



**Queensland
Government**

Department of Environment and Heritage Protection (EHP)
ABN 46 640 294 485
Contaminated Land Unit Level 7 400 George St Brisbane, Queensland 4001
GPO Box 2454 Brisbane QLD 4001 AUSTRALIA
Telephone (07) 3330 5685 Facsimile (07) 3330 5634
<http://www.ehp.qld.gov.au/land/contaminated-land/>

SUITABILITY STATEMENT

OWNER

BRISBANE CITY COUNCIL
GPO BOX 1434
BRISBANE QLD 4001

DATE OF ISSUE: 11/10/2012

PROPERTY DESCRIPTION

LOT: 24 PLAN: SP245490
360 SHERBROOKE ROAD
WILLAWONG QLD 4110

Brisbane City Council
EMR Site ID: 99277 FILE REFERENCE: BNE40728

STUDIES UNDERTAKEN BY APPLICANT OR REQUESTED BY DIRECTOR

Willawong Remediation Project, Remedial Works Design Report
Prepared for Brisbane City Council
Environmental and Ground Engineering City Design
Allan Watson Associates, Waste and Water Management Consultants
May 2000, Project No. 9929-bcc-001 R002-b

STATEMENT OF SUITABILITY

On the basis of the information supplied to this Department, the subject site is suitable for the following use(s) providing the site is used and managed as per the Amended Site Management Plan attached as Annexure 1.
The site is suitable for commercial/industrial land use subject to compliance with the provisions of this management plan.

Other specific uses may be suitable for the site, please contact this Department for further advice. The suitability statement provides information on appropriate land uses at the date of effect. Subsequent uses of the site for notifiable activities or for situations where a hazardous contaminant is released into the soil may result in the need to review suitable uses or amend the attached site management plan.

ENVIRONMENTAL MANAGEMENT REGISTER

LOT: 24 PLAN: SP245490 is recorded on the Environmental Management Register with a Site Management Plan. A copy of the Site Management Plan is attached as Annexure 1.

49-Sch4 - Signature

David Cook
Team Leader - Enforcement Services
BRISBANE

Delegate of Administering Authority
Environmental Protection Act 1994



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ANNEXURE 1 - SITE MANAGEMENT PLAN

RPD: Lot 24 on SP245490

EHP FILE REF: BNE40728

DATE OF EFFECT: 21/8/2012

Transfer Station Site WILLAWONG

DATE: 15/06/2012 Version

RPD Lot 24 on SP 245490

1.0 SUMMARY OF CONTAMINATION

Contamination investigations and assessment work undertaken in 1991 and 1992 by Brisbane City Council identified that the Willawong Transfer Station site (formerly described as Lot 2 on SP183655) was used for the disposal of various wastes.

Acid tars, surface paints contamination and solvent deposits were identified encroaching on the site. Remedial works which were conducted on the site in November and December 1991 resulted in the removal of the major proportion of the contamination.

It was subsequently accepted by the chemical Hazards and Emergency Management Unit that the site was suitable for the proposed use as a Transfer Station subject to the following conditions:

- (a) No uncontrolled public access.
- (b) Further assessment would be required if development of this area were proposed.
- (c) Groundwater and soil gas monitoring should be conducted as proposed in the report from Scientific Services Branch, 29 January, 1992.

Subsequently extensive remedial works have been conducted on land directly adjacent to the Willawong Transfer Station site that included removal of acid tar deposit on adjacent land (Lots 3 & 6 on SP183655) and construction of an engineering cap on substantial areas of the former Willawong Waste Disposal Site.

Groundwater monitoring for the site is part of the monitoring program of the former Willawong Waste Disposal Site. Soil gas monitoring is no longer required.

As part of a configuration of lot in January 2012, the BCC Depot and Holding Yard Area (formerly part of Lot 21 on SP234575) was incorporated into Lot 24.

The Willawong Transfer Station has been extended to include part of former Lot 21 on SP234575 which is on the eastern side of Sherbrooke Road. Anecdotal evidence indicates that there is at least 2m of fill beneath the current ground surface and approximately 2m layer of waste which was disposed on this property in late 1970s or early 1980s. There is also potential risk of landfill gas migration from the adjacent former Willawong Waste Disposal Site to Lot 24.

2.0 OBJECTIVES OF THE SMP

The purpose of this SMP is to manage contamination on the site in a manner that protects human health and the environment.

3.0 ACHIEVEMENT AND MAINTENANCE OF OBJECTIVES

3.1 *Responsibility.* The owner of the land (as defined in the Environmental Protection Act 1994) is to ensure that this SMP and any variation approved or required by the administering authority are complied with. The obligations and conditions set out in this SMP bind the owner, from time to time of the land.

3.2 *Site Use.* The site is suitable for commercial/ industrial land use subject to compliance with the provisions of this management plan.

3.3 *Provision of the SMP to appropriate Persons.* The owner must provide all persons involved in building design and planning and all contractors and lessees conducting building and or/ excavation works with a copy of the SMP prior to the commencement of site works. All persons occupying or working on the site must comply with the requirements of the SMP.

3.4 *Surface Capping and protecting Barriers.* The existing site capping, stabilised surface, vegetative cover and protective barriers must be maintained in sound condition. Any disruption to the existing site capping, stabilised surface, vegetative cover or protective barriers must be done in accordance with provisions 3.5, 3.6, 3.7 and 3.8 below.

3.5 *Sealing of services.* All inground services including trenches, inspection pits, stormwater drains and manholes must be constructed with walls and base lined with a minimum of 0.5m clean clay soil fill. All inspection chambers, inspection pits, junction boxes and similar structures must be sealed so as to prevent the migration and/or confinement of landfill gas.

3.5 *Soil Excavation and Removal:* Any soil excavated on the site must be assessed for contaminants of concern to determine if the material is contaminated and to identify appropriate management and disposal/ re- use options.

3.6 *Unexpected Contamination:* if during any site earthworks or excavation, offensive or noxious odours and/or evidence of waste or contamination not previously detected are observed, site works are to cease in that area and action taken to immediately prevent or minimise environmental harm. The administering authority is to be notified in writing within two (2) business days of detection and advised of any remedial action undertaken.

Any remedial action is to be developed by an appropriately qualified and experienced person in accordance with Section 381 of the EP Act.

3.7 *General Environmental Protection:* all earthworks are to be undertaken in accordance with general environmental protection measures to avoid unwanted migration and deposition of soil. These measures include the control of dust, noise, stormwater runoff, sediment, erosion, spillage from haulage trucks and odour releases involving the handling or movement of contaminated material. The use of groundwater at the site must not occur unless an investigation provides information that the groundwater at the site is suitable for the proposed use and the EPA gives written consent for such use to occur.

3.8 *Workplace Health and Safety:* a workplace Health and Safety Plan (WH&S plan), which conforms to the requirements of the Workplace Health and Safety Act 1995 is to be developed for any site excavation works in contaminated areas. The WH&S plan must specifically address contaminants of concern.

3.9 *Landfill gas:* while undertaking excavations which extend below the capping layer into the refuse, work procedures are to be established by and appropriately experienced person which ensures that landfill gas does not result in a risk to anyone on the subject site. Landfill gas must be continually monitored in all excavations involving waste materials. Methane gas concentrations within any excavation must not exceeded 25% of the Lower Explosive Limit (LEL) for methane. Where such levels are exceeded, excavation works must cease until concentrations reach acceptable levels.

4.0 MONITORING AND REPORTING

Records and to be kept of all inspections, any soil excavation in contaminated areas, disposal permits and site management plans compliance for review by the administering authority from time to time. A biennial inspection is to be undertaken to ensure that capping and protective barriers remain in sound condition at all times in accordance with section 3.4.

This Site Management Plan (SMP) has been developed to manage site contamination risks present at the issue date. Subsequent uses of the site may result in the need to review the plan.

From: JOHNS Allen [Allen.Johns@ehp.qld.gov.au]
Sent: Wednesday, 5 November 2014 9:13 AM
To: FRANCIS Karen
Subject: FW: Willawong Background
Attachments: Round 49 report.pdf; Willawong Summary.pdf

Regards

Allen Johns

Principal Environmental Officer | Waste and Land Contamination Assessment Unit |
Environmental Services & Regulation | Department of Environment and Heritage Protection

Phone +61 (07) 3330 5694

Email: allen.johns@ehp.qld.gov.au

Level 9, 400 George Street, Brisbane, QLD 4001

GPO Box 2454, Brisbane QLD 4001

 Please consider the environment before printing this email

ehp-email-signature



From: JOHNS Allen
Sent: Thursday, 30 October 2014 11:35 AM
To: HERTSLET Bryce; FRANZMANN Fiona
Subject: Willawong Background

Hi Bryce,

I herd you are working on the Willawong issues by Cookie. Please find some background information on the site hope this helps ta Allen

Regards

Allen Johns

Principal Environmental Officer | Waste and Land Contamination Assessment Unit |
Environmental Services & Regulation | Department of Environment and Heritage Protection

Phone +61 (07) 3330 5694

Email: allen.johns@ehp.qld.gov.au

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Willawong Environmental Monitoring

Round 49
May 2013



To: **BI CPO Planning & Design** Date: **24 June 2013**

Attn: **Erik Dekker, Willawong Remediation Project Manager**

CC:

From: **Bob Gray, Chemist in Charge**

Re: **Willawong Environmental Monitoring – Round 49**
Our Reference: 13/06776

Scientific Analytical Services

Queensland Urban Utilities

180 Ashridge Rd
Darra Qld 4076

Phone: 07 38567555
Facsimile: 07 38567572
Email: Bob.gray@urbanutilities.com.au
Internet: www.urbanutilities.com.au/SAS

The forty-ninth round of monitoring for the above project was carried out between 20 and 23 May 2013. This round of sampling was performed under dry conditions.

Rainfall (measured at BLR 736 Blunder Creek, Inala Gauging station) indicated an above-average rainfall for March, average for April, and well below average for May.

Month	Rainfall (mm) (measured at Oxley 040463)	Mean Rainfall (measured at Oxley 040463)
March	192.6	99.8
April	81.5	80.3
May	28.7	95.2

The current 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.

Bores were purged until at least three bore volumes were removed or until dry, and allowed to recharge before samples were taken. Construction activities on the site have resulted in burial or destruction of a large number of bores, as reported from our bore level monitoring activities in Reference 13/05445, a copy of which has been provided for your information.

Blunder and Oxley Creeks

Physical / Inorganic Analysis

Recorded pH values in the Oxley and Blunder creeks ranged from pH 6.9 at CMPS&F5 (Blunder Creek) to pH 7.4 at DOE15 in Oxley Creek. Brisbane City Council's Water Quality Objectives for fresh water incorporate a desirable pH range of 6.5-8.5.

On this occasion, conductivity readings in Blunder Creek had returned to the normally expected range, between 190µS/cm at WR3 and 389µS/cm at DOEB3. Conductivity readings in Oxley Creek were in the normal range at 359µS/cm and 364µS/cm at DOE15 and DOE14 respectively.

Dissolved oxygen concentrations were excellent in the two Oxley Creek locations, but again varied widely in Blunder Creek, although showing a marked improvement since the Round 48 sampling event, with concentrations between 5.5mg/L and 7.2mg/L being recorded. 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 have decreased in both creeks since the previous sampling event, with very good result of 8mg/L being returned for DOE15, but DOE14 remains relatively high at 18mg/L. CMPS&F4, near the north-eastern end of the landfill, returned the highest Blunder Creek result, also of 18mg/L, but the remaining locations were low, in the range <5mg/L to 8mg/L.

Heavy metals concentrations at most of the creek locations were low, with most below the level of reporting. However, mercury was reported at CMPS&F4 at 0.3µg/L, with 0.1µg/L being reported in the field duplicate.

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

Although there has been a 10-fold reduction since the previous sampling event, the highest ammonia nitrogen results have occurred at the northern end of Blunder Creek, at DOEB3 (1.2mg/L) and CMPS&F5 (0.66mg/L). These two locations also returned the highest oxidised nitrogen results of 0.84mg/L and 0.44mg/L respectively. These results were reflected in the total nitrogen results of 2.5mg/L and 1.5mg/L.

Microbiological Analysis

Blunder Creek's microbiological quality was very good, with thermotolerant (faecal) coliforms ranging from 10cfu/100mL to 120cfu/100mL. Oxley Creek quality was considerable poorer, with 400cfu/100mL at DOE14 and 420cfu/100mL at DOE15. The guideline for primary contact (swimming) is 150cfu/100mL.

Groundwater Samples

Physical / Inorganic analysis

pH values for borewaters varied between a strongly acidic pH 3.7 (BH01/02S) and slightly alkaline pH 7.6 (BH13S). High salinity continues to be a feature of many of the bores. BH08/04 (19,000µS/cm) and BH02/01 (17,500µS/cm) returned the highest conductivities, and the lowest conductivity was again recorded at BH01/09S (270µS/cm). Redox potentials varied widely, from +280mV at BH01/02S, to -190mV at BH97/20S.

BH17S, adjacent to Blunder Creek in the south-west of the site, again returned the highest ammonia nitrogen concentration of 330mg/L, followed by BH13S to the north at 130mg/L.

The highest oxidised nitrogen (NO₂ + NO₃) results were again reported at 97/6M in the north-east (17mg/L) and BH97/9S in the south-east at 10mg/L. The results are consistent with previous results from these locations.

The highest total organic carbon result again came from BH17S on the western boundary near Blunder Creek, at 240mg/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.

Thirty bores returned arsenic results between the limit of reporting (0.001mg/L) and 0.021mg/L, with the highest result again coming from BH97/5S, in the north-eastern corner of the site.

Only three locations reported cadmium results above the limit of reporting of 0.0002mg/L, with the highest being 0.0006mg/L at BH7D.

Cobalt has historically been found at relatively high concentrations at this site, with concentrations ranging up to 0.14mg/L, at BH01/05S on this occasion. This is consistent with previous results.

The highest lead result was 0.028mg/L, at BH97/17.

Three locations reported mercury above the limit of reporting of 0.1µg/L. BH01/09S, at 0.58µg/L, was the highest, followed by BH97/16 (0.18µg/L) and BH18S (0.12µg/L).

The highest nickel concentrations were obtained for BH01/02S (0.13mg/L) and BH08/04 (0.084mg/L).

Low concentrations of selenium, just above the limit of reporting of 0.002mg/L, were reported for nine bores, with the highest readings of 0.002mg/L again being returned for BH12S, BH17/S and BH97/6S.

BH97/16 returned the highest zinc result of 0.45mg/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)

BH17S and BH13S were the only locations to return a chlorinated benzene result above the limit of reporting of 2µg/L, at 8µg/L and 3µg/L respectively.

Ten locations reported benzene above the limit of reporting, in the range 1 - 49µg/L, with BH02/02 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.

Sulfolane was detected in only two of the six bores sampled, with 4.7mg/L at BH111, and 3.8mg/L at BH112. These bores also returned the highest Thiolane results of 1310µg/L at BH112 and 1080µg/L at BH111. BH8A reported 96µg/L, but BH97/1S, BH97/2S and BH114 were all below the limit of reporting of 5µg/L.

Summary

The results for Blunder Creek indicate a significant improvement in leachate control along the western side of the landfill in comparison with the previous sampling event, with a commensurate improvement in water quality. Groundwater quality remains consistent with historical records.

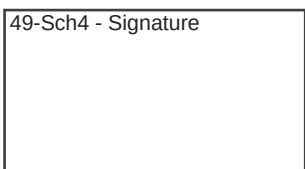
Data Management

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

Willawong Summary

BNE24336 (formerly 900090)

**\\EO_Integrated Assessment\\Project Support\\Manager GOC\\Willawong
Remediation\\Remediation**

10 October 2012

Background

Willawong was formerly Brisbane's hazardous waste disposal facility, operating for many years. In addition a large putrescibles landfill operated on the site up until the early 1990s. The hazardous waste facility closed in 1998.

The site has been subject to extensive investigations and monitoring for many years. Copies of these reports are in EHP filing systems. On the basis of the investigations, in 1999 a remedial works design was prepared for BCC. It provides the basis for the remediation approach and its design, which is essentially capping to control infiltration and leachate collection on the SW corner and at strategic points on the toe of the former putrescibles landfill. A copy of the report is on file, an electronic copy is at \\EO_Integrated Assessment\\Project Support\\Manager GOC\\Willawong Remediation\\Remediation\\Reports.

The site is divided into remediation areas and capping designs established for the areas (see attached figures). These designs have been fully implemented at a cost of about \$50M. A spreadsheet Leonie's - historical list of remediation projects september 2008_1.xls is in the folder which includes timing of remediation works for all Brisbane landfills, including Willawong.

Areas 3, 5, 6, 10, 11 & 12 are to remain open space – no public use. Areas 1, 2, 7, 8 & 9 (7 & 8 are not shown on the plan but are just to the east of the main site and is called Pallara Parkland) are open space but may have public use. Area 4 is being developed for commercial and industrial. BCC established a bus depot and other businesses are establishing. SMPs apply to these activities. The former putrescibles landfill (Area 9) has been capped and landfill gas recovery is operating (quite successfully). BCC do not intend to use this land for sporting ovals as subsidence (and reinstatement of the capping levels to minimise infiltration) would be practical issues. Area 13 (the former Tyrecycle site) is to be used for a recycling area.

An interesting feature of the Willawong remediation was the three wetlands, two of which (southern and northern) were built and the eastern wetland used a natural feature. The wetlands, combined with capping and leachate recovery, were instigated to improve the quality of runoff and groundwater, and to improve the quality of the receiving environment (chiefly Blunder Creek). Over time there has been considerable improvement in the quality of Blunder Creek, with ammonia and conductivity reducing.

Extensive monitoring has operated at Willawong for many years. An MSAccess database is held EO_Integrated Assessment\\Project Support\\Manager GOC\\Willawong Remediation\\Remediation\\Monitoring Data along with many individual monitoring round reports. Queries are set for the database to enable the extraction of specific data.

The location of current monitoring bores is attached along with creek sampling locations.

Current issues

Ongoing monitoring needs to continue. It provides a measure of the performance of the remediation works.

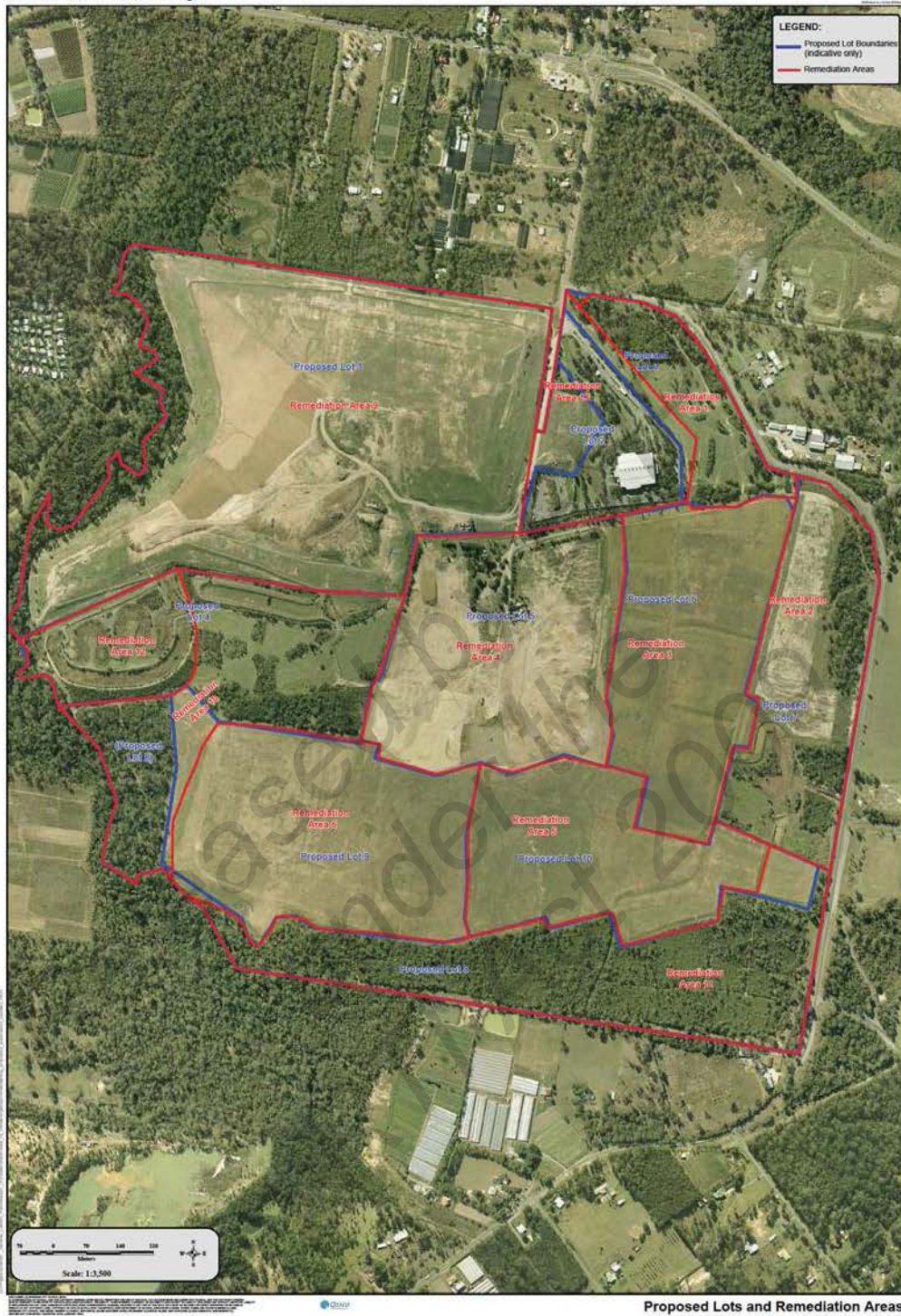
The development of area 4 has progressed to be close to the landfill. Gas issues need to be addressed and the maintenance of the substantial cap is important.

BCC is proposing to establish a “recycling store” on the opposite side of the road to the old landfill (Area 13). This use is supported, an SMP applies.

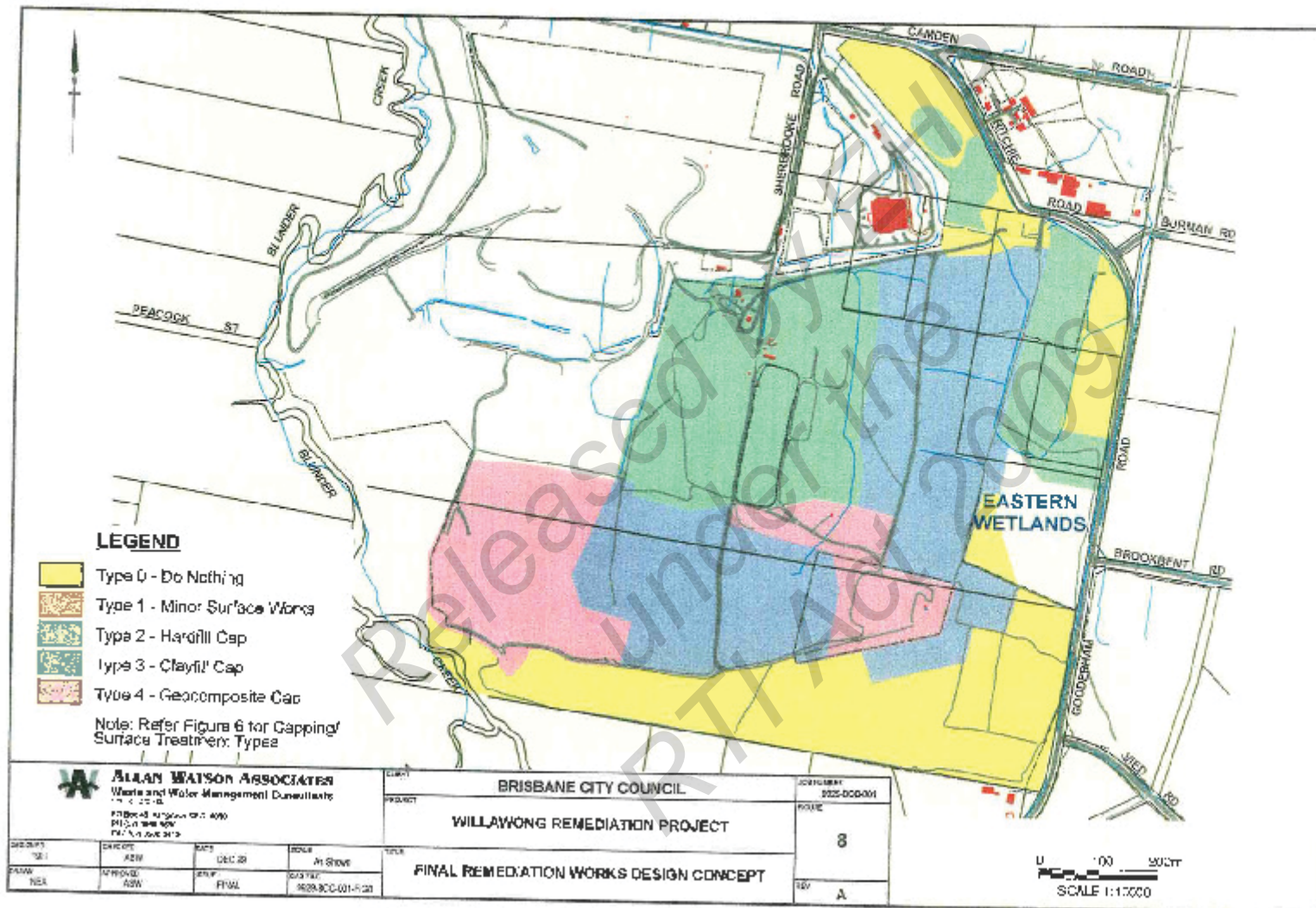
Over the years there has been a significant reduction in leachate volumes collected and pumped away. This shows the effectiveness of the capping system. A down side of this is that site managers may overlook the maintenance of such systems and regularly monitor leachate volumes. BCC has recognised this and is putting in place improved monitoring systems to ensure that pumps continue to work and volumes of pumped leachate are kept.

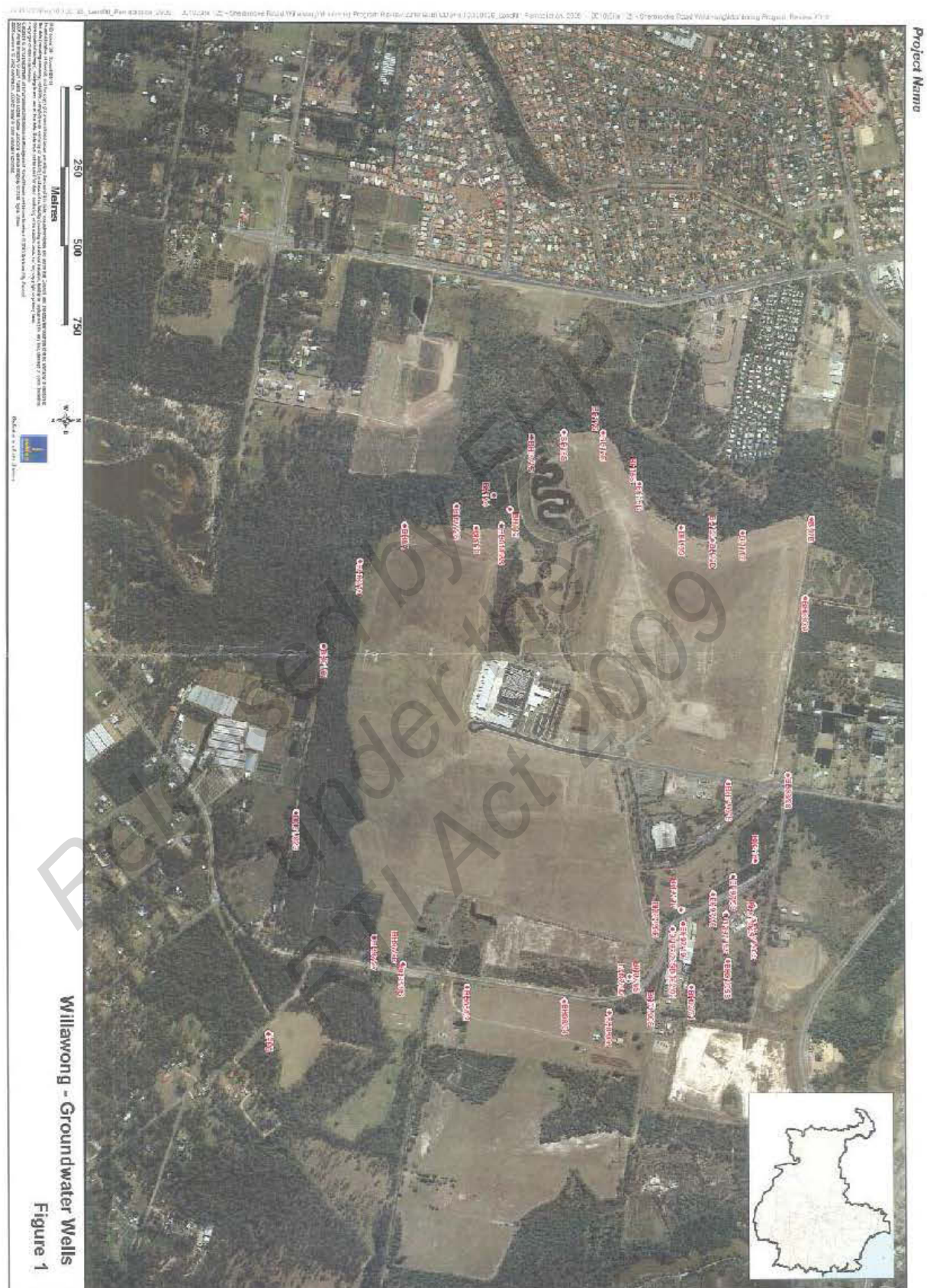
Contacts

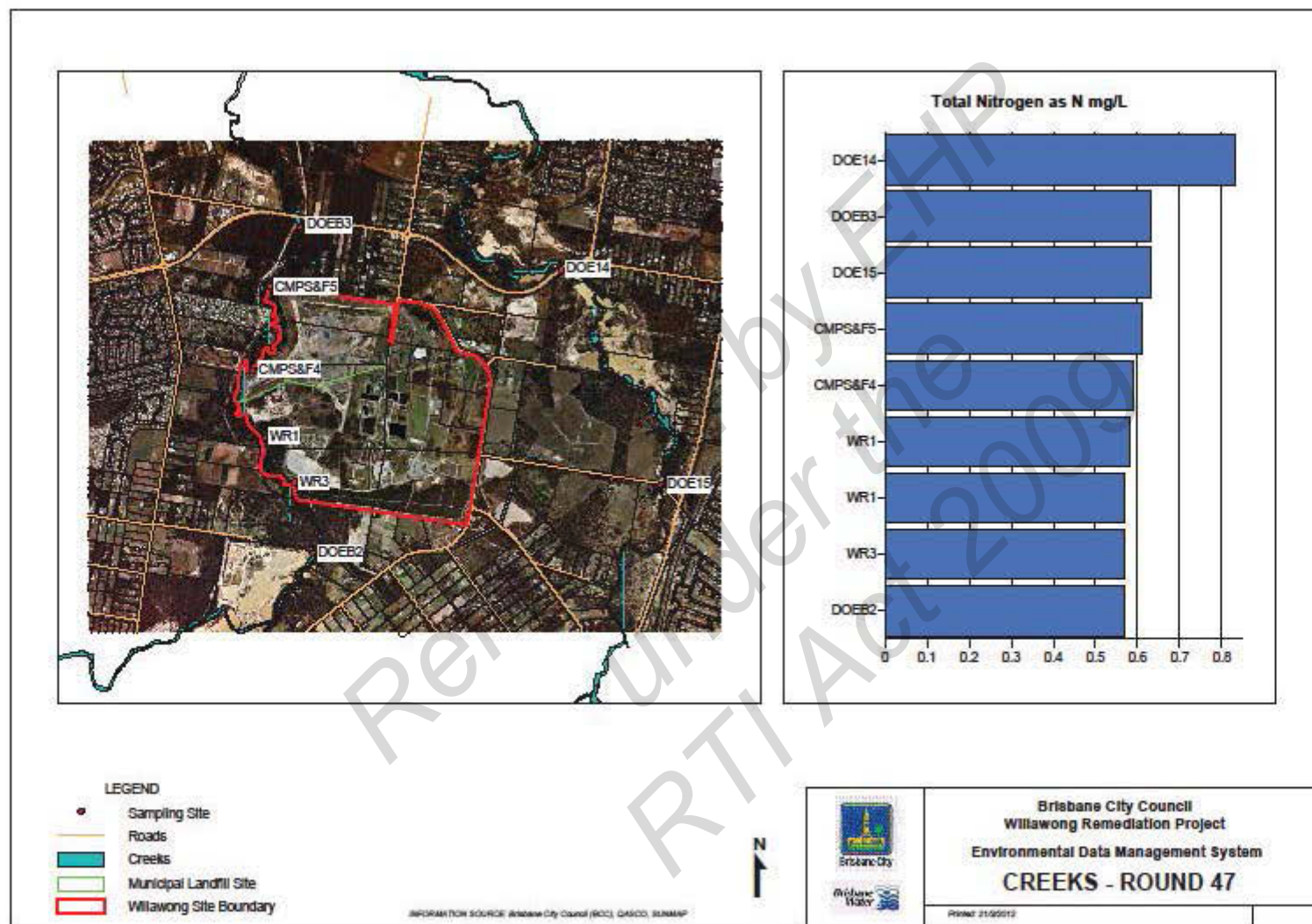
Erik Dekker BCC (07) 3027-4725 Erik.Dekker@brisbane.qld.gov.au



Proposed Lots and Remediation Areas







Remediation activities timeline

1997/1998	Willawong	Construction of South-west wetlands and sediment dam
1997/1998	Willawong	Construction of northern wetlands
2000/2001	Willawong	Area 1 remediated
2000/2001	Willawong	Area 2B remediated
2000/2001	Willawong	35% Hardfill capped
2000/2001	Willawong	Eastern wetlands constructed
2000/2001	Willawong	60% Southwest cutoff wall constructed
2000/2001	Willawong	Landfill gas well drilling commenced
2000/2001	Willawong	Leachate collection system installed
2001/2002	Willawong	Leachate collection pipe installed under Blunder Creek
2001/2002	Willawong	Lagoons filled
2001/2002	Willawong	Area 5A capped
2001/2002	Willawong	Tyrecycle capped
2001/2002	Willawong	Thiolane Stripping Plant construction
2002/2003	Willawong	Area 5B and 5C capped
2002/2003	Willawong	Area 6A and 6B capped
2002/2003	Willawong	Another 35% Hardfill capped
2002/2003	Willawong	Stormwater berms and downbatter drain installed on hardfill
2002/2003	Willawong	Landfill gas well installation completed
2003/2004	Willawong	Area 3 capping
2004/2005	Willawong	Northern Drain reconstruction
2004/2005	Willawong	Capping Area 3
2004/2005	Willawong	Capping Area 4