

O'Connor Gary

From: Leonie Picerno [Leonie.Picerno@brisbane.qld.gov.au]
Sent: Friday, 9 September 2011 10:22 AM
To: O'Connor Gary
Cc: Erik Dekker
Subject: Willawong Monitoring Program
Attachments: willawong_gw_LYP_100910.jpg; groundwater_monitoring_well_list_LYP.xls

Gary

As discussed, the Willawong monitoring program was amended last year. The attached map and spreadsheet indicate monitoring locations.

Basic changes to the program are summarised below:

- All broken, damaged or buried wells removed from program.
- Some of the nested wells were removed from program (recent groundwater studies (particularly HLA report) have confirmed that there is little difference in results between deep and shallow wells and that these aquifers are actually connected anyway).
- We are now monitoring perimeter wells only as remediation has been completed and we have a good baseline of contamination.
- Monitoring is undertaken on a six monthly basis. We aim for Aug/Sept and Feb/Mar.
- Groundwater well levels are measured in all onsite wells (including ones dropped from the original monitoring program) on a six monthly basis.
- Surface water samples are collected from Blunder and Oxley Creek on a six monthly basis.

I will forward the last round of monitoring results in another email. As discussed, the only major change I have noticed recently is an increase in ammonia in groundwater and surface water adjacent to the municipal landfill site. It was subsequently discovered that there was an electrical problem with our leachate collection system which was causing operational problems. This is currently being rectified and I hope the ammonia levels will subsequently decrease again.

Please feel free to contact me on 3027 4729 if you have any queries.

Regards
 Leonie

Leonie Picerno
 City Projects Office
 Brisbane City Council
 Green Square, South Tower
 505 St. Paul's Terrace
 Fortitude Valley QLD 4006
 Ph 3027 4729

12/9/11.
Noted changes to program with focus on perimeter lines. Some slight NH₃ increase in creek but leachate collect - system being improved. Other contaminants fairly typical

49-Sch4 - Sig

***** This message has passed through an insecure network. Please direct all enquiries to the message author. *****

BH01/01
BH01/02S
BH01/03S
BH01/04S
BH01/05S
BH01/07S
BH01/08D
BH01/08S
BH01/09S
BH111
BH112
BH114
BH11D
BH12D
BH12L
BH12S
BH13S
BH15D
BH15S
BH17D
BH17S
BH18S
BH216
BH7D
BH7S
BH8A
BH97/14S
BH97/16
BH97/17
BH97/19
BH97/1S
BH97/20D
BH97/20S
BH97/27
BH97/2S
BH97/5S
BH97/6M
BH97/6S
BH97/9D
BH97/9S
PP6
BH08/06
BH08/04
BH08/02
BH08/08
BH08/09
BH02/01
BH02/02
BH04/10





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REPORT

To:	City Design Environmental Management	Date:	4 July 2011
Attn:	Carl Douthwaite, Willawong Remediation Project Manager		
CC:			
From:	R.B. Gray, Chemist In Charge, Scientific Analytical Services		
Re:	WILLAWONG ENVIRONMENTAL MONITORING – ROUND 46		

Scientific Analytical Services

180 Ashridge Rd
Darra Qld 4076

Enquiries: 07 3407 2666
Fax: 07 3407 2690

Chemist in Charge, Bob Gray, 3407 2661
Environmental 1, Sue Mole, 3407 2664
Environmental 2, Patti O'Shea, 3407 2665
Microbiology, Bob Phillips, 3407 2673
Environmental Monitoring, Rebecca MacKinney, 49-Sch4 - Mol

The forty-sixth round of monitoring for the above project was carried out between 2 and 9 June 2011. This round of sampling was performed under dry conditions, but following wet conditions in late May.

Rainfall (measured at BLR 736 Blunder Creek, Inala Gauging station) indicated a very dry June and July, followed by an unusually wet August.

Month	Rainfall (mm) At BLR736 Blunder Ck Inala	Mean Rainfall (measured at Brisbane Airport)
March	131	138.5
April	131	90.4
May	79	98.8

The latest (September 2010) update to the monitoring program for the Willawong Remediation Project concentrates primarily on measurement of components leaving the site, by sampling the bores located around the perimeter of the site. The locations monitored are annotated on the attached site map. Sampling is now conducted at 8-month intervals.

Multi-parameter Field Analysers, calibrated on the day of use, were employed in the determination of field results for pH, conductivity, temperature, dissolved oxygen and redox potential.

Blunder and Oxley Creeks

Physical / Inorganic Analysis

Both Blunder and Oxley Creeks exhibited good flows during the sampling period. Recorded pH values in the creeks were slightly alkaline, in a range from pH 7.3 to pH 7.6. Brisbane City Council's Water Quality Objectives for fresh water incorporate a desirable pH range of 6.5-8.5.

Conductivity readings were low and in line with long-term values, with a range of 200 - 360 μ S/cm being recorded across the sites.

Dissolved oxygen results were acceptable at most sample locations in both Oxley and Blunder creeks, but the lowest results have been returned for the Blunder Creek locations CMPS&F4, CMPS&F5 and WR1, at 4.7, 5.4 and 5.5mg/L respectively. These locations are at the north-western corner of the site and have historically been affected by discharges from the Northern Drain and the adjacent landfill. A dissolved oxygen concentration of 5mg/L is generally accepted as the minimum concentration desirable for maintenance of a viable aquatic ecosystem.

Suspended solids concentrations were higher than usual, having been affected by several heavy rainfall events at the end of May. DOE14 and DOE15 in Oxley Creek, and CMPS&F4 and CMPS&F5 in Blunder Creek returned the highest results, in the range 35-71mg/L.

Heavy metals concentrations were low, with most below the level of reporting.

High ammonia nitrogen results of 0.78mg/L at CMPS&F5, 0.29mg/L at CMPS&F4, 0.47mg/L at DOE13 and 0.18mg/L at WR1 show a distinct influence from the landfill. This is also reflected in the oxidised nitrogen (nitrite + nitrate) results reported for these locations. Total nitrogen results for northern Blunder Creek locations, at 0.8 – 1.7mg/L, lie above the expected range for SE Queensland creeks.

No cyanide results were returned above the limit of reporting of 0.004mg/L.

Microbiological Analysis

Microbiological quality in Blunder Creek was good and complied with primary contact (swimming) guidelines of <150cfu/100mL faecal coliforms. The Oxley Creek locations DOE14 and DOE15 were slightly above the guideline, at 170 and 180cfu/100mL respectively.

Groundwater Samples

Physical / Inorganic analysis

pH values for borewaters varied between a strongly acidic pH 4.4 (BH01/05S) and near-neutral pH 6.9 (BH13S). High salinity continues to be a feature of many of the bores. BH01/05S (17,000 μ S/cm) and BH02/01 (17,000 μ S/cm) returned the highest conductivities, and the lowest conductivity was recorded at BH15D (390 μ S/cm). Redox potentials varied widely, from +250mV at BH01/08D, to -94mV at BH17S.

BH17S returned a very high ammonia nitrogen concentration of 340mg/L, followed by BH13S at 160mg/L.

High oxidised nitrogen (NO₂ + NO₃) results were again reported at 97/9S in the south-east (23mg/L) and BH97/14S at 11mg/L. These results are consistent with previous results from these locations.

With the locations in the centre of the site with the highest total organic carbon concentrations not being sampled, the highest TOC result came from BH17S on the western boundary near Blunder Creek, at 180mg/L.

No location returned a total cyanide result above the limit of reporting of 0.004mg/L. For reference, the Australian Drinking water Guideline maximum value for cyanide is 0.08mg/L.

Many of the bores (27) returned arsenic results between the limit of reporting (0.001mg/L) and 0.018mg/L, with the highest result coming from BH97/5S, at the north-eastern corner of the site.

Cadmium results were low, with many locations below the limit of reporting of <0.0002mg/L and none exceeding 0.0006mg/L.

Cobalt has historically been found at relatively high concentrations at this site, with concentrations ranging up to 0.26mg/L, at BH01/05S on this occasion. This is consistent with previous results.

The highest lead result was 0.027mg/L at BH01/05.

No location reported mercury above the limit of reporting of 0.1µg/L.

The highest nickel concentrations were obtained for BH01/05S (0.061mg/L) and BH17S (0.060mg/L).

Low concentrations of selenium, just above the limit of reporting, were reported for seven locations, with the highest results being returned for bores BH97/6S, BH17S and BH12S, all at 0.002mg/L.

BH114 returned the highest zinc result of 0.71mg/L.

Organics Analysis

The range of organics targeted for this program is limited to include only the following components of interest:

Benzene
1,4 Dichlorobenzene
2,4 Dichlorophenol
2,6 Dichlorophenol
Endosulfan 1 (alpha Endosulfan)
Endosulfan 2 (beta Endosulfan)
Sulfolane (selected SW corner locations)
Thiolane (selected SW corner locations)

Again, only BH17S has returned a 1,4 dichlorobenzene result above the limit of reporting, at 11µg/L.

Seven locations reported benzene above the limit of reporting, in the range 2-16µg/L, with BH13S being the highest.

No location reported 2,4 dichlorophenol or 2,6 dichlorophenol above the limit of reporting of 1µg/L. Alpha and beta endosulfan were not detected above the limit of reporting in any bore.

For the first time, no bore returned sulfolane results above the limit of reporting of 1mg/L. BH112 returned the highest thiolane result of 916µg/L, followed by BH01/08D at 626µg/L. These results are considerably lower than previously reported from these locations.

Summary

The ammonia, oxidised nitrogen and total nitrogen results for Round 46 indicate some leakage of leachate into Blunder Creek adjacent to the Northern Drain and some distance upstream. Oxley Creek remains unaffected.

Data Management

Data from this and preceding Rounds have been entered into the SiteMan database for future interrogation.

Please advise if you have any queries regarding this project or if we can be of further assistance.

Regards

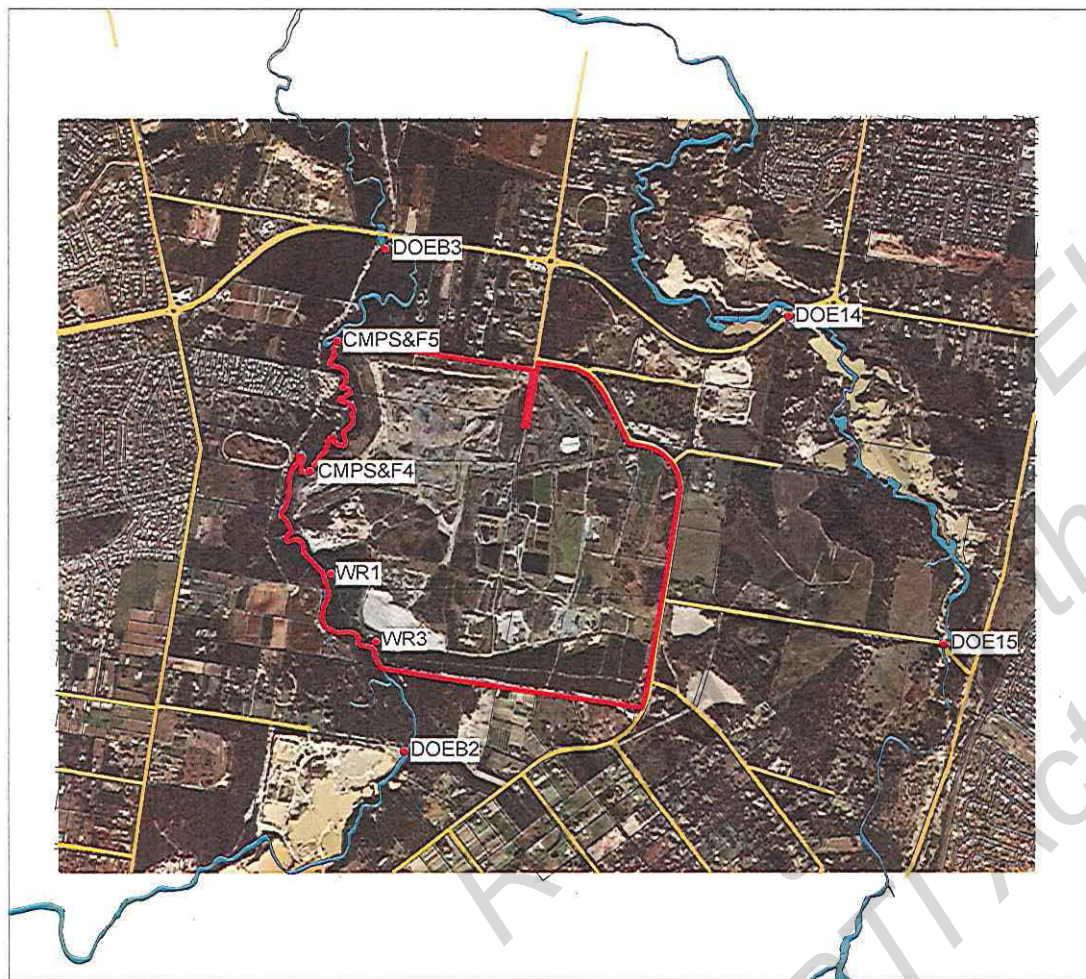
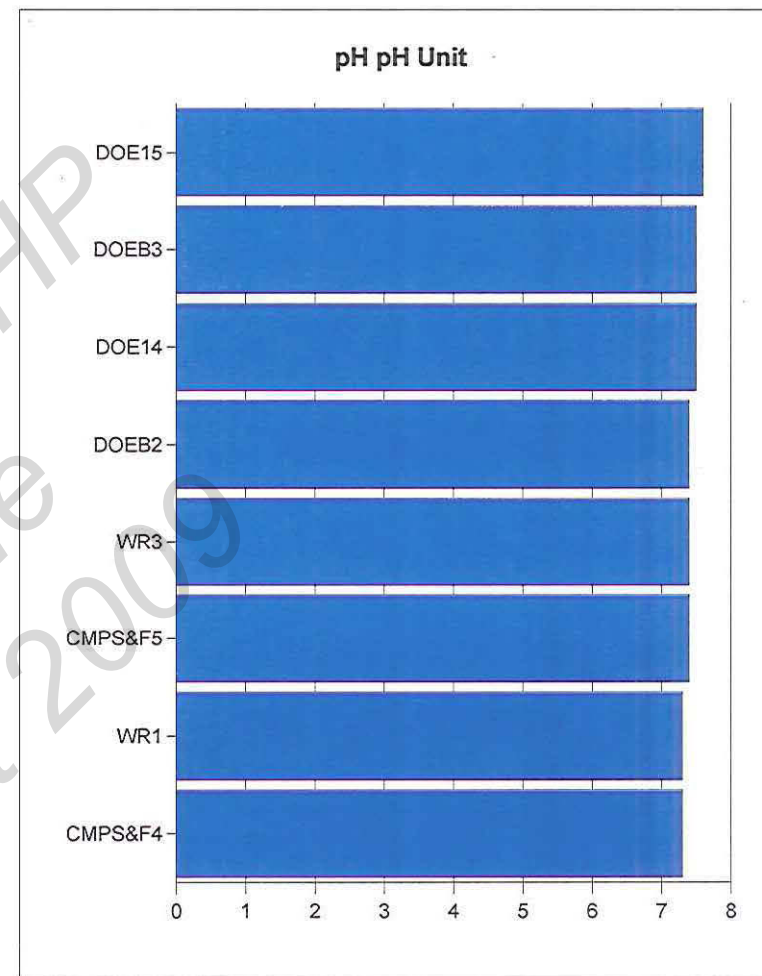
49-Sch4 - Signature



Bob Gray
Manager, Scientific Analytical Services

Attachments - graphs, location diagrams, site map

Released by EHP
under the
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INFORMATION SOURCE: Brisbane City Council (BCC), QASCO, SUNMAP

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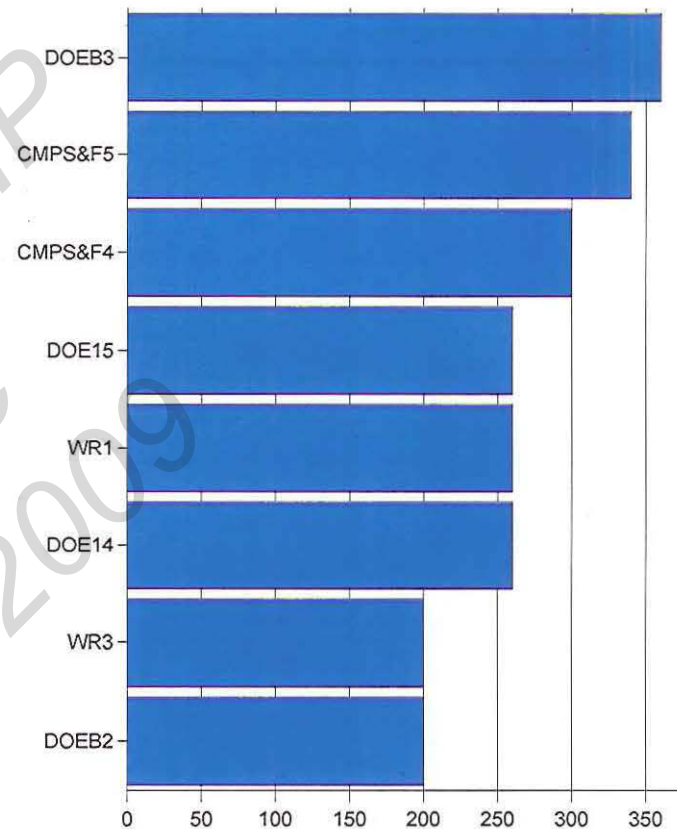
LEGEND

- Sampling Site
- Roads
- Creeks
- Municipal Landfill Site
- Willawong Site Boundary

INFORMATION SOURCE: Brisbane City Council (BCC), QASCO, SUNMAP

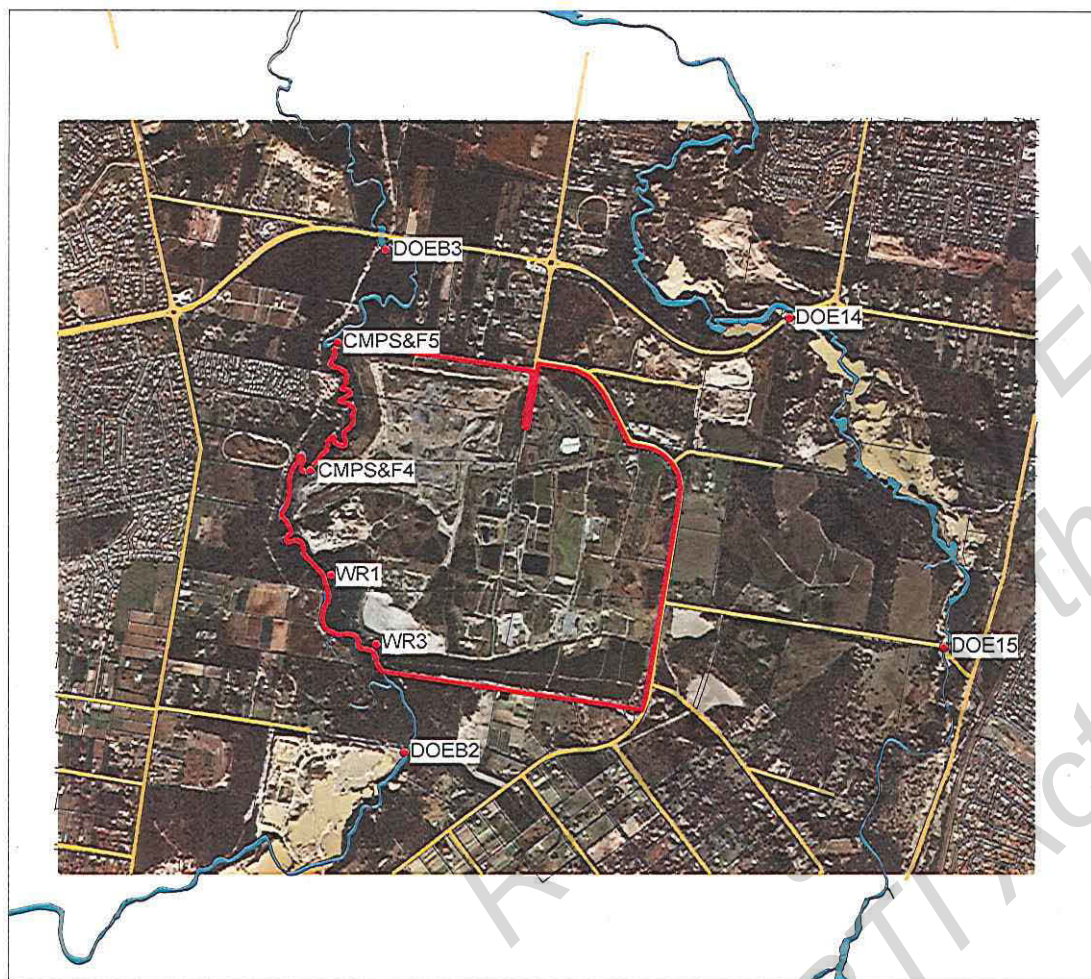
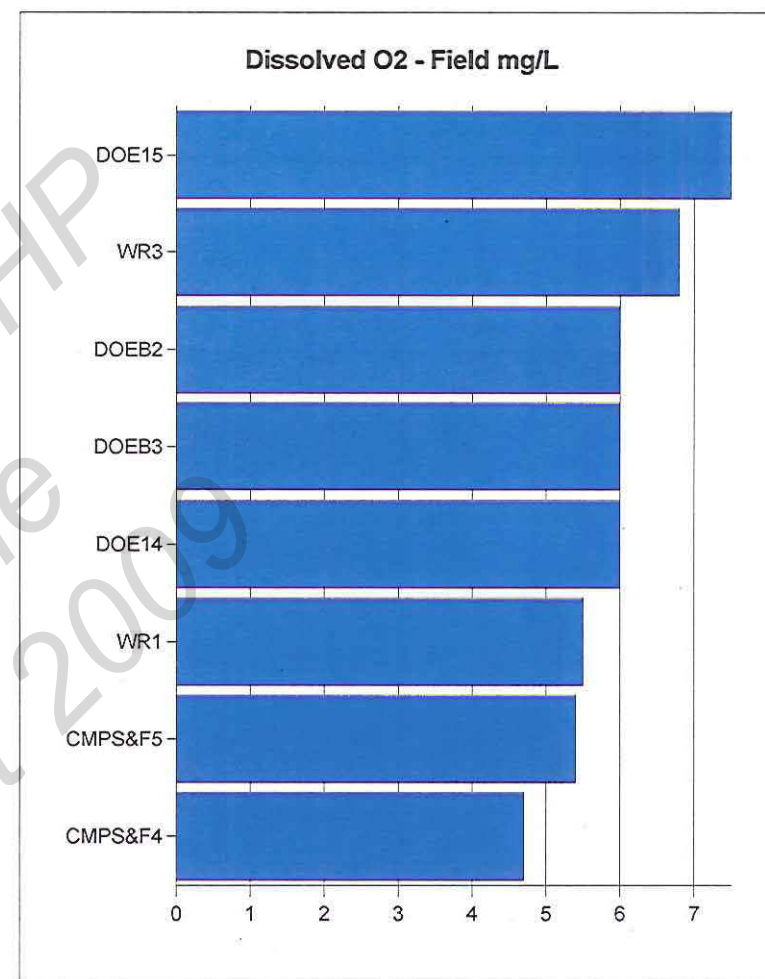


Conductivity uS/cm



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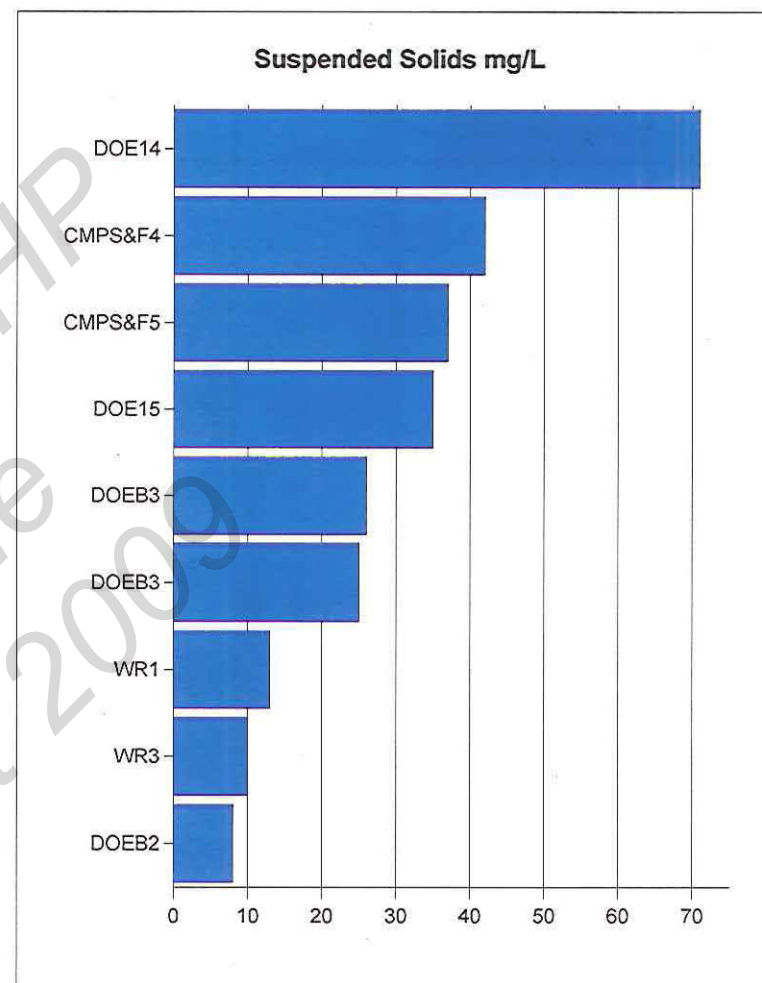


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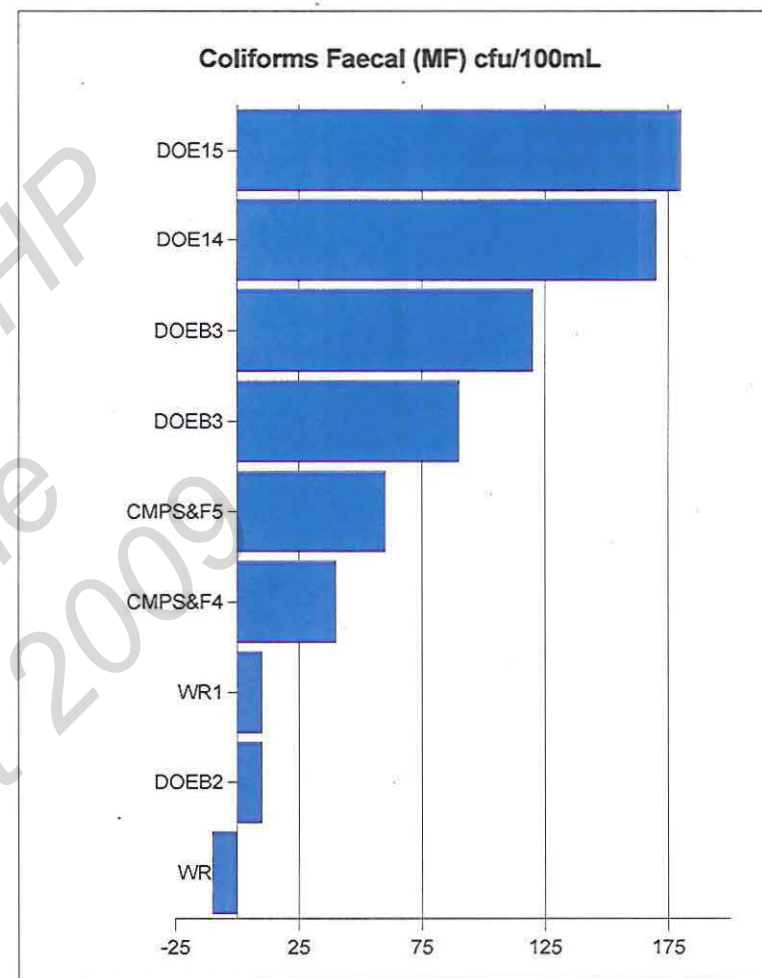
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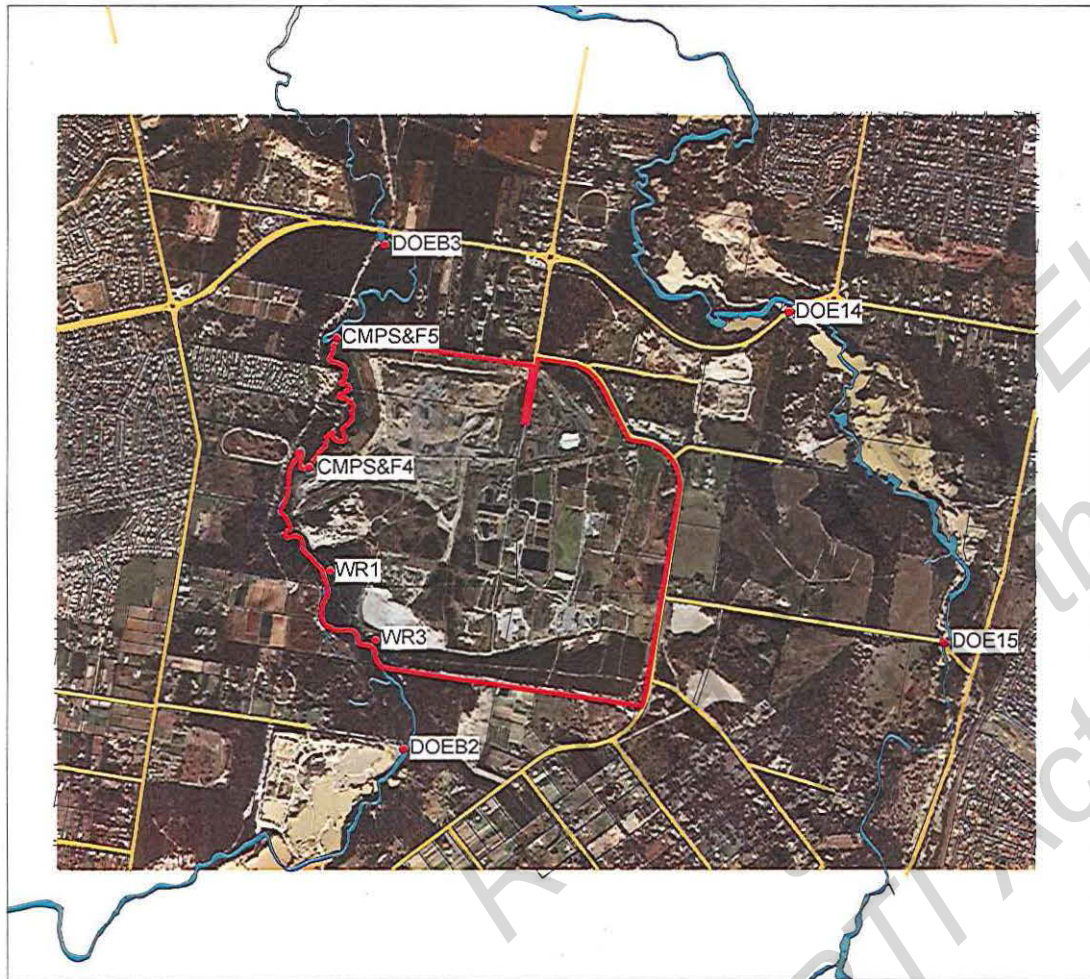
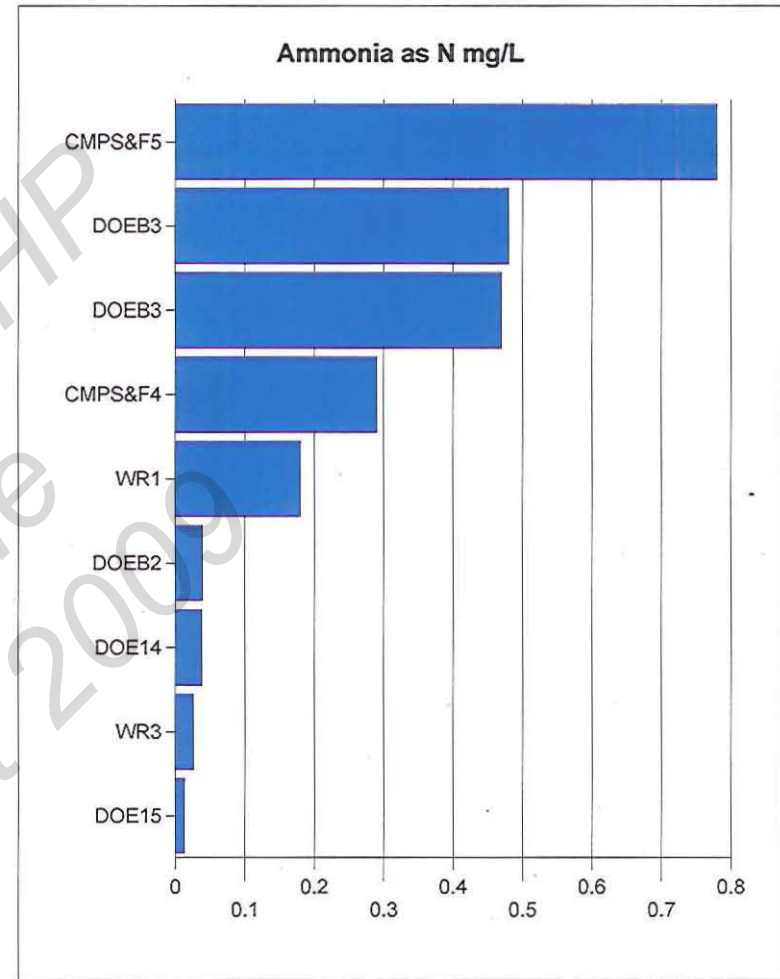
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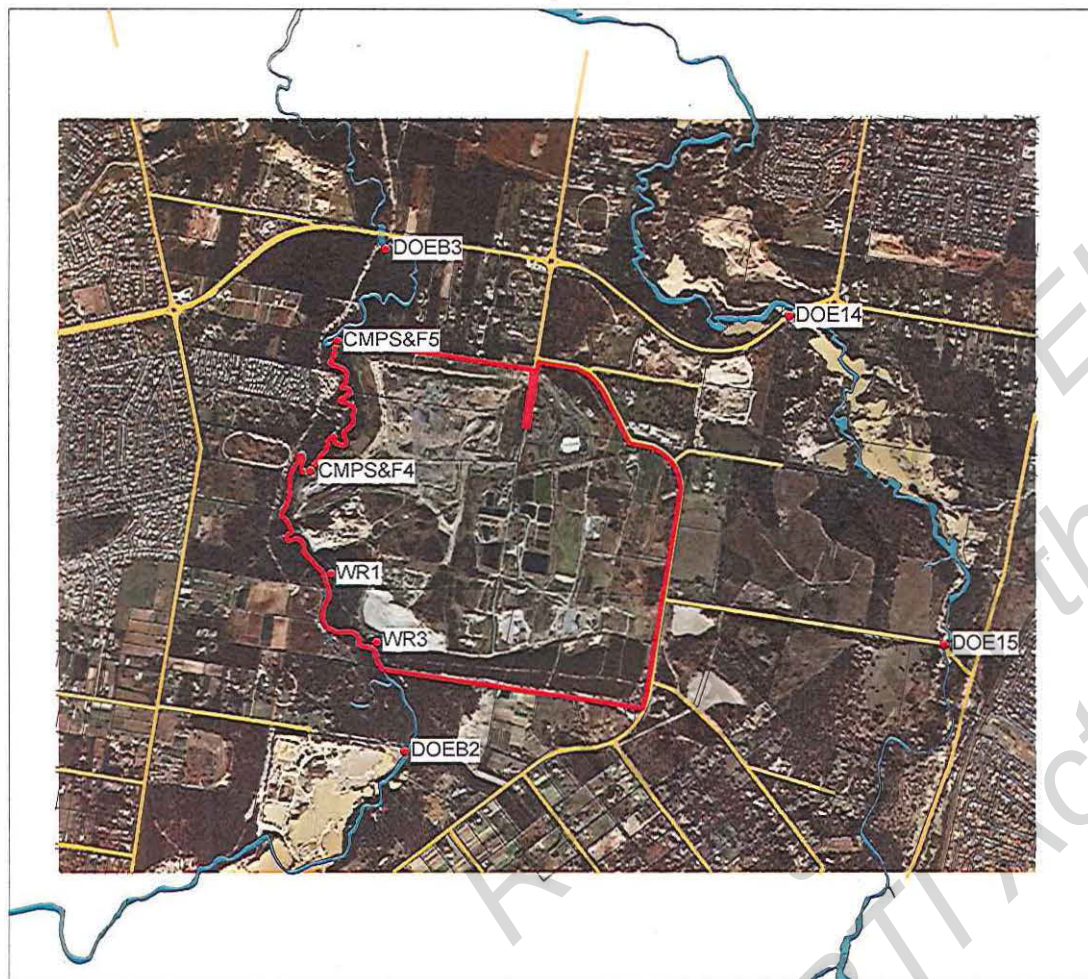
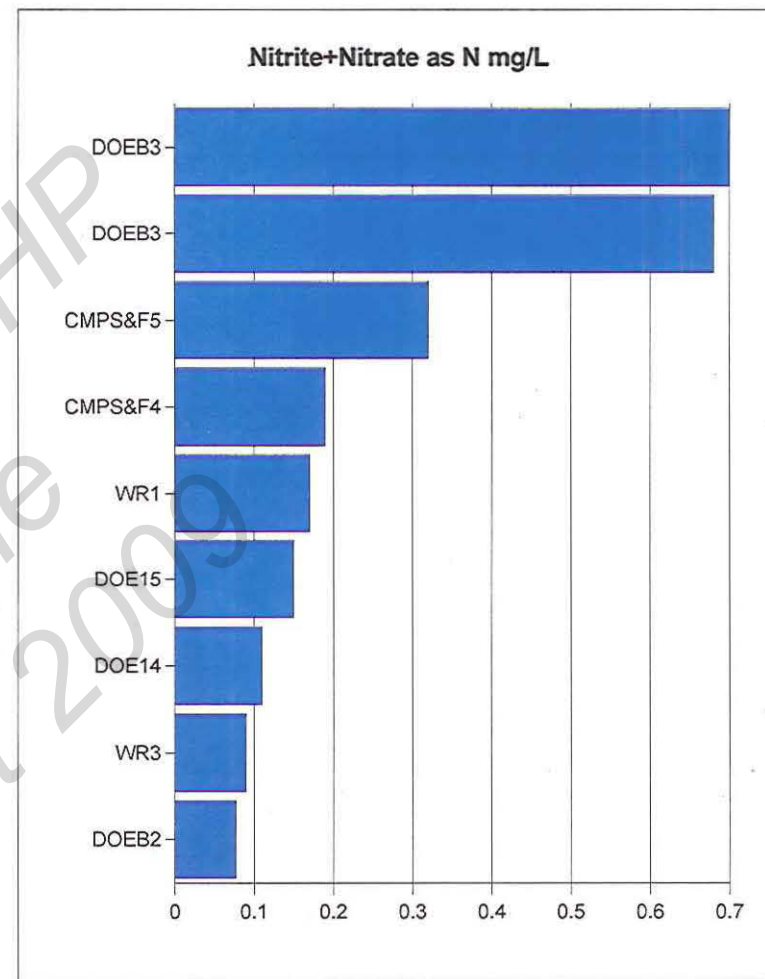
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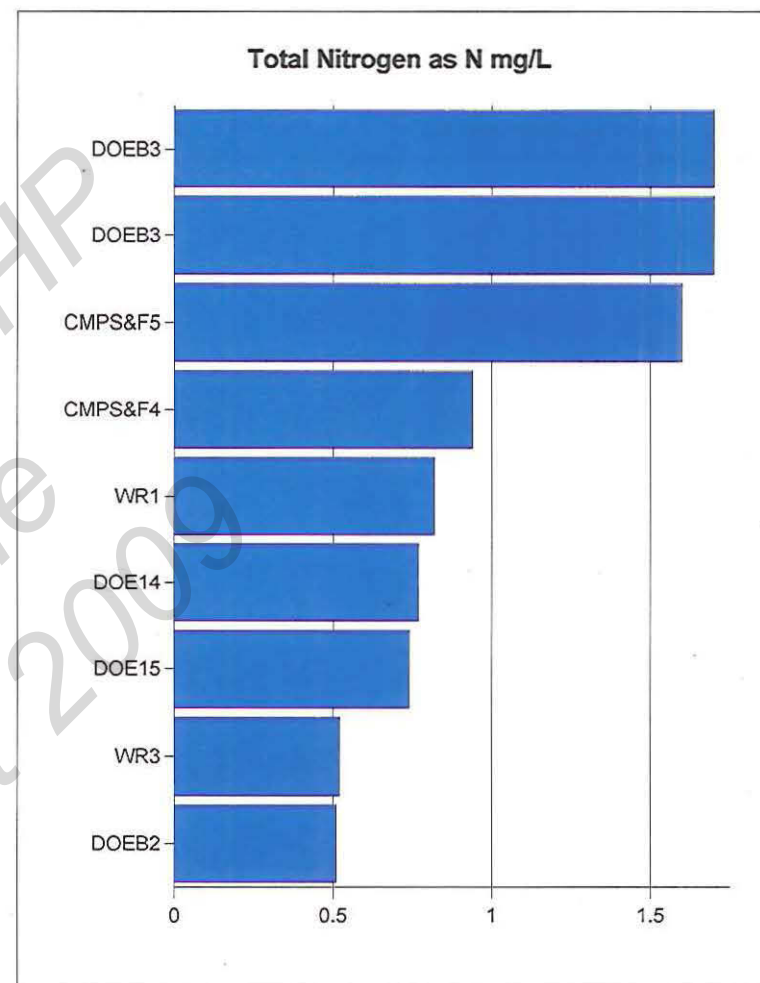
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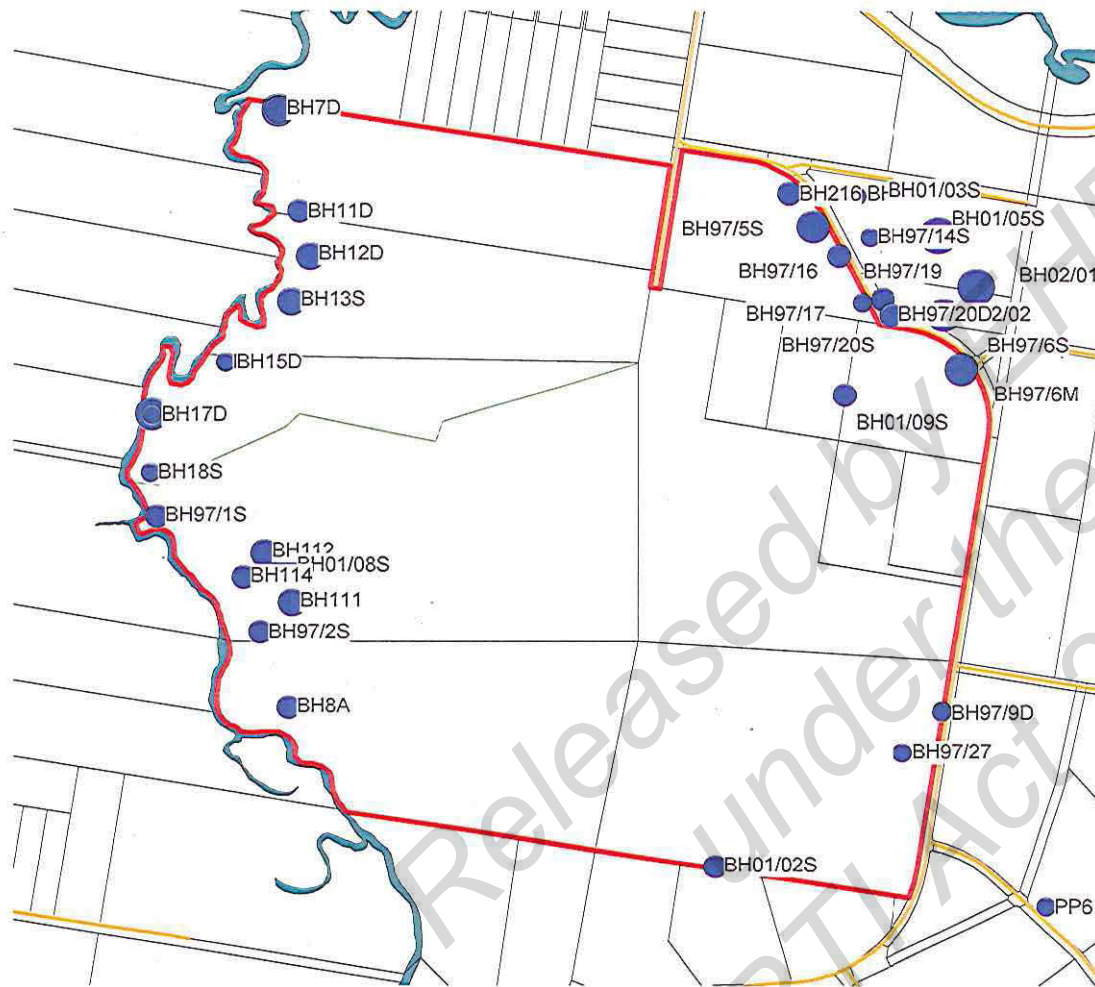
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Conductivity uS/cm



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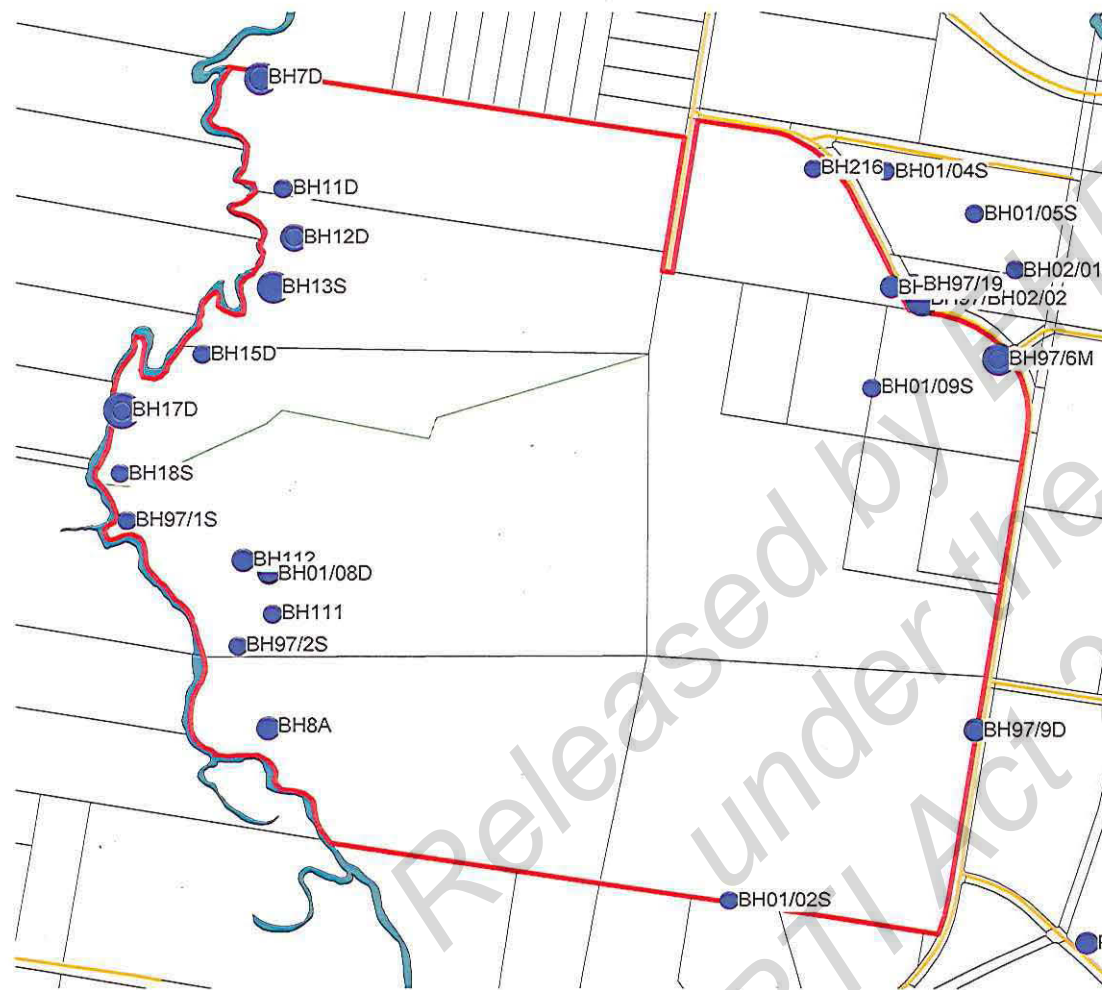
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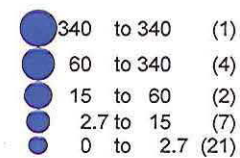


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Ammonia as N mg/L



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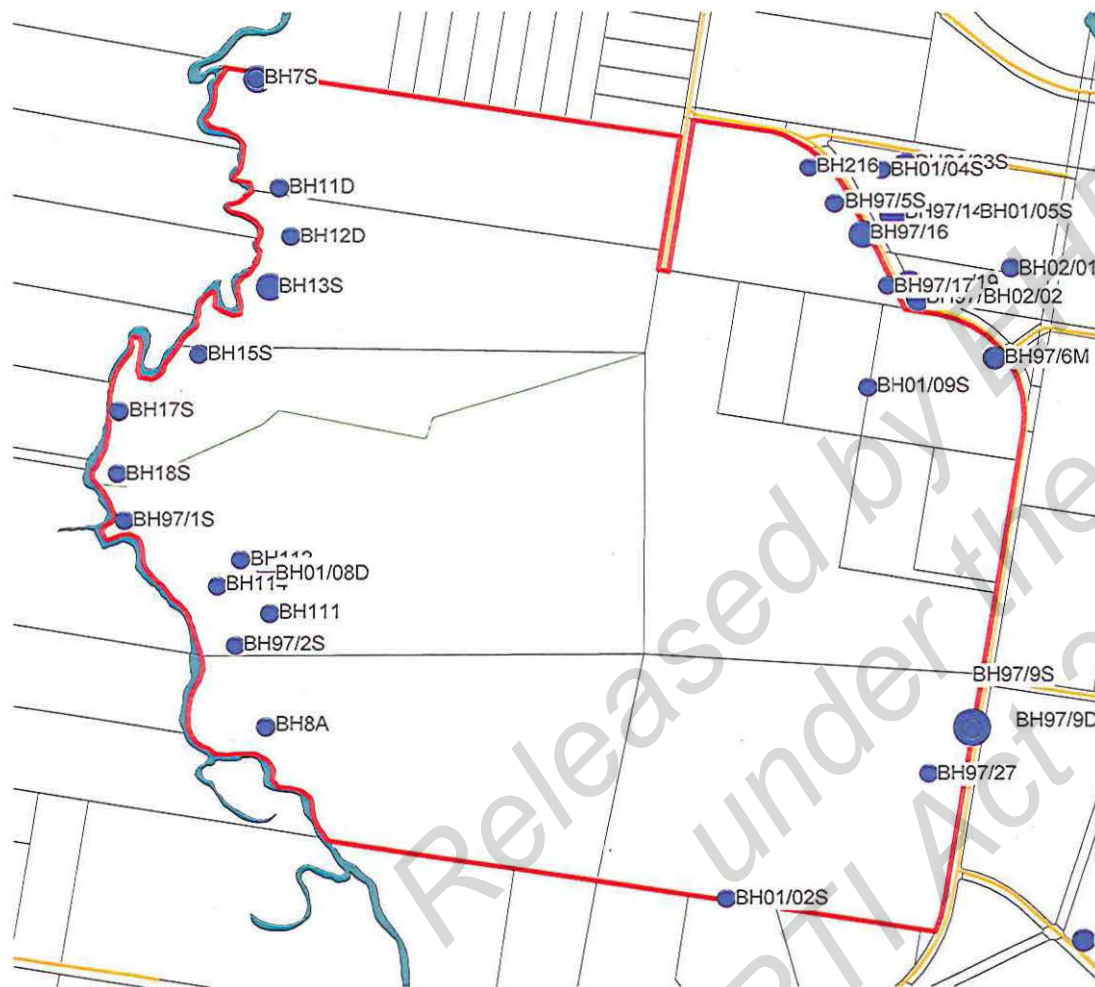
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Nitrite+Nitrate as N mg/L

- 23 to 23.1 (1)
- 11 to 23 (2)
- 2.9 to 11 (3)
- 0.3 to 2.9 (6)
- 0 to 0.3 (30)

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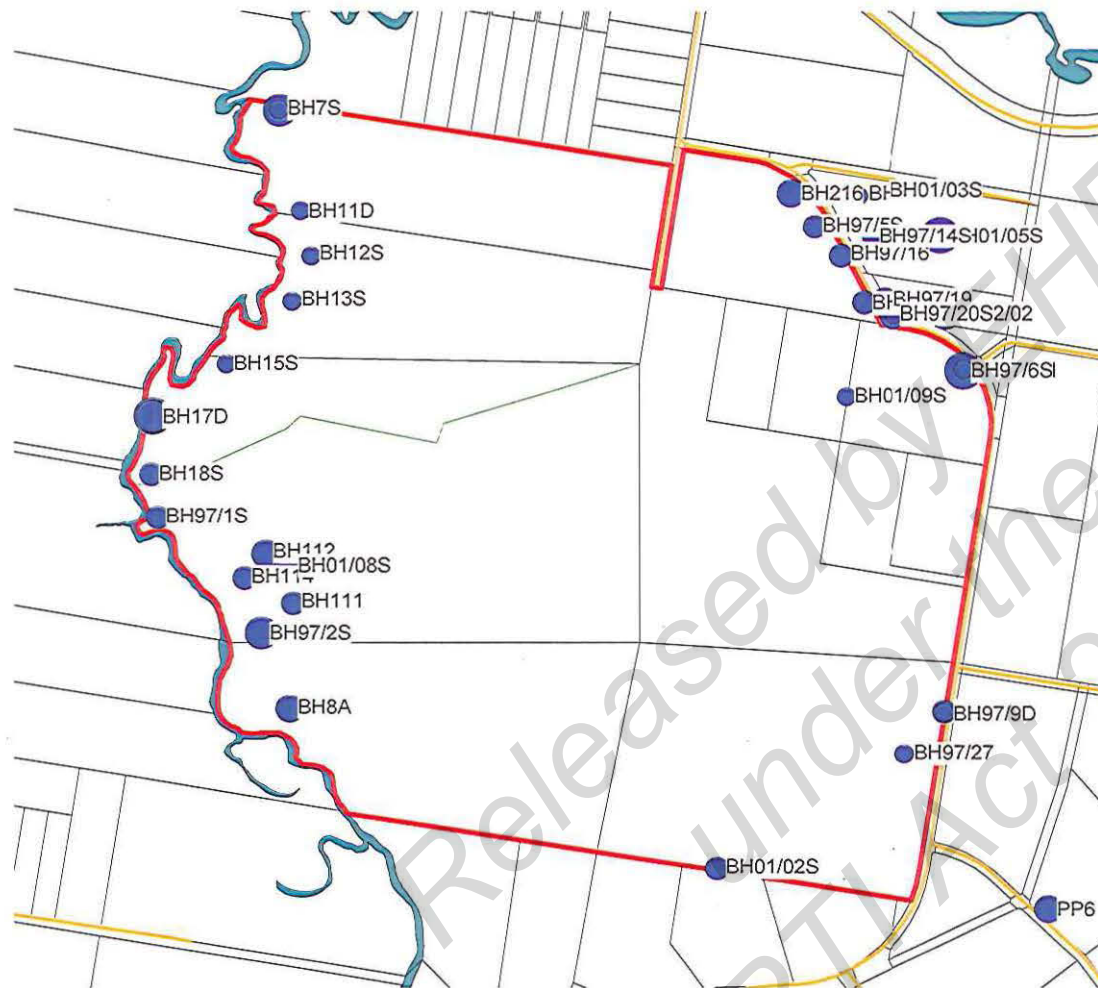


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Cobalt (Soluble) mg/L

- 0.04 to 0.26 (5)
- 0.03 to 0.04 (3)
- 0.02 to 0.03 (6)
- 0.01 to 0.02 (11)
- 0 to 0.01 (14)

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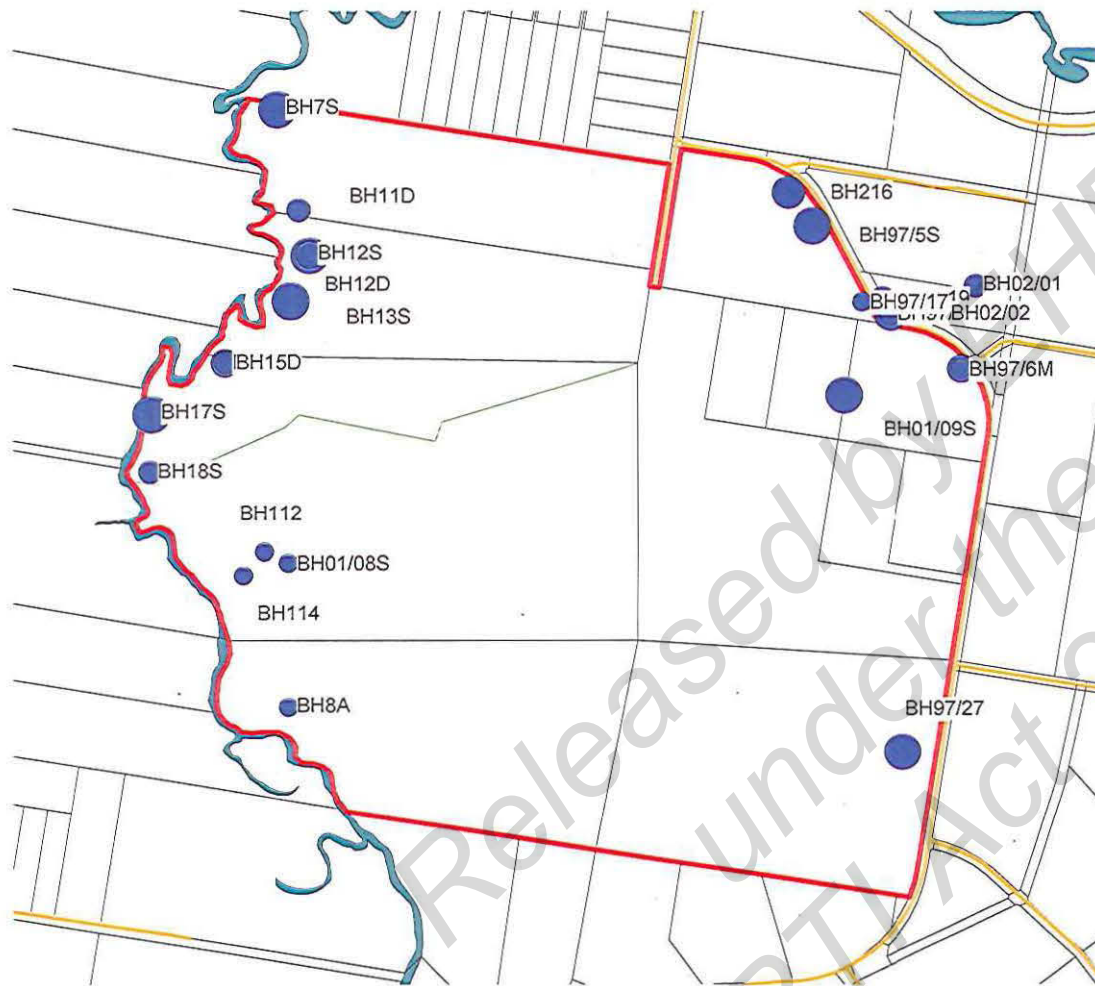


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Arsenic (Soluble) mg/L

- 0.006 to 0.019 (7)
- 0.004 to 0.006 (2)
- 0.003 to 0.004 (3)
- 0.002 to 0.003 (6)
- 0.001 to 0.002 (7)

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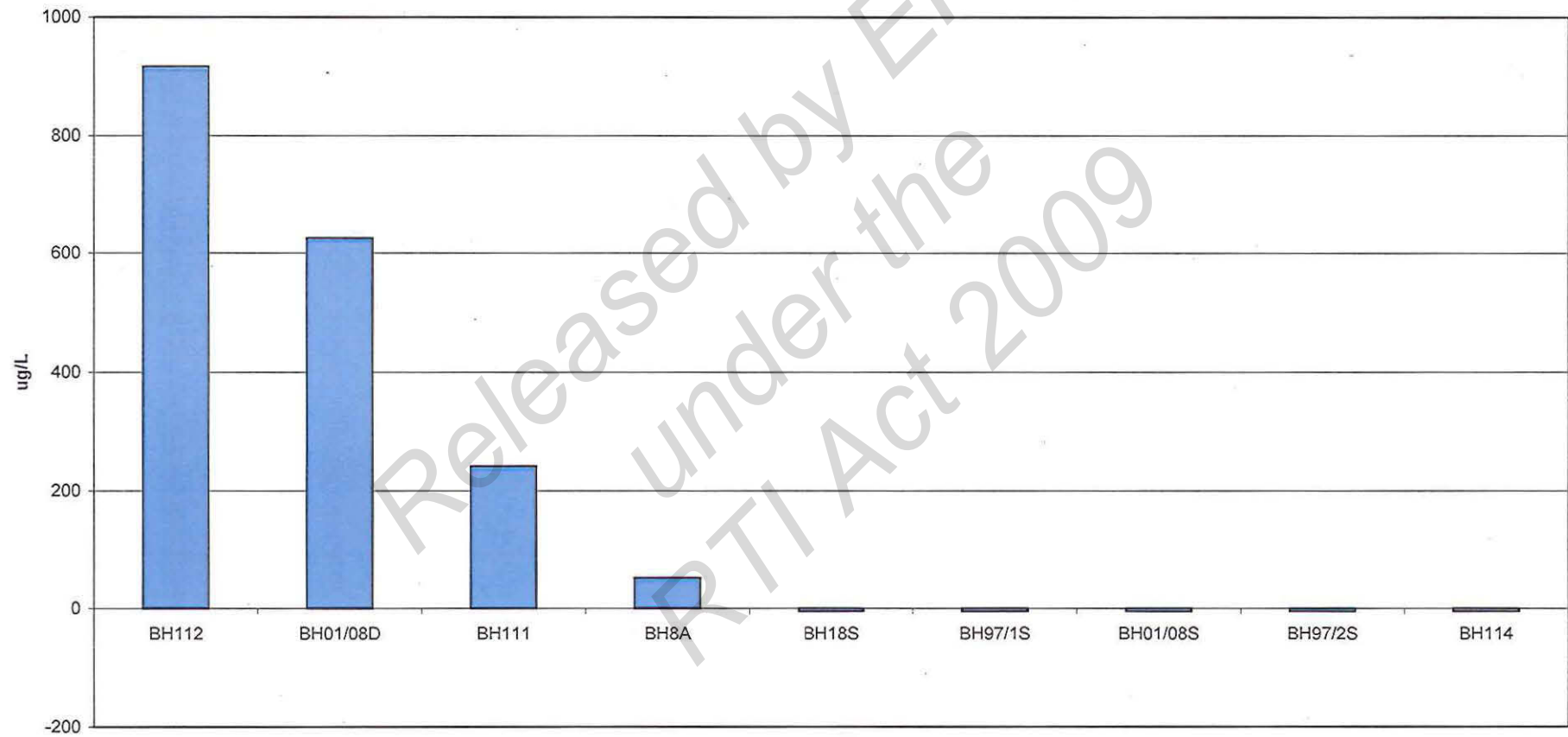
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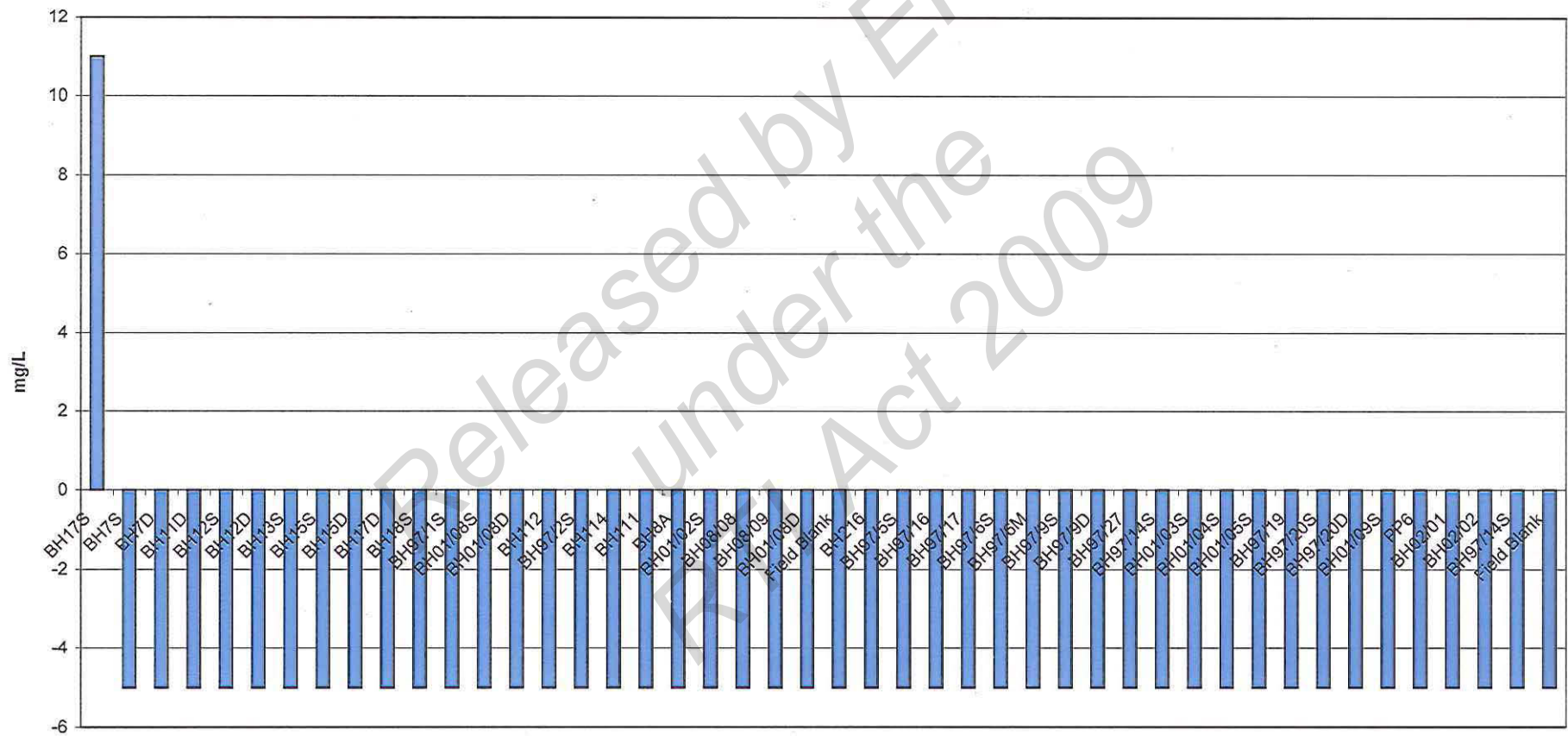
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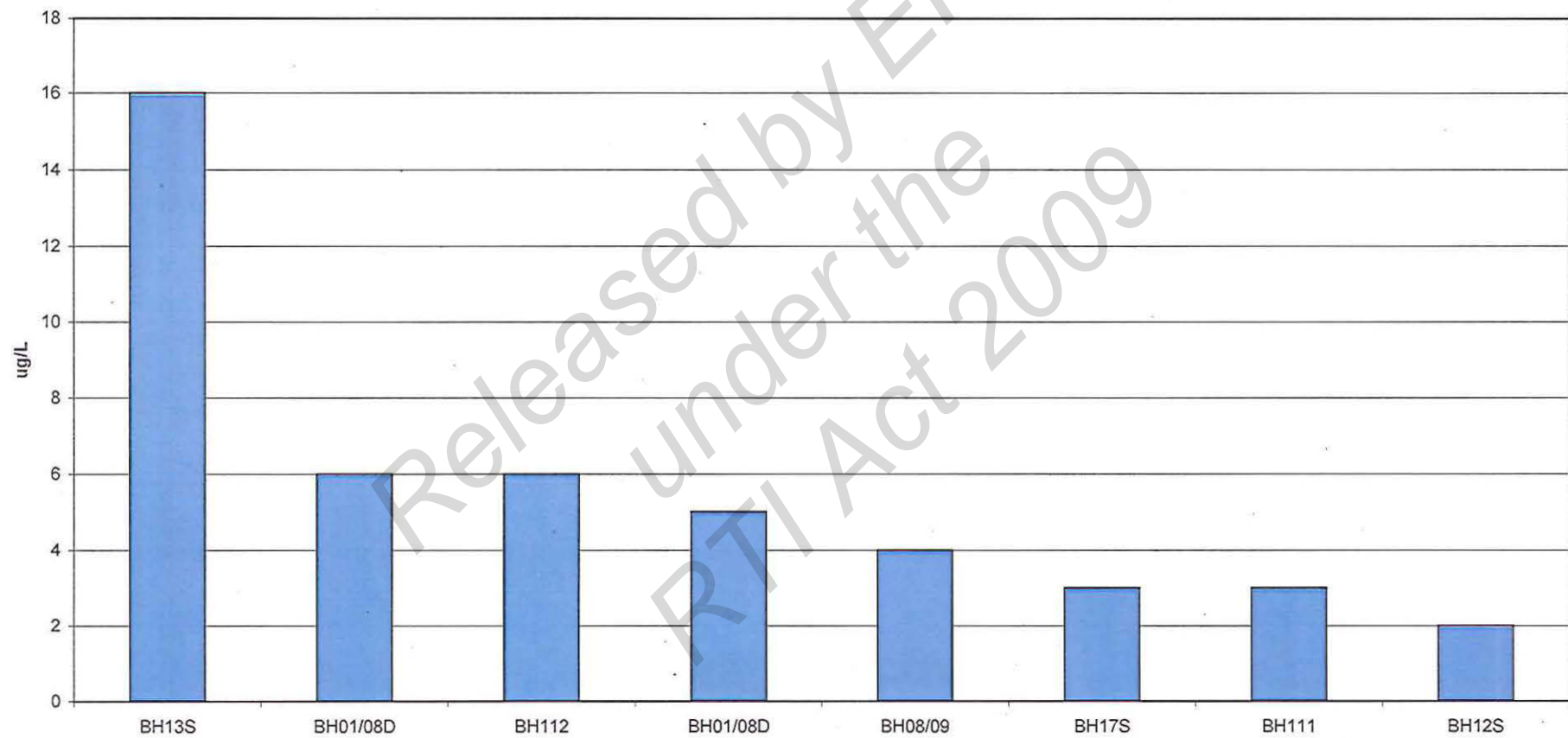
Willawong Bores Thiolane



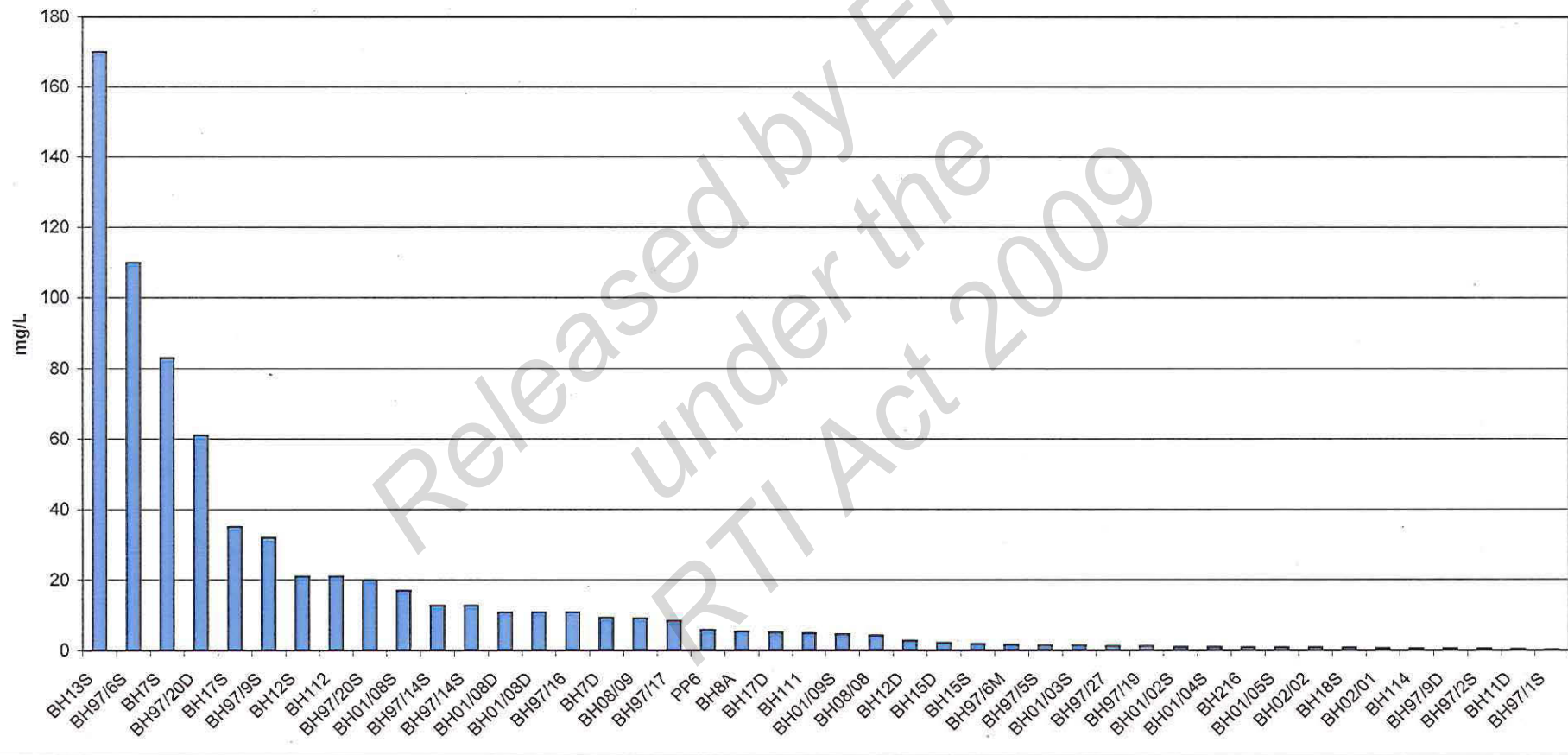
Willawong Bores 1,4-Dichlorobenzene



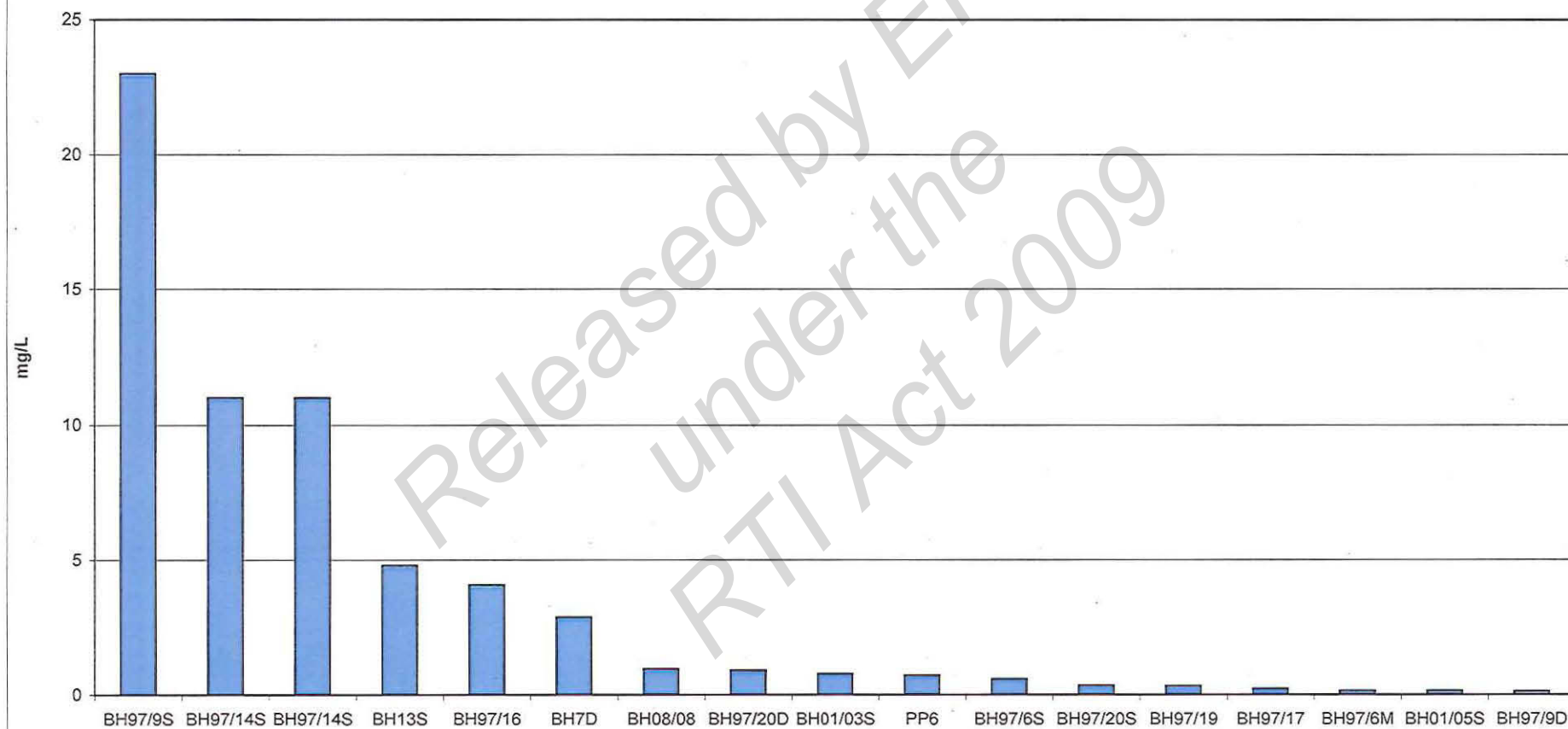
Willawong Bores Benzene



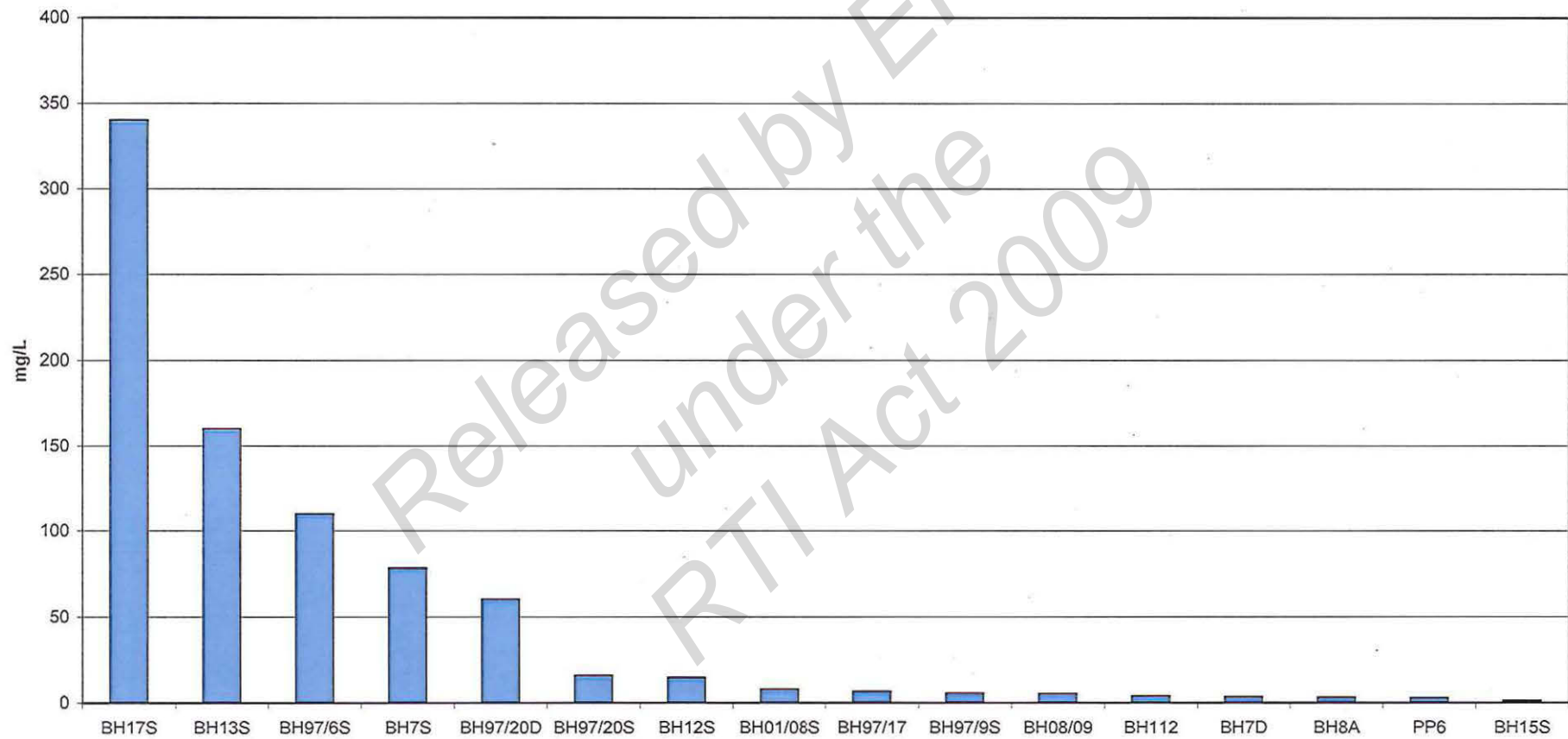
Willawong Bores Total Nitrogen



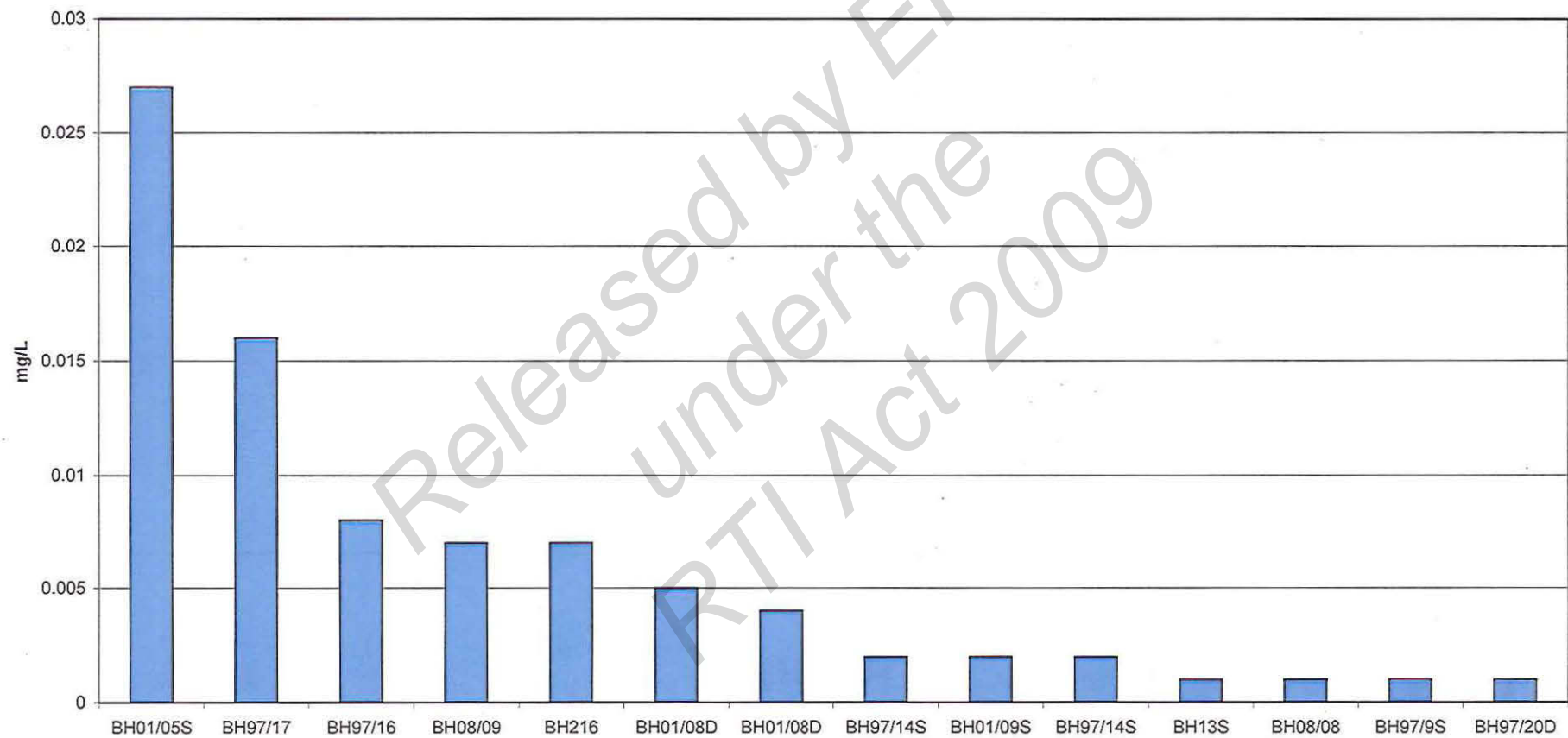
Willawong Bores Nitrite + Nitrate N



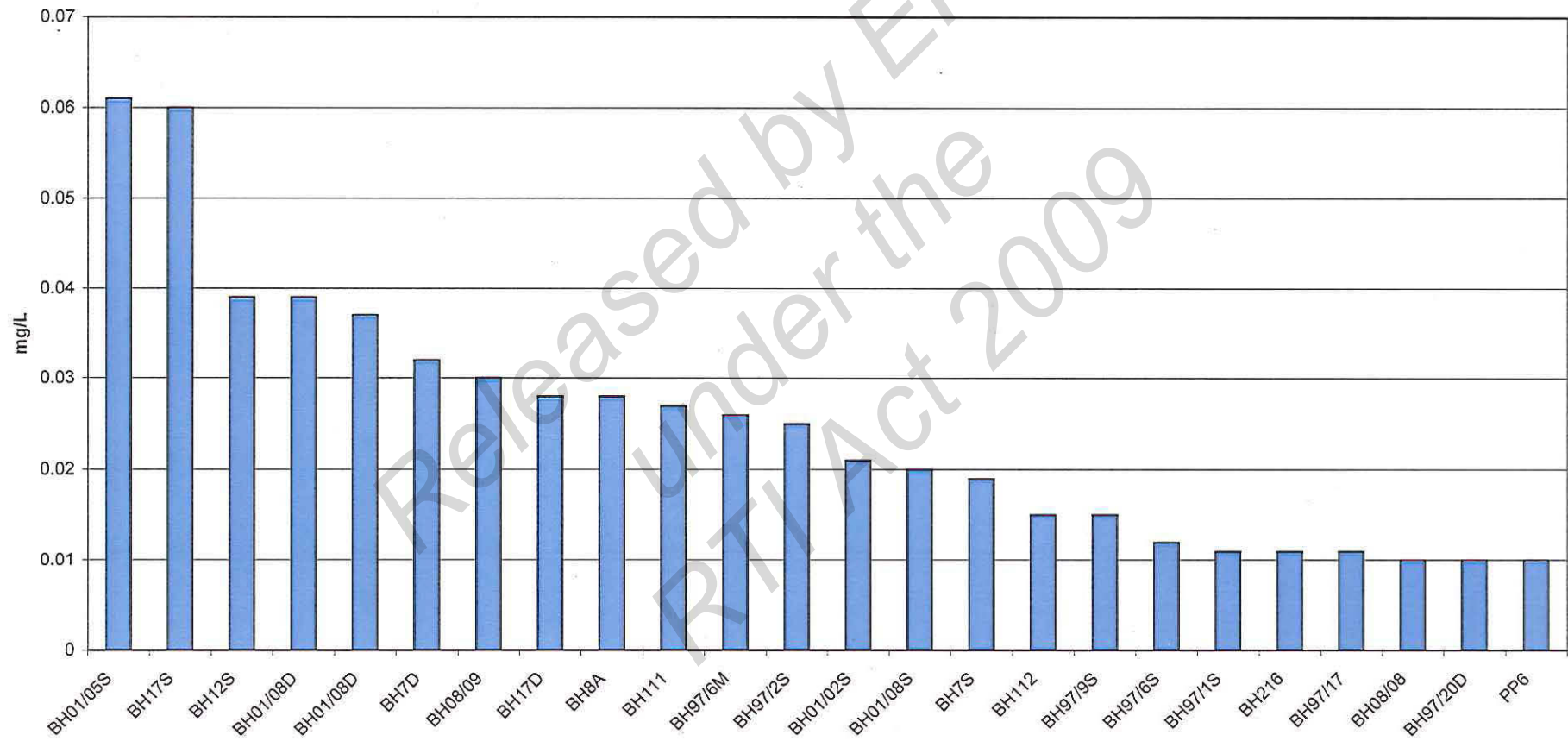
Willawong Bores Ammonia Nitrogen



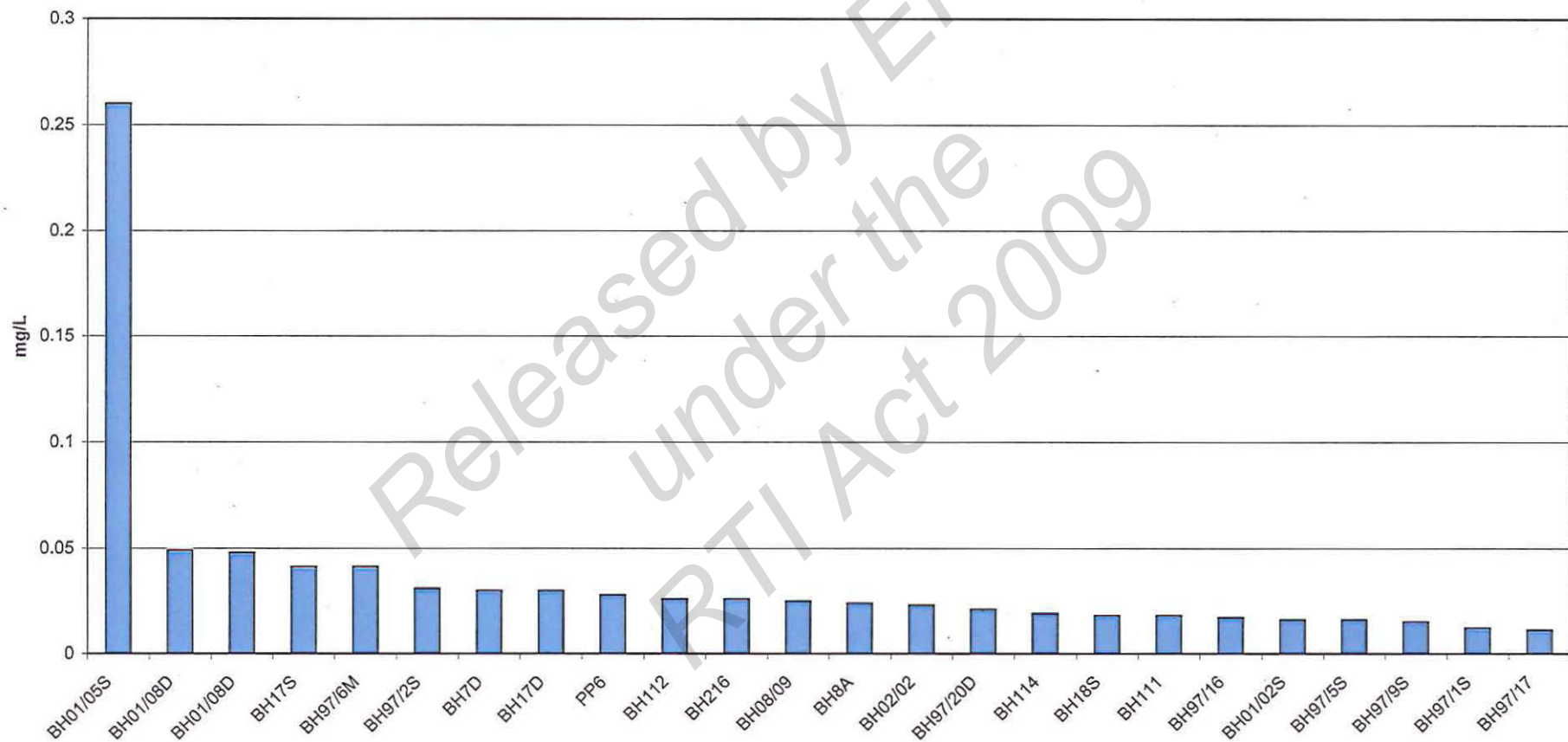
Willawong Bores Lead



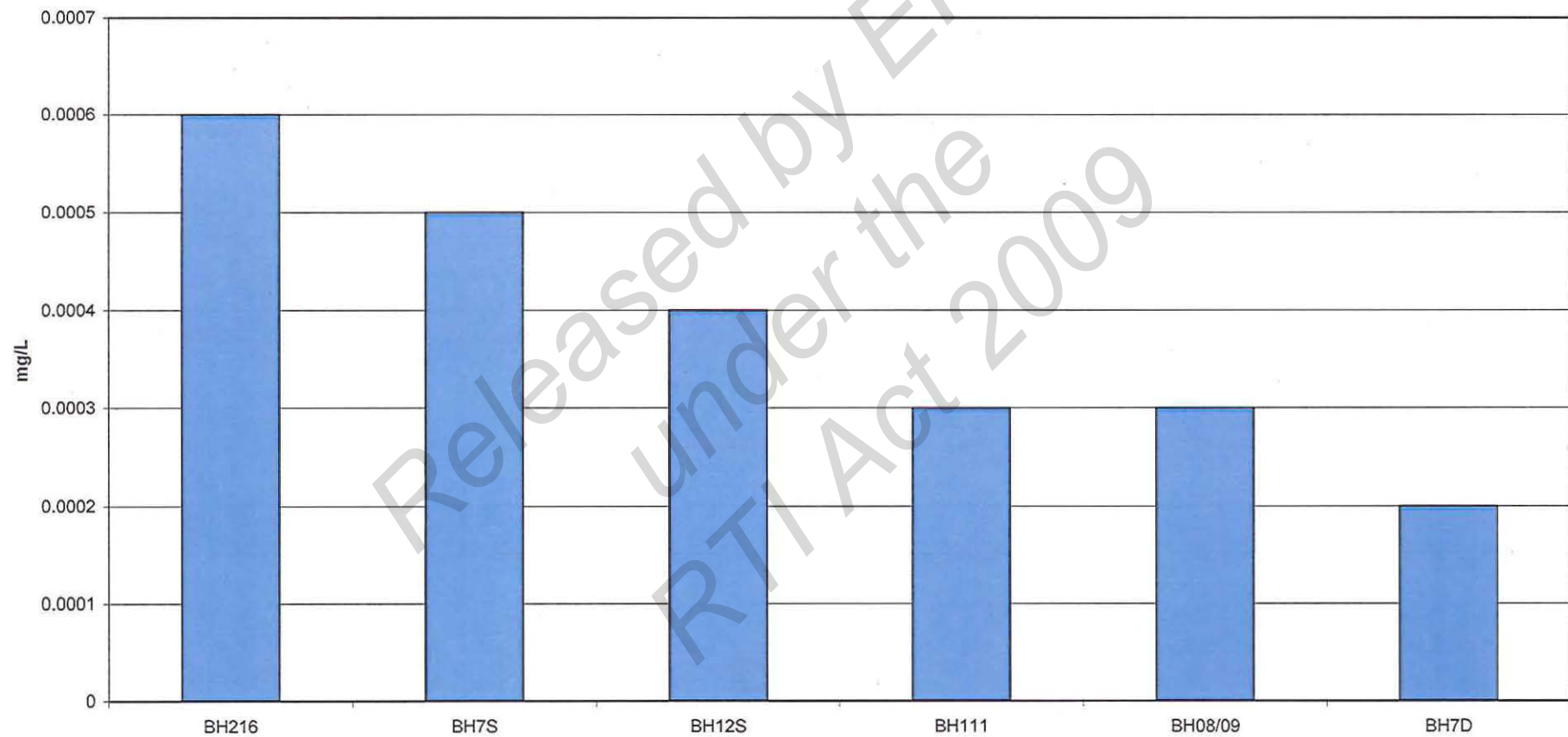
Willawong Bores Nickel



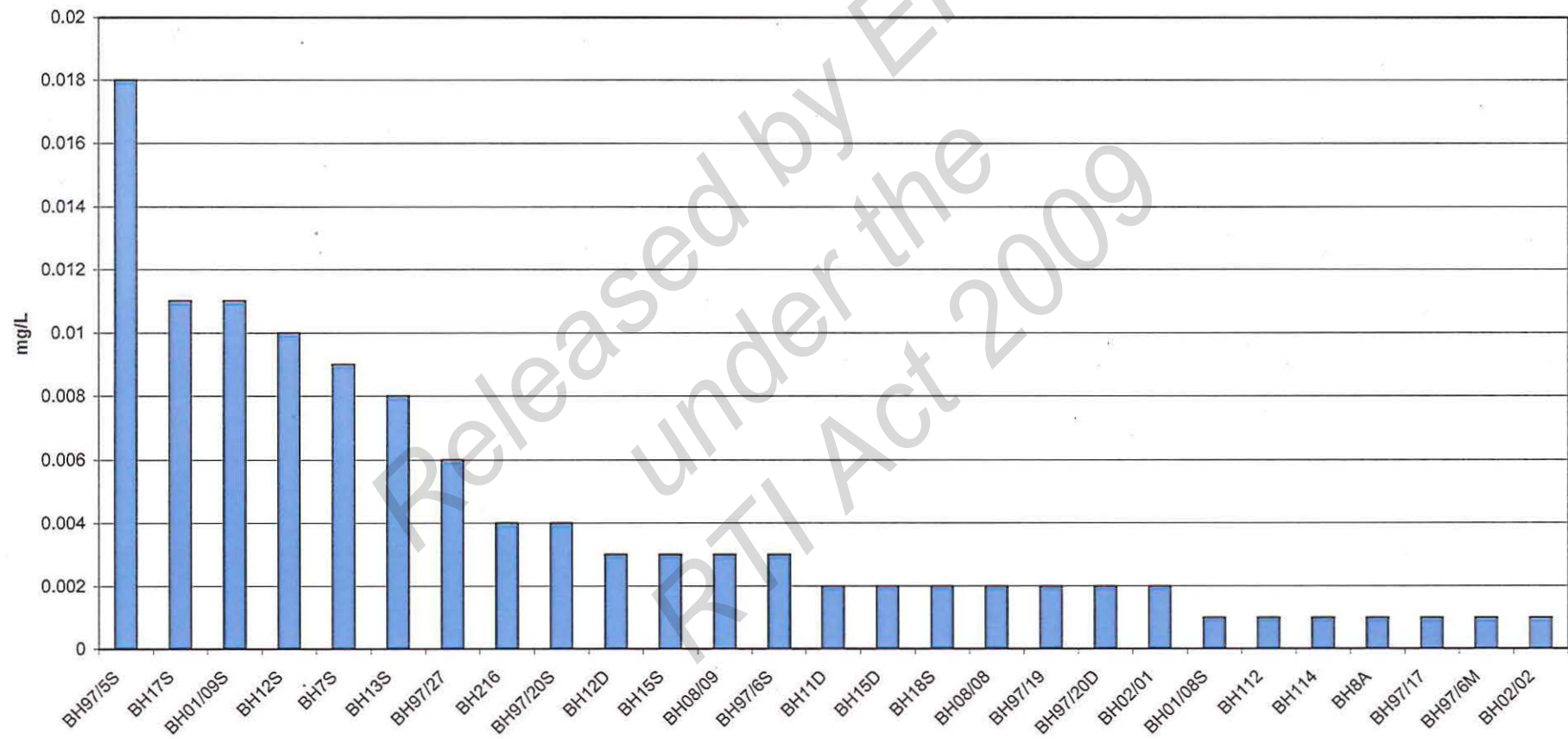
Willawong Bores Cobalt



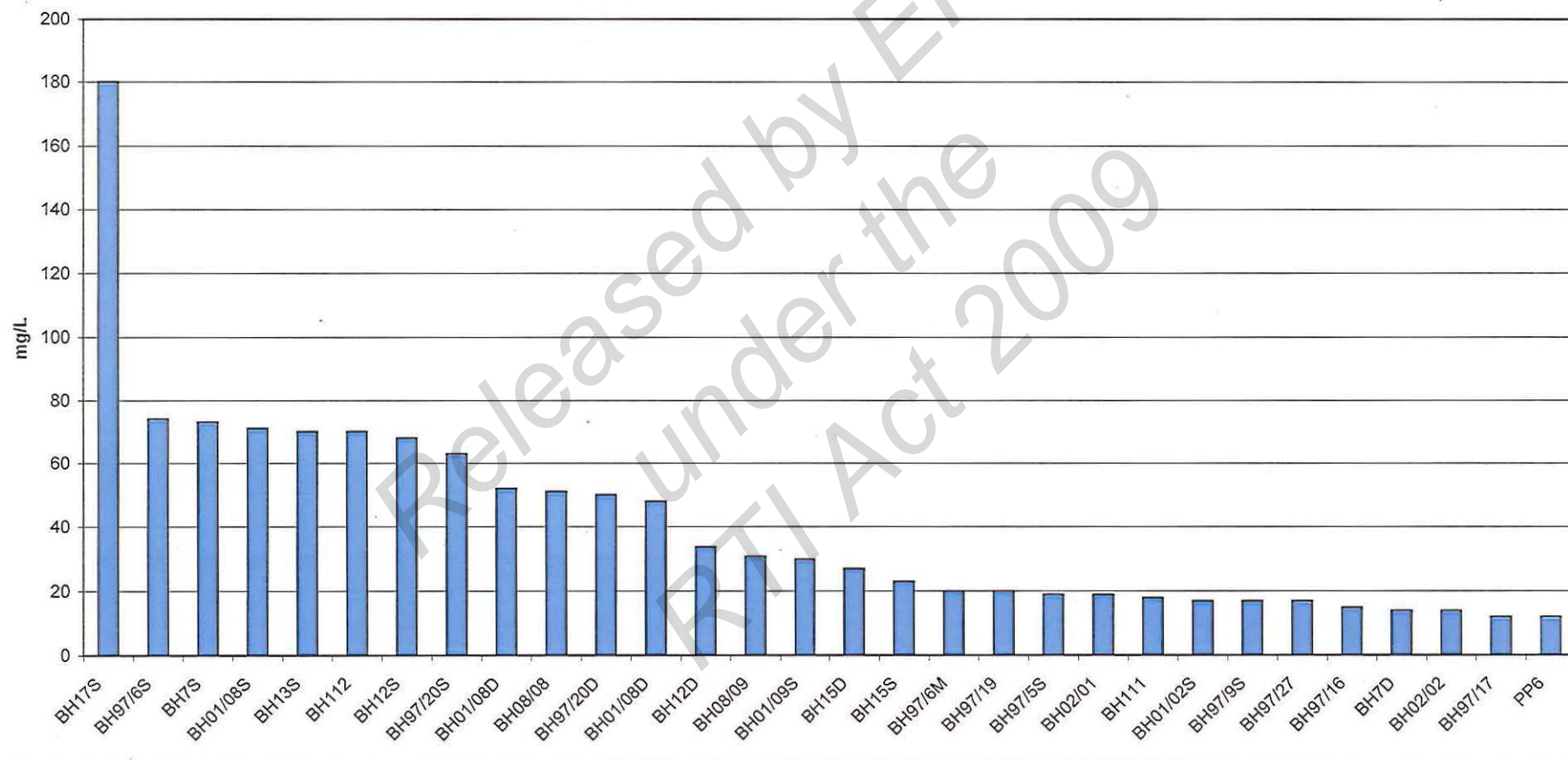
Willawong Bores Cadmium



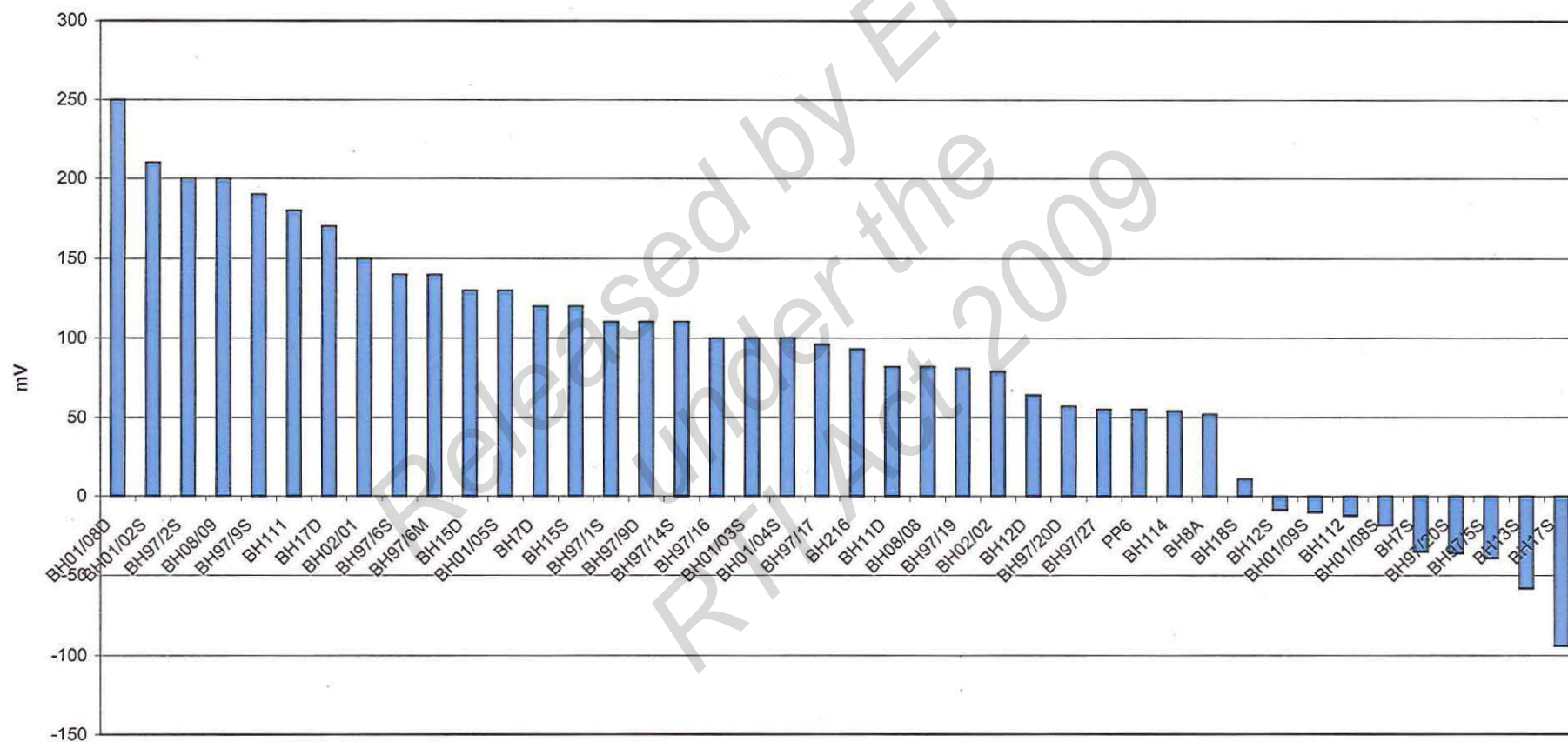
Willawong Bores Arsenic



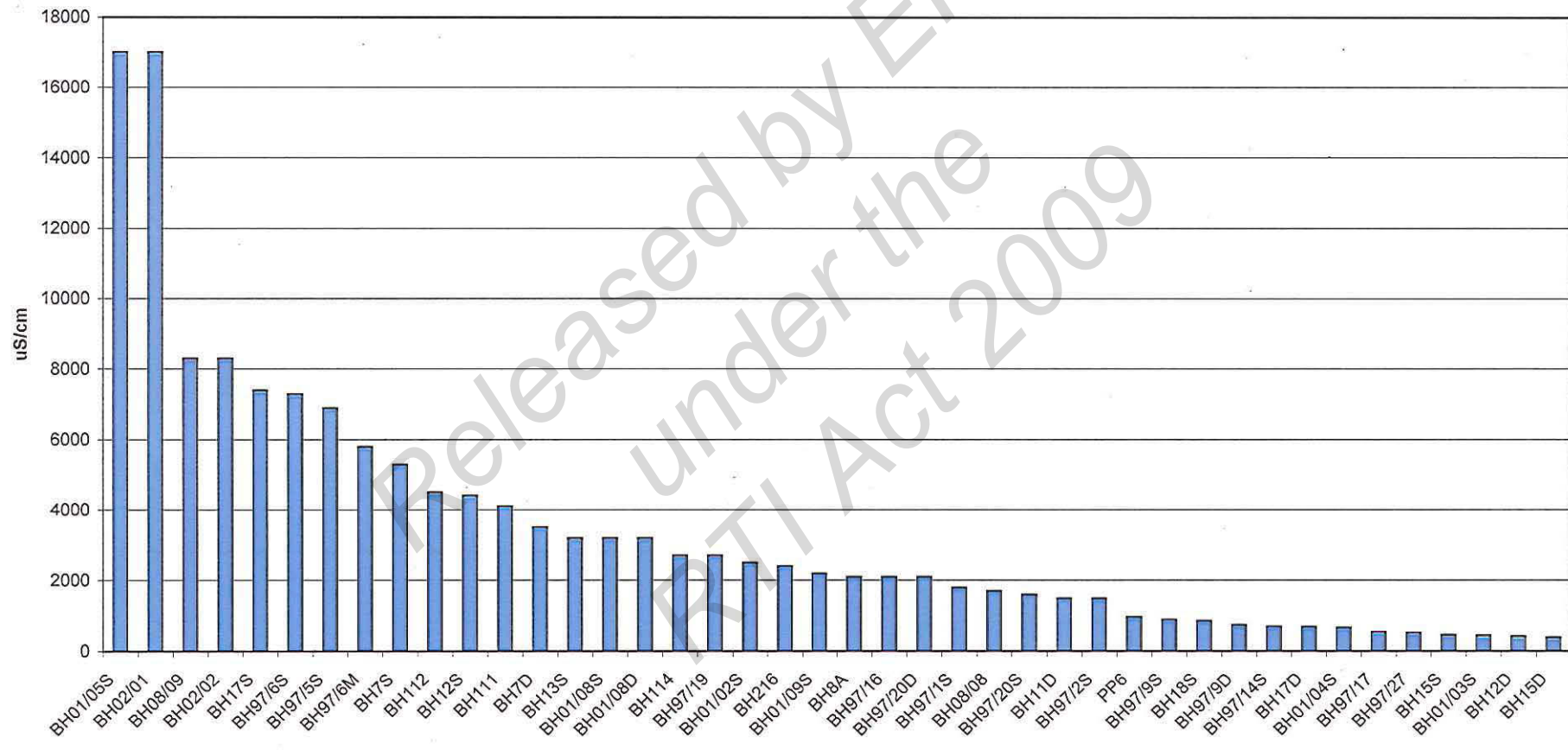
Willawong Bores Total Organic Carbon



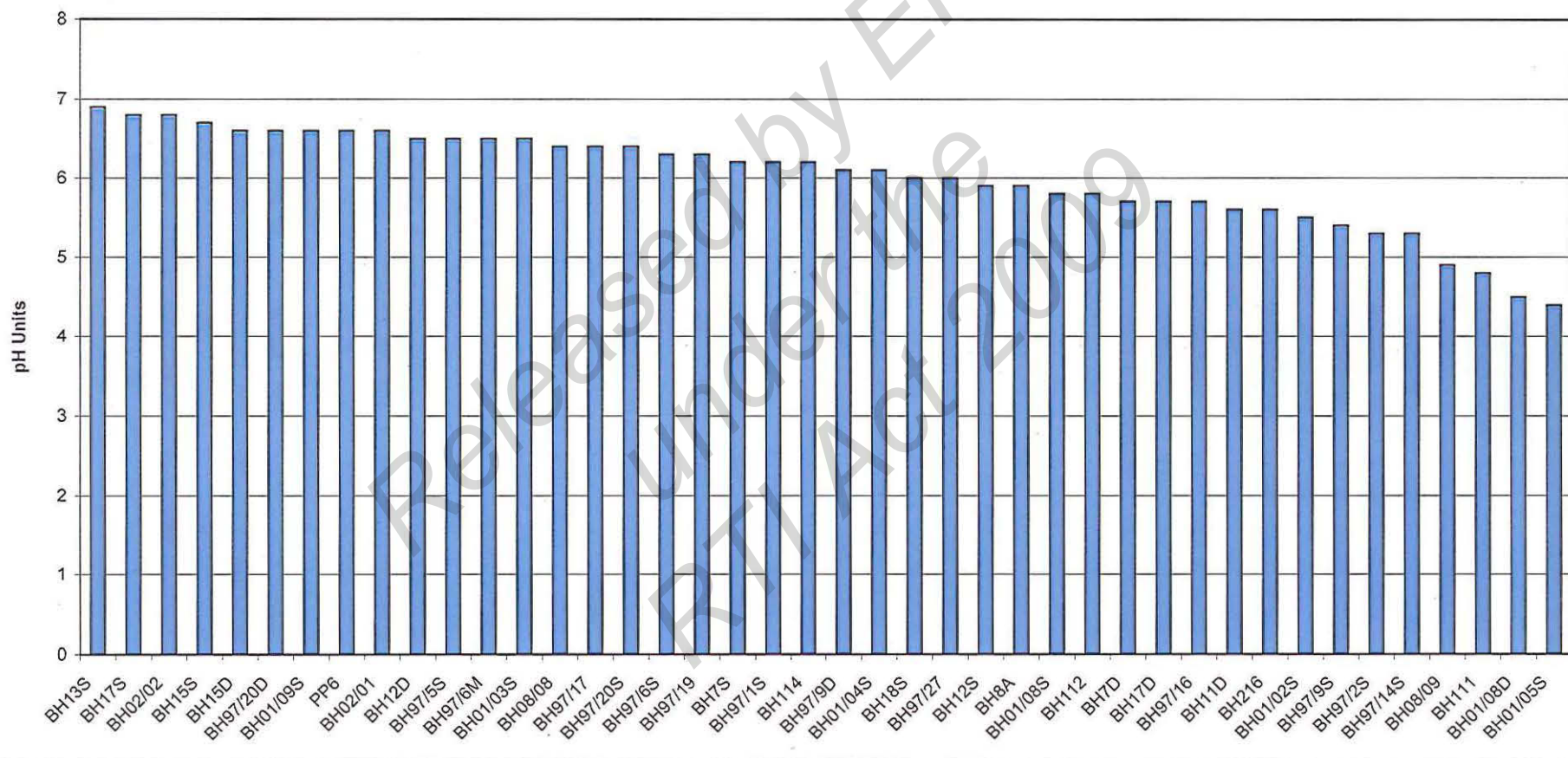
Willawong Bores Redox Potential

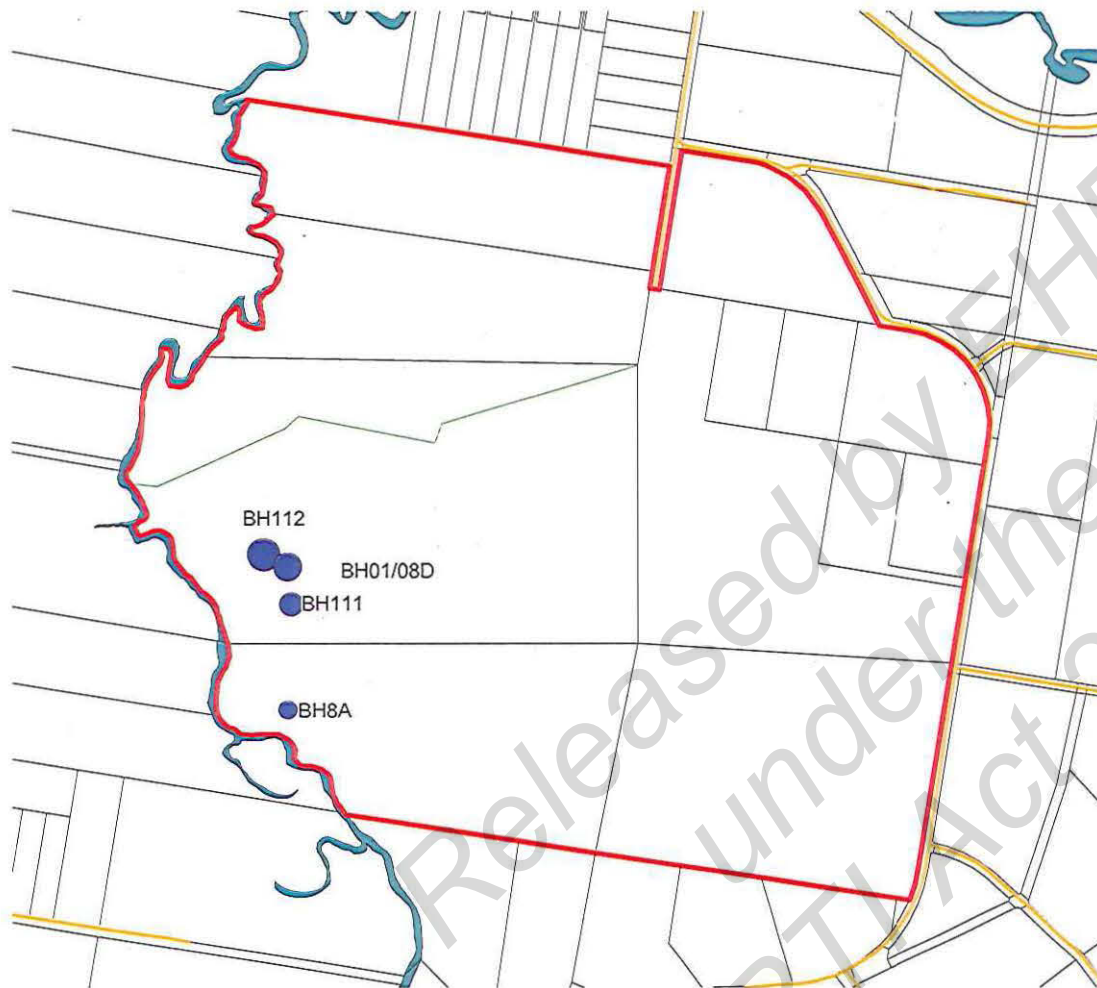


Willawong Bores Conductivity



Willawong Bores pH Value

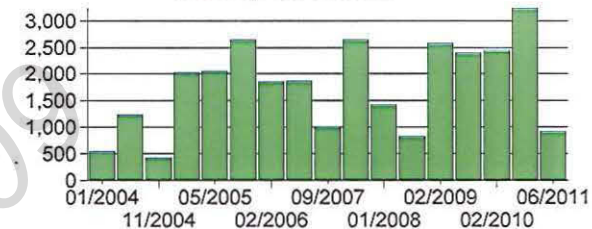




Thiolane UG/L

- 916 to 916 (1)
- 626 to 916 (1)
- 241 to 626 (1)
- 52 to 241 (1)

History for BH112



LEGEND

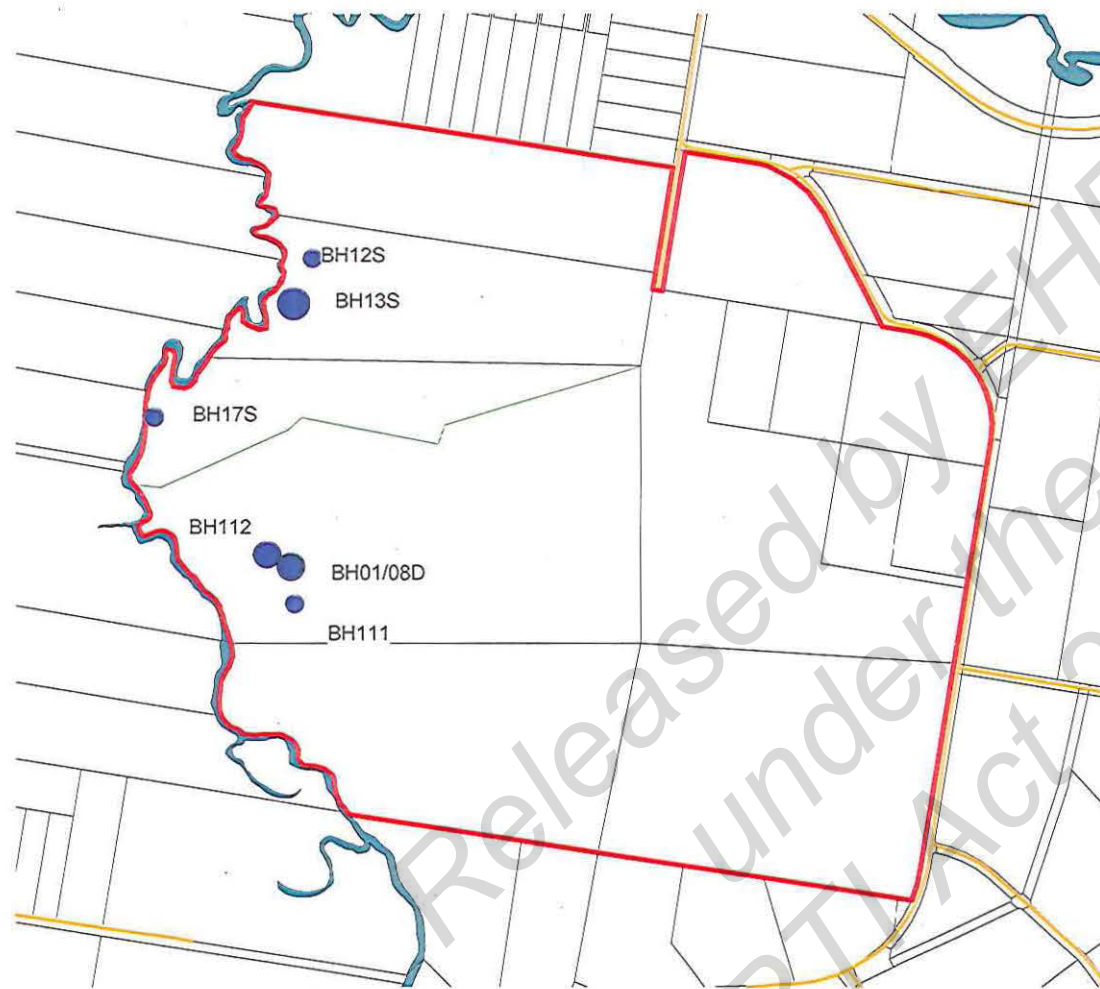
- Sampling Site
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Benzene UG/L

- 16 to 16 (1)
- 6 to 16 (2)
- 5 to 6 (1)
- 2 to 5 (3)

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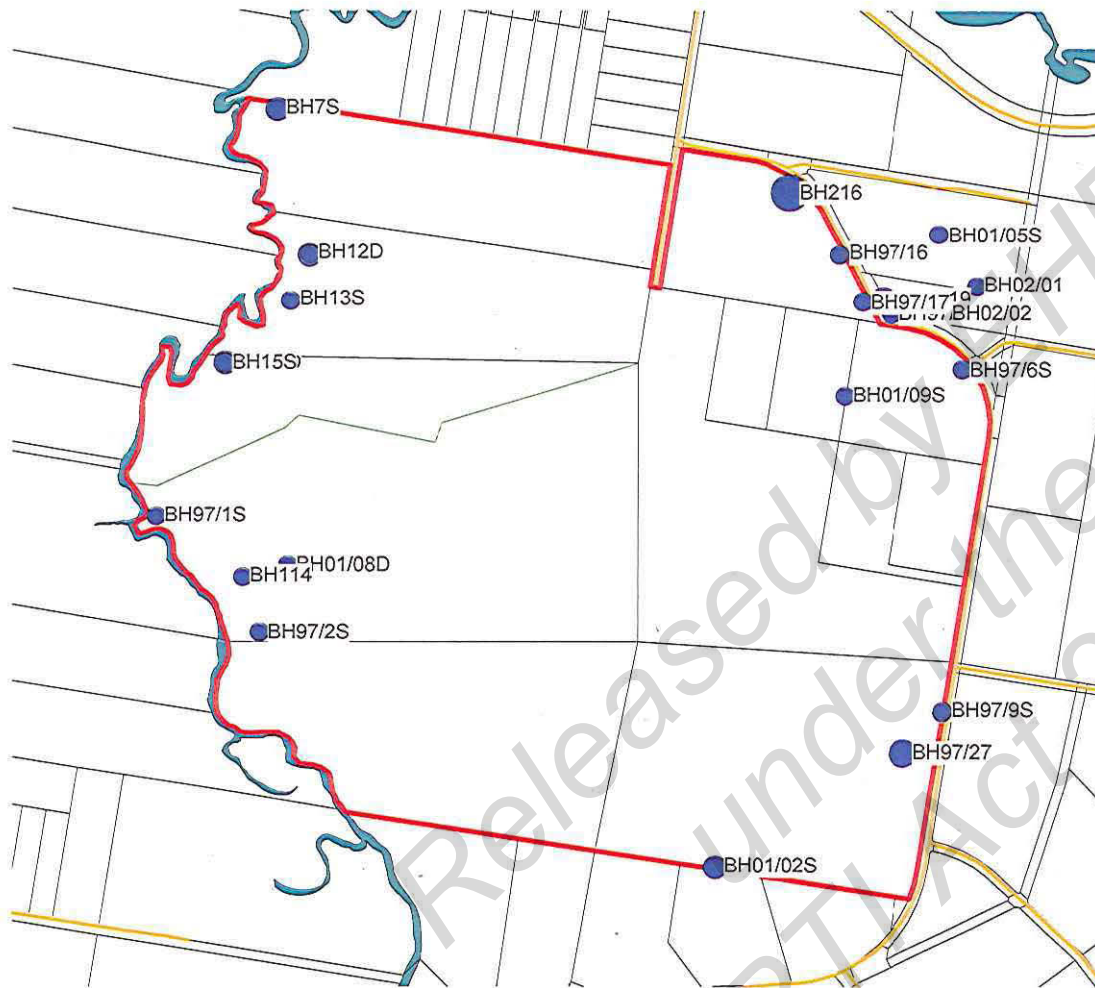
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Copper (Soluble) mg/L

- 0.021 to 0.025 (1)
- 0.011 to 0.016 (1)
- 0.006 to 0.011 (6)
- 0.001 to 0.006 (18)

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