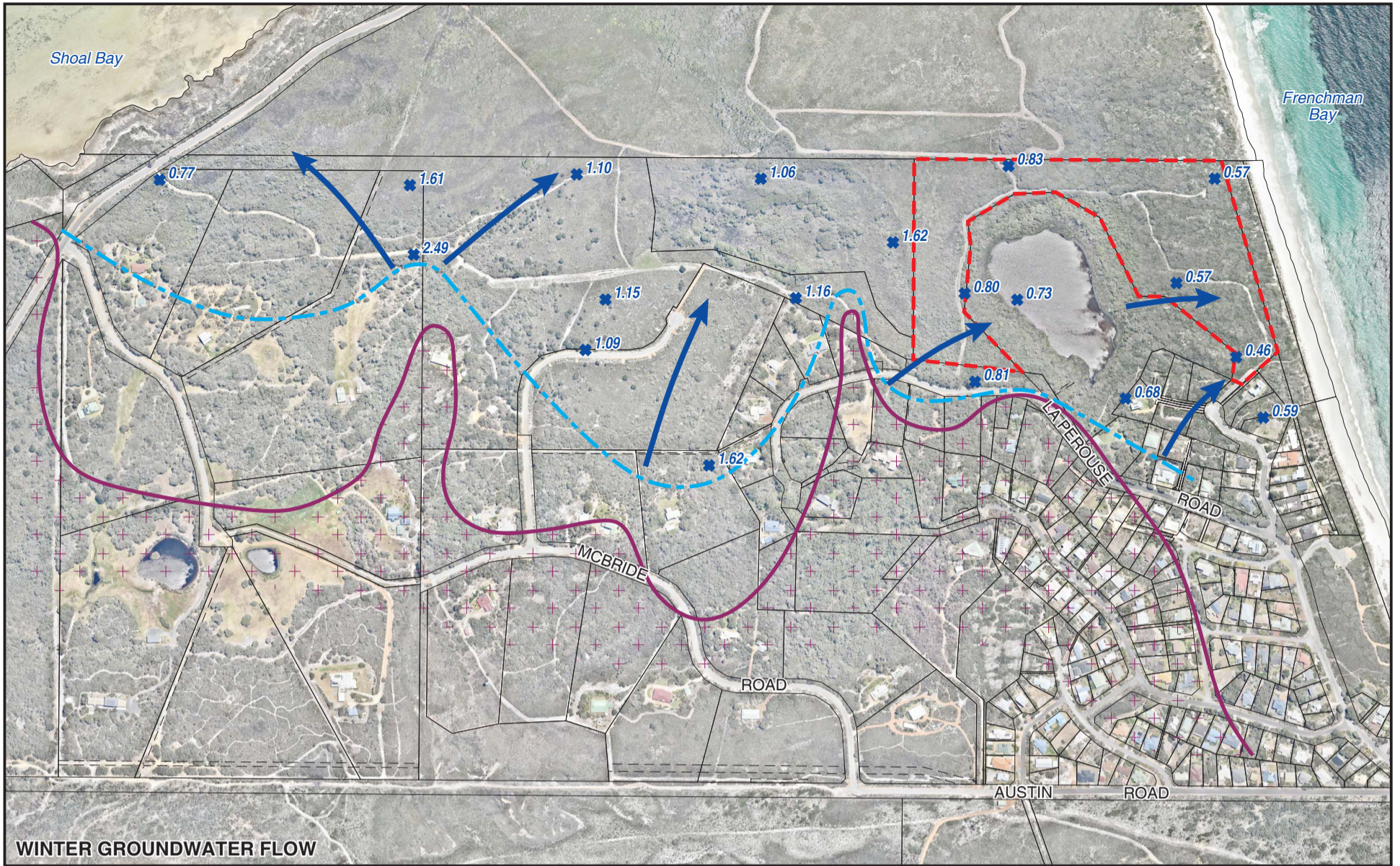
**Responses to DWER Queries (20 September 2018)**

DWER COMMENT/ QUERY	AURORA/ ROCKWATER RESPONSE
Monitoring bores CHE003, CHE004, CHE007 and CHE008 have bottom of bore depths which may not be deep enough to monitor the seasonal minimum ground water level (with reference summer groundwater level, Figure 4, Rockwater 1992)	Manual monitoring is being undertaken to ensure that groundwater lows are captured. We note that groundwater is higher than 1986/ 1987 monitoring (likely due to increased runoff from urbanisation) which reduces the risk of bore depths being too shallow. Additional piezometers may be installed if required.
There are unexplained anomalies between bore depths in the table <i>Bore and Piezometer Details</i> and the <i>Rockwater Appendix 1 Bore Completion Data</i> (for example FB2 ‘Bottom of Bore’ appears to be above the top of the screen. This may be a mistake or the bore casing may have failed, affecting the suitability of the bore)	Original depth of CHE001/FB2 was 23m bgl. Current measures indicate that the depth is now 14.78 which is above the depth to which the casing was originally installed, but below the top of the screen (14.73 mbgl).
If bore FB2 is still operational, recorded head data may not be suitable for groundwater gradient analysis due to the relatively deep screen in relation to other bores in the vicinity	An additional shallow piezometer has been installed next to CHE001/FB2 to compare levels.
Bore FB2 was established to monitor movement of the seawater interface and was screened in the apparent fresh – saline groundwater transition zone. This screen depth may not be suitable for characterising the ambient groundwater quality of the site or for future performance monitoring. It is suggested that CHE003 may be a suitable alternative for groundwater quality monitoring.	CHE003 and CHE001/ FB2 will both being monitored for groundwater quality.
Groundwater investigation and monitoring bores should be constructed to minimum accepted standards, for example with annulus and surface seals to prevent surface water ingress. (e.g. refer to <i>ASTM D5092 / D5092M – 16, Standard Practice for Design and Installation of Groundwater Monitoring Wells</i> ). For this investigation the prevention of surface water ingress is mostly relevant to the bores used for water quality sampling, and CHE006 may be unsuitable.	The piezometers have been constructed to adequately prevent water ingress.
Sufficient manual groundwater level measurement should be undertaken to adjust and verify datalogger data and ensure critical information isn’t missed in case of logger failure, particularly at times of expected maximum and minimum groundwater levels.	Manual groundwater level monitoring has been undertaken at least monthly since August 2018 and will continue with monthly monitoring until May 2019.

<p>Further liaison with DWER is recommended when scoping the groundwater modelling assessment and designing and siting ongoing performance monitoring bores and monitoring program.</p>	<p>Noted. Phil Warton from Rockwater will contact DWER regarding modelling and Aurora Environmental will be involved in developing a framework for ongoing monitoring.</p>
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## **ATTACHMENT 1**



**Legend**

- - - Site Boundary
- - - Inferred Subsurface Contact Between Water Table of Granite Bedrock
- Cadastral Boundary
- Approximate Boundary of Outcropping Granite
- - - Easement Boundary
- ← Direction of Groundwater Flow
- \* 1.79 Water Level in Shallow Observation Bore Measured 02-09-86, mAHD



0 50 100 150 200 250m  
SCALE 1 : 7 500 at A3 (MGA)



Cherry Martin  
ENVIRONMENTAL ASSESSMENT - VANCOUVER BEACH RESORT  
LOT 40 LA PEROUSE COURT - GOODE BEACH, CITY OF ALBANY, WA

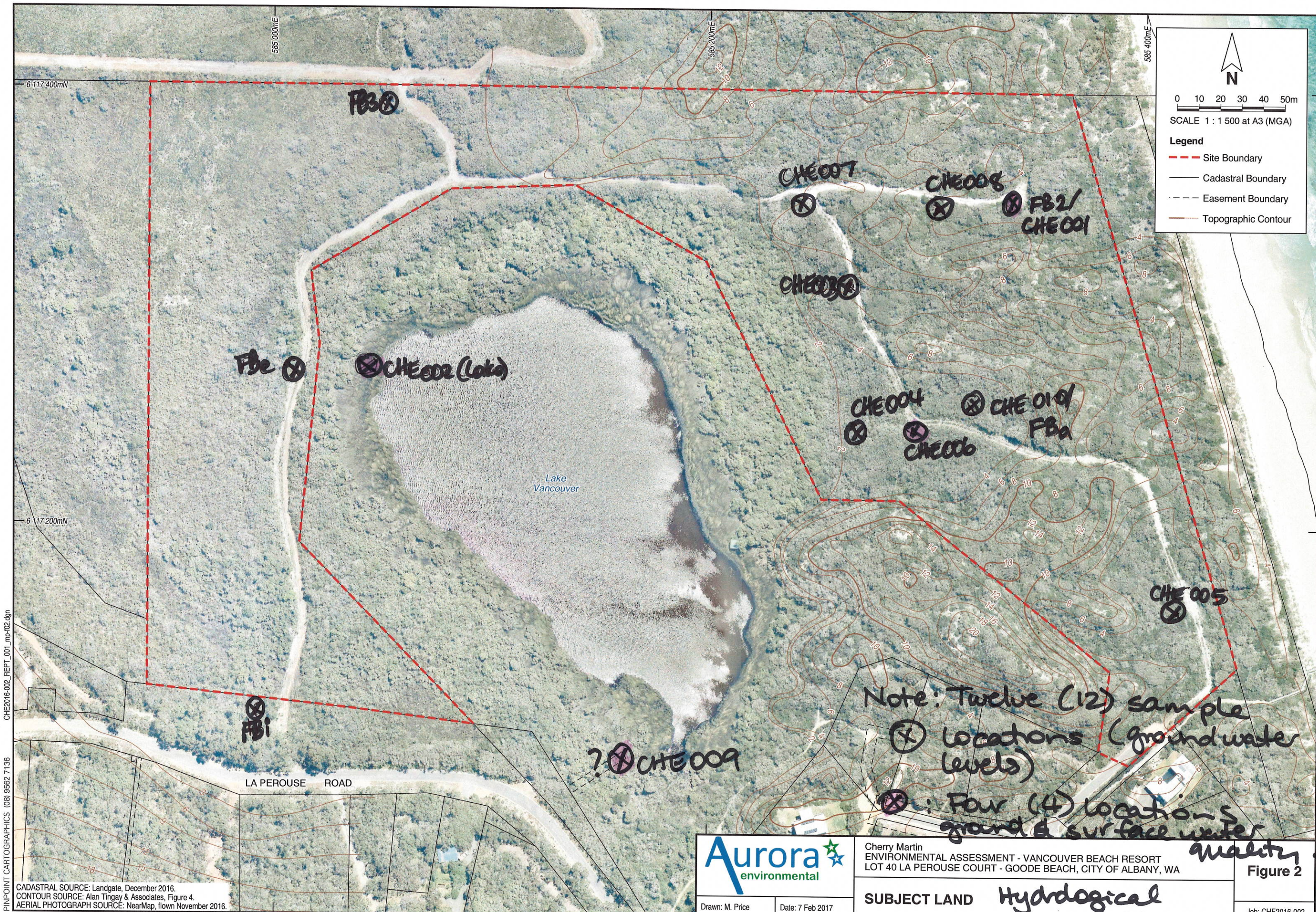
**GROUNDWATER FLOW**

Drawn: M. Price      Date: 7 Feb 2017

**Figure 5**

CADASTRAL SOURCE: Landgate, December 2016.  
AERIAL PHOTOGRAPH SOURCE: NearMap, flown November 2016.  
GROUNDWATER FLOW SOURCE: Alan Tingay & Associates, Figure 6 & 7, 1992.

## ATTACHMENT 2



N

0 10 20 30 40 50m

SCALE 1 : 1 500 at A3 (MGA)

**Legend**

- - - Site Boundary
- Cadastral Boundary
- - - Easement Boundary
- Topographic Contour

Note: Twelve (12) sample locations (groundwater levels)

⊗ : Four (4) locations ground & surface water quality

PINPOINT CARTOGRAPHICS (08) 9562 7136 CHE2016-002\_REPT\_001\_mpf-02.dgn

CADASTRAL SOURCE: Landgate, December 2016.  
 CONTOUR SOURCE: Alan Tingay & Associates, Figure 4.  
 AERIAL PHOTOGRAPH SOURCE: NearMap, flown November 2016.

**Aurora**  
 environmental

Drawn: M. Price      Date: 7 Feb 2017

Cherry Martin  
 ENVIRONMENTAL ASSESSMENT - VANCOUVER BEACH RESORT  
 LOT 40 LA PEROUSE COURT - GOODE BEACH, CITY OF ALBANY, WA

**SUBJECT LAND**      Hydrological Investigation

Figure 2

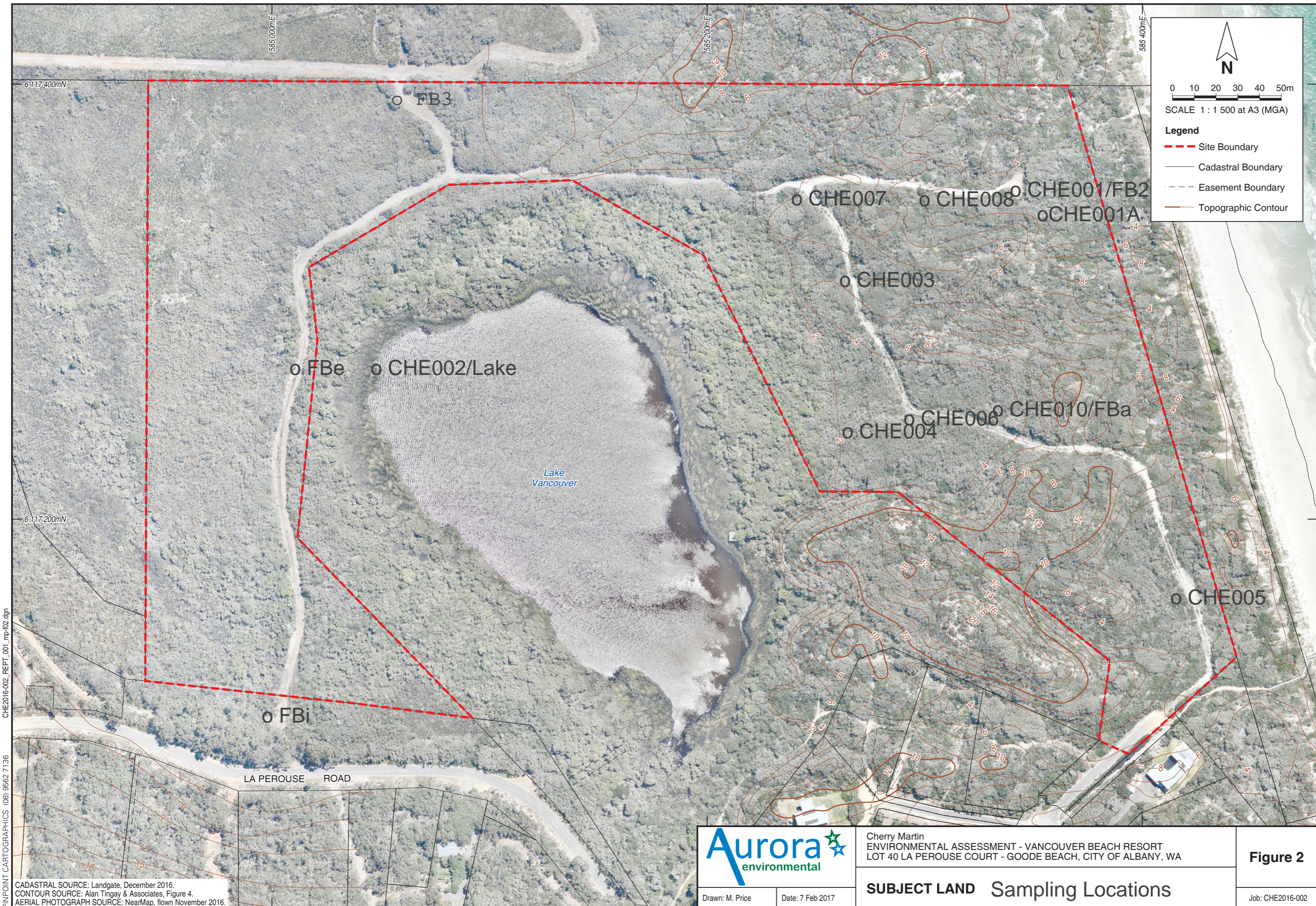
Job: CHE2016-002

## **ATTACHMENT 3**

**Bore and Piezometer Details**

Location	Construction	Bottom of Bore (mAHD)	Depth (m below ground level)
CHE001/FB2	Monitoring bore	-11.77	14.23
CHE002	Stilling pond erected in lake		
CHE003	Piezometer (factory slotted pipe) (hand augured)	0.105	1.94
CHE004	Piezometer (factory slotted pipe) (hand augured)	0.225	1.75
CHE005	Piezometer (factory slotted pipe) (hand augured)	-0.59	2.30
CHE006	Piezometer (factory slotted pipe) (hand augured)	-0.70	2.47
CHE007	Piezometer (factory slotted pipe) (hand augured)	0.10	2.72
CHE008	Piezometer (factory slotted pipe) (hand augured)	0.25	3.58
CHE010/FBa	Piezometer (factory slotted pipe) (hand augured)	-0.54	2.58
FB3	Monitoring bore	-17.33	19.02
FBe	Piezometer (factory slotted pipe) (hand augured)	-2.12	1.42
FBi	Monitoring bore	-0.68	2.01

**Attachment 2**  
**Sampling Locations**



CHE2016-002.REPT\_001.mp-02.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136

CADASTRAL SOURCE: Landgate, December 2016.  
 CONTOUR SOURCE: Alan Tingay & Associates, Figure 4.  
 AERIAL PHOTOGRAPH SOURCE: NearMap, flown November 2016.



Cherry Martin  
 ENVIRONMENTAL ASSESSMENT - VANCOUVER BEACH RESORT  
 LOT 40 LA PEROUSE COURT - GOODE BEACH, CITY OF ALBANY, WA

Drawn: M. Price

Date: 7 Feb 2017

**SUBJECT LAND** Sampling Locations

**Figure 2**

Job: CHE2016-002

o CHE009



**Attachment 3**  
**Description of Sampling Locations**  
**Result Summary**

**Bore and Piezometer Details**

<b>Location</b>	<b>Construction</b>	<b>Bottom of Bore (mAHD)</b>	<b>Depth (m below ground level)</b>
CHE001/FB2	Monitoring bore (information attached)	-11.77	14.23
CHE002	Stilling pond erected in lake		
CHE003	Piezometer (factory slotted pipe) (hand augured)	0.105	1.94
CHE006	Piezometer (factory slotted pipe) (hand augured)	-0.70	2.47
CHE009	Road side sump with grate		

APPENDIX I  
BORE COMPLETION DATA

Bore FB2

Location: Lot 401 north-east corner.  
Status: Saltwater interface monitoring bore  
Date Commenced: 06/08/86  
Date Completed: 11/08/86  
Static Water Level: 2.31 mbtc (02/09/86)  
Height of PVC Casing: 0.33 magl  
Reduced Level of Top of  
PVC Casing: 2.879 m AHD  
Reduced Water Level: 0.57 m AHD (02/09/86)  
Drilling Method: Cable tool  
Drilling Contractor: Western Irrigation Pty Ltd  
Make of Drilling Rig: Carse  
Total Depth Drilled: 23.0 m  
Diameter Drilled: 0 - 2.6 m, 270 mm; 2.6 - 23 m, 186 mm  
Casing Type: 50 mm UPVC Class 9  
Casing Installed: +0.33 - 16.73 mbgl  
Slotted Interval: 14.73 - 16.73 m, horizontal slots 100 mm apart  
Slot Aperture: 1.5 mm  
Gravel Pack: +2 - 4 mm; 14.3 - 16.73 m  
Cement Grout Hole: 16.73 - 23 m  
Cement Grout Annulus: 12.5 - 13.3 m  
Depth to Saltwater Interface  
(1,500 mg/l level): 17.5 m  
Salinity of Water from Slotted Interval  
Following Airlift Development: 1,500 mg/l

Lithology:

- 0 - 7.5 m SAND/SHELL - white, very fine to medium grained, poorly sorted, sub-angular to sub-rounded quartz with a trace of heavy minerals and feldspar. Shell-bivalve fragments to 30 mm.
- 7.5 - 11.5 SILT/SAND/SHELL - dark grey, very fine to medium grained, poorly sorted, sub-angular to sub-rounded quartz with a trace of heavy minerals and feldspar. Macro and micro shells. 9.5 - 11.5 m - brown, some ferruginised semi-cemented sandstone.
- 11.5 - 22 SAND - buff, very fine to fine grained, moderately sorted, sub-rounded quartz. Traces of sub-angular granite to 5 mm.
- 13.5 - 14.5 m - white.  
14.5 - 16.5 m - light brown, very fine to medium grained, sub-angular to sub-rounded. Traces of black coal.  
16.5 - 18.5 m - light grey/buff, very fine to medium grained.  
18.5 - 22 m - buff to light brown with depth, fine to medium grained, sub-angular to sub-rounded.
- 22 - 23 WEATHERED GRANITE - grey/white mottled angular chips of granite with minor balls of brown puggy clay.

APPENDIX I  
BORE COMPLETION DATA

Bore FBa

Location: Lot 401, 170 m south of northern boundary, 125 m west of eastern boundary.

Status: Water level monitoring bore

Date Commenced: 04/08/86

Date Completed: 07/08/86

Static Water Level: 1.72 mbtc (02/09/86)

Height of PVC casing: 0.34 magl

Reduced Level of Top

of PVC casing: 2.285 m AHD

Reduced Water Level: 0.57 m AHD (02/09/86)

Drilling Method: Hand augered and sludged

Drilled By: Mr K. Greenham, Rockwater Pty Ltd

Total Depth Drilled: 2.75 m

Diameter Drilled: 0 - 1.8 m, 80 mm; 1.8 - 2.75 m, 60 mm

Casing Type: 50 mm UPVC, Class 9

Casing Installed: +0.34 - 2.75 mbgl

Slotted Interval: 1.7 - 2.75 mbgl, horizontal slots, 100 mm apart

Slot Aperture: 1.5 mm

Water Salinity: 660 mg/l

Bore FBb

Location: Lot 401, 270 m south of northern boundary, 80 m west of eastern boundary.

Status: Water level monitoring bore

Date Commenced: 04/08/86

Date Completed: 05/08/86

Static Water Level: 1.81 mbtc (02/09/86)

Height of PVC casing: 0.28 magl

Reduced Level of Top

of PVC casing: 2.270 m AHD

Reduced Water Level: 0.46 m AHD (02/09/86)

Drilling Method: Hand augered and sludged

Drilled By: Mr K. Greenham, Rockwater Pty Ltd

Total Depth Drilled: 3.2 m

Diameter Drilled: 0 - 1.5 m, 80 mm; 1.5 - 3.2 m, 60 mm

Casing Type: 50 mm UPVC, Class 9

Casing Installed: +0.28 - 3.2 mbgl

Slotted Interval: 1.5 - 3.2 m, horizontal slots, 100 mm apart

Slot Aperture: 1.5 mm

Water Salinity: 590 mg/l

APPENDIX I  
BQRE COMPLETION DATA

Bore FBi

Location: Lot 401, 15 m north of southern boundary, 30 m east of western boundary.  
Status: Water level monitoring bore  
Date Commenced: 15/08/86  
Date Completed: 15/08/86  
Static Water Level: 0.76 mbtc (02/09/86)  
Height of PVC casing: 0.41 magl  
Reduced Level of Top  
of PVC casing: 1.570 m AHD  
Reduced Water Level: 0.81 m AHD (02/09/86)  
Drilling Method: Hand augered and sludged  
Drilled By: Mr K. Greenham, Rockwater Pty Ltd  
Total Depth Drilled: 3.0 m  
Diameter Drilled: 0 - 0.8 m, 80 mm; 0.8 - 3.0 m, 60 mm  
Casing Type: 50 mm UPVC, Class 9  
Casing Installed: +0.41 - 3.0 mbgl  
Slotted Interval: 0.6 - 3.0 m  
Slot Aperture: 1.5 mm  
Water Salinity: 340 mg/l

Bore FBj

Location: Lot 402, on western boundary, 20 m south of northern boundary  
Status: Water level monitoring bore  
Date Commenced: 16/08/86  
Date Completed: 16/08/86  
Static Water Level: 1.08 mbtc (02/09/86)  
Height of PVC casing: 0.26 magl  
Reduced Level of Top  
of PVC casing: 2.684 m AHD  
Reduced Water Level: 1.61 m AHD (02/09/86)  
Drilling Method: Hand augered and sludged  
Drilled By: Mr K. Greenham, Rockwater Pty Ltd  
Total Depth Drilled: 2.5 m  
Diameter Drilled: 0 - 1.2 m, 80 mm; 1.2 - 2.5 m, 60 mm  
Casing Type: 50 mm UPVC, Class 9  
Casing Installed: +0.26 - 2.5 mbgl  
Slotted Interval: 1.0 - 2.5 m  
Slot Aperture: 1.5 mm  
Water Salinity: 400 mg/l

APPENDIX I  
BORE COMPLETION DATA

Bore FB3

Location: Lot 401, northern boundary, 105 m east of western boundary.  
Status: Saltwater interface monitoring bore  
Date Commenced: 11/08/86  
Date Completed: 15/08/86  
Static Water Level: 1.23 mbtc (02/09/86)  
Height of PVC Casing: 0.31 m  
Reduced Level of Top of  
PVC Casing: 2.057 m AHD  
Reduced Water Level: 0.83 m AHD (02/09/86)  
Drilling Method: Cable tool  
Drilling Contractor: Western Irrigation Pty Ltd  
Make of Drilling Rig: Carse  
Total Depth Drilled: 31.1 m  
Diameter Drilled: 0 - 2.6 m, 270 mm; 2.6 - 31.1 m, 186 mm  
Casing Type: 50 mm UPVC Class 9  
Casing Installed: +0.31 - 18.6 mbgl  
Slotted Interval: 16.6 - 18.6 m, horizontal slots 100 mm apart  
Slot Aperture: 1.5 mm  
Gravel Pack: +2 - 4 mm, 16.0 - 18.6 m  
Cement Grout Hole: 18.6 - 19.5 m  
Cement Grout Annulus: 14.0 - 15.0 m  
Depth to Saltwater Interface  
(1,500 mg/l level): 27 m  
Salinity of Water from Slotted Interval  
Following Airlift Development: 890 mg/l

Lithology:

- 0 - 6 m SAND/SHELL - buff, fine to medium grained, minor coarse grains, poorly sorted, sub-angular to sub-rounded quartz. Micro and macro shells to 40 mm.
- 6 - 8.5 SILTY SAND/SHELL - grey, very fine to medium grained, poorly sorted, sub angular quartz. Shells as above.
- 8.5 - 12.5 SILT/SAND - brown, very fine to medium grained, poorly sorted, sub-angular quartz. Semi consolidated.
- 12.5 - 20 SAND - light brown, very fine to medium grained, poorly sorted, sub-angular to sub-rounded quartz, traces of sub-angular granite to 15 mm and heavy minerals.
- 15 - 18 m - white, sub-rounded.  
18 - 20 m - light grey/brown, sub-rounded.
- 20 - 30.4 SILT/SAND - dark grey/brown, very fine to medium grained, poorly sorted, sub-angular to sub-rounded quartz, trace of heavy minerals.
- 20.2 m - trace of dark grey puggy clay.  
26 - 30.4 m - grey.
- 30.4 - 31.1 WEATHERED GRANITE - light grey, granular, angular, quartz and granite in puggy, light grey clay.

**Attachment 4**  
**Result Summary**

		Physicochemical				Nutrients								Metals												
ANZECC, 2000 trigger values		WATER ASSESSMENT CRITERIA (in mg/L unless otherwise noted)																								
Fresh Waters - Wetlands		7.5-8.5	NV	NV	NV	0.04	NV	NV	0.1	NV	1.50	0.030	0.06	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	
Fresh Waters - Lakes & Reservoirs SW Aust		6.5-8.0	NV	NV	NV	0.01	NV	NV	0.010	NV	0.35	0.005	0.01	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	
Freshwater								0.70								0.055	0.024	0.0002	NV	0.0014	1.9	0.00006	NV	0.011	0.0034	0.008
ASS Indicators		<5	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	>1	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
Sample ID	Date	WATER ANALYTICAL RESULTS (in mg/L unless otherwise noted)																								
		pH	Conductivity (mS/cm)	TDS (mg/L)	Alkalinity (mgCaCO3/L)	Ammonia-N	Nitrite-N	Nitrate-N	NOx-N	TKN	Total Nitrogen	Filterable Reactive Phosphorus	Total Phosphorus	Total Al	Total Fe	Aluminium	Arsenic	Cadmium	Chromium	Copper	Manganese	Mercury	Iron	Nickel	Lead	Zinc
CHE001/FB2	16 April 2019	7.4	1.1	640	190	<0.02	<0.01	3.6	3.6	0.6	4.2	2.1	2.5													
CHE006	16 April 2019	7.3	1.7	1,000	340	0.1	0.14	0.29	0.43	3.5	3.9	0.03	0.19													
CHE002/Lake	16 April 2019	8.3	3.3	2,000	170	0.06	<0.01	0.01	0.01	7.8	7.8	<0.01	0.13													
CHE009	16 April 2019	6.9	0.28	170	40	0.54	<0.01	0.04	0.04	1.1	1.1	<0.01	0.13													
CHE003	16 April 2019	7.3	3.3	1,900	10,000	0.22	0.08	0.5	0.58	64	65	<0.01	4.9													
CHE001/FB2	21 January 2019	7.3	1	450	180	0.05	0.02	2.9	2.9	3.4	6.3	2.5	2.5													
CHE006	21 January 2019	7.2	1.7	870	450	0.52	<0.01	<0.01	<0.01	19	19	0.03	0.25													
CHE002/Lake	21 January 2019	7.9	2.5	1,200	180	0.26	<0.01	0.01	0.01	3.9	3.9	<0.01	0.08													
CHE009	21 January 2019	6.6	0.39	230	170	3	<0.01	0.04	0.04	11	11	0.01	0.68													
CHE003	21 January 2019	7.3	3.9	1,800	990	0.2	<0.01	0.02	0.02	21	21	0.1	1.1													
CHE001/FB2	20 November 2018	7.4	1.1	580	200	1.6	0.02	2.6	2.6	3.4	6	2.2	2.2													
CHE006	20 November 2018	7.3	1.5	990	370	0.12	<0.01	<0.01	<0.01	12	12	0.06	0.5													
CHE002/Lake	20 November 2018	7.4	2	1,100	170	0.04	0.01	0.01	0.02	1.4	1.4	<0.01	0.06													
CHE009	20 November 2018	6.6	0.3	180	82	1.4	0.01	0.03	0.04	7.5	7.5	0.01	1.5													
CHE003	20 November 2018	7.2	4.3	2,400	670	0.32	0.03	0.05	0.08	11	11	0.02	0.73													
CHE001/FB2	21 August 2018	7.5	1	540	190	2.1	0.73	2.6	3.3	2.8	6.1	2.3	2.3	0.06	0.1	<0.01	0.001	<0.0001	0.002	0.019	<0.01	<0.0001	<0.01	0.001	0.003	0.006
CHE006	21 August 2018	7.3	1.7	1,200	510	0.3	<0.01	<0.01	<0.01	38	38	0.03	0.89	3.2	4.1	0.38	0.002	<0.0001	0.006	<0.001	<0.01	<0.0001	0.51	0.001	<0.001	<0.005
CHE002/Lake	21 August 2018	7.6	1.8	1,000	130	0.02	<0.01	<0.01	<0.01	1.4	1.4	<0.01	0.04	0.07	0.28	0.04	<0.001	<0.0001	0.002	0.002	<0.01	<0.0001	0.21	<0.001	<0.001	<0.005
CHE009	21 August 2018	6.5	0.08	48	17	<0.02	<0.01	<0.01	<0.01	1.1	1.1	<0.01	0.06	2	5.2	0.03	<0.001	<0.0001	0.002	0.001	<0.01	<0.0001	0.88	<0.001	<0.001	<0.005



Sample ID	Date	Aldrin	alpha-BHC (HCH)	beta-BHC (HCH)	delta-BHC (HCH)	Bifenthrin	Bromophos Ethyl	Chlordane	Chlorothalonil	Chlorpyrifos	Diazinon	Dieldrin	Endosulfan I	Endosulfan II	
ANZECC ARMCANZ 2000	Fresh Waters Recreation	WATER ASSESSMENT CRITERIA													
		NA	NA	NA	NA	NA	NA	0.03	NA	0.01	0.01	NA	NA	NA	
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
PQL		0.001	0.001	0.001	0.001	0.05	0.005	0.002	0.01	0.005	0.01	0.001	0.001	0.001	
CHE001/FB2	21 August 2018	<0.001	<0.001	<0.001	<0.001	<0.05	<0.005	<0.002	<0.01	<0.005	<0.01	<0.001	<0.001	<0.001	
CHE006	21 August 2018	<0.001	<0.001	<0.001	<0.001	<0.05	<0.005	<0.002	<0.01	<0.005	<0.01	<0.001	<0.001	<0.001	
CHE002/Lake	21 August 2018	<0.001	<0.001	<0.001	<0.001	<0.05	<0.005	<0.002	<0.01	<0.005	<0.01	<0.001	<0.001	<0.001	
CHE009	21 August 2018	<0.001	<0.001	<0.001	<0.001	<0.05	<0.005	<0.002	<0.01	<0.005	<0.01	<0.001	<0.001	<0.001	

Sample ID	Date	Endosulfan Sulfate	Endrin	Ethion	Fenitrothion	Fipronil	Hexachlorobenzene (HCB)	Heptachlor Epoxide	Heptachlor	Lindane	Malathion	Methoxychlor	o,p-DDT	Oxychlorthane	
ANZECC ARMCANZ 2000	Fresh Waters Recreation	WATER ASSESSMENT CRITERIA													
		NA	0.01	NA	NA	NA	NA	NA	0.01	0.2	0.05	NA	0.01	NA	
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
PQL		0.001	0.01	0.01	0.01	0.02	0.001	0.001	0.001	0.001	0.01	0.02	0.001	0.001	
CHE001/FB2	21 August 2018	<0.001	<0.01	<0.01	<0.01	<0.02	<0.001	<0.001	<0.001	<0.001	<0.01	<0.02	<0.001	<0.001	
CHE006	21 August 2018	<0.001	<0.01	<0.01	<0.01	<0.02	<0.001	<0.001	<0.001	<0.001	<0.01	<0.02	<0.001	<0.001	
CHE002/Lake	21 August 2018	<0.001	<0.01	<0.01	<0.01	<0.02	<0.001	<0.001	<0.001	<0.001	<0.01	<0.02	<0.001	<0.001	
CHE009	21 August 2018	<0.001	<0.01	<0.01	<0.01	<0.02	<0.001	<0.001	<0.001	<0.001	<0.01	<0.02	<0.001	<0.001	

Sample ID	Date	p,p'-DDD	p,p'-DDE	p,p'-DDT	Parathion Ethyl	Parathion Methyl	Trifluralin	Vinclozolin
ANZECC ARMCANZ 2000	Fresh Waters Recreation	WATER ASSESSMENT CRITERIA						
		NA	NA	0.01	0.004	0.004	4.4	NA
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL		0.001	0.001	0.001	0.02	0.02	0.01	0.02
CHE001/FB2	21 August 2018	<0.001	<0.001	<0.001	<0.02	<0.02	<0.01	<0.02
CHE006	21 August 2018	<0.001	<0.001	<0.001	<0.02	<0.02	<0.01	<0.02
CHE002/Lake	21 August 2018	<0.001	<0.001	<0.001	<0.02	<0.02	<0.01	<0.02
CHE009	21 August 2018	<0.001	<0.001	<0.001	<0.02	<0.02	<0.01	<0.02

Sample ID	Date	Benzene	Toluene	Ethylbenzene	Xylenes (Total)	Naphthalene	TRH C <sub>6-10</sub>	TRH C <sub>6-10</sub> minus BTEX (F1)	TRH C <sub>10-16</sub>	TRH C <sub>10-16</sub>	TRH C <sub>16-34</sub>	TRH C <sub>34-40</sub>
ANZECC ARMCANZ 2000	Fresh Waters Recreation	WATER ASSESSMENT CRITERIA										
		950	NA	NA	NA	0.016	NA	NA	NA	NA	NA	NA
Units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
PQL		0.001	0.001	0.001	0.003	0.005	0.02	0.02	0.05	0.05	0.1	0.1
CHE001/FB2	21 August 2018	<0.001	<0.001	<0.001	<0.003	<0.005	<0.02	<0.02	<0.05	<0.05	<0.1	<0.1
CHE006	21 August 2018	<0.001	<0.001	<0.001	<0.003	<0.005	<0.02	<0.02	<0.05	<0.05	<0.1	<0.1
CHE002/Lake	21 August 2018	<0.001	<0.001	<0.001	<0.003	<0.005	<0.02	<0.02	<0.05	<0.05	<0.1	<0.1
CHE009	21 August 2018	<0.001	0.021	<0.001	<0.003	<0.005	0.02	<0.02	0.5	0.5	0.9	0.5

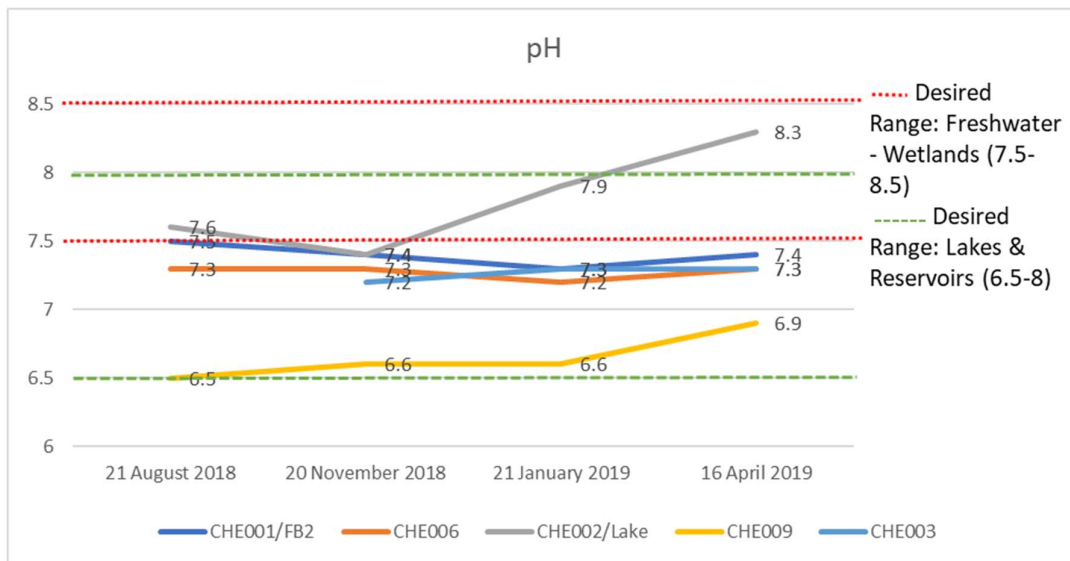
## Result Summary

Results are summarised in Attachment 3.

### pH

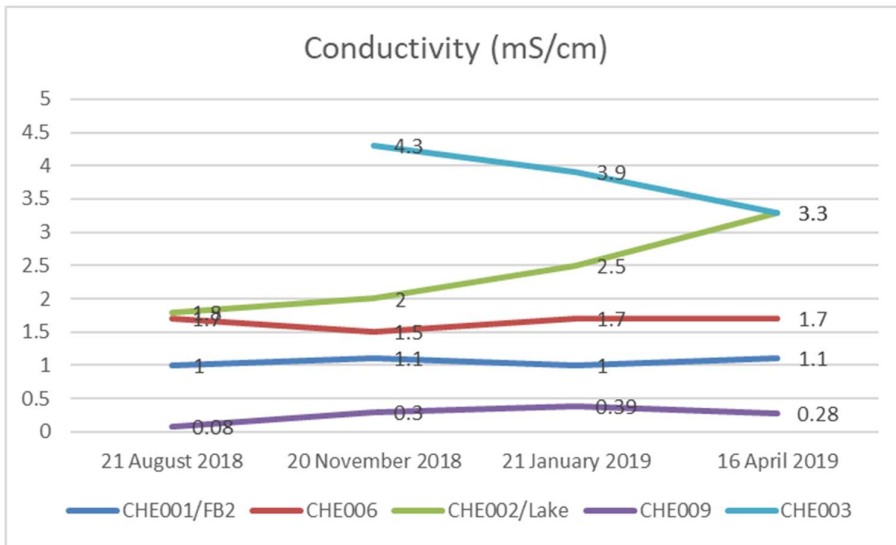
pH is an indicator of acidity or alkalinity. pH is a logarithmic scale and an increase or decrease of one pH unit is a 10 fold change. Neutral water has a pH of 7, acidic solutions have values between 0-6 and alkaline solutions have values between 8-14.

pH for almost all results were below the desired range of 7.5 – 8.5 for Fresh Waters – Wetlands. One result in April 2019 for Lake Vancouver exceeds the trigger for Fresh Waters - Lakes & Reservoirs SW Aust (desired range: 6.5 – 8.0 versus 8.3). The lowest pH was consistently recorded at CHE009, which represents water entering Lake Vancouver from the existing residential area and La Perouse Road. Low pH is a common characteristic for groundwater and wetlands in the Albany area due to the generally acidic nature of the native soils.



### Conductivity

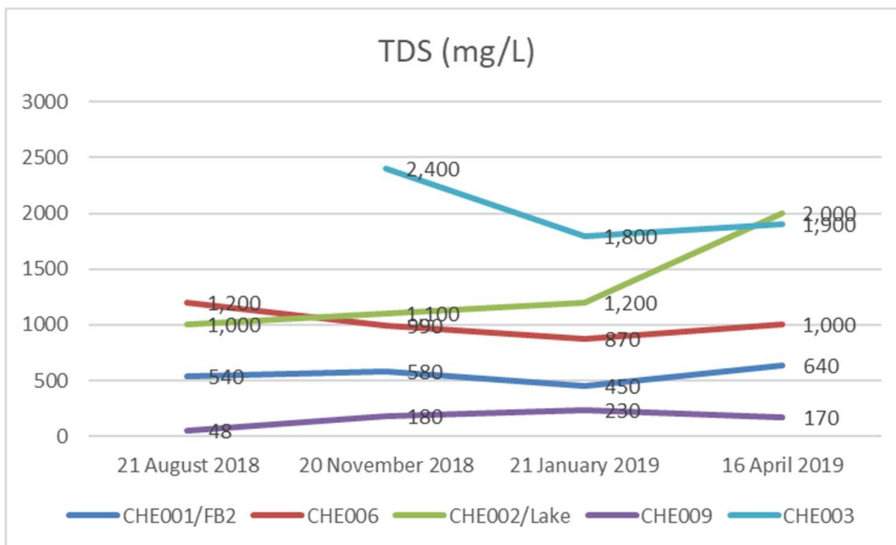
Conductivity is a measure of the capacity of an aqueous solution to carry an electrical current, and depends on the presence of ions; on their total concentration, mobility and valence. Conductivity is commonly used to determine salinity. There is no trigger value for conductivity. The highest conductivity was consistently at CHE003 (east of Lake Vancouver 3.3 – 4.3 mS/cm) which equates to 'brackish' (noting that seawater is around 53 mS/cm). The lowest conductivity was 0.08 mS/cm at CHE009 (reflecting existing development and runoff from La Perouse Road) which equates to 'low salinity water'. Lake Vancouver had consistently higher conductivity compared to CHE006 and CHE001 and ranged between 1.8 mS/cm and 3.3 mS/cm (brackish).



### Total Dissolved Solids

Total dissolved solids indicate the amount of substances dissolved in the sampled water (e.g. salts, minerals, metals). There are no trigger values for TDS but 0 – 600 mg/L are generally considered to reflect low total dissolved solids and readings over 1200 mg/L are more likely to reflect water with a high level of dissolved solids.

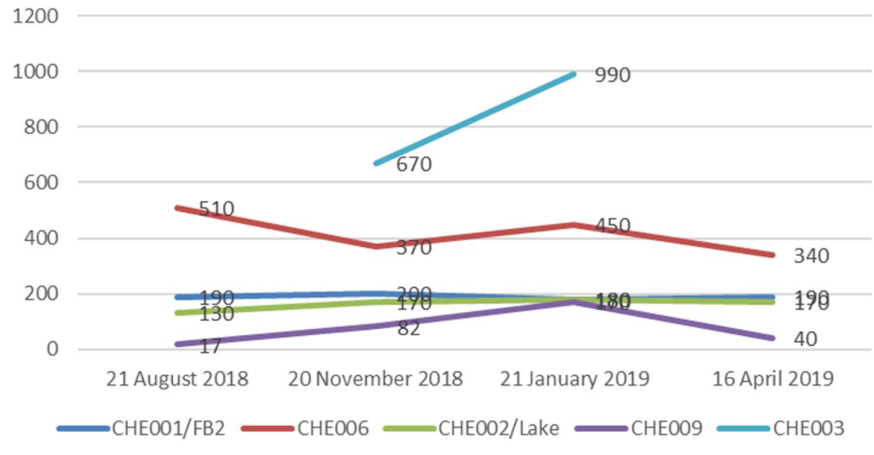
The lowest TDS was consistently measured at CHE009 (48 – 230 mg/L) which reflects water runoff from the existing residential area and La Perouse Road. The highest TDS was recorded at CHE003 (east of Lake Vancouver in November 2018 at 2,400 mg/L) and CHE002/Lake (2000 mg/L in April 2019). Lake TDS was generally higher than groundwater at CHE006 and CHE001/FB2.



### Alkalinity

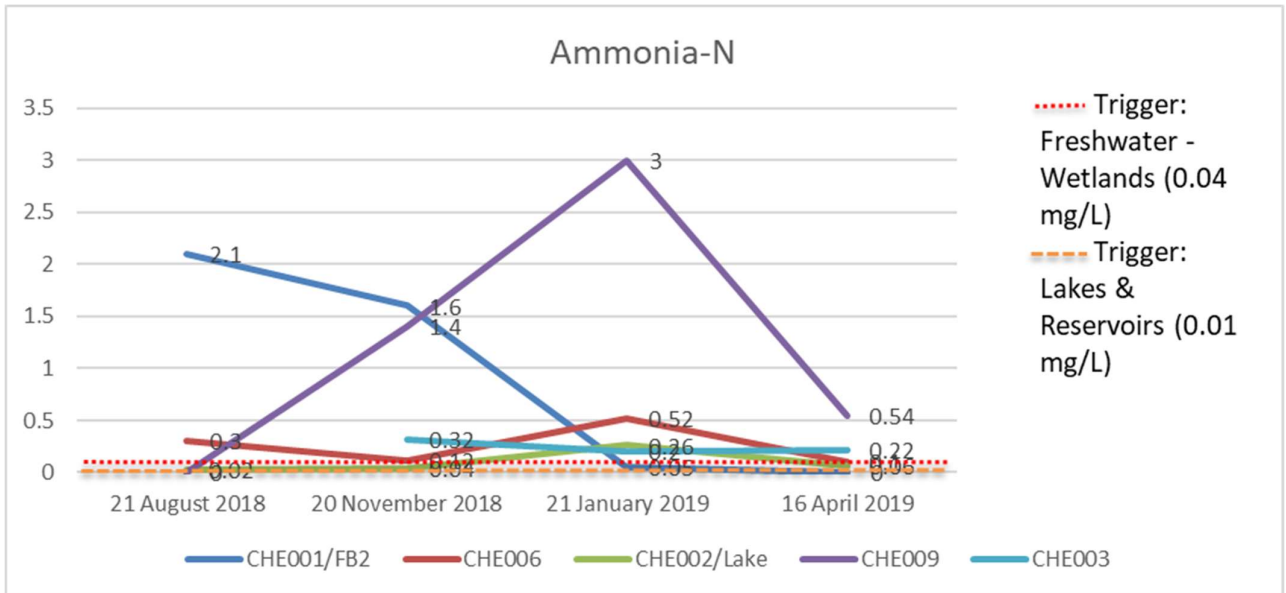
Alkalinity is the capacity of water to resist changes (or provide buffering) with respect to pH that would otherwise make the water more acidic. It is a measure of the sensitivity of a water body to acid inputs. Alkalinity of greater than 20 mg/L is considered adequate, with lower values reflecting a reduced ability to buffer acidity. There are no trigger values for alkalinity. The lowest alkalinity result was associated with CHE009 (17 mg/L for water coming from the existing residential area and La Perouse Road), reflecting a low buffering ability. The highest alkalinity was for CHE003 (east of Lake Vancouver) which ranged from 670 to 990 mg/L, indicating a high buffering ability.

### Alkalinity (mgCaCO3/L)



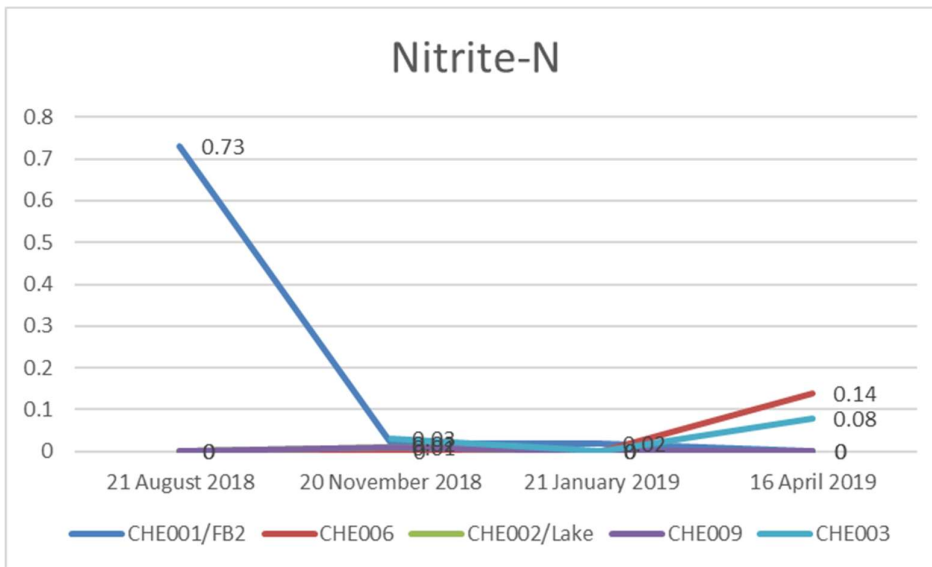
## Ammonia – Nitrogen

Ammonia (NH<sub>3</sub>-N) is the sum of both NH<sub>3</sub> and NH<sub>4</sub><sup>+</sup> and in high levels can cause algal growth and indicate decay of plant, animal or faecal matter. Samples collected generally exceeded triggers for Freshwater – Wetlands (0.04 mg/L) and Lakes and Reservoirs SW Australia (0.01 mg/L). Results were particularly high at CHE009 (reflective of water from the existing residential area and La Perouse Road – 0.54 – 3 mg/L) and CHE001/FB2 during August and November 2019 (2.1 and 1.6 mg/L respectively).



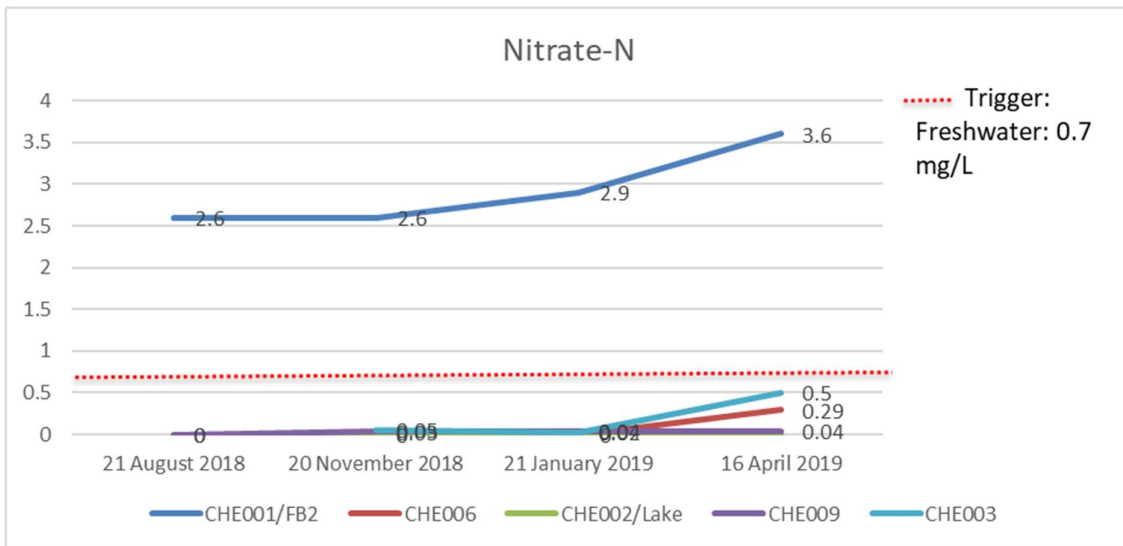
## Nitrite- N

Nitrite (NO<sub>2</sub><sup>-</sup>) is toxic at higher concentrations but is generally converted to nitrate (NO<sub>3</sub><sup>-</sup>) by bacterial action. There is no trigger value for Nitrite – N. Most samples returned results below the detection limit of 0.01 mg/L. However, a high result of 0.73 mg/L was recorded at CHE001/FB2 in November 2018.



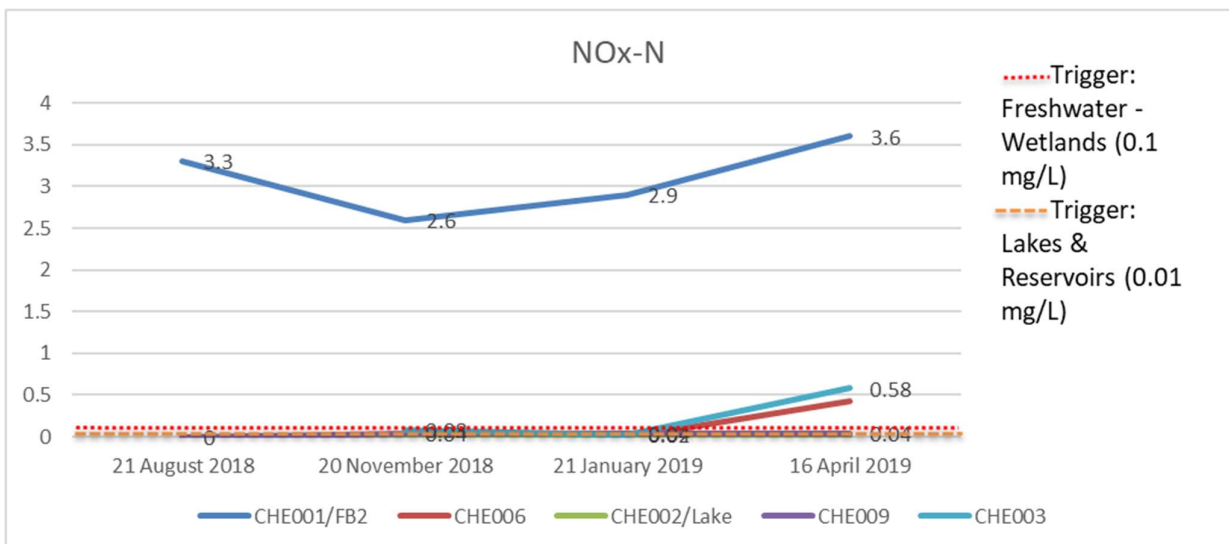
## Nitrate- Nitrogen

Nitrate-N ( $\text{NO}_3^-$ ) reactions in fresh water can cause oxygen depletion. The major sources of nitrates in water bodies are from wastewater (e.g. septic tanks) and animal wastes. The trigger value for Freshwater is 0.70 mg/L. Nitrates were either lower than the detection limit (0.01 mg/L) or trigger value in all locations except CHE001/FB2 which recorded values between 2.6 and 3.6 mg/L.



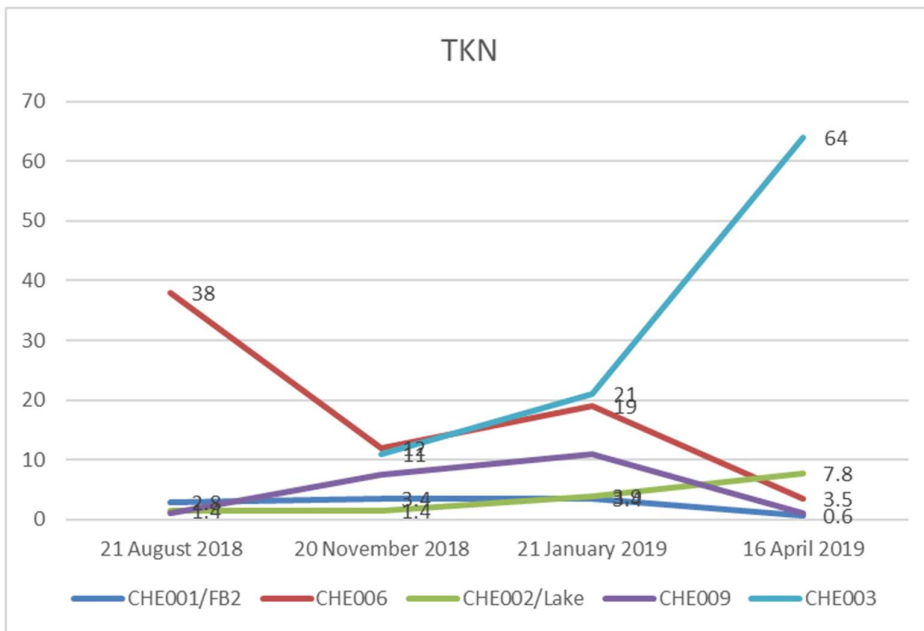
## Nitrogen Oxides - Nitrate + Nitrite (NO<sub>x</sub>-N)

Triggers for nitrogen oxides (nitrate + nitrite – NO<sub>x</sub>-N) range from 0.010 mg/L for Fresh Waters – Lakes and Reservoirs SW Aust to 0.1 mg/L for Fresh Water – Wetlands. NO<sub>x</sub> levels were generally above the trigger for Fresh Water – Lakes and Reservoirs and on some occasions above the trigger for Freshwater – Wetlands. CHE001/FB2 recorded the highest values of 2.6 to 3.6 mg/L.



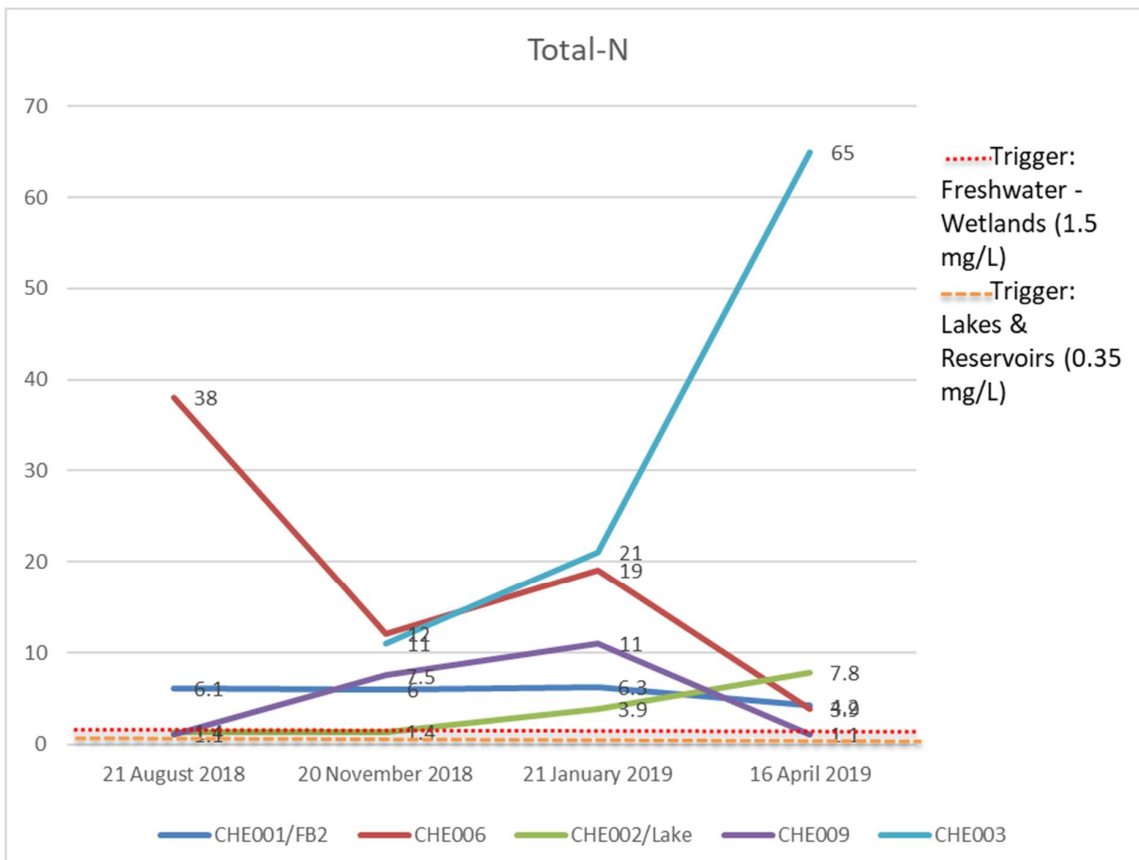
### Total Kjeldahl Nitrogen

Total Kjeldahl Nitrogen (TKN) is the total concentration of organic nitrogen and ammonia. There are no trigger values for TKN. The highest results were recorded at CHE003 (64 mg/L in April 2019) and CHE006 (38 mg/L in August 2018). The lowest values were generally recorded at CHE002/Lake and CHE001/FB2.



### Total Nitrogen

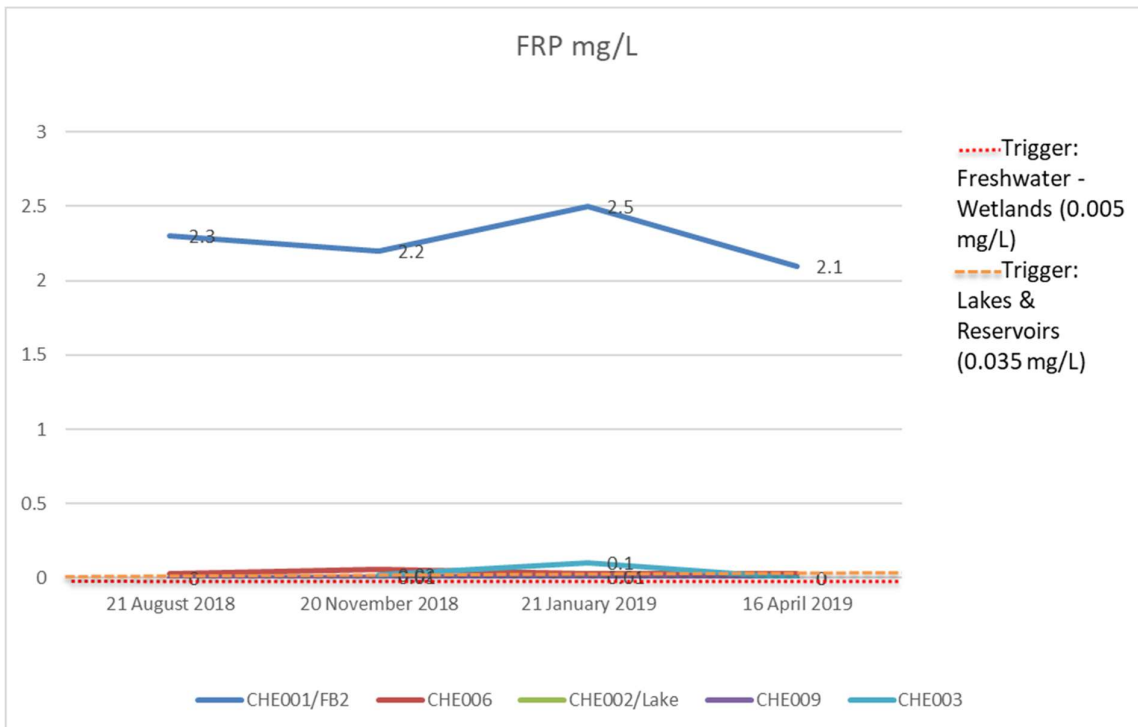
Total Nitrogen is the sum of inorganic nitrogen (nitrate + nitrite + ammonium). Triggers for Total Nitrogen are 0.35 mg/L for Fresh Waters - Lakes & Reservoirs SW Aust and 1.5 mg/L for Fresh Waters – Wetlands. Results exceeded both trigger values at all sampling locations with the highest levels of 65 mg/L at CHE003 in April 2019 and 38 mg/L at CHE006 in August 2018.





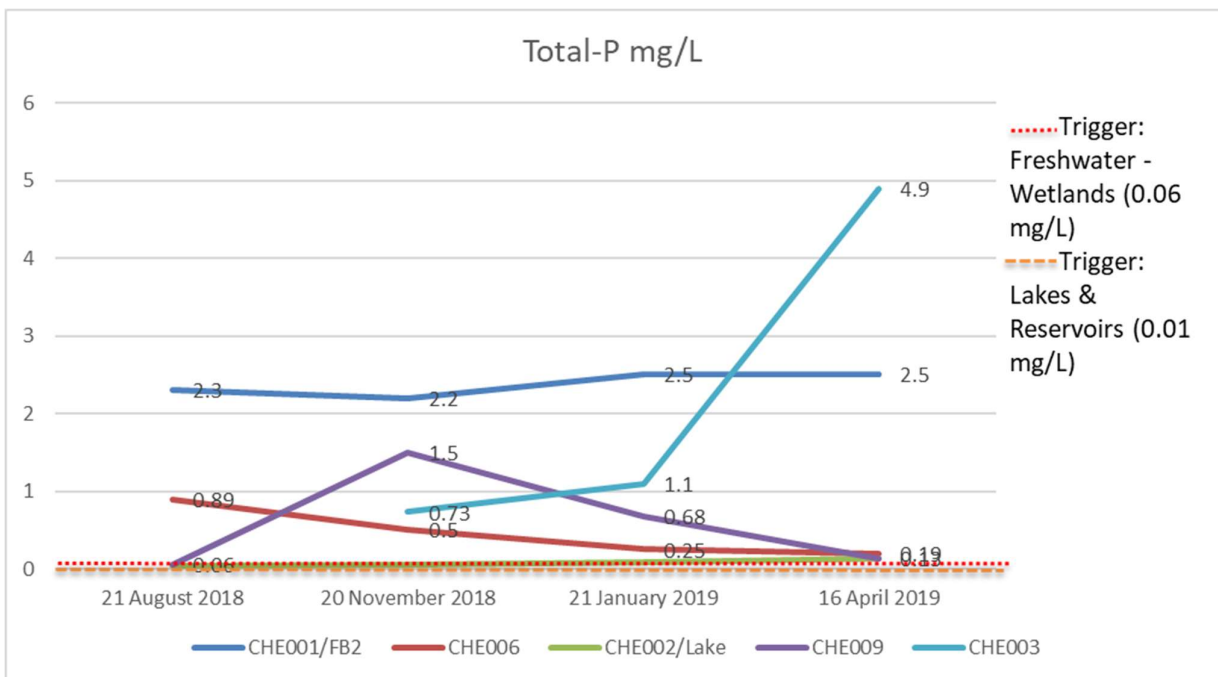
## Filterable Reactive Phosphorus

Filterable Reactive Phosphorus (FRP) is indicative of orthophosphate (PO<sub>4</sub>). Triggers for FRP are 0.005 mg/L for Fresh Waters - Lakes & Reservoirs SW Aust and 0.030 mg/L for Fresh Waters – Wetlands. Results were generally higher than the trigger values with the highest values at CHE001/FB2 with a range between 2.1 and 2.5 mg/L.



## Total Phosphorus

Total Phosphorus (TP) measures the sum of all phosphorus compounds. Triggers for TP are 0.01 mg/L for Fresh Waters - Lakes & Reservoirs SW Aust and 0.06 mg/L for Fresh Waters – Wetlands. Results for all samples exceeded the trigger values with the highest value of 4.9 mg/L at CHE003. CHE001/FB2 also had elevated levels between 2.2 and 2.5 mg/L.



## Metals

**Total Aluminium:** There is no trigger value for Total Aluminium. Results ranged from 0.06 to 3.2 mg/L with the highest level recorded at CHE006 (east of Lake Vancouver).

**Total Iron:** There are no trigger values for Total Iron. Results ranged from 0.1 to 5.2 mg/L with the highest level recorded at CHE009 (reflective of water from the existing residential area and runoff from La Perouse Road).

**Aluminium:** Trigger value for Freshwater: 0.055 mg/L and ASS indicator when greater than 1 mg/L. Results ranged from below detection limit of 0.01 mg/L at CHE001 with the result 0.38 mg/L at CHE006 exceeding the trigger value for Freshwater.

**Arsenic:** Trigger value for Freshwater 0.024 mg/L. Results ranged from below detection limit (0.001 mg/L) to 0.02 mg/l at CHE006. All values were lower than the trigger values.

**Cadmium:** Trigger value for Freshwater: 0.0002 mg/L. All results were lower than detection limit (0.0001 mg/L).

**Chromium:** There is no trigger value for this parameter. Results ranged from 0.002 to 0.006 mg/L with the highest value recorded at CHE006.

**Copper:** The trigger value for Freshwater is 0.0014 mg/L. Results ranged from below detection limit (0.001 mg/L) to 0.019 mg/L. Results above trigger values occurred at CHE002/Lake (0.002 mg/L) and CHE001/FB2 (0.019 mg/L).

**Manganese:** The trigger value for Freshwater is 1.9 mg/L. Results were below the detection limit (0.01 mg/L).

**Mercury:** The trigger value for Freshwater is 0.00006 mg/L. Results were all below the detection limit of 0.0001 mg/L which is higher than the trigger value.

**Iron:** There is no trigger value for this parameter. Iron levels ranged from below detection limit (0.01 mg/L) to 0.88 mg/L with the highest level at CHE009 from water entering from the existing residential development and La Perouse Road.

**Nickel:** The trigger value for Freshwater is 0.011 mg/L. Results for CHE002/Lake and CHE009 were below the detection limit of 0.001 mg/L. CHE006 and CHE001/FB2 recorded 0.001 mg/L which is below the trigger value.

**Lead:** The trigger value for Freshwater is 0.0034 mg/L. Results for CHE009, CHE002/Lake and CHE006 were below the detection limit (0.001 mg/L). CHE001/FB2 had a result of 0.003 mg/L which is less than the trigger value.

**Zinc:** The trigger value for Freshwater is 0.008 mg/L. Results for CHE009, CHE002/Lake and CHE006 were below the detection limit (0.005 mg/L). CHE001/FB2 had a result of 0.006 mg/L which is less than the trigger value.

## Pesticides and Hydrocarbons

Pesticides and hydrocarbons were sampled on 21 August 2018. No pesticides were detected in any of the samples with all results below detection limits. For hydrocarbons, most parameters were below detection limits.

Only CHE009, which measured water entering the study area from the existing residential area and La Perouse Road had measurable levels of toluene (0.021 mg/L compared to trigger for Freshwater of 950 mg/L) and TRH<sub>C6-10</sub> (0.02 mg/L – no trigger value). The result for TRH<sub>C>10-16</sub>, TRH<sub>C>10-16</sub> and TRH<sub>C>34-40</sub> was 0.5 mg/L (no trigger value). The result for TRH<sub>C>16-34</sub> was 0.9 mg/L (no trigger value).

**Attachment 5**  
**Description of Results**

**Attachment 6**  
**Laboratory Certificates**

**LABORATORY REPORT**

**Job Number:** 18-12590  
**Revision:** 00  
**Date:** 30 August 2018

**ADDRESS:** **Aurora Environmental**  
76 Festing Street  
ALBANY WA 6330

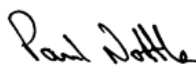
**ATTENTION:** Melanie Price


**DATE RECEIVED:** 22/08/2018

**YOUR REFERENCE:** CHE2016-002HYD2

**PURCHASE ORDER:**

**APPROVALS:**

  
Paul Nottle  
Organics Manager

  
Sean Sangster  
Inorganics Supervisor

**REPORT COMMENTS:**

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd  
Samples are analysed on an as received basis unless otherwise noted.

**METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377  
Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561

ARL No. 002	OCOP and PCB in Water
ARL No. 190	Total Recoverable Hydrocarbons (C <sub>6</sub> -C <sub>10</sub> ) in Water
ARL No. 191	Total Recoverable Hydrocarbons (>C <sub>10</sub> -C <sub>40</sub> ) in Water
ARL No. 29/402/403	Metals in Water by AAS/ICPOES/ICPMS
ARL No. 040	Arsenic by Hydride Atomic Absorption
ARL No. 406	Mercury by Cold Vapour Atomic Absorption Spectrophotometry
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NO <sub>x</sub> in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids



**ARL GROUP**

46-48 Banksia Road, Welshpool, Western Australia 6106  
Telephone: 08 6253 4444 Facsimile: 08 6253 4440 www.arlgroup.com.au

**LABORATORY REPORT**

Aurora Environmental

ARL Job No: 18-12590

Revision: 00

Date: 30 August 2018

OCOP in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-12590-1 CHE001 21/08/2018	18-12590-2 CHE006 21/08/2018	18-12590-3 CHE002 21/08/2018	18-12590-4 CHE009 21/08/2018
Aldrin	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
alpha-BHC (HCH)	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
beta-BHC (HCH)	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
delta-BHC (HCH)	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Bifenthrin	0.05	µg/L	<0.05	<0.05	<0.05	<0.05
Bromophos Ethyl	0.005	µg/L	<0.005	<0.005	<0.005	<0.005
Chlordane	0.002	µg/L	<0.002	<0.002	<0.002	<0.002
Chlorothalonil	0.01	µg/L	<0.01	<0.01	<0.01	<0.01
Chlorpyrifos	0.005	µg/L	<0.005	<0.005	<0.005	<0.005
Diazinon	0.01	µg/L	<0.01	<0.01	<0.01	<0.01
Dieldrin	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Endosulfan I	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Endosulfan II	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Endosulfan Sulfate	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Endrin	0.01	µg/L	<0.01	<0.01	<0.01	<0.01
Ethion	0.01	µg/L	<0.01	<0.01	<0.01	<0.01
Fenitrothion	0.01	µg/L	<0.01	<0.01	<0.01	<0.01
Fipronil	0.02	µg/L	<0.02	<0.02	<0.02	<0.02
Hexachlorobenzene (HCB)	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Heptachlor Epoxide	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Heptachlor	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Lindane	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Malathion	0.01	µg/L	<0.01	<0.01	<0.01	<0.01
Methoxychlor	0.02	µg/L	<0.02	<0.02	<0.02	<0.02
o,p-DDT	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Oxychlordane	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
p,p-DDD	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
p,p-DDE	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
p,p-DDT	0.001	µg/L	<0.001	<0.001	<0.001	<0.001
Parathion Ethyl	0.02	µg/L	<0.02	<0.02	<0.02	<0.02
Parathion Methyl	0.02	µg/L	<0.02	<0.02	<0.02	<0.02
Trifluralin	0.01	µg/L	<0.01	<0.01	<0.01	<0.01
Vinclozolin	0.02	µg/L	<0.02	<0.02	<0.02	<0.02

**ARL GROUP**

46-48 Banksia Road, Welshpool, Western Australia 6106

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**LABORATORY REPORT**

Aurora Environmental

ARL Job No: 18-12590

Revision: 00

Date: 30 August 2018

TRH (C <sub>6</sub> -C <sub>40</sub> ) in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-12590-1 CHE001 21/08/2018	18-12590-2 CHE006 21/08/2018	18-12590-3 CHE002 21/08/2018	18-12590-4 CHE009 21/08/2018
Benzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Toluene	0.001	mg/L	<0.001	<0.001	<0.001	0.021
Ethylbenzene	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Xylenes (Total)	0.003	mg/L	<0.003	<0.003	<0.003	<0.003
Naphthalene	0.005	mg/L	<0.005	<0.005	<0.005	<0.005
TRHC <sub>6-10</sub>	0.02	mg/L	<0.02	<0.02	<0.02	0.02
TRHC <sub>6-10</sub> minus BTEX (F1)	0.02	mg/L	<0.02	<0.02	<0.02	<0.02
TRHC <sub>&gt;10-16</sub>	0.05	mg/L	<0.05	<0.05	<0.05	0.50
TRHC <sub>&gt;10-16</sub> minus Naphthalene (F2)	0.05	mg/L	<0.05	<0.05	<0.05	0.50
TRHC <sub>&gt;16-34</sub>	0.1	mg/L	<0.1	<0.1	<0.1	0.9
TRHC <sub>&gt;34-40</sub>	0.1	mg/L	<0.1	<0.1	<0.1	0.5

Metals in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-12590-1 CHE001 21/08/2018	18-12590-2 CHE006 21/08/2018	18-12590-3 CHE002 21/08/2018	18-12590-4 CHE009 21/08/2018
Aluminium - Total	0.01	mg/L	0.06	3.2	0.07	2.0
Iron - Total	0.01	mg/L	0.10	4.1	0.28	5.2
Aluminium - Dissolved	0.01	mg/L	<0.01	0.38	0.04	0.03
Arsenic - Dissolved	0.001	mg/L	0.001	0.002	<0.001	<0.001
Cadmium - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Chromium - Dissolved	0.001	mg/L	0.002	0.006	0.002	0.002
Copper - Dissolved	0.001	mg/L	0.019	<0.001	0.002	0.001
Mercury - Dissolved	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Iron - Dissolved	0.01	mg/L	<0.01	0.51	0.21	0.88
Manganese - Dissolved	0.01	mg/L	<0.01	<0.01	<0.01	<0.01
Nickel - Dissolved	0.001	mg/L	0.001	0.001	<0.001	<0.001
Lead - Dissolved	0.001	mg/L	0.003	<0.001	<0.001	<0.001
Zinc - Dissolved	0.005	mg/L	0.006	<0.005	<0.005	<0.005

**LABORATORY REPORT**

Aurora Environmental

ARL Job No: 18-12590

Revision: 00

Date: 30 August 2018

Total Nitrogen in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-12590-1 CHE001 21/08/2018	18-12590-2 CHE006 21/08/2018	18-12590-3 CHE002 21/08/2018	18-12590-4 CHE009 21/08/2018
Total Nitrogen	0.2	mg/L	6.1	38	1.4	1.1
Total Kjeldahl Nitrogen	0.2	mg/L	2.8	38	1.4	1.1

Total Phosphorus in Water Sample No: Sample Description: Sample Date:	LOR	UNITS	18-12590-1 CHE001 21/08/2018	18-12590-2 CHE006 21/08/2018	18-12590-3 CHE002 21/08/2018	18-12590-4 CHE009 21/08/2018
Total Phosphorus	0.01	mg/L	2.3	0.89	0.04	0.06

Ions by Discrete Analyser Sample No: Sample Description: Sample Date:	LOR	UNITS	18-12590-1 CHE001 21/08/2018	18-12590-2 CHE006 21/08/2018	18-12590-3 CHE002 21/08/2018	18-12590-4 CHE009 21/08/2018
Ammonia-N	0.02	mg/L	2.1	0.30	0.02	<0.02
NOx-N	0.01	mg/L	3.3	<0.01	<0.01	<0.01
Nitrite-N	0.01	mg/L	0.73	<0.01	<0.01	<0.01
Nitrate-N	0.01	mg/L	2.6	<0.01	<0.01	<0.01
Filterable Reactive Phosphorus	0.01	mg/L	2.3	0.03	<0.01	<0.01

Physical Parameters Sample No: Sample Description: Sample Date:	LOR	UNITS	18-12590-1 CHE001 21/08/2018	18-12590-2 CHE006 21/08/2018	18-12590-3 CHE002 21/08/2018	18-12590-4 CHE009 21/08/2018
Alkalinity	5	mgCaCO <sub>3</sub> /L	190	510	130	17
pH	0.1	pH units	7.5	7.3	7.6	6.5
Conductivity	0.01	mS/cm	1.0	1.7	1.8	0.08
Total Dissolved Solids	5	mg/L	540	1,200	1,000	48

**Result Definitions**

LOR Limit of Reporting            [NT] Not Tested            [ND] Not Detected at indicated Limit of Reporting

\* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.

**ARL GROUP**

46-48 Banksia Road, Welshpool, Western Australia 6106  
Telephone: 08 6253 4444 Facsimile: 08 6253 4440 www.arlgroup.com.au



**LABORATORY REPORT**

**Job Number:** 18-17444  
**Revision:** 00  
**Date:** 28 November 2018

**ADDRESS:** **Aurora Environmental**  
 76 Festing Street  
 ALBANY WA 6330

**ATTENTION:** Melanie Price

**DATE RECEIVED:** 21/11/2018

**YOUR REFERENCE:** CHE2016-002 HYD2

**PURCHASE ORDER:**

**APPROVALS:**



Sean Sangster  
 Inorganics Supervisor

**REPORT COMMENTS:**

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd  
 Samples are analysed on an as received basis unless otherwise noted.

**METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377  
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids



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 ACCREDITATION**  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

Aurora Environmental  
Job No: 18-17444

LABORATORY REPORT  
Revision: 00

Date: 28/11/18

Total Nitrogen in Water			Sample No:	18-17444-1	18-17444-2	18-17444-3	18-17444-4	18-17444-5
			Sample Details:	CHE001	CHE006	CHE002	CHE009	CHE003
ANALYTE	LOR	Units	20/11/2018	20/11/2018	20/11/2018	20/11/2018	20/11/2018	20/11/2018
Total Nitrogen	0.2	mg/L	6.0	12	1.4	7.5	11	
Total Kjeldahl Nitrogen	0.2	mg/L	3.4	12	1.4	7.5	11	

Total Phosphorus in Water			Sample No:	18-17444-1	18-17444-2	18-17444-3	18-17444-4	18-17444-5
			Sample Details:	CHE001	CHE006	CHE002	CHE009	CHE003
ANALYTE	LOR	Units	20/11/2018	20/11/2018	20/11/2018	20/11/2018	20/11/2018	20/11/2018
Total Phosphorus	0.01	mg/L	2.2	0.50	0.06	1.5	0.73	

Ions by Discrete Analyser			Sample No:	18-17444-1	18-17444-2	18-17444-3	18-17444-4	18-17444-5
			Sample Details:	CHE001	CHE006	CHE002	CHE009	CHE003
ANALYTE	LOR	Units	20/11/2018	20/11/2018	20/11/2018	20/11/2018	20/11/2018	20/11/2018
Filterable Reactive Phosphorus	0.01	mg/L	2.2	0.06	<0.01	0.01	0.02	
Ammonia-N	0.02	mg/L	1.6	0.12	0.04	1.4	0.32	
Nitrate-N	0.01	mg/L	2.6	<0.01	0.01	0.03	0.05	
NOx-N	0.01	mg/L	2.6	<0.01	0.02	0.04	0.08	
Nitrite-N	0.01	mg/L	0.02	<0.01	0.01	0.01	0.03	

Physical Parameters			Sample No:	18-17444-1	18-17444-2	18-17444-3	18-17444-4	18-17444-5
			Sample Details:	CHE001	CHE006	CHE002	CHE009	CHE003
ANALYTE	LOR	Units	20/11/2018	20/11/2018	20/11/2018	20/11/2018	20/11/2018	20/11/2018
Alkalinity	5	mg CaCO <sub>3</sub> /L	200	370	170	82	670	
pH	0.1	pH units	7.4	7.3	7.4	6.6	7.2	
Conductivity	0.01	mS/cm	1.1	1.5	2.0	0.30	4.3	
Total Dissolved Solids	5	mg/L	580	990	1,100	180	2,400	

**Result Definitions**

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting  
\* Denotes test not covered by NATA Accreditation

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**LABORATORY REPORT**

**Job Number:** 19-01070  
**Revision:** 00  
**Date:** 5 February 2019

**ADDRESS:** **Aurora Environmental**  
 76 Festing Street  
 ALBANY WA 6330

**ATTENTION:** Melanie Price

**DATE RECEIVED:** 22/01/2019

**YOUR REFERENCE:** CHE2016-002 HYD2

**PURCHASE ORDER:**

**APPROVALS:**



Sam Becker  
 Inorganics Manager

**REPORT COMMENTS:**

This report is issued by Analytical Reference Laboratory (WA) Pty Ltd  
 Samples are analysed on an as received basis unless otherwise noted.

**METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377  
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561

Method ID	Method Description
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids



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 ACCREDITATION**  
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Aurora Environmental  
Job No: 19-01070

LABORATORY REPORT  
Revision: 00

Date: 5/02/19

Total Nitrogen in Water			Sample No:	19-01070-1	19-01070-2	19-01070-3	19-01070-4	19-01070-5
			Sample Details:	CHE001	CHE006	CHE002	CHE009	CHE003
ANALYTE	LOR	Units	21/01/2019	21/01/2019	21/01/2019	21/01/2019	21/01/2019	21/01/2019
Total Nitrogen	0.2	mg/L	6.3	19	3.9	11	21	
Total Kjeldahl Nitrogen	0.2	mg/L	3.4	19	3.9	11	21	

Total Phosphorus in Water			Sample No:	19-01070-1	19-01070-2	19-01070-3	19-01070-4	19-01070-5
			Sample Details:	CHE001	CHE006	CHE002	CHE009	CHE003
ANALYTE	LOR	Units	21/01/2019	21/01/2019	21/01/2019	21/01/2019	21/01/2019	21/01/2019
Total Phosphorus	0.01	mg/L	2.5	0.25	0.08	0.68	1.1	

Ions by Discrete Analyser			Sample No:	19-01070-1	19-01070-2	19-01070-3	19-01070-4	19-01070-5
			Sample Details:	CHE001	CHE006	CHE002	CHE009	CHE003
ANALYTE	LOR	Units	21/01/2019	21/01/2019	21/01/2019	21/01/2019	21/01/2019	21/01/2019
Filterable Reactive Phosphorus	0.01	mg/L	2.5	0.03	<0.01	0.01	0.10	
Ammonia-N	0.02	mg/L	0.05	0.52	0.26	3.0	0.20	
Nitrate-N	0.01	mg/L	2.9	<0.01	0.01	0.04	0.02	
NOx-N	0.01	mg/L	2.9	<0.01	0.01	0.04	0.02	
Nitrite-N	0.01	mg/L	0.02	<0.01	<0.01	<0.01	<0.01	

Physical Parameters			Sample No:	19-01070-1	19-01070-2	19-01070-3	19-01070-4	19-01070-5
			Sample Details:	CHE001	CHE006	CHE002	CHE009	CHE003
ANALYTE	LOR	Units	21/01/2019	21/01/2019	21/01/2019	21/01/2019	21/01/2019	21/01/2019
Alkalinity	5	mg CaCO <sub>3</sub> /L	180	450	180	170	990	
pH	0.1	pH units	7.3	7.2	7.9	6.6	7.3	
Conductivity	0.01	mS/cm	1.0	1.7	2.5	0.39	3.9	
Total Dissolved Solids	5	mg/L	450	870	1,200	230	1,800	

**Result Definitions**

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting  
\* Denotes test not covered by NATA Accreditation

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## LABORATORY REPORT

**Job Number:** 19-05938  
**Revision:** 00  
**Date:** 3 May 2019

**ADDRESS:** **Aurora Environmental**  
 76 Festing Street  
 ALBANY WA 6330

**ATTENTION:** Melanie Price

**DATE RECEIVED:** 17/04/2019

**YOUR REFERENCE:** CHE2016-002 HYD2

**PURCHASE ORDER:**

**APPROVALS:**



Sean Sangster  
 Inorganics Supervisor

**REPORT COMMENTS:**

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 Samples are analysed on an as received basis unless otherwise noted.

**METHOD REFERENCES:**

Methods prefixed with "ARL" are covered under NATA Accreditation Number: 2377  
 Methods prefixed with "PM" are covered under NATA Accreditation Number: 2561  
 Methods prefixed with "EDP" are covered under NATA Accreditation Number: 19290

Method ID	Method Description
ARL No. 330	Persulfate Method for Simultaneous Determination of TN & TP
ARL No. 308	Total Phosphorus in Water by Discrete Analyser
ARL No. 309	Filterable Reactive Phosphorus in Water by Discrete Analyser
ARL No. 303	Ammonia in Water by Discrete Analyser
ARL No. 313/319	NOx in Water by Discrete Analyser
ARL No. 311	Nitrite in Water by Discrete Analyser
ARL No. 037	Alkalinity in Water
ARL No. 014	pH in Water
ARL No. 019	Conductivity and Salinity in Water
ARL No. 017	Total Dissolved Solids



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Aurora Environmental  
Job No: 19-05938

LABORATORY REPORT  
Revision: 00

Date: 3/05/19

Total Nitrogen in Water			Sample No	19-05938-1	19-05938-2	19-05938-3	19-05938-4	19-05938-5
Sample Description				CHE001	CHE006	CHE002	CHE009	CHE003
Sample Date				16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Nitrogen	0.2	mg/L	4.2	3.9	7.8	1.1	65	
Total Kjeldahl Nitrogen	0.2	mg/L	0.6	3.5	7.8	1.1	64	

Total Phosphorus in Water			Sample No	19-05938-1	19-05938-2	19-05938-3	19-05938-4	19-05938-5
Sample Description				CHE001	CHE006	CHE002	CHE009	CHE003
Sample Date				16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Total Phosphorus	0.01	mg/L	2.5	0.19	0.13	0.13	4.9	

Ions by Discrete Analyser			Sample No	19-05938-1	19-05938-2	19-05938-3	19-05938-4	19-05938-5
Sample Description				CHE001	CHE006	CHE002	CHE009	CHE003
Sample Date				16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Filterable Reactive Phosphorus	0.01	mg/L	2.1	0.03	<0.01	<0.01	<0.01	
Ammonia-N	0.02	mg/L	<0.02	0.10	0.06	0.54	0.22	
Nitrate-N	0.01	mg/L	3.6	0.29	0.01	0.04	0.50	
NOx-N	0.01	mg/L	3.6	0.43	0.01	0.04	0.58	
Nitrite-N	0.01	mg/L	<0.01	0.14	<0.01	<0.01	0.08	

Physical Parameters			Sample No	19-05938-1	19-05938-2	19-05938-3	19-05938-4	19-05938-5
Sample Description				CHE001	CHE006	CHE002	CHE009	CHE003
Sample Date				16/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019
ANALYTE	LOR	Units	Result	Result	Result	Result	Result	Result
Alkalinity	5	mg CaCO <sub>3</sub> /L	190	340	170	40	10,000	
pH	0.1	pH units	7.4	7.3	8.3	6.9	7.3	
Conductivity	0.01	mS/cm	1.1	1.7	3.3	0.28	3.3	
Total Dissolved Solids	5	mg/L	640	1,000	2,000	170	1,900	

**Result Definitions**

LOR Limit of Reporting [NT] Not Tested [ND] Not Detected at indicated Limit of Reporting  
\* Denotes test not covered by NATA Accreditation

FOR MICROBIOLOGICAL TESTING - The data in this report may not be representative of a lot, batch or other samples and may not necessarily justify the acceptance or rejection of a lot or batch, a product recall or support legal proceedings. Tests are not routinely performed as duplicates unless specifically requested. Changes occur in the bacterial content of biological samples. Samples should be examined as soon as possible after collection, preferably within 6 hrs and must be stored at 4 degrees Celsius or below. Samples tested after 24 hrs cannot be regarded as satisfactory because of temperature abuse and variations.