STRATFORDCOAL
Part of the Yancoal Australia Group






Stratford Extension Project

Environmental Impact Statement

APPENDIX B

SURFACE WATER ASSESSMENT

On Thursday 28 June 2012, Yancoal Australia Limited was listed on the Australian Stock Exchange and merged with Gloucester Coal Ltd (GCL) under a scheme of agreement on the same date. Stratford Coal Pty Ltd is now a wholly owned subsidiary of Yancoal Australia Limited. Any reference to GCL in this Appendix should be read as Yancoal Australia Limited.

HYDROLOGY AND WATER MANAGEMENT CONSULTANTS

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STRATFORD EXTENSION PROJECT

Surface Water Assessment

Prepared for: **Stratford Coal Pty Ltd**

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List of Acronyms and Abbreviations

AHD	Australian Height Datum
ARD	Acid rock drainage
ARI	Average Recurrence Interval
AWBM	Australian Water Balance Model
BoM	Bureau of Meteorology
BRNOC	Bowens Road North Open Cut
CHPP	Coal Handling and Preparation Plant
CRCCH	Cooperative Research Centre for Catchment Hydrology
DEC	Department of Environment and Conservation
DECCW	Department of Environment Climate Change and Water
DIPNR	Department of Infrastructure, Planning and Natural Resources
DP&I	Department of Planning and Infrastructure
DGRs	Director-General's Requirements
DADs	Disturbed Area Dams
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
ERA	Environmental Risk Assessment
GCL	Gloucester Coal Ltd
LWRRDC	Land and Water Resources Research and Development Council
ML	Megalitre
m	Metres
Mtpa	Million tonnes per annum
MDL	Mine Development Licence
NSW	New South Wales
NAF	Non-acid forming
OEH	Office of Environment and Heritage
PAF	Potentially acid forming
ROM	Run-of-Mine
SD	Sediment Dam
SCM	Stratford Coal Mine
SCPL	Stratford Coal Pty Ltd
t/m^3	Tonnes per cubic metre
WSP	Water Sharing Plan

B1.0 INTRODUCTION

Stratford Coal Pty Ltd (SCPL) is the owner and operator of the Stratford Coal Mine (SCM) and Bowens Road North Open Cut (BRNOC). SCPL is a wholly owned subsidiary of Gloucester Coal Ltd (GCL). The SCM and BRNOC are referred to as the Stratford Mining Complex. The Stratford Mining Complex is located approximately 10 kilometres (km) south of Gloucester and 100 km north of Newcastle in New South Wales (NSW) (Figures B-1 and B-2). Another GCL subsidiary, Duralie Coal Pty Ltd, owns and operates the Duralie Coal Mine (DCM), which is located some 20 km to the south of the Stratford Mining Complex.

The Stratford Extension Project (the Project) would be an extension of the existing/approved operations at the Stratford Mining Complex, and would involve open cut mining at a rate of up to 2.6 million tonnes per annum (Mtpa). It would also require the development of supporting infrastructure and upgrades to some existing infrastructure.

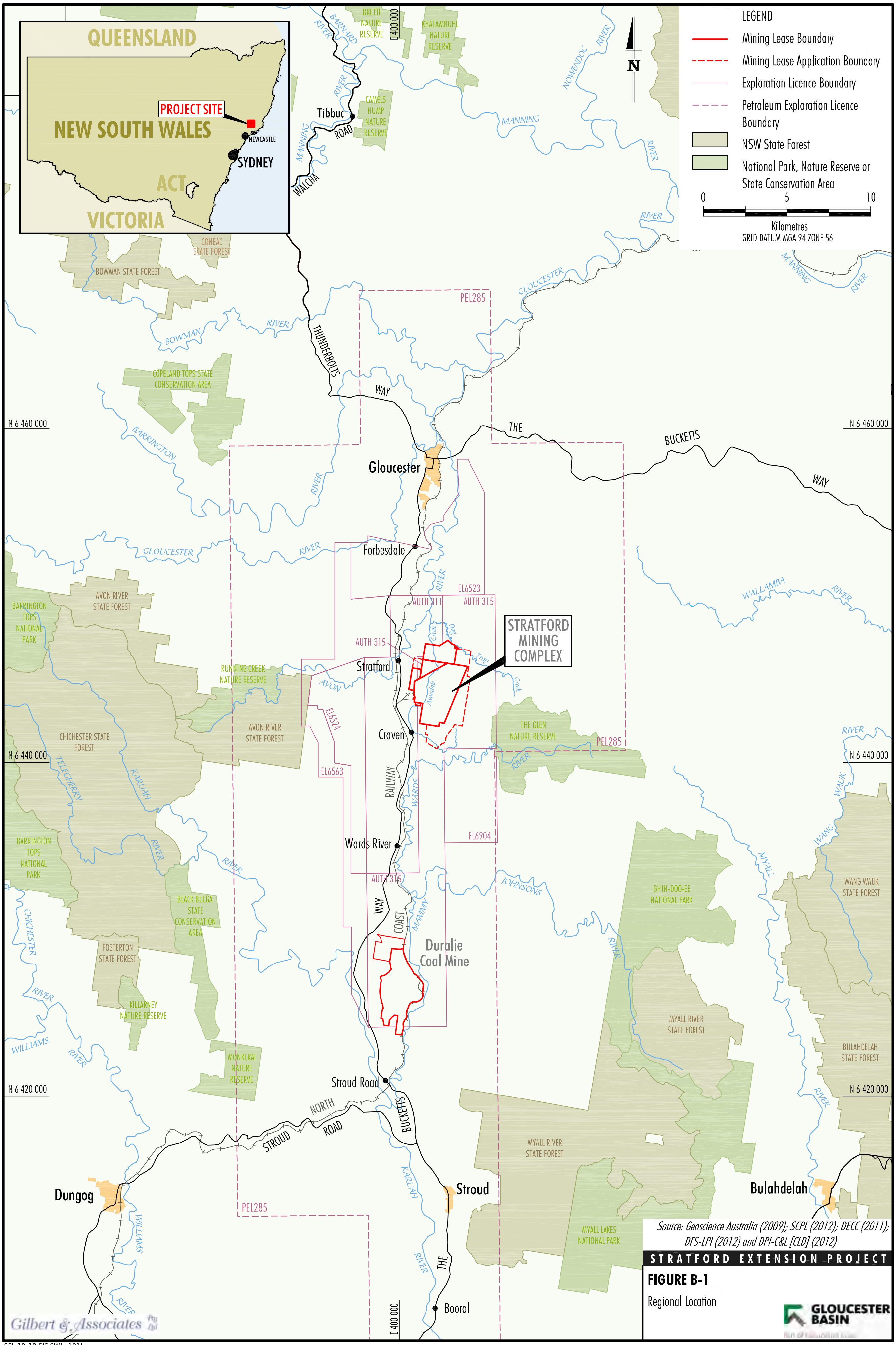
The components of the Project are described in Section 2 in the Main Report of the Environmental Impact Statement (EIS). Figure B-3 shows the 2011 layout of the Stratford Mining Complex, while Figures B-4 to B-7 show the general arrangements of the Project at the end of Years 2, 7 and 10 and at the end of the Project life, respectively.

This surface water assessment report has been compiled in support of the Project EIS and draws on the findings of other studies, including the results of groundwater modelling contained in the Groundwater Assessment report by Heritage Computing (2012) (Appendix A of the EIS), and the geochemical assessment as reported by Environmental Geochemistry International Pty Ltd (EGi) (2012) (Appendix L of the EIS).

B1.1 Study Requirements and Scope

This assessment has been prepared in accordance with the Director-General's Requirements (DGRs) for the Project (issued by the NSW Department of Planning and Infrastructure [DP&I] on 14 December 2011). In relation to surface water, the DGRs require:

> ***Water Resources** – including:*
>
> - *detailed assessment of potential impacts on the quality and quantity of existing surface and ground water resources, including:*
>
>   *…*
>
>   - *impacts on affected licensed water users and basic landholder rights; and*
>   - *impacts on riparian, ecological, geo-morphological and hydrological values of watercourses, including environmental flows;*
> - *a detailed site water balance, including a description of site water demands, water disposal methods (inclusive of volume and frequency of any water discharges), water supply infrastructure and water storage structures;*
> - *an assessment of proposed water discharge quantities and quality/ies against receiving water quality and flow objectives;*
> - *assessment of impacts of salinity from mining operations, including disposal and management of coal rejects and modified hydrogeology, a salinity budget and the evaluation of salt migration to surface and groundwater sources;*
> - *identification of any licensing requirements or other approvals under the Water Act 1912 and/or Water Management Act 2000;*



STRATFORD EXTENSION PROJECT

FIGURE B-1

Regional Location

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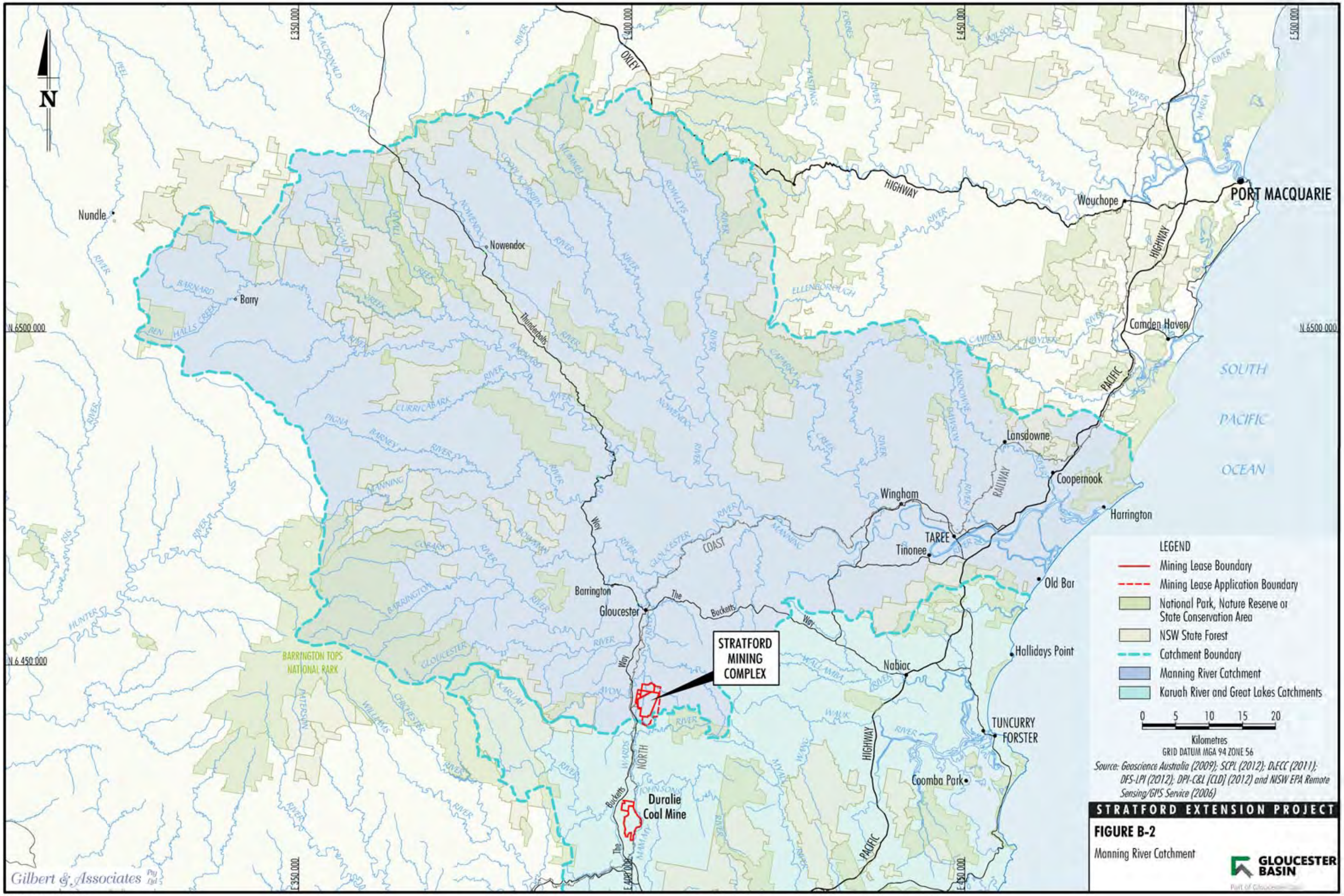


FIGURE B-2

Manning River Catchment

GCL-10-12 EIS SWA_103D

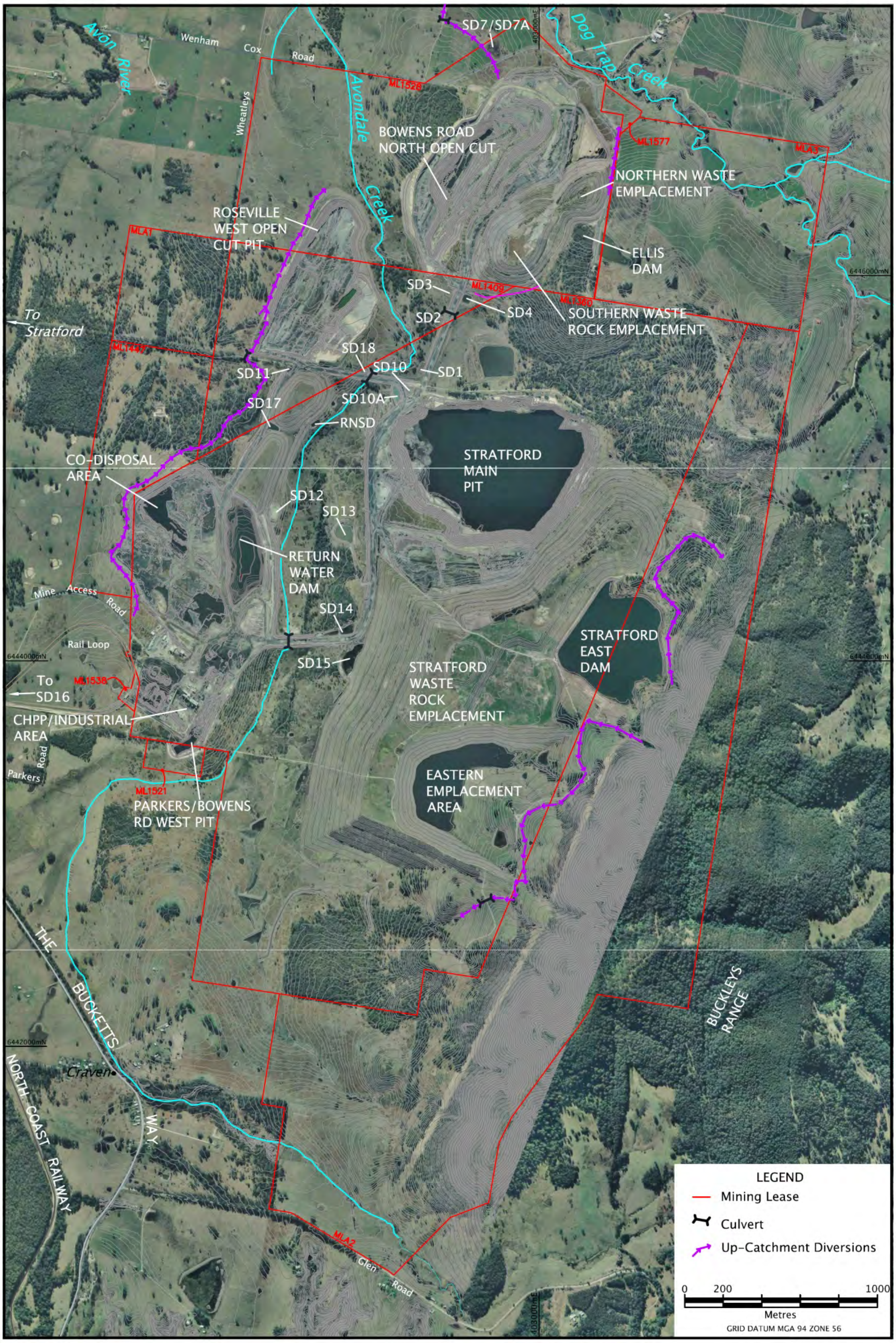


Figure B-3 Existing Site Layout

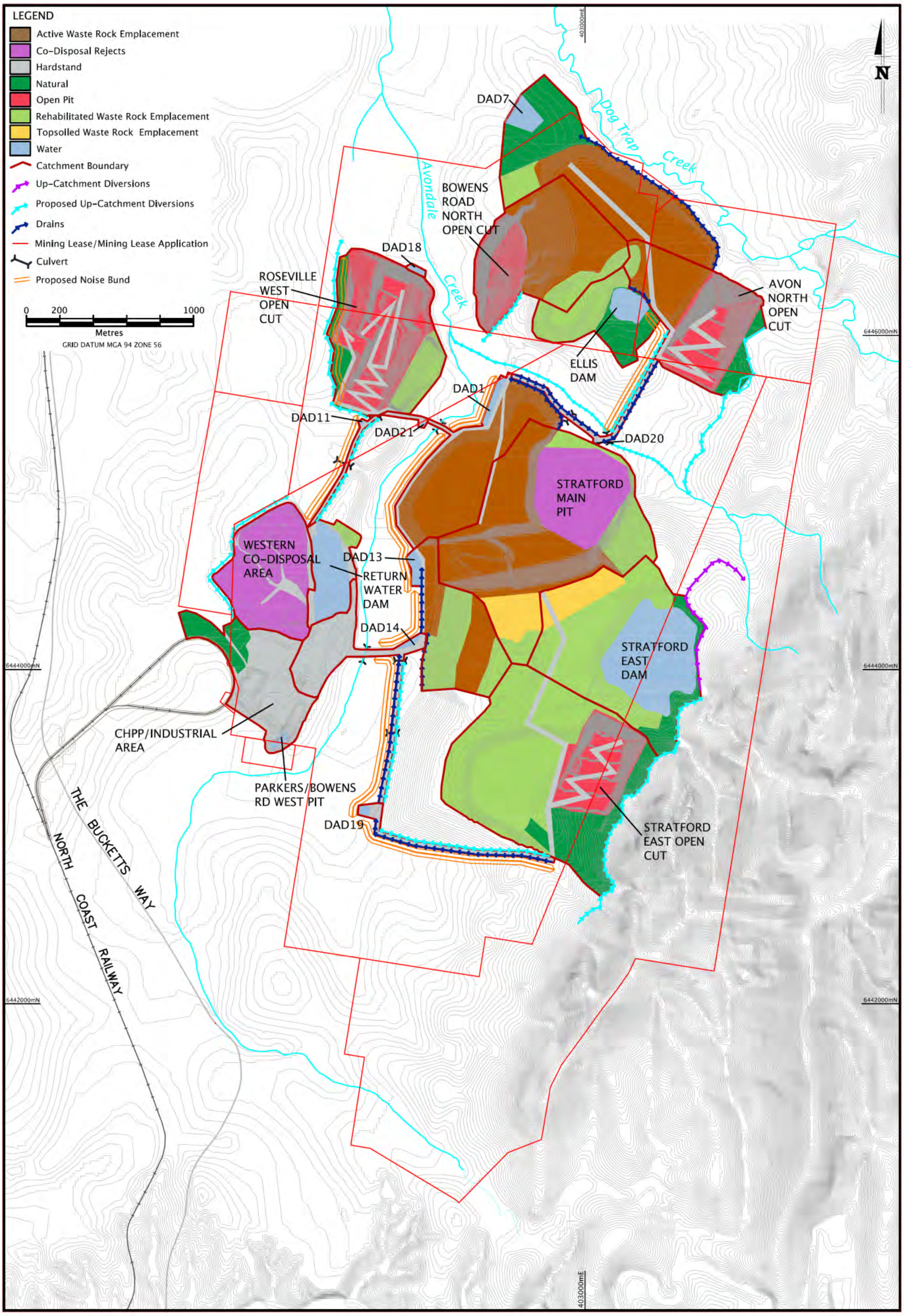


Figure B-4 Project Year 2 Indicative General Arrangement and Catchment Areas

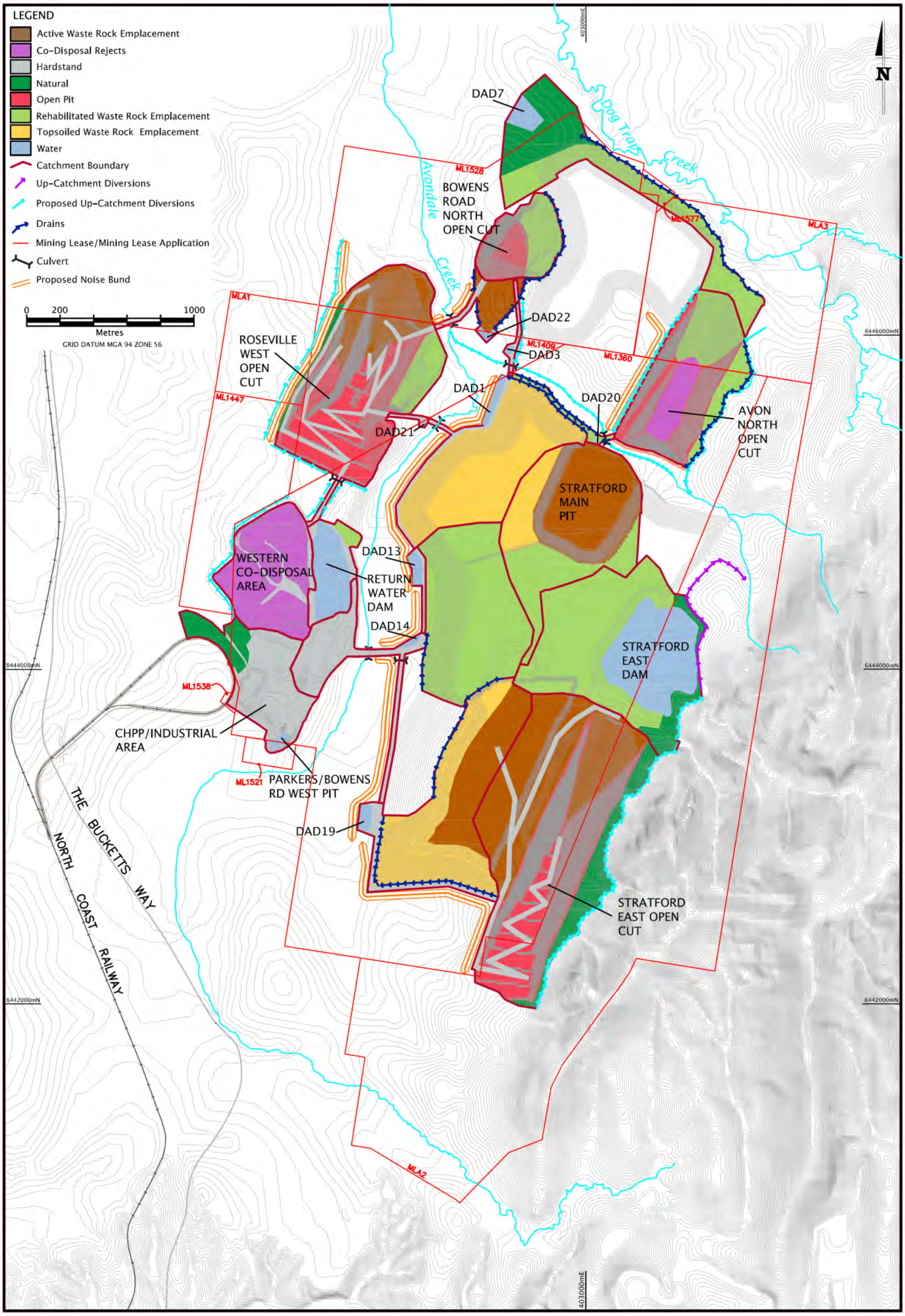


Figure B-5 Project Year 7 Indicative General Arrangement and Catchment Areas

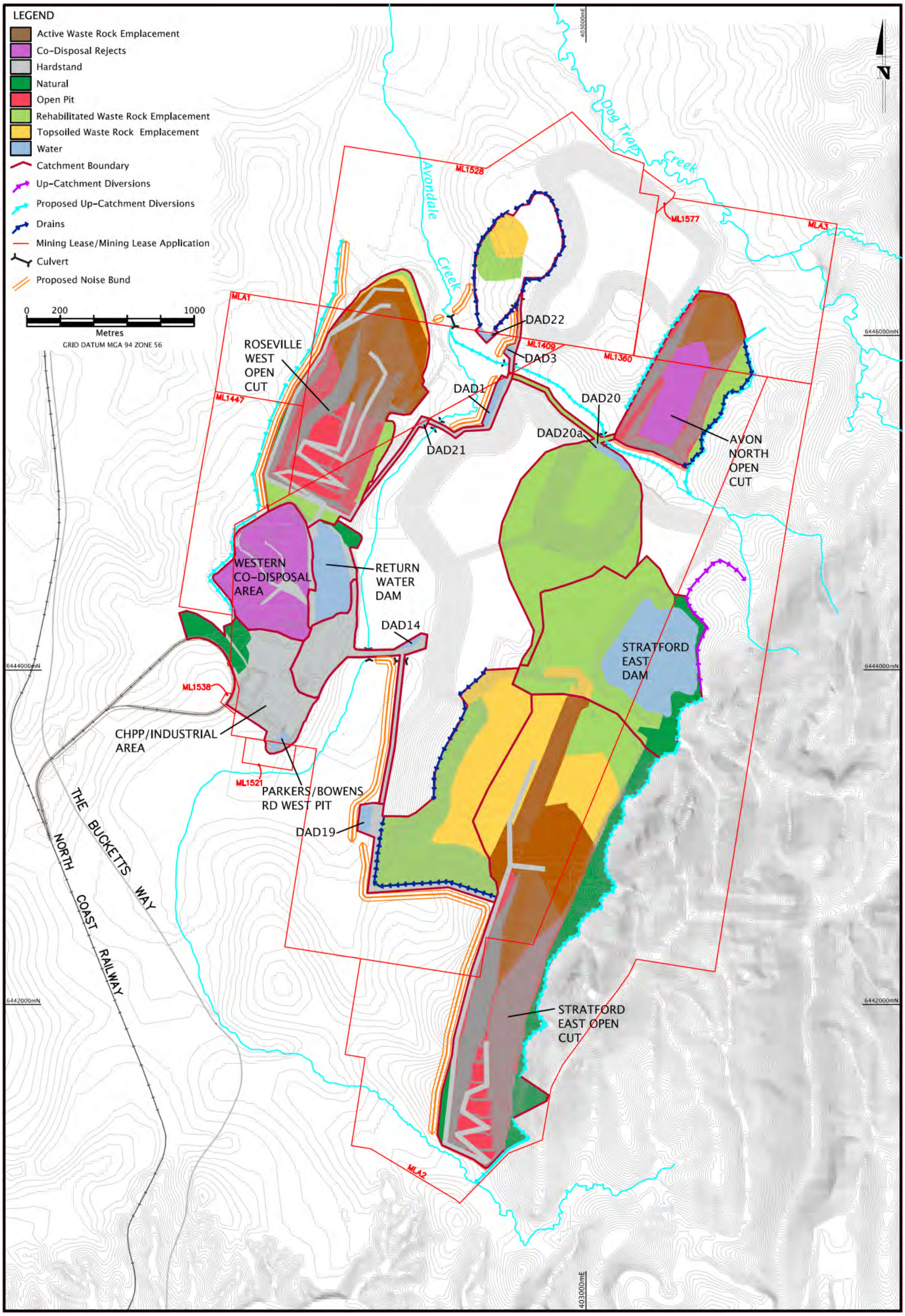


Figure B-6 Project Year 10 Indicative General Arrangement and Catchment Areas

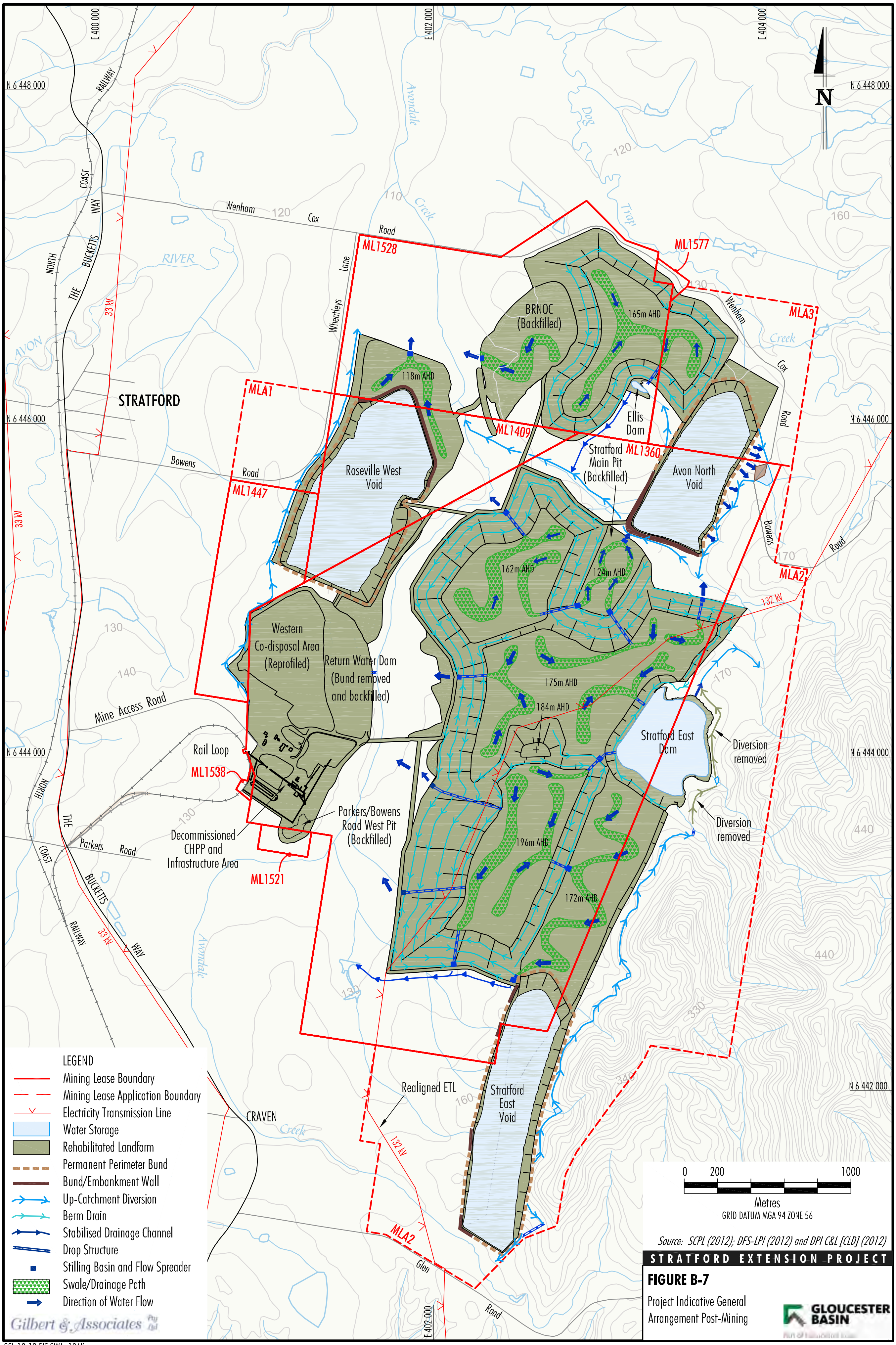


FIGURE B-7
Project Indicative General Arrangement Post-Mining

GCL-10-12 EIS SWA_106K

- *demonstration that water for the construction and operation of the development can be obtained from an appropriately authorised and reliable supply in accordance with the operating rules of any relevant Water Sharing Plan (WSP);*
- *a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant WSP or water source embargo;*
- *a detailed description of the proposed water management system (including sewage) water monitoring program and other measures to mitigate surface and groundwater impacts; and*
- *detailed flood impact assessment, which identifies impacts on local flood regimes, including:*
  - *an assessment of the potential for flooding to occur in the open-cut pits; and*
  - *any measures proposed to mitigate potential flood impacts;*

The surface water assessment has been prepared to address the DGRs and issues raised by government agencies during the consultation process and, in addition, the surface water related issues identified during the environmental risk assessment (ERA) undertaken for the Project (described further below). The guidelines used as a basis for assessing impacts in this report include:

1.	National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ) [2000a]	The surface water quality monitoring results from the existing Stratford Mining Complex and surrounding areas have been compared to these guidelines where appropriate (Section B2.5 and Attachment BA).
2.	National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ) [2000b]	The surface water quality monitoring programme developed for the Project would be conducted in accordance with these guidelines (Section B8.2).
3.	National Water Quality Management Strategy: Guidelines for Sewerage Systems – Effluent Management (ANZECC/ARMCANZ) [1997]	The existing sewerage systems at the Stratford Mining Complex (with upgrades as required) would continue to be operated in accordance with the *Environmental Guidelines: Use of Effluent by Irrigation* (DEC, 2004a) as described in Section 2 in the Main Report of the EIS.
4.	National Water Quality Management Strategy: Guidelines for Sewerage System – Use of Reclaimed Water (ANZECC/ARMCANZ) [2000c]	The existing sewerage systems at the Stratford Mining Complex (with upgrades as required) would continue to be operated in accordance with the *Environmental Guidelines: Use of Effluent by Irrigation* (DEC, 2004a) which makes reference to ANZECC/ARMCANZ (2000c).
5.	Using the ANZECC Guideline and Water Quality Objectives in NSW (DEC) [2006]	The *Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000a) have been applied in accordance with this guideline, including consideration of the NSW Government Water Quality and River Flow Objectives (NSW Office of Environment and Heritage [OEH], 2011).

6.	State Water Management Outcomes Plan	The assessment includes consideration of the policy developed under the State Water Management Outcomes Plan and the *Water Management Act, 2000*, including the *Water Sharing Plan for the Lower North Coast Unregulated and Alluvial Water Sources, 2009* (Section B2.6).
7.	Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009	The Project is located outside of the Hunter Unregulated and Alluvial Water Sources 2009 boundary. The assessment includes consideration of the *Water Sharing Plan for the Lower North Coast Unregulated and Alluvial Water Sources, 2009* (Section B2.6).
8.	NSW Government Water Quality and River Flow Objectives (OEH) [2011]	Where applicable, the Water Quality Objectives for the Avon River have been compared to surface water quality monitoring results from the existing Stratford Mining Complex and surrounding areas (Section B2.5).
9.	Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC) [2004]	The surface water quality monitoring programme developed for the Project would be conducted in accordance with these guidelines (Section B8.2).
10.	Managing Urban Stormwater: Soils & Construction (Landcom, 2004) and associated Volume 2E: Mines and Quarries (DECCW) [2008]	It is planned that disturbed area dams (DADs) be designed in accordance with Landcom (2004) to control suspended solids in runoff (Section B5.3).
11.	Managing Urban Stormwater: Treatment Techniques (EPA) [1997]	Would be considered and applied as relevant to drainage design/management around mine infrastructure area.
12.	Managing Urban Stormwater: Source Control (EPA) [1998]	Would be considered and applied as relevant to drainage design/management in mine infrastructure areas.
13.	Floodplain Development Manual (DIPNR) [2005]	Not considered relevant to this assessment as there are no properties outside those owned by the proponent that could be affected by mine infrastructure in any floodplain.
14.	Floodplain Risk Management Guideline (DECCW) [2010]	Not considered relevant to this assessment as the Project is outside areas which could be affected by current sea level rise predictions and there are no properties outside those owned by the proponent that could be affected by mine infrastructure in any floodplain.
15.	A Rehabilitation Manual for Australian Streams (LWRRDC and CRCCH) [2000]	This guideline will be considered upon approval of the Project during the design of rehabilitated watercourses.

16.	Technical Guidelines: Bunding & Spill Management	Would be used in design of containment systems for hazardous chemicals and would be incorporated into standard operating procedures for spill response.
17.	Environmental Guidelines: Use of Effluent by Irrigation	The surface water quality monitoring results from the existing Stratford Mining Complex and surrounding areas have been compared to guidelines set in ANZECC (2000a) for use of water as irrigation water where relevant (Section B2.5 and Attachment BA).
18.	Guidelines for Practical Consideration of Climate Change (DECC) [2007]	Considered in the interpretations of post-mine impacts.
19.	NSW State Rivers and Estuaries Policy (NSW Water Resources Council) [1993]	A number of institutional arrangements as well as legislation has changed since the publication of the Policy. Objectives and principles of more recent publications are considered, *albeit* generally the same.

DIPNR = NSW Department of Infrastructure, Planning and Natural Resources.

DECC = NSW Department of Environment and Climate Change.

ANZECC/ARMCANZ = Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand.

DEC = NSW Department of Environment and Conservation.

OEH = NSW Office of Environment and Heritage.

DECCW = NSW Department of Environment, Climate Change and Water.

EPA = NSW Environment Protection Authority.

The objects of the NSW *Water Management Act 2000*, which is the principal statute governing management of water resources in NSW, were also considered during the assessment of impacts. The objects of the *Water Management Act 2000* include: *" to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations and, in particular:*

- *(a) to apply the principles of ecologically sustainable development, and*
- *(b) to protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality, and*
- *(c) to recognise and foster the significant social and economic benefits to the State that result from the sustainable and efficient use of water, including:*
  - *(i) benefits to the environment, and*
  - *(ii) benefits to urban communities, agriculture, fisheries, industry and recreation, and*
  - *(iii) benefits to culture and heritage, and*
  - *(iv) benefits to the Aboriginal people in relation to their spiritual, social customary and economic use of land and water,*
- *(d) to recognise the role of the community, as a partner with government, in resolving issues relating to the management of water sources,*
- *(e) to provide for the orderly, efficient and equitable sharing of water from water sources,*
- *(f) to integrate the management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna,*
- *(g) to encourage the sharing of responsibility for the sustainable and efficient use of water between the Government and water users,*
- *(h) to encourage best practice in the management and use of water."*

Specific consideration of the objects of the *Water Management Act, 2000* are provided in Attachment 5 (Water Licensing Addendum) in the Main Report of the EIS.

As part of the assessment process an ERA was undertaken. This included a facilitated, risk based workshop involving experts across a range of disciplines, and experienced SCPL personnel. The risk assessment team included a representative of Gilbert & Associates Pty Ltd.

The workshop was conducted on 19 January 2012 and was facilitated by a risk assessment specialist (SP Solutions Pty Ltd, 2012). The objective of the assessment was to identify key potential environmental issues for further assessment in the EIS. The key potential surface water related issues identified in the ERA (Appendix R of the EIS) included:

- Long-term spill of water with elevated salinity from final voids.
- Long-term stability of upslope permanent diversions.
- Long-term stability of unnamed tributary to Avondale Creek.
- Design of post-mine landform water management to be stable in the long-term, including upslope diversions.
- Site water balance and management of surplus mine water on-site to achieve zero discharge of mine water.

B1.2 Project Overview

The SCM commenced operation in 1995 and currently produces approximately 1 Mtpa run-of-mine (ROM) coal. The existing Stratford Mining Complex involves two open cut pits – BRNOC and Roseville West Pit. Mine waste rock emplacements have been developed adjacent to both open cut pits. ROM coal is transported by haul trucks to the SCM coal handling and preparation plant (CHPP). Up to 3 Mtpa of ROM coal from the DCM is railed to the SCM and is also processed at the SCM CHPP. Coal rejects from a former rejects co-disposal area (western co-disposal area) north of the CHPP are being recovered at a rate of approximately 0.2 Mtpa and are re-processed in the CHPP. Combined coarse and fine CHPP rejects are pumped as a slurry and emplaced in the mined-out Stratford Main Pit. Water is recovered from the Stratford Main Pit for re-use in the CHPP and for other site uses. Product coal is transported from site by rail.

The proposed Project involves (refer Figures B-3 to B-7):

- Continued mining of the BRNOC and Roseville West pit with associated waste rock emplacement.
- Development of two additional pits: Avon North Open Cut and Stratford East Open Cut, with development of associated waste rock emplacements.
- Continued disposal of CHPP rejects in the Stratford Main Pit with future disposal to the Avon North Open Cut.
- Use of the BRNOC and Avon North Open Cut as water storages when mining is completed in these open cuts.

Further detail on the Project water management system is provided in Section B3.0.

B2.0 BASELINE HYDROLOGY

The Project is situated in the Gloucester Valley. The Project area drains northwards via Avondale Creek to the Avon River, a tributary of the Gloucester River which itself is a tributary of the Manning River (refer Section B2.2). Land use in the Project area comprises mainly cattle grazing, with additional uses including existing rural residential and residential development in the villages of Stratford and Craven (refer Figure B-1). Land in and surrounding the Project area has been extensively cleared for grazing, however areas of remnant bushland remain, and the Glen Nature Reserve, which bounds the eastern side of the Project area, remains substantially timbered.

The topography of the Gloucester Valley is characterised by north-south oriented linear ridges with intervening undulating lowlands and floodplains. The ridges rise up to 470 metres (m) AHD[1], are moderately to steeply sloping and remain timbered; while the undulating lowlands generally range from 50 to 150 m AHD in elevation and are characterised by gentle slopes and generally cleared land. The highest point in the headwater drainages of the Glen Nature Reserve immediately to the east of the Project is at approximately 447 m AHD, while Avondale Creek near the northern end of the Project area is at approximately 107 m AHD.

The geology of the Stroud-Gloucester area is dominated by the Permian Gloucester Basin, an elongated, north-south trending syncline comprising a 4,000 m thick sequence of Permian rocks along the central axis of the syncline (SCPL, 1994 and 2001). The Permian rocks comprise conglomerate, sandstone, mudstone and coal. The underlying Carboniferous age rock consisting of tuffs, mudstones and volcanics. The resistant volcanics form ridges on either side of the Gloucester Valley, often with precipitous faces exposing bare rock, while the Permian rocks, including coal measures, occupy the valley floor. Generally the geology of the Stratford area is characterised by strata dipping in excess of 45 degrees (^{o}) to the west, with numerous interbedded coal seams.

The various sedimentary rocks in the Project area generally have low primary or intergranular porosity and permeability (SCPL, 2001). The main aquifers in the Project area are associated with the coal seams which are intersected by faults which compartmentalise groundwater flow. The pre-mine groundwater table approached the ground surface near Avondale Creek near the northern boundary of the Project area. Groundwater in the Project area is generally saline, highly mineralised and hard, with slightly alkaline to acidic pH, is unsuitable for human consumption and, in some cases, unsuitable for livestock.

B2.1 Climate

The Project area experiences a temperate climate which is influenced locally by orographic effects of the local terrain and distance from the coast.

Regional climate monitoring stations in the vicinity of the Project have varying periods of records (Table B-1). The Craven (Longview), Gloucester (Hiawatha) and Gloucester and Stroud Post Office (PO) stations are the closest Bureau of Meteorology (BoM) stations with long-term records without significant gaps in the data record.

[1] Australian Height Datum which approximates mean sea level.

Table B-1
Summary of Regional Rainfall Monitoring Stations

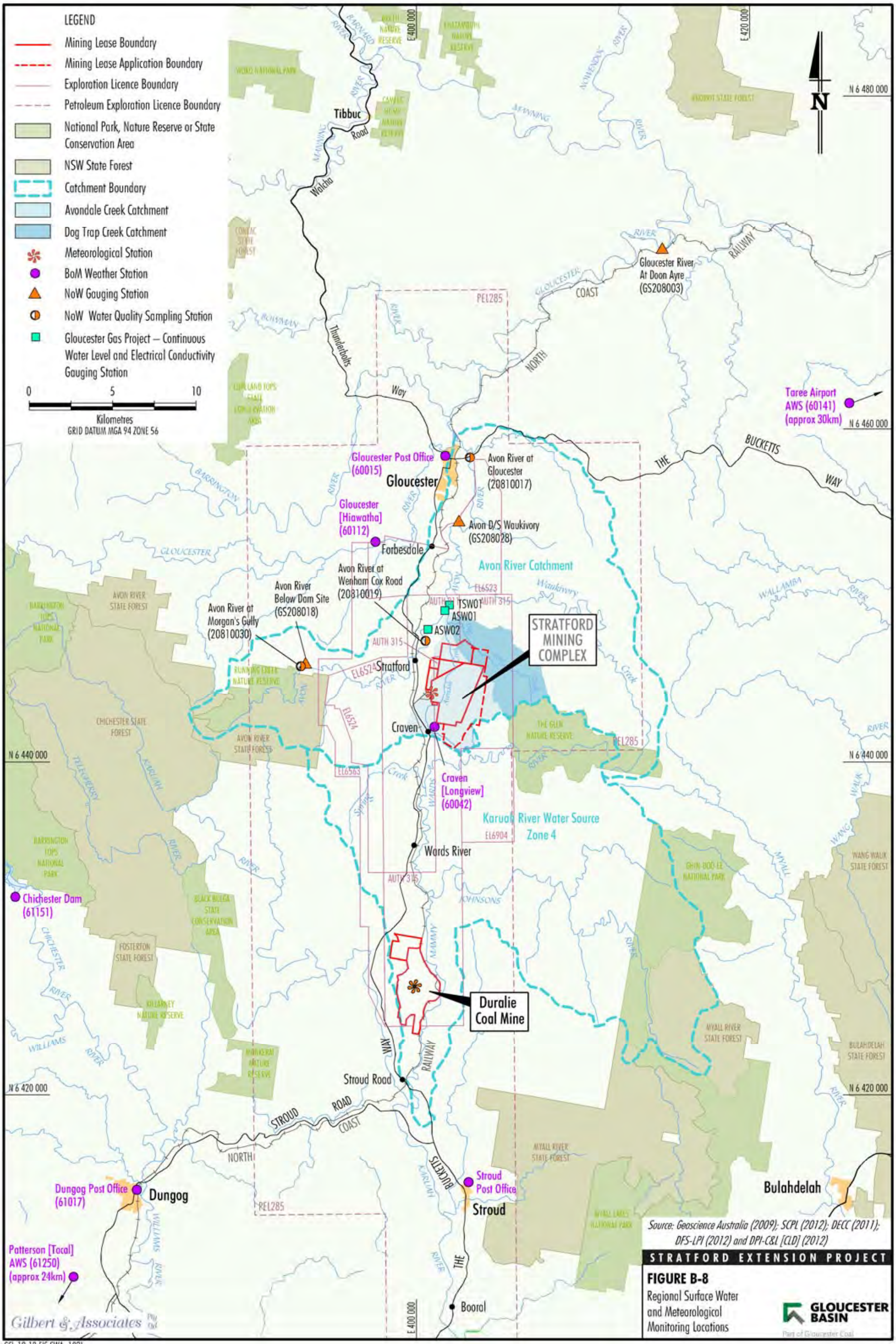
Station Number	Station Name	Location*		Distance from Stratford Mining Complex (km)	Elevation (m AHD)	Period of Record
		Longitude	Latitude			
060042	Craven (Longview)	32.15	151.95	1.6	130	1961 - present
060112	Gloucester (Hiawatha)	32.05	151.91	10	125	1976 - present
060015	Gloucester PO	32.01	151.96	14	105	1888 - present
061071	Stroud PO	32.40	151.97	30	44	1889 - present

* Refer to Figure B-8 for location. Latitude and longitude in decimal degrees
Source: BoM (2011).

Meteorological conditions have also been monitored at the SCM weather station since 1996. Data is also available from the DCM weather station which has operated for a similar period. Monthly average rainfalls for the BoM stations and the SCM weather station are summarised in Table B-2. Also shown in Table B-2 are monthly averages sourced from the Data Drill system[2] for a location close to the Stratford Mining Complex (refer Table B-2). A comparison of monthly averages from the SCM weather station and the Data Drill indicates that rainfall experienced at the Stratford Mining Complex since 1996 has been below the long-term average in all months except November. A comparison of monthly average rainfall totals from the Data Drill and Craven (Longview) indicates that the data are similar.

The data in Table B-2 also indicate a spatial increase in average rainfall from north (i.e. Gloucester PO) to south (Stroud PO). Figure B-9 shows isohyetal (average annual rainfall) contours for the Project area, which also indicates increasing average rainfall to the south of Gloucester, and with increasing elevation to the east and west of the Stratford Mining Complex.

[2] The Data Drill is a system which provides synthetic data sets for a specified point by interpolation between surrounding point records held by the BoM. It is based on Jeffrey *et al*. (2001).



LEGEND
Mining Lease Boundary
Mining Lease Application Boundary
Exploration Licence Boundary
Petroleum Exploration Licence Boundary
National Park, Nature Reserve or State Conservation Area
NSW State Forest
Catchment Boundary
Avondale Creek Catchment
Dog Trap Creek Catchment
Meteorological Station
BoM Weather Station
NoW Gauging Station
NoW Water Quality Sampling Station
Gloucester Gas Project – Continuous Water Level and Electrical Conductivity Gauging Station
0 5 10
Kilometres
GRID DATUM MGA 94 ZONE 56
Tibbuc
Gloucester River At Doon Ayre (GS208003)
Taree Airport AWS (60141) (approx 30km)
Gloucester Post Office (60015)
Gloucester
Avon River at Gloucester (20810017)
Gloucester [Hiawatha] (60112)
Avon D/S Waukivory (GS208028)
Forbesdale
Avon River Catchment
Avon River at Wenham Cox Road (20810019)
Avon River Below Dam Site (GS208018)
Avon River at Morgan's Gully (20810030)
TSW01
ASW01
ASW02
STRATFORD MINING COMPLEX
Stratford
Craven
Craven [Longview] (60042)
Karuah River Water Source Zone 4
Wards River
Chichester Dam (61151)
Duralie Coal Mine
Stroud Road
Dungog Post Office (61017)
Dungog
Stroud Post Office
Stroud
Bulahdelah
Booral
Patterson [Tocal] AWS (61250) (approx 24km)
PEL285
EL6523
EL6524
EL6563
EL6904
AUTH 315
N 6 480 000
N 6 460 000
N 6 440 000
N 6 420 000
E 400 000
E 420 000
Source: Geoscience Australia (2009); SCPL (2012); DECC (2011); DFS-LPI (2012) and DPI-C&L [CLD] (2012)
STRATFORD EXTENSION PROJECT
FIGURE B-8
Regional Surface Water and Meteorological Monitoring Locations
GLOUCESTER BASIN
Gilbert & Associates
GCL-10-12 EIS SWA_102L

Table B-2
Summary of Mean Rainfall Statistics

Station Name	SCM Weather Station		Data Drill[2]		Craven (Longview)		Gloucester (Hiawatha)		Gloucester PO		Stroud PO	
No. Yrs of Data	16[1]		123		51		36		124		123	
BoM Station No:	N/A		N/A		060042		060112		060015		061071	
	Rainfall (mm)	No. of Rain Days	Rainfall (mm)[3]	No. of Rain Days[3]	Rainfall (mm)[2]	No. of Rain Days[3]	Rainfall (mm)[3]	No. of Rain Days[3]	Rainfall (mm)[3]	No. of Rain Days[3]	Rainfall (mm)[3]	No. of Rain Days[3]
January	99.6	11.3	121.6	15.0	125.3	12.2	113.3	12.1	114.8	9.8	115.4	9.6
February	111.1	11.9	129.3	14.4	136.8	12.4	131.7	12.2	121.7	9.5	124.5	9.6
March	107.9	13.4	134.6	16.3	133.9	13.7	124.1	12.8	127.9	10.5	144.6	10.5
April	71.1	13.7	88.3	13.9	85.2	11.8	83.8	10.1	77.3	8.3	101.6	9.3
May	72.1	15.7	78.1	13.8	88.3	12.0	81.4	10.7	68.6	8.0	92.5	9.5
June	79.2	15.7	79.9	12.7	79.2	12.0	60.4	9.1	68.4	7.4	100.5	9.2
July	51.0	14.8	58.9	12.1	40.3	8.7	39.9	8.4	51.4	6.7	75.7	8.7
August	36.6	10.5	53.1	11.9	44.3	8.1	36.1	7.0	46.6	6.5	65	8.1
September	42.8	9.1	55.9	11.3	47.4	8.3	44.5	7.5	51.2	6.5	63.6	7.4
October	70.6	9.9	73.9	13.0	79.3	10.4	68.5	9.3	69.2	7.8	78.8	8.4
November	106.1	11.1	85.6	13.7	91.8	11.5	102.4	11.7	83.9	8.8	83.5	8.8
December	78.7	11.3	108.1	14.4	98.5	11.4	101.7	11.1	104.4	9.3	102.9	9
Annual Average	924 [927]	148	1067 [1067]	162	1057 [1050]	132	1021 [988]	121	983 [985]	99	1144 [1149]	108

[1] Missing SCM data 12/3/01 to 31/12/01, 17/1/08 to13/2/08, 7/11/05 to 30/11/05, 10/2/05 to 25/3/05, 5/10/02 to 23/10/02 and 21/8/07 to 28/8/07
[2] Data Drill location 32.15°S, 151.95° E
[3] Anomalous BOM Data (i.e. data denoted by BoM as suspect), which could lead to incorrect long-term averages was removed and not included in the data set.
mm = millimetres.
[ ] - Sum of average monthly records

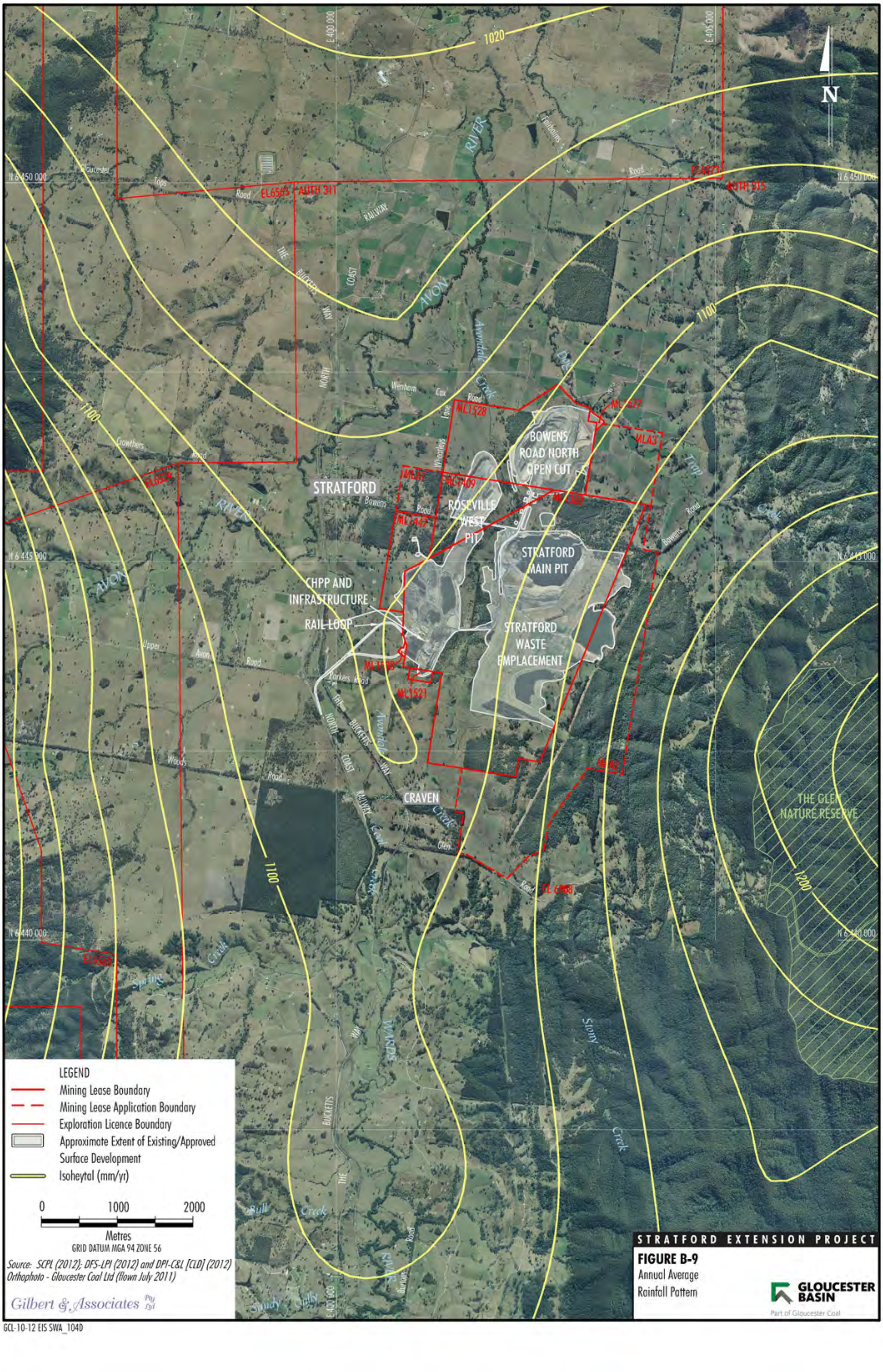


FIGURE B-9
Annual Average Rainfall Pattern

GCL-10-12 EIS SWA_104D

Figure B-10 shows a plot of monthly average rainfall totals for the Data Drill near the Stratford Mining Complex (which is representative of the long-term average for the Project area), compared with long-term averages for Gloucester PO and for two BoM stations with long-term records (more than 100 years) located further inland and south in the Hunter Valley. Figure B-10 shows significantly higher rainfall on average in the Gloucester Valley in spring and summer months when compared with Hunter Valley monitoring locations. In addition the higher average annual rainfall at the Stratford Mining Complex compared with Gloucester (indicated in Figure B-9) appears to be spread throughout the year.

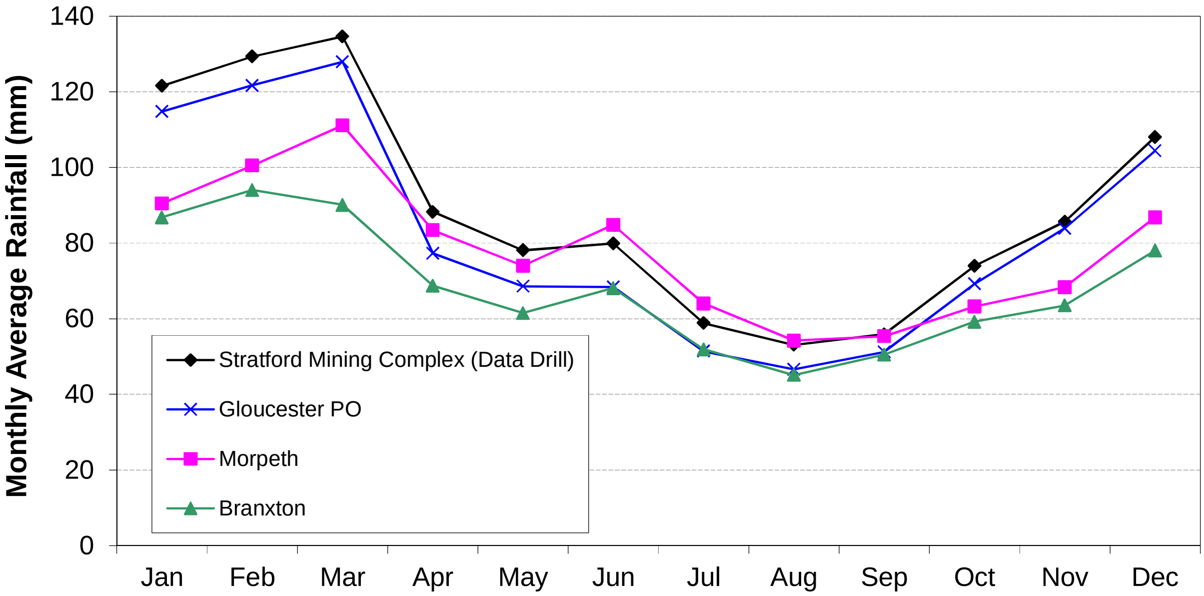


Figure B-10 Monthly Average Rainfall Totals

The nearest available BoM stations with pan evaporation records are located at Chichester Dam (BoM site 061151 – data available from 1974) located 28 km west of the Stratford Mining Complex; Paterson (Tocal) (BoM site 061250 – data available from 1967) located 64 km south-west of the Stratford Mining Complex and Taree Airport (BoM site 060141 – data available from 1999) located 59km north-east of the Stratford Mining Complex.

A summary of monthly average measured class-A pan evaporation for the above BoM stations (for the full period of available data for each station), and Data Drill estimated pan evaporation, are presented in Table B-3. It is noteworthy that although the Chichester Dam station is closest to the Stratford Mining Complex at a similar elevation, the data contains significant gaps (data available for only 68 percent [%] of the period of record). The Paterson (Tocal) and Taree Airport stations are located near sea level, and the latter is much closer to the coast than the Stratford Mining Complex.

Table B-3
Summary of Average Evaporation (mm)

Month	Data Drill[1]	Paterson (Tocal) (Station No. 061250)[2]	Chichester Dam (Station No. 061151)[2]	Taree Airport (Station No. 060141)[2]
January	171.5	192.2	139.5	201.5
February	135.2	149.7	110.2	155.4
March	120.7	130.2	93.0	148.8
April	88.3	99.0	69.0	105.0
May	64.5	74.4	46.5	83.7
June	54.0	63.0	33.0	66.0
July	62.0	74.4	40.3	74.4
August	87.4	105.4	58.9	99.2
September	115.4	132.0	87.0	138.0
October	142.0	161.2	108.5	158.1
November	152.0	174.0	123.0	162.0
December	180.0	210.8	151.9	201.5
Annual Average	1,374 [1,373]	1,571 [1,566]	1,059 [1,061]	1,607 [1,593]

[1] Data Drill location 32.15°S, 151.95° E
[2] Source: BoM (2011)
[ ] - Sum of average monthly records

In addition to the above pan data, open water evaporation for the Stratford Mining Complex was calculated from the on-site weather station data using the Penman (1956) equation. Figure B-11 shows a plot of concurrent monthly pan evaporation data from the Data Drill and open water evaporation calculated using daily data recorded by the SCM weather station (supplemented by the DCM weather station where data gaps occurred in the SCM weather station record).

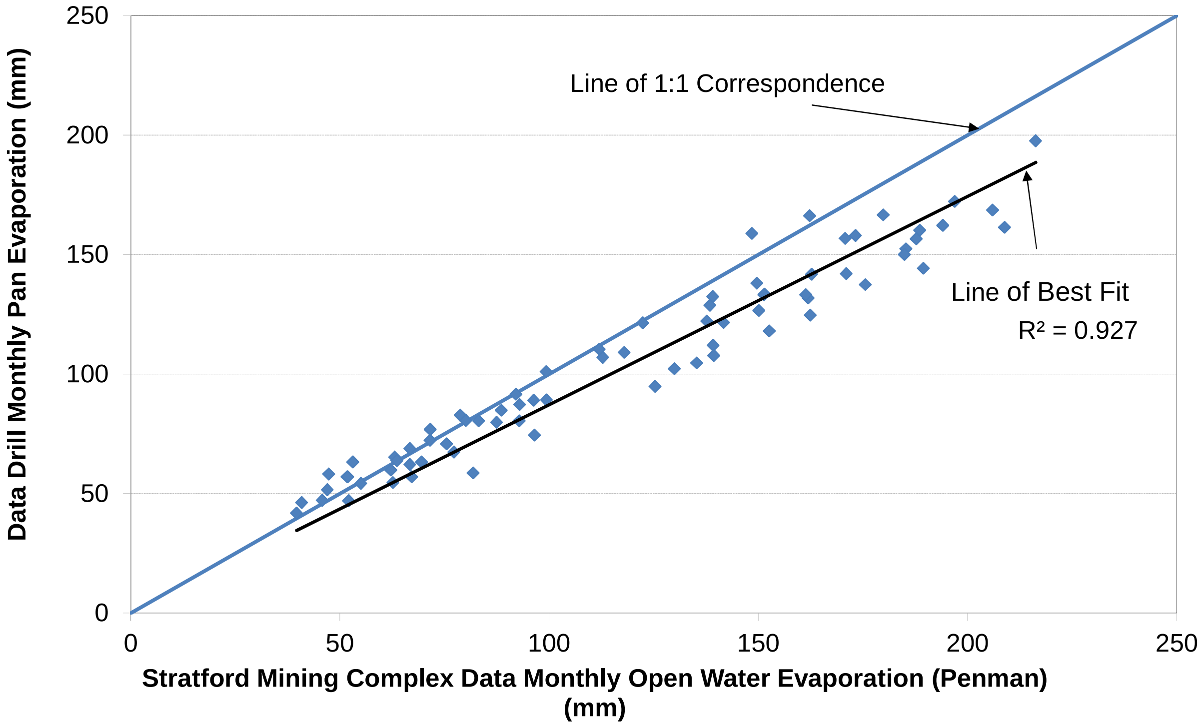


Figure B-11 Monthly Evaporation Comparison

From Figure B-11 it may be seen that there is a good correlation between evaporation calculated at the SCM weather station and pan evaporation from the Data Drill. Typically on average open water evaporation is less than pan evaporation, however Figure B-11 indicates that calculated open water evaporation at the SCM weather station is slightly higher than Data Drill estimates. Therefore the use of Data Drill pan evaporation data (refer Section B4.1.2) is likely to slightly under-estimate evaporation at the Stratford Mining Complex. In the context of a site with a surplus water balance (such as the Stratford Mining Complex), this is considered to be a conservative assumption (i.e. it will tend to slightly over-estimate the site water balance).

B2.2 Catchments and Surface Water Resources

B2.2.1 General

The Project is situated in the Avon River sub-catchment of the Manning River catchment. The Avon River drains to the Gloucester River, which rises in the Barrington Tops State Forest near Mount McKenzie, and is itself a tributary of the Manning River. The Manning River drains to the South Pacific Ocean near Harrington 76 km north-east of the Stratford Mining Complex (Figure B-2). The Avon River rises in the Avon River State Forest and flows east past the township of Stratford and then north to join the Gloucester River near Gloucester. The Avon River downstream of Stratford and north of the Project area flows through an undulating landscape which has been extensively cleared for cattle grazing.

The Stratford Mining Complex is situated within the catchments of Avondale Creek and Dog Trap Creek (refer Figure B-8 and B-9). Avondale Creek has its headwaters in the timbered foothills to the south-east of the Project area and flows west and then northwards through the Stratford Mining Complex.

Dog Trap Creek also has its headwaters in the foothills east of the Stratford Mining Complex and flows north-westwards passing north of the existing BRNOC. Avondale Creek joins Dog Trap Creek to the north of the Project area in an area known as Avondale Swamp, and Dog Trap Creek then flows into the Avon River approximately 1 km further north. Avondale Creek in the Project area is a broadly meandering, swampy and in places a poorly defined stream. Between the Project area and Wenham Cox Road, channel excavation appears to have been undertaken at some time prior to commencement of the SCM that has concentrated what historically would probably have been a relatively broad swamp drainage. Dog Trap Creek (upstream of the Avondale Creek confluence) by contrast comprises a much more tightly meandering, well defined, incised channel (refer Plates B-1 to B-3).

According to the Strahler classification system, in the vicinity of the Stratford Mining Complex, Avondale Creek is a second order stream above the confluence with a tributary, hereinafter referred to as the “tributary of Avondale Creek”, that flows between the BRNOC and the Stratford Main Pit. Avondale Creek is a third order stream downstream of the confluence.

Dog Trap Creek in the vicinity of the Stratford Mine Complex is a second and third order stream according to the Strahler classification system.

Plate B-1 Avondale Creek East of Roseville West Pit

Plate B-2 Avondale Creek North of Roseville West Pit in Area of Channel Excavation

Plate B-3 Dog Trap Creek North of Proposed Avon North Open Cut

A number of unnamed ephemeral drainage lines emanate from the hills to the east of the Stratford Mining Complex, and drain westwards towards Avondale Creek. These drainages, which are well defined in the steeper terrain of the hills, become ill-defined in the flatter areas near Avondale Creek south of the Stratford Mining Complex. East of the Stratford Mining Complex, a number of these drainages have been diverted (refer Figure B-3), with diversions ultimately reporting back into Avondale Creek. These diversions are discussed in more detail in Section B3.1. The largest of these drainages is the tributary of Avondale Creek located north of the Stratford East Dam and passes between the Stratford Main Pit and BRNOC (refer Figure B-3) – hereinafter this is referred to as the "tributary of Avondale Creek". This tributary is a third order stream according to the Strahler classification system.

The catchment divide between Avondale Creek and the Avon River exists just west of the existing Roseville West Pit. Up-catchment runoff from the area between the catchment divide and the Roseville West Pit has been diverted northwards and back into Avondale Creek further north (refer Figure B-3). Likewise drainage from upslope (west) of the western co-disposal area and CHPP is diverted south and back into Avondale Creek south of the CHPP.

A summary of the catchments within the Project area and surrounds is provided in Table B-4.

Table B-4
Catchment Area Summary

Sub-Catchment	Total Catchment Area (km^2)	Maximum % of Total Catchment Excised by Existing/Approved Stratford Mining Complex
Avondale Creek (upstream of confluence with Dog Trap Creek)	23	27%
Dog Trap Creek (upstream of confluence with Avondale Creek)	17	0.9%
Dog Trap Creek to confluence with Avon River	40	16%
Avon River (upstream of confluence with Oaky Creek)	117	5.5%
Avon River (upstream of confluence with Gloucester River)	292	2.2%

km^2 = square kilometres

B2.2.2 Baseline Geomorphology of Tributary of Avondale Creek

Fluvial Systems Pty Ltd (2012) were engaged to undertake a fluvial geomorphological assessment for the Project. Their report is included as Attachment BB. Fluvial Systems Pty Ltd concluded that the changes in drainage configurations associated with the Project would have negligible effect on the fluvial geomorphology of Avondale Creek and Dog Trap Creek. The focus of the assessment was on the unnamed tributary of Avondale Creek which flows between the Stratford Main Pit and the BRNOC on the basis that changes to this tributary (as outlined in Section B3.2.7) could risk undesirable geomorphological change to this tributary.

The stream bed and bank characteristics of the tributary of Avondale Creek were logged during a field survey which occurred as part of a study undertaken in 1997 (Gilbert and Sutherland, 1997). Figure B-11A shows the location of field survey points which were noted as “transition points” where channel characteristics were noted to change; while “channel segments” (in between transition points) comprised reaches with similar characteristics. The following summary is taken from Gilbert and Sutherland (1997).

The tributary consists of three main sections defined mainly by topography. The upper reaches of the channel (from Point A down to Point O) were relatively steep and exhibited well defined flow paths, with a few flatter areas where low to medium flows would tend to spread. Active erosional features occured along the majority of the reach, with channel cross-sections exhibiting vertical sides and undercutting. Eroded sections of the channel increased in frequency and extent moving downstream from initially intermittent eroded sections of approximately 300 mm depth in Segment C to D, to a maximum gully depth of approximately 1.5 m to 2.0 m at Segment I to J.

Between Point O and Point P the tributary underwent a transition from a single line of flow into an area which appeared to exhibit sheet flow across a wide area. No single defined channel was evident. At Point P the single drainage line upstream ended. Downstream of Point P flow appeared to slow, divide and spread out to enter two other drainage lines, one to the north (Creek 1a) and one to the south (Creek 1b) of the original. Between Point P and Segment R to S, the topography of the area was more “low lying” with flow paths not well defined and evidence of the flow splitting into two main directions. The area within this section of creek line consists of generally flat to slightly undulating terrain, with swampy depressions and slightly raised drier areas.

Downstream of Point R, the drainage path was again very flat, however a single significant drainage gully had formed (possibly originally man-made for the purpose of paddock drainage) along the drainage line and all flow from the two drainage lines entering this creek concentrated within this gully. The gully extended from Point R to Point T, with point R representing the main confluence point between Creek 1a and the eroded gully, and Point S the main confluence between Creek 1b and eroded gully. During periods of higher flow, it is likely that flow within Creeks 1a and 1b would exceed the capacity of the two low flow channels and combine within the low lying area between the creeks. Under these conditions, flow would occur as overland flow into the section of Creek 2 between Points R and S. Downstream of Point T, gullying due to erosion became more sporadic with sections of deep cutting interspersed with areas of no gullying, until the flow path met Avondale Creek in a wide, low-lying and swampy area downstream of Point U.

It is important to note that earthworks and diversion construction activities which have occurred in the time since the 1997 field survey are likely to have altered the geomorphology of the tributary. These activities include construction of a sediment dam and diversion bund (as indicated on Figure B-11A) and diversion of other headwater tributaries into the head of this tributary (refer Section B3.1).

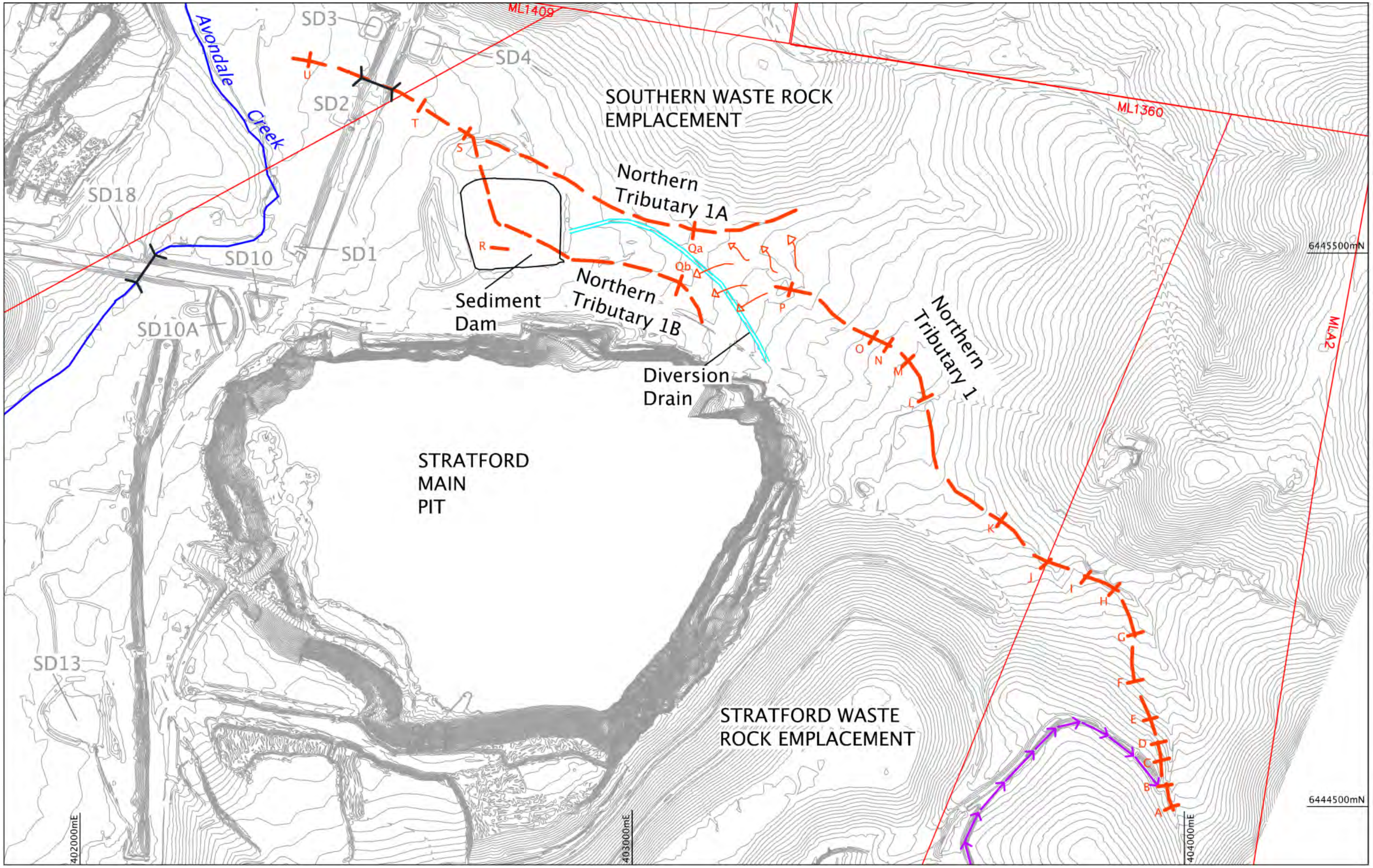


Figure B-11A Baseline Characterisation of Tributary of Avondale Creek

Fluvial Systems Pty Ltd conducted a field inspection of the same tributary in February 2012 to assess its then condition and to compare that with condition of the tributary as reported by Gilbert and Sutherland (1997). In summary (Fluvial Systems Pty Ltd, 2012) found the following:

- Actively headward cutting knickpoints were noted in the upper reaches of the tributary (below the diversion outlet). The fluvial geomorphological type of this section of the Tributary was classified as “Headwater Discontinuous Incision”.
- The poorly defined channel morphology present in the lower gradient areas further downstream appeared consistent and unchanged from conditions described by Gilbert and Sutherland (1997).
- An interception bund, sediment dam and associated vehicle access track constructed after the 1997 survey appeared to have resulted in some concentration of flows in the access track wheel ruts and some erosion of the bund which was “inconsequential in terms of channel stability.”
- The most downstream section of the tributary, between the Avondale Creek confluence and the culverts beneath the haul road crossing, was “very well vegetated and stable.” The geomorphic type of these lower reaches was defined as “Swampy Meadow, Discontinuous Channel.”
- The “Headwater Discontinuous Incision” stream type has a medium fragility but a degree of resilience.
- The “Swampy Meadow, Discontinuous Channel” type had medium fragility in the upper section where it had been disturbed and a low fragility lower section near the Avondale Creek confluence.

B2.3 Runoff and Streamflow

The nearest NSW Office of Water (NOW) gauging station to the Project area is located on the Avon River downstream of the Waukivory Creek confluence (refer Figure B-8) – GS208028 which has operated since 2004. A second gauging station further upstream on the Avon River (Below Dam Site) – GS208018 operated from 1971 to 1985. The river catchment area at the two gauging station sites is estimated at 225 km^2 and 26 km^2 respectively. The nearest gauging station on the Gloucester River downstream of the Project area is GS208003 (Doon Ayre) with a catchment area of 1,610 km^2 and which has been in operation since 1945.

Figures B-12 and B-13 show the recorded streamflow hydrographs for the two Avon River NOW gauging stations. Streamflows are shown on a logarithmic scale to more clearly show low flow periods, and is expressed on a per unit catchment area basis for direct comparison between the two gauging station sites which have appreciably different catchment areas. Figure B-14 shows flow duration curves for both gauging stations. Figure B-15 shows the flow duration curve for the Gloucester River at the Doon Ayre gauge.

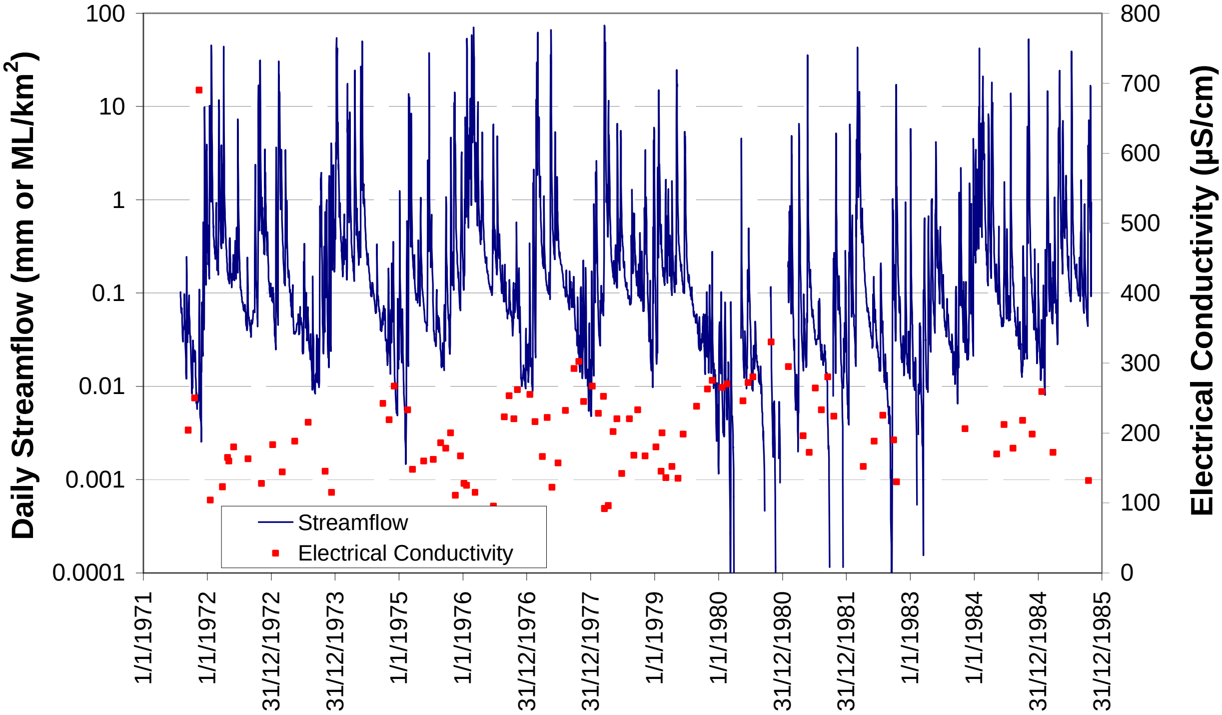


Figure B-12 Recorded Streamflow Hydrograph – GS208018 – Avon River at Below Dam Site

Note: ML/km^2 = megalitres per square metres; µS/c, = microSiemens per centimetre; EC – electrical conductivity.

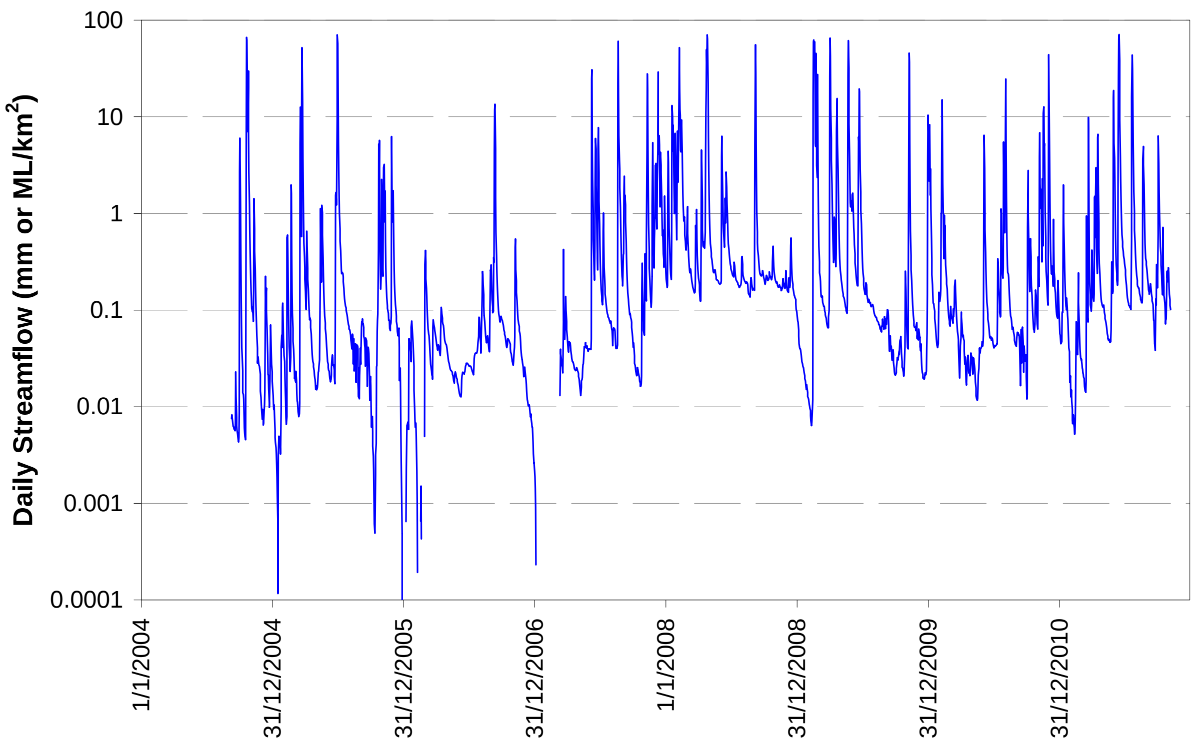


Figure B-13 Recorded Streamflow Hydrograph – GS208028 – Avon River at Dowstream Waukivory Creek

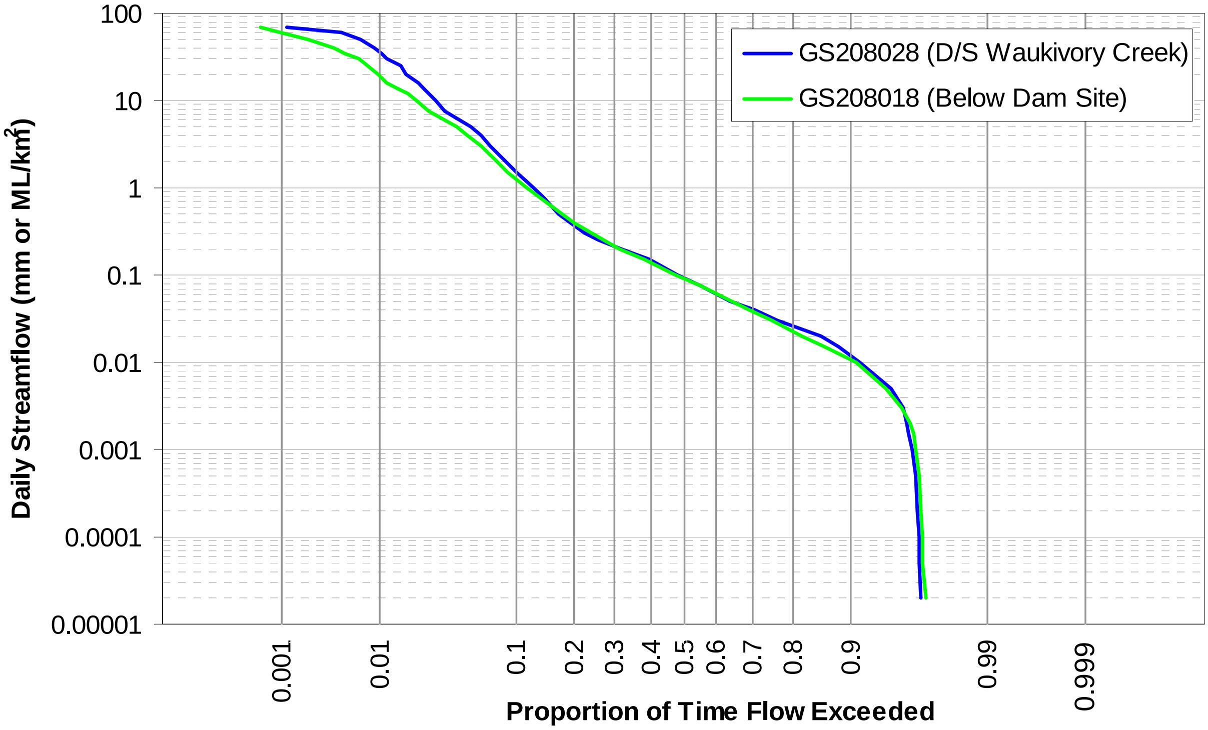


Figure B-14 Recorded Flow-Duration Curves – Avon River

Note: D/S = downstream.

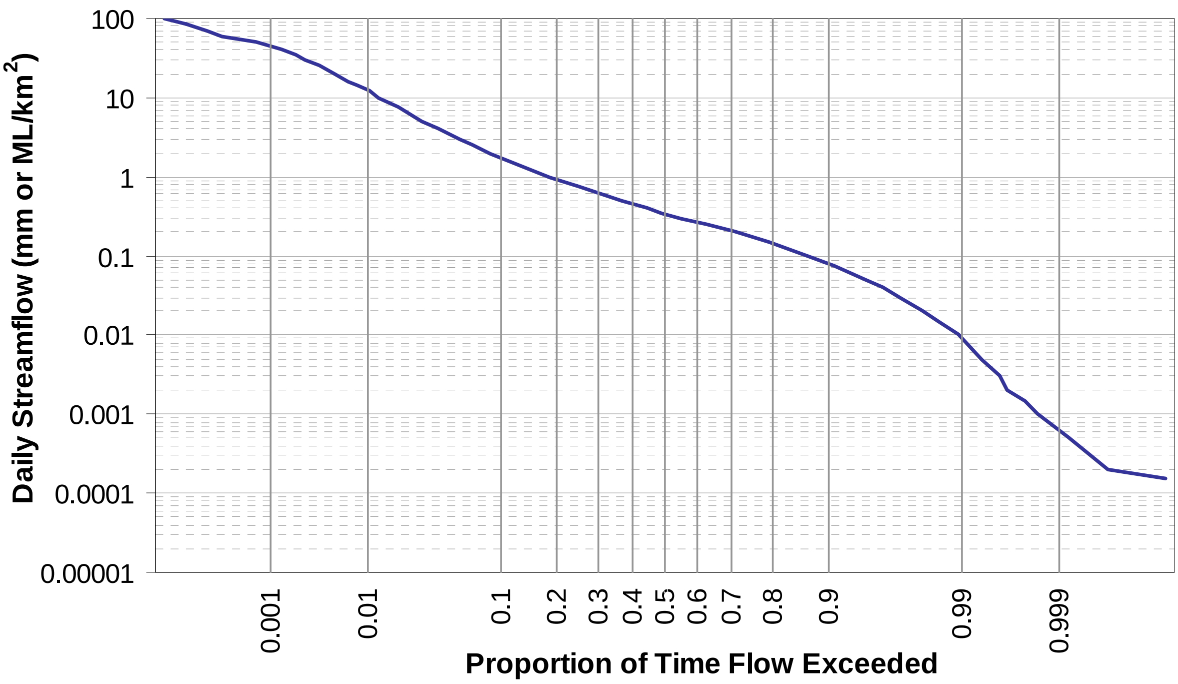


Figure B-15 Recorded Flow-Duration Curve – Gloucester River at Doon Ayre

Figure B-14 shows that recorded streamflows at the two Avon River gauging stations are remarkably similar on a per catchment area basis. High flows (those exceeded 10% of the time or less) are somewhat higher at the downstream gauge, however median flows are both approximately 0.09 ML/km^2.

In terms of total flow, the mean annual flow to date at the downstream gauge is approximately 110,600 megalitres (ML), while at the upstream gauge this number is approximately 8,940 ML. Zero flow was recorded on just over 3% of days at both gauges. An analysis of baseflow[3] and an examination of the recorded streamflow hydrograph at the Avon River D/S Waukivory Creek gauge indicates that baseflow accounts for only 10% of total flow on average, that baseflow recedes quite quickly and that flow is subject to transmission loss (possibly due to riparian evapotranspiration (ET) and extraction for stock and domestic use) which is most evident in summer months. The low proportion of baseflow indicates that streamflow is sustained by frequent rainfall – which is supported by the quite high number of rain days per year – refer Table B-2.

Averaged over the full period of record, streamflow in the Avon River at D/S Waukivory Creek gauge is estimated to amount to some 44% of rainfall – quite a high rate of runoff but consistent with streams in the area[4].

SCPL have installed flow depth and electrical conductivity (EC) monitoring equipment in the Avon River just downstream of the Dog Trap Creek confluence (monitoring site W2). Figure B-16 shows recorded data for 2010-11, with recorded flow depth showing similar flow persistence to data from the Avon River at D/S Waukivory Creek gauge. Recorded EC values generally fall during periods of increased recorded depth and progressively increase during times of recession.

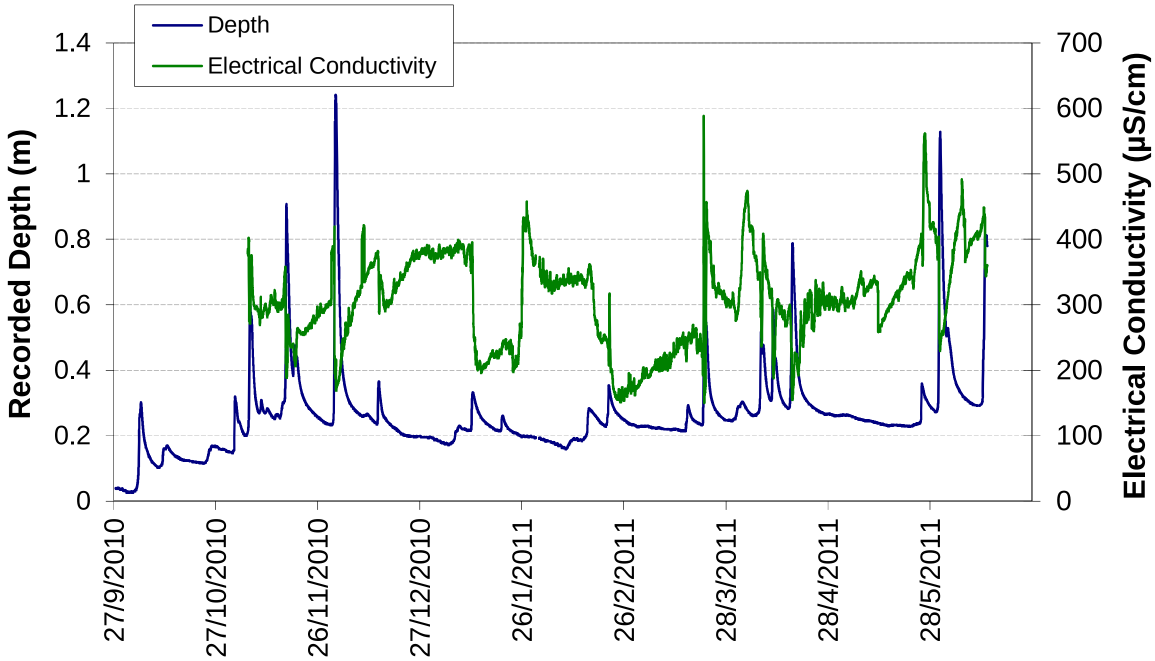


Figure B-16 Recorded Depth and Electrical Conductivity – Avon River at W2

[3] Using methods outlined in Boughton (1988).

[4] c.f. average of 34% for GS208008 (Gloucester River at Forbesdale) and 51% for GS209001 (Karuah River at Monkerai) in Peel *et al*. (2000).

SCPL also installed flow depth and EC monitoring equipment in Avondale Creek just upstream of Wenham Cox Rd (monitoring site W5) in 2000. At monitoring site W5, the reporting catchment of Avondale Creek is 20.5 km^2. Monitoring was discontinued in 2004 but recommissioned in late 2010. A continuous water level record is available since October 2010. Figures B-17 and B-18 show recorded hydrographs for 2001 and 2010-11. These indicate typical reductions in EC during times of increased stream water level, and increases in EC at times of low stream water level.

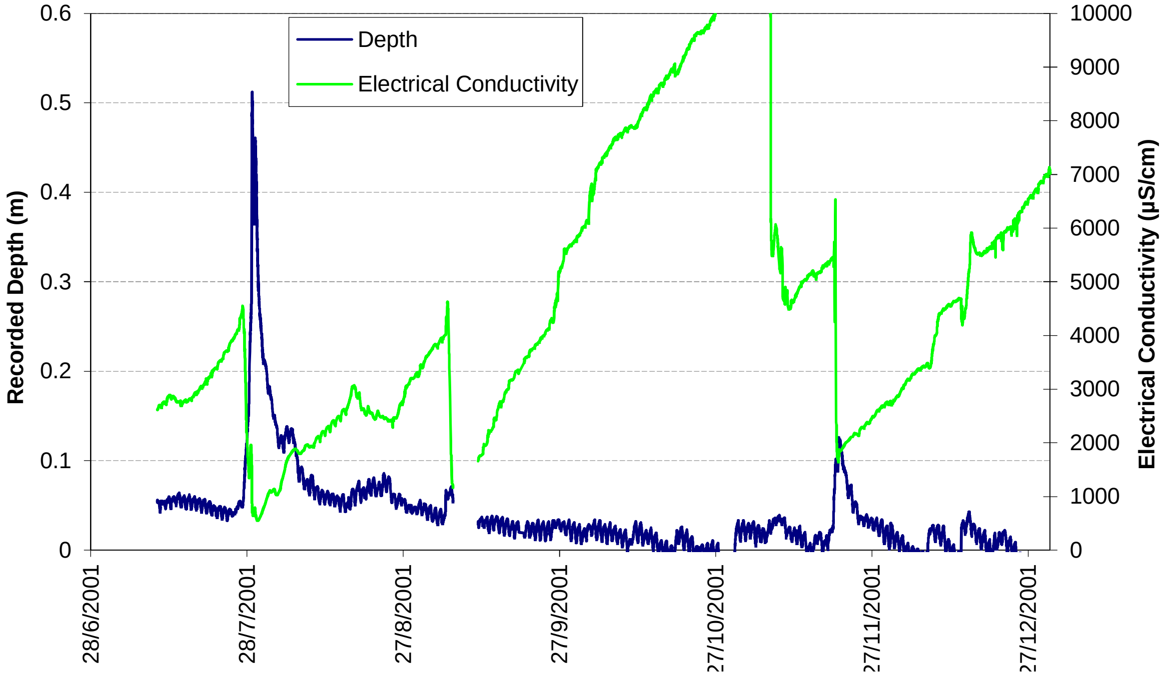


Figure B-17 Recorded Depth and Electrical Conductivity - Avondale Creek at W5 (2001)

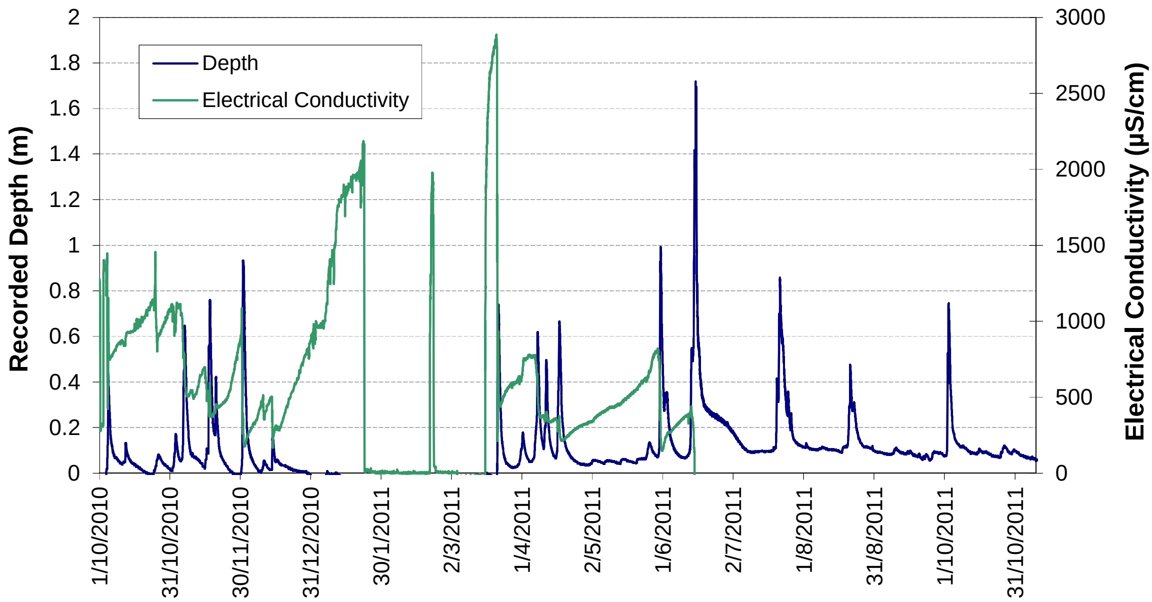


Figure B-18 Recorded Depth and Electrical Conductivity - Avondale Creek at W5 (2010-11)

AGL Gloucester LE Pty Ltd (AGL) has recently installed 3 stream (water level recording) gauges on the Avon River. There are currently no flow records available from the gauges which were installed with the objective of providing data on the interaction between stream and bore water levels.

Within the Project area Avondale Creek is considered to be an ephemeral waterway experiencing some extended periods of no or low flow during dry weather.

From the available data, Avondale Creek downstream of the Project site appears to exhibit less flow persistence than the Avon River, with some extended periods of no or negligible flow. Rapid flow response is exhibited following rainfall, with quite rapid recession, as might be expected given the hilly, rocky nature of the creek headwaters. However, from the recorded hydrograph, there does appear to be some creek baseflow (flow persistence), which is inferred to be due to discharge from transient creek bank storage and recharge from coal measures. Runoff rates from the Avondale Creek catchment are likely to be similar to the Avon River, given similar terrain and vegetation. Avondale Creek water quality is discussed in Section B2.5.

No streamflow information is available for Dog Trap Creek. Anecdotal evidence suggests the creek has similar flow patterns to Avondale Creek, but may be regarded as ephemeral with less flow persistence, given its catchment comprises a higher proportion of timbered area and less flat, swampy terrain than the lower reaches of Avondale Creek.

B2.4 Flooding

Downstream of Stratford, the Avon River meanders through a 1 to 1.5 km wide valley confined by low hills on both sides – floodplains occur between the hills and the river. Near the Avon River confluence with Dog Trap Creek, this confinement by low hills narrows somewhat and flood levels are likely to be controlled by this feature. Downstream of this point, the valley widens substantially, with more extensive flood plains and remnant river channel lakes evident. There are no official records of flooding along the lower reaches of the Avon River and there is no known government flood study having been conducted along the section of the river upstream of the Dog Trap Creek confluence.

The Project area lies within the Avondale and Dog Trap Creek catchments. Two haul road crossings have been constructed across Avondale Creek as part of the Stratford Mining Complex. The two haul road crossings cause localised increases in creek levels upstream of these crossings during high flows. Hydraulic design and modelling of these crossings and associated flood bunding has been completed by SCPL in order to design flood mitigation measures (including bunding) to reduce the risk of flooding of mine areas, with design based on a 100-year average recurrence interval (ARI) flow event.

B2.5 Local and Regional Surface Water Quality

B2.5.1 General

Water quality data was collected from sampling sites operated by SCPL and from sites operated by NOW. SCPL monitors surface water quality within and surrounding the Stratford Mining Complex by predominantly manual sampling from both streams and water storages. In total there are records from 33 water quality monitoring sites - 10 located along streams and 23 located at water storages. Table B-5 lists these sites along with monitored parameters and period of data record. Sites labelled “upstream” or “downstream” refer to the potential influence of the past operations at the Stratford Mining Complex (i.e. upstream = nil influence).

Table B-5

Summary of Stratford Mining Complex Surface Water Quality Monitoring Program

Site Name	Site Description	Frequency[1]	Current Suite of Parameters	Period of Record[2]
W1	Upstream Avon River	Monthly/Event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb, alkalinity, ORP, DO, nitrate and nitrite as nitrogen, redox	4/5/1994 – 3/10/2011
W2	Downstream Avon River	Monthly/Event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb, alkalinity, ORP, DO	4/5/1994 – 6/6/2011
W3	Dog Trap Creek	Monthly/Event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb, alkalinity, ORP, DO	4/5/1994 – 7/6/2011
W3A	Upstream Dog Trap Creek	Monthly/Event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb, alkalinity, ORP	27/11/2002 – 3/10/2011
W4	Dog Trap Creek/ Avondale Creek Confluence (Avondale Swamp)	Monthly/Event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb, alkalinity, ORP	4/5/1994 – 3/10/2011
W5	Avondale Creek Downstream (Wenham Cox Road)	Monthly/Event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb, alkalinity, ORP, DO	4/5/1994 – 7/6/2011
W6	Avondale Creek at Parkers Road	Monthly/Event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb, alkalinity, ORP,	4/5/1994 – 3/10/2011
W8	Avondale Creek at Bowens Road	Monthly/Event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb, alkalinity, ORP, DO	23/5/1995 – 8/6/2011
W9	Avondale Creek Upstream	Monthly/Event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb, alkalinity, ORP	29/5/2008 – 3/10/2011
W10	Tributary of Avondale Creek	Monthly/Event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb, alkalinity, ORP	29/5/2008 – 3/10/2011
SD1	Haul Road Sediment Dam	Overflow and dewatering event	pH, EC, turbidity, TSS	26/5/2003 – 15/6/2011

Table B-5 (continued)
Summary of Stratford Mining Complex Surface Water Quality Monitoring Program

Site Name	Site Description	Frequency[1]	Current Suite of Parameters	Period of Record[2]
SD2	Haul Road Sediment Dam	Overflow and dewatering event	pH, EC, turbidity, TSS	6/12/2003 – 15/6/2011
SD3	Haul Road Sediment Dam	Overflow and dewatering event	pH, EC, turbidity, TSS	23/5/2004 – 15/6/2011
SD4	Haul Road Sediment Dam	Overflow and dewatering event	pH, EC, turbidity, TSS	23/5/2004 – 15/6/2011
SD7 (SWQ5)	BRNOC Sediment Dam	Overflow and dewatering event	pH, EC, turbidity, TSS, DO, alkalinity	27/11/2002 – 7/6/2011
SD8	BRNOC Farm Dam	Overflow and dewatering event	pH, EC, turbidity, TSS	15/3/2004 – 8/6/2007
SD10	Bowens Road South Sediment Dam	Overflow and dewatering event	pH, EC, turbidity, TSS	16/6/2011
SD11	Roseville Sediment Dam/Roseville Haul Road Sediment Dam	Overflow and dewatering event	pH, EC, TSS, TDS, turbidity, chloride, sulphate, Fe	7/10/1998 – 10/11/2009
SWQ6	Downslope BRNOC	Overflow and dewatering event	pH, EC,TDS, TSS, turbidity alkalinity, As, Bo, Ca, Cd, chloride, Cu, Cr, Fe, Pb, Hg, Mg, Mn, sulphate, total N, total P	19/11/02 – 28/1/2009
SD13	Western Sediment Dam	Overflow and dewatering event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb	25/11/1996 – 15/6/2011
SD14	Haul Road Sediment Dam	Overflow and dewatering event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb	26/10/1995 – 16/6/2011
SD15	Waste Rock Emplacement Silt Dam	Overflow and dewatering event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb	4/5/1996 – 15/6/2011
SD16	Rail Sediment Dam	Overflow and dewatering event	pH, EC, TDS, TSS, turbidity, chloride, sulphate, total N, total P, Fe, Ca, Mg, Cu, As, Cd, Cr, B, Hg, Mn, Pb	6/9/1995 – 22/6/2011
SD17	Between the two Roseville (in-pit) Waste Rock Emplacements	Overflow and dewatering event	pH, EC, ORP	12/10/2009 – 10/11/2009
SD18	Link Road Sediment Dam	Overflow and dewatering event	pH, EC, turbidity, TSS, chloride, sulphate, Fe	15-6/2011 – 21/6/2011

Table B-5 (continued)
Summary of Stratford Mining Complex Surface Water Quality Monitoring Program

Site Name	Site Description	Frequency[1]	Current Suite of Parameters	Period of Record[2]
BRN Pit	BRNOC	Monthly	pH, EC, TDS, TSS, turbidity, acidity, alkalinity, Al, As, B, Cd, Ca, chloride, Cr, Cu, Fe, Pb, Hg, Mg, Mn, Zn, total N, ORP, total P, sulphate,	25/9/2003 – 28/10/2011
Eastern Emplacement Area	Eastern Emplacement Area	Dewatering event	pH, EC, TDS, TSS, turbidity, acidity, alkalinity, Al, As, B, Cd, Ca, Cr, Cu, Fe, Pb, Hg, Mg, Mn, Zn, total N, ORP, pH, total P, sodium, sulphate	6/7/2001 – 29/9/2011
Parkers/BRW Pit	Bowens Road West	Monthly	pH, EC, acidity, ORP, sodium, chloride, sulphate, Fe, Al, Ca, Mg, Mn, Zn	7/9/1998 – 29/9/2011
Main Pit	Stratford Main Pit	Monthly	pH, EC, TDS, TSS, turbidity, acidity, alkalinity, Al, As, B, Cd, Ca, chloride, Cr, Cu, Fe, Pb, Hg, Mg, Mn, Zn, nitrate, total N, ORP, pH, total P, sodium, sulphate	3/4/1995 – 29/9/2011
Roseville	Roseville Pit	Dewatering event	pH, EC, TDS, TSS, turbidity, acidity, alkalinity, Al, As, B, Cd, Ca, chloride, Cr, Cu, Fe, Pb, Hg, Mg, Mn, Zn, nitrate, total N, ORP, pH, total P, sodium, sulphate	3/4/1995 – 10/8/2009
Roseville West	Roseville West Pit	Monthly/Spot	pH, EC, acidity, ORP, sodium, chloride, sulphate, Fe, Al, Ca, Mg, Mn, Zn	14/9/2009 – 26/09/2011
SED	Stratford East Dam	Monthly	Acidity, Al, As, Ba, Be, alkalinity bicarbonate, B, Ca, Cd, chloride, colour, EC, Cu, Cr, Fe, Pb, Hg, Mg, Mn, Mo, Ni, nitrate, oil and grease, ORP, pH, K, Se, Si, Na, St, sulphate, sulphide, TDS, total N, total P, total alkalinity, total hardness, TSS, turbidity, Zn	25/8/1995 – 29/9/2011
RWD	Return Water Dam	Monthly/Spot	Acidity, alkalinity, EC, Al, As, B, Ca, Cd, chloride, Cu, Cr, Fe, Pb, Hg, Mg, Mn, Na, ORP, pH, sulphate, TDS, total N, total P, TSS, turbidity, Zn	29/5/1995 – 29/9/2011

1 A maximum of one event sample is taken in any 21 day period. An event is defined as a runoff-producing rainfall event (i.e. 25 mm or greater of rainfall in a 24-hour period).

2 Represents total period of record of monitoring at site. Not all parameters have been monitored for the complete period of record.

Data from four NOW monitoring sites located on the Avon River were also used in the water quality assessment. The NOW sites are summarised in Table B-6.

Table B-6
Summary of NOW Surface Water Quality Sites

Site Name	Site Description	Frequency[1]	Current Suite of Parameters	Period of Record[2]
20810019	Avon River at Wenham Cox Rd	Monthly	EC, turbidity, total P, nitrate and nitrite as nitrogen	11/11/1994 – 12/11/1997
20810017	Avon River at Gloucester	Monthly	EC, nitrate and nitrite as nitrogen, total P, turbidity	11/11/1994 – 16/9/1997
GS208018	Avon River Below Dam Site	Monthly	Alkalinity as bicarbonate, alkalinity as carbonate, B, Ca, chloride, colour, EC, fluoride, Fe, Mg, nitrate and nitrite as nitrogen, pH, Phosphorus - acid hydrolysable – dissolved, total P, K, Si, Na, sulphate, turbidity, Zn	22/1/1971 – 15/10/1985
20810030	Avon River at Morgan's Gully	Variable	EC, nitrite as nitrogen, total P, turbidity	11/11/1994 – 13/10/1997

1 A maximum of one event sample is taken in any 21 day period. An event is defined as a runoff-producing rainfall event (i.e. 25 mm or greater of rainfall in a 24-hour period).

2 Represents total period of record of monitoring at site. Not all parameters have been monitored for the complete period of record.

The locations of surface water monitoring sites are shown in Figures B-8 and B-19. Schoeller plots are also provided in Attachment BC.

Surface water samples are tested for a range of parameters including pH, EC, turbidity, total suspended solids (TSS), total dissolved solids (TDS), acidity/alkalinity, oxidation/reduction potential (ORP), aluminium (Al), calcium (Ca), chloride (Cl), iron (Fe), magnesium (Mg), manganese (Mn), sulphate (SO_4), zinc (Zn), sodium (Na), nitrogen (N) nitrate (NO_3), phosphorus (P), arsenic (As), boron (B), cadmium (Cd), copper (Cu), lead (Pb), chromium (Cr) and mercury (Hg). SCPL also maintains continuous EC sensors/loggers on Avondale Creek (W5) and the Avon River (W5) downstream of the Stratford Mining Complex (refer Figure B-19).

Additional information collected during the 1994 EIS has also been included (SCPL, 1994). The 1994 EIS included results of baseline water quality sampling programs conducted in 1981/1982 and 1994. The summary from the 1981/1982 program[5] has been included for comparison, and key results from the 1994 program have been appended to the current water quality data sets.

[5] The available information from the 1981/82 monitoring is limited to minimum, maximum and mean concentrations. The number of samples and individual values used in the calculation of these statistics are unknown.

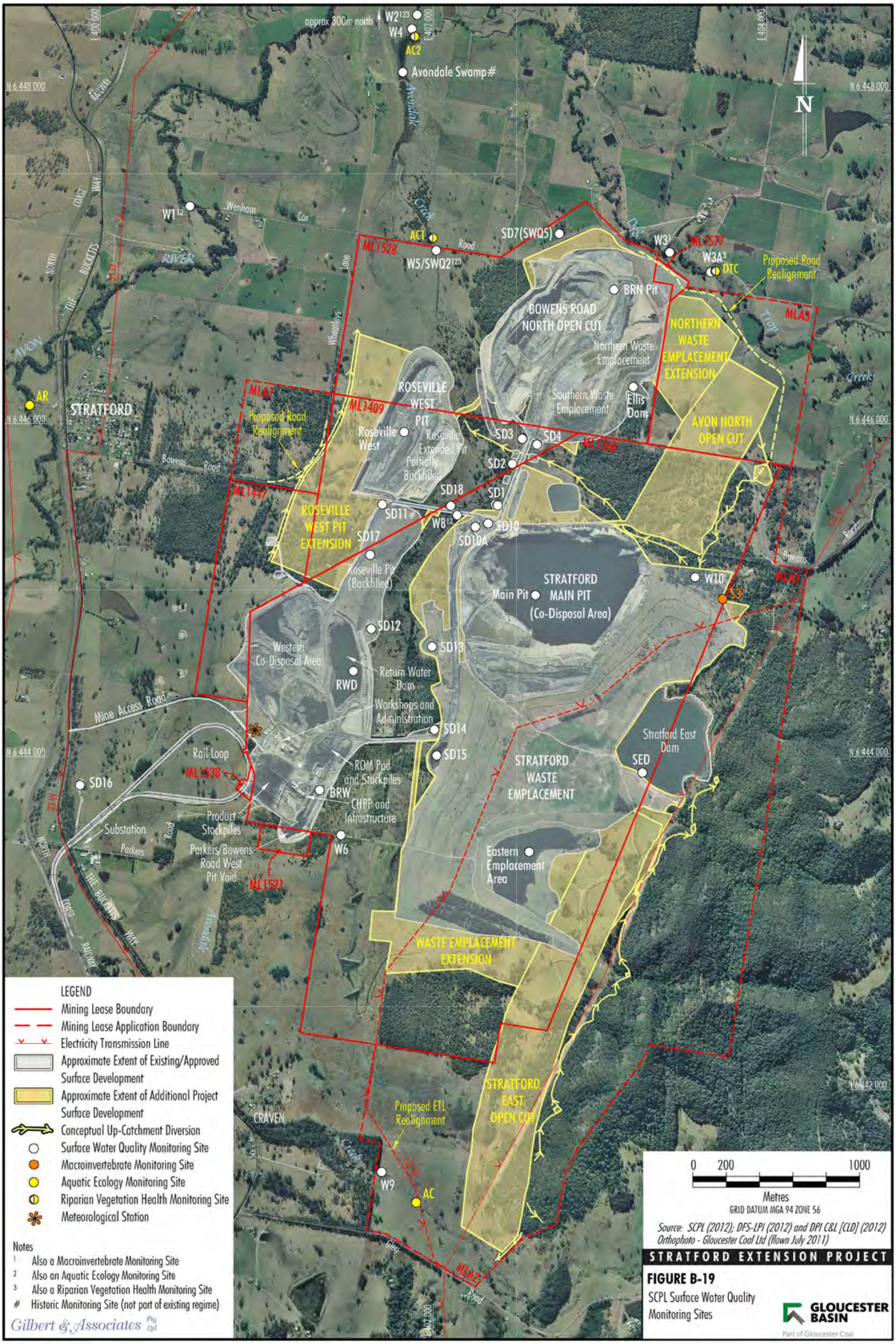


FIGURE B-19
SCPL Surface Water Quality Monitoring Sites

GCL-10-12 EIS SWA_105L

B2.5.2 *Relevant Guidelines*

As indicated in Section B2.0, land use in the area comprises cattle grazing and rural residential. Given the nature of watercourses, and use of watercourses for livestock watering, monitored water quality indicators have been compared to the ANZECC (2000a) guidelines for the protection of aquatic ecosystems and primary industries (livestock watering). Given that rural residential and irrigation of pasture are known uses in the Avon River, water quality data has also been compared to the relevant guidelines for drinking water and irrigation water.

ANZECC (2000a) aquatic Ecosystem guidelines for pH, EC and turbidity were based on the trigger values set for slightly disturbed lowland rivers in south-east Australia. Guidelines for metals were based on a 95% level of species protection for a slightly-moderately disturbed freshwater system. Livestock drinking water guidelines were based on the lowest applicable trigger value. In addition, Avon River samples were compared to the ANZECC (2000a) guidelines for irrigation water and the Australian Drinking Water Guidelines (National Health and Medical Research Council [NHMRC], 2011). The NSW water quality objectives for uncontrolled streams were also considered.

The NSW water quality objectives for the Manning River catchment refer to the ANZECC (2000a) guidelines and the Australian Drinking Water Guidelines (NHMRC, 2011)[6] and do not list any different guideline values for the parameters included in this water quality monitoring program.

Water quality results for the streams and water storages are presented in the following sections. Data has been summarised by calculating the minimum, maximum and average concentrations, and by calculating the percentage of samples which exceeded the ANZECC (2000a) guidelines for the protection of aquatic ecosystems. Samples were considered to exceed the guidelines if the reported concentration was greater than the method detection limit (MDL), and greater than the current guideline. The proportion of these samples to the total number of samples collected was considered the percentage exceedence.

This method of calculating the percentage exceedence was considered to be the best option. An alternative approach would have been to assume that if the MDL exceeded the guideline that the sample concentration also exceeded the guideline. There is a level of uncertainty in taking that approach as the actual concentration is unknown. The MDL may have exceeded the current guideline because it was a historical sample which was collected when sampling methodology was not as precise or accurate, or sample interference (i.e. from high sediment content) may have caused the MDL to be raised. It is not necessarily indicative of the sample exceeding the guideline. Another alternative approach would have been to exclude all samples where the concentration was reported as less than the MDL (i.e. report the percentage exceedence as the number of samples which were greater than the MDL and exceeded the guideline relative to the total number of samples which exceeded the MDL). This however would have greatly reduced the sample population and been unrepresentative of the likely water quality characteristics.

[6] At the time of publication, the NSW water quality objectives for the Manning River catchment referred to the 2004 version of the Australian Drinking Water Guidelines which have subsequently been superseded by the 2011 version on the basis the NSW water quality objectives would be updated appropriately.

A copy of the full water quality data base used in the analysis is presented in Attachment BA.

B2.5.3 Avon River

A summary of the water quality in the Avon River is presented below in Table B-7. Samples collected from W1 and W2 exceeded the ANZECC (2000a) guidelines for the protection of aquatic ecosystems for turbidity in over 30% of samples, total nitrogen in over 80% of samples and phosphorous in over 40% of the samples. The samples collected at NOW surface water monitoring site 20810017 (Avon River near Gloucester) exceeded the EC guideline value in approximately 68% of samples.

Table B-7
Summary of Avon River Water Quality Data

Monitoring Site[1]/Guideline		pH	EC (µS/cm)	Alkalinity[3] (mg/L)	Turbidity (NTU)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
20810030/ GS208018 (Avon River Below Dam Site)	Average	7.2	217	51.5	10.31	ND	0.03
	Minimum	6.8	90	20.0	0.80	ND	0.01
	Maximum	8.0	690	84.0	100	ND	0.14
	No. Samples	63	127	10	79	-	36
	% Exceedence[2]	0	0	-	4	-	47
20810019/W1 (Upstream of Avon River confluence with Dog Trap Creek)	Average	7.0	332	67.3	64.9	1.71	0.15
	Minimum	5.7	69	2.00	0.50	0.01	0.01
	Maximum	8.1	1500	240	780	23.0	1.5
	No. Samples	291	309	142	248	104	142
	% Exceedence[2]	9	0	-	37	74	49
W2 (Downstream of Avon River confluence with Dog Trap Creek)	Average	7.0	387	66.9	50.8	1.57	0.20
	Minimum	5.7	40	2.0	1.0	0.01	0.003
	Maximum	8.3	1295	200	570	20.0	3.40
	No. Samples	281	260	140	210	106	107
	% Exceedence[2]	10	0	-	37	79	55
20810017 (near Gloucester)	Average	ND	670	ND	15.4	ND	0.05
	Minimum	ND	64	ND	1.4	ND	0.01
	Maximum	ND	2990	ND	113	ND	0.25
	No. Samples	-	19	-	19	-	19
	% Exceedence[2]	-	11	-	5	-	68
ANZECC (2000a) Guideline Trigger Values	Protection of Aquatic Ecosystems[4]	6.5 - 8.0	2200	-	50	0.35	0.025
	Primary Industries (Irrigation Water)	6.5 - 8.5	2985	-	-	-	-
	Primary Industries (Livestock Drinking Water)	6 - 9	950	-	-	5	0.05
NHMRC (2011) Australian Drinking Water Guidelines	Health	6.5 – 8.5	-	-	-	-	-
	Aesthetic		-	-	5	-	-

1 Refer Figure B-8

2 Percentage of samples that are outside the aquatic ecosystem guideline range for slightly disturbed lowland rivers in south-east Australia (ANZECC, 2000a).

3 Alkalinity as bicarbonate

4 The EC guideline value of 2200 µS/cm represents the upper limit of the range reported in Table 3.3.3 in ANZECC (2000a). This value was selected as creeks in the area were not considered to be typical NSW coastal rivers as coal seams are known to underlie the creeks and to contribute saline baseflow.

ND = Not determined

mg/L = milligrams per litre

Figure B-12 shows recorded grab sample EC values at GS208018 (Avon River Below Dam Site) – EC has typically varied between approximately 100 and 300 µS/cm, with EC decreasing at higher flow rates.

Metals were also analysed in samples collected from W1, W2 and from the NOW station GS208018 (Avon River Below Dam Site). Parameters which exceeded the ANZECC (2000a) guidelines for protection of aquatic ecosystems included:

- Cadmium – 7% at W1, 11% at W2;
- Chromium – 17% at W1, 20% at W2;
- Copper – 8% at W1, 27% at W2; and
- Lead – 16% at W1, 13% at W2.

Parameters which exceeded the ANZECC (2000a) irrigation water guidelines included:

- Iron – 91% in W1, 85% in W2; and
- Manganese – 25% in W1, 27% in W2.

Parameters which exceeded the drinking water guidelines (NHMRC, 2011) included:

- Arsenic – 5% (health) in W2.
- Manganese – 12% (health) and 40% (aesthetic) in W1; 39% (aesthetic) in W2; and
- Iron – 89% (aesthetic) in W1; 80% (aesthetic) in W2.

The percentage exceedance was calculated as the ratio of the number of samples which had concentrations greater than the MDL and the current guideline to the total number of samples collected. The above percentage values (which exceeded the guidelines) did not include those samples where the concentration was recorded as being less than the MDL and where the MDL exceeded the guideline. All other metals exceeded the guidelines (ANZECC [2000a] and NHMRC [2011]) in less than 5% of samples. Time based plots of monitored EC, sulphate, and cadmium[7] are presented in Figures B-20, B-21, and B-22 respectively.

From Figure B-20, it is evident that the majority of recorded EC values were below the ANZECC (2000a) guideline value for protection of aquatic ecosystems, and there is no apparent trend in EC with time. Sulphate concentrations (Figure B-21) were generally relatively consistent with most samples being below 20 mg/L. There were several periods when samples have returned relatively elevated sulphate concentrations between 50 and 115 mg/L at both W1 and W2. The majority of the monitored cadmium concentrations (Figure B-22) were also below the ANZECC (2000a) guideline value for protection of aquatic ecosystems and livestock watering. There is no visually apparent trend in the monitored cadmium values and elevated concentrations were recorded at both W1 and W2 consistently.

[7] EC and sulphate were selected on the basis that they are indicators of mine water and cadmium was selected because it was a metal which exceeded guideline values in local watercourses.

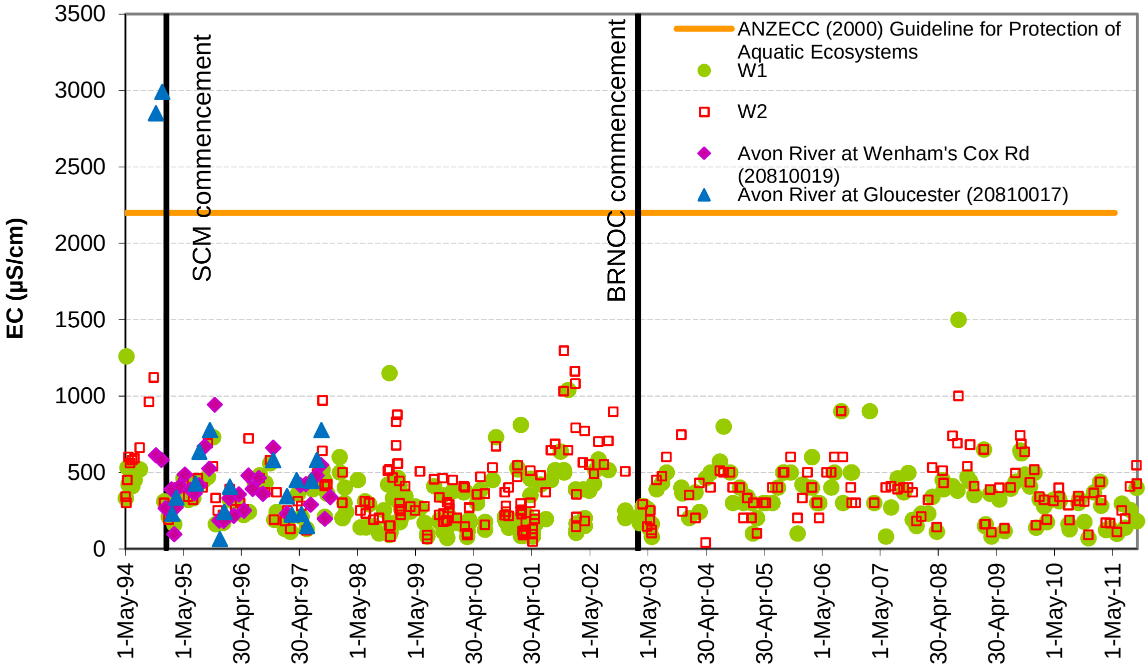


Figure B-20 Recorded EC – Avon River

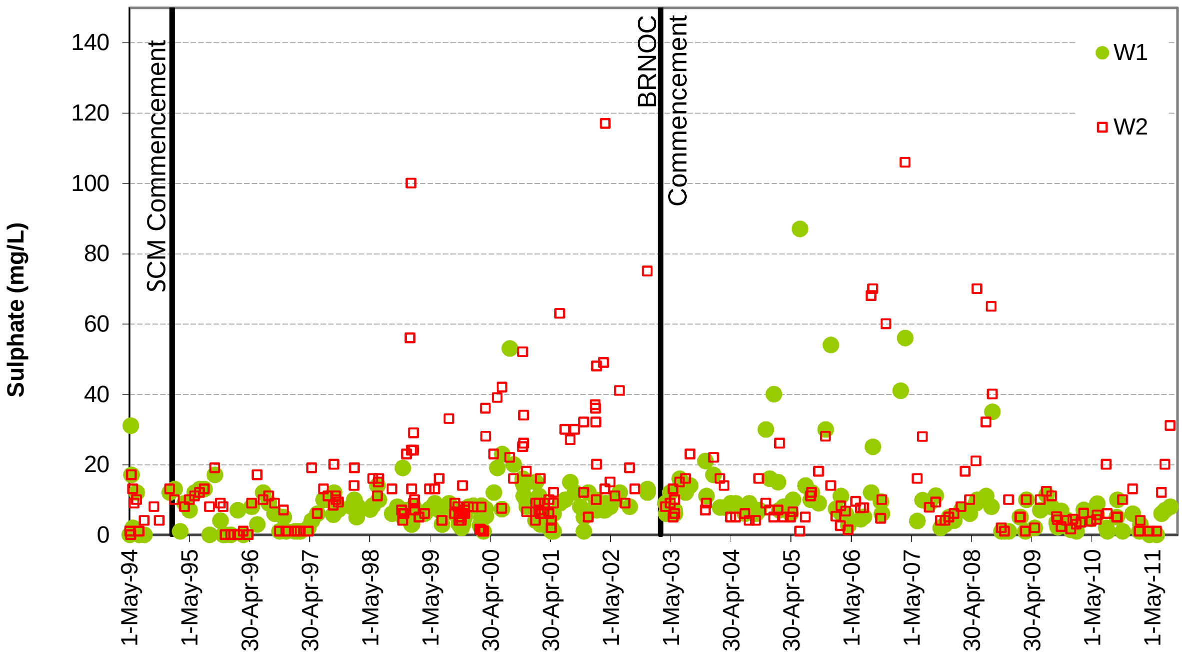


Figure B-21 Recorded Sulphate – Avon River

Note: Samples which had concentrations reported as less than the MDL have been reported on this graph to have a concentration of the MDL.

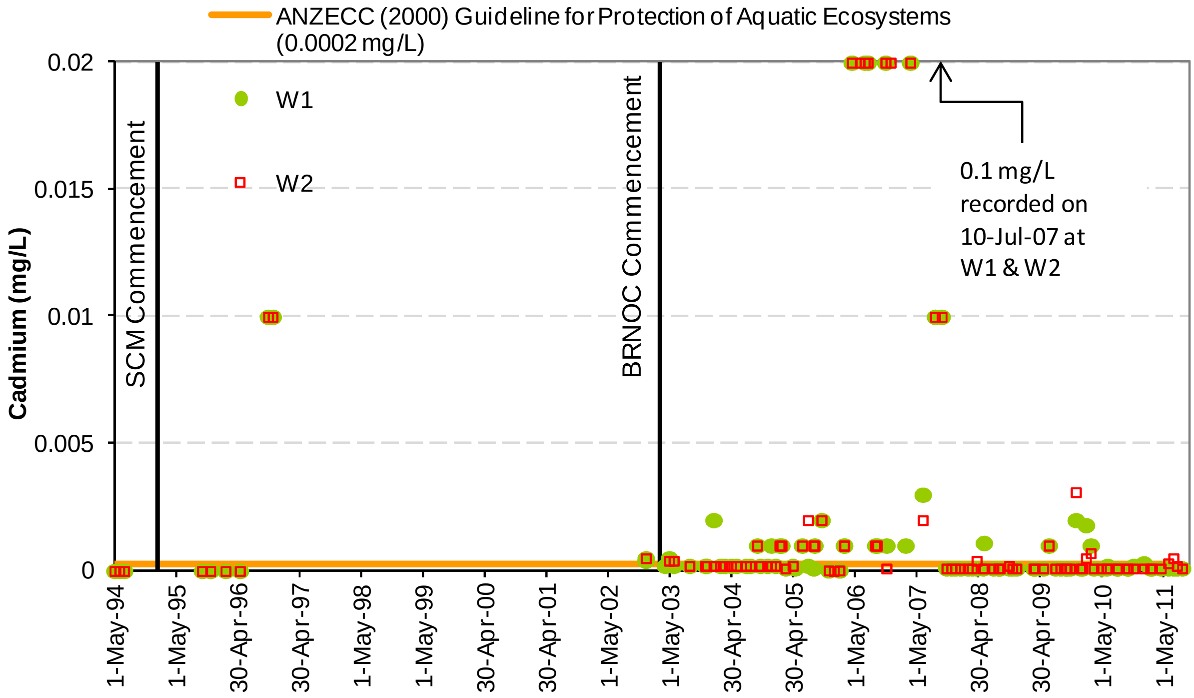


Figure B-22 Recorded Cadmium– Avon River

Note: Samples which had concentrations reported as less than the MDL have been reported on this graph to have a concentration of the MDL.

B2.5.4 Avondale Creek

A summary of the water quality in Avondale Creek is presented in Table B-8. The available data indicate that the local surface water resources are generally characterised by near neutral pH conditions.

Within Avondale Creek, the incidence of EC exceeding the ANZECC (2000a) guidelines for protection of aquatic ecosystems was highest (23%) at W5 (Avondale Creek at Wenham Cox Road). Total nitrogen exceeded the ANZECC (2000a) guidelines for protection of aquatic ecosystems in over 70% of samples, and total phosphorus in over 40% of samples at all locations.

Water quality data for Avondale Creek was also collected as part of the 1994 EIS (SCPL, 1994). Comparing values recorded just upstream of the Dog Trap Creek/Avondale Creek Confluence (Avondale Swamp) during the 1981/1982 program to the nearest Stratford Mining Complex station at W5, pH and EC concentrations at W5 were similar. Concentrations of sulphate, total phosphorus and TSS at W5 were higher on average than those recorded during the 1981/82 sampling program, and concentrations of iron were lower.

Table B-8
Summary of Avondale Creek Water Quality Data

Monitoring Site[1]		pH	EC (µS/cm)	TSS (mg/L)	Iron (filt.) (mg/L)	Sulphate (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
W9 (Upstream of Operations)	Average	6.5	227	30	1.18	4.16	1.06	0.17
	Minimum	5.3	58	2	0.18	0.96	0.02	0.01
	Maximum	7.8	1371	166	3.47	10.0	2.1	0.52
	No. Samples	24	24	18	20	20	18	20
	% Exceedence[2]	50	0	-	-	-	94	95
W6 (Upstream of Operations)	Average	6.6	747	74.7	1.2	25.0	2.0	0.31
	Minimum	5.1	66	2.0	0.02	0.99	0.04	0.01
	Maximum	8.2	5200	671	16.0	1300	26.0	7.10
	No. Samples	320	221	199	203	202	70	73
	% Exceedence[2]	29	5	-	-	-	92	70
W8 (Within operations area)	Average	6.9	786	193	1.38	48.7	1.25	0.18
	Minimum	5.3	80	0	0.04	0.84	0.10	0.01
	Maximum	8.5	3200	6400	19.2	469	4.00	1.30
	No. Samples	119	189	108	95	92	42	45
	% Exceedence[2]	23	2	-	-	-	83	44
W5 (Downstream of Operations)	Average	6.7	1671	85	0.83	72.1	1.66	0.10
	Minimum	5.6	80	1	0.01	1.00	0.10	0.01
	Maximum	8.2	13000	583	11.0	550	24.0	0.48
	No. Samples	239	264	227	227	229	79	82
	% Exceedence[2]	36	23	-	-	-	90	54
Avondale Swamp[3]	Average	6.6	1601	20	1.7	20	ND	0.067
	Minimum	4.2	520	1	0.3	1	ND	0.032
	Maximum	8.8	7060	436	4.4	110	ND	0.130
ANZECC (2000a) Guideline Trigger Values	Protection of Aquatic Ecosystems[4]	6.5 - 8.0	2200	-	-	-	0.35	0.025
	Primary Industries (Livestock Drinking Water)	6 - 9	2985	-	-	1000	-	-

1 Refer Figure B-19

2 Percentage of samples that are outside the aquatic ecosystem guideline range for slightly disturbed NSW coastal rivers (ANZECC, 2000a).

3 Site located downstream of W5 and upstream of Avondale Creek/Dog Trap Creek confluence, sampled as part of 1981-82 monitoring campaign – from SCPL (1994).

4 The EC guideline value of 2200 µS/cm represents the upper limit of the range reported in Table 3.3.3 in ANZECC (2000a). This value was selected as creeks in the area were not considered to be typical NSW coastal rivers as coal seams are known to underlie the creeks.

ND = Not determined

With regard to metals, the ANZECC (2000a) guidelines for the protection of aquatic ecosystems were exceeded for the following parameters:

- Copper - 72% at W9, 30% at W6, 29% at W8, and 29% at W5;
- Chromium - 56% at W9, 10% at W6, 14% at W8 and 17% at W5;
- Cadmium – 10% at W6 and 7% at W8;
- Lead – 17% at W6 and 18% at W5; and
- Manganese – 9% at W8 and 9% at W5.

The percentage exceedance was calculated as the ratio of the number of samples which had concentrations greater than the MDL and the current guideline to the total number of samples collected. The above percentage values (which exceeded the guidelines) did not include those samples where the concentration was recorded as being less than the MDL and where the MDL exceeded the guideline. All other metals exceeded the ANZECC (2000a) guidelines for protection of aquatic ecosystems on less than 5% of occasions.

More detailed results of EC, sulphate, and cadmium showing the concentrations in time are presented below in Figures B-23, B-24, and B-25 respectively. From Figure B-23 it is evident that EC values from W5 (Avondale Creek at Wenham Cox Road – the most downstream site) had higher EC concentrations relative to the other locations along Avondale Creek. It is considered that Avondale Creek is generally more saline at this downstream point due to its intermittent nature and the outcropping/sub-cropping of coal seams within the catchment and associated slow seepage of more saline groundwater into the creek. Figures B-17 and B-18 show continuously recorded EC at site W5 (Avondale Creek at Wenham Cox Road). This shows a clear relationship between creek flow and EC, with high EC at times of low or no flow and EC falling during periods of flow. A similar trend occurs in the Avon River at W2 (Figure B-16) although EC values are significantly lower.

Compared to other sampling sites, higher sulphate concentrations were recorded at W5 and W6 (Figure B-24). There is however no visually apparent temporal or spatial trend in sulphate concentration. The majority of the cadmium concentrations (Figure B-25) were below the ANZECC (2000a) guidelines for protection of aquatic ecosystems, however cadmium exceeded the guideline value at W5, W6, and W8.

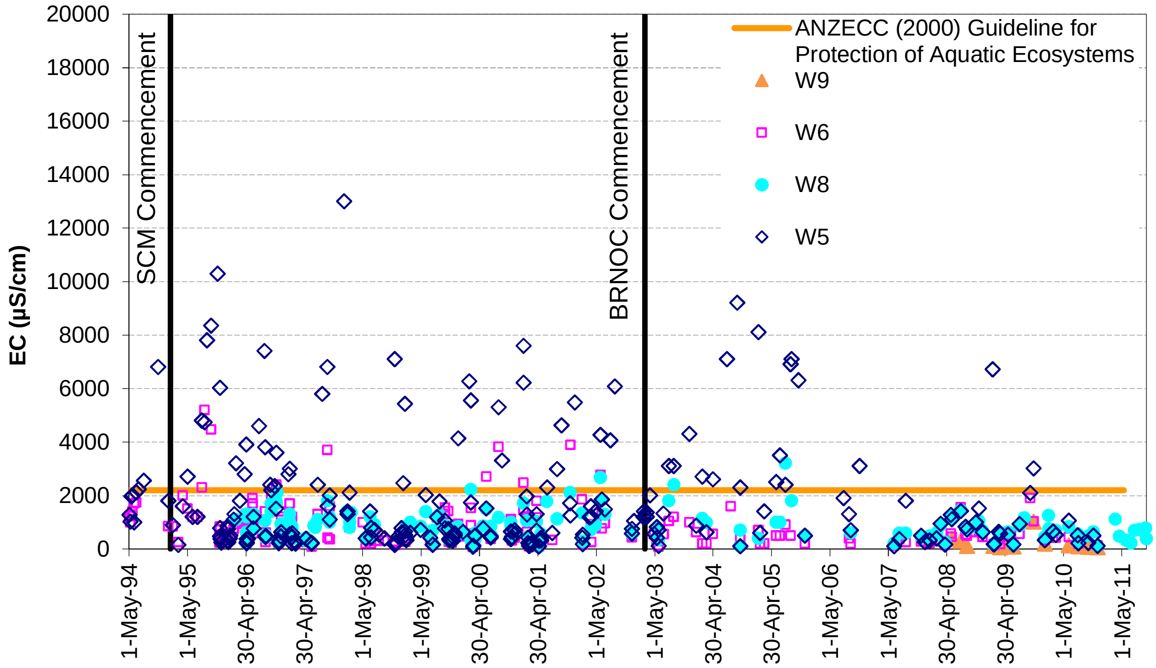


Figure B-23 Recorded EC – Avondale Creek

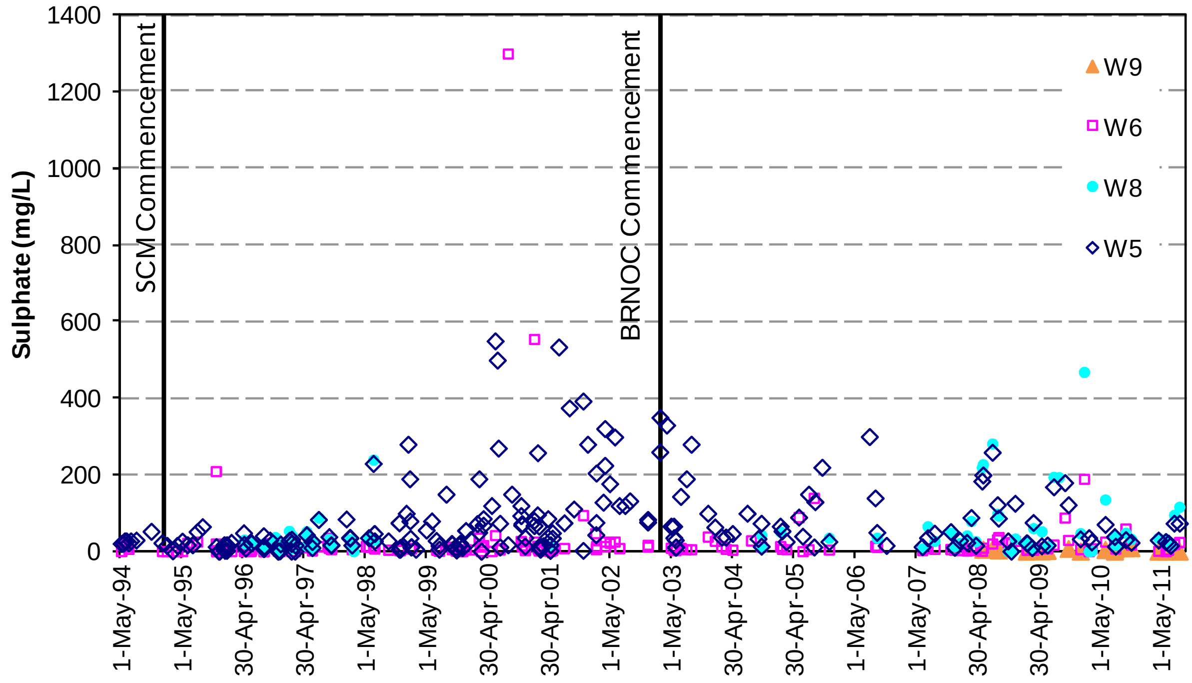


Figure B-24 Recorded Sulphate – Avondale Creek

Note: Samples which had concentrations reported as less than the MDL have been reported on this graph to have a concentration of the MDL.

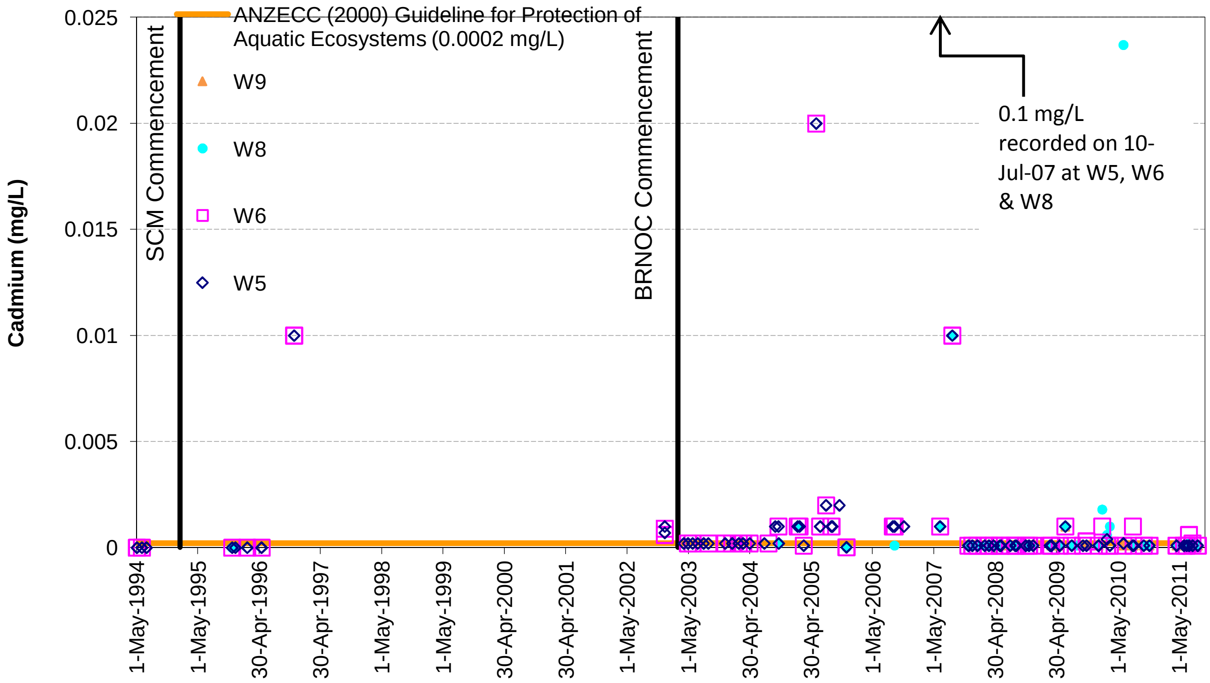


Figure B-25 Recorded Cadmium – Avondale Creek

Note: Samples which had concentrations reported as less than the MDL have been reported on this graph to have a concentration of the MDL.

B2.5.5 Dog Trap Creek and Tributary of Avondale Creek

Water quality data from Dog Trap Creek and site W10 (tributary of Avondale Creek) is summarised in Table B-9. Total nitrogen and total phosphorus exceeded the ANZECC (2000a) guidelines for protection of aquatic ecosystems on more than 50% of occasions at all locations.

Water quality data for Dog Trap Creek was also collected as part of the 1994 EIS (SCPL, 1994). Comparing values recorded at the Dog Trap Creek Upstream during the 1981/1982 program to the nearest SCPL monitoring location at W3, pH, EC and TSS concentrations at W3 were similar. Concentrations of total phosphorus were higher on average at W3 than those recorded during the 1981/82 sampling program, while concentrations of iron and sulphate were lower.

With regard to metals, the ANZECC (2000a) guidelines for protection of aquatic ecosystems were exceeded for the following parameters:

- Cadmium – 13% at W10, 7% at W3A, 12% at W4, 9% at W3;
- Chromium – 13% at W10, 8% at W3A, 12% at W4,16% at W3;
- Copper – 30% at W10, 31% at W3A, 29% at W4, 40% at W3;
- Lead – 7% at W3A, 11% at W4, 14% at W3; and
- Manganese – 5% at W3.

Table B-9
Summary of Dog Trap Creek and Tributary of Avondale Creek Water Quality Data

Monitoring Site[1]		pH	EC (µS/cm)	TSS (mg/L)	Iron (filt.) (mg/L)	Sulphate (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
W3a (Dog Trap Creek Up-stream)	Average	7.0	383	43	0.78	11.32	2.14	0.30
	Minimum	5.7	112	0	0.05	0.54	0.01	0.01
	Maximum	8.1	880	530	5.36	110	21.1	3.30
	No. Samples	121	121	68	71	71	71	69
	% Exceedence[2]	7	0	-	-	-	80	77
Dog Trap Creek Up-stream[3]	Average	6.9	570	26	2.2	15	ND	0.098
	Minimum	6.1	170	1	0.2	2.7	ND	0.019
	Maximum	7.2	1090	115	9.8	41	ND	0.49
W3 (Dog Trap Creek)	Average	7.0	419	33	0.60	10.5	2.64	0.39
	Minimum	5.7	85	1	0.01	0.80	0.01	0.01
	Maximum	8.2	1270	483	8.18	100	31.00	3.30
	No. Samples	297	237	222	230	229	79	82
	% Exceedence[2]	7	0	-	-	-	90	71
W4 (Dog Trap Creek Down-stream)	Average	7.0	608	48	0.67	39.2	2.02	0.21
	Minimum	5.6	75	2	0.02	1.0	0.01	0.01
	Maximum	8.0	3090	406	2.90	400	31.0	4.00
	No. Samples	295	223	207	216	216	75	76
	% Exceedence[2]	11	2	-	-	-	89	66
W10 (tributary of Avondale Creek)	Average	6.9	617	35	0.74	38.19	0.64	0.08
	Minimum	6.1	123	0	0.05	0.25	0.01	0.01
	Maximum	7.7	2110	350	3.78	154.	1.60	0.48
	No. Samples	29	29	23	25	25	23	25
	% Exceedence[2]	17	0	-	-	-	78	56
ANZECC (2000a) Guideline Trigger Values	Protection of Aquatic Ecosystems[4]	6.5 - 8.0	2200	-	-	-	0.35	0.025
	Primary Industries (Livestock Drinking Water)	6 - 9	2985	-	-	1000	-	-

1 Refer Figure B-19

2 Percentage of samples that are outside the aquatic ecosystem guideline range for slightly disturbed lowland rivers in south-east Australia (ANZECC, 2000a).

3 Site located downstream of W5 and upstream of Avondale Creek/Dog Trap Creek confluence, sampled as part of 1981-82 monitoring campaign – from SCPL (1994).

4 The EC guideline value of 2200 µS/cm represents the upper limit of the range reported in Table 3.3.3 in ANZECC (2000a). This value was selected as creeks in the area were not considered to be typical NSW coastal rivers as coal seams are known to underlie the creeks and to contribute saline baseflow.

ND = Not determined

The percentage exceedance was calculated as the ratio of the number of samples which had concentrations greater than the MDL and the current guideline to the total number of samples collected. The above percentage values (which exceeded the guidelines) did not include those samples where the concentration was recorded as being less than the MDL and where the MDL exceeded the guideline.

All other parameters exceed the ANZECC (2000a) guidelines for protection of aquatic ecosystems on less than 5% of occasions.

More detailed results of EC, sulphate, and cadmium showing the concentrations in time are presented below in Figures B-26, B-27, and B-28 respectively. From Figure B-26 and B-27 it is evident that EC and sulphate values from W4 on Dog Trap Creek (downstream of the Avondale Creek confluence) were higher relative to the other locations along Dog Trap Creek, while concentrations at W3 and W3A were similar.

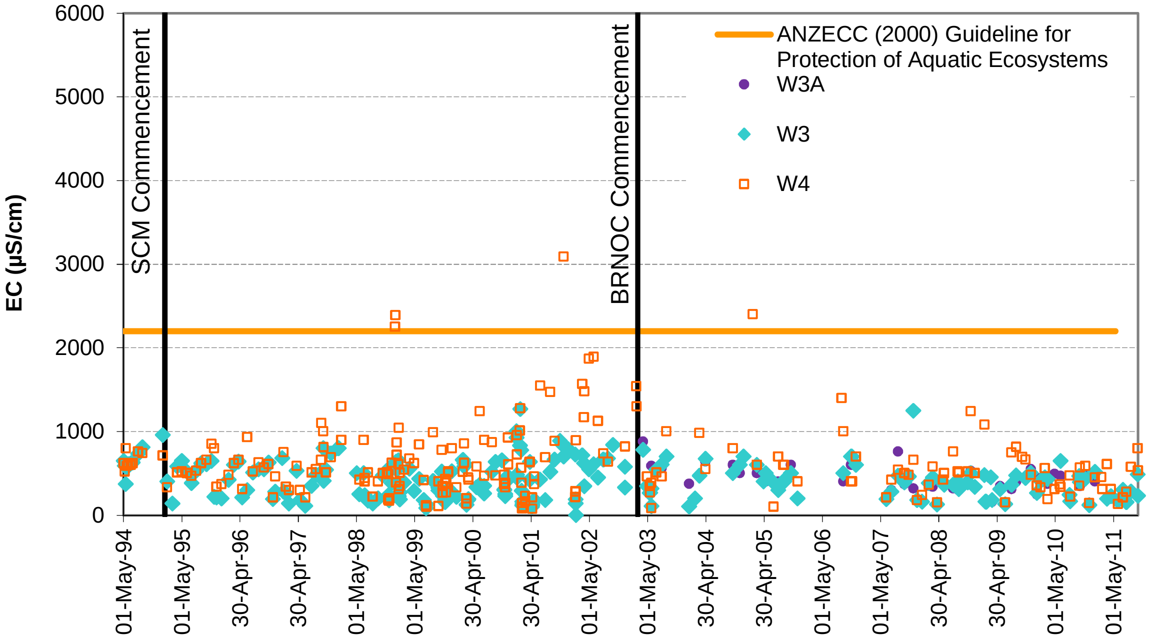


Figure B-26 – Recorded EC – Dog Trap Creek

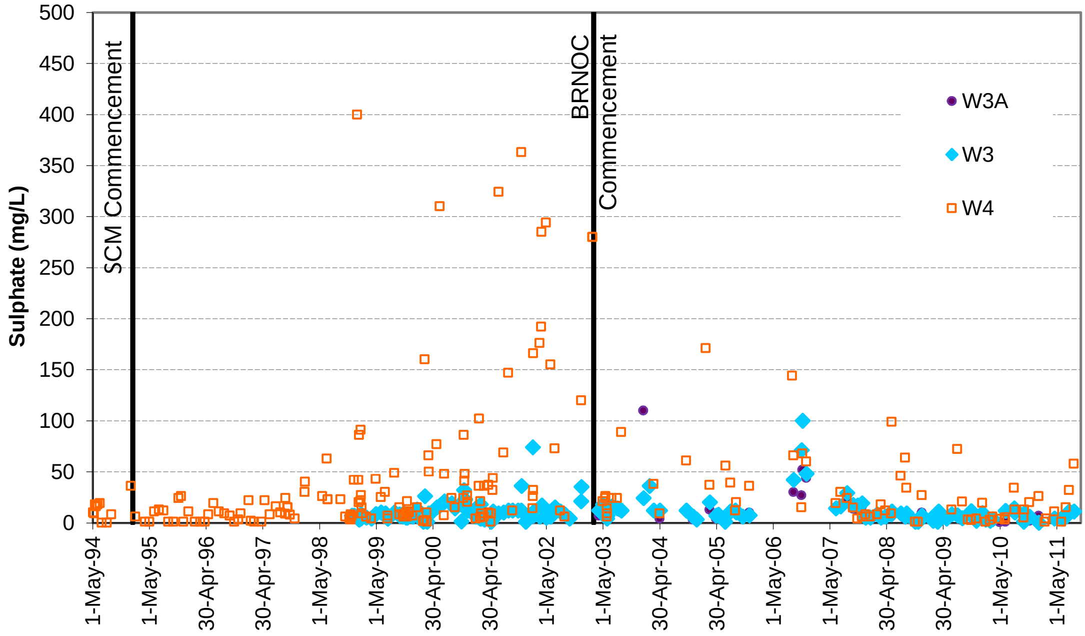


Figure B-27 Recorded Sulphate – Dog Trap Creek

Note: Samples which had concentrations reported as less than the MDL have been reported on this graph to have a concentration of the MDL.

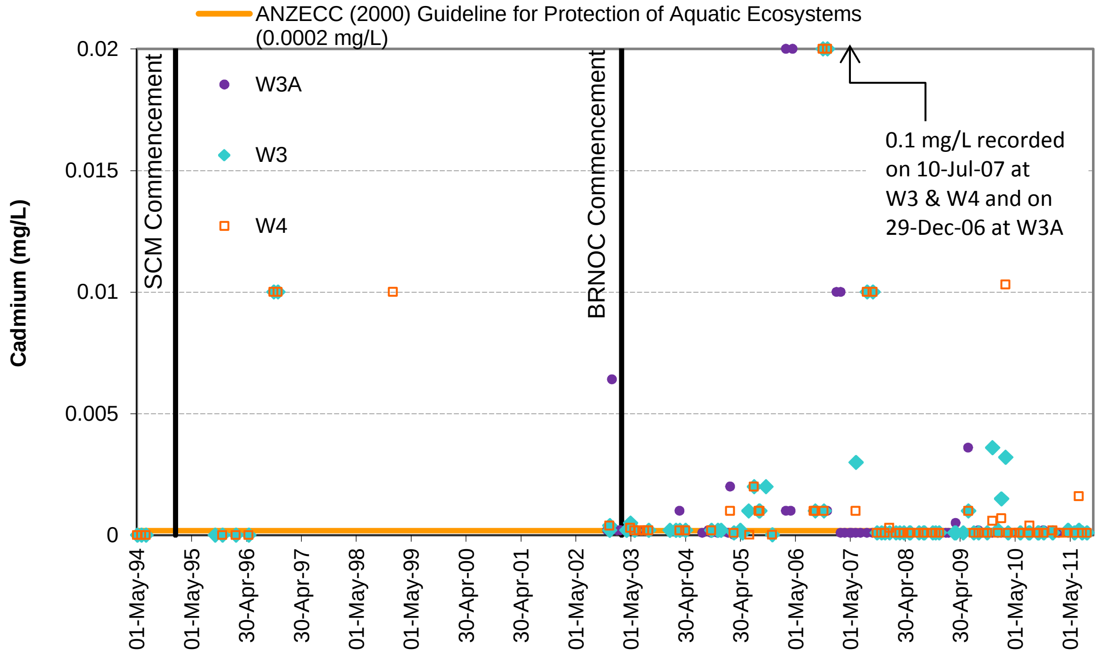


Figure B-28 Recorded Cadmium – Dog Trap Creek

Note: Samples which had concentrations reported as less than the MDL have been reported on this graph to have a concentration of the MDL.

B2.5.6 Mine Water Storages

Table B-10 summarises water quality in contained water storages and other storages at the Stratford Mining Complex. Mine water storages had average pH values near neutral (between 6.2 and 7.7). However, in more than 5% of the samples at the Roseville Pit, the Stratford Main Pit and Parkers/Bowens Road West (BRW) Pit, the recorded pH was less than 4 (acidic). Low pH values are not unexpected for contained water within an operational mining area. Average EC ranged between 2,400 µS/cm and 3,800 µS/cm in the contained water storages and open pits, whereas the range in the sediment dams was 800 µS/cm to 1,200 µS/cm. The highest reported concentrations of dissolved zinc were found in the BRNOC (2.6 mg/L) and Parkers/BRW Pits (4.4 mg/L). The highest concentration of iron was reported in the Stratford Main Pit (150 mg/L).

The stored water quality in the sediment dams was compared to the ANZECC (2000a) guidelines, since licensed releases/overflows from these sediment dams enter Avondale Creek (although water from sediment dams is also routinely pumped back to contained water storages – refer Section B3.1). Samples collected from the BRNOC sediment dams exceeded the ANZECC (2000a) guidelines for protection of aquatic ecosystems for pH and EC in 7% and 2% of samples respectively. Samples collected from the SCM sediment dams exceeded the ANZECC (2000a) guidelines for protection of aquatic ecosystems for pH and EC in 41% and 19% of samples respectively.

Table B-10
Summary of Mine Water Quality Data

Location[1]		pH	EC	TSS	Dissolved Metals			
					Fe	As	Cd	Zn
		-	(µS/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Open Cut Pits (Roseville Pit, Roseville Extended Pit, BRNOC)	Average	6.8	3,716	8	5.39	0.001	0.0011	0.128
	Minimum	2.4	200	2	0.01	0.001	0.0001	0.0005
	Maximum	9.4	12,130	13	541	0.001	0.0003	2.63
Stratford Main Pit (rejects co-disposal area)	Average	6.7	3,366	42	9.58	0.001	0.0001	0.0247
	Minimum	2.4	530	4	0.01	0.001	0.0001	0.0050
	Maximum	8.4	6,500	220	150	0.001	0.0001	0.177
Stratford East Dam	Average	7.7	1,594	116	0.90	0.003	0.0024	0.005
	Minimum	6.4	136	2	0.01	0.001	0.0001	0.005
	Maximum	9.1	2,650	670	7.80	0.008	0.0100	0.05
Return Water Dam (RWD)	Average	7.2	3,637	9	0.67	0.001	0.0051	0.0247
	Minimum	3.9	1,850	2	0.01	0.001	0.0001	0.009
	Maximum	8.9	6,000	30	13.0	0.001	0.010	0.076
Parkers/BRW Pit	Average	6.2	2,470	ND	0.89	ND	ND	1.32
	Minimum	2.6	600	ND	0.01	ND	ND	0.0015
	Maximum	7.9	3,660	ND	11.9	ND	ND	4.4
Sediment Dams								
BRNOC Sediment Dams (SD1, SD2, SD3, SD4, & SD7)	Average	6.9	829	327	ND	ND	ND	ND
	Minimum	5.0	100	1	ND	ND	ND	ND
	Maximum	7.9	2,500	4,480	ND	ND	ND	ND
	No. Samples	113	63	58	-	-	-	-
	% Exceedence[2]	7	2	0	-	-	-	-
SCM Sediment Dams (SD8, SD10, SD11, SD13, SD14, SD15, SD16, SD17, SD18, Ellis)	Average	7.3	1,215	706	1.75	ND	0.0100	ND
	Minimum	3.6	44	1	0.01	ND	0.0100	ND
	Maximum	8.9	6,500	5200	21.00	ND	0.0100	ND
	No. Samples	343	344	183	95		1	-
	% Exceedence[2]	41	18	-	-	-	0	-
NSW Water Quality Objectives and ANZECC (2000a) Guideline Trigger Values	Protection of Aquatic Eco-systems [3]	6.5 - 8.0	2,200	-	-	0.024	0.0002	0.008
	Primary Industries (Livestock Drinking Water)	6 - 9	2,985	-	-	0.5	0.01	20

1 Refer Figure B-19

2 Percentage of samples that are outside the aquatic ecosystem guideline range for slightly disturbed lowland rivers in south-east Australia (ANZECC 2000a).

3 The EC guideline value of 2200 µS/cm represents the upper limit of the range reported in Table 3.3.3 in ANZECC (2000a). This value was selected as creeks in the area were not considered to be typical NSW coastal rivers as coal seams are known to underlie the creeks and to contribute saline baseflow.

ND = Not determined

B2.6 Water Sharing Plan for the Lower North Coast Unregulated and Alluvial Water Sources

The surface waters associated with the Project area (refer Figure B-8) fall wholly within the Avon River Water Source, in the broader Manning Extraction Management Unit of the *Water Sharing Plan for the Lower North Coast Unregulated and Alluvial Water Sources, 2009* (the Lower North Coast Water Sharing Plan) made under section 50 of the *Water Management Act, 2000*. The plan commenced on 1 August 2009 and applies to 31 July 2019.

The vision for the Lower North Coast Water Sharing Plan is:

> *"…to provide sustainable and integrated management of these water sources for the benefit of both present and future generations."*

The plan defines access conditions for water extraction and rules for extracting water, including limiting the long-term average extraction of water, and the amount of water that can be extracted on a daily basis from different flow classes. The existing Stratford Mining Complex does not currently, and the Project does not propose to, extract water from any unregulated water source within the Lower North Coast Water Sharing Plan area.

While there is small portion of the proposed Mining Lease Application boundary in the south of the Project (based on cadastre) that appears to be within the Karuah River Water Source Zone 4, the proposed Project (as shown on Figure B-8) does not include any surface development or mining activities within the Karuah River Catchment.

B2.6.1 Surface Water Users

Water in the Avon River is used for stock watering purposes and irrigation purposes. There are 45 surface water licences in the Avon River water source, with a total volumetric surface water licence of 1,997 megalitres per year (ML/year) of which 95% is used for irrigation purposes. There are two licences on Dog Trap Creek with a total volumetric licence of 140 ML/year. There are no licences on Avondale Creek.

B2.6.2 Harvestable Right

Landholders in most NSW rural areas are allowed to collect a proportion of the rainfall runoff on their property and store it in one or more dams up to a certain size. This is known as a 'harvestable right'. Maximum harvestable right dam capacity is the total dam capacity allowed under the harvestable right for a given property. It is based on 10% of the average regional rainfall runoff and takes into account local evaporation rates and rainfall periods. The maximum harvestable right dam capacity for the total area of property held by SCPL in the Avon River catchment is 253 ML.

The regulations (made under the *NSW Water Management Act 2000*) relating to harvestable right exclude capture of drainage and/or effluent in accordance with best management practice, and dams constructed to control or prevent soil erosion. None of the storages on site are used to harvest runoff from land and all storages are used to contain contaminated drainage, mine water or effluent in accordance with best management practice, or are used to control soil erosion. It is concluded therefore that all of these storages should be excluded from consideration as a component of the harvestable right calculation.

A schedule of storages and the basis for their exclusion is provided in Table B-11 below.

Table B-11 Schedule of Existing and Proposed Dams and Storages at Stratford Coal Mine

Dam/Storage Name	Purpose	Design Basis	Exemption Clause from Harvestable Right
DAD1 DAD3 DAD7 DAD10 DAD11 DAD13 DAD14 DAD18 DAD19 DAD20 DAD21 DAD22	Containment of waters contaminated by active mining activity.	Sized/designed for sediment capture with transfer of water to containment structures.	(3) Dams solely for the capture, containment and recirculation of drainage and/or effluent, consistent with best management practice or required by a Government agency or Local Government Council to prevent the contamination of a water source.
Stratford East Dam[8] Return Water Dam[9]	Containment of waters contaminated by mining activities.	Sized, in combination with other components of contained water system, to not spill under all simulated conditions	(4) Dams approved in writing by the Department for specific environmental management purposes.
Eastern Emplacement Area	Clean water diversion dam.	Storage formed as a result of waste dump configuration. Upslope diversions have been constructed to minimize runoff reporting to this area. Water from incident rainfall is not harvested for use on site and is pumped out to Avondale Creek Catchment.	(5) Dams without a catchment, such as “turkeys nest” dams and ring tanks, provided no water from harvestable right works is diverted into them.
Parkers/Bowens Road West Pit	Containment of waters contaminated by active mining activity.	Sized, in combination with other components of contained water system, to not spill under all simulated conditions.	(3) Dams solely for the capture, containment and recirculation of drainage and/or effluent, consistent with best management practice or required by a Government agency or Local Government Council to prevent the contamination of a water source.

[8] Upslope diversions have been constructed to minimize catchment reporting to this storage.
[9] Structure has been constructed as a Turkey’s Nest Dam – with no external catchment.

B3.0 SURFACE WATER MANAGEMENT

The existing water management system would continue to be augmented as water management requirements change over the life of the Project.

Section B3.1 provides a description of the existing water management system, while Section B3.2 describes the proposed changes to the water management system that would be implemented as part of the Project including a description of the water management system at future stages in the Project life.

A predictive assessment of the performance of the Project water supply system (including the proposed changes to the site water management system under a range of different climatic scenarios) is presented in Section B4.0.

B3.1 Existing Water Management System

A schematic of the existing Stratford Mining Complex water management is shown on Figure B-29. The existing water management system at the Stratford Mining Complex is based on the management of five separate water types namely:- up-catchment diversions/runoff, mine-water, sewage, water carrying sediments from areas disturbed by Project activities, and runoff from rehabilitated or partially rehabilitated areas. It includes the following components:

- Contained water storages including the Return Water Dam (RWD), Parkers/Bowens Road West (BRW) Pit void, Stratford Main Pit, Stratford East Dam and mine open pits (BRNOC and Roseville West Pit);
- diversion of runoff from catchment areas upstream of the mine disturbance area;
- runoff control on disturbed and rehabilitated areas at the mine;
- runoff control on infrastructure areas;
- sedimentation control;
- open pit dewatering;
- disposal of excess water through on-site agricultural irrigation; and
- sewage treatment and disposal of effluent.

The Stratford Mining Complex is subject to existing Environmental Protection Licences (EPL) 5161 and 11745, administered by the EPA. The EPLs include conditions pertaining to environmental monitoring and management of waters on and off-site.

The main water requirement at the Stratford Mining Complex is for CHPP make-up supply and for dust suppression. The water balance at the Stratford Mining Complex has historically been in surplus. Irrigation of water from the Stratford East Dam occurs over approved areas of the Stratford Waste Rock Emplacement to provide contingency storage for mine water.

The existing Stratford Mining Complex water management system does not release water from disturbed areas off site other than from sediment dams and rehabilitated landforms, in accordance with the EPLs and Development Consent.

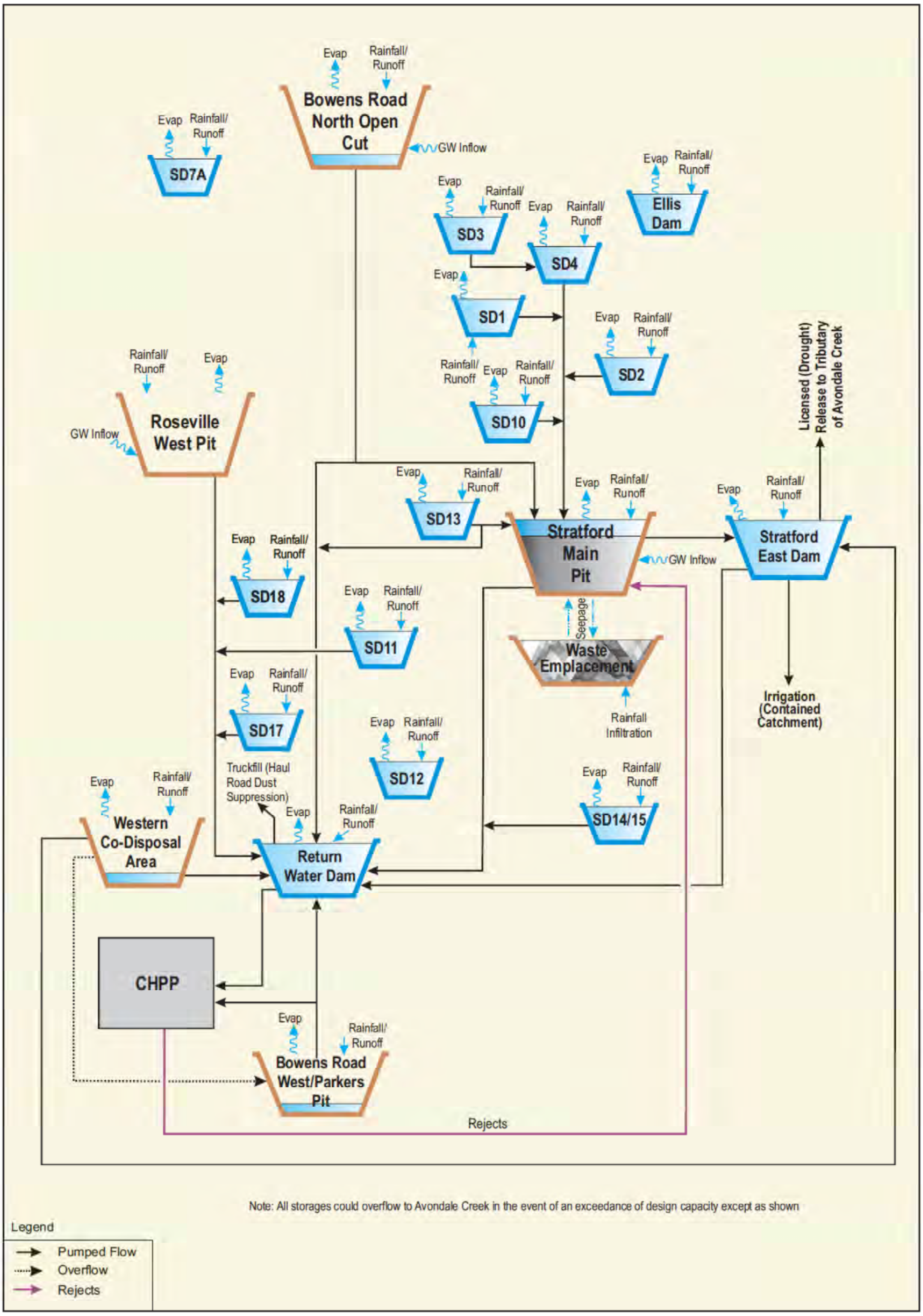


Figure B-29 Existing Stratford Mining Complex Water Management Schematic

Water is ponded within the eastern emplacement area – behind an existing waste rock emplacement (refer Figure B-3). Up-catchment runoff has been diverted around this area to Avondale Creek in order to limit inflows – inflow to this area originates from incident rainfall, runoff and seepage from portions of the surrounding rehabilitated Stratford Waste Rock Emplacement. This water pond does not form part of the water management system and is periodically pumped to upslope clean water diversions.

B3.1.1 Contained Water Storages

Water collected for storage on-site includes runoff from mine disturbance areas and groundwater inflows into the Stratford Mining Complex open pits, water liberated from rejects in the Stratford Main Pit, and rainfall-runoff reporting to this pit. Water pumped from sumps in the open pits is pumped to either the RWD or the Stratford Main Pit. The Stratford Main Pit acts as both the rejects and main water storage at the Stratford Mining Complex, with an estimated remaining capacity of 24 gigalitres (GL) as at mid-2011.

The Stratford East Dam was the former main contained water storage at the Stratford Mining Complex (when the Stratford Main Pit was still an active mining operation) – it has an approximate capacity of 2.872 ML. Irrigation of water from Stratford East Dam is undertaken over a portion of the adjacent rehabilitated Stratford Waste Rock Emplacement (within the catchment of the Stratford East Dam), in order to reduce its stored water volume and provide additional storage capacity for the Project. The upslope catchment has been diverted around this dam to limit the catchment area of the storage – flow in this diversion reports to the headwaters of the tributary of Avondale Creek.

The RWD provides a supply reservoir for the CHPP and for haul road dust suppression. It is kept supplied by pumping from other storages. It has a design (as-built) capacity of 512 ML. Recent survey has indicated it now has an estimated capacity of 335 ML due to silt accumulation. The RWD is maintained with freeboard to allow for incident rainfall.

The Parkers/Bowens Road West Pit void captures runoff from the CHPP area and is kept dewatered by pumping to the RWD. It has an estimated capacity of 107 ML.

B3.1.2 Runoff Control

Surface water runoff controls aimed at preventing up-catchment runoff water from entering open pit and waste rock emplacement areas have been constructed where practicable.

The main runoff water control structures at the Stratford Mining Complex are:

- <u>Eastern Diversions</u> – Two diversion drains/bunds have been constructed upslope of the Stratford East Dam and the eastern emplacement area respectively, diverting upslope runoff (from the foothills east of the Stratford Mining Complex) to the north and south respectively (refer Figure B-3). These diversions were designed to pass a 100-year ARI peak flow. These diversions were designed with cut-to-fill construction (excavated drain and earthfill bund), grassed channel invert, rip-rap lining at discharge points and with gentle (1 in 1,000) longitudinal gradients in order to control erosion. The diversions have been in service for many years and have been stable during this time (refer Plate B-4).

Plate B-4 Existing Eastern Diversion

- Western Diversions – Diversion drains/bunds have been constructed upslope of the former co-disposal area, backfilled Roseville Pit and Roseville West pit, diverting upslope runoff to the north to Avondale Creek.

- Bowens Road North Diversions – Diversion bunds and drains have been constructed on the north-east side upslope of the BRNOC, diverting upslope runoff to Dog Trap Creek.

- Flood control Embankments – Levees have been constructed to prevent inundation of open pit areas, waste rock emplacements and contained water storages.

- Haul Road Creek Crossings – two engineered creek crossings of Avondale Creek have been constructed to allow access between the eastern and western sides of Avondale Creek.

B3.1.3 Sedimentation Control

Erosion and sediment control structures currently in use at the Stratford Mining Complex include (Figure B-3):

- four sediment dams surrounding the BRNOC waste rock emplacement (SD3, SD4, SD7/7A and Ellis Dam);
- two sediment dams adjacent to the backfilled Roseville Pit (SD17 and RNSD);
- eight sediment dams alongside haul roads (SD1, SD2, SD10, SD10A, SD11, SD12, SD13 and SD14);
- SD15 downslope of the rehabilitated Stratford waste rock emplacement; and
- SD16 adjacent to the rail siding cutting near Bucketts Way.

Based on the Site Water Management Plan for the Stratford Mining Complex (Resource Strategies, 2002a) and the Erosion and Sediment Control Plan (Resource Strategies, 2002b), sediment dam sizing is based on:

- sufficient capacity to capture runoff from a 20-year ARI 1 hour duration rainfall event (54.9 mm) over the dam catchment; and
- sufficient area to provide for gravity settling of particles coarser that fine silt size in a 20-year ARI 1 hour duration rainfall event.

Water captured in sediment dams which receive runoff from haul roads and active waste rock emplacement areas is normally pumped to a contained water storage. Water captured in sediment dams which receive runoff from rehabilitated or partially rehabilitated areas only (i.e. not from haul roads or active waste rock emplacements) is usually allowed to discharge from the sediment dam after gravity settling (i.e. passive management). This is in accordance with the guidelines given in Landcom (2004).

In addition, sediment generation is controlled by timely progressive rehabilitation and vegetation establishment on disturbed areas (e.g. completed sections of waste rock emplacements) to minimise the area exposed to erosion. Silt fences are also erected downslope of other disturbed area (e.g. topsoil stockpiles before grass cover establishment). Sediment dams and silt fences are routinely inspected on a minimum quarterly basis and after major rainfall events, with maintenance carried out as required to maintain their effectiveness. This includes removal of sediment from sediment dams when the storage volume is reduced by 30% due to sediment accumulation.

B3.2 Proposed Project Water Management System

The proposed Project water management system is shown in schematic form in Figure B-30. The Project water management system would be based on the existing Stratford Mining Complex water management system with augmentations undertaken as required over the life of the Project.

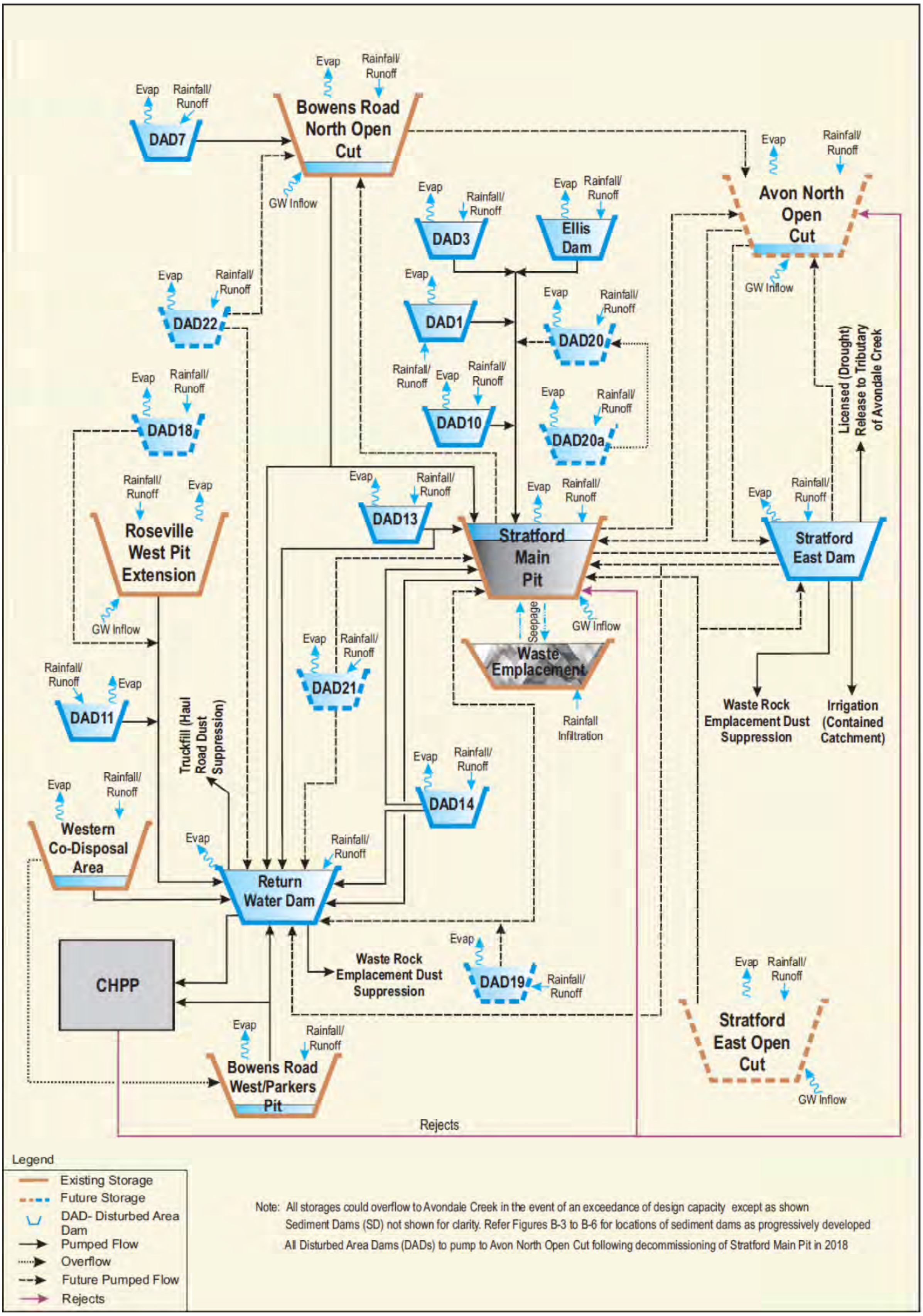


Figure B-30 Project Water Management Schematic

Features additional to those shown on Figure B-30 include:

- Progressive installation of extensions to up-catchment diversions west of the Roseville West Pit and east of the proposed Stratford East Open Cut, and construction of an up-catchment diversion east of the proposed Avon North Open Cut.

- Development of new irrigation areas within the rehabilitated catchments of contained water storages, progressively on an as-required basis (i.e. as determined by periodic reviews of the site water balance), as new rehabilitated areas become available.

- Development of irrigation for dust suppression upon active waste rock emplacements.

For future Project water management a distinction is made between dams which receive runoff from haul roads/active waste rock emplacement and other disturbed areas and dams which receive runoff from rehabilitated areas only.

B3.2.1 Approach and Design Criteria

The objectives of the water management on-site throughout the Project would be to:

- protect the integrity of local and regional water resources;
- operate such that there was no release of mine water off-site;
- maintain separation between runoff from areas undisturbed by mining and water generated within active mining areas; and
- provide a reliable source of water to meet Project requirements.

Based on the results of past monitoring and experience with the existing Stratford Mining Complex water management system, water generated by the Project has been classified into the following 4 types:

1. Runoff from areas undisturbed by mining – being runoff from catchments which are, to the maximum extent possible, allowed to flow unhindered to their natural receiving waters downstream. Where these areas have to be intercepted they would be diverted to downstream receiving waters.

2. Runoff from stabilised rehabilitated mine areas – comprising runoff from rehabilitated mine areas that have established stable vegetation cover and where runoff has similar water quality characteristics to areas that are undisturbed by mining activities. The water management system is based on managing the runoff from these areas in the same way as runoff from undisturbed areas.

3. Runoff from topsoiled/partially rehabilitated mine areas – being runoff from mine areas that have been shaped to final profiles, covered with topsoil and seeded. Runoff would have similar quality to runoff from undisturbed areas, except that it is likely to contain elevated suspended sediment following intense rainfall. Runoff would therefore be directed to sediment dams for gravity settling of sediment prior to release off site. Sediment dams (SDs) would be sized to capture runoff from a 90th percentile rainfall event with a duration of 5 days (in accordance with Landcom, 2004 and DECCW, 2008) and with a length/width ratio of 3:1 minimum.

4. Mine water – comprising water extracted from open pits and contained water storages, runoff from active waste rock emplacements or other areas disturbed by mining activities and runoff from haul roads or the CHPP area. Such water is likely to have elevated salinity levels. Such water would either be directed to contained water storages, open pits or to Disturbed Area Dams (DADs). DADs would be sized consistent with the sizing criteria for sediment dams in the existing Stratford Mining Complex Site Water Management Plan (refer Section B3.1.3), with pumped transfer of accumulated water back to contained water storages.

B3.2.2 Progressive Development of the Water Management System

Figures B-4 to B-7 show the progressive development of the Project and the water management system.

The Project as at mid-2015 (end of Year 2) is shown in Figure B-4. Mining of the Stratford East and Avon North Open Cuts would be occurring (having commenced in Year 1) along with mining of the Roseville West Pit Extension – all open cut pits would be mined generally from north to south. Mining in the BRNOC would have been completed (scheduled for completion at the end of Year 1), while mining of the former co-disposal area would continue.

In parallel with the development of, and prior to the commencement of mining of the Stratford East and Avon North Open Cuts, up-catchment diversions would be constructed along the indicated alignments (refer Section B3.2.7 below). Out-of-pit waste rock emplacements would be developed adjacent to the Stratford East and Avon North Open Cuts respectively, while waste rock from the Roseville West Pit Extension would be hauled to an emplacement developed to the east and south of the Stratford Main Pit. Runoff from waste rock emplacements and haul roads would be directed either to contained water storages, open pits or to a number of DADs which would be dewatered by pumping to contained water storages. Sediment Dams SD15 and SD19 would capture runoff from topsoiled waste rock emplacement areas, allowing gravity settling of sediment prior to dewatering to downslope areas. Sediment dams would be maintained until such time as vegetation successfully establishes on topsoiled areas. Areas which are fully rehabilitated (revegetated) would have runoff directed off site and would not form part of the water management system (e.g. rehabilitated batters of BRNOC waste rock emplacement). Runoff from rehabilitated areas upslope of the BRNOC void would be directed around the void, which would be used as a contained water storage. Runoff form the CHPP area would continue to report to Parkers/Bowens Road West Pit.

The Project as at mid-2019 (end of Year 6) is shown in Figure B-5. Mining would be continuing in the three open pits and the former co-disposal area. The up-catchment diversion east of the Stratford East Open Cut would be extended further south in parallel but ahead of open pit development. Similarly up-catchment diversions would be developed on the southern and western sides of the Roseville West Pit Extension. Waste rock from the Roseville West Pit Extension and Avon North Open Cut would be disposed of in mined-out open cut pit areas. Waste rock from the Stratford East Open Cut would also be used to backfill mined-out areas with some disposal continuing to out-of-pit emplacement areas to the north of the open pit. Runoff from in-pit waste rock emplacement areas would be managed in-pit. Runoff from the Stratford East out-of pit waste rock emplacement would be directed either to the open pit or the Stratford East Dam. Runoff from the majority of rehabilitated portions of out-of-pit waste rock emplacements would be directed off site – including diversion around the Stratford Main Pit (rejects/contained water storage). DADs would be located to capture haul road runoff and would continue to be dewatered by pumping to contained water storages.

The Project as at mid-2022 (end of Year 9) is shown in Figure B-6. Mining in the Avon North Open Cut would have been completed (at the end of Year 7), as would mining of the former co-disposal area (scheduled for the end of Year 8). The Avon North Open Cut void would be used as a contained water storage. Mining of Roseville West Pit Extension and Stratford East Open Cut would continue. The up-catchment diversion east of the Stratford East Open Cut would be extended further south in parallel but ahead of open cut pit development. Up-catchment diversions would likewise be extended on the western side of the Roseville West Pit Extension. Waste rock from the Roseville West Pit Extension and Avon North Open Cut would be disposed of in mined-out open cut pit areas, with some waste rock used to backfill the BRNOC void (the void would have been dewatered by pumping to other contained water storages). An additional haul road crossing of Avondale Creek would have been constructed for this purpose.

Runoff from in-pit waste rock emplacement areas would be managed in-pit. Runoff from the outer (northern) portions of the Roseville West Pit Extension waste rock emplacement would be directed to DAD18. Additional DADs would be located to capture haul road runoff and would continue to be dewatered by pumping to contained water storages. Rehabilitated or topsoiled waste rock emplacement areas which report to contained water storages (green and yellow areas on Figure B-6) would remain as contingency irrigation areas (refer Section B3.2.6).

Figure B-7 shows the post-mine landform. Final voids would remain in Roseville West Pit Extension, Avon North and Stratford East Open Cuts. The voids would form permanent contained lakes with a minimal contributing catchment. Up-catchment diversions would remain as permanent features, to minimise final void catchment areas. Details of the final void water balances are provided in Section B4.0. The Stratford Main Pit would be covered with waste rock during the final stages of mining, followed by topsoiling and revegetation. The up-catchment diversions east of the Stratford East Dam would be removed, allowing flow into the dam and facilitating periodic spill. The dam would remain as a water storage following mining.

Components of the proposed Project water management system are described in the sub-sections below.

B3.2.3 System Inflows

Rainfall induced runoff from active mining areas would vary with climatic conditions and the extent of current disturbance throughout the Project life (refer Section B4.0). Upslope runoff to active mining areas would be minimised through the use of up-catchment diversions. Runoff from active mining areas, containing elevated salinity and potentially high in suspended sediments, would be captured in contained water storages, open pits or DADs.

The open pit workings would become sinks for incident rainfall, infiltration through mine waste rock emplacements and rainfall runoff. Sumps would be excavated in the floor of the active open pits as part of routine mining operations to facilitate efficient dewatering operations and to minimise interruption to mining.

Groundwater inflows to the open pits have been modelled by Heritage Computing (Appendix A of the EIS) and are presented in Table B-12.

Water that accumulates in the open cut pit sumps would be transferred to one of the contained water storages where it would be used for dust suppression over Project haul roads and active waste rock emplacement surfaces and/or for use in the CHPP.

Table B-12
Predicted Groundwater Inflows

End of Project Year	Predicted Groundwater Inflow (ML/day)				
	BRNOC	Roseville West Pit Extension	Stratford Main Pit	Avon North Open Cut	Stratford East Open Cut
0	0.35	0.50	0.22	0.00	0.00
1	0.34	0.71	0.23	0.23	0.10
2	0.42	0.63	0.24	0.24	0.13
3	0.41	0.43	0.22	0.22	0.11
4	0.43	0.49	0.20	0.24	0.15
5	0.45	0.51	0.17	0.23	0.10
6	0.45	0.49	0.16	Reducing linearly with pit water level to 0.19 ML/day (at equilibrium)	0.08
7	0.0	0.53	0.0		0.09
8	0.0	0.47	0.0		0.07
9	0.0	0.46	0.0		0.07
10	0.0	0.46	0.0		0.15
11	0.0	0.49	0.0		0.08

Source: Heritage Computing (2012).
ML/day = megalitre per day.

B3.2.4 Contained Water Storages

Contained water storages for the Project would include the Stratford East Dam, the Stratford Main Pit, the RWD and Parkers/Bowens Road West Pit.

The Stratford East Dam and other contained water storages would be managed and operated for no release to downstream watercourses. This would involve operating the storages with a maximum operating level to provide freeboard for storm runoff storage. The freeboard for storm runoff storage would be maintained by transferring excess water to other contained storages or, in the unlikely event that all storages had insufficient freeboard, by pumping to the former co-disposal area or a mine open pit.

The capacity of the Stratford Main Pit would reduce progressively over time as it filled with rejects. Based on plans provided by SCPL, the estimated capacity of the Stratford Main Pit would reduce from approximately 18,000 ML at Project commencement to approximately 3,700 by mid-2023. Once mining in the BRNOC was completed (scheduled for mid-2014), the remaining void would be used as a water storage, with an estimated capacity of approximately 8,600 ML. Once mining in the Avon North Open Cut was completed (scheduled for mid-2020), the remaining, partially backfilled void would be used as a water storage, with an estimated capacity of approximately 20,300 ML. Water would be transferred out of the BRNOC void, the void would be backfilled with waste rock and the area rehabilitated. The Avon North Open Cut void would also be used as a rejects storage towards the end of the Project.

Water would be transferred between the storages to minimise the risk of disruption to mining and to maintain storm runoff storage capacity needed to achieve a low (negligible) risk of off-site release. Water would be transferred to the RWD to maintain supply to the CHPP and for haul road dust suppression (truckfill). The performance of the water management system, risks of off-site releases and reliability of supply have been assessed as part of the water management system modelling discussed in Section B4.0.

B3.2.5 Water Consumption

The main water requirement for the Project would be for CHPP makeup supply, to replace water pumped out with the co-disposed rejects (to the Stratford Main Pit) and moisture lost with product coal. Water would also be required for washdown of mobile equipment, dust suppression on haul roads, active waste rock emplacement areas, ROM coal stockpiles and conveyor systems. Some water would also be used for fire fighting and other minor non-potable water uses.

The water consumption requirements and the water balance of the system would fluctuate with climatic conditions and as the extent of the mining operation changes over time. Fluctuations in water consumption have been accounted for in the site water balance model (Section B4.0).

B3.2.6 Irrigation

The Project would involve the usage of existing approved irrigation areas as well as the development of new areas on an as-required basis (i.e. as determined by periodic reviews of the site water balance), as new rehabilitated areas become available. Irrigation would only occur on rehabilitated or topsoiled areas from which runoff reports to contained water storages or open pits. As indicated in Figures B-4 to B-6, extensive additional irrigation areas become available later in the Project life.

B3.2.7 Drainage Management for Undisturbed Areas and Project Areas

The Project water management system would control waters generated from surface development areas while minimising the capture of surface water runoff by diverting up-catchment runoff around such areas. The water management system would include a combination of permanent structures that may continue to operate post closure and temporary structures that would only be required until the completion of rehabilitation works (e.g. sediment control structures).

Temporary and permanent up-catchment diversion bunds/drains and interception dams would continue to be constructed over the life of the Project to divert runoff from undisturbed areas around the open pits and waste rock emplacements. The most significant diversions would comprise progressive development of:

- diversion bunds/drains to the east of the Stratford East Open Cut;
- a diversion bund/drain to the east of the Avon North Open Cut; and
- a diversion bund/drain to the west and south of the Roseville West Pit Extension.

An existing diversion bund/drain system is located to the east of the Stratford East Dam. It was constructed to divert up-catchment runoff to the north of the storage and into the tributary of Avondale Creek (refer Figure B-3). This gully flows westwards, initially as a well-defined gully in steeper terrain, before flowing across quite flat terrain as an ill-defined gully between the Stratford Main Pit and the Bowens Road North waste rock emplacement. In parallel to commencement of pre-stripping operations for the Stratford East Open Cut, an additional diversion bund/drain would be constructed to the east of the open pit alignment – refer Figure B-4.

This diversion would direct up-catchment runoff northwards to a small interception dam located in a gully to the south-east of the Stratford East Dam. An additional diversion would then direct flow northwards from this dam to another existing interception dam at the head of the existing Stratford East Dam diversion. The longitudinal alignment of the diversion would, for most of the diversion length, comprise a “contour” bund/drain constructed with a low longitudinal gradient, to control the risk of erosion at high flows. However, existing topography and the alignment of the proposed open pit mean that a single drop structure would be required to direct flow into the gully south-east of the Stratford East Dam (refer Figure B-4). On-going development of the Stratford East Open Cut would see the diversion drain/bund extended to the south - ahead of pit development (refer Figure B-5). For the majority of the pit length, the diversion would direct flow northwards to link into the existing Stratford East Dam diversion. However, from approximately 2021 (Year 8), due to topographical constraints, an additional diversion would be constructed near the south-east corner of MLA2, directing up-catchment runoff south to the headwaters of Avondale Creek (refer Figure B-6). This diversion would comprise a series of “contour” (low gradient) drains and engineered drop structures.

The proposed diversion described above will add some additional catchment to the tributary of Avondale Creek (approximately 1.41 km^2 ultimately – an increase of approximately 84% to the current creek catchment at the existing diversion outfall). Fluvial Systems Pty Ltd have recommended on-going monitoring of the tributary and an adaptive management approach (refer Attachment BB). In addition a 600 m long section of the tributary identified by Fluvial Systems Pty Ltd (Attachment BB), would need to be diverted south by up to 150 m to avoid the Avon North Open Cut at its southern extent. Prior to diversion of this 600 m section, as recommended by Fluvial Systems Pty Ltd, an investigation should be undertaken to determine the overall performance of the diversion along its length (via monitoring) to inform the final design. A separate investigation including modelling of peak flows should also be undertaken to support the final design of this 600 m section.

An existing haul road crossing of the tributary exists in its lower reaches (refer Figure B-3) – linking to BRNOC. An additional crossing would be constructed (to the Avon North Open Cut) further upstream (refer Figures B-4 to B-6).

The catchment area reporting to the Avon North Open Cut would be minimised by backfilling the area between the proposed up-catchment diversion to the east and the final void in parallel with open cut development and progressively rehabilitating this area during mining (refer Figures B-4 to B-6). An existing diversion bund is located to the west of the existing Roseville West Pit Extension, directing up-catchment runoff (from a limited catchment area) to the north (refer Figure B-3). In addition, an existing diversion drain/bund is located to the west of the former co-disposal area, diverting up-catchment runoff to the north. On-going development of the Roseville West Pit Extension (to the south) would see the extension of diversion bunding on the western side of the open pit area in parallel with pit development, ultimately linking in to the existing diversion west of the former co-disposal area (refer Figures B-4 to B-6). The diversion would be located along the western perimeter of the mine disturbance area. The longitudinal gradient of the diversion would vary and, in places, armouring (e.g. with rockfill) may be required to ensure stability against erosion.

Permanent up-catchment diversion bunds/drains would remain around final voids (refer Figure B-7).

Up-catchment diversion works would be designed in consultation with the NOW, with particular focus on channel stability and longevity. The design capacity of these up-catchment diversion works would be consistent with existing up-catchment diversion works (i.e. sufficient to pass a 100-year ARI peak flow).

Up-catchment diversions would be designed to be stable at the design flow rates – i.e. the diversions should not need engineering works to restore their function following an event of this size or smaller. Stabilisation of the up-catchment diversions would be achieved by design of appropriate channel cross-sections and gradients and the use of channel lining with grass or rockfill as required. In general, diversions would be designed as "contour" drains with low longitudinal gradients (e.g. 0.5%) to limit erosion potential. Drop structures would be required at (refer Figures B-4 to B-6):

- the northern end of the proposed diversion east of the Stratford East Open Cut;
- along and at the end of the short diversion at the south-eastern end of the Stratford East Open Cut; and
- the outfall of the diversion west of the Roseville West Pit Extension.

Drop structures would be designed to be stable at design flow rates and would involve lining with coarse, durable rockfill or some other form of stable revetment, as well as energy dissipation integrated within the design.

Up-catchment diversions are inspected routinely following significant rainfall events to check for signs of erosion or obstruction. Inspections would continue for the duration of the Project.

A system of collection drains, bunds and culverts would be used to collect runoff from disturbed areas and direct runoff to DADs (as indicated on Figures B-4 to B-6). The design capacity of these drainage systems would be appropriate to their service life and the consequences of exceedence.

The final top surface of the Stratford East and Avon North waste rock emplacements would be graded to drain to the east, away from the outer batters of the emplacements, thereby minimising the catchment reporting to the batters. Final emplacement top surface drainage would however be directed around the final voids (refer Figure B-7). Emplacement batter drainage would be progressively developed as part of waste rock emplacement activities. Drainage would comprise berm drains (with low longitudinal gradients) spaced at regular intervals down the batters, directing drainage around the emplacement perimeter, either to intersect the natural surface (and thence to natural drainage lines) or to engineered drop structures. The capacity of emplacement drainage structures would be designed in consultation with the NOW.

The proposed additional haul road crossing of Avondale Creek (to BRNOC) would be designed with adequate capacity to pass up to a 100-year ARI peak flow – consistent with existing Avondale Creek crossings. The creek crossing design is likely to include culverts and their design and installation would be undertaken with due regard to minimising potential environmental impacts (e.g. effects on fish passage).

B3.2.8 Waste Rock Emplacement Drainage Management

Geochemical investigations were undertaken and included as part of the Geochemical Assessment prepared for the Project (EGi, 2012) (Appendix L of the EIS).

Testwork results indicate that the vast majority of the waste rock from the Roseville West Pit Extension and Avon North Open Cut are likely to be non-acid forming (NAF) and would not require special handling. Waste rock material from the Stratford East Open Cut will require materials segregation and management to prevent acid rock drainage (ARD). Recommended management strategies include:

- Potentially acid forming (PAF) waste rock should either be placed in-pit below the final (post mine) water table level or, if placed in out-of-pit emplacements, should include an engineered cover system to control infiltration and oxygen diffusion.
- Interim exposed PAF waste rock material should be treated with crushed limestone to control ARD.
- PAF and NAF material should be segregated during mining operations. Segregation is reliant on knowledge of the locations of PAF and NAF horizons, which in turn will require additional testing to define the distribution and continuity of geochemical rock types.
- Paddock dumping and traffic compacting of PAF materials in lifts of 5 m or less to minimise the risk of accelerated oxidation through convection.
- Timely removal of ponded water from pit sumps should be undertaken where possible (within the context of the wider mine water management system), or alternatively water treatment/neutralisation should be undertake if acid formation occurs.

In assessing Project impacts on water quality we have assumed that these recommendations would be implemented.

B4.0 SIMULATED PERFORMANCE OF WATER MANAGEMENT SYSTEM

A water and salt balance model of the Project water management system has been developed to simulate the behaviour of the water management system over the 11 year Project life. The model structure is generally as per the schematic in Figure B-30.

The structure of this section is as follows:

- A description of the model structure, set-up data and assumptions (Section B4.1).
- An outline of the model calibration using monitoring data sourced from SCPL (Section B4.2).
- Details of model predictions for the 11 year Project life (Section B4.3).
- A discussion of model sensitivity to key water balance parameters (Section B4.4).
- A summary of implications of the model and assumptions in regard to on-going management of the system at Stratford Mining Complex.

B4.1 Model Description

B4.1.1 General

The model simulates daily changes in stored volumes of water at the Project in response to inflows (rainfall and groundwater) and outflows (evaporation, dust suppression use, irrigation loss and spill [if any]). Modelling includes simulation of storage in the contained water storages, open pits, Stratford Main Pit waste rock emplacement (pore water storage) and DADs (refer Figure B-30). For each storage, the model simulates:

Change in Storage = Inflow – Outflow

Where:

Inflow includes rainfall runoff (for surface storages), seepage (from the Stratford Main Pit waste rock emplacement to the Main Pit), groundwater inflow (for open pits), water inflow from settling and consolidating rejects (for the Stratford Main Pit) and all pumped inflows from other storages.

Outflow includes evaporation, seepage and all pumped outflows to other storages or to a water use.

Runoff from all mine areas reports to the open pits, contained water storages or DADs.

The model also simulates changes in the salinity (EC) of each storage by assigning EC values to inflow streams (runoff, groundwater, seepage and CHPP rejects water) and assuming conservation of mass.

B4.1.2 Rainfall and Evaporation

The model has been developed to simulate the 11 year Project life plus the (approximately) 2 year period prior to Project commencement (in July 2013), so as to start the model with "current" water storage volumes. The model operates on a less than daily time step (1/6th of a day) and uses the full period of available climatic data for the region from 1889 to 2010 (sourced from the Data Drill system – refer Section B2.1). The Data Drill rainfall data was compared with the Stratford Mining Complex rainfall data record (for the period from 1996 to 2011) and found to be well correlated – refer Figure B-31 below which shows a plot of monthly rainfall totals from the SCM weather station record versus monthly rainfall totals from Data Drill. Figure B-31 shows that the data is well correlated and that the Data Drill may slightly over-estimate rainfall measured at the SCM weather station.

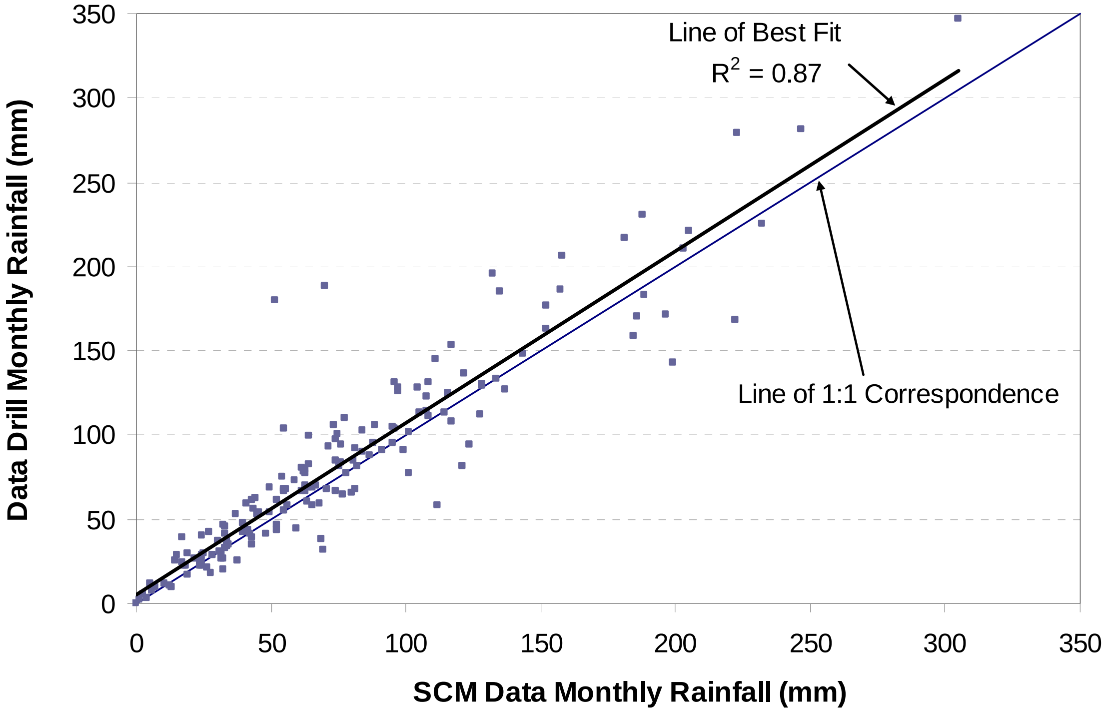


Figure B-31 Comparison of Monthly Rainfalls – SCM Weather Station and Data Drill

The model simulates 123 possible mine life "realizations", each of 13 years (11 year Project life plus approximately 2 years prior). Realization 1 uses climatic data from 1889 to 1901; realization 2 uses data from 1890 to 1902; realization 3 uses data from 1891 to 1903 and so on. In order that recent climate be included in as many realizations as all other years in the record, climate data was "wrapped" with data from 1889 to 1900 added to the record after 2010. In this way, historically representative climatic realizations are produced which can be used to test the water management system over a wide range of climatic conditions. By ranking simulated outcomes, the model can be used to estimate the probability and consequences of different water management outcomes occurring.

Daily pan evaporation data was also sourced from the Data Drill system covering the same period as the rainfall sequence (1889 – 2010). The pan evaporation data was converted to estimates of open water evaporation by applying a pan factor of 0.9 for water storages (typical value for Australian reservoirs), 0.8 for open pits (likely to be lower than for reservoirs because of the reduction in wind speed in these depressed water bodies) and 1.1 for exposed rejects surfaces (likely to be higher for the darker rejects material which has less reflectance).

B4.1.3 Runoff Simulation

The Australian Water Balance Model (AWBM) (Boughton, 2004) was used to simulate runoff from rainfall on the various catchments and landforms across the Project area. The AWBM is a nationally-recognised catchment-scale water balance model that estimates streamflow (a combination of rainfall runoff and baseflow) from rainfall and evaporation. Modelling of the following seven different sub-catchment types was undertaken (as shown in Figures B-4 to B-6):

- Natural Surface/Undisturbed;
- Active Waste Rock Emplacements;
- Partially Rehabilitated (Topsoiled) Areas;
- Rehabilitated Areas;
- Co-Disposed Rejects;
- Hardstand; and
- Open Pit.

AWBM parameters for undisturbed areas were taken from model calibrations undertaken for Mammy Johnsons River[10]. Parameters for the remaining sub-catchments were taken from values or experience with similar projects. Table B-13 outlines the AWBM parameters used in the model.

Table B-13
Water Balance Model AWBM Parameters

Parameter	Natural Surface	Active	Partially Rehabilitated	Rehabilitated	Co-Disposed Rejects	Hardstand	Open Pit
C1 (mm)	4.6	5.0	5.0	4.6	0	1.0	5.0
C2 (mm)	47.2	70	55	40	25	6.0	20
C3 (mm)	94.5	-	-	90	-	-	-
A1	0.134	0.05	0.05	0.13	0.1	0.5	0.1
A2	0.433	0.95	0.95	0.43	0.9	0.5	0.9
A3	0.433	0	0	0.44	0	0	0
BFI	0.23	0.5	0.4	0.23	0.0	0.0	0.1
K_{base}	0.823	0.97	0.97	0.97	0.0	0.0	0.9
K_{surf}	0.5	0.2	0.2	0.2	0.2	0.1	0.1

Note: An AWBM evaporation factor of 0.85 was used in the model as recommended by Boughton (2006).

Catchment and sub-catchment areas were calculated from current and future mine layout plans provided by SCPL. The total catchment area reporting to the mine open pits, contained water storages and DADs varied over the mine life as shown on Figure B-32. In calculating these areas from supplied plans, it has been assumed that after cessation of mining activity (e.g. waste rock emplacement operations) in any area for one year, that area is topsoiled and seeded, while one year further on it is assumed to be fully rehabilitated.

[10] Mammy Johnsons River gauging station (GS 209002) – located in an adjacent catchment to the south-east and as documented in Boughton and Chiew (2003).

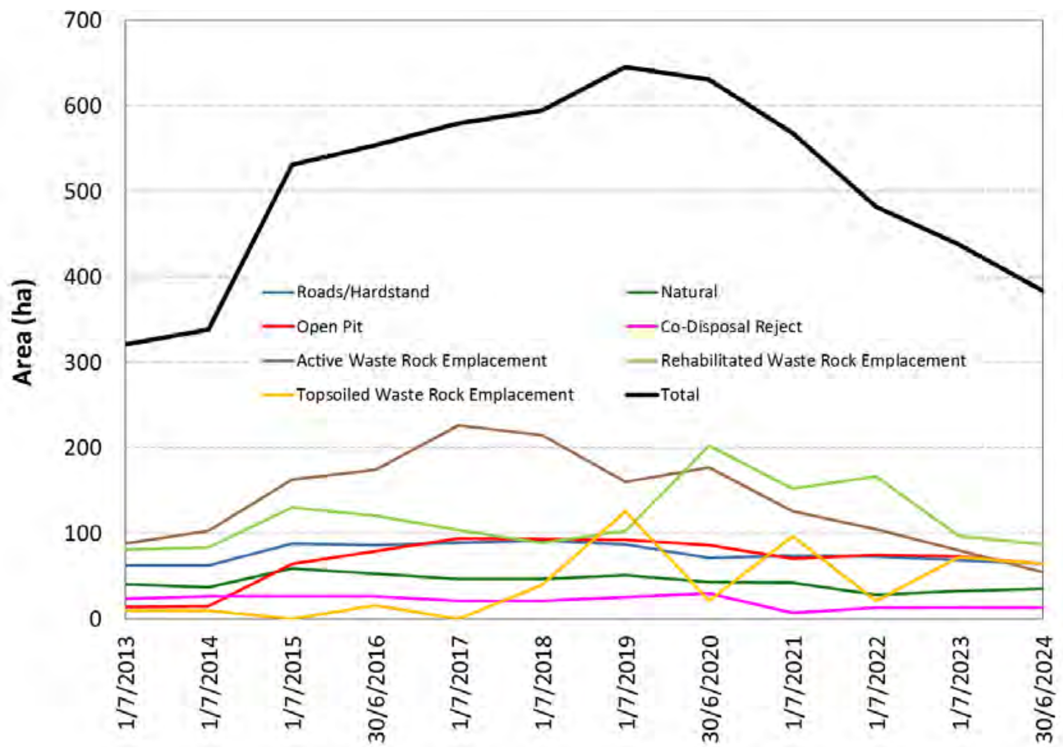


Figure B-32 Variation in Total Catchment Area over Project Life

Note: ha = hectares

B4.1.4 Water Demands

B4.1.4.1 CHPP Make-Up

CHPP make-up was calculated as the water required to be made up to replace water pumped with co-disposed rejects. This rate is therefore related directly to the rate of ROM coal feed to the CHPP and the rate of production of rejects. These rates (annual tonnages) are summarised in Table B-14 below.

Table B-14
CHPP ROM Coal and Rejects Rates

Financial Year Ending June	Project Year	ROM Coal Feed (Mt)	Rejects (Mt)
2012	-	3.7	1.2
2013	-	4	1.3
2014	1	4.3	1.4
2015	2	4.8	1.3
2016	3	4.1	1.4
2017	4	4.2	1.4
2018	5	4.6	1.5
2019	6	3.5	1.2
2020	7	2.3	0.8
2021	8	2.4	0.9
2022	9	2.4	0.9
2023	10	2.6	1.0
2024	11	1.5	0.5

Mt = million tonnes.

The water demand was calculated based on a pumped rejects solids concentration of 28.5% (based on data received from SCPL). The resulting annual make-up demands are summarised in Figure B-33 below. Estimated make-up peaks at a rate of 10.3 ML/day.

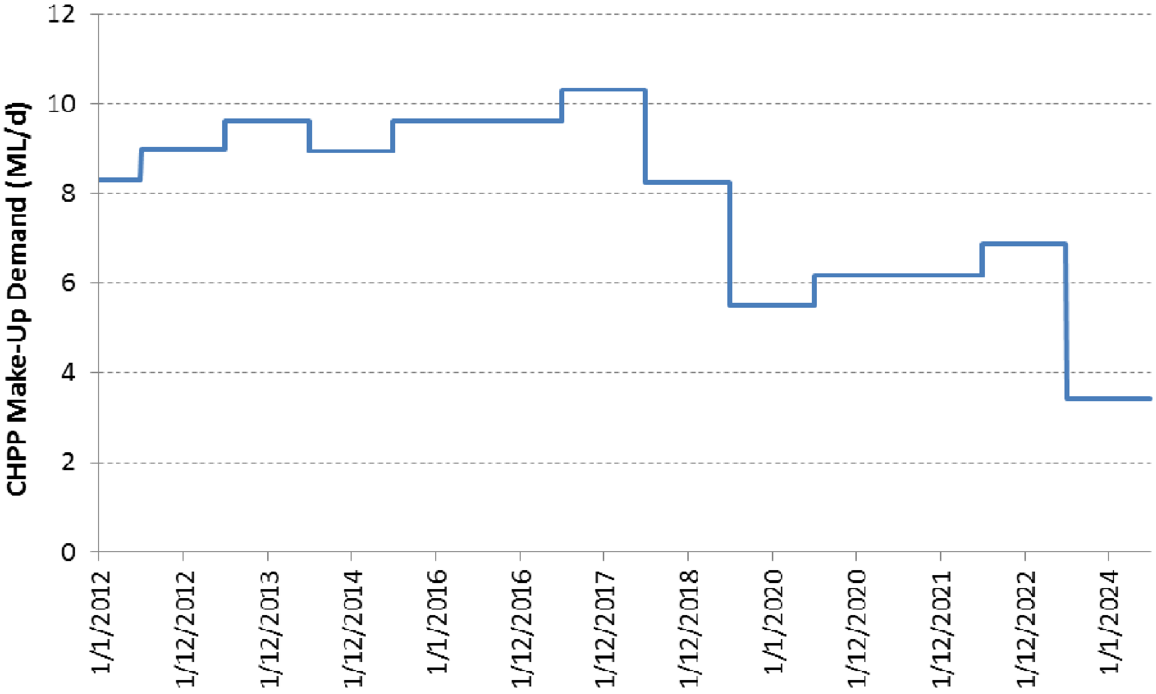


Figure B-33 Estimated CHPP Make-Up Demand

B4.1.4.2 Haul Road Dust Suppression

Project haul road dust suppression demand was calculated based on estimated future haul road lengths, derived from annual haul road layouts provided by SCPL. Also as advised by SCPL haul roads for the Roseville West Pit Extension and BRNOC were set at 22.5 m, while the width of haul roads for Avon North and Stratford East Open Cuts were set to be 30 m for modelling purposes. This data was used to calculate haul road areas. Daily dust suppression demand was calculated as pan evaporation minus rainfall over this area multiplied by 1.35, to allow for higher evaporation off the dark, highly trafficked haul roads. Figure B-34 summarises estimated haul road water demand averaged over all climatic realizations.

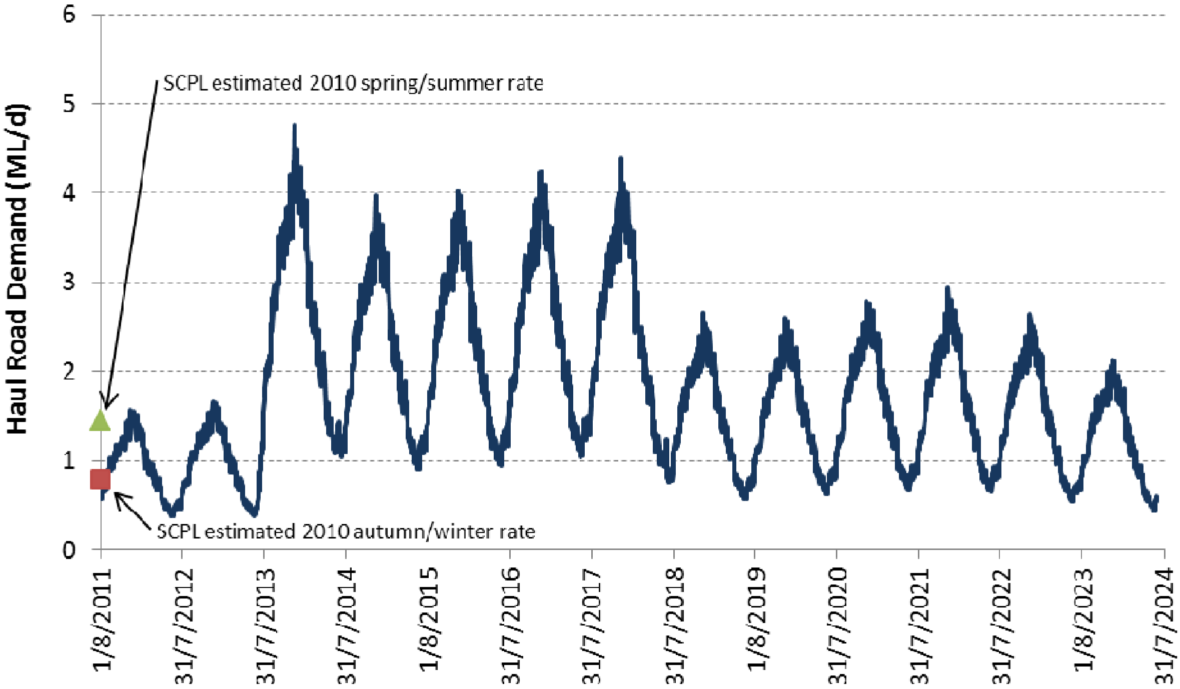


Figure B-34 Estimated Haul Road Dust Suppression Demand

From Figure B-34 it can be seen that estimated haul road demand is highly seasonal and increases upon Project commencement in mid-2013. The estimates for 2011 and 2012 compare reasonably well with average monitored 2010 use in spring/summer of 1.46 ML/day and 0.79 ML/day in autumn/winter (as advised by SCPL).

B4.1.4.3 Active Waste Rock Emplacement Dust Suppression

In order to control dust generation from waste rock emplacement operations, “active” waste rock emplacements are to be watered in a similar fashion to haul roads. Figures B-4 to B-6 highlight the extent of active waste rock emplacement areas at different phases of the Project, while Figure B-32 shows estimated change in area over the Project life. Daily demand was calculated by multiplying this area by pan evaporation minus rainfall multiplied by an “efficiency” factor of 67% (recognising that not all areas of waste rock emplacement may be able to be accessed for watering at any one time). Figure B-35 summarises estimated waste rock emplacement dust suppression water demand averaged over all climatic realizations.

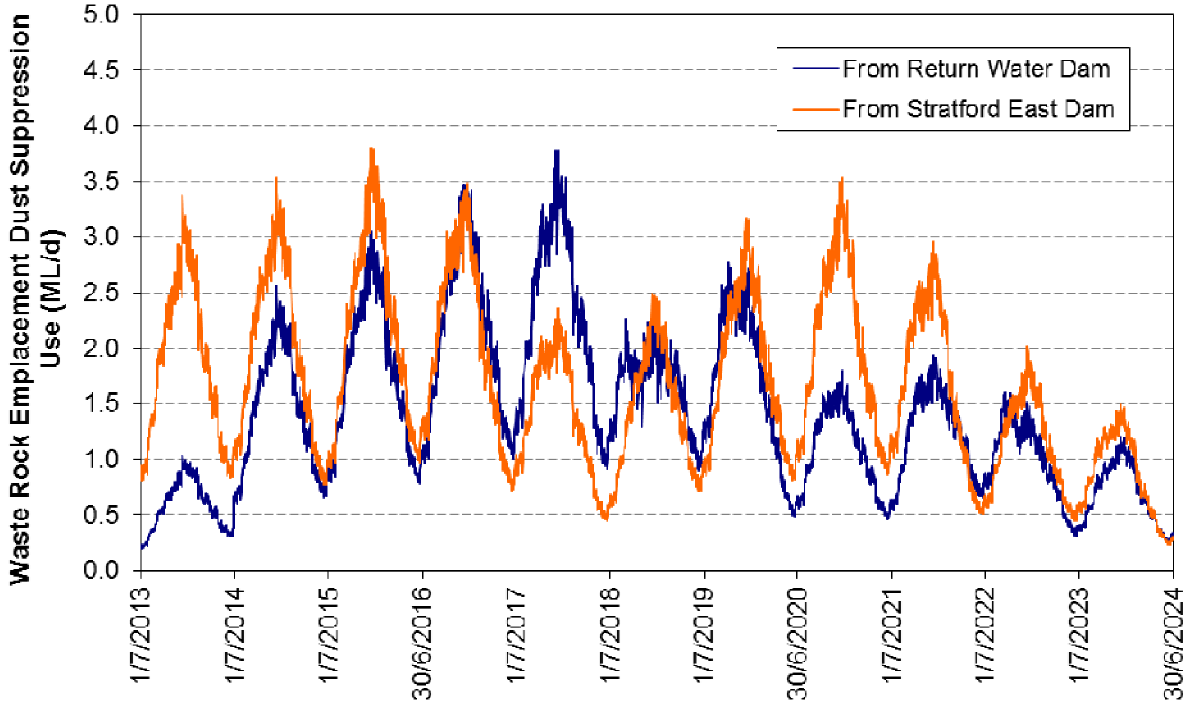


Figure B-35 Estimated Average Waste Rock Emplacement Dust Suppression Use

B4.1.5 Irrigation

As indicated in Section B3.1.1 irrigation currently occurs over rehabilitated waste rock emplacement areas within the catchment of the Stratford East Dam. Irrigation was assumed to occur over additional rehabilitated waste rock emplacement areas within the catchments of contained water storages. Irrigation was assumed to occur at a rate equal to pan evaporation minus rainfall multiplied by a crop factor (0.67 for summer and 0.28 for winter[11]). In the model, irrigation is assumed to occur from the Stratford East Dam and only when the total stored water volume on site was in excess of 3,500 ML (in order to maintain a supply reserve).

B4.1.6 Rejects Density

In-pit rejects disposal results in liberation of water pumped with the combined rejects as settling and consolidation occurs. A key parameter in this regard is the *in-situ* density of the rejects – the higher the density the greater the relative volume of water that will report to the surface of the pit void and contribute to the system water balance. Based on bench-scale testwork on rejects samples from the SCM CHPP, and discussions with SCPL personnel; a dry density[12] of 1.2 tonnes per cubic metre (t/m^3) was assumed as a “base” case. A density of 1.2 t/m^3 results in an estimated 85% of the original water pumped out in the rejects from the CHPP being “liberated” during settlement of the reject solids in the void and reporting to the void surface. A review characterization of the CHPP rejects was undertaken by Allan Watson Associates (2012) (Attachment BD). This review concluded that a deposited average rejects dry density of up to 1.6 t/m^3 could be achieved. A higher rejects dry density results in a higher water yield from the rejects. Therefore the effect of a higher rejects dry density was assessed as part of sensitivity analyses (refer Section B4.4).

[11] Based on irrigation experience at the nearby DCM.
[12] Dry density is the mass of dry particles per unit total volume.

B4.1.7 Salinity Estimates

Salinity (EC) values were assigned to runoff from each of the sub-catchment areas given in Table B-13 as well as to groundwater, waste rock emplacement seepage and CHPP rejects water. An initial set of values was assigned and subsequently adjusted so that simulated EC values in contained water storages in the early period of the simulation approximated those recorded in these storages in recent years. Table B-15 summarises EC values used in the model. Initial EC values in simulated storages were set at values recorded in mid-late 2011.

Table B-15
Adopted Model Electrical Conductivity Values

Sub-Catchment or Inflow Stream	Electrical Conductivity Value (µS/cm)	Remarks
Natural Surface	617	Average value for W10 (tributary of Avondale Creek)
Active Waste Emplacement	1,200	Approximate average values for SCM sediment dams which receive runoff predominantly from waste rock emplacements
Partially Rehabilitated Waste Emplacement	1,200	
Rehabilitated Waste Emplacement	1,200	
Co-Disposal Area (Runoff)	3,700	Estimate
Hardstand	2,400	Approximate average value for Parkers/BRW Pit which comprises mostly hardstand areas and coal stockpiles
Open Pit	2,400	
CHPP Rejects Water	4,100	Estimate derived in order to match Stratford Main Pit simulated values to recently monitored range
Groundwater – Roseville West Pit Extension and Avon North Open Cut	5,000	Heritage Computing (2012)
Groundwater – BRNOC	3,100	SCPL (2001) Appendix C
Groundwater – Stratford East Open Cut	2,100	Woodward-Clyde (1996) Appendix Eb. On basis of advice from SCPL, coal mined in Stratford East Open Cut likely to be similar to Weismantel Seam mined at Duralie Coal Mine

B4.1.8 Other Data

Other key data and assumptions used in the model include the following:

- Modelled contained water storage capacities were as summarised in Section B3.2.4. DADs were sized consistent with the sizing criteria for sediment dams in the existing Stratford Mining Complex Surface Water Management Plan and the Erosion and Sediment Control Plan (refer Resource Strategies, 2002a and 2002b and Section B3.1.3).

- Future mine catchment areas measured from annual “snapshot” plans provided by SCPL. Future haul road, waste rock emplacement dust suppression and irrigation areas were derived from these plans.

- Groundwater inflow rates to open pits as summarised in Table B-12 (provided by Heritage Computing, 2012).

- Project simulations commence on 1st August 2011, with an assumed total stored surface water volume at the Stratford Mining Complex of approximately 9,200 ML.

Table B-16 summarises key contained water storage trigger volumes and associated operating assumptions. Assumed pump capacities are summarised in Table B-17.

Supply from the Return Water Dam to the CHPP and for dust suppression was assumed not limited by pumping rates. Likewise irrigation supply drawn from the Stratford East Dam was assumed not pump rate limited.

Table B-16
Contained Water Storage Trigger Volumes

Storage	Trigger Description	Volume (ML) (% of Capacity)	Operational Assumption
Return Water Dam	High Operating Volume	200 (60%)	No pumping to this storage occurs when it is above this volume, except from Parkers/Bowens Road West Pit void.
	Low Operating Volume	90 (27%)	Keep storage at at least this volume by supply of water from other contained water storages
BRNOC	High Operating Volume	11,118* (96%)	No pumping to this storage above this volume; if above this volume pump to Return Water Dam up to its high operating volume.
Stratford East Dam	Very High Operating Volume	2,786 (97%)	Initiate pumping to Roseville West Pit Extension if above this volume.
	High Operating Volume	2,384 (83%)	No pumping to this storage above this volume; if above this volume pump to Return Water Dam up to its high operating volume. Initiate pumping to Roseville West Pit Extension if above this volume and Avon North Open Cut void above its high operating volume.
	Low Operating Volume	650 (23%)	No irrigation of rehabilitated waste rock emplacement areas if below this volume.
Stratford Main Pit	Very High Operating Volume	Varies** (94%)	Initiate pumping to Roseville West Pit Extension if above this volume; no pumping from DADs if above this volume.
	High Operating Volume	Varies** (90%)	No pumping from active open pits when it is above this volume; if above this volume pump to Return Water Dam up to its high operating volume; if above this volume pump to Stratford East Dam, regardless of its volume, to maintain equivalent freeboard in both storages.

Table B-16 (Continued)
Contained Water Storage Trigger Volumes

Storage	Trigger Description	Volume (ML) (% of Capacity)	Operational Assumption
Avon North Open Cut Void	High Operating Volume	Varies*** (97.5%)	No pumping to this storage occurs when it is above this volume; if above this volume pump out to Stratford Main Pit and Stratford East Dam if those storages are below their respective high operating volumes. Initiate pumping to Roseville West Pit Extension if above this volume and Stratford East Dam above its high operating volume.

* Includes pore water storage in adjacent waste rock emplacement.

** Volume (ML) varies with time as capacity reduces due to accumulation of rejects – from some 17,090 ML and 16,360 ML at the commencement of the Project to 5,100 ML and 4,890 ML at completion of the storage life.

*** Volume (ML) varies with time as capacity reduces due to accumulation of rejects – from some 22,270 ML at the commencement of the use of this void as a storage to 17,500 ML and Project completion.

Table B-17
Modelled Water Management System Pump Rates

Pump	Rate (L/s)
Parkers/Bowens Road West Pit Void	65
Western Co-Disposal Area	100
Roseville West Pit Extension	85
BRNOC	85
Avon North Open Cut	240
Stratford East Open Cut	85
Stratford Main Pit to Return Water Dam	355
Stratford Main Pit to Stratford East Dam	200
Stratford East Dam to Stratford Main Pit	140
Stratford East Dam to Return Water Dam	100
DAD1, DAD3, DAD19, DAD18 and Ellis Dam*	35
DAD11	35
DAD19	35
DAD20	35
DAD22	20

* One mobile pump moved between storages depending on which has the lowest freeboard

L/s = litres per second

B4.2 Model Calibration

SCPL has provided the following data for use in model calibration:

- Daily estimated volumes of water pumped out of Roseville West Pit and BRNOC.
- Daily rainfall at the Stratford Mining Complex (SCM weather station records).
- Daily site evaporation data (calculated from the SCM weather station records).

Data has been provided for the period from mid-2009 to mid-2011.

Model calibration has been carried out for inflow to the two open pits, on the assumption that no significant volume of water has been allowed to accumulate in the open pits over time.

The open pits receive runoff from the mine area and active and rehabilitated waste rock emplacement areas, as well as groundwater inflow. Groundwater inflow rates for the Roseville West pit and the BRNOC were provided by Heritage Computing (2012) and are detailed in Table B-18. Figures B-36 and B-37 show predicted and monitored cumulative pumped water volume from the BRNOC and Roseville West pits, respectively. Rainfall runoff parameters were as given in Table B-13, while groundwater inflow rates were reduced to 70% for the Roseville West pit and increased to 140% for the BRNOC.

Table B-18
Modelled Groundwater Inflow Rates – Calibration Period

Date	Roseville West Pit	BRNOC
31/5/2009	0.62	0.37
30/6/2009	0.60	0.36
31/7/2009	0.58	0.34
31/8/2009	0.54	0.33
30/9/2009	0.51	0.32
31/10/2009	0.51	0.34
30/10/2009	0.50	0.35
31/12/2009	0.52	0.36
31/1/2010	0.51	0.24
28/2/2010	0.51	0.26
31/3/2010	0.50	0.26
30/4/2010	0.47	0.25
31/5/2010	0.36	0.25
30/6/2010	0.35	0.26
20/8/2011*	0.35*	0.26*

* Constant after this date

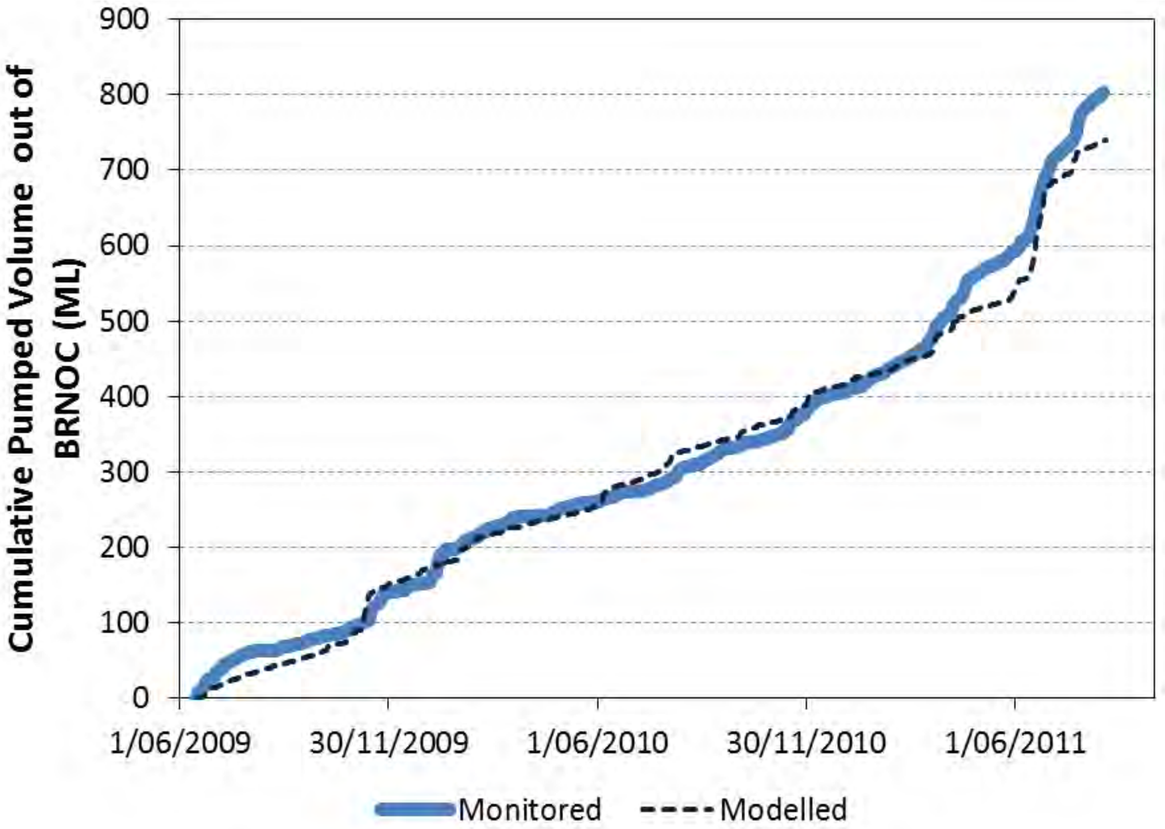


Figure B-36 Recorded and Predicted Pit Inflow – BRNOC

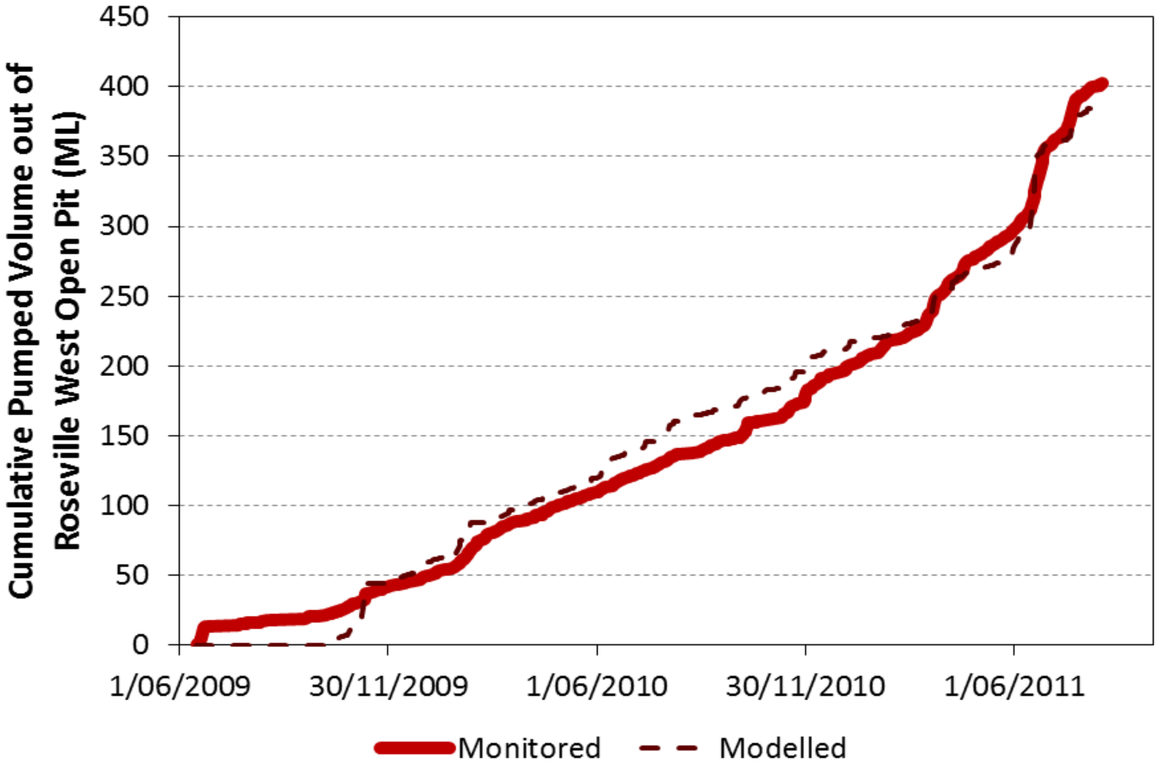


Figure B-37 Recorded and Predicted Pit Inflow – Roseville West Pit

Figures B-36 and B-37 indicate a good fit between predicted and recorded data, indicating that the AWBM parameters used in the water balance model should give a good estimate of rainfall runoff for mine sub-catchments.

B4.3 Simulated Performance

B4.3.1 Overall Water Balance

The overall water balance for the Project, for the Project life, averaged over all 123 realizations is summarised in Table B-19. The results show that on average inflows were dominated by rainfall and runoff from the mine site catchments and tailings water. Outflows were dominated by water use (CHPP water supply and water use on haul roads). On average there is a small difference between total inflows and total outflows which reflects the average difference in water inventory on site at the start and end of the simulation. The water balance behaviour of individual realizations will however vary with climatic conditions – refer Table B-20.

Table B-19
Predicted Average Water Balance

	Average Inflows (ML/year)
Groundwater	451
Rainfall-runoff	3,267
Stratford Main Pit Waste Rock Emplacement Recharge	65
Tailings Water	2,395
TOTAL	6,178
	Average Outflows (ML/year)
Evaporation	733
CHPP Supply	2,805
Haul Road Dust Suppression	663
Waste Emplacement Rock Dust Suppression	1,114
Irrigation	748
DAD Overflow	117
TOTAL	6,180

The water balance for the Project life for realizations with rainfall totals corresponding to the median, 10%ile (dry) and 90%ile (wet) are given in Table B-20.

Table B-20
Predicted Project Water Balance for Given Rainfall Totals

Average Inflow (ML/year) from:	*10%ile Rainfall*	*Median Rainfall*	*90%ile Rainfall*
Groundwater	455	455	434
Rainfall-runoff	2,729	3,003	4,386
Stratford Main Pit Waste Rock Emplacement Recharge	48	61	106
Co-disposed Rejects Water	2,395	2,395	2,395
TOTAL	5,627	5,914	7,321
Average Outflow (ML/year) to:			
Evaporation	759	725	853
CHPP Supply	2,805	2,805	2,805
Haul Road Dust Suppression	651	692	652
Waste Rock Emplacement Dust Suppression	1,108	1,166	1,099
Irrigation	803	854	807
DAD Overflow	43	54	235
TOTAL	6,169	6,296	6,451

Note: The difference between total inflows and total outflows reflects the difference in water volume in storage at the start and end of each realization.

B4.3.2 Overall System Performance

Water balance simulation showed that there were no simulated releases of mine related water from the contained water storages in any of the 123 realizations simulated. Figure B-38 shows average and 5 and 95 percentile non-exceedences based on the 123 realizations of simulated total volume of water stored in all water storages (including DADs and open pits) for the simulation period.

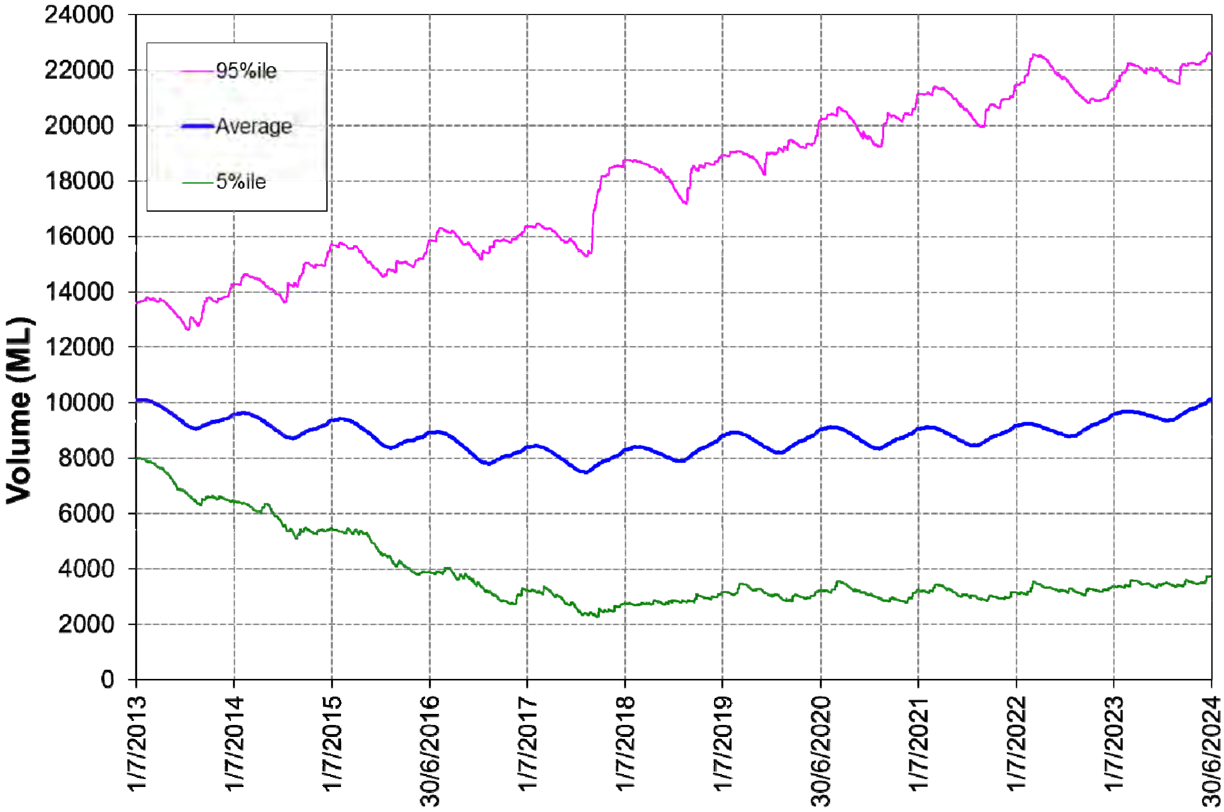


Figure B-38 Predicted Total Volume of Water Stored in all Water Storages[13]

Figure B-38 shows that, through the use of effective water management measures, there is predicted on average to be no net increase in total water stored over the Project life. These measures include (refer also Section B4.1.8):

- the use of water for dust suppression on active waste rock emplacement areas;
- the use of controlled irrigation over rehabilitated and partly rehabilitated waste rock emplacement areas;
- maintaining adequate freeboard in contained water storages for large rainfall events;
- timely rehabilitation of disturbed areas and diversion of runoff from these areas off site via sediment dams; and
- storing water in open pits if required.

[13] Because each realization is overlapping, simple probability theory does not apply and the 95 and 5 percentile values shown should not be interpreted in a strict probability sense, but rather as the percentage of realizations out of 123 above a given value of volume.

The Project would be operated with an operational risk of disruption to mining which could occur as a result of exceedence of the design capacity of the water management system and the need to store water in active open pits if required (refer Table B-21). The operational risk to the Project as a result of this has been assessed by SCPL and has been determined to be an economically and operationally acceptable risk.

Table B-21
Predicted Risk of More than 200 ML Water Volume in Open Cut Pits

Open Pit	Percentage of days simulated where volume contained in open pit exceeded 200 ML		
	Average over all realizations	95th percentile value over all realizations	Highest of all realizations
Roseville West Pit Extension	4.0%	21%	45%
BRNOC*	<0.1%	<0.1%	<0.1%
Avon North Open Cut*	0.8%	0.4%	27%
Stratford East Open Cut	2.5%	11%	23%

* Up to end of mining

Predicted CHPP water supply reliability averaged more than 99.9% over all realizations – that is more than 99.9% of the CHPP demand simulated over all realizations could be supplied.

The simulated median salinity (EC) of water in contained water storages over the Project life is shown in Figure B-39.

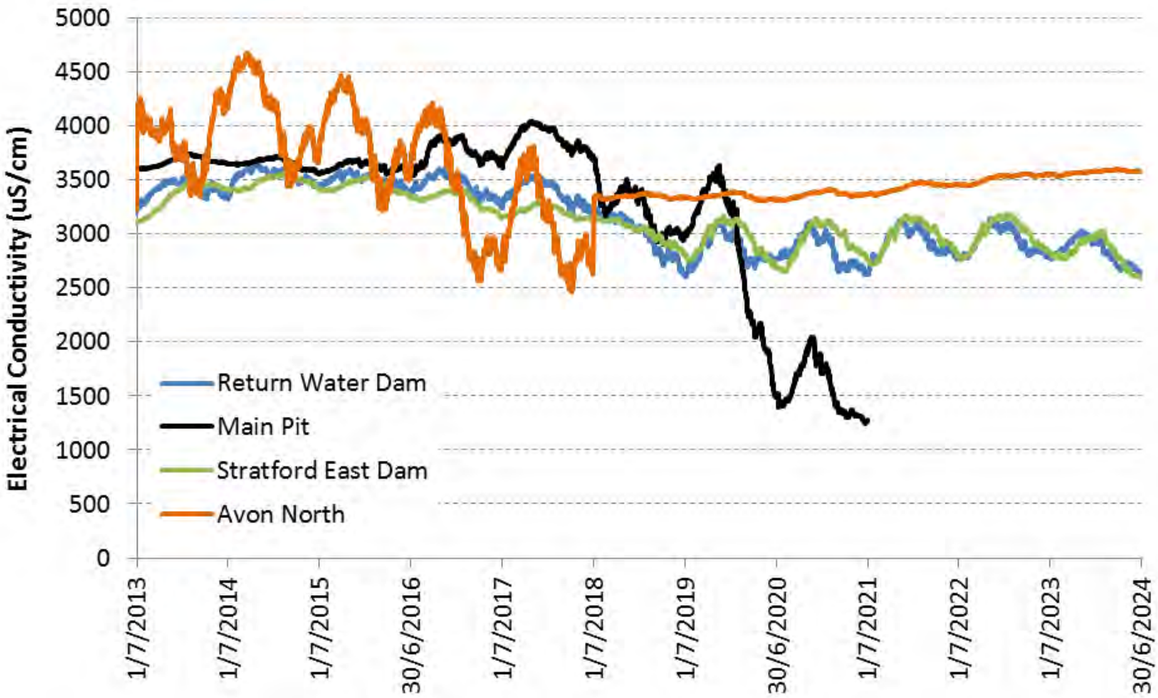


Figure B-39 Predicted Median Electrical Conductivity in Contained Water Storages

Figure B-39 shows indicates that the EC in water in the contained water storages would fluctuate seasonally, but is predicted to decrease slightly due to the relative increase of waste rock emplacement areas as a proportion of the total catchment (refer also Figure B-32).

B4.4 Model Sensitivity

Model calibration at present is limited to the water balance behaviour of two open pits. Forward predictions may be sensitive to uncertainty in components of the water balance which will change significantly compared to their current magnitudes.

The sensitivity of model was tested by varying modelled:

- rainfall runoff parameters (AWBM surface store capacities) by +/-10%;
- predicted groundwater inflows/outflows by +/-10%;
- co-disposed rejects density by increasing density to 1.6 t/m^3 (i.e. a 33% increase) in line with the upper bound of predictions by Allan Watson Associates (2012); and
- evaporation rates by +/-10%.

For all model sensitivity runs, there were no simulated releases of water from the contained water storages in any of the 123 realizations simulated. Figures B-40 to B-43 summarise total stored water volumes for each of the model sensitivity simulations.

Sensitivity modelling results indicate that predicted stored water volume is most sensitive to changes in assumed settled co-disposed rejects density and evaporation rates. However predicted percentage changes to stored water volume at the end of the Project life are lower than the percentage changes in sensitivity parameters.

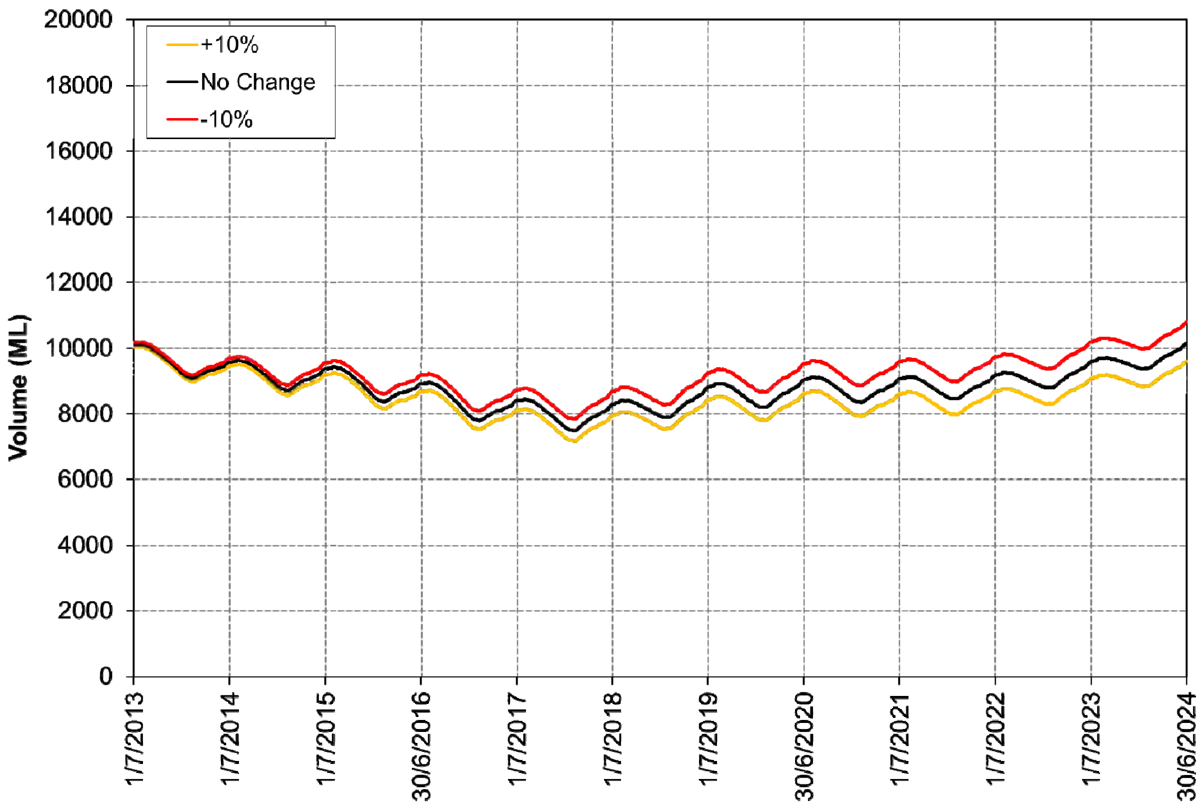


Figure B-40 Predicted Average Volume of Water Stored in all Water Storages – Sensitivity to Rainfall-Runoff Parameters

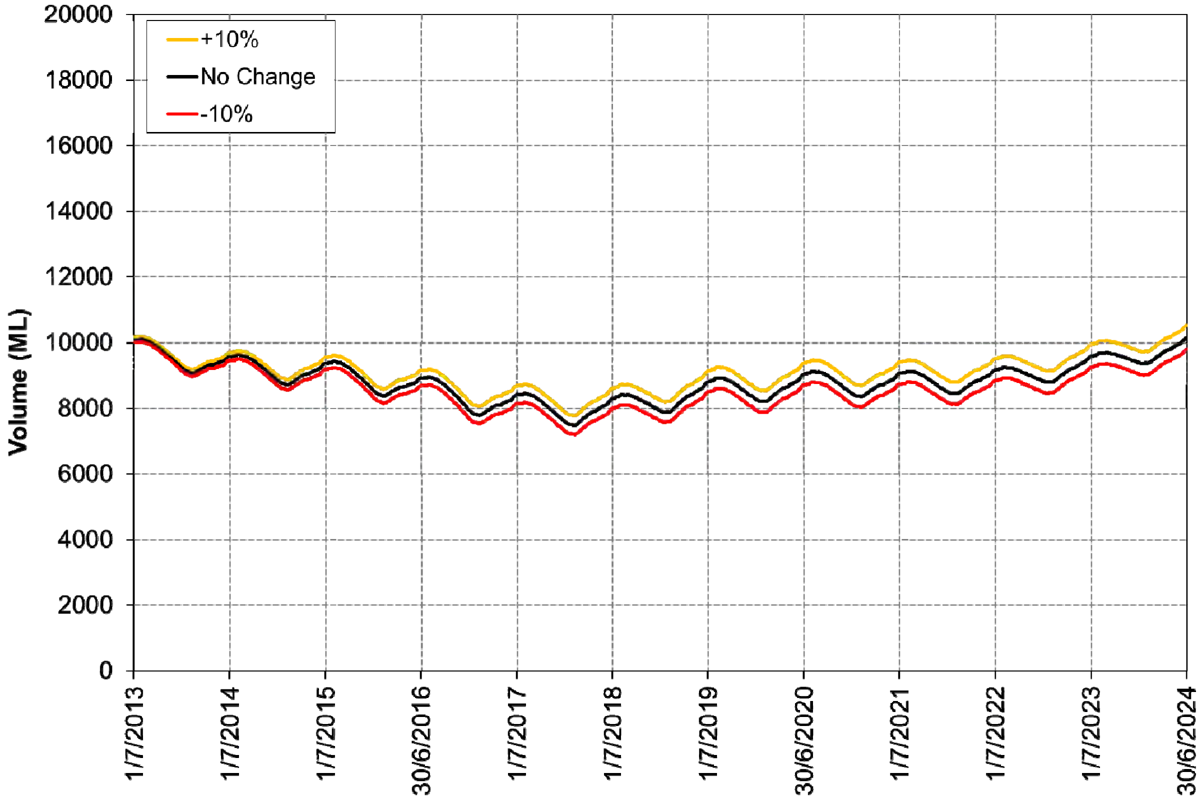


Figure B-41 Predicted Average Volume of Water Stored in all Water Storages – Sensitivity to Groundwater Rates

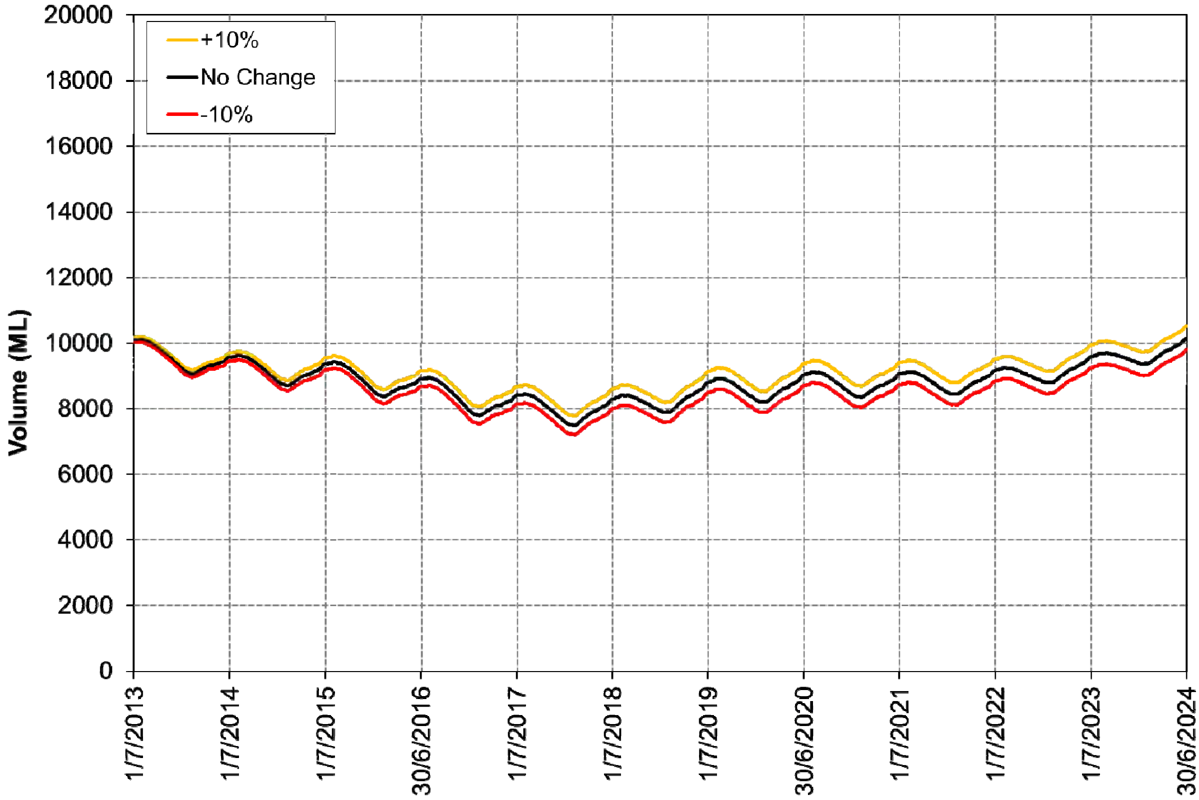


Figure B-42 Predicted Average Volume of Water Stored in all Water Storages – Sensitivity to Rejects Density

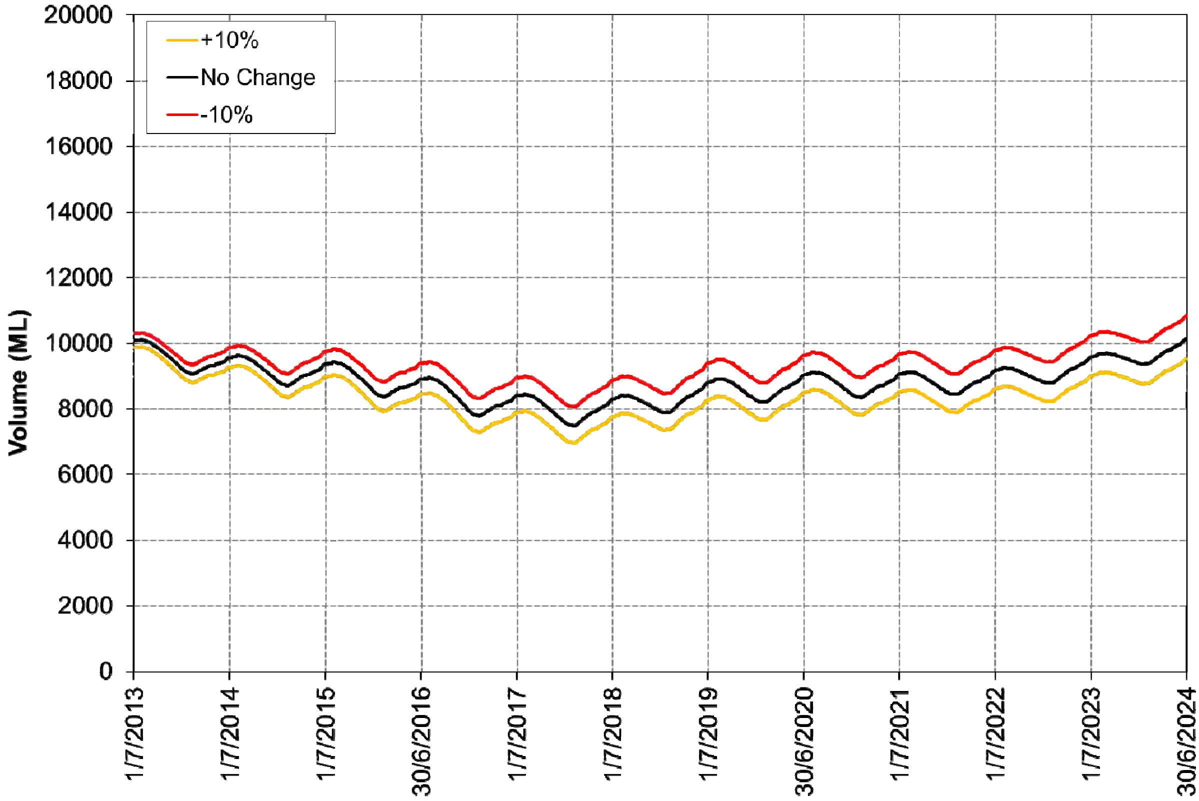


Figure B-43 Predicted Average Volume of Water Stored in all Water Storages – Sensitivity to Evaporation Rates

B5.0 ASSESSMENT OF POTENTIAL OPERATIONAL SURFACE WATER IMPACTS

The potential operational impacts of the Project on local and regional surface water resources are:

- Changes to flows in Avondale and Dog Trap Creeks due to capture and re-use of drainage from active mine catchment areas.
- Increases in flood levels on Avondale Creek upstream of the Project area due to haul road crossings and flood bunding.
- Potential for export of contaminants (principally sediments and soluble salts) in mine catchment area runoff, overflows from DADs and accidental spills from contained water storages (principally sediments, soluble salts, oils and greases), causing degradation of local and regional watercourses.
- Changes to flows in the Avon River as a result of runoff and flow changes in contributing catchments and groundwater drawdown.
- Project related, undesirable changes to the geomorphological condition of the tributary of Avondale Creek north of the Stratford Main Pit.

The potential for flooding to occur in the open cut pits has also been identified as an operational surface water impact.

B5.1 Impacts on Flow Regime

The potential impacts to downstream flow regimes has been assessed by estimating changes to mine site catchments which contribute to runoff in local and regional waters and assessing baseflow loss predictions made by Heritage Computing (2012).

The maximum catchment area excised from Avondale and Dog Trap Creeks and the Avon River by the Project are given in Table B-22. The reduction in average flow in the creeks is likely to be proportional to the reduction in catchment area, however compared to the existing/approved total catchment area excised by the Stratford Mining Complex, the Project is not expected to result in a measurable change to downstream flows in the Avon River, Avondale Creek and Dog Trap Creek.

The estimated cumulative impact of the Project and Gloucester Resources Limited's (GRL's) proposed Rocky Hill Coal Project on average flows in the Avon River is also given in Table B-22. Estimated areas captured within the Rocky Hill water management system were derived from information available in Corkery (2012). The maximum excision from the proposed Rocky Hill Coal Project was estimated to be 4.94 km^2, which represents approximately 2% of the Avon River catchment at the confluence of Oaky Creek, and 1.7% of the Avon River catchment at the confluence with the Gloucester River. In assessing the potential cumulative impact, the worst case has been assumed i.e. that the timing of the Project maximum catchment area reduction would coincide with the timing of the proposed Rocky Hill Coal Project's maximum catchment area reduction.

Table B-22
Changes to Contributing Catchments

Catchment	Total Pre-Mining Catchment Area (km^2)	Area Captured in Water Management System					
		Existing (approved Stratford Mining Complex) – km^2 (%)	Proposed Project		Proposed Project with Concurrent GRL Maximum		Proposed Project Post-Mining – km^2 (%)
			Project Maximum – km^2 (%)	Project Maximum Change (%)	Cumulative Maximum – km^2 (%)	Cumulative Maximum Change (%)	
Avondale Creek upstream of tributary† confluence	15.6	6.2 (40%)	8.2 (53%)	13%	8.2 (53%)	13%	2.9 (19%)
Avondale Creek at Dog Trap Creek	23	6.2 (27%)	7.1 (31%)	3.7%	7.1 (31%)	3.7%	1.9 (7.2%)
Dog Trap Creek	17*	0.2 (0.9%)	0.7 (4.4%)	3.5%	0.7 (4.4%)	3.5%	0.2 (1.3%)
Avon River at confluence with Oaky Creek**	242	6.4 (2.6%)	7.8 (3.2%)	0.6%	13 (5.3%)	2.6%	2.1 (0.9%)
Avon River at confluence with Gloucester River	292	6.4 (2.2%)	7.8 (2.7%)	0.5%	13 (4.4%)	2.2%	2.1 (0.7%)

† Tributary which drains between the BRNOC and Stratford Main Pit to join Avondale Creek.

* To confluence with Avondale Creek.

** Adjacent to GRL's proposed Rocky Hill Coal Project.

The catchments of these creeks would be progressively reinstated as the waste rock emplacements are rehabilitated and become free draining. Following the completion of rehabilitation (post-mining) only the catchment areas of the final voids would remain excised from the receiving water catchments (total of 1.85 km^2) (Section B6.2).

As indicated in Table B-22, the impacts on the flow regime of Avondale Creek are somewhat greater in the reach upstream of the junction with the tributary of Avondale Creek which will convey flows from the diversion east of the Stratford East Open Cut (between the BRNOC and Stratford Main Pit). Flows in this reach of Avondale Creek will be reduced proportionally by both the catchment excision associated with the Project as well as by the redirection of flow from the diversion around the eastern emplacement area (which presently discharges southwards into this reach of Avondale Creek) northwards into the tributary of Avondale Creek. It is estimated that the maximum (as a result of the Project) reduction in catchment reporting to this reach of Avondale Creek (just upstream of the confluence with the tributary) would be 2.0 km^2. This represents approximately 13% of the existing approved Stratford Mining Complex catchment area of Avondale Creek just upstream of the junction with the unnamed tributary. Following mining, the catchment relative to the existing approved Stratford Mining Complex would be larger by 3.3 km^2. This represents an increase of approximately 21%.

Dog Trap Creek would continue as a gaining stream and would have an average baseflow reduction of about 0.07 ML/day during the Project. The baseflow reduction would peak at a little over 0.08 ML/day and would become progressively less (i.e. reducing to <0.05 ML/day over time) when the BRNOC is backfilled in 2019 (Heritage Computing, 2012) (Appendix A of the EIS).

Avondale Creek would have a complicated pattern of changes in baseflow. Overall, an average net reduction in baseflow of about 0.02 ML/day is expected (Heritage Computing, 2012) (Appendix A of the EIS).

Assuming that the flow characteristics (in terms of catchment yield per unit catchment area and baseflow proportion) for Dog Trap Creek and Avondale Creek can be estimated from measured streamflow on the Avon River, the estimated effect of these peak reductions on the mean annual baseflow volume of these creeks would be negligible. However, there would likely be some reduction of low flow persistence during the Project life.

The potential impact on surface water users (including licensed water users) is likely to be proportional to the relative reduction in contributing catchment area – refer Table B-22. For licensed water users on the Avon River and Dog Trap Creek, this is estimated to be small – of the order of 3 to 4%, respectively.

The cumulative impact of the Project and AGL's Gloucester Gas Project on flow reduction in local creeks is likely to be negligibly different than that for the Project alone. This is because the area of surface catchment reduction for the AGL Gloucester Gas Project is predicted to be very small (effectively amounting to the area of treated water ponds at the central processing facility – estimated at less than 0.4 ha). Discharge of treated water from the AGL Gloucester Gas Project is likely to have a positive impact in terms of offsetting the flow reduction caused by catchment area reduction.

B5.2 Impacts on Flooding in Avondale Creek and Open Cut Pits

Flood water inundation potential in the Project area during major floods is controlled by the hydraulic capacity of the haul road crossings. The constriction of flow through culverts under the haul road crossing causes water to back-up on the upstream side of the crossing – this back-up is known as afflux.

The most upstream haul road crossing of Avondale Creek has been constructed just east of the CHPP area and the downstream crossing near the Roseville West Pit (refer Figure B-3). Flood modelling using the HECRAS computer software program with 18 cross-sections derived from topographic plans provided by SCPL, together with estimates of stream hydraulic roughness from site inspections/photographs, was undertaken to assess afflux of the peak 100-year ARI flow. Results of the modelling indicate that afflux of 1-2 centimetres (cm) are likely 1.3 km upstream of the crossing (upstream limit of model extent). SCPL owned land on Avondale Creek extends another 1.5 km upstream of this point. It is therefore considered unlikely that any discernible 100-year ARI peak flow flood level increases would extend upstream of SCPL owned land.

The additional haul road crossing proposed as part of the Project would be located approximately 2 km downstream of the existing most upstream crossing. Provided that the additional crossing is designed with similar geometry and capacity as the existing downstream (Roseville West Pit) crossing, it is considered highly unlikely that any afflux could extend upstream of SCPL owned land.

The potential for flooding in the Project area to impact on mine infrastructure would be managed through the construction of levees around mine infrastructure including open cut pits.

B5.3 Release of Contaminants in Drainage Off-site

DADs would be designed in accordance with Landcom (2004), to reduce the level of suspended solids in runoff. DADs would be dewatered (by pumping) to contained water storages between runoff events, limiting their spill potential. Water balance modelling indicates that overflows from DADs (which are predicted to comprise only 2% of system outflows) would typically be greatly diluted by natural flows in Avondale Creek. A median dilution factor of 19 was simulated on days with concurrent overflow and flow in Avondale Creek over all realizations simulated (refer Section B4.0) – that is, on days on which overflow was simulated, 50% of the time the flow in Avondale Creek (at its confluence with Dog Trap Creek) was simulated as at least 19 times the total overflow rate from all DADs.

Figure B-44 shows a plot of recorded, concurrent (same day) EC in Avondale Creek (at W8) and in existing sediment dams at the Stratford Mining Complex. There is no clear distinction between EC in the sediment dams and EC in Avondale Creek, with an approximately equal number of points above and below the line of 1:1 correspondence.

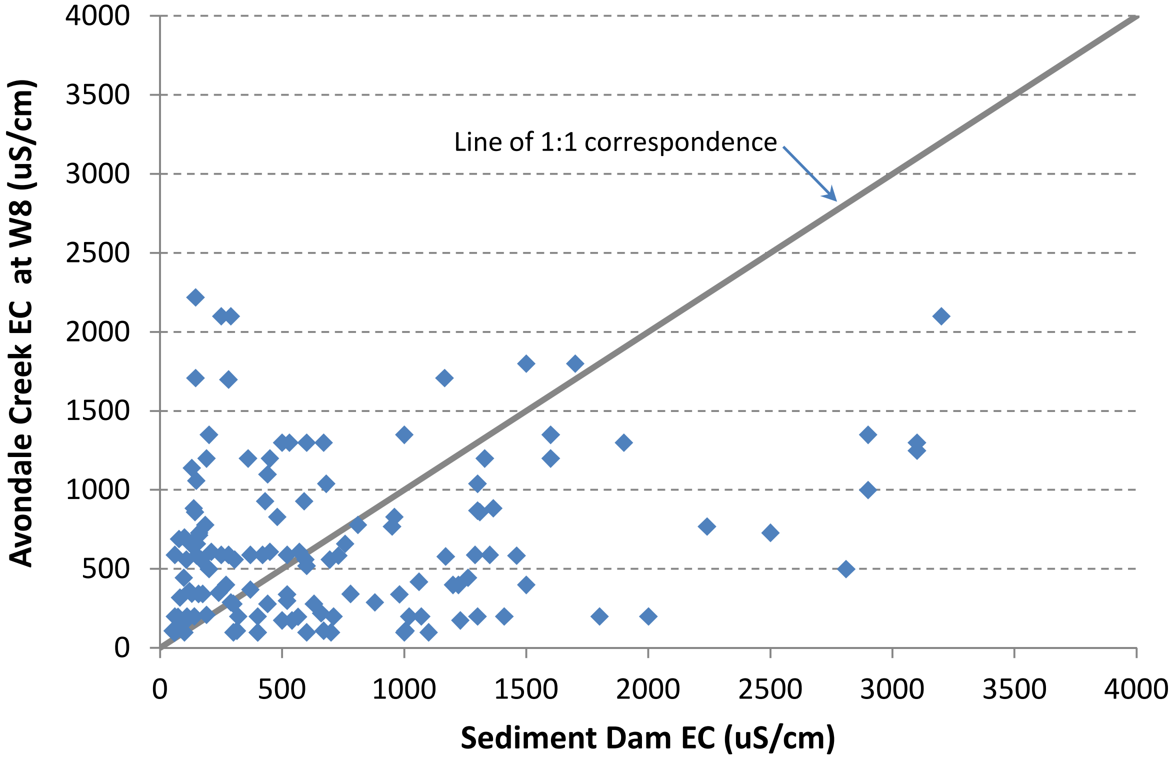


Figure B-44 Concurrent EC in Avondale Creek and Stratford Mining Complex Sediment Dams

Based on the above and assuming the implementation of management strategies and monitoring (refer also Section B8.2) recommended in the Geochemical Assessment (EGi, 2012) (Appendix L of the EIS), the risks of elevated dissolved solids and other contaminants impacting downstream waters is considered to be low.

The risk of spill from the contained water storages has been evaluated as part of the site water balance (Section B4.0). There were no spills simulated during the 123 climatic realizations simulated and subject to adherence with the operational protocols and other assumptions inherent in the modelling (refer Section B4.1), there is a very low risk of spill occurring from the contained water storages over the Project life to Avondale Creek.

The risk of increased suspended sediment migration to Avondale Creek from erosion associated with up-catchment diversions is considered low due to the proposed erosion control measures that both have been used in the past and are proposed for future diversions (refer Section B3.2.7).

The risk of build-up of salts in irrigation areas and their impact on downstream water quality is considered negligible because irrigation would only occur within the surface catchment of contained water storages. The potential for build-up of salt in irrigated soils would be managed by routine salinity profiling (sampling and testing) of the soils and, if required, the flushing of salts to deeper groundwater by scheduling irrigation applications to leach accumulated salt.

The risk of adverse impacts to water quality in Avondale Creek, Dog Trap Creek and the Avon River due to cumulative release of contaminants from the Project and the AGL Gloucester Gas Project is likewise considered low or negligible because of the numerous safeguards proposed for the Project and for the AGL Gloucester Gas Project (AECOM, 2009).

In the absence of assessment and approval of the proposed Rocky Hill Coal Project, it is considered unlikely that any significant or sustained cumulative surface water quality impacts would arise from the mining activities being undertaken by GRL in the region, assuming such activities will be closely regulated by the EPA (via an EPL under the *Protection of the Environment Operations Act, 1997*) and the DP&I (via a Development Consent under the *Environmental Planning and Assessment Act, 1979*).

B5.4 Changes of the Geomorphological Condition of the Tributary of Avondale Creek North of the Stratford Main Pit

The fluvial geomorphological assessment undertaken by Fluvial Systems Pty Ltd (Attachment BB) identified that there was a current un-quantified but not insignificant risk that the additional catchment area which would be diverted into the tributary of Avondale Creek "could cause the channel to exceed its hydraulic threshold and undergo some level of change." In light of the existing generally stable and well vegetated condition of the tributary, Fluvial Systems Pty Ltd recommended ongoing condition monitoring and surveys with a commitment to adaptive management where monitored changes were "outside the normal range of natural variability."

Fluvial Systems Pty Ltd (Attachment BB) also recommended that:

> *Prior to diversion of this 600m section of the tributary to avoid the Avon North Open Cut, an investigation should be undertaken in consideration of the actual increase in catchment at the time and the overall performance of the diversion along its length (via survey) to inform the final design. A separate investigation including modelling of peak flows should also be undertaken to support the final design of this 600m section.*

B6.0 POST-MINING WATER MANAGEMENT

The post-mining water management strategy presented in the SCM EIS (SCPL, 1994) involved final void isolation with no spill. The Stratford East Dam was to be retained (with up-catchment diversions removed) as a water source for post mining land use. The post-mining water management strategy for the BRNOC void (SCPL, 2001) involved final void filling by diversion of runoff from rehabilitated mine areas into the void and allowing the void to spill periodically to Avondale Creek.

The final post-mining water management strategy for the current Project is indicated in Figure B-7. Three final voids would remain: Roseville West Pit Extension, Avon North Open Cut and Stratford East Open Cut voids (refer Section B6.2). BRNOC would be backfilled and rehabilitated during the Project life. The Stratford Main pit, following the completion of rejects disposal, would be dewatered, covered with waste rock material and rehabilitated.

Up-catchment diversions upslope of the Stratford East Dam would be removed and drainage allowed into this storage, increasing its catchment area to approximately 3 km^2. This storage would be retained as a resource for future land use (e.g. cattle grazing, cropping). Water balance modelling of the Stratford East Dam post mining indicates that it would spill 11 days per year on average, which would limit the build-up of salinity within the storage. The routing of up-catchment runoff through this storage rather than around it (via diversions - as would occur during mining) would reduce the peak flow rates reporting to the downstream tributary of Avondale Creek (refer Section B3.2.7). Therefore the risk of potential geomorphological changes described in Section B5.4 due to additional catchment would be significantly reduced post-mining.

The Return Water Dam would be dewatered by pumping to one of the final voids and its eastern confining embankment either removed or breached to allow free drainage of this rehabilitated area to Avondale Creek. Likewise the Parkers/Bowens Road West pit would be dewatered and backfilled as part of final rehabilitation of the CHPP area.

The final water management strategy for the Project would be finalised through the NSW Department of Industry and Investment's (DII's) Mining, Rehabilitation and Environmental Management Process (MREMP).

B6.1 Rehabilitated Waste Rock Emplacement Drainage

Conceptual surface drainage for final rehabilitated waste rock emplacements would include (refer Figure B-7) the following features.

- Stratford waste rock emplacement top surface graded to generally drain away from the higher western batter and towards the Stratford East Dam or the at-grade interface with the natural surface on the eastern side of the emplacement area.

- Waste rock emplacement batter drainage collected in a system of low longitudinal gradient "berm" drains, directing drainage *along* the batter. Berm drains would be formed as part of waste rock emplacement activities and would be designed to pass up to a 100-year ARI peak flow. It is envisaged that berm drains would be constructed with grass lining to maintain stability against erosion at the design flow rates. Berm drains have been constructed on the batters of the existing Stratford waste rock emplacement and appear to be operating effectively. Berm drains on the existing Stratford waste rock emplacement are spaced at 15 m vertical intervals and this spacing would be maintained for Project rehabilitation.

- Where feasible, waste rock emplacement batter drainage would be discharged (from the berm drains) directly to the natural surface and then drainage lines. Otherwise discharge would be to a number of constructed drop structures, directing drainage *down* the batter and into natural drainage lines. Overall batter slopes (from emplacement crest to toe) would be approximately 4H:1V and therefore drop structures would be constructed to this gradient. It is therefore envisaged that drop structures would need to be rock-lined with coarse durable rockfill, designed to be stable at the design peak 100-year ARI flow rates. Constructed stilling basins will likely be required at the toe of drop structures to dissipate flow energy and control erosion. Where possible, drop structures would be discharged to existing sediment dams or DADs which would act both as stilling basins and to trap sediments mobilised from the waste rock emplacement surface. Alternatively drop structures would be designed with flow spreaders to discharge flow to downslope areas to control concentration of flow downstream. A number of drop structure locations have been indicated on Figure B-7 – a larger number is favoured in order to reduce concentrating flow in a few larger drop structures and to reduce the design flow rate for each structure.

- Drainage lines from drop structures to existing drainages (e.g. Avondale Creek) would likewise be stabilised to be non-eroding at the design flow rates.

- Additional drop structures would be required as indicated on Figure B-7 – for example from the elevated “plateau” at the northern end of the Stratford East Open Cut void, directing drainage from the waste rock emplacement to the west.

- Removal of up-catchment diversions upslope of the Stratford waste rock emplacement to allow drainage via the above drop structure to Avondale Creek.

Waste rock emplacement drainage would be progressively developed during the Project life where feasible. This would allow time for vegetation establishment (to enhance stability, particularly of the berm drains), waste rock emplacement settlement and monitoring to ensure drainage stability.

Rehabilitation would include passive management of runoff (i.e. allowing runoff to drain off site via sediment dams which are not actively dewatered between rainfall events) after rehabilitation areas have become stabilised by vegetation.

B6.2 Final Void Water Management

The catchment area of the three final voids would be minimised to the maximum extent practicable, by directing drainage from upslope areas around the final voids and to tributaries of Avondale Creek using upslope diversions, bunds and contour drains around their perimeter (refer Figure B-7). Compacted earthfill bunds would be constructed adjacent to the lowest side of each final void as indicated on Figure B-7, in order to confine each final void water body. The approximate depths, surface areas and contributing catchment areas of final voids are provided in Table B-23.

Table B-23
Project Final Voids

Final Void	Depth (m)	Area (ha)	Catchment Area (ha)
Roseville West Pit Extension	140	65	71
Avon North Open Cut	30	24	45
Stratford East Open Cut	180	49	69

Inflows to the final open pit voids comprise incident rainfall over the void lake surface, runoff and seepage from the sides of the voids and their adjacent contributing catchment and seepage from coal seam groundwater and waste rock emplacement infiltration. A water and salt balance model has been developed for each of the final voids to predict the long-term behaviour of the final void water bodies.

Post recovery groundwater seepage rates (including overburden infiltration) to the voids were advised by Heritage Computing (2012). Inflow rates were estimated for different final void water levels (reducing with rising water level).

Rainfall runoff from the void catchments (broken down into sub-catchments) was estimated using the AWBM, with parameters as given in Table B-13. Daily rainfall data used in the model was the Data Drill rainfall (Section B4.1.2) repeated several times over to generate a simulation duration of several hundred years. Likewise evaporation data was sourced from the Data Drill, multiplied by a pan factor of 0.9, with allowance for further evaporation reduction due to salinity increases[14]. Storage of water was modelled in the waste rock emplacement interstitial void space with an assumed void ratio of 0.25. It was assumed that the Roseville West and Stratford East Open Cut final voids were empty at the end of the Project life, while the water volume in the Avon North Open Cut final void was set equal to the median volume predicted at the end of the Project (refer Section 4.0). Salinity prediction was undertaken assuming constant salinity values for runoff from each final void sub-catchment (derived from SCPL monitoring results) and assuming conservation of mass.

Model results are shown in Figures B-45 to B-47 below in terms of predicted final void water levels versus time. No spills were predicted from the final voids.

[14] Hydrological Recipes Estimation Techniques in Australian Hydrology", Grayson R B, Argent R M, Nathan R J McMahon T A and Mein R G 1996

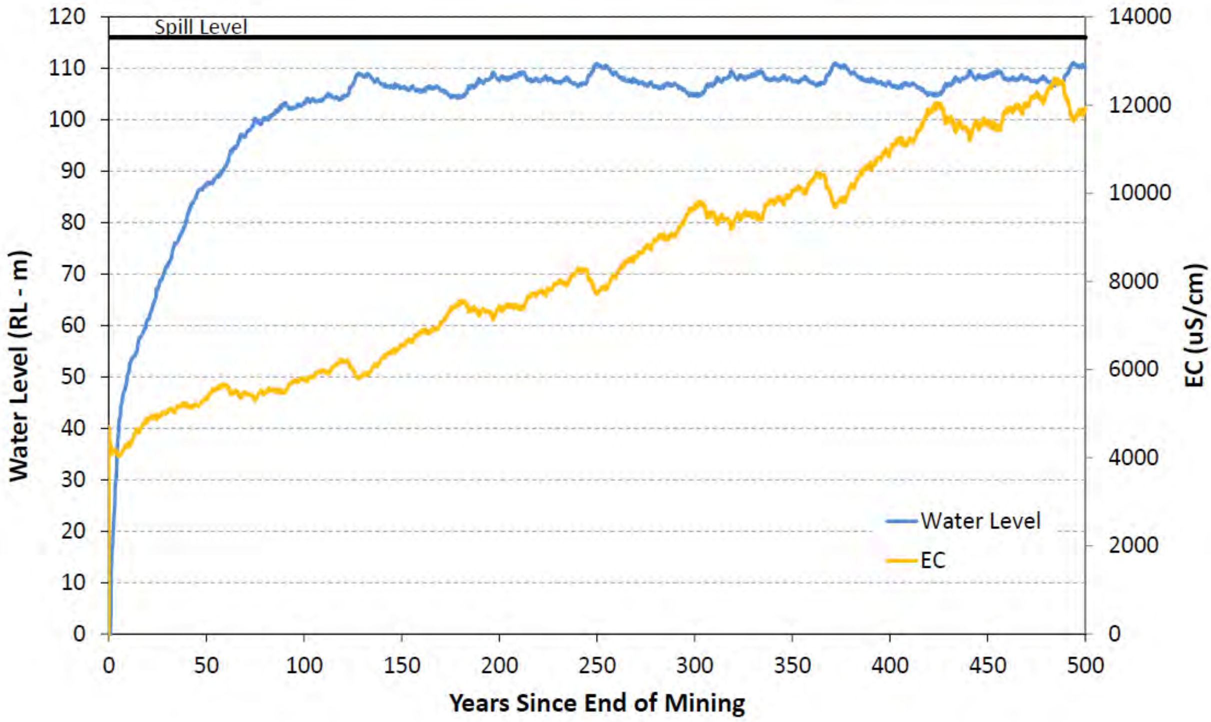


Figure B-45 Predicted Final Void Water Levels and EC – Roseville West Pit Extension

Note: RL = relative level.

Figure B-45 shows that the final void water level would take approximately 200 years to reach quasi-equilibrium at between 5-10 m below spill level, with EC predicted to increase to approximately 7,000 µS/cm in this time.

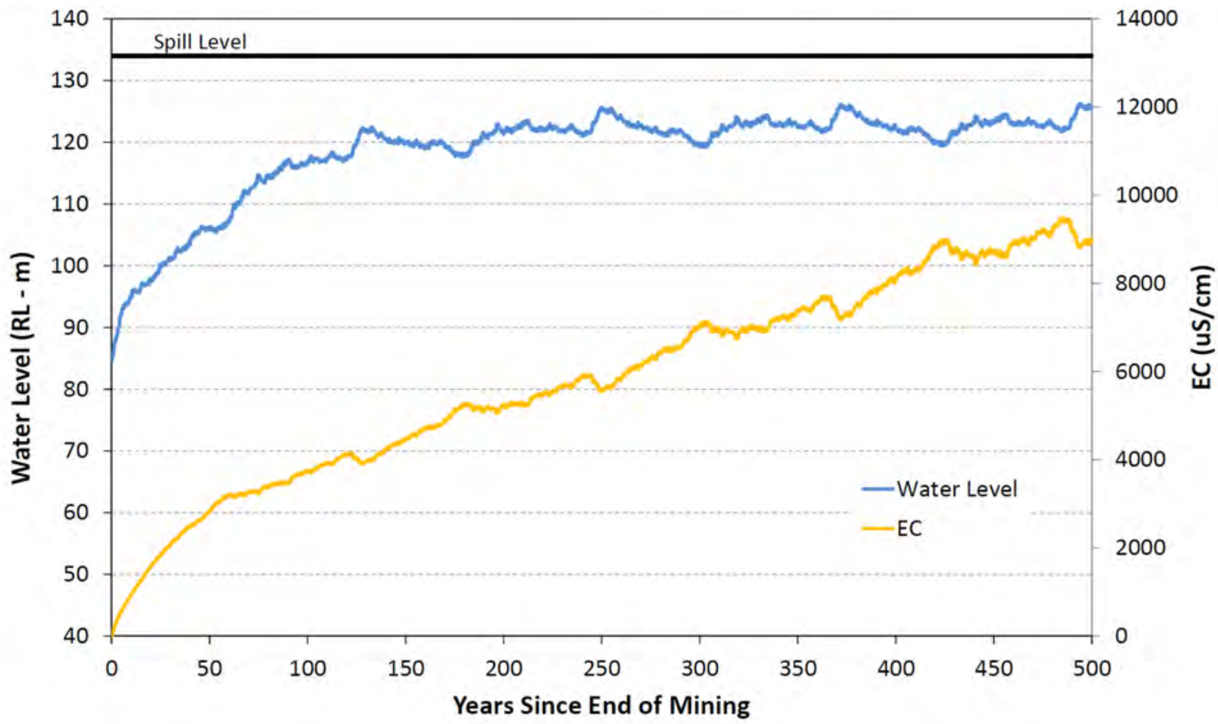


Figure B-46 Predicted Final Void Water Levels and EC – Avon North Open Cut

Figure B-46 shows that the final void water level would take approximately 300 years to reach quasi-equilibrium at between 8-14 m below spill level. Predicted salinity would reach 7,000 to 8,000 µS/cm during this time.

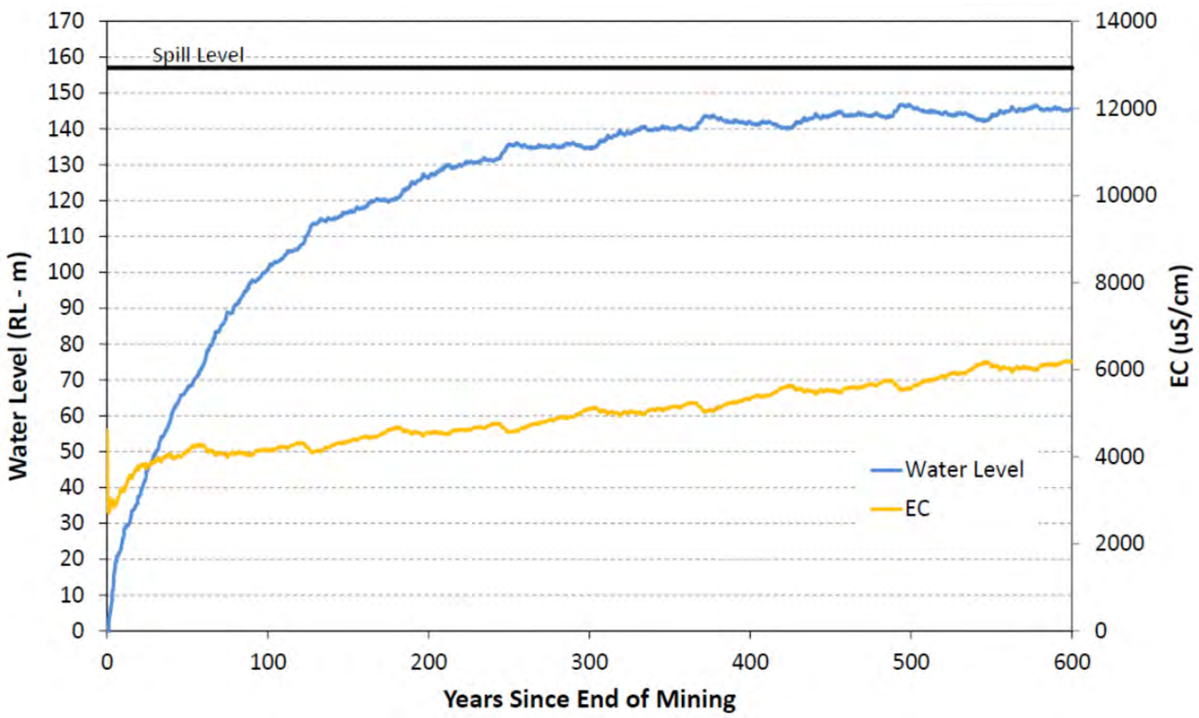


Figure B-47 Predicted Final Void Water Levels and EC – Stratford East Open Cut

Figure B-47 shows that the final void water level would take approximately 500 years to reach quasi-equilibrium at between 10-14 m below spill level. Predicted salinity would reach approximately 6,000 µS/cm during this time.

The sensitivity of model predictions to key parameters was tested. Table B-24 summarises the results of the analysis.

Table B-24
Final Void Water Balance Sensitivity Results

Parameter	Variation	Predicted Equilibrium Final Void Water Level (m below spill level)		
		Roseville West Pit Extension	Avon North Open Cut	Stratford East Open Cut
Runoff Rate	+20%	7.5	10	8.5
Groundwater Rate	+20%	7.5	10	12
Evaporation Rate	-5%	6.0	7.5	7.0
	-10%	3.5	4.0	3.0

Results of the sensitivity analysis indicate that the predicted final void water levels were in all cases below spill level.

B7.0 EFFECTS OF CLIMATE CHANGE

Recent (post 1950) changes to temperature are evident in many parts of the world including Australia. The Intergovernmental Panel on Climate Change (IPCC) (2007) has, in its most recent assessment, concluded that:

> *most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations. Discernible human influences now extend to other aspects of climate, including ocean warming, continental average temperatures, temperature extremes and wind patterns.*

Predicting future climate using global climate models is now undertaken by a large number of research organizations around the world. In Australia much of this effort has been conducted and co-ordinated by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). CSIRO has recently published a comprehensive assessment of future climate change effects on Australia (CSIRO, 2007). CSIRO has included assessments based on the predictions from 23 selected climate models from research organisations around the world. Model predictions were made for a range of different future greenhouse emission scenarios adopted by the IPCC.

CSIRO has used predictions of future climate from these various models to formulate probability distributions for a range of climate variables including temperature, rainfall potential evaporation, snow cover and drought. The model predictions are made relative to 1990 conditions at 5 yearly increments between 2030 and 2100. Predictions for 2030 are relatively insensitive to future emission scenarios because they largely reflect greenhouse gases that have already been emitted. Longer term predictions become increasingly more sensitive to future emission scenarios.

B7.1 Future Rainfall and Evapotranspiration

Predictions of future rainfall in south-eastern Australia are generally for reduced annual rainfall, but increased daily rainfall and a higher number of dry days per year. Future monthly rainfall and evapotranspiration predictions for the Project area have been obtained using the CSIRO's (2007) OzClim system for a range of models. Results from the models which generate both rainfall and potential evapotranspiration predictions were assessed. Predictions of 2100 annual rainfall varied from model to model from an increase of 27% to a decrease of 24%. Potential evapotranspiration predictions for 2100 varied from an increase of 10% to a decrease of about 1%. The climate model which closest to average (median) results for both rainfall and potential evapotranspiration was the NCAR:NCAR CCSM3 model with low climate sensitivity, maximum rate of global warming and the A1FI emission scenario[15]. The prediction of monthly and annual changes in rainfall and potential evapotranspiration obtained from this model are summarised in Table B-25 below.

[15] A1FI emission scenario refers to expected emissions for a future characterised by very rapid economic growth, global population that peaks in mid-century and declines thereafter and a substantial reduction in regional differences in per capita income. It assumes rapid introduction of new and more efficient technologies but emphasises fossil-fuel intensity.

Table B-25
Percentage Change in Predicted Monthly Rainfall and Evapotranspiration in 2030 and 2100 Relative to 1990 – Stratford Region (from NCAR:NCAR CCSM3)

Season	Percentage Change by 2030		Change by 2030 (mm)	Percentage Change by 2100		Change by 2100 (mm)
	Rainfall	Potential ET	Rainfall Excess[1]	Rainfall	Potential ET	Rainfall Excess[1]
January	-0.2	0.9	-1.7	-0.8	4.3	-8.2
February	1.6	1.3	0.4	7.8	6.1	2.2
March	-4.4	1.7	-8.7	-19.6	8.3	-39.4
April	-1.9	3.6	-4.6	-8.7	17.5	-22
May	1.5	4.1	-1.2	7.2	19.6	-5.6
June	-4.3	4.1	-4.4	-19.0	20.0	-20.3
July	-3.3	4.1	-3.5	-15.3	19.6	-16.5
August	0.0	2.7	-2.2	0.3	13.2	-10.7
September	-7.3	1.8	-4.9	-30.3	8.5	-21.6
October	2.6	1.7	-0.5	12.7	8.4	-2.6
November	2.0	0.9	0.6	9.8	4.3	2.8
December	2.9	0.7	1.6	14.0	3.2	7.7
Annual	-0.5	1.8	-28.9	-1.7	8.8	-134

[1] Rainfall excess is calculated as rainfall minus potential evapotranspiration (mm)

Based on these predictions by 2100 there would be both increases and decreases in monthly rainfall with a small (1.7%) overall decrease in annual rainfall. By 2100 potential evapotranspiration is predicted to increase in all months with an annual increase of about 9%. Rainfall excess is predicted to reduce in most months with a decline of about 134mm (or 34% decrease) in annual rainfall excess relative to the 1990 baseline.

B7.2 Water Management Implications of Climate Change Predictions

The implications of climate change predictions on water management are unlikely to be significant over the Project life because they are small compared to the natural climatic variability.

Longer term climate change predictions do however have potential implications for post mine water management and specifically the water balance of the final void. In this regard the currently most accepted scenarios would see a reduction in overall rainfall, an increase in evapotranspiration and a corresponding decrease in rainfall excess. This would translate to reduced surface water runoff inflows to the void and reduced incident rainfall over the surface of the void. There would also be increased evaporation loss for the void surface and as a consequence lower average water levels in the void.

B8.0 RECOMMENDED MONITORING

SCPL have established a weather station near the CHPP which provides short interval data including rainfall, temperature, humidity and solar radiation. The existing surface water quality and flow monitoring programme is shown on Figures B-8 and B-19.

SCPL also monitor a range of operational water management indicators including data on pumped water transfers, haul road water use, storage levels and water quality in contained water storages and sediment dams, water volumes applied to the approved irrigation area and the moisture levels in soils in this area. The following recommendations to expand the current monitoring are provided on the basis of the Project mining activities.

B8.1 Surface Water Flows

SCPL have established continuous water depth and EC monitoring stations on Avondale Creek at W5 and the Avon River at W2. The monitoring station at W5 should be rated (establishing a relationship between flow depth and flow rate) so that flow rate is effectively continuously monitored. Data from this station in combination with water quality data would be used to assess changes to the quantity and quality of water generated from the Avondale Creek catchment during the Project life and into the post mining closure stages of the Project. On-going checking/updating of the rating (via manual streamflow gauging) should be undertaken monthly for at least the next two years and be reviewed thereafter.

B8.2 Surface Water Quality

The existing water quality monitoring program described in Section B2.5 should be expanded to include monitoring of water quality in new open cuts (Avon North Open Cut and Stratford East Open Cut). Water quality monitoring sites should also be established in DADs, with monitored parameters and frequency consistent with existing SD13 – SD16 (refer Table B-5). DADs should be equipped with gauge boards (with board levels surveyed relative to spillway level) and records kept of gauge board level (and whether overflow is occurring) at the time of sampling so that water quality can be related to stored volume.

Water used for irrigation should be monitored monthly for the following parameters:

- pH;
- EC;
- Residual Sodium Carbonate (RSC); and
- Sodium Adsorption Ration (SAR).

Contingency measures to be applied if the irrigation water quality changes for an extended period are nominated in McKenzie Soil Management Pty Ltd (2012).

In accordance with the recommendations of the Geochemical Assessment (EGi, 2012) (Appendix L of the EIS) monitoring of seepage and runoff from open cuts and waste rock emplacements should be carried out to check for ARD generation. Water quality monitoring in DADs which receive runoff/seepage from waste rock emplacements and in open cut pits should include determination pH, EC, acidity/alkalinity, SO4, Al, cobalt, Fe, Mn, nickel, Zn. Water quality monitoring in DADs should be conducted at a frequency consistent with existing sediment dams.

Water quality monitoring would be undertaken in accordance with the *Australian Guidelines for Water Quality Monitoring and Reporting* (ANZECC, 2000b) and *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (DEC, 2004).

B8.3 Site Water Balance Monitoring

The site water balance should be monitored and reviewed annually to check that it is behaving within the bounds projected by the current modelling. These reviews would also enable corrective actions to be implemented. This would require monitoring of water levels in contained water storages on a weekly basis (initially). Monitoring should also include quantities of water transferred to and from these storages, including water pumped to the CHPP and volumes and solids concentrations of co-disposed rejects pumped to the Stratford Main Pit. Annual bathymetric survey of the co-disposed rejects surface within the Stratford Main Pit and (when commissioned for rejects disposal) the Avon North Open Cut, should be undertaken so as to enable estimates of stored water volumes and *in-situ* rejects density to be made. This information should be reviewed and compared with model predictions on an annual basis (using monitored climate data). Results of this and other monitoring activities should be reported in the Annual Review. The frequency and parameters monitored should be reviewed on an annual basis.

B8.4 Up-Catchment Diversion Monitoring

The integrity of up-catchment diversion channels/bunds should be visually checked on a monthly basis or after significant rainfall (50 mm or more rainfall in a 24-hour period) to check for any signs of visible erosion or instability.

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ATTACHMENT BA
Water Quality Monitoring Data

W1

Upstream Avon River (Wenhams Cox Rd - Glenavon)

Notes:

values reported in 1994 EIS

Data from NSW gov stn at Wenham's Cox

conc taken as MDL

DATE	EVENT	Flow	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Redox	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp	DO	DO (% sat)	Turbidity	Temperature (°C)	Nitrate + nitrite as N (NOx)
		Rate		(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C	(mg/L	(% sat)	(NTU)		(mg/L)
4/05/1994			7.0	330	210	1		59	1	0.72		1.5	1	14.1	8.1	0.01	0.002	0.01	0.01	0.05	0.02	0.12	0.01								
10/05/1994			7.3	1260	740			313	31	0.06																					
16/05/1994			7.2	530	280			108	17	0.03																					
23/05/1994			7.1	420	210			76	2	0.57																					
2/06/1994			7.1	420	390	47		112	1	0.24		23	1	16.9	10.4	0.01	0.002	0.01	0.01	0.03	0.04	0.01	0.01								
16/06/1994			7.1	410	210			108	12	0.19																					
30/06/1994			6.9	450	260	145		114	1	0.33		7	1	18.1	11.8	0.01	0.002	0.01	0.01	0.01	0.01	0.78	0.01								
1/08/1994			7.6	519	270	57		91	1	0.14		1	0.11	21.8	13.8																
3/01/1995			6.6	310	190	340		58	12	0.56			0.3	13	9.2																
31/01/1995			7.1	210	640	76		120	13	0.01		3.4	0.37	18	9.7																
6/03/1995			6.4	160	120	100		33	1	0.98		3.6	0.25	4.9	3.6																
3/04/1995			6.7	380	230			74	9	1.01																					
3/05/1995			7.2	460	210			90	7	0.33																					
3/06/1995			6.9	320	160	8			12	0.89																					
3/07/1995			#N/A	330	160	16			13	0.68																					
1/08/1995			7.0	440	180	11			13	0.10																					
1/09/1995			#N/A	440	220	3		99	1	**0.05**				19	12									Iron (filt.) is indicative only as the sample was not in an acid washed bottle							
4/10/1995			7.1	470	260	5		99	17	0.49		2.4	0.2	16	10	0.01	0.005	0.01		0.02	0.0005	0.09	0.01								
6/11/1995			6.9	730	410	10		180	4	0.02				23	16																
22/11/1995			6.0	160		620		32	1	1.30		6.8	0.23	5.6	3.9	0.01	0.005	0.01	0.01	0.06	0.001	1.7	0.01	3.05pm sampled							
6/12/1995			6.2	170	160	200		28	**1**	0.89				5.7	4.1									9.10am flow sampled, filtered thru 0.45um membrane prior to sulphate analysis							
8/01/1996			7.2	170	150	82		42	1	1.30				5.9	3.8									2.35pm flow sampled							
20/02/1996			6.9	320	170	5		55	7			2.6	0.1	24	5.7	0.005	0.003	0.005	0.005	0.03	0.0002	0.07	0.01	3.05pm flow sampled							
25/03/1996			7.0	300	130	4		51	1	1.20				13	7.7									2.35pm flow sampled							
15/05/1996			6.8	220	180	1500		36	8	0.89		15	0.18	9	5.5	0.005	0.004	0.005	0.005	0.04	0.0002	0.04	0.005	11.30am flow sampled							
17/06/1996			6.8	240	150	82		49	**3**	1.10				6.2	5.3									2.00pm flow sampled, filtered thru 0.45u paper for sulphate							
23/07/1996			7.4	430	230	8		89	12	0.56				19	11									12.00 noon flow sampled							
26/08/1996			7.2	480	250	2		110	9	0.01				20	12									11.45am - low flow sampled							
30/09/1996			7.2	430	250	23		88	6	0.46				14	13									2.25pm - low flow sampled							
29/10/1996			6.8	560	290	9		120	1	0.23				22	14	0.01		0.01	0.01			0.17	0.03	11.35am - low flow sampled							
25/11/1996			7.3	190	**170**	62		32	5	1.10		14	0.3	5.8	3.5	0.01	0.003	0.01	0.01	0.04	0.0002	0.04	0.01	11.40am - flow sampled, filtrate cloudy							
9/12/1996			7.2	240	**210**	43		49	**1**	1.70				8.6	6									1.45pm - flow sampled, sample filtered thru 0.45u membrane prior to analysis, cloured filt							
31/01/1997			6.5	130	120	130		27	1	1.30				5	3.1									flow sampled 11.25am, 2m+ over causeway							
14/02/1997			7.6	180	170	81		34	1	0.84				7.7	4.6									flow sampled 1.45pm							
6/03/1997			6.7	110	**110**	240		20	1	0.92				4.6	3.1									contained particles less than 0.45um							
23/04/1997			7.1	360	190	5		60	2	1.60				16	9									low flow sampled 2.25pm							
14/05/1997			7.6	210	180	28		95	4	0.76				9.5	4.9									flow sampled 11.10am							
16/06/1997			6.5	130	100	360		20	6	0.87				4.1	2.9									flow sampled 12.10pm							
25/07/1997			7.1	390	180	8	8	79	10	0.54				18	9.1									flow sampled 1.40pm							
22/08/1997			7.0	440	200	2	5	87	10	0.59														flow sampled 10.15am							
22/09/1997			7.0	520	320	52	23	100	5.7	0.16														flow sampled 11.10am							
25/09/1997			7.1	470	280	140	110	94	12	0.62														flow sampled 11.00am							
7/10/1997			6.9	440	280	6	13	87	9	1.30														flow sampled 10.35am							
8/10/1997			6.7	210	200	100	82	36	9	0.73														flow sampled 10.25am							
23/10/1997			7.0	360	190	12	9	65	7.2	1.70														flow sampled 3.35pm.							
24/11/1997		No flow	#N/A	#N/A																				No flow							
22/12/1997		No flow	#N/A	#N/A																				No flow over road crossing							
6/01/1998		No flow	#N/A	#N/A																				No flow at 9:25am							
7/01/1998		No flow	#N/A	#N/A																				No flow at 9:05am							
10/01/1998		No flow	7.1	600	330	14	10	110	8	0.21														Low flow at 11:30am							
11/01/1998			7.2	500	300	20	10	91	8	0.42														Very low flow at 10:20am							
20/01/1998		No flow	#N/A	#N/A																				No flow @ 9:20am							
27/01/1998			6.8	200	130	66	58	37	10	0.53														Sampled at 2.55pm							
28/01/1998			6.8	200	120	46	42	40	9.9	0.47														Sampled at 2.35pm							
9/02/1998	Flow		7.0	300	210	8	8.6	57	5	1.10														Sampled at 11:05am - low flow							
10/02/1998	Flow		7.0	400	220	40	33	88	7	0.66														Sampled at 10:15am - low flow							
19/02/1998	Routine		6.8	240	170	10	8	40	8	0.86														Sampled at 9.25am - low flow							
20/03/1998	Routine	No flow	#N/A	#N/A																											
21/04/1998	Routine	No flow	#N/A	#N/A																				Very dry							
3/05/1998			6.6	450	290	25	26	85	7.2	0.29														Moderate flow, clear							
20/05/1998	Routine		6.7	140	100	120	69	40	8.4	0.61																					
17/06/1998	Routine		7.0	310	220	20	15	63	14	0.79														Low flow sampled, clear							
23/06/1998	Flow		7.0	140	150	120	70	26	10	0.76														Good flow, 0.4m							
24/06/1998	Flow		7.1	140	130	92	55	31	10	0.55														Good flow							
15/07/1998	Routine		7.6	290		10	8.3			0.82																					
12/08/1998	Routine		7.3	150		24	39			1.10																					
14/09/1998	Routine		7.5	100		71	57	50	6	1.20																					
14/10/1998	Routine		7.2	253		3	3	80	8	1.30																					
11/11/1998	Routine		7.0	420		2	5	83	6	0.78																					
18/11/1998	Flow		7.2	1150		37	29	240	19	0.14																					
19/11/1998	Flow		6.8	90		160	82	20	5	1.10																					

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DATE	EVENT	Flow	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Redox	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp	DO	DO (% sat)	Turbidity	Temperature (°C)	Nitrate + nitrite as N (NOx)
		Rate		(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C	(mg/L)	(% sat)	(NTU)		(mg/L)
24/11/1998	Flow		6.6	109		120	81	20	5	0.96																					
25/11/1998	Flow		6.6	167		42		30	6	2.10																					
10/12/1998	Routine		7.0	330		4	4	63	7	0.92																					
31/12/1998	**Accident**		**7.3**	**410**																											
1/01/1999	**Accident**		**7.4**	**346**																											
7/01/1999	Routine		7.2	464		5	2	130	4	0.37																					
10/01/1999	Flow		7.1	447		8		80	3	0.61																					
11/01/1999	Flow		7.3	464		10	12	80	3	0.49																					
21/01/1999	Flow		#N/A	413		10		57	5	1.40																					
22/01/1999	Flow		#N/A	297		64		60	7	0.69																					
23/01/1999	Flow		#N/A	174		60		27	8	0.93																					
28/01/1999	Flow		#N/A	265		350		33	6	0.99																					
29/01/1999	Flow		#N/A	199		100		33	7	1.00																					
25/02/1999	Routine		7.2	345		7	5	55	6	1.10																					
30/03/1999	Routine		6.9	243		13	16	41	6	1.10																					
29/04/1999	Routine		6.8	277		10	20	48	7.4	0.70																					
31/05/1999	Routine		6.9	265		6	8	82	9	0.93																					
28/06/1999	Routine		6.8	170		30	46	32	7	1.20																					
14/07/1999	Flow		6.4	79		190	140	10	3	0.76																					
15/07/1999	Flow		6.6	100		93	100	18	3	0.37																					
26/08/1999	Routine		7.3	410		11	18	86	9	0.98																					
28/09/1999	Flow		7.4	177		83	62	34	7	0.43																					
29/09/1999	Flow		7.3	188		74	65	41	6	0.62																					
20/10/1999	Routine		7.3	350		12	2	72	6	0.71																					
25/10/1999	Flow		6.5	110		70	83	24	3	1.50																					
26/10/1999	Flow		7.0	135		74	64	27	4	1.50																					
9/11/1999	Flow		8.0	105		170	130	27	2	1.20																					
10/11/1999	Flow		7.7	120		76	76	24	3	1.40																					
16/11/1999	Flow		8.0	155		130	93	40	5	1.00																					
17/11/1999	Flow		7.7	70		68	65	30	3	1.40																					
29/11/1999	Flow		7.3	190		49	34	37	5	1.00																					
30/11/1999	Flow		7.3	210		27	30	40	6	0.99																					
21/12/1999	Routine		7.0	375		7	6	71	8	1.20																					
19/01/2000	Routine		7.6	170		26	40	34	8.3	0.50																					
28/02/2000	Routine		7.2	370		10	8	71	2.7	1.10																					
8/03/2000	Flow		7.1	375		34	36	71	4.9	0.58																					
9/03/2000	Flow		7.0	145		76	80	27	8.3	0.45																					
22/03/2000	Flow		7.2	78		440	575	17	1	0.65																					
23/03/2000	Flow		6.2	115		76	195	23	7.7	0.43																					
3/04/2000	Flow		7.0	170		37	40	180	7.4	0.61																					
4/04/2000	Flow		6.9	190		40	41	40	5.3	0.40																					
24/05/2000	Routine		7.2	300		9	15	66	12	0.61																					
14/06/2000	Routine		7.0	385		11	10	87	19	0.81																					
11/07/2000	Flow		6.8	175		110	107	38	7.3	0.60																					
12/07/2000	Flow		7.1	125		40	54	52	23	0.51																					
29/08/2000	Routine		7.0	450		<2	13	100	53	0.95																					
20/09/2000	Routine		7.3	730		7	5	210	20	0.13																					
30/10/2000	Routine	No flow	#N/A																												
14/11/2000	Flow		6.7	210		270	225	55	16	0.96																					
15/11/2000	Flow		6.6	195		120	76	55	15	0.98																					
20/11/2000	Flow		6.6	175		42	61	40	14	1.00																					
21/11/2000	Flow		6.6	190		39	70	43	11	0.91																					
8/12/2000	Flow		6.7	138		26	109	35	9.5	2.10																					
9/12/2000	Flow		7.1	200		89	42	24	8	2.50																					
30/01/2001	Routine	No flow	#N/A																												
31/01/2001	Flow	No flow	#N/A																												
1/02/2001	Flow		6.9	530		54	28	80	4	**2.40**																					
2/02/2001	Flow		7.0	520		137	80	110	15	1.10																					
21/02/2001	Flow		7.7	810		794	660	180	11	**2.80**																					
22/02/2001	Flow		6.4	85		36	57	30	8	**2.30**																					
1/03/2001	Flow		6.8	112		486	340	20	3	**2.10**																					
2/03/2001	Flow		7.1	150		163	104	29	8	**2.30**																					
7/03/2001	Flow		6.8	97		79	340	16	9	2.10																					
8/03/2001	Flow		6.9	85		453	370	15	8	1.90																					
9/03/2001	Flow		6.9	107		46	107	20	9	2.20																					
26/03/2001	Flow		6.4	143		88	121	20	6	2.50																					
27/03/2001	Flow		7.2	223		37	64	30	3	2.60																					
23/04/2001	Flow		7.2	350		33	57	65	3	1.30																					
24/04/2001	Flow		7.7	459		14	19	93	2	1.10																					
7/05/2001	Flow		6.8	87		269	280	13	2	1.30																					
8/05/2001	Flow		6.8	79		103	163	8	2	3.60																					
9/05/2001	Flow		6.9	119		56	90	19	1	0.80																					
21/05/2001	Flow		7.1	157		32	70	26	6	3.00																					
22/05/2001	Flow		7.0	180		25	62	33	1	3.00																					

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DATE	EVENT	Flow	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Redox	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp	DO (mg/L)	DO (% sat)	Turbidity (NTU)	Temperature (°C)	Nitrate + nitrite as N (NOx)
		Rate		(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C	(mg/L	(% sat)	(NTU)		(mg/L)
28/06/2001	Routine		7.7	420		7	13	73	9	1.20																					
30/07/2001	Routine		7.4	195		49	73	38	10	2.20																					
30/08/2001	Routine		7.6	450		6	12	65	15	0.90																					
26/09/2001	Routine		7.1	515		4	8	95	12	0.53																					
30/10/2001	Routine		7.1	635		18	17	124	8	0.22																					
20/11/2001	Flow		6.7	515		16	29	115	1	1.50																					
21/11/2001	Flow		7.1	500		21	30	75	5	1.64																					
18/12/2001	Routine		6.7	1040		21	7	290	12	0.96																					
30/01/2002	Routine	No flow	#N/A																												
1/02/2002	Flow	No flow	#N/A																												
2/02/2002	Flow		6.4	390		46	67	65	10	2.00																					
5/02/2002	Flow		6.0	105		625	307	15	7	0.80																					
6/02/2002	Flow		5.8	130		91	73	30	7	0.60																					
7/02/2002	Flow		5.9	165		90	69	28	9	1.90																					
20/03/2002	Routine		6.8	390		5	8	80	7	2.20																					
30/03/2002	Flow		6.7	150		260	120	21	7	2.30																					
31/03/2002	Flow		6.7	200		30	35	28	9	1.80																					
29/04/2002	Routine		6.5	380		19	20	81	8	2.10																					
29/05/2002	Routine		6.9	425		4	7	74	10	0.80																					
5/06/2002	Spot		#N/A	515																											
25/06/2002	Routine		6.7	585		23	32	130	12	1.20																					
29/07/2002	Routine	No flow	#N/A																												
27/08/2002	Routine		7.8	515		15	11	149	8	0.40																					
27/09/2002	Routine	No flow	#N/A																												
27/10/2002	Routine	No flow	#N/A																												
27/11/2002	Routine	No flow	#N/A																												
11/12/2002	>25mm		7.2	250	540	131	530	61	12	1.60		3.4	0.36	4.6	4.5	0.13	0.003	0.0004	0.01	0.06	0.001	0.03	0.01	15							
12/12/2002	>25mm		6.6	200	216	58	64	40	13	1.90		2.4	0.11	6.5	4.6	0.13	0.002	0.0005	0.01	0.06	0.001	0.01	0.005	19							
31/01/2003	Routine	No flow	#N/A																												
22/02/2003	Routine/>25mm	No flow	#N/A																												
12/03/2003	Discharge		7.6	167																											
13/03/2003	Discharge		7.3	173																											
14/03/2003	Discharge		7.6	218																											
31/03/2003	Routine		6.7	280		5	5.6	47	9	1.04																					
4/04/2003	>25mm		7.0	280	188	11	7	74	6	1.23		0.44	0.1	14	7.5	0.06	0.002	0.0002	0.02	0.02	0.0001	0.23	0.005	63							
29/04/2003	Routine/>20mm		7.6	262	204	418	375	74	12	0.66		6.6	0.2	8	5	0.01	0.002	0.0005	0.02	0.02	0.0002	0.02	0.005	80							
16/05/2003	>25mm		7.3	126		88	42	21	6	0.63																					
17/05/2003	>25mm		7.2	170		23	48	29	6	0.47																					
26/05/2003	>25mm		7.0	163	180	39	16	39	7	0.81		0.67	0.1	11	6	0.01	0.003	0.0002	0.01	0.05	0.0002	0.02	0.005	63							
27/05/2003	>25mm		6.7	78		190	182	5	6	0.37																					
28/05/2003	>25mm		#N/A	#N/A		106	ND	29	6	0.34																					
26/06/2003	Routine		7.4	390		3	6.7	83	16	1.47	137.0																				
31/07/2003	Routine		7.4	431		11	14.6	100	12	1.09																					
28/08/2003	Routine		7.4	500	294	6	5	100	14	0.82		0.49	0.1	21	12	0.04	0.002	0.0002	0.01	0.03	0.0002	0.13	0.005	79							
24/09/2003	Routine	No flow	#N/A																												
30/10/2003	Routine	No flow	#N/A																												
28/11/2003	Routine		7.0	400	296	40	30	124	21	5.46		0.71	0.1	18	11	0.01	0.01	0.0002	0.01	0.01	0.0001	0.03	0.033	95							
6/12/2003	>20mm		7.1	363	278	109	260	943	11	2.96		3.81	0.07	11	8	0.01	0.005	0.0002	0.01	0.08	0.0002	0.1	0.017	38							
17/01/2004	>20mm		7.4	200	412	688	780	67	17	13.00		3.1	0.11	4.4	4.6	0.03	0.012	0.002	0.01	0.09	0.0002	0.02	0.02	23							
25/02/2004	>20mm		7.2	370	216	84	61	65	7.8	1.81		1.5	0.1	15	9	0.02	0.001	0.0002	0.01	0.07	0.0002	0.3	0.005	76							
22/03/2004	>20mm		7.4	240	194	86	110	45	7.8	1.10		1.8	0.1	6.5	4.8	0.01	0.001	0.0002	0.02	0.05	0.0002	0.01	0.005	42							
30/04/2004	Routine		7.0	460	250	11	10	82	9	0.85		1	0.1	22	13	0.01	0.001	0.0002	0.01	0.04	0.0002	0.09	0.005	82							
31/05/2004	Routine		7.4	500	290	14	6	94	9	0.05		1.7	0.1	23	14	0.01	0.001	0.0002	0.01	0.06	0.0002	0.53	0.005	97							
30/06/2004	Routine	No flow	#N/A																												
27/07/2004	Routine		7.1	570	286	4	1	110	6	0.39		0.02	0.1	24	14	0.01	0.001	0.0002	0.02	0.11	0.0002	0.51	0.005	100							
20/08/2004	>20mm		6.9	800	398	5	3	170	9	0.12		0.6	0.79	25	16	0.01	0.001	0.0002	0.02	0.02	0.0003	0.14	0.005	90							
1/10/2004	>20mm		7.1	500	250	12	40	84	6	0.41		0.8	0.06	20	11	0.01	0.001	0.001	0.02	0.02	0.0005	0.94	0.001	90							
19/10/2004	>20mm		7.0	300	218	21	19	67	7	0.59		1	0.06	15	10	0.01	0.001	0.0002	0.02	0.02	0.0002	0.1	0.005	20							
30/11/2004	Routine		7.6	400	200	9	9.2	60	30	0.87		0.5	0.06	16	9	0.01	0.001	0.0002	0.01	0.04	0.0001	9	0.005	80							
23/12/2004	Routine		7.4	300	160	4	9	45	16	1.66		2.87	0.06	16	7.1	0.01	0.001	0.001	0.01	0.04	0.0001	0.06	0.005	20							
17/01/2005	>20mm		6.9	340	128	47	38	45	40	0.16		1.1	0.06	15	8	0.01	0.001	0.0002	0.01	0.04	0.0001	8	0.005	96							
11/02/2005	>20mm		7.6	300	180	310	160	75	15	1.40		0.8	0.06	11	6.4	0.03	0.002	0.001	0.01	0.06	0.0001	0.03	0.01	44							
21/02/2005	>20mm/Routine		7.3	100	170	21	90	40	7	2.03		0.92	0.06	5	3.2	0.01	0.001	0.001	0.01	0.05	0.0001	0.02	0.02	24							
18/03/2005	>20mm		7.5	200	148	302	445	54.6	8	1.90		1.16	0.15	4	2.7	0.02	0.0012	0.0001	0.01	0.09	0.0001	0.01	0.0001	240							
29/04/2005	Routine		7.9	300	194	2	7	72	6	1.12		0.67	0.06	16	9.1	0.01	0.0007	0.0002	0.02	0.01	0.5	0.01	0.01	68							
13/05/2005	>20mm		7.2	300	230	5	8.5	45	10	0.70		1.75	0.42	15	8.3	0.02	1	0.0001	0.01	0.03	0.0005	0.02	0.0001	64							
24/06/2005	>20mm		7.3	300	74	16	5.1	86	87	0.01		0.5	0.02	13	8	0.04	0.005	0.001	0.01	0.02	0.0005	0.02	0.0005	59							
29/07/2005	Routine		7.8	400	190	2	15	71	14	0.09		0.55	0.06	16	9	1.4	0.0007	0.0002	0.01	0.01	0.0005	0.02	0.0005	60							
30/08/2005	Routine		7.9	500	310	5	2	79	10	0.49		1.8	0.06	19	11	0.01	0.0005	0.0001	0.01	0.04	0.0005	0.08	0.008	94							
5/09/2005	>20mm		8.0	500	230	8	13	109	12	0.66		0.5	0.06	20	12	0.01	0.0006	0.001	0.01	0.01	0.0005	0.16	0.003	65							
17/10/2005	>20mm		7.5	500	330	36	25	170	9	0.98		0.8	0.82	22	16	0.03	0.0018	0.002	0.01	0.01	0.0005	0.42	0.005	160							

Notes:

values reported in 1994 EIS

Data from NSW gov stn at Wenham's Cox

conc taken as MDL

DATE	EVENT	Flow	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Redox	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp	DO (mg/L)	DO (% sat)	Turbidity (NTU)	Temperature (°C)	Nitrate + nitrite as N (NOx)
		Rate		(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C	(mg/L	(% sat)	(NTU)		(mg/L)
28/11/2005	>20mm		7.6	100	302	130	127	25	30	2.90		3.09	0.12	9.5	4.5	0.01	0.0006	0.00002	0.02	0.03	0.0005	0.02	0.0002	16							
29/12/2005	Routine		7.8	420	na	4.4	6	59	54	0.30																					
31/01/2006	Routine		7.1	400	200	2	7	50	7.4	1.10		0.5	0.06	19	11	0.01	0.0018	0.00002	0.01	0.03	0.0005	0.01	0.0001	100							
27/02/2006	Routine		7.8	600	360	12	18	50	6.3	1.10		0.86	0.06	24	13	0.01	0.0019	0.001	0.01	0.02	0.0005	0.05	0.0001	130							
28/02/2006	>20mm		7.7	400	340	8	12	74	11	1.80		2.2	0.06	18	9.6	0.01	0.0006	0.001	0.01	0.06	0.0005	0.01	0.001	85							
31/03/2006	Routine		7.0	300	220	11	5.5	12	5.9	1.00		0.51	0.06	11	7	0.09	0.0008	1	0.01	0.03	0.00005	0.02	0.001	140							
14/04/2006	>20mm		7.4	300	150	10	7.8	37	2.7	1.10		1.2	0.06	12	6.9	0.01	0.0009	0.02	0.01	0.27	0.0005	0.01	0.02	57							
31/05/2006	Routine	No flow	#N/A																												
29/06/2006	Routine		7.6	400	360	27	4.3	37	4.4	1.20		0.38	0.06	21	14	0.02	0.0024	0.02	0.01	0.01	0.0005	0.06	0.1	100							
17/07/2006	>20mm		7.7	500	380	8	11	180	5.1	0.67		0.27	0.06	19.1	10.71	0.01	0.0014	0.02	0.01	0.04	0.0005	0.01	0.1	8							
31/08/2006	Routine		7.6	900	370	16	34	270	12	0.96		0.81	0.06	15	12	0.01	0.001	0.001	0.01	0.07	0.0005	0.01	0.002	87							
10/09/2006	>20mm		7.3	300	430	300	54	50	25	1.10		0.1	0.13	11	7.1	0.01	0.0026	0.001	0.01	0.02	0.0005	0.02	0.005	47							
30/10/2006	Routine		7.5	500	390	21	10.6	99	9.5	0.19		0.07	1	21	12	0.004	0.00005	0.02	0.002	0.01	0.0005	0.2	0.1	92							
5/11/2006	>20mm		7.2	500	540	<1	7	220	6	1.10		0.08	1.1	19	12	0.003	0.0011	0.001	0.001	0.02	0.0005	0.47	0.002	87							
30/11/2006	Routine	No flow	#N/A																												
29/12/2006	Routine	No flow	#N/A																												
31/01/2007	Routine	No flow	#N/A																												
26/02/2007	>20mm		8.0	900	610	2	160	200	41	0.10			0.06	22	24	0.002	0.0011	0.001	0.001	0.02	0.0005	0.5	0.001	67							
28/02/2007	Routine	Low flow refer sample 26/02																													
26/03/2007	>20mm		7.3	300	206	10	5.3	25	56	2.10		na	0.05	12.7	7.1	0.02	0.0014	0.02	0.2	0.05	0.0005	0.09	0.1	33							
30/04/2007	Routine	No flow	#N/A																												
10/05/2007	>20mm		#N/A																												
8/06/2007	>20mm		7.2	80	128	492	486	74	3.9	6.20		2.7	1.5	22	2.3	0.01	0.01	0.003	0.03	0.01	0.01	0.01	0.01	2							
10/07/2007	>20mm		6.7	270	350	23	51	47	9.9	3.00	149.0	2.1	0.3	9.8	6.5	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	10							
20/08/2007	>20mm		7.2	460	278	4	20	94	9	0.02	-85.0	0.5	0.02	19	11	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	69							
28/09/2007	Routine		7.2	370	222	6.5	8	177	11.1	1.10	-30.0	0.86	0.03	18	10	0.02	0.02	0.01	0.01	0.03	0.03	0.01	0.01	65							
26/10/2007	>20mm		7.1	497	250	6	52	98	2	1.26		0.5	0.07	20	11	0.001	0.002	0.0001	0.001	0.05	0.0001	0.72	0.001	97							
24/11/2007	>20mm		8.1	190	162	36	7	30	3	0.68		0.714	0.07	10	6	0.001	0.01	0.0001	0.001	0.05	0.0001	0.002	0.001	56							
17/12/2007	>20mm		7.3	150	230	85	69	38	5	2.21		0.8	0.18	5	3	0.002	0.01	0.0001	0.001	0.05	0.0001	0.039	0.001	34							
17/01/2008	>20mm		7.6	230	16	4	14	47	4	0.67		0.486	0.01	10	5	0.001	0.01	0.0001	0.001	0.05	0.0001	0.041	0.001	56							
29/02/2008	>20mm		7.1	230	226	43	87	85	7	3.42		0.6	0.06	7	5	0.003	0.003	0.0001	0.001	0.05	0.0001	0.082	0.002	59							
25/03/2008	>20mm		8.1	340	180	6.5	10	72.9	7	0.85		0.6	0.14	13	8	0.001	0.002	0.0001	0.001	0.05	0.0001	0.064	0.001	63.8							
22/04/2008	>20mm		7.8	111	165	82	150	10	6	0.69		1.9	0.17	4	3	0.004	0.003	0.0001	0.002	0.05	0.0001	0.059	0.004	62							
29/05/2008	Routine		6.6	450	150	7	16	63	9	0.44		0.3	1.26	16	9	0.001	0.001	0.0001	0.001	0.05	0.0001	0.15	0.001	71							
4/06/2008	>20mm		7.1	390	280	32	14	66	10	1.16		0.4	0.1	16	9	0.005	0.001	0.0011	0.001	0.05	0.0001	0.335	0.001	69							
30/07/2008	Routine		7.2	410	230	13	16	68	11	0.83		0.3	0.09	16	9	0.001	0.001	0.0001	0.001	0.05	0.0001	0.109	0.001	71							
29/08/2008	Routine		7.5	380	244	2	27	76	8	0.83		0.2	0.01	19	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.111	0.001	73							
5/09/2008	>20mm		7.8	1500	1120	82	72	651	35	2.92		0.6	0.02	39	39	0.001	0.001	0.0001	0.001	0.05	0.0001	0.28	0.001	152							
31/10/2008	Routine		7.3	470	144	4	7	76	1	0.38		0.6	1.06	19	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.203	0.001	79							
19/11/2008	>20mm		7.4	440	250	9	10	58	1	0.40		0.1	0.01	22	12	0.001	0.002	0.0001	0.001	0.05	0.0001	0.927	0.001	92							
13/12/2008	>20mm		7.2	350	212	45	41	70	1	1.37		0.9	0.09	16	9	0.001	0.003	0.0001	0.001	0.05	0.0001	0.225	0.001	82							
28/01/2009	Routine	No Flow	#N/A																												
13/02/2009	>20mm	No Flow	7.4	650																											
19/02/2009	Routine	Mod Flow	6.7	150			34	24	5	2.20			0.08	5	3							0.061	0.002								
23/02/2009	>20mm		5.7	160			72	25	5	1.99			0.09	6	4							0.059	0.001								
24/03/2009	Routine		7.2	359	200	3	8.03	63	1	2.51		0.3	0.05	16	9	0.001	0.002	0.0001	0.001	0.05	0.0001	0.192	0.001	72							
1/04/2009	>20mm	High Flow	6.7	79	130	100	189	14	10	4.11		1.6	0.19	4	2	0.003	0.002	0.0001	0.002	0.05	0.0001	0.089	0.003	20							
21/05/2009	>20mm		6.9	321	172	8	22.1	51	2	1.39		0.2	0.04	12	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.091	0.001	58	124						
23/06/2009	>20mm	Mod Flow	6.2	116	141	8	96.8	23	7	0.65		0.1	0.22	4	3	0.002	0.001	0.001	0.002	0.05	0.0001	0.041	0.002	25	217						
31/07/2009	Routine		7.1	393	218	4	10.13	74.9	11.3	1.02		0.1	0.02	16	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.081	0.001	68	152	11					
31/08/2009	Routine		6.7	438	130	5	8.44	78.3	7.9	1.02		0.4	0.01	20	12	0.001	0.001	0.0001	0.001	0.05	0.0001	0.284	0.001	86	165	14.9					
30/09/2009	Routine	Low Flow	7.2	643	300	24	10.42	100	3.52	0.1		0.7	0.03	24	13	0.001	0.001	0.0001	0.001	0.05	0.0001	1.28	0.001	102	182						
6/10/2009	>20mm	Low Flow	7.2	625	310	20	16.1	98.8	2.17	0.44		0.9	0.05	26	13	0.001	0.002	0.0001	0.001	0.05	0.0001	1.31	0.001	135	143						
27/10/2009	>20mm		7.0	485	270	20	15	85.4	6.84	0.17		0.8	0.09	20	11	0.001	0.002	0.0001	0.001	0.05	0.0001	0.953	0.001	115							
30/11/2009	Routine		7.1	406	260	3	9.64	59.3	4.23	2.90		0.6	0.02	16	9	0.001	0.002	0.002	0.001	0.05	0.0001	0.327	0.001	77							
27/12/2009	>20mm		6.4	497	270	12	10.05	72.9	1.39	0.54		0.8	0.05	22	12	0.001	0.002	0.0001	0.001	0.05	0.0001	0.83	0.001	110							
7/01/2010	Routine	Mod Flow	6.1	139	180	62	100.7	19.1	3.12	0.92		1.5	0.17	5	3	0.001	0.002	0.0001	0.001	0.05	0.0001	0.047	0.002	31							
29/01/2010	>20mm		7.1	323	220	63	110	53	1	0.57		1.3	0.16	13	10	0.001	0.002	0.0018	0.001	0.05	0.0001	0.087	0.002	59		24.1					
26/02/2010	Routine	Low Flow	6.5	276	170	2	12.3	40.7	4.14	0.90		0.4	0.02	12	7	0.001	0.002	0.001	0.001	0.05	0.0001	0.062	0.001	58		20.7					
15/03/2010	>20mm	Mod Flow	6.9	173	101	12	16.2	33.2	7.08	0.44		0.4	0.06	11	6	0.001	0.001	0.0001	0.001	0.05	0.0001	0.034	0.001	47	233	19.5					
28/04/2010	Routine	Low Flow	6.5	322	159	3	6.56	48.1	4.52	1.32		0.3	0.11	16	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.106	0.001	70	239	17.2					
31/05/2010	Routine	Low Flow	6.5	329	140	3	5.78	49.2	5.76	0.72		0.1	0.07	14	7	0.001	0.001	0.0001	0.002	0.05	0.0001	0.042	0.001	67	200	13					
4/06/2010	>20mm	Low Flow	6.7	311	138	6	8.19	50.1	8.88	0.82		1.2	0.01	14	8	0.001	0.001	0.0002	0.001	0.05	0.0001	0.039	0.001	61	222	14.5					
30/07/2010	Routine	Mod-Low Flow	6.9	160	183	29	97.7	26	2	1.17		1.5	0.24	6	4	0.002	0.001	0.0001	0.001	0.05	0.0001	0.044	0.002	24	176	12.7					
4/08/2010	>20mm	Mod-High Flow	6.7	126	210	72	148	19	1	1.11		2	0.2	4	2	0.003	0.002	0.0001	0.002	0.05	0.0001	0.071	0.003	16	117	11.5					
30/09/2010	Routine	Low Flow	6.8	300	216	8	8.41	65	5	0.61		0.01	0.01	17	9	0.001	0.002	0.0001	0.001	0.05	0.0001	0.333	0.001	85	161	15.6					
4/10/2010	>20mm	Low-Mod Flow	7.1	323	308	124	204	83	10	0.59		0.14	0.01	10	7	0.001	0.002	0.0001	0.001	0.05	0.0001	0.143	0.003	92	173	17.3					
20/10/2010	Macro sample	Low Flow	#N/A																					56							
6/11/2010	>20mm	Low Flow	6.7	177	46	210	73.1	36	1	1.12		1.5	0.46	8	5	0.002	0.002	0.0002	0.002	0.05	0.0001	0.073	0.002	43	134	16.2					

Notes:
values reported in 1994 EIS
Data from NSW gov stn at Wenham's Cox
conc taken as MDL

DATE	EVENT	Flow	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Redox	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp	DO (mg/L)	DO (% sat)	Turbidity (NTU)	Temperature (°C)	Nitrate + nitrite as N (NOx)
		Rate		(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C	(mg/L	(% sat)	(NTU)		(mg/L)
2/12/2010	>20mm	High Flow	6.2	69			185																		182	21.2					
6-Jan-11	Routine	Low-Mod Flow	6.4	370	188	12	12	59	6	3.99		0.5	0.01	14	8	0.005	0.002	0.0003	0.001	0.05	0.0001	0.291	0.001	83		21					
14-Feb-11	Routine	Low Flow	6.4	439	242	10	9	31	1	2.58		1	0.32	10	6	0.001	0.003	0.0001	0.001	0.05	0.0001	0.34	0.001	79	48	21.3					
21-Feb-11	Event	Low Flow	6.4	281	139	12	27	25	3	2.23		0.4	0.01	10	5	0.001	0.002	0.0001	0.001	0.05	0.0001	0.058	0.001	45	43	25.3					
22-Mar-11	Event	Mod Flow	5.8	122			211																		121	24.1					
17-Apr-11	Event	High Flow	6.2	133	204	70	125	20	1	3.58		1.2	0.15	4	3	0.004	0.001	0.0001	0.002	0.05	0.0001	0.08	0.003	22	114						
31-May-11	Event	High Flow	6.6	97	190	196	267	13	1	4.58		2.4	0.33	3	2	0.004	0.002	0.0001	0.001	0.05	0.0001	0.114	0.005	14	123	14					
30-Jun-11	Routine	Low Flow	6.4	295	182	5	18	53	6	2.06		0.1	0.01	12	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.126	0.001	48	117	12.8					
21-Jul-11	Event	Mod Flow	6.7	138	122	66	107	23	7	1.86		1.4	0.2	4	3	0.003	0.001	0.0001	0.001	0.05	0.0001	0.043	0.001	15							
21-Aug-11	Event	Low-Mod Flow	6.6	254	236	84	156	45	8	4.34		1.6	0.51	7	5	0.003	0.002	0.0001	0.002	0.05	0.0001	0.113	0.003	34	139	12.3					
30-Sep-11	routine	Low Flow	7.3	397			4																		138	15.9					
3-Oct-11	Event	Low-Mod Flow	6.4	180			89																		137	14.1					
12/06/2011	from AQ WQ study		5.91	254																				79			8.44	75.8	27.9	10.85	
4-May-10	from DG's AGL study		7.7	350.0	136	1		52.7	4.16	1			0.0	16	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.088	0.001	70							
11/11/1994 12:10				610			0.5						0.01																		0.01
15/12/1994 9:30				583			3						0.06																		0.01
11/01/1995 16:00				266			8						0.01																		0.01
16/02/1995 13:30				390			2.4						0.02																		0.01
5/03/1995 0:00				95			125						0.13																		0.16
15/03/1995 14:00				271			10						0.02																		0.04
11/04/1995 11:30				410			5						0.01																		0.01
12/05/1995 11:45				486			55						0.01																		0.01
15/06/1995 11:30				387			5.1						0.01																		0.01
12/07/1995 11:30				362			7.1						0.02																		0.01
10/08/1995 10:30				417			3.8						0.01																		0.01
14/09/1995 0:00				669			1.6						0.01																		0.01
13/10/1995 10:30				523			3.7						0.03																		0.01
15/11/1995 14:30				942			6						0.05																		0.03
13/12/1995 11:45				186			15.6						0.07																		0.03
10/01/1996 16:30				182			34						0.04																		0.01
15/02/1996 0:00				331			7.2						0.02																		0.01
14/03/1996 11:30				216			5.1						0.06																		0.01
14/04/1996 9:00				356			7.7						0.05																		0.1
17/05/1996 11:30				250			29.1						0.08																		0.04
15/06/1996 11:30				478			5.6						0.01																		0.01
10/07/1996 15:30				391			6.4						0.01																		0.01
19/08/1996 11:30				462			7.7						0.01																		0.01
13/09/1996 13:30				361			11						0.03																		0.01
17/11/1996 11:30				661			5						0.04																		0.01
12/02/1997 13:30				229			96						0.47																		0.08
7/05/1997 11:30				415			8.1						0.04																		0.01
11/06/1997 10:30				422			7						0.01																		0.01
11/07/1997 8:30				288			23						0.02																		0.01
17/08/1997 11:30				478			6.4						0.01																		0.05
14/09/1997 11:00				548			8.2						0.03																		0.02
8/10/1997 0:00				197			139						0.19																		0.08
12/11/1997 0:00				338			12						0.09																		0.03

W2
Downstream Avon River
Notes:
values reported in 1994 EIS
conc taken as MDL

DATE	Event	Flow	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C	DO (mg/L)	DO (% sat) (% sat)	Turbidity (NTU)
4-May-94			6.9	340	260	24		73	1	0.5	1.7	1	13	9.1	0.01	0.002	0.01	0.01	0.04	0.04	0.310	0.01						
10-May-94			6.9	300	180			54	1	0.7																		
16-May-94			7.1	450	250			95	17	1.0																		
23-May-94			6.9	600	340			115	13	0.3																		
2-Jun-94			7.1	560	390	6		166	9	0.5	2	1	15.8	12.2	0.01	0.002	0.01	0.01	0.01	0.08	0.01	0.01						
16-Jun-94			6.8	580	320			190	10	0.4																		
30-Jun-94			6.8	590	330	158		182	1	0.3	4	1	17.5	14.1	0.01	0.002	0.01	0.01	0.04	0.04	0.260	0.01						
1-Aug-94			7.0	661	320	21		265	4	0.1	1	1	19.8	16														
29-Sep-94			7.5	960	470			240	8	0.1																		
30-Oct-94			7.2	1120	590			290	4	0.1																		
3-Jan-95			6.2	300	220	20		58	13	0.01		1	11	7.5														
31-Jan-95			7.2	190	240	7		72	10	0.1	1.1	0.08	14	9.1														
6-Mar-95			#N/A																									
3-Apr-95			6.7	400	230			85	8	0.9																		
3-May-95			#N/A	430	170			53	10	0.0																		
3-Jun-95			6.2	340	190	13			11	0.7																		
3-Jul-95			#N/A	320	180	25			12	0.8																		
1-Aug-95			7.1	460	180	9			13	0.3																		
1-Sep-95			7.4	400	180	4		88	8	**0.05**			15	11									Iron (filt.) is indicative only as the sample was not in an acid washed bc					
4-Oct-95			7.3	690	380	4		170	19	0.1	2.6	0.2	10	15	0.01	0.005	0.01		0.02	0.0005	0.050	0.01						
6-Nov-95			7.1	540	310	3		140	9	0.02			19	14														
22-Nov-95			6.3	330		190		77	8	0.7	5.6	0.13	7.7	7.1	0.01	0.005	0.01	0.01	0.03	0.001	1.600	0.01	3.35pm sampled					
6-Dec-95			6.1	250	190	210		53	**1**	0.8			7.1	6.3									12.00 noon sampled, sample filtered thru 0.45um membrane prior to s					
8-Jan-96			7.0	220	220	52		52	1	1.1			6.7	5									2.50pm flow sampled					
20-Feb-96			7.1	390	230	6		79	1		7.6	0.1	14	9.8	0.005	0.005	0.005	0.005	0.03	0.0002	0.070	0.01	3.25pm flow sampled					
25-Mar-96			7.3	260	100	16		69	1	0.4			11	6.9									2.50pm flow sampled					
23-Apr-96			7.0	300	180	8		59	1	0.1			12	8.1									2.50pm very low water level (farm pumping?)					
15-May-96			6.7	260	220	120		47	9	1.0	13	0.32	7.6	6.4	0.005	0.002	0.005	0.005	0.04	0.0002	0.900	0.005	12.15pm flow sampled					
17-Jun-96			6.8	720	370	100		180	17	0.4			16	18									2.20pm flow sampled					
23-Jul-96			7.6	440	230	7		84	10	0.5			18	11									12.15pm flow sampled					
26-Aug-96			7.3	460	240	2		110	11	0.0			17	12									12.05pm - sampled					
30-Sep-96			7.3	370	220	22		73	9	0.6			13	11									2.40pm - sampled					
29-Oct-96			7.1	580	330	6		130	1	0.1			20	16	0.01		0.01	0.01			0.100	0.03	11.55am - sampled					
25-Nov-96			6.6	190	130	83		44	7	1.2	20	0.3	4.6	3.9	0.01	0.003	0.01	0.01	0.03	0.0002	0.040	0.01	12.00pm - sampled					
9-Dec-96			6.9	370	240	68		88	**1**	1.3			10	9.2									2.10pm - sampled, sample filtered thru 0.45u membrane prior to analy					
31-Jan-97			6.5	180	160	120		27	1	1.2			6.4	4.6									flow sampled 12.55pm					
14-Feb-97			6.5	250	180	120		57	1	0.8			8.2	5.9									flow sampled 2.05pm					
6-Mar-97			6.8	130	94	170		25	1	0.8			5.4	3.7														
23-Apr-97			7.1	310	180	10		75	1	0.8			13	7.3									sampled 2.45pm					
14-May-97			7.0	280	160	52		100	19	0.3			7.7	6.1									flow sampled 11.40am					
16-Jun-97			6.8	120	110	410		30	6	0.9			4.1	3.3									flow sampled 2.05pm					
25-Jul-97			7.1	440	240	14	13	90	13	0.3			18	11									flow sampled 12.30pm					
22-Aug-97			7.3	490	270	4	5	120	11	0.1													flow sampled 10.35am					
22-Sep-97			7.0	640	380	42	18	120	8.4	0.0													flow sampled 11.30am					
25-Sep-97			6.9	970	550	81	61	270	20	0.2													flow sampled 11.30am					
7-Oct-97			6.9	420	230	20	24	87	11	1.1													flow sampled 10.55am					
8-Oct-97			6.6	410	210	160	110	94	10	0.5													flow sampled 10.40am					
23-Oct-97			6.8	420	270	21	16	97	9.3	1.2													flow sampled 4.00pm.					
24-Nov-97			#N/A																				No flow					
22-Dec-97			#N/A																				No flow					
6-Jan-98			#N/A																				No flow/not visited as no sample taken at W1 or W4 and based on rec					
7-Jan-98			#N/A																				No flow - comments as above					
10-Jan-98			#N/A																				No flow - spoke to farmer Norm Bignall at farmhouse					
11-Jan-98			#N/A																				No flow - based on yesterday's results and slower flows u/stream.					
20-Jan-98			#N/A																				No flow - based on recent trends and no flow upstream.					
27-Jan-98			6.6	300	180	100	90	77	14	0.5													Moderate flow at 3.10pm					
28-Jan-98			6.4	500	270	100	88	130	19	0.4													Flow at 2.55pm					
9-Feb-98			#N/A																				No flow at 11:15am					
10-Feb-98			#N/A																				No flow as per 9/2/98					
19-Feb-98			#N/A																				No flow at 9.55am					
20-Mar-98			#N/A																									
21-Apr-98			#N/A																				Some small puddles					
3-May-98			#N/A																									
20-May-98			6.6	250	130	90	76	65	16	0.6													Flowing - taken on east side of River (Fairbones Rd entrance used).					
17-Jun-98			7.1	310	200	10	9	57	11	0.4													Slow flow sampled					

Notes:
values reported in 1994 EIS
conc taken as MDL

DATE	Event	Flow	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C	DO (mg/L)	DO (% sat)	Turbidity (NTU)
23-Jun-98			7.0	230	220	150	87	51	15	1.0													Good flow					
24-Jun-98			6.8	230	200	60	54	68	16	0.8																		
15-Jul-98	Routine		7.7	300		17	20			0.9																		
12-Aug-98	Routine		7.1	190		44	54			1.2																		
14-Sep-98	Routine		7.1	200		66	61	57	13	1.1																		
14-Oct-98	Routine		#N/A																									
11-Nov-98	Routine		7.0	510		4	3	110	7	0.2																		
18-Nov-98	Flow		7.3	520		4	4	87	4	0.3																		
19-Nov-98	Flow		6.5	150		140	120	27	6	0.7																		
24-Nov-98	Flow		6.8	151		120	60	27	6	1.0																		
25-Nov-98	Flow		6.3	78		60		33	6	1.6																		
10-Dec-98	Routine		7.0	465		6	3	83	23	0.7																		
31-Dec-98	**Accident**		7.2	**830**				**180**	**56**																			
1-Jan-99	**Accident**		7.2	**675**				**150**																				
7-Jan-99	Routine		7.1	876		5	2	200	**100**	0.3																		
10-Jan-99	Flow		7.2	554		6		120	24	0.8																		
11-Jan-99	Flow		6.7	558		6	4	100	13	0.7																		
21-Jan-99	Flow		#N/A	442		7		87	9	0.2																		
22-Jan-99	Flow		#N/A	260		110		83	29	0.7																		
23-Jan-99	Flow		#N/A	297		70		63	24	0.9																		
28-Jan-99	Flow		#N/A	220		150		73	10	1.0																		
29-Jan-99	Flow		#N/A	245		240		40	7	1.1																		
25-Feb-99	Routine		7.1	410		8	3	72	5	1.0																		
30-Mar-99	Routine		6.9	275		13	18	48	6	1.0																		
29-Apr-99	Routine		6.8	249		16	21	59	13	0.9																		
31-May-99	Routine		6.9	505		7	9	110	13	1.0																		
28-Jun-99	Routine		6.9	277		29	40	69	16	1.1																		
14-Jul-99	Flow**		6.4	65		110	90	19	4	0.8	ble - sampled at Fairbairns Rd																	
15-Jul-99	Flow**		6.4	88		97	120	13	4	0.5																		
26-Aug-99	Routine		6.9	455		8	16	96	33	0.7																		
28-Sep-99	Flow		6.9	220		83	55	52	6	0.5																		
29-Sep-99	Flow		7.5	335		52	44	38	9	0.6																		
20-Oct-99	Routine		7.1	460		12	2	110	8	0.5																		
25-Oct-99	Flow		6.7	175		88	105	40	4	1.3																		
26-Oct-99	Flow		6.3	230		56	66	47	5	1.3																		
9-Nov-99	Flow		8.1	180		210	150	44	5	1.2																		
10-Nov-99	Flow		7.6	185		94	92	44	4	1.6																		
16-Nov-99	Flow		8.0	305		72	51	64	14	1.0																		
17-Nov-99	Flow		7.5	185		58	58	47	6	1.3																		
29-Nov-99	Flow		7.2	290		47	37	71	7	1.0																		
30-Nov-99	Flow		7.2	265		30	29	61	6	1.0																		
21-Dec-99	Routine		6.9	450		13	6	98	8	1.3																		
19-Jan-00	Routine		6.7	200		24	34	50	7.9	0.6																		
28-Feb-00	Routine		6.7	410		9	4	77	1.6	0.3																		
8-Mar-00	Flow		7.0	400		11	10	81	1.4	0.5																		
9-Mar-00	Flow		6.9	145		98	91	34	7.9	0.6																		
22-Mar-00	Flow		6.7	100		76	100	23	1	0.7	irns Lane (no access beyond)																	
23-Mar-00	Flow		6.0	88		100	115	20	1	0.6																		
3-Apr-00	Flow		6.7	265		46	46	54	36	0.6																		
4-Apr-00	Flow		7.0	270		31	31	57	28	0.5																		
24-May-00	Routine		7.2	355		7	15	80	23	0.4																		
14-Jun-00	Routine		7.0	470		8	9	94	39	0.9																		
11-Jul-00	Flow		6.8	155		120	125	38	7.5	0.6																		
12-Jul-00	Flow		7.2	360		50	50	130	42	0.4																		
29-Aug-00	Routine		7.1	530		2	6	130	22	0.4																		
20-Sep-00	Routine		7.3	670		17	11	150	16	0.1																		
30-Oct-00	Routine		#N/A																									
14-Nov-00	Flow		6.4	218		140	270	77	25	0.7																		
15-Nov-00	Flow		6.6	370		75	71	100	52	0.8																		
20-Nov-00	Flow		6.7	240		28	54	59	26	1.2																		
21-Nov-00	Flow		6.6	280		31	60	66	34	1.2																		
8-Dec-00	Flow		6.8	215		41	110	92	18	1.8																		
9-Dec-00	Flow		6.9	400		85	43	38	6.5	2.3																		
30-Jan-01	Routine		#N/A																									
31-Jan-01	Flow		#N/A																									
1-Feb-01	Flow		6.7	470		15	20	105	4	3.5																		
2-Feb-01	Flow		6.8	545		18	18	112	9	2.2																		
21-Feb-01	Flow		6.8	295		34	14	53	7	1.2																		

Notes:
values reported in 1994 EIS
conc taken as MDL

DATE	Event	Flow	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C	DO (mg/L)	DO (% sat) (% sat)	Turbidity (NTU)
22-Feb-01	Flow		6.6	245		26	51	51	9	2.0																		
1-Mar-01	Flow		7.1	225		363	205	37	6	2.3																		
2-Mar-01	Flow		6.8	255		45	103	54	16	2.6																		
7-Mar-01	Flow		6.5	116		406	111	20	6	2.6																		
8-Mar-01	Flow		7.2	101		30	68	20	6	2.1																		
9-Mar-01	Flow		6.6	89		52	93	16	6	2.3																		
26-Mar-01	Flow		6.8	115		78	110	20	6	2.7																		
27-Mar-01	Flow		7.4	178		41	66	30	9	2.4																		
23-Apr-01	Flow		7.2	510		12	17	93	6	1.4																		
24-Apr-01	Flow		7.7	299		17	33	93	10	1.4																		
7-May-01	Flow		7.1	96		104	125	42	2	0.9																		
8-May-01	Flow		6.7	45		70	110	12	2	1.3																		
9-May-01	Flow		7.2	130		85	97	21	4	0.5													post initial mine water release					
21-May-01	Flow		7.0	193		33	75	29	12	2.8																		
22-May-01	Flow		6.9	220		27	64	36	9	2.4																		
28-Jun-01	Routine		7.6	480		7	13	113	63	1.1																		
30-Jul-01	Routine		7.2	370		28	60	77	30	1.8																		
30-Aug-01	Routine		7.8	645		21	7	104	27	0.7																		
26-Sep-01	Routine		6.8	685		12	5	30	30	0.0																		
30-Oct-01	Routine		#N/A																									
20-Nov-01	Flow		7.0	1030		14	23	290	12	0.3																		
21-Nov-01	Flow		6.7	1295		29	50	340	32	0.7																		
18-Dec-01	Routine		6.8	644		13	7	140	5	0.4																		
30-Jan-02	Routine		6.9	1160		13	7	274	37	0.1																		
1-Feb-02	Flow		7.4	1080		26	18	230	36	0.6																		
2-Feb-02	Flow		6.5	790		16	18	200	32	0.1																		
5-Feb-02	Flow		5.8	142		553	265	15	10	1.4																		
6-Feb-02	Flow		6.1	208		112	75	25	20	0.5																		
7-Feb-02	Flow		6.4	355		41	36	58	48	0.8																		
20-Mar-02	Routine		7.1	565		39	18	105	49	1.6																		
30-Mar-02	Flow		6.7	180		585	220	33	13	1.9																		
31-Mar-02	Flow		6.6	770		30	24	109	117	0.9																		
29-Apr-02	Routine		6.7	550		2	5	79	15	1.2																		
29-May-02	Routine		6.9	490		5	8	80	11	0.9																		
5-Jun-02	Spot		#N/A																									
25-Jun-02	Routine		6.9	700		8	16	160	41	0.5																		
29-Jul-02	Routine		7.4	550		14	19	124	9	1.6																		
27-Aug-02	Routine		7.6	705		2	7	432	19	0.1																		
27-Sep-02	Routine		6.9	895		3	3.9	180	13	0.3																		
27-Oct-02	Routine		#N/A																									
27-Nov-02	Routine		#N/A																									
11-Dec-02	>25mm		#N/A																									
12-Dec-02	>25mm		6.8	506	480	73	78	120	75	1.5	3.8	0.21	15	15	0.04	0.005	0.0005	0.01	0.07	0.001	0.210	0.0111	17					
31-Jan-03	Routine		#N/A																									
22-Feb-03	Routine/>25mm		#N/A																									
31-Mar-03	Routine		6.5	290		10	10.3	68	8	1.1																		
29-Apr-03	Routine/>20mm		7.1	145	134	171	120	45	9	0.6	1.9	0.04	5	3	0.01	0.001	0.0004	0.02	0.02	0.0003	0.020	0.005	55					
16-May-03	>25mm		7.4	187		143	70	29	5	0.7																		
17-May-03	>25mm		6.9	250		32	52	45	13	0.6																		
26-May-03	>25mm		7.4	123	176	413	24	16	10	0.7	2.4	0.35	4	3	0.01	0.005	0.0004	0.01	0.07	0.0002	0.020	0.005	17					
27-May-03	>25mm		6.7	101		54	103	10	10	0.7																		
28-May-03	>25mm		#N/A			33	ND	4	6	0.5																		
26-Jun-03	Routine		7.7	450		4	10.2	83	15	1.2																		
31-Jul-03	Routine		7.3	474		3	2.4	98	16	0.5																		
28-Aug-03	Routine		7.4	600	322	4	2.5	120	23	0.2	0.5	0.1	24	17	0.02	0.004	0.0002	0.01	0.02	0.0002	0.060	0.005	74					
24-Sep-03	Routine		#N/A																									
30-Oct-03	Routine		#N/A																									
28-Nov-03	Routine		7.1	745	588	23	2.8	347	7	0.2	0.86	0.1	33	22	0.01	0.01	0.0002	0.01	0.02	0.0001	0.010	0.024	110					
6-Dec-03	>20mm		7.1	244	277	26	10.2	99	9	2.2	2.11	0.1	21	13	0.01	0.001	0.0002	0.01	0.05	0.0002	0.560	0.009	110					
18-Jan-04	>20mm		7.1	350	354	502	570	123	22	0.8	2.5	0.06	11	8.1	0.45	0.01	0.0002	0.01	0.06	0.0002	0.080	0.005	50					
25-Feb-04	>20mm		7.2	200	156	146	270	25	16	0.7	1.3	0.1	4.8	3.7	0.05	0.001	0.0002	0.01	0.07	0.0002	0.060	0.005	17					
22-Mar-04	>20mm		7.2	430	254	27	27	85	14	1.1	0.9	0.1	11	8	0.01	0.001	0.0002	0.02	0.04	0.0002	0.010	0.005	53					
30-Apr-04	Routine		7.1	40	250	5	3.5	77	5	0.2	0.9	0.1	18	12	0.01	0.001	0.0002	0.01	0.03	0.0002	0.020	0.005	80					
31-May-04	Routine		7.8	400	234	1	1	79	5	0.1	0.8	0.1	18	12	0.01	0.001	0.0002	0.01	0.06	0.0002	0.020	0.005	84					
30-Jun-04	Routine		#N/A																									
27-Jul-04	Routine		7.5	510	238	11	14	84	6	0.2	0.4	0.1	18	12	0.01	0.001	0.0002	0.02	0.07	0.0002	0.050	0.005	86					
20-Aug-04	>20mm		7.1	500	268	10	3	94	4	0.04	0.5	0.07	9	12	0.01	0.001	0.0002	0.02	0.02	0.0003	0.020	0.005	80					

Notes:
values reported in 1994 EIS
conc taken as MDL

DATE	Event	Flow	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C	DO (mg/L)	DO (% sat) (% sat)	Turbidity (NTU)
30-Sep-04	>20mm		7.2	500	280	4	6	110	4	0.08	0.6	0.06	19	12	0.01	0.001	0.001	0.02	0.02	0.0005	0.020	0.001	80					
19-Oct-04	>20mm		6.8	400	204	21	15	59	16	1.40	1.4	0.06	11	9	0.01	0.001	0.0002	0.02	0.04	0.0002	0.110	0.005	<5					
30-Nov-04	Routine		7.4	400	160	7	9	65	9	0.78	0.5	0.06	15	9	0.01	0.001	0.0002	0.01	0.03	0.0001	9.000	0.005	90					
23-Dec-04	Routine		7.1	200	140	15	11	40	7	1.27	2.2	0.06	10	5.6	0.01	0.001	0.0002	0.01	0.03	0.0001	0.020	0.005	100					
17-Jan-05	>20mm		7.1	330	194	17	17.5	40	5	0.53	1.1	0.14	11	7	0.01	0.001	0.0002	0.01	0.02	0.0001	0.010	0.005	62					
11-Feb-05	>20mm		7.6	200	170	190	230	85	7	2.20	0.87	0.06	9	5.4	0.04	0.002	0.001	0.01	0.05	0.0001	0.010	0.005	56					
22-Feb-05	>20mm/Routine		7.0	300	260	48	84	110	26	1.54	1.75	0.08	7.3	6.5	0.02	0.001	0.001	0.01	0.04	0.0001	0.020	0.02	20					
18-Mar-05	>20mm		7.6	100	204	354	208	44.7	5	1.50	1.76	0.14	2.7	1.5	0.03	0.001	0.0001	0.01	0.01	0.0001	0.010	0.0001	88					
29-Apr-05	Routine		7.8	300	192	1	10	54.5	5	0.82	0.66	0.06	15	8.9	0.02	0.8	0.0002	0.01	0.01	0.0005	0.010	0.015	60					
13-May-05	>20mm		7.1	300	230	8	5.8	50	6.5	0.7	1.1	0.14	15	8.8	0.01	1	1	0.01	0.01	0.0005	0.030	0.0002	60					
24-Jun-05	>20mm		7.6	400	120	3	2.7	74	1	0.4	0.5	0.02	14	8.8	0.02	0.005	0.001	0.01	0.02	0.0005	0.020	0.005	57					
29-Jul-05	Routine		7.8	400	190	1.3	19	71	5	0.7	0.55	0.06	15	10	0.11	0.0007	0.002	0.01	0.01	0.0005	0.060	0.005	60					
30-Aug-05	Routine		7.8	500	300	1	7	74	11	0.4	0.8	0.11	18	11	0.01	0.0005	0.001	0.01	0.03	0.0005	0.020	0.006	82					
5-Sep-05	>20mm		8.0	500	230	6	8	99	12	0.2	0.5	0.06	20	12	0.01	0.0005	0.001	0.01	0.01	0.0005	0.070	0.001	59					
17-Oct-05	>20mm		7.4	600	340	4	6	160	18	0.0	0.5	0.06	24	19	0.05	0.001	0.002	0.01	0.01	0.005	0.010	0.005	200					
28-Nov-05	>20mm		7.5	200	220	160	125	40	28	2.2	2.9	0.06	9.4	6	0.01	0.0007	0.00002	0.02	0.03	0.0005	0.070	0.0002	20					
29-Dec-05	Routine		7.8	330	na	1.2	6	47	14	0.5	na	na	na	na	na	na	na	na	na	na	na	na	na	-not analysed				
31-Jan-06	Routine		6.8	500	190	16	6	300	5.2	0.5	0.5	0.06	16	9	0.01	0.0016	0.00002	0.01	0.03	0.0005	0.010	0.0001	120					
27-Feb-06	Routine		7.5	400	220	9	8	110	2.6	1.1	0.8	0.09	17	10	0.01	0.0013	0.001	0.01	0.02	0.0005	0.060	0.001	90					
28-Feb-06	>20mm		7.8	400	290	10	8	37	8.2	1.4	2	0.06	17	8	0.01	0.8	0.001	0.01	0.03	0.0005	0.010	0.001	95					
31-Mar-06	Routine		7.1	300	230	5.5	4	<5	6.7	0.8	0.5	0.06	11	6.7	0.11	0.0008	1	0.01	0.03	0.00005	0.010	0.001	103					
14-Apr-06	>20mm		7.4	200	130	9.5	6.4	25	1.4	0.1	1.1	0.06	11	6.2	0.01	0.0007	0.02	0.02	0.15	0.0005	0.010	0.2	67					
31-May-06	Routine		7.8	500	160	25	8	270	9.5	0.1	15	0.06	24	17	0.01	0.0008	0.02	0.03	0.04	0.0005	0.040	0.1	73					
29-Jun-06	Routine		7.4	500	270	35	2.1	112	7.6	0.0	0.45	0.06	20	14	0.03	0.0007	0.02	0.01	0.01	0.0005	0.090	0.1	67					
17-Jul-06	>20mm		7.4	600	300	4.5	2	110	7.7	0.1	0.42	0.08	17.57	10.58	0.01	0.0005	0.02	0.02	0.01	0.0005	0.010	0.1	60					
31-Aug-06	Routine		7.5	900	540	22	20	210	68	0.6	0.4	0.06	18	17	0.01	0.0005	0.001	0.02	0.06	0.0005	0.020	0.001	53					
10-Sep-06	>20mm		7.1	600	370	32	38	140	70	0.8	0.88	0.06	17	17	0.01	0.0013	0.001	0.03	0.01	0.0005	0.020	0.004	53					
30-Oct-06	Routine		7.5	400	250	3	3.4	25	4.6	0.4	0.08	0.2	14	10	0.0005	0.0007	0.02	0.002	0.01	0.0005	0.020	0.1	80					
5-Nov-06	>20mm		7.3	300	500	1	5	200	10	0.8	0.6	0.17	15	10	0.003	0.0006	0.0001	0.001	0.01	0.0005	0.220	0.002	87					
30-Nov-06	Routine		8.3	300	150	4	6	37	60	1.0	0.6	0.19	12	7.4	0.02	0.0005	0.02	0.2	0.01	0.0005	0.180	0.1	67					
29-Dec-06	Routine	No flow	#N/A																									
31-Jan-07	Routine	No flow	#N/A																									
26-Feb-07	>20mm	No flow	#N/A																									
26-Mar-07	Routine		7.4	300	193	13	3.7	0	106	2.8	na	<0.05	12.6	7.4	0.02	0.0005	0.02	0.2	0.05	0.0005	0.290	0.1	33					
30-Apr-07	Routine	No flow	#N/A																									
10-May-07	>20mm	No flow	#N/A																									
8-Jun-07	>20mm		6.8	400	200	158	128	74	16	2.2	1.2	3.4	4	4.6	0.01	0.01	0.002	0.01	0.01	0.01	0.010	0.01	2					
10-Jul-07	>20mm		6.7	410	350	36	58	70	27.9	2.1	2.1	0.1	11	11	0.1	0.1	0.1	0.1	0.1	0.01	0.100	0.1	10					
20-Aug-07	>20mm		7.2	390	220	2	5	85	7.8	0.0	0.5	0.003	16	9.4	0.01	0.03	0.01	0.001	0.01	0.01	0.010	0.02	57					
28-Sep-07	Routine		7.5	400	226	8.5	9	80	9.3	1.0	0.6	0.03	16	9.5	0.03	0.01	0.01	0.04	0.01	0.01	0.010	0.01	65					
26-Oct-07	>20mm		7.1	400	200	2	4	68	4	0.7	0.5	0.07	15	9	0.001	0.003	0.0001	0.0001	0.05	0.0001	0.350	0.001	77					
24-Nov-07	>20mm		7.9	370	188	76	89	59	4	0.8	1.601	0.23	12	9	0.001	0.002	0.0001	0.001	0.05	0.0001	0.004	0.001	69					
17-Dec-07	>20mm		7.2	180	180	78	58	47	5	3.8	0.9	0.34	5	4	0.003	0.002	0.0001	0.002	0.05	0.001	0.064	0.003	43					
17-Jan-08	>20mm		7.7	210	58	40	65	38	6	0.3	1.082	0.09	7	5	0.001	0.001	0.0001	0.001	0.05	0.0001	0.041	0.001	65					
29-Feb-08	>20mm		7.0	320	1180	14	20	123	8	1.6	0.6	<0.01	11	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.075	0.001	86					
25-Mar-08	>20mm		7.9	530	305	18	40	114.6	18	0.7	0.7	0.16	17	14	0.001	0.001	0.0001	0.001	0.05	0.0001	0.168	0.001	63.8					
22-Apr-08	>20mm		7.6	140	130	61	132	26	10	0.7	1.8	0.19	4	4	0.003	0.003	0.0004	0.001	0.05	0.0001	0.076	0.003	28					
29-May-08	Routine		6.4	510	200	7	31	87	21	0.7	0.4	0.14	17	12	0.001	0.001	0.0001	0.001	0.05	0.0001	0.190	0.001	71					
4-Jun-08	>20mm		7.0	430	355	32	33	102	70	0.5	0.8	0.21	20	18	0.001	0.001	0.0001	0.001	0.05	0.0001	0.330	0.001	63					
30-Jul-08	Routine		6.9	740	360	7	17	68	32	0.4	0.6	0.06	21	16	0.001	0.001	0.0001	0.001	0.05	0.0001	0.228	0.001	80					
29-Aug-08	Routine		7.6	690	462	14	26	144	65	0.5	0.5	<0.01	21	22	0.001	0.001	0.0001	0.001	0.05	0.0001	0.183	0.001	112					
5-Sep-08	>20mm		7.8	1000	890	72	60	405	40	3.5	1.2	0.07	29	29	0.002	0.001	0.0001	0.001	0.05	0.0001	0.371	0.001	124					
31-Oct-08	Routine		7.4	540	416	4	7	2	2	0.1	0.5	0.07	22	14	0.002	0.001	0.0002	0.001	0.05	0.0001	0.226	0.001	85					
19-Nov-08	>20mm		7.6	680	380	4	3	124	1	0.2	0.3	<0.01	22	19	0.001	0.001	0.0001	0.001	0.05	0.0001	0.266	0.001	129					
13-Dec-08	>20mm		7.2	410	322	195	115	75	10	1.4	2.2	0.2	15	13	0.002	0.004	0.0001	0.002	0.05	0.0001	0.460	0.006	72					
23-Jan-09	Routine	No Flow	#N/A																									
13-Feb-09	>20mm	No Flow	7.4	650																								
19-Feb-09	Routine	Mod Flow	7.0	160			23	23	5	1.69		0.1	4	3							0.083	0.001						
23-Feb-09	>20mm		5.7	160			50	23	5	1.94		0.13	5	4							0.160	0.001						
24-Mar-09	Routine		7.1	386	220	3	9.16	72	1	2.37	0.5	0.06	17	9	0.001	0.001	0.0001	0.001	0.05	0.0001	0.330	0.001	100					
1-Apr-09	>20mm		6.7	106	130	90	181	20	10	4.70	1.8	0.22	5	3	0.003	0.002	0.0001	0.002	0.05	0.0001	0.154	0.004	23					
21-May-09	>20mm		7.1	399	204	24	35.9	71	2	0.87	0.1	0.16	13	9	0.001	0.001	0.0001	0.001	0.05	0.0001	0.128	0.001	65	66				
23-Jun-09	>20mm	Mod Flow	6.4	134	148	22	88.4	28	10	0.76	0.1	0.23	4	3	0.003	0.001	0.001	0.002	0.05	0.0001	0.039	0.002	24	207				

Notes:

values reported in 1994 EIS

conc taken as MDL

DATE	Event	Flow	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C	DO (mg/L) (mg/L)	DO (% sat) (% sat)	Turbidity (NTU)
31-Jul-09	Routine		7.0	400	214	6	13.8	74.4	12.3	1.07	0.2	<0.01	17	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.086	0.001	69	70	12			
31-Aug-09	Routine		6.8	495	160	5	6.62	98.4	11	0.27	0.4	<0.01	21	13	0.001	0.001	0.0001	0.001	0.05	0.0001	0.242	0.001	86	153	14.5			
30-Sep-09	Routine	Low Flow	7.3	741	360	5	6.19	142	5.1	0.50	0.6	0.01	25	16	0.001	0.001	0.0001	0.001	0.05	0.0001	0.370	0.001	102	172				
6-Oct-09	>20mm	Low Flow	7.2	684	330	8	7.36	134	4.2	0.05	0.5	<0.01	24	15	0.003	0.001	0.0001	0.001	0.05	0.0001	0.320	0.001	110	186				
27-Oct-09	>20mm		7.5	634	350	3	4.65	130	2.28	0.06	0.6	<0.01	25	14	0.001	0.001	0.0001	0.001	0.05	0.0001	0.335	0.001	110					
30-Nov-09	Routine		7.0	433	280	14	9.62	67.8	4.07	2.16	0.6	0.04	16	10	0.001	0.002	0.0031	0.001	0.05	0.0001	0.316	0.001	83					
27-Dec-09	>20mm		6.5	517	280	14	14.7	90.5	1.61	0.88	0.7	0.08	20	12	0.001	0.002	0.0001	0.001	0.05	0.0001	0.364	0.001	97					
7-Jan-10	Routine	Mod Flow	6.2	155	210	51	155	23.2	4.45	0.82	1.5	0.15	6	3	0.002	0.002	0.0001	0.001	0.05	0.0001	0.082	0.003	29					
29-Jan-10	>20mm		7.0	339	230	22	16.7	54	3	0.71	0.6	0.07	14	10	0.001	0.003	0.0005	0.001	0.05	0.0001	0.344	0.001	68		25.2			
26-Feb-10	Routine	Low Flow	6.5	319	230	10	22.2	52.8	3.57	1.02	0.9	0.1	12	8	0.001	0.002	0.0007	0.001	0.05	0.0001	0.287	0.001	61		21.6			
15-Mar-10	>20mm	Mod Flow	6.8	190	167	14	11.4	35.7	6.12	0.82	0.4	0.02	13	6	0.001	0.001	0.0001	0.001	0.05	0.0001	0.031	0.001	54	229	20.7			
28-Apr-10	Routine	Low Flow	6.4	312	164	3	7.3	46.4	3.82	0.67	0.3	0.27	15	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.097	0.001	68	239	17.9			
31-May-10	Routine	Low Flow	6.5	398	164	3	5.32	63.7	4.38	0.21	0.1	0.04	17	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.071	0.001	78	174	13.6			
4-Jun-10	>20mm	Low Flow	6.5	339	170	4	7.35	56.2	5.61	0.20	0.7	0.14	14	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.035	0.001	68	200	14.5			
30-Jul-10	Routine	lod-Low Flo	6.6	284	236	29	93.7	57	20	0.89	1.8	0.2	6	6	0.002	0.001	0.0001	0.001	0.05	0.0001	0.044	0.001	28	184	13.9			
4-Aug-10	>20mm	High Flow	6.6	186	148	48	132	18	6	1.09	2	0.31	4	3	0.002	0.001	0.0001	0.002	0.05	0.0001	0.059	0.002	17	125	12.1			
30-Sep-10	Routine	Low Flow	6.9	345	228	4	4.43	76	5	0.21	0.01	0.47	16	10	0.001	0.0001	0.0001	0.001	0.05	0.0001	0.242	0.001	82	137	16.6			
4-Oct-10	>20mm	ow-Mod Flo	6.8	312	224	13	18.9	74	5	0.50	0.03	0.1	16	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.259	0.003	80	181	16.1			
18-Oct-10	Macro sample		#N/A																				58					
6-Nov-10	>20mm	ow-Mod Flo	6.7	308	12	228	24.9	72	10	0.98	1.2	0.14	10	9	0.001	0.001	0.0001	0.001	0.05	0.0001	0.073	0.001	49	143	17.2			
2-Dec-10	>20mm	High Flow	6.3	90			183																	174	22.1			
6-Jan-11	Routine	Low Flow	6.7	365	164	7	8	54	13	1.91	0.3	0.22	12	7	0.001	0.002	0.0001	0.001	0.05	0.0001	0.174	0.001	70	150	23			
14-Feb-11	Routine	Low Flow	6.2	437	254	8	7	35	1	1.44	0.9	0.32	12	6	0.001	0.002	0.0001	0.001	0.05	0.0001	0.286	0.001	78	61	21.7			
21-Feb-11	Event	Low Flow	6.4	317	123	6	7	30	4	1.72	0.4	0.01	11	6	0.001	0.001	0.0001	0.001	0.05	0.0001	0.147	0.001	48	75	24.5			
22-Mar-11	Event	lod-High Flc	6.2	170			113																	140	24.2			
17-Apr-11	Event	High Flow	6.4	168	205	90	149	24	1	4.15	1.1	0.2	5	4	0.004	0.002	0.0001	0.002	0.05	0.0001	0.111	0.004	24	99				
31-May-11	Event	High Flow	6.8	108	168	118	233	13	1	3.86	1.5	0.31	3	2	0.004	0.002	0.0003	0.001	0.05	0.0001	0.123	0.005	16	92	13.9			
30-Jun-11	Routine	ow-Mod Flo	6.7	249	199	8	36	44	12	1.84	0.4	0.02	8	7	0.003	0.001	0.0005	0.001	0.05	0.0001	0.058	0.001	35	125	12.7			
21-Jul-11	Event	Mod Flow	6.0	196	182	53	83	31	20	2.32	1.3	0.2	5	5	0.004	0.001	0.0002	0.001	0.05	0.0001	0.048	0.002	16		13.9			
21-Aug-11	Event	lod-Low Flo	6.7	406	282	39	76	72	31	2.91	1.2	0.17	12	10	0.002	0.002	0.0001	0.004	0.05	0.0001	0.136	0.002	45	141	12			
30-Sep-11	routine	Low Flow	7.4	547			7																	126	15.9			
3-Oct-11	Event	Mod Flow	6.6	426			77																	138	14.3			
6/06/2011	from AQ WQ study		6.6	262																			75		13.07	7.87	74.1	56.2

Gloucester
NOW Station
Notes:
values reported in 1994 EI
conc taken as MDL

Parameter Date		Conductivity (µS/cm)	Nitrate + nitrite as N (NOx) (mg/L)	Phosphorus - total (mg/L)	Turbidity (NTU)
11/11/1994 9:30		2850	0.01	0.03	2
19/12/1994 14:10		2990	0.01	0.02	4
21/02/1995 9:40		229	0.02	0.08	12
18/03/1995 15:50		335	0.05	0.05	5
17/07/1995 16:00		428	0.01	0.04	13
10/08/1995 0:00		636	0.01	0.01	3.7
16/10/1995 0:00		778	0.01	0.02	5.2
19/12/1995 9:30		64	0.03	0.03	1.4
16/01/1996 8:30		241	0.07	0.08	31
20/02/1996 0:00		406	0.01	0.03	7.5
18/11/1996 16:30		580	0.01	0.04	6.3
12/02/1997 0:00		344	0.09	0.09	16
13/03/1997 17:30		224	0.05	0.05	27
14/04/1997 9:30		450	0.01	0.04	11.2
13/05/1997 9:30		227	0.15	0.08	6.8
17/06/1997 11:30		150	0.27	0.25	113
15/07/1997 15:15		445	0.01	0.02	18
19/08/1997 0:00		581	0.01	0.02	4.6
16/09/1997 9:00		778	0.01	0.01	4

Below Dam Site and Morgan's Gully

Below Dam Site

Notes:

values reported in 1994 EIS

conc taken as MDL

Parameter Date	Alkalinity as Bicarbonate (HCO3) (mg/L)	Alkalinity as Carbonate (CO3) (mg/L)	Boron as B - total (mg/L)	Calcium as Ca - total (mg/L)	Chloride as Cl (mg/L)	Colour - True scalar	EC (µS/cm)	Fluoride as F - soluble (mg/L)	Iron as Fe - total (mg/L)	Magnesium as Mg - total (mg/L)	Nitrate as N (mg/L)	pH	Phosphorus - acid hydrolysable - dissolved	Phosphorus - total	Potassium as K - soluble	Silica as SiO2 - reactive (mg/L)	Sodium as Na - soluble (mg/L)	Sulphate as SO4 (mg/L)	Turbidity NTU	Zinc as Zn - total (mg/L)	Nitrate + nitrite as N (NOx)
22/01/1971 12:00							90														
14/09/1971 12:00							204														
21/10/1971 12:00							250														
16/11/1971 12:00							690														
18/01/1972 12:00							104														
28/03/1972 12:00							123														
27/04/1972 12:00							165														
4/05/1972 12:00							160														
1/06/1972 12:00							180														
22/08/1972 12:00							163														
7/11/1972 12:00							128														
9/01/1973 12:00							183														
6/03/1973 12:00							144														
15/05/1973 12:00							188														
31/07/1973 12:00							215														
6/11/1973 12:00							145														
12/12/1973 12:00							115														
1/10/1974 12:00							242														
6/11/1974 12:00							219														
4/12/1974 12:00							267														
19/02/1975 12:00							233														
19/03/1975 12:00							148														
21/05/1975 12:00							160														
16/07/1975 12:00							162														
27/08/1975 12:00							186														
24/09/1975 12:00							178														
22/10/1975 12:00							200														
19/11/1975 12:00							111														
17/12/1975 12:00							167														
8/01/1976 12:00							128														
21/01/1976 12:00							125														
11/03/1976 12:00							115														
23/06/1976 12:00							95														
25/08/1976 9:00							223					7.4									
22/09/1976 10:00							253					7.4									
19/10/1976 16:00							220					7.6									
8/11/1976 12:00							262					7.4									
18/01/1977 8:00							255					7.3									
15/02/1977 14:00							216					7.5									
29/03/1977 14:00							166					7.4									
27/04/1977 11:00							222					7.2									
24/05/1977 9:00							122					7.1									
28/06/1977 12:00							157					7.1									
9/08/1977 12:00							232					7.4									
27/09/1977 12:00							292					7.4									
25/10/1977 14:00							302					7.6							1		
22/11/1977 12:00							245					7.8							2.2		
10/01/1978 9:00							267					7.4							1.4		
14/02/1978 13:00							228					7.4							1.8		
15/03/1978 9:00							252					7.2							22		
21/03/1978 16:00							92					6.9							34		
11/04/1978 10:00							96					7							58		
9/05/1978 17:00							202					7.4							2.2		
30/05/1978 9:00							220					7.3							3.3		
27/06/1978 9:00							142					6.9							52		
9/08/1978 9:00							220					7.4							1.9		
5/09/1978 12:00							168					7.4							29		
26/09/1978 9:00							233					7.2							2.5		
7/11/1978 10:00							167					6.8							18		
9/01/1979 10:00							180					7.4							6.2		
6/02/1979 13:00							145					7.4							14		
13/02/1979 11:00							200					6.8							3.25		

Notes:
values reported in 1994 EIS
conc taken as MDL

Parameter Date	Alkalinity as Bicarbonate (HCO3) (mg/L)	Alkalinity as Carbonate (CO3) (mg/L)	Boron as B - total (mg/L)	Calcium as Ca - total (mg/L)	Chloride as Cl (mg/L)	Colour - True scalar	EC (µS/cm)	Fluoride as F - soluble (mg/L)	Iron as Fe - total (mg/L)	Magnesium as Mg - total (mg/L)	Nitrate as N (mg/L)	pH	Phosphorus - acid hydrolysable - dissolved	Phosphorus - total	Potassium as K - soluble	Silica as SiO2 - reactive (mg/L)	Sodium as Na - soluble (mg/L)	Sulphate as SO4 (mg/L)	Turbidity NTU	Zinc as Zn - total (mg/L)	Nitrate + nitrite as N (NOx)
6/03/1979 10:00							136					6.8							31		
10/04/1979 11:00							152					7.2							21		
15/05/1979 10:00							135					6.9							31		
12/06/1979 10:00							198					7									
28/08/1979 13:00							238					7.1							1.1		
30/10/1979 12:00							263					7.1							0.9		
27/11/1979 10:00							275					7.2							3.5		
22/01/1980 10:00							265					7.2							1.5		
19/02/1980 10:00							270					7.2							1		
20/05/1980 10:00							246					7.1							1.6		
19/06/1980 10:00							272					7							2		
15/07/1980 10:00							280					7							2		
28/10/1980 9:00							330					7							1		
3/02/1981 16:00							295					7							1.5		
28/04/1981 16:00							196					7							3.2		
2/06/1981 17:00							172					6.8							4.3		
7/07/1981 16:00	44	0		11.7	31	13	264			5.7		7.47			1.9		18.7	14	2.6		
11/08/1981 16:00	48	0		12	33		233			6.2		7.7			1.5		20	19			
15/09/1981 16:00	84	0		23.9	36.2	6	280			8.7		8.04			2.2		24.8	19	3.2		
20/10/1981 14:00	52	0		13.2	30.1	1	224			5.9		7.35			1.5		18.3	14.3	1		
6/04/1982 16:00	33	0		7.7	22.9	6	152			4	0.11	7.01			1.7		17.3	6.3	8.5		
8/06/1982 9:00	49	0	0	11	22.4	10	188		0.01	4.7	0.05	7.4		0.03	1.4	15.4	16.8	10.6	4.2		
28/07/1982 14:00							225					6.9									
29/09/1982 8:00	45	0	0	10.6	30.5	24	190		0.1	4.7	0	7.37		0.06	1.1	8.4	17.7	10.5	9.5		
14/10/1982 12:00	20	0	0	5.1	23.1	26	130		0.04	2.3	0.02	6.98		0.04	1.2	10.3	13.8	5.95	28		
9/11/1983 17:00	59	0	0	11.9	27.7	12	206	0.37	0.01	5.2	0	7.4		0.06	2.4	6.4	18.1	7.6	1.8	0	
8/05/1984 16:00							170					7							3.7		
19/06/1984 12:00							212					7.1							3.7		
9/08/1984 10:00							178					7.3							7.15		
3/10/1984 10:00							218					7.4							2		
27/11/1984 13:00							198					7.2							2.75		
22/01/1985 13:00	81	0	0.03	14.3	28.6	14	259	0	0.04	7.5	0.01	7.35	0.03	0.13	2.3	17	20.6	6.6	0.8		
26/03/1985 17:00							172					7.1							1.5		
15/10/1985 13:00							132					6.9							25.5		
Morgans Gully																					
11/11/1994 18:15							421						---	0.04					1.2	<	0.01
19/12/1994 0:00							328						---	0.13					3	<	0.01
13/01/1995 14:15							264						<	0.01					2.5	<	0.01
20/02/1995 8:25							205						---	0.01					2.7	<	0.01
5/03/1995 18:20							132						---	0.03	---				4	---	0.18
20/03/1995 17:55							230						---	0.01					100	---	0.03
19/06/1995 15:00							205						---	0.03					24	---	0.04
17/07/1995 18:50							300						---	0.01					3.8	<	0.01
14/08/1995 9:10							281						<	0.01					0.8	<	0.01
13/09/1995 0:00							334						<	0.01					1.7	<	0.01
16/10/1995 8:45							314						---	0.01					2.1	---	0.01
20/11/1995 18:15							314						---	0.06					29.3	---	0.02
18/12/1995 21:15							239						---	0.03					7.8	---	0.03

Notes:
values reported in 1994 EIS
conc taken as MDL

Parameter	Alkalinity as Bicarbonate (HCO3)	Alkalinity as Carbonate (CO3)	Boron as B - total	Calcium as Ca - total	Chloride as Cl	Colour - True	EC	Fluoride as F - soluble	Iron as Fe - total	Magnesium as Mg - total	Nitrate as N	pH	Phosphorus - acid hydrolysable - dissolved	Phosphorus - total	Potassium as K - soluble	Silica as SiO2 - reactive	Sodium as Na - soluble	Sulphate as SO4	Turbidity	Zinc as Zn - total	Nitrate + nitrite as N (NOx)
Date	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	scalar	(µS/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)					(mg/L)	(mg/L)	(mg/L)	NTU	(mg/L)	
15/01/1996 18:45							192						---	0.02					17	---	0.02
16/02/1996 0:00							252						---	0.01					4	<	0.01
18/03/1996 18:40							228						---	0.04					5.6	---	0.15
20/05/1996 8:30							195						---	0.01					14.8	---	0.02
17/06/1996 21:15							292						---	0.04					2.4	---	0.02
15/07/1996 21:15							236						---	0.01					24	<	0.01
12/08/1996 20:20							304						---	0.02					2.9	---	0.01
16/09/1996 20:30							314						---	0.01					3.2	---	0.01
14/10/1996 0:00							311						---	0.02					3.2	<	0.01
13/11/1996 19:50							324						---	0.04					2.2	<	0.01
17/02/1997 15:00							216						---	0.14					12	---	0.07
17/03/1997 18:20							223						---	0.01					9	---	0.07
14/04/1997 20:40							261						---	0.01					5	---	0.03
12/05/1997 8:50							204						---	0.03					26.4	---	0.02
12/06/1997 9:00							254						---	0.01					4.5	---	0.01
14/07/1997 17:40							245						---	0.01					15	---	0.01
15/09/1997 17:00							334						---	0.04					8.4	---	0.01
13/10/1997 20:15							243						---	0.01					7.1	---	0.07

W3
Upstream Dog Trap Creek
(Dog Trap Creek - Ellis)

Notes:
values reported in 1994 EIS
conc taken as MDL

DATE	Flow Rate	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C	DO mg/L	DO % sat	Turbidity (NTU) (NTU)	Temperature deg C
4-May-94		6.9	650	330	13		142	7	0.09	0.7	1	22.7	16	0.01	0.003	0.01	0.01	0.03	0.03	0.45	0.01							
10-May-94		6.8	590	340			130	13	0.01																			
16-May-94		7.2	370	210			73	2	0.94																			
23-May-94		6.9	570	300			118	18	0.01																			
2-Jun-94		7.0	510	460	1		174	11	0.02	3	1	21.2	15.5	0.01	0.002	0.01	0.01	0.01	0.02	0.01	0.01							
16-Jun-94		6.8	620	340			198	10	0.02																			
30-Jun-94		6.8	630	320	3		201	11	0.11	6	1	20.7	15.7	0.01	0.002	0.01	0.01	0.01	0.01	0.32	0.01							
1-Aug-94		7.0	730	380	10		232	6	0.08	1	1	23	18															
30-Aug-94		6.9	810	400			180	9	0.02																			
3-Jan-95		6.8	960	510	120		200	8	0.07		2	25	20															
31-Jan-95		6.7	400	380	23		160	4	0.01	1.8	0.1	25	17															
6-Mar-95		6.8	140	120	25		26	1	0.44	3.6	0.2	17	3															
3-Apr-95		6.7	580	320			160	9	0.09																			
3-May-95		7.2	650	240			170	1	0.13																			
3-Jun-95		#N/A	520	280	7.5			13	0.22																			
3-Jul-95		7.1	380	200	8			11	0.16																			
1-Aug-95		#N/A	530	280	12			18	0.04																			
1-Sep-95		7.4	620	330	8		160	7	**0.12**			21	16									Iron (filt.) is indicative only as the sample was not in an acid washed bottle						
4-Oct-95		7.1	610	170	28		150	3	0.06	2.4	0.2	19	15	0.01	0.005	0.01		0.02	0.0005	0.4	0.01							
6-Nov-95		7.0	650	350	4		150	2	0.02			18	14															
22-Nov-95		6.7	220		64		39	9	0.62			6.3	4.6	0.01		0.01	0.01			0.83	0.01	2.30pm sampled						
6-Dec-95		6.3	210	160	40		39															9.00am flow sampled						
8-Jan-96		7.2	200	180	14		38	6	0.81			6.7	4.7									2.10pm flow sampled						
20-Feb-96		7.0	420	230	5		79	1		7.4	0.1	14	10	0.005	0.004	0.005	0.005	0.03	0.0002	0.24	0.01	2.40pm low flow sampled						
25-Mar-96		7.1	600	280	3		100	1	0.13			18	14									2.15pm low flow sampled						
23-Apr-96		6.9	640	360	6		140	1	0.01			19	15									2.10pm, very low flow sampled						
15-May-96		6.9	210	140	34		36	9	0.55	4.4	0.12	7.7	5.2	0.005	0.004	0.005	0.005	0.03	0.0002	0.08	0.005	11.05am flow sampled						
17-Jun-96		7.3	300	230	18		50	12	0.60			8.5	7									1.45pm flow sampled						
23-Jul-96		7.4	510	270	5		110	15	0.01			18	13									11.40am flow sampled						
26-Aug-96		7.1	550	270	14		130	12	0.08			19	14									11.25am - low flow sampled						
30-Sep-96		7.2	550	320	11		120	7	0.22			21	16									2.00pm - low flow sampled						
29-Oct-96		6.8	630	340	5		120	1	0.13			22	15	0.01		0.01	0.01			0.48	0.03	11.10am - low flow sampled						
25-Nov-96		7.1	190	130	38		35	7	0.99	31	0.3	6.5	4.4	0.01	0.001	0.01	0.01	0.03	0.0002	0.05	0.01	11.15am - flow sampled						
9-Dec-96		7.2	280	150	5		44	**1**	0.48			10	7.4									1.20pm - flow sampled, sample filtered thru 0.45u membrane prior to analysis						
23-Jan-97		7.4	680	470	37		140	1	0.23			23	18									2.30pm very low flow sampled						
31-Jan-97		6.8	280	200	36		46	13	0.72			9.7	7.2									flow sampled 11.05am						
14-Feb-97		6.9	260	160	23		38	5	0.51			10	6.4									flow sampled 1.25pm						
6-Mar-97		6.8	140	92	68		25	1	0.73			5.5	4															
23-Apr-97		7.2	530	290	4		110	1	0.12			18	13									low flow sampled 2.00pm						
14-May-97		6.9	180	150	27		40	10	0.46			6.8	4.3									flow sampled 10.45am						
16-Jun-97		7.1	110	90	90		20	5	0.65			3.8	2.5									flow sampled 11.40am						
25-Jul-97		7.2	350	180	5	2	65	11	0.12			14	8.9									flow sampled 1.15pm						
22-Aug-97		7.0	480	230	7	6	110	10	0.04													flow sampled 9.50am						
22-Sep-97		7.1	500	300	4	5.5	110	7.2	0.06													flow sampled 10.50am						
25-Sep-97		7.1	510	300	34	18	94	14	0.24													flow sampled 10.30am						
7-Oct-97		7.2	800	430	160	51	120	8	0.13													flow sampled 10.10am						
8-Oct-97		7.0	410	170	28	21	79	11	0.51													flow sampled 9.50am						
23-Oct-97		7.1	540	320	17	6	120	6.3	0.09													flow sampled 3.05pm.						
24-Nov-97		6.8	740	390	22	9	160	5	0.05													very slight flow/trickle sampled at 11:10am						
22-Dec-97	No flow	#N/A																				no flow						
6-Jan-98		7.3	800	460	58	29	190	11	0.30													Slight flow - sampled at 9am						
7-Jan-98	No flow	#N/A																				No flow at 8:30am						
10-Jan-98		7.1	800	420	18	10	200	13	0.31													Very low/slight flow at 11:15am						
11-Jan-98	No flow	#N/A																				No flow at 10am'						
20-Jan-98	No flow	#N/A																				No flow @ 8.55am						
27-Jan-97	No flow	#N/A																				Insufficient flow to sample						
28-Jan-97	No flow	#N/A																				No flow at 2:05pm						

Notes:
values reported in 1994 EIS
conc taken as MDL

DATE		Flow Rate	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C	DO mg/L	DO % sat	Turbidity (NTU) (NTU)	Temperature deg C
9-Feb-98		No flow	#N/A																				Insufficient flow to sample						
10-Feb-98		No flow	#N/A																				Insufficient flow to sample at 10:00am						
19-Feb-98		No flow	#N/A																				No flow at 8.50am						
20-Mar-98		No flow	#N/A																				Insufficient flow to sample						
21-Apr-98		No flow	#N/A																				Stagnant						
3-May-98			6.2	500	330	270	80	100	12	0.26													Moderate flow, turbid						
20-May-98			6.5	250	180	20	26	60	17	0.37													Flowing						
17-Jun-98			7.1	500	220	2	2	77	17	0.13													Good flow, clear						
23-Jun-98			7.0	240	180	25	28	43	11	0.67													strong flow						
24-Jun-98			7.0	220	160	11	15	43	14	0.44													Flowing, good flow						
15-Jul-98	Routine		7.4	170		4	1.8			0.19																			
12-Aug-98	Routine		7.0	140		12	23			0.75																			
14-Sep-98	Routine		7.1	200		9	15	50	9	0.59																			
14-Oct-98	Routine		7.0	473		2	2	93	9	0.34																			
11-Nov-98	Routine		7.0	534		4	4	130	6	0.12																			
18-Nov-98	Flow		7.0	550		16	6	110	6	0.13																			
19-Nov-98	Flow		6.6	240		18	30	37	8	0.66																			
24-Nov-98	Flow		6.8	177		18	29	27	7	0.72																			
25-Nov-98	Flow		6.1	228		17		27	7	1.30																			
10-Dec-98	Routine		6.8	380		3	2	77	7	0.36																			
31-Dec-98	**Accident**	**not sampled**	#N/A																										
1-Jan-99	**Accident**	**not sampled**	#N/A																										
7-Jan-99	Routine		7.1	641		7	5	130	4	0.06																			
10-Jan-99	Flow		7.3	540		2		100	3	0.31																			
11-Jan-99	Flow		7.1	369		5	5	100	3	0.19																			
21-Jan-99	Flow	0-Jan-00	#N/A	658		5		120	4	0.17																			
22-Jan-99	Flow	0-Jan-00	#N/A	222		26		33	8	0.62																			
23-Jan-99	Flow	0-Jan-00	#N/A	226		16		30	8	0.91																			
28-Jan-99	Flow	0-Jan-00	#N/A	272		20		37	7	0.55																			
29-Jan-99	Flow	0-Jan-00	#N/A	186		17		33	6	0.74																			
25-Feb-99	Routine		7.2	388		21	5	55	5	0.32																			
30-Mar-99	Routine		6.5	558		5	6	100	4	0.17																			
29-Apr-99	Routine		7.4	287		2	3.7	52	8.5	0.19																			
31-May-99	Routine		6.9	434		11	11	72	10	0.23																			
29-Jun-99	Routine		6.9	181		5	19	42	9	0.52																			
14-Jul-99	Flow		6.4	85		320	120	12	4	0.44																			
15-Jul-99	Flow		6.8	128		50	65	22	4	0.19																			
26-Aug-99	Routine		7.2	410		5	10	79	10	0.29																			
28-Sep-99	Flow		7.1	294		16	9	58	7	0.41																			
29-Sep-99	Flow		7.2	326		10	10	69	8	0.41																			
20-Oct-99	Routine		7.1	520		4	3	96	6	0.03																			
25-Oct-99	Flow		6.7	230		27	41	44	9	0.76																			
26-Oct-99	Flow		7.0	250		21	30	54	9	0.51																			
9-Nov-99	Flow		7.8	155		22	41	34	5	0.93																			
10-Nov-99	Flow		8.0	180		18	48	34	6	0.87																			
16-Nov-99	Flow		7.9	170		56	62	30	6	0.59																			
17-Nov-99	Flow		7.6	190		18	24	40	5	0.67																			
29-Nov-99	Flow		7.1	300		9	9	57	7	0.74																			
30-Nov-99	Flow		7.2	315		10	18	57	7	0.69																			
21-Dec-99	Routine		6.9	525		6	7	120	6	0.49																			
19-Jan-00	Routine		7.6	220		12	17	40	13	0.38																			
28-Feb-00	Routine		6.8	660		22	33	140	0.8	0.41																			
8-Mar-00	Flow		7.1	580		10	19	130	1.8	0.55																			
9-Mar-00	Flow		6.8	620		22	12	130	26	0.68																			
22-Mar-00	Flow	s due to moderate flooding																											
23-Mar-00	Flow		6.9	125		22	54	30	1	0.23																			
3-Apr-00	Flow		7.3	180		13	31	34	9.1	0.54																			
4-Apr-00	Flow		7.3	190		22	27	37	7.9	0.28																			
24-May-00	Routine		7.2	335		2	6	66	15	0.18																			
14-Jun-00	Routine		7.1	360		3	5	73	17	0.28																			
11-Jul-00	Flow		7.2	350		8	9	69	20	0.19																			
12-Jul-00	Flow		7.5	260		10	11	73	21	0.15																			
29-Aug-00	Routine		7.0	515		2	6	120	19	0.15																			
20-Sep-00	Routine		6.9	635		10	8	150	14	0.12																			
30-Oct-00	Routine		6.9	655		8	7	200	1.4	0.18																			
14-Nov-00	Flow		6.7	305		36	56	70	16	0.84																			
15-Nov-00	Flow		6.6	300		30	29	77	32	0.58																			
20-Nov-00	Flow		6.6	225		14	48	51	22	0.67																			
21-Nov-00	Flow		6.7	250		12	52	62	23	0.59																			
8-Dec-00	Flow		6.8	465		27	6	82	12	0.60																			

Notes:

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DATE		Flow Rate	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C	DO mg/L	DO % sat	Turbidity (NTU) (NTU)	Temperature deg C
9-Dec-00	Flow		7.0	425		2	5	94	13.5	0.60																			
30-Jan-01	Routine		7.0	1000		5	4	23	7	0.56																			
31-Jan-01	Flow		7.0	925		62	27	212	6	0.85																			
1-Feb-01	Flow		6.8	450		18	57	62	14	1.50																			
2-Feb-01	Flow		6.9	480		11	25	68	12	1.50																			
21-Feb-01	Flow		7.3	830		7	8	176	5	0.35																			
22-Feb-01	Flow		7.4	1270		27	14	159	6	0.77																			
1-Mar-01	Flow		7.1	775		69	70	163	4	0.90																			
2-Mar-01	Flow		7.1	290		5	18	64	18	1.00																			
7-Mar-01	Flow		6.9	158		4	52	29	9	1.50																			
8-Mar-01	Flow		7.0	116		44	56	19	4	1.20																			
9-Mar-01	Flow		7.1	133		14	41	23	6	1.20																			
26-Mar-01	Flow		7.1	150		13	41	23	6	1.50																			
27-Mar-01	Flow		7.4	170		4	28	30	3	1.30																			
23-Apr-01	Flow		7.2	420		9	5	83	4	0.50																			
24-Apr-01	Flow		7.6	638		3	2	105	4	0.50																			
7-May-01	Flow		6.8	101		232	96	18	2	0.50																			
8-May-01	Flow		6.7	121		18	55	22	2	1.50																			
9-May-01	Flow		7.1	128		8	46	23	1	0.30													post initial mine water release						
21-May-01	Flow		6.9	174		8	40	26	6	1.90																			
22-May-01	Flow		7.1	180		11	32	30	11	1.30																			
26-Jun-01	Routine		8.0	425		4	6	78	9	0.30																			
30-Jul-01	Routine		7.4	180		14	64	28	10	2.20																			
30-Aug-01	Routine		7.1	515		15	5	79	12	0.30																			
26-Sep-01	Routine		7.1	665		15	9	145	12	0.34																			
30-Oct-01	Routine		6.8	885		13	12	194	12	0.59																			
20-Nov-01	Flow		6.6	830		18	20	185	12	0.92																			
21-Nov-01	Flow		7.3	700		23	31	115	36	1.39																			
18-Dec-01	Routine		6.7	790		8	8	165	1	0.82																			
30-Jan-02	Routine	No flow	#N/A																										
1-Feb-02	Flow	No flow	#N/A																										
2-Feb-02	Flow		6.5	725		30	42	100	74	0.70																			
5-Feb-02	Flow		5.7	186		103	76	30	10	0.70																			
6-Feb-02	Flow		6.2	139		12	82	15	7	0.40																			
7-Feb-02	Flow		6.4	error		5	21	26	8	0.40																			
20-Mar-02	Routine		6.7	715		1	9	315	6	0.30																			
30-Mar-02	Flow		5.8	620		30	22	128	12	0.60																			
31-Mar-02	Flow		6.7	345		27	20	59	17	1.20																			
29-Apr-02	Routine		6.4	550		3	3	111	5	0.30																			
29-May-02	Routine		6.8	610		3	6	126	6	0.20																			
25-Jun-02	Routine		6.7	450		9	14	99	15	0.02																			
29-Jul-02	Routine		6.7	665		26	27	149	11	0.45																			
27-Aug-02	Routine		7.4	675		5	13	213	8	0.59																			
27-Sep-02	Routine		7.2	837		8	6.6	200	4	0.13																			
27-Oct-02	Routine	No Flow	#N/A																										
27-Nov-02	Routine	No Flow	#N/A																										
11-Dec-02	>25mm		6.3	575	270	63	197	58	21	1.80	3.4	0.49	10	7.4	0.03	0.005	0.0002	0.01	0.05	0.001	0.04	0.006	23						
12-Dec-02	>25mm		6.5	330	276	18	25	67	35	1.00	2.8	0.15	13	9	0.02	0.002	0.0004	0.01	0.06	0.001	0.17	0.007	27						
31-Jan-03	Routine	No flow	#N/A																										
22-Feb-03	Routine/>25mm	No flow	#N/A																										
31-Mar-03	Routine	No flow	#N/A																										
4-Apr-03	>25mm		6.7	780	580	19	10	230	12	0.17	0.64	0.22	30	24	0.05	0.002	0.0002	0.02	0.02	0.0001	2.6	0.005	190						
29-Apr-03	Routine/>20mm		7.1	346	390	35	42	74	18	0.67	2.2	0.44	12	9	0.01	0.001	0.0005	0.02	0.02	0.0003	0.17	0.005	55						
16-May-03	>25mm		6.7	261		14	18	40	12	0.38																			
17-May-03	>25mm		6.9	265		8	22	44	13	0.27																			
26-May-03	>25mm		7.1	320	232	9	20	34	13	0.43	1.5	0.1	20	9	0.01	0.004	0.0002	0.01	0.05	0.0002	0.03	0.005	42						
27-May-03	>25mm		6.9	109		69	68.5	39	4	0.27																			
28-May-03	>25mm	ND	ND			14	ND	20	7	0.18																			
26-Jun-03	Routine		7.0	540		9	9.1	117	16	0.39																			
31-Jul-03	Routine		7.5	605		4	2.6	140	14	0.26																			
28-Aug-03	Routine		7.6	700	376	6	2.5	150	12	0.20	1	0.1	24	18	0.04	0.003	0.0002	0.01	0.03	0.0002	0.12	0.005	100						
24-Sep-03	Routine	No flow	#N/A																										
30-Oct-03	Routine	No flow	#N/A																										
19-Nov-03	Routine	No flow	#N/A																										
6-Dec-03	>20mm	No flow	#N/A																										
17-Jan-04	>20mm		7.1	105	160	152	270	26	24	0.48	2.7	0.09	3.1	2.8	0.01	0.009	0.0002	0.01	0.03	0.0002	0.06	0.005	11						
25-Feb-04	>20mm		7.2	200	274	201	240	25	36	0.99	1.6	0.1	4.5	4.7	0.01	0.001	0.0002	0.01	0.06	0.0002	0.09	0.005	8.4	of sampling. Flow commenced 25/26					
22-Mar-04	>20mm		7.0	470	268	10	13	110	12	0.49	3.8	0.94	14	10	0.01	0.001	0.0002	0.01	0.04	0.0002	0.01	0.005	76						
30-Apr-04	Routine		6.9	670	346	4	3.2	140	12	0.30	1	0.1	22	16	0.01	0.001	0.0002	0.01	0.03	0.0002	0.54	0.005	98						

Notes:
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DATE		Flow	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp	DO	DO	Turbidity (NTU)	Temperature
		Rate		(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C	mg/L	% sat	(NTU)	deg C
31-May-04	Routine	No flow	#N/A																										
30-Jun-04	Routine	No flow	#N/A																										
27-Jul-04	Routine	No flow	#N/A																										
20-Aug-04	>20mm	No flow	#N/A																										
30-Sep-04	>20mm	No flow	#N/A																										
19-Oct-04	>20mm		6.9	500	320	17	13	60	12	0.28	1	0.06	19	13	0.01	0.001	0.0002	0.02	0.02	0.0002	0.02	0.005	16						
30-Nov-04	Routine		7.0	600	280	6	7	110	6	0.24	0.5	0.15	18	12	0.01	0.001	0.0002	0.01	0.03	0.0001	12	0.005	180						
23-Dec-04	Routine		7.1	700	350	5	12.3	130	3	0.38	1.79	0.06	20	15	0.01	0.001	0.0002	0.01	0.02	0.001	0.02	0.005	220						
17-Jan-05	>20mm	No flow	#N/A																										
10-Feb-05	>20mm	No flow	#N/A																										
22-Feb-05	>20mm/Routine	No flow	#N/A																										
18-Mar-05	>20mm		7.2	600	394	24	32	134	20	0.61	1.39	0.56	20	15	0.01	0.0027	0.0001	0.01	0.01	0.0001	0.15	0.0001	96						
29-Apr-05	Routine		7.7	400	246	1	3	74.5	7	0.14	0.85	0.06	16	11	0.02	0.0007	0.0002	0.02	0.01	0.0005	0.01	0.0005	72						
13-May-05	>20mm		7.0	500	270	6.3	5.1	70	7.8	0.26	1.1	0.1	16	11	0.01	0.0001	0.0001	0.01	0.01	0.0005	0.02	0.0001	76						
24-Jun-05	>20mm		7.4	400	180	1	2.8	86	1	0.15	0.5	0.02	14	10	0.01	0.005	0.001	0.01	0.02	0.0005	0.05	0.005	78						
29-Jul-05	Routine		7.7	300	160	1	3.4	50	11	0.21	0.55	0.06	12	8	0.07	0.0011	0.002	0.01	0.01	0.0005	0.03	0.005	70						
30-Aug-05	Routine		7.8	400	1100	4	7	69	12	0.08	1.1	0.06	13	10	0.01	0.0007	0.001	0.01	0.03	0.0005	0.01	0.003	94						
5-Sep-05	>20mm		8.2	400	180	17	12	160	10	0.15	0.56	0.06	14	10	0.01	0.00006	0.001	0.01	0.01	0.0005	0.06	0.001	71						
17-Oct-05	>20mm		7.4	500	240	2.5	3.5	150	6	0.14	0.6	0.06	16	12	0.02	0.002	0.002	0.01	0.01	0.0005	0.01	0.005	220						
28-Nov-05	>20mm		7.4	200	140	24	36	30	7.2	1.40	1.9	1.3	7	4.7	0.05	0.0017	0.00002	0.02	0.04	0.0005	0.01	0.0002	20						
29-Dec-05	Routine	No Flow	#N/A																										
31-Jan-06	Routine	No Flow	#N/A																										
27-Feb-06	Routine	No Flow	#N/A																										
28-Feb-06	>20mm	No Flow	#N/A																										
31-Mar-06	Routine	No Flow	#N/A																										
14-Apr-06	Routine	No Flow	#N/A																										
31-May-06	Routine	No Flow	#N/A																										
29-Jun-06	Routine	No Flow	#N/A																										
17-Jul-06	>20mm	No Flow	#N/A																										
31-Aug-06	Routine	No Flow	#N/A																										
10-Sep-06	>20mm		7.3	500	720	35	14	140	42	0.11	1.08	0.06	18	12	0.01	0.0014	0.001	0.01	0.01	0.0005	0.02	0.003	40						
30-Oct-06	Routine		7.4	700	480	9	10	5300	71	0.26	1.1	0.15	30	20	0.003	0.0005	0.02	0.001	0.01	0.0005	0.48	0.1	68						
5-Nov-06	>20mm		7.2	700	400	12	16	50	100	0.11	0.8	0.13	26	18	0.04	0.0005	0.001	0.001	0.01	0.0005	0.38	0.003	60						
30-Nov-06	Routine		8.1	600	320	18	10	74	48	1.30	0.8	0.25	22	16	0.02	0.0005	0.02	0.2	0.01	0.0005	0.54	0.1	100						
29-Dec-06	Routine	No flow	#N/A																										
31-Jan-07	Routine	No flow	#N/A																										
26-Feb-07	>20mm	No flow	#N/A																										
28-Feb-03	Routine	No flow	#N/A																										
26-Mar-07	>20mm	No flow	#N/A																										
30-Apr-07	Routine	No flow	#N/A																										
10-May-07	>20mm	No flow	#N/A																										
8-Jun-07	>20mm		7.2	190	168	95	128	99	14	1.30	2.7	3.3	6	4.8	0.01	0.04	0.003	0.01	0.01	0.01	0.01	0.01	4						
10-Jul-07	>20mm		6.8	280	400	16	36	23	15.9	1.20	2.7	0.3	9.2	6.6	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	10						
20-Aug-07	>20mm		7.0	470	292	44	50	85	29	0.38	1.17	0.01	16	11	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	53						
28-Sep-07	Routine		7.4	390	220	9.5	9	184	17.4	0.63	0.06	0.04	13	9.2	0.02	0.01	0.01	0.07	0.01	0.01	0.09	0.01	57						
26-Oct-07	>20mm		7.0	460	160	6	7	127	17	0.66	0.3	0.04	13	9	0.001	0.002	0.0001	0.001	0.05	0.0001	0.35	0.001	73						
24-Nov-07	>20mm		7.7	1250	166	15	2	49	19	0.59	2.7	0.48	13	9	0.001	0.002	0.0001	0.001	0.05	0.0001	0.002	0.001	86						
17-Dec-07	>20mm		7.1	180	150	14	19	<5	5	0.82	0.9	0.29	6	4	0.001	0.002	0.0001	0.0001	0.05	0.0001	0.018	0.001	47						
17-Jan-08	>20mm		7.8	160			30		5	0.44	0.853	0.02	5	4	0.02	0.002	0.0001	0.001	0.05	0.0001	0.042	0.001							
29-Feb-08	>20mm		6.8	380	198	24	14.5	94	8	1.33	2	0.33	9	7	0.001	0.002	0.0001	0.001	0.05	0.0001	0.156	0.001	69						
25-Mar-08	>20mm		7.9	450	235	80.1	22	72.9	5	0.05	2.2	0.24	13	10	0.001	0.007	0.0001	0.001	0.05	0.0001	1.31	0.001	106.3						
22-Apr-08	>20mm		7.5	129	103	79	87	21	6	0.57	1.7	0.18	5	3	0.002	0.003	0.0001	0.002	0.05	0.0001	0.166	0.002	34						
29-May-08	Routine		6.4	390	95	10	20	54	8	0.07	1.6	0.12	13	8	0.001	0.001	0.0001	0.001	0.05	0.0001	1.46	0.001	81						
4-Jun-08	>20mm		6.9	360	165	76	49	52	11	0.15	2.7	0.4	13	8	0.002	0.001	0.0001	0.001	0.05	0.0001	0.509	0.001	62						
30-Jul-08	Routine		6.9	360	210	7	13	54	9	0.29	1.9	0.22	11	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.246	0.001	71						
29-Aug-08	Routine		7.5	400	248	8	12	75	6	0.55	2.1	0.39	16	11	0.002	0.002	0.0001	0.001	0.05	0.0001	0.543	0.001	86						
5-Sep-08	>20mm		7.8	310	230	126	188	58	9	3.33	2.5	0.24	10	7	0.001	0.002	0.0001	0.001	0.05	0.0001	0.483	0.001	57						
31-Oct-08	Routine		7.4	390	264	6	17	73	1	0.15	1	0.18	16	10	0.001	0.003	0.0001	0.001	0.05	0.0001	0.683	0.001	80						
19-Nov-08	>20mm		7.4	500	280	46	92	79	1	1.27	10	0.59	18	12	0.004	0.003	0.0001	0.001	0.05	0.0001	0.942	0.003	155						
13-Dec-08	>20mm		7.1	340	304	483	502	57	7	0.51	5.5	0.71	9	8	0.004	0.004	0.0001	0.004	0.05	0.0001	0.742	0.01	73						
28-Jan-09	Routine	No Flow	#N/A																										
13-Feb-09	>20mm	No Flow	6.8	478																									
19-Feb-09	Routine	Mod Flow	6.5	160			11	25	5	0.97		0.06	4	3							0.052	0.001							
23-Feb-09	>20mm		5.7	160			30	26	2	0.96		0.06	4	3							0.049	0.001							
24-Mar-09	Routine	Low Flow	7.0	452	240	3	6.44	80	1	1.56	1.2	0.17	16	10	0.001	0.004	0.0001	0.001	0.05	0.0001	0.91	0.001	91						
1-Apr-09	>20mm		6.4	181	160	460	365	32	11	8.18	6.3	0.8	8	6	0.005	0.004	0.0001	0.003	0.05	0.0001	0.72	0.009	35						

Notes:

values reported in 1994 EIS

conc taken as MDL

DATE		Flow Rate	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C	DO mg/L	DO % sat	Turbidity (NTU) (NTU)	Temperature deg C
21-May-09	>20mm		6.9	312	148	9.6	13.3	49	4	0.26	0.2	0.08	11	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.214	0.001	59	107					
23-Jun-09	>20mm	Mod Flow	5.9	132	132	5	56.4	26	8	0.40	2.1	0.37	4	3	0.002	0.001	0.001	0.001	0.05	0.0001	0.055	0.001	21	212					
31-Jul-09	Routine		6.7	362	192	7	13	57.2	7.29	0.28	2.3	0.15	13	9	0.001	0.001	0.0001	0.001	0.05	0.0001	0.418	0.001	82	123	11.9				
31-Aug-09	Routine	Low Flow	6.6	475	180	5	3.99	76	4.46	0.21	3	0.05	19	13	0.001	0.001	0.0001	0.001	0.05	0.0001	0.804	0.001	117	157	16.6				
30-Sep-09	Routine	No Flow	#N/A																										
6-Oct-09	>20mm	No Flow	#N/A																										
27-Oct-09	>20mm		7.3	447	310	42	141	69	11.3	0.65	3.5	0.57	16	11	0.001	0.005	0.0001	0.001	0.05	0.0001	1.46	0.002	99						
30-Nov-09	routine		7.8	506	290	7	10.83	86.3	1.75	0.82	1.5	0.18	15	10	0.001	0.004	0.0036	0.001	0.05	0.0001	0.296	0.001	89						
27-Dec-09	>20mm	No flow	#N/A																										
7-Jan-10	Routine		6.4	262	190	23	34.4	41.8	9.37	0.54	2	0.46	10	6	0.001	0.003	0.0002	0.001	0.05	0.0001	0.118	0.001	52						
29-Jan-10	>20mm		7.0	411	270	200	310	62	3	0.10	2	0.22	14	12	0.002	0.005	0.0015	0.002	0.05	0.0001	1.13	0.004	78		28.4				
26-Feb-10	Routine	Low Flow	6.5	454	450	16	9.92	68.3	1.84	0.20	3	0.14	16	11	0.001	0.005	0.0032	0.001	0.05	0.0001	2.03	0.001	103		20.2				
15-Mar-10	>20mm	Low Flow	6.7	429	192	14	13.9	80.6	3.52	0.53	2.1	0.11	18	12	0.001	0.004	0.0001	0.001	0.05	0.0001	0.884	0.001	108	234	20.6				
28-Apr-10	Routine	No Flow	#N/A																										
31-May-10	Routine	No Flow	#N/A																										
4-Jun-10	>20mm	Low Flow	6.9	647	330	220	267	75	11.7	0.32	10.8	2.15	18	14	0.005	0.006	0.0001	0.002	0.05	0.0001	1.01	0.004	153	232	15.8				
30-Jul-10	Routine	Low-Mod Flow	6.7	243	173	10	47.3	40	14	0.51	1.5	0.24	7	5	0.001	0.001	0.0001	0.001	0.05	0.0001	0.084	0.001	42	178	14.3				
4-Aug-10	>20mm	Mod Flow	6.6	163.9	100	26	103.7	25	10	0.77	1.7	0.39	4	3	0.001	0.001	0.0001	0.001	0.05	0.0001	0.065	0.001	28	97	15.2				
30-Sep-10	Routine	Trickle Flow	7.1	466	310	236	371	105	1	0.10	0.01	0.28	23	16	0.006	0.005	0.0001	0.001	0.05	0.0001	2.11	0.006	144	143	17.9				
4-Oct-10	>20mm	Low Flow	7.1	392	254	40	62.8	68	9	0.48	0.63	1.24	14	11	0.002	0.004	0.0001	0.001	0.05	0.0001	0.596	0.001	132	178	17.6				
18-Oct-10	Macro sample		#N/A																				82						
6-Nov-10	>20mm	Low Flow	6.7	434	66	298	99.7	77	6	0.55	6.7	1.45	14	10	0.001	0.003	0.0001	0.001	0.05	0.0001	0.608	0.001	125	77	15.8				
2-Dec-10	>20mm	Mod Flow	6.3	119.5			72.9																	178	23.1				
6-Jan-11	Routine	Very Low Flow	6.8	515	290	50	85	82	<1	2.80	6.8	0.33	15	12	0.003	0.005	0.0001	0.001	0.05	0.0001	1.36	0.002	137		23				
14-Feb-11	Routine	No Flow	#N/A																										
21-Feb-11	Event	No Flow	#N/A																										
22-Mar-11	Event	Low Flow	6.0	194			134																	124	24.6				
17-Apr-11	Event	Mod Flow	6.4	225	217	18	47	29	4	2.04	1.1	0.23	7	5	0.002	0.001	0.0002	0.001	0.05	0.0001	0.085	0.001	43	99					
31-May-11	Event	High Flow	6.8	166	160	52	97	25	4	2.53	2.1	0.58	5	4	0.003	0.002	0.0001	0.001	0.05	0.0001	0.136	0.002	25	94	14.9				
30-Jun-11	Routine	Low Flow	6.4	303	262	16	24	51	6	1.42	1.1	0.16	11	7	0.002	0.002	0.0002	0.001	0.05	0.0001	0.195	0.001	57	95	13				
21-Jul-11	Event	Low Flow	6.9	157	157	27	86	21	11	2.01	1.1	0.15	5	3	0.002	0.001	0.0001	0.001	0.05	0.0001	0.061	0.001	26		12.9				
21-Aug-11	Event	Low Flow	6.8	283	186	27	63	44	11	1.72	2	0.36	8	6	0.003	0.002	0.0001	0.001	0.05	0.0001	0.128	0.001	49	133	13.9				
30-Sep-11	routine	Low Flow	7.6	486			140																	128	17.4				
3-Oct-11	Event	Low Flow	6.6	231			50																	125	14.6				
7/06/2011	r Aquatic WQ study		6.68	228																			86			9	77.1	29	11.64

W3A
Upstream Dog Trap Creek
(Dog Trap Creek - Ellis)

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Notes:
conc taken as MDL

DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp
27-Nov-02		No Flow	#N/A																						
11-Dec-02			#N/A																						
12-Dec-02			#N/A																						
28-Dec-02		No Flow	#N/A																						
31-Jan-03		No Flow	#N/A																						
22-Feb-03		No Flow	#N/A																						
23-Feb-03		No Flow	#N/A																						
31-Mar-03		No Flow	#N/A																						
4-Apr-03			7.2	880	566	18	11	230	7	0.29	2.2	0.1	28	23	0.05	0.002	0.0002	0.02	0.04	0.0001	4.1	0.005	130		
29-Apr-03			7.1	340	250	32	42	69	18	0.65	2.3	0.36	12	9	0.01	0.001	0.0002	0.02	0.02	0.0004	0.14	0.005	59		
16-May-03			6.7	255			20																		
26-May-03			6.9	590	374	138	40	99	18	0.52	19	2.7	20	15	0.01	0.01	0.0064	0.01	0.07	0.0002	0.51	0.005	110		
26-Jun-03			7.4	560	278		22	100	18	0.22	0.3	0.1	18	12	0.01	0.004	0.0002	0.01	0.03	0.0002	0.49	0.005	69		
31-Jul-03			7.4	560	310	3	2.2	120	15	0.28	0.02	0.1	20	15	0.01	0.002	0.0002	0.01	0.01	0.0003	0.32	0.005	79		
28-Aug-03			7.6	700	377	14	3.5	150	10	0.56	2.77	0.1	25	18	0.01	0.005	0.0002	0.01	0.03	0.0002	0.45	0.005	110		
24-Sep-03		No Flow	#N/A																						
31-Oct-03		No Flow	#N/A																						
28-Nov-03		No Flow	#N/A																						
6-Dec-03		No Flow	#N/A																						
17-Jan-04			6.9	373	404	49	30	92	110	1.03	5.8	0.17	23	14	0.01	0.001	0.0002	0.01	0.05	0.0002	1.6	0.005	29		
25-Feb-04		No Flow	#N/A																						
22-Mar-04			7.1	460	432	8	14.8	85	12	0.54	3.8	0.96	14	9.9	0.01	0.001	0.0002	0.01	0.02	0.0002	0.01	0.005	74		
30-Apr-04			6.9	640	316	19	10	130	4	0.23	1.5	0.1	20	16	0.01	0.001	0.0002	0.01	0.02	0.0002	0.9	0.005	100		
31-May-04		No Flow	#N/A																						
30-Jun-04		No Flow	#N/A																						
27-Jul-04		No Flow	#N/A																						
20-Aug-04		No Flow	#N/A																						
30-Sep-04		No Flow	#N/A																						
19-Oct-04			7	600	348	530	7	90	13	0.11	0.8	0.16	19	13	0.01	0.001	0.0002	0.02	0.02	0.0002	0.02	0.005	16		
30-Nov-04			7.4	500	210	1	7	100	3	0.11	0.5	0.06	16	11	0.01	0.001	0.001	0.01	0.03	0.0001	0.01	0.005	80		
22-Dec-04			7	700		8	4.5	130	4	0.65	3.46	0.06	21	16	0.01	0.001	0.0002	0.01	0.04	0.0001	0.02	0.005	320		
17-Jan-05	>20mm	No Flow	#N/A																						
10-Feb-05	>20mm	No Flow	#N/A																						
22-Feb-05	>20mm	No Flow	#N/A																						
18-Mar-05	>20mm		7.6	500	116	18	16	29.8	13	0.15	0.82	0.2	3.9	2.1	0.01	0.0006	0.0001	0.01	0.01	0.0001	0.01	0.001	80		
29-Apr-05	Routine		7.5	500	264	3	4	77	4	0.67	1.15	0.06	16	11	0.02	0.0008	0.0002	0.01	0.01	0.0005	0.01	0.0005	68		
13-May-05	>20mm		7	400	210	31	22	94	5.8	0.34	1.1	0.15	16	11	0.02	0.001	0.0001	0.01	0.01	0.0005	0.2	0.0002	84		
24-Jun-05	>20mm		7.6	400	62	61	22	62	1	0.27	2.5	0.02	14	10	0.01	0.0008	0.0001	0.01	0.02	0.0005	0.23	0.005	67		
29-Jul-05	Routine		7.4	400			3.4																		
30-Aug-05	Routine		7.8	400			9																		
5-Sep-05	>20mm		8.1	400	240	11	7	140	9	0.22	0.9	0.06	15	11	0.01	0.0009	0.0001	0.01	0.01	0.0005	0.11	0.001	71		
17-Oct-05	>20mm		7.5	600	290	1	13	99	5	0.69	0.96	0.1	15	11	0.07	0.0038	0.002	0.01	0.01	0.0005	0.06	0.005	200		
28-Nov-05	>20mm		7.4	200	120	20	33	32	10	1.2	1.8	0.11	6.6	4.7	0.02	0.0009	0.00002	0.02	0.01	0.0005	0.01	0.0002	40		
29-Dec-05	Routine	No Flow	#N/A																						
31-Jan-06	Routine	No Flow	#N/A																						

Notes:
conc taken as MDL

DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp
27-Feb-06	Routine	No Flow	#N/A																						
28-Feb-06	>20mm	No Flow	#N/A																						
31-Mar-06	Routine	No Flow	#N/A																						
14-Apr-06	Routine	No Flow	#N/A																						
31-May-06	Routine	No Flow	#N/A																						
29-Jun-06	Routine	No Flow	#N/A																						
17-Jul-06	>20mm	No Flow	#N/A																						
31-Aug-06	Routine	No Flow	#N/A																						
10-Sep-06	>20mm		7.4	400	240	35	17	112	30	0.17	0.92	0.06	16	11	0.01	0.0022	0.001	0.01	0.02	0.00005	0.03	0.003	47		
30-Oct-06	Routine		7.1	600	390	24	13	5300	27	0.29	2.76	0.16	20	14	0.003	0.0005	0.02	0.001	0.01	0.0005	0.12	0.1	60		
5-Nov-06	>20mm		7.1	600	330	20	13	270	52	1.1	0.86	0.16	18	13	0.003	0.0005	0.001	0.001	0.01	0.0005	0.51	0.002	60		
30-Nov-06	Routine		7.7	600	310	8	7	50	44	1.5	0.81	0.27	18	11	0.02	0.0005	0.02	0.2	0.01	0.0005	1.3	0.1	80		
29-Dec-06	Routine	No Flow	#N/A																						
31-Jan-07	Routine	No flow	#N/A																						
26-Feb-07	>20mm	No flow	#N/A																						
28-Feb-07	Routine	No flow	#N/A																						
26-Mar-07	>20mm	No flow	#N/A																						
30-Apr-07	>20mm	No flow	#N/A																						
10-May-07	>20mm	No flow	#N/A																						
8-Jun-07	>20mm		7.2	180	146	69	110	25	14	1.4	2.8	3.1	5.9	4.6	0.01	0.01	0.001	0.02	0.01	0.01	0.01	0.01	4		
10-Jul-07	>20mm		7	300	250	19	73	23	15	1.2	3	0.3	9.1	6.4	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	25		
20-Aug-07	>20mm		7.2	760	412	88	110	132	20	0.39	21.14	3.3	20	17	0.02	0.01	0.01	0.01	0.03	0.01	0.05	0.01	153		
28-Sep-07	Routine		7.2	370	216	3.5	3	52	13.8	0.34	0.6	0.02	13	9.4	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	65		
26-Oct-07	>20mm		7	464	230	7	7	108	12	2.12	0.2	0.02	12	9	0.001	0.002	0.0001	0.001	0.05	0.0001	1.18	0.001	77		
24-Nov-07	>20mm		7.9	320	156	4	3	68	16	0.38	0.419	0.07	11	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.001	0.001	60		
17-Dec-07	>20mm		7.3	180	75	18	17	5	5	1.07	0.8	0.29	6	4	0.001	0.002	0.0001	0.001	0.005	0.0001	0.066	0.001	54		
17-Jan-08	>20mm		7.8	160	64	5	32	19	5	0.48	1.192	0.22	5	4	0.002	0.001	0.0001	0.001	0.05	0.0001	0.045	0.001	52		
29-Feb-08	>20mm		6.8	350	168	26	20	104	8	1.67	2.5	0.32	9	7	0.001	0.003	0.0001	0.001	0.05	0.0001	0.196	0.001	69		
25-Mar-08	>20mm		8	340	230	23	18	52.1	5	0.05	0.2	0.15	11	8	0.001	0.002	0.0001	0.001	0.005	0.0001	0.547	0.001	74.4		
22-Apr-08	>20mm		7.3	140	110	89	91	21	6	0.49	1.7	0.18	5	3	0.017	0.002	0.0001	0.001	0.05	0.0001	0.17	0.004	28		
29-May-08	Routine		6.4	400	110	5	10	55	6	0.22	1.7	0.23	12	8	0.002	0.002	0.0001	0.001	0.05	0.0001	0.55	0.001	80		
4-Jun-08	>20mm		7	360	150	66	48	53	11	0.13	2.5	0.4	13	9	0.001	0.001	0.0001	0.001	0.05	0.0001	0.567	0.001	62		
30-Jul-08	Routine		6.9	320	180	3	4	56	10	0.18	0.3	0.05	12	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.199	0.001	62		
29-Aug-08	Routine		7.5	390	254	12	13	74	4	0.42	2.1	0.14	14	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.406	0.001	83		
5-Sep-08	>20mm		7.8	300	220	28	180	57	7	3.52	2	0.25	9	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.49	0.001	54		
31-Oct-08	Routine		7.3	400	416	5	19	73	<1	0.18	1.1	0.11	16	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.702	0.001	81		
19-Nov-08	>20mm		7.4	530	240	11	13	82	<1	0.38	6	0.94	18	13	0.001	0.001	0.0001	0.001	0.05	0.0001	1.26	0.001	126		
13-Dec-08	Routine		7.2	330	274	500	246	55	<10	0.72	5.2	0.67	9	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.735	0.01	72		
28-Jan-09	Routine	No Flow	#N/A												0.001	0.001	0.0001	0.001	0.05	0.0001					
13-Feb-09	>20mm	No Flow	#N/A												0.001	0.001	0.0001	0.001	0.05	0.0001					
19-Feb-09	routine		6.5	160			20	25	<5	0.96		0.04	5	3	0.001	0.001	0.0001	0.001	0.05	0.0001	0.043	0.001			
23-Feb-09	>20mm		5.7	160			435	25	<2	0.86		0.03	5	3	0.001	0.001	0.0001	0.001	0.05	0.0001	0.037	0.01			
24-Mar-09	Routine	low flow	7.1	437	240	0	437	77	<1	1.12	1.2	0.05	17	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.85	0.001	84		
1-Apr-09	>20mm		6.5	160	130	180	148	29	<10	5.36	6.3	0.43	8	5	0.001	0.001	0.0001	0.001	0.05	0.0001	0.503	0.004	34		
21-May-09	>20mm		6.8	346	170	31.5	40.2	52	4	0.54	3	0.61	10	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.224	0.001	60	105	
23-Jun-09	Routine		6	127	110	1	55.7	26	8	0.31	<0.1	0.18	4	3	0.001	0.001	0.0001	0.001	0.05	0.0001	0.04	0.001	25	210	
31-Jul-09	Routine	low flow	6.9	310	162	26	47.6	52.6	8.18	0.42	0.3	0.01	12	9	0.001	0.001	0.0001	0.001	0.05	0.0001	0.338	0.001	64	133	12
31-Aug-09	Routine	low flow	6.6	397	160	4	5.36	68.8	2.62	0.05	0.5	0.01	15	10	0.0002	0.001	0.0001	0.001	0.05	0.0001	0.375	0.001	86	159	14.9
30-Sep-09	Routine	No Flow	#N/A																						
6-Oct-09	>20mm	No Flow	#N/A																						
27-Oct-09	>20mm	No Flow	#N/A																						
30-Nov-09	Routine	trickle	6.8	550	360	23	77.3	82.8	2.9	2.49	6.8	0.52	17	12	0.034	0.01	0.0005	0.031	0.05	0.0001	1.2	0.24	124		
7-Jan-10	Routine		6.4	247	180	15	31.7	38.8	9.66	0.4	0.9	0.08	9	6	0.001	0.002	0.0001	0.001	0.05	0.0001	0.068	0.001	47		
29-Jan-10	>20mm		7	443	270	24	17.1	86	2	0.05	1.2	0.08	16	13	0.001	0.002	0.0036	0.001	0.05	0.0001	1.53	0.001	86		25.3
26-Feb-10	Routine	low flow	6.3	412	230	11	9.03	66.8	1.76	0.39	1.3	0.03	16	10	0.001	0.003	0.0001	0.001	0.05	0.0001	1.66	0.001	88		20.2
15-Mar-10	>20mm	low flow	6.8	372	186	10	7.09	78	1.38	0.15	0.5	0.03	18	11	0.001	0.002	0.0002	0.001	0.05	0.0001	1.02	0.001	92	196	20.2
28-Apr-10	Routine	trickle	6.5	493	223	28	21.5	78.2	0.54	0.05	1	0.23	20	13	0.001	0.003	0.0001	0.001	0.05	0.0001	2.74	0.001	108	253	18.2
31-May-10	Routine	No Flow	#N/A																						
4-Jun-10	>20mm	low flow	6.5	470	216	12	16.1	76.1	0.98	0.19	0.8	0.08	18	12	0.001	0.002	0.0001	0.0001	0.05	0.0001	1.53	0.001	101	231	14.9
30-Jul-10	Routine	Low-Mod Flow	6.7	231	186	8	42.4	38	14	0.49	0.9	0.15	7	5	0.001	0.001	0.0001	0.001	0.05	0.0001	0.075	0.001	38	178	14.3
4-Aug-10	>20mm	Mod Flow	6.6	153.7	160	21	97.1	22	9	0.77	1.1	0.22	4	3	0.002	0.002	0.0001	0.001	0.05	0.0001	0.058	0.002	23	129	14.6
30-Sep-10	Routine	trickle	7.4	394	258	17	21.4	91	1	0.05	0.01	0.21	19	13	0.001	0.002	0.0001	0.001	0.05	0.0001	0.643	0.001	108	141	20.9
4-Oct-10	>20mm	Low Flow	7	348	264	17	38.5	87	9	0.69	0.01	0.8	16	11	0.001	0.002	0.0001	0.001	0.05	0.0001	1.01	0.001	84	179	16.6

Notes:
conc taken as MDL

DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp
6-Nov-10	>20mm	Low Flow	6.9	481	23	302	26.6	119	2	0.26	0.5	0.01	19	12	0.001	0.002	0.0001	0.001	0.05	0.0001	1.24	0.001	89	37	15.5
2-Dec-10	>20mm	Mod Flow	6.6	111.9	113	21	74	19	5	0.68	1	0.08	5	3	0.003	0.002	0.0001	0.002	0.05	0.0001	0.054	0.002	36	177	22.5
6-Jan-11	Routine	low flow	6.7	400	232	5	21	69	7	2.67	0.3	0.01	15	10	0.001	0.004	0.0001	0.001	0.05	0.0001	2.13	0.001	93		25

Notes:
conc taken as MDL

DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp
14-Feb-11	Routine	No Flow	#N/A																						
21-Feb-11	>25mm	No Flow	#N/A																						
22-Mar-11	>25mm	low flow	6.1	158			92																	109	24.6
17-Apr-11	>25mm	Low-Mod Flow	6.4	202	191	14	35	27	4	1.21	0.5	0.08	7	5	0.002	0.001	0.0001	0.001	0.05	0.0001	0.053	0.001	40	113	
31-May-11	>25mm	Mod Flow	6.9	138	161	65	80	20	1	1.32	1.3	0.19	4	3	0.003	0.001	0.0001	0.001	0.05	0.0001	0.087	0.001	24	69	15.1
30-Jun-11	Routine	low flow	6.4	290	240	6	15	50	6	1.14	0.2	0.03	11	7	0.001	0.001	0.0002	0.001	0.05	0.0001	0.206	0.001	52	93	13.4
21-Jul-11	Event	low flow	6.8	155	151	15	81	21	11	1.07	0.8	0.11	5	4	0.001	0.001	0.0001	0.001	0.05	0.0001	0.042	0.001	27		13
21-Aug-11	Event	low flow	6.9	234	170	20	59	37	9	1.60	1	0.13	7	5	0.002	0.002	0.0001	0.004	0.05	0.0001	0.084	0.001	37	131	12.6
30-Sep-11	routine	low flow	7.5	407	252	5	8	76	5	0.96	0.7	0.01	15	10	0.003	0.001	0.0001	0.001	0.05	0.0001	0.26	0.001	83	137	16.1
3-Oct-11	Event	low flow	6.8	219	147	10	49	33	9	1.65	0.9	0.11	8	6	0.001	0.001	0.0001	0.001	0.05	0.0001	0.088	0.001	40	139	14.7

W4
Avondale Creek - Downstream of Dog Trap Creek
(Avondale Swamp - Atkins)

Notes:
values reported in 1994 EIS
conc taken as MDL

DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C
04-May-94			7.0	520		4		108	10	0.16	1.7	1	17.5	12.8	0.01	0.002	0.01	0.01	0.03	0.02	0.27	0.01			
10-May-94			6.9	530				110	9	0.13															
16-May-94			7.2	800				198	18	0.11															
23-May-94			7.0	590				125	16	0.07															
02-Jun-94			6.5	610		4		186	18	0.08	31	1	19	14	0.01	0.002	0.01	0.01	0.02	0.02	0.01	0.01			
16-Jun-94			7.0	600				166	19	0.07															
30-Jun-94			7.0	620		53		182	1	0.08	6	1	20	15.4	0.01	0.002	0.01	0.01	0.01	0.01	0.6	0.01			
01-Aug-94			7.3	760		16		223	1	0.19	2	1	25.5	21.9											
30-Aug-94			7.2	740				160	8	0.03															
03-Jan-95			6.5	710		170		150	36	0.98		0.5	24	18											
31-Jan-95			6.8	330		5		78	6	0.01	2.3	0.06	21	15											
06-Mar-95			#N/A																						
03-Apr-95			7.1	510				74	1	0.21															
03-May-95			7.6	520				70	1	0.11															
03-Jun-95			#N/A	500		76			11	0.16															
03-Jul-95			7.3	470		40			13	0.21															
01-Aug-95			#N/A	530		7			12	0.05															
01-Sep-95			7.3	620				140	1	0.05															
04-Oct-95			7.1	660				140	1	0.28										(mg/L)					
06-Nov-95			6.8	850				180	24	0.16															
22-Nov-95			5.9	800		140		220	26	0.14	4.6	0.1	13	17	0.01	0.005	0.01	0.01	0.02	0.001	3.8	0.01			
06-Dec-95			6.4	340		88		77	1	0.77			7.6	8.4											
08-Jan-96			6.9	370		46		94	11	0.66			8	8.8											
20-Feb-96			7.1	480		18		58	1		5.8	0.1	14	13	0.005	0.004	0.005	0.005	0.03	0.0002	0.25	0.01			
25-Mar-96			7.3	620		21		140	1	0.19			23	19											
23-Apr-96			7.3	660		25		130	1	0.02			22	19											
15-May-96			6.4	310		85		67	8	0.60	3	0.13	7.2	7.3	0.005	0.004	0.005	0.005	0.03	0.0007	0.13	0.005			
17-Jun-96			6.5	930		33		260	19	2.20			18	24											
23-Jul-96			7.8	520		5		50	11	0.14			19	14											
26-Aug-96			7.4	630		16		140	9	0.12			21	16											
30-Sep-96			7.5	570		21		120	7	0.28			21	17											
29-Oct-96			7.0	610		5		120	1	0.46			22	16	0.01		0.01	0.01			0.25	0.03			
25-Nov-96			6.4	210		92		54	3	0.89	12	0.3	4	4.2	0.01	0.001	0.01	0.01	0.03	0.0002	0.03	0.01			
09-Dec-96			6.6	460		84		120	9	0.74			9.7	12											
31-Jan-97			6.5	750		140		200	22	0.44			19	21											
14-Feb-97			7.0	340		140		86	2	0.72			7.5	7.5											
06-Mar-97			6.8	300		40		69	1	0.58			8.1	9.2											
23-Apr-97			7.6	590		46		130	1	0.06			21	16											
14-May-97			6.5	300		57		100	22	0.24			7	6.8											
16-Jun-97			6.6	210		220		55	8	0.39			4.7	5.1											
25-Jul-97			7.4	510		19	11	100	16	0.07			18	13											
22-Aug-97			7.3	550		9	6	120	10	0.10															
22-Sep-97			7.3	660		4	3.3	120	8.7	0.22															
25-Sep-97			6.4	1100		94	63	300	24	0.26															
07-Oct-97			7.0	1000		50	30	260	15	0.12															
08-Oct-97			6.4	810		140	110	220	15	0.21															
23-Oct-97			7.2	510		16	5	94	7.8	0.44															
24-Nov-97			7.2	690		63	29	140	4	0.05															
22-Dec-97			#N/A																						
06-Jan-98			#N/A																						
07-Jan-98			#N/A																						
10-Jan-98			#N/A																						
11-Jan-98			#N/A																						
20-Jan-98			#N/A																						
27-Jan-98			5.8	900		160	146	230	30	0.23															
28-Jan-98			5.8	1300		63	55	310	40	0.17															
09-Feb-98			#N/A																						
10-Feb-98			#N/A																						

Notes:
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conc taken as MDL

DATE	EVENT	FLOW	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp
				(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C
19-Feb-98			#N/A																						
20-Mar-98			#N/A																						
21-Apr-98			#N/A																						
03-May-98			#N/A																						
20-May-98			6.3	420		120	100	110	26	0.51															
17-Jun-98			7.2	900		12	11	140	63	0.10															
23-Jun-98			6.6	440		80	58	110	23	0.68															
24-Jun-98			6.8	400		68	55	120	23	0.70															
15-Jul-98	Routine		7.7	510		31	28			0.29															
12-Aug-98	Routine		7.1	220		71	66			0.99															
14-Sep-98	Routine		7.1	400		51	49	97	23	1.10															
14-Oct-98	Routine		7.2	500		8	5	100	6	0.54															
11-Nov-98	Routine		7.2	510		4	3	110	4	0.33															
18-Nov-98	Flow		7.2	490		25	7	100	3	0.49															
19-Nov-98	Flow		#N/A	185		110	100	43	8	0.80															
24-Nov-98	Flow		6.0	170		58	49	47	6	1.10															
25-Nov-98	Flow		7.1	198		84		43	7	1.90															
10-Dec-98	Routine		6.3	625		29	12	120	42	0.25															
31-Dec-98	Accident		6.6	2250				470	400						0.01	0.006	0.01	0.01		0.0002		0.01			
01-Jan-99	Accident		6.5	2390				470																	
07-Jan-99	Routine		7.1	390		7	4	110	42	0.10															
10-Jan-99	Flow		7.2	720		10		110	20	0.35															
11-Jan-99	Flow		6.7	865		11	6	170	86	0.24															
21-Jan-99	Flow		#N/A	610		6		130	22	0.36															
22-Jan-99	Flow		#N/A	1042		86		200	91	0.34															
23-Jan-99	Flow		#N/A	310		60		77	27	0.69															
28-Jan-99	Flow		#N/A	506		26		100	15	1.10															
29-Jan-99	Flow		#N/A	345		52		63	9	1.00															
25-Feb-99	Routine		7.1	540		9	3	96	6	0.34															
30-Mar-99	Routine		6.9	675		21	7	130	4	0.18															
29-Apr-99	Routine		7.5	619		18	17	130	43	0.61															
31-May-99	Routine		6.5	841		19	20	200	25	0.19															
28-Jun-99	Routine		6.8	417		35	38	140	30	0.91															
14-Jul-99	Flow		6.4	115		160	120	31	4	0.75															
15-Jul-99	Flow		6.6	100		79	90	15	7	0.56															
26-Aug-99	Routine		7.5	990		14	17	230	49	0.16															
28-Sep-99	Flow		6.9	400		39	28	100	8	0.42															
29-Sep-99	Flow		7.5	106		22	22	180	15	0.28															
20-Oct-99	Routine		7.3	780		12	2	170	8	0.06															
25-Oct-99	Flow		6.6	265		54	60	87	6	1.10															
26-Oct-99	Flow		6.6	345		54	59	87	6	1.20															
09-Nov-99	Flow		7.3	430		54	58	120	10	0.95															
10-Nov-99	Flow		7.4	385		40	49	110	8	1.00															
16-Nov-99	Flow		7.8	270		58	51	57	6	0.67															
17-Nov-99	Flow		7.5	385		36	37	87	21	0.81															
29-Nov-99	Flow		7.2	510		26	39	130	10	0.64															
30-Nov-99	Flow		7.3	520		160	60	120	11	0.59															
21-Dec-99	Routine		7.0	800		17	15	190	7	0.39															
19-Jan-00	Routine		7.6	330		21	20	50	15	0.46															
28-Feb-00	Routine		7.3	515		19	19	120	1.5	0.25															
08-Mar-00	Flow		7.3	625		8	11	120	2.5	1.00															
09-Mar-00	Flow		7.0	855		20	10	160	160	0.90															
22-Mar-00	Flow		6.5	200		26	58	54	9.9	0.56															
23-Mar-00	Flow		6.1	135		100	92	27	1	0.92															
03-Apr-00	Flow		6.8	450		37	35	98	66	0.55															
04-Apr-00	Flow		6.8	420		20	20	91	50	0.46															
24-May-00	Routine		7.2	580		14	14	140	77	0.02															
14-Jun-00	Routine		7.4	1240		13	10	230	310	0.04															
11-Jul-00	Flow		7.4	900		13	10	220	7.1	0.14															
12-Jul-00	Flow		7.1	470		26	32	190	48	0.24															
29-Aug-00	Routine		7.4	870		<2	13	250	24	0.12															
20-Sep-00	Routine		7.4	475		120	90	180	15	0.05															

Notes:

values reported in 1994 EIS

conc taken as MDL

DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C
30-Oct-00	Routine	No flow	#N/A																						
14-Nov-00	Flow		6.6	370		58	59	110	24	0.41															
15-Nov-00	Flow		6.4	480		46	34	150	86	0.59															
20-Nov-00	Flow		6.4	330		26	48	78	41	1.50															
21-Nov-00	Flow		6.4	385		24	58	98	48	1.10															
08-Dec-00	Flow		6.9	925		50	14	148	20.5	1.10															
09-Dec-00	Flow		6.7	605		14	22	241	26.5	0.50															
30-Jan-01	Routine	No flow	#N/A																						
31-Jan-01	Flow	No flow	#N/A																						
01-Feb-01	Flow		7.1	725		19	16	138	4	0.39															
02-Feb-01	Flow		7.2	955		13	3	190	4	1.00															
21-Feb-01	Flow		6.7	1010		346	240	263	36	0.71															
22-Feb-01	Flow		6.0	1275		14	13	364	102	0.34															
01-Mar-01	Flow		7.0	565		71	51	102	5	1.30															
02-Mar-01	Flow		6.4	385		34	46	104	21	1.50															
07-Mar-01	Flow		6.4	145		22	63	31	6	2.20															
08-Mar-01	Flow		6.8	80		52	80	12	9	2.20															
09-Mar-01	Flow		6.4	96		24	54	15	9	2.20															
26-Mar-01	Flow		6.4	162		51	79	23	6	2.50															
27-Mar-01	Flow		6.5	225		33	53	33	36	2.90															
23-Apr-01	Flow		7.4	630		98	48	133	10	1.50															
24-Apr-01	Flow		7.6	638		14	23	140	37	0.60															
07-May-01	Flow		#N/A																						
08-May-01	Flow		6.5	75		70	90	8	1	1.70															
09-May-01	Flow		6.6	210		29	88	26	9	0.60															
21-May-01	Flow		6.5	460		36	74	48	32	2.40															
22-May-01	Flow		7.1	370		49	72	62	44	2.30															
28-Jun-01	Routine		7.8	1545		31	28	254	324	0.20															
30-Jul-01	Routine		7.1	690		22	53	147	69	1.20															
30-Aug-01	Routine		7.4	1470		10	11	293	147	0.30															
26-Sep-01	Routine		7.4	885		41	19	175	12	0.09															
30-Oct-01	Routine	No flow	#N/A																						
20-Nov-01	Flow	No flow	#N/A																						
21-Nov-01	Flow		7.1	3090		18	21	805	363	0.28															
18-Dec-01	Routine	No flow	#N/A																						
30-Jan-02	Routine	No flow	#N/A																						
01-Feb-02	Flow	No flow	#N/A																						
02-Feb-02	Flow		6.5	215		57	80	65	14	1.10															
05-Feb-02	Flow		5.6	280		117	79	45	26	0.30															
06-Feb-02	Flow		5.7	285		22	42	40	32	0.50															
07-Feb-02	Flow		6.1	895		13	23	150	166	0.60															
20-Mar-02	Routine		7.4	1565		6	14	295	176	0.30															
30-Mar-02	Flow		6.5	1170		8	13	213	192	0.10															
31-Mar-02	Flow		6.9	1480		7	13	233	285	0.30															
29-Apr-02	Routine		6.6	1870		4	4	397	294	0.10															
29-May-02	Routine		6.8	1890		28	24	224	155	0.20															
25-Jun-02	Routine		6.7	1125		9	17	250	73	0.02															
29-Jul-02	Routine		6.8	735		4	52	159	12	0.58															
27-Aug-02	Routine		7.6	635		2	6	432	6	0.18															
27-Sep-02	Routine	No Flow	#N/A																						
27-Oct-02	Routine	No Flow	#N/A																						
27-Nov-02	Routine	No Flow	#N/A																						
11-Dec-02	>25mm	No Flow	#N/A																						
12-Dec-02	>25mm		6.5	820	694	39	85	220	120	1.10	3.8	0.15	22	24	0.04	0.003	0.0004	0.01	0.06	0.001	0.41	0.005	15		
31-Jan-03	Routine	No flow	#N/A																						
22-Feb-03	Routine/>25mm		6.6	1540		17	21	440	280	0.21															
23-Feb-03	Routine/>25mm		6.8	1300		17	21	280	280	0.27															
31-Mar-03	Routine	No flow	#N/A																						
29-Apr-03	Routine/>20mm		7.1	460	338	93	134	120	21	0.67	3.3	0.45	13	11	0.01	0.001	0.0003	0.02	0.02	0.0002	0.17	0.005	55		
16-May-03	>25mm		6.9	345		52	26	72	24	0.58															
17-May-03	>25mm		6.9	270		45	40	89	26	0.78															
26-May-03	>25mm		7.0	385	250	245	12	64	14	0.41	1.8	0.1	13	10	0.01	0.004	0.0002	0.01	0.04	0.0002	0.01	0.005	59		

Notes:
values reported in 1994 EIS
conc taken as MDL

DATE	EVENT	FLOW	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp
				(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C
27-May-03	>25mm		6.8	85		48	79	20	6	0.53															
28-May-03	>25mm		#N/A			37		15	9	0.63															
26-Jun-03	Routine		7.6	510	296	IS	17.4	96	24	0.57	0.3	0.1	15	13	0.01	0.01	0.0002	0.01	0.03	0.0002	0.02	0.005	63		
31-Jul-03	Routine		7.4	460		8	11.4	120	24	0.47	0.6	0.11	21	18	0.01	0.002	0.0002	0.01	0.01	0.0002	0.06	0.02	74		
28-Aug-03	Routine		7.4	1000	648	128	65	250	89	0.31	1.2	0.1	32	32	0.08	0.004	0.0002	0.01	0.02	0.0002	0.21	0.005	84	Cattle in creek line	
24-Sep-03	Routine	No flow	#N/A																						
30-Oct-03	Routine	No flow	#N/A																						
28-Nov-03	Routine	No flow	#N/A																						
06-Dec-03	>20mm	No flow	#N/A																						
17-Jan-04	>20mm	No flow	#N/A																						
25-Feb-04	>20mm	No flow at time c	#N/A																						
22-Mar-04	>20mm		6.9	980	526	26	27	210	38	1.10	0.9	0.1	20	20	0.01	0.001	0.0002	0.01	0.03	0.0002	0.04	0.005	80		
30-Apr-04	Routine		7.5	550	302	89	51	92	9	0.09	2.1	0.1	20	17	0.01	0.001	0.0002	0.01	0.02	0.0002	0.13	0.005	100		
31-May-04	Routine	No flow	#N/A																						
30-Jun-04	Routine	No flow	#N/A																						
27-Jul-04	>20mm	No flow	#N/A																						
20-Aug-04	>20mm	No flow	#N/A																						
30-Sep-04	>20mm	No flow	#N/A																						
19-Oct-04	>20mm		6.9	800	452	158	172	170	61	1.70	2.7	0.06	17	18	0.01	0.001	0.0002	0.02	0.03	0.0002	0.02	0.005	<5		
30-Nov-04	Routine	No flow	#N/A																						
23-Dec-04	Routine	No flow	#N/A																						
17-Jan-05	>20mm	No flow	#N/A																						
10-Feb-05	>20mm	No flow	#N/A																						
21-Feb-05	>20mm/Routine		6.6	2400	1500	25	23	640	171	0.35	1.4	0.06	56	61	0.01	0.001	0.001	0.01	0.04	0.0001	1.94	0.02	12		
18-Mar-05	>20mm		7.0	600	572	29	32	124.1	37	1.21	0.65	0.1	16	15	0.01	0.0014	0.0001	0.01	0.01	0.0001	0.43	0.0001	76		
29-Apr-05	Routine	No flow	#N/A																						
13-May-05	>20mm	No flow	#N/A																						
31-May-05	Routine	No flow	#N/A																						
30-Jun-05	>20mm/Routine		7.8	100	370	120	70	44	56	0.55	1.2	0.22	1.8	1.8	0.1	0.0005	0.00002	0.01	0.03	0.00005	0.01	0.002	9.8		
29-Jul-05	Routine		7.5	700	350	24	24	130	39	0.27	0.5	0.06	18	18	0.05	0.0006	0.002	0.01	0.01	0.0005	0.05	0.005	70		
30-Aug-05	Routine		8.0	600	260	11	21	79	12	0.04	0.8	0.06	13	10	0.01	0.0007	0.001	0.01	0.03	0.0005	0.17	0.003	150		
05-Sep-05	>20mm		7.8	600	290	22	13	99	20	0.25	1.3	0.06	21	16	0.01	0.0007	0.001	0.01	0.01	0.0005	0.1	0.001	82		
17-Oct-05	Routine	No flow	#N/A																						
28-Nov-05	>20mm		7.0	400	320	62	59	120	36	1.30	2.2	0.06	9.3	13	0.01	0.0005	0.00002	0.02	0.02	0.0005	0.01	0.0002	40		
29-Dec-05	Routine	No Flow	#N/A																						
31-Jan-06	Routine	No Flow	#N/A																						
27-Feb-06	Routine	No Flow	#N/A																						
28-Feb-06	>20mm	No Flow	#N/A																						
31-Mar-06	Routine	No Flow	#N/A																						
14-Apr-06	Routine	No Flow	#N/A																						
31-May-06	Routine	No Flow	#N/A																						
29-Jun-06	Routine	No Flow	#N/A																						
17-Jul-06	Routine	No Flow	#N/A																						
31-Aug-06	Routine		7.6	1400	750	26	22	430	144	0.49	1.2	0.06	20	24	0.02	0.0005	0.001	0.04	0.01	0.0005	0.02	0.0001	27		
10-Sep-06	>20mm		7.0	1000	720	35	57	200	66	1.10	1.1	0.12	19	23	0.01	0.0009	0.001	0.02	0.01	0.0005	0.03	0.003	40		
30-Oct-06	Routine		7.5	400	230	2	2	5300	15	0.13	0.5	0.006	15	9.7	0.002	0.0007	0.02	0.001	0.01	0.0005	0.02	0.1	84		
06-Nov-06	>20mm		7.2	400	2040	20	4	250	68	1.00	2.25	0.11	84	34	0.003	0.0005	0.001	0.001	0.09	0.0005	0.4	0.003	40		
30-Nov-06	Routine		7.7	700	450	12	20	110	60	0.57	0.86	0.64	17	18	0.02	0.0009	0.02	0.2	0.01	0.0005	1.8	0.1	120		
29-Dec-06	Routine	No Flow	#N/A																						
31-Jan-07	Routine	No flow	#N/A																						
26-Feb-07	>20mm	No flow	#N/A																						
28-Feb-07	Routine	No flow	#N/A																						
26-Mar-07	>20mm	No flow	#N/A																						
30-Apr-07	Routine	No flow	#N/A																						
10-May-07	>20mm	No flow	#N/A																						
08-Jun-07	>20mm		7.1	210	178	208	194	124	19	2.30	2.6	4	4.6	5.5	0.01	0.02	0.001	0.02	0.01	0.01	0.01	0.01	2		
10-Jul-07	>20mm		6.7	420	410	24	65	94	30	2.20	2.9	0.2	10	<0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	5		
20-Aug-07	>20mm		7.1	540	330	5	16	132	24	0.45	1.86	0.08	17	14	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	67		
28-Sep-07	Routine		7.7	500	246	26	18	71	14.7	0.65	0.11	0.06	15	12	0.02	0.01	0.01	0.03	0.01	0.01	0.01	0.01	72		
26-Oct-07	>20mm		7.4	480	210	5	6	98	4	0.64	0.4	0.06	14	9	0.001	0.002	0.0001	0.001	0.05	0.0001	0.17	0.001	80		
24-Nov-07	>20mm		7.4	660	252	51	16	78	6	0.76	2.712	0.4	12	11	0.001	0.001	0.0001	0.001	0.05	0.0001	0.002	0.001	71		

Notes:
values reported in 1994 EIS
conc taken as MDL

DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C
17-Dec-07	>20mm		7.2	180	115	18	39	28	8	1.31	0.8	0.23	7	6	0.001	0.02	0.0001	0.001	0.05	0.0001	0.05	0.001	56		
17-Jan-08	>20mm		7.7	240	56	79	72	38	6	0.31	0.568	0.25	7	5	0.001	0.002	0.0003	0.001	0.05	0.0001	0.09	0.001	52		
29-Feb-08	>20mm		6.9	360	188	13	26	123	8	1.96	0.1	0.21	11	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.084	0.001	88		
25-Mar-08	>20mm		7.9	580	310	20	31	114.6	18	0.84	0.5	0.23	16	14	0.001	0.001	0.0001	0.001	0.05	0.0001	0.188	0.001	68		
22-Apr-08	>20mm		7.5	150	140	53	97	36	12	0.70	1.6	0.12	4	4	0.002	0.003	0.0001	0.001	0.05	0.0001	0.092	0.002	28		
29-May-08	Routine		6.5	420	150	5	27	69	9	1.11	0.5	0.06	16	9	0.001	0.001	0.0001	0.008	0.05	0.0001	0.14	0.002	73		
04-Jun-08	>20mm		7.0	500	375	60	55	120	99	0.09	1.5	0.2	22	22	0.002	0.001	0.0001	0.001	0.05	0.0001	0.403	0.001	58		
30-Jul-08	Routine		6.9	760	420	12	18	161	46	0.28	2	0.02	23	21	0.001	0.001	0.0001	0.001	0.05	0.0001	0.301	0.001	82		
29-Aug-08	Routine		7.6	520	462	30	10	146	64	0.46	0.7	0.01	20	22	0.001	0.001	0.0001	0.001	0.05	0.0001	0.236	0.001	112		
05-Sep-08	>20mm		7.9	510	350	82	78	101	34	2.48	1.8	0.21	13	15	0.001	0.001	0.0001	0.001	0.05	0.0001	0.284	0.001	88		
31-Oct-08	Routine		7.4	520	412	4	37	132	1	0.06	0.8	0.03	22	14	0.001	0.001	0.0001	0.001	0.05	0.0001	0.225	0.001	83		
19-Nov-08	>20mm		7.8	1240	700	19	13	241	1	0.12	1.5	0.05	28	39	0.001	0.002	0.0001	0.001	0.05	0.0001	2.28	0.001	237		
13-Dec-08	>20mm		7.2	500	458	370	234	80	27	0.84	4.1	0.4	13	14	0.003	0.004	0.0001	0.004	0.05	0.0001	0.526	0.008	69		
23-Jan-09	Routine	No Flow	#N/A																						
13-Feb-09	>20mm	No flow	7.4	1080																					
19-Feb-09	routine		#N/A																						
23-Feb-09	>20mm		#N/A																						
24-Mar-09	Routine		#N/A																						
01-Apr-09	>20mm		#N/A																						
21-May-09	>20mm		#N/A																						
23-Jun-09	>20mm		6.4	153	150	8	72.5	33	13	0.69	0.1	0.3	4	4	0.002	0.001	0.001	0.001	0.05	0.0001	0.034	0.001	24	211	
31-Jul-09	Routine		7.3	746	440	106	127	174	72.3	0.37	0.5	0.03	22	22	0.001	0.001	0.0001	0.002	0.05	0.0001	0.395	0.003	50	161	
31-Aug-09	Routine		6.9	816	410	11	13.8	189	20.6	0.19	1	0.04	25	21	0.001	0.001	0.0001	0.001	0.05	0.0001	0.855	0.001	119	53	13.7
30-Sep-09	Routine	No Flow	#N/A																						
6-Oct-09	>20mm	Low Flow	7.3	695	350	20	9.65	130	3.15	0.05	0.8	0.04	25	16	0.001	0.001	0.0001	0.001	0.05	0.0001	0.483	0.001	116	137	
27-Oct-09	>20mm		7.6	664	370	4	6.41	138	2.57	0.05	0.5	0.56	26	15	0.001	0.001	0.0001	0.001	0.05	0.0001	0.434	0.001	109		
30-Nov-09	routine		7.0	483	320	16	15.3	78.9	4.12	2.63	1.2	0.08	16	11	0.004	0.003	0.0006	0.001	0.05	0.0001	0.636	0.002	87		
27-Dec-09	>20mm	No Flow	#N/A																						
7-Jan-10	Routine		6.4	355	250	19	34	65.2	19.5	0.60	1.3	0.2	11	8	0.017	0.002	0.0001	0.001	0.05	0.0001	0.106	0.001	46		
29-Jan-10	>20mm		7.1	332	200	16	9.89	55	1	0.60	0.8	0.11		10	0.001	0.002	0.0007	0.001	0.05	0.0001	0.323	0.001	61		24
26-Feb-10	Routine	Low Flow	6.6	561	360	11	51.1	106	2.95	1.66	1.7	0.16	14	14	0.001	0.003	0.0103	0.001	0.05	0.0001	0.678	0.001	90		21.1
15-Mar-10	>20mm	Low Flow	6.8	190	147	13	11.9	34.9	5.84	0.82	0.4	0.04	13	6	0.001	0.001	0.0001	0.001	0.05	0.0001	0.047	0.001	53	232	20.9
28-Apr-10	Routine	Low Flow	6.5	311	160	3	5.88	46.5	3.83	0.76	0.3	0.22	14	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.118	0.001	69	234	18.7
31-May-10	Routine	Low Flow	6.8	366	172	3	8.23	59.5	3.27	0.49	0.2	0.11	15	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.309	0.001	80	168	12.5
4-Jun-10	>20mm	Low Flow	6.6	335	164	6	7.83	56.1	5.38	0.22	0.4	0.04	14	7	0.001	0.001	0.0001	0.0001	0.05	0.0001	0.073	0.001	67	199	14.3
30-Jul-10	Routine	Low-Mod Flow	6.6	474	416	27	64.2	106	34	0.68	1.8	0.3	8	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.054	0.001	30	182	14.8
4-Aug-10	>20mm	High Flow	6.7	219	226	48	114	41	13	0.90	2.2	0.32	4	4	0.003	0.001	0.0004	0.001	0.05	0.0001	0.048	0.001	15	133	15.3
30-Sep-10	Routine	Low Flow	7.0	352	6	218	6.29	91	5	0.25	0.01	0.05	18	12	0.001	0.001	0.0001	0.001	0.05	0.0001	0.298	0.001	87	142	14.8
4-Oct-10	>20mm	Low-Mod Flow	7.0	570	438	34	55.9	178	13	0.34	0.33	0.02	19	18	0.001	0.001	0.0001	0.001	0.05	0.0001	0.782	0.001	84	138	16.9
6-Nov-10	>20mm	Low Flow	6.9	589	30	406	46.2	170	20	0.38	1.7	0.19	15	19	0.001	0.001	0.0001	0.001	0.05	0.0001	0.109	0.001	60	138	15.4
2-Dec-10	>20mm	High Flow	6.1	144.6			96.2																	187	23.2
6-Jan-11	Routine	Low Flow	6.7	450	244	10	11	85	26	2.10	0.8	0.04	15	11	0.004	0.002	0.0002	0.001	0.05	0.0001	0.821	0.001	92	160	22
14-Feb-11	Routine	Low Flow	6.2	453	248	12	9	34	1	1.58	1	0.34	11	6	0.001	0.002	0.0001	0.001	0.05	0.0001	0.301	0.001	80	72	21.4
21-Feb-11	Event	Low Flow	6.5	310	136	7	7	29	4	1.73	2	0.01	11	6	0.001	0.002	0.0001	0.001	0.05	0.0001	0.16	0.001	50	58	24.1
22-Mar-11	Event	Low Flow	6.1	610			73																	139	25.3
17-Apr-11	Event	High Flow	6.2	311	342	29	91	58	11	2.13	1.5	0.22	8	7	0.003	0.002	0.0001	0.002	0.05	0.0001	0.058	0.001	32	94	
31-May-11	Event	High Flow	6.7	130	181	65	227	16	1	1.60	1.8	0.33	4	3	0.003	0.001	0.0001	0.001	0.05	0.0001	0.127	0.003	23	95	13.8
30-Jun-11	Routine	Low-Mod Flow	6.5	210	123	7	45	30	15	1.42	0.5	0.04	5	6	0.002	0.001	0.0016	0.001	0.05	0.0001	0.034	0.001	27	128	13.1
21-Jul-11	Event	Mod Flow	6.0	277	230	35	80	45	32	1.83	1.4	0.16	7	7	0.002	0.001	0.0001	0.001	0.05	0.0001	0.046	0.001	22		14.1
21-Aug-11	Event	Low-Mod Flow	6.9	578	360	20	65	110	58	1.88	1.2	0.21	15	18	0.002	0.001	0.0001	0.001	0.05	0.0001	0.187	0.002	48	123	12.1
30-Sep-11	Routine	Low Flow	7.6	800			9																	129	16.5
3-Oct-11	Event	Mod Flow	6.6	533			74																	142	14.4

W10
Lemon Tree Creek
(Off Bowens Road - SCPL)

Notes:
conc taken as MDL

DATE	Event	Flow	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C
29-May-08	Routine		6.9	970	430	1	4	200	41	0.08	0.2	0.04	31	20	0.001	0.001	0.0001	0.001	0.05	0.0001	0.028	0.001	89		
04-Jun-08	>20mm		7.4	440	170	18	45	91	26	0.51	0.9	0.15	13	8	0.002	0.001	0.0001	0.001	0.05	0.0001	0.147	0.001	36		
30-Jul-08	Routine		6.8	980	480	3	14	201	53	0.13	0.5	0.01	32	19	0.001	0.001	0.0001	0.001	0.05	0.0001	0.061	0.001	81		
29-Aug-08		No Flow																							
05-Sep-08	>20mm		7.6	500	340	54	90	128	38	3.78	0.8	0.03	15	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.229	0.001	32		
31-Oct-08		No Flow																							
19-Nov-08		No Flow																							
13-Dec-08	>20mm		7.3	600	474	40	53	144	48	0.49	0.8	0.01	22	14	0.001	0.001	0.0001	0.002	0.05	0.0001	0.039	0.002	37		
28-Jan-09		Dry																							
13-Feb-09	>20mm	No flow																							
19-Feb-09	Routine	mod flow	6.5	150			10	28	5	0.65		0.03	4	3							0.01	0.001			
23-Feb-09	>20mm		6.2	160			114	28	2	0.62		0.02	4	3							0.012	0.001			
24-Mar-09	Routine	No Flow																							
01-Apr-09	>20mm		6.1	132	180	30	76.8	28	11	1.61	1	0.05	4	3	0.001	0.001	0.0001	0.001	0.05	0.0001	0.036	0.002	13		
21-May-09	>20mm		7.1	327	212	16	68.4	67	4	0.58	0.7	0.17	8	6	0.001	0.001	0.0001	0.001	0.05	0.0001	0.035	0.001	24	154	
23-Jun-09	>20mm		6.3	137	126	1	42.5	32	0.25	0.4	0.2	0.01	3	3	0.001	0.001	0.001	0.001	0.05	0.0001	0.019	0.001	14	214	
31-Jul-09	Routine		7.2	770	468	0	4.02	178	50.5	0.08	0.1	0.01	24	17	0.001	0.001	0.0001	0.001	0.05	0.0001	0.011	0.001	53	160	10
31-Aug-09	Routine	No Flow																							
30-Sep-09	Routine	No flow																							
06-Oct-09	>20mm	No Flow																							
27-Oct-09	>20mm	No Flow																							
30-Nov-09	Routine	No Flow																							
27-Dec-09	>20mm	No Flow																							
07-Jan-10	Routine		6.6	369	370	10	64.9	62	28	0.42	0.7	0.04	10	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.023	0.001	43		
29-Jan-10	>20mm	Trickle Flow	7.1	2110	1500	14	25.9	593	63	0.05	0.6	0.01		70	0.001	0.001	0.0005	0.001	0.05	0.0001	0.089	0.001	105		25.9
26-Feb-10	Routine	Trickle Flow	6.9	1475	800	3	2.99	355	72	0.05	1.2	0.01	56	39	0.001	0.001	0.0084	0.001	0.05	0.0001	0.074	0.001	105		21.3
15-Mar-10	>20mm	Low Flow	7.3	1649	1110	3	5.28	464	139	0.05	0.5	0.01	82	49	0.001	0.001	0.0001	0.001	0.05	0.0001	0.068	0.001	133	265	22.4
28-Apr-10	Routine	No Flow																							
31-May-10	Routine	No Flow																							
04-Jun-10	>20mm	Low Flow	6.6	1654	878	85	108.2	387	154	0.15	0.6	0.08	58	36	0.002	0.001	0.0023	0.001	0.05	0.0001	0.147	0.002	92	243	15.2
30-Jul-10	Routine	Low Flow	7.2	651	464	15	64.4	124	58	0.28	0.7	0.1	23	14	0.001	0.001	0.0001	0.001	0.05	0.0001	0.029	0.001	60	197	13.8
04-Aug-10	>20mm	Mod Flow	6.9	195.9	196	16	73.2	30	14	0.6	1.1	0.15	4	3	0.001	0.001	0.0001	0.002	0.05	0.0001	0.031	0.001	21	119	11.1
30-Sep-10	Routine	No Flow																							
4-Oct-10	>20mm	Low Flow	7.5	658	530	35	73.7	159	10	0.24	0.01	0.48	28	20	0.001	0.001	0.0001	0.001	0.05	0.0001	0.064	0.001	93	182	17.4
18-Oct-10	Macro sample																						56		
06-Nov-10	>20mm	mod flow	6.6	329	134	350	212	65	26	0.63	1.6	0.48	11	8	0.003	0.001	0.0002	0.002	0.05	0.0001	0.217	0.004	49	162	15
02-Dec-10	>20mm	Low-Mod Flow	6.4	122.7			70.8																	195	23.1
06-Jan-11	Routine	No Flow																							
14-Feb-11	Routine	No Flow																							
21-Feb-11	Event	No Flow																							
22-Mar-11	Event	Low Flow	6.3	382			148																	116	22.2
17-Apr-11	Event	mod flow	6.5	219	254	24	89.2	29	15	1.62	0.4	0.01	6	4	0.002	0.001	0.0001	0.001	0.05	0.0001	0.022	0.002	34	113	
31-May-11	Event	mod flow	6.8	209	234	35	106.7	30	21	1.48	0.7	0.01	6	4	0.002	0.001	0.0001	0.001	0.05	0.0001	0.032	0.002	31	106	14.6
30-Jun-11	Routine	Low Flow	6.9	659	410	6	13.1	139	32	0.56	0.2	0.01	23	15	0.001	0.001	0.0001	0.001	0.05	0.0001	0.016	0.001	62	85	12.2
21-Jul-11	Event	Low Flow	7.1	172	150	30	74.4	27	15	1.52	0.8	0.08	4	3	0.002	0.001	0.0001	0.001	0.05	0.0001	0.025	0.001	20		12.6
21-Aug-11	Event	Low Flow	7.1	280	236	26	93.8	40	29	1.9	0.5	0.08	8	7	0.002	0.001	0.0001	0.001	0.05	0.0001	0.031	0.002	38	137	12.6
30-Sep-11	Routine	Trickle Flow	7.7	1258			2.79																	119	16.5
03-Oct-11	Event	Low Flow	7	344			71.2																	147	14.2

W5
Downstream of Mine - Upstream of Avondale Swamp
(Wenhams Cox Road - SCPL)

Notes:
conc taken as MDL
values reported in 1994 EIS

DATE	EVENT	FLOW	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Total N	Total P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp	DO	DO	Turbidity
				(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)			(mg/L)	(% sat)	(NTU)
4-May-94			6.3	1270	750	4		362	21	0.16	1.6	1	25.1	29.2	0.01	0.002	0.01	0.01	0.03	0.03	0.39	0.01						
10-May-94			6.5	1020	1140			580	22	0.01																		
16-May-94			6.2	1960	1000			572	22	0.01																		
23-May-94			5.8	2000	1090			590	28	0.01																		
2-Jun-94			6.0	1000	1430	1		853	28	0.02	1	1	42.7	53.2	0.01	0.002	0.01	0.01	0.02	0.03	0.01	0.01						
16-Jun-94			6.2	2120	1060			886	23	0.02																		
30-Jun-94			6.3	2230	1150	9		834	28	0.02	1.5	1	43.3	53.8	0.01	0.002	0.01	0.01	0.01	0.01	0.05	0.01						
1-Aug-94			6.5	2550	1250	13		1076	30	0.02	1	1	55.8	66.7														
30-Oct-94			6.4	6810	3870			2200	53	0.01																		
3-Jan-95			5.8	1800	1100	380		530	23	0.01		0.3	45	50														
31-Jan-95			7.8	890	860	8		430	16	0.08	1.8	0.07	37	41														
6-Mar-95			6.4	150	180	100		37	2	1.00	4.5	0.2	2.5	3.4														
3-Apr-95				1600	940			460	16	0.02																		
3-May-95			7.2	2700	1700			810	27	0.02																		
3-Jun-95				1200	670	66			18	0.26																		
3-Jul-95			6.4	1200	560	140			18	0.34																		
1-Aug-95			6.6	4800	2600	8			52	0.03																		
18-Aug-95			6.3	4740																								
1-Sep-95			7.5	7800	4400			2500	65	**0.05**																		
27-Sep-95			6.9	8350																								
6-Nov-95			6.6	10290																								
21-Nov-95			6.2	6020																								
21-Nov-95			6.0	778																								
22-Nov-95			5.8	470		280		120	13	0.82	2.8	0.09	6.4	8.9	0.01	0.005	0.01	0.01	0.02	0.001	1.3	0.01						
23-Nov-95			6.4	375																								
1-Dec-95			6.1	240	180	380		63																				
6-Dec-95			6.3	280	230	160		74	**1**	0.84			4.8	6.5														
11-Dec-95			6.4	320	220	300		88	**1**	0.57			4.7	7.7	0.01		0.01	0.01			0.05	0.01						
7-Jan-96			6.5	320	230	160		87	8	0.98			5.1	6.6														
8-Jan-96			6.4	840	460	74		240	18	0.49			13	20														
9-Jan-96			6.1	740																								
11-Jan-96			6.4	250	250	250		87	3	1.10			4.6	5.8														
23-Jan-96			6.2	400	210	180		100	3	1.50			6	8.9														
24-Jan-96			6.1	500	320	180		140	18	0.75			7.7	13														
16-Feb-96			7.1	1100	710	42		270																				
20-Feb-96			6.8	1300	760	13		360	24		2.8	0.1	31	36	0.005	0.003	0.005	0.005	0.03	0.0002	0.2	0.01						
1-Mar-96			6.9	3200	1600	20		1000																				
25-Mar-96			6.8	1800	910	2		500																				
23-Apr-96			6.7	2800																								
4-May-96			5.8	3900	2100	39		1000	49	0.06			100	100														
6-May-96				210																								
6-May-96			6.0	370	160	320		79	**19**	0.39			6.3	8.8														
7-May-96			6.1	240	170	140		47																				
15-May-96			6.2	380	200	120		87	9	0.56	4	0.03	6.7	7.9	0.005	0.004	0.005	0.005	0.03	0.0002	0.08	0.005						
17-Jun-96			5.6	1200	630	48		330	22	0.24			18	30														
19-Jun-96			5.7	760	390	90		200	23	0.61			10	17														
23-Jul-96			6.7	4600																								
26-Aug-96			6.7	7400																								
30-Aug-96			5.8	3800	1900	140		1200	41	0.39			120	110														
31-Aug-96			6.9	450	510	360		130	8	0.30			7	11														
2-Sep-96			6.4	480	290	80		140	14	0.80			7	11														
30-Sep-96			6.4	2400																								
7-Oct-96			6.2	2200	1300	96		650	30	0.63			58	62														
29-Oct-96			6.1	2350																								
6-Nov-96			6.0	1500	800	160		420																				
8-Nov-96			6.0	3600	1900	15		1100																				
24-Nov-96			6.0	210	130	240		57	**1**	0.80			2.8	3.9														
25-Nov-96			6.1	240	170	130		64	1	1.20	24	0.3	3.5	4.8	0.01	0.001	0.01	0.01	0.04	0.0002	0.02	0.01						
26-Nov-96			6.3	310																								
6-Dec-96			6.4	470	280	260		130	**2**	0.79			7.9	11														
9-Dec-96			6.6	620	370	95		170	**20**	0.94			9.8	15														
23-Jan-97			7.0	2800																								
30-Jan-97			6.3	3000	1600	44		930	29	0.05			78	85														

Notes:
conc taken as MDL
values reported in 1994 EIS

DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Total N (mg/L)	Total P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp	DO (mg/L)	DO (% sat)	Turbidity (NTU)
31-Jan-97			5.9	550	350	480		150	29	0.52			8.7	13														
12-Feb-97			6.1	220	140	290		53	1	0.39			2.7	3.2														
13-Feb-97			6.2	450	310	350		120	21	0.58			6.9	8.9														
14-Feb-97			6.3	580	370	130		150	32	0.47			8.9	12														
6-Mar-97			6.6	280	170	560		59	1	0.60			5.4	7.4														
7-Mar-97			6.9	200	130	150		39	17	0.69			4.1	5.6														
14-May-97			6.2	380	230	74		80	44	0.26			6.4	8.6									flow sampled 10.40am					
16-Jun-97			6.2	200	130	420		55	10	0.58			3.7	4.8									flow sampled 11.30am					
17-Jun-97			6.5	230	120	120		45	26	0.32			4.7	5.4									flow sampled 8.50am					
25-Jul-97			6.4	2400	1300	17	7	690	84	0.02			70	68									sampled 1.10pm, groundwater inflow?					
22-Aug-97			6.1	5800	No flow																		no flow					
22-Sep-97			5.7	6800	No flow																		no flow					
25-Sep-97			7.9	1600	920	60	41	460	39	0.08													sampled 10.25am					
7-Oct-97			6.0	2000	1100	85	65	580	18	0.21													sampled 10.05am					
8-Oct-97			6.1	1100	530	94	57	300	17	0.10													sampled 9.45am					
23-Oct-97		No flow																					no flow - sampled 2.55pm.					
24-Nov-97		No Flow																					no flow					
22-Dec-97		No Flow																					No flow					
6-Jan-98			5.9	13,000	7200	7	4	4400	85	0.03													Sampled at 8:50am					
7-Jan-98		No flow																					No flow - @ 8:20am					
10-Jan-98		No flow																					No flow at 9:30am - some sediment laden pondage: source likely c					
11-Jan-98		No flow																					No flow at 8:25am					
20-Jan-98		No flow																					No flow @ 8:50am					
27-Jan-98			5.9	1300	630	48	36	330	37	0.13													Moderate flow @ 2.25pm					
28-Jan-98			6.0	1400	720	30	21	370	35	0.13													Very slow flow sampled at 2pm					
9-Feb-98			6.7	2100	1000	23	21	580	17	0.02													Very slow flow at 10:30am					
10-Feb-98		No flow																					No flow at 9:50am'					
19-Feb-98		No flow																					No flow at 8.25am					
20-Mar-98		No flow																										
21-Apr-98		No flow																					Water level very low					
3-May-98		No flow																										
20-May-98			6.2	400	240	150	120	100	36	0.64													Flowing					
17-Jun-98			6.2	1400	890	21	18	320	230	0.03													Very slow flow					
23-Jun-98			6.5	790	440	140	67	200	47	0.45													Strong/high fllow					
24-Jun-98			6.6	430	310	78	65	110	28	0.92																		
15-Jul-98	Routine		7.2	720		180	140			1.10																		
12-Aug-98	Routine		7.1	540		110	120			1.60																		
14-Sep-98	Routine		7.4	400		52	55	100	28	1.50																		
14-Oct-98	Routine	No flow																										
11-Nov-98	Routine	No flow																										
18-Nov-98	Flow		6.0	7100		140	62	2600	75	0.15																		
19-Nov-98	Flow		6.3	150		120	100	27	6	1.00																		
24-Nov-98	Flow		6.4	193		16	98	43	6	0.96																		
25-Nov-98	Flow		6.7	244		94		43	11	2.00																		
10-Dec-98	Routine		6.6	455		110	91	100	15	1.30																		
31-Dec-98	**Accident**		**7.4**	**772**				**150**	**100**																			
1-Jan-99	**Accident**		**7.1**	**623**				**150**																				
7-Jan-99	Routine	No flow																										
10-Jan-99	Flow		7.4	2460		10		580	**280**	0.02																		
11-Jan-99	Flow	No flow																										
21-Jan-99	Flow			5420		7		1600	190	0.01																		
22-Jan-99	Flow			653		140		120	80	0.59																		
23-Jan-99	Flow			523		93		110	35	0.82																		
28-Jan-99	Flow			380		230		77	12	1.30																		
29-Jan-99	Flow			325		98		67	13	1.30																		
25-Feb-99	Routine		7.4	605		58	49	120	6	0.94																		
30-Mar-99	Routine	No flow																										
29-Apr-99	Routine		7.4	720		110	83	160	56	0.29																		
31-May-99	Routine		6.4	2020		10	7	540	80	0.15																		
28-Jun-99	Routine		7.0	420		31	38	100	29	1.00																		
14-Jul-99	Flow		6.4	155		190	140	37	6	0.62																		
15-Jul-99	Flow		6.8	170		140	130	24	16	0.30																		
11-Aug-99	Spot		7.4	1190																								
26-Aug-99	Routine		7.3	1770		39	32	430	150	0.11																		
28-Sep-99	Flow		7.2	760		80	50	210	21	0.26																		
29-Sep-99	Flow		7.5	1060		52	40	320	19	0.28																		
20-Oct-99	Routine		7.3	755		100	70	260	12	0.39																		
25-Oct-99	Flow		6.8	365		56	52	100	5	1.10																		

Notes:
conc taken as MDL
values reported in 1994 EIS

DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Total N (mg/L)	Total P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp	DO (mg/L)	DO (% sat)	Turbidity (NTU)
26-Oct-99	Flow		6.7	325		60	65	87	4	1.40																		
9-Nov-99	Flow		7.7	360		110	86	91	17	0.80																		
10-Nov-99	Flow		7.9	325		64	61	84	17	1.30																		
16-Nov-99	Flow		7.8	310		90	71	67	21	0.71																		
17-Nov-99	Flow		7.6	450		52	51	110	19	0.73																		
29-Nov-99	Flow		7.3	515		31	23	130	10	0.86																		
30-Nov-99	Flow		7.4	570		46	36	150	11	0.76													higher turbidity due to BRNSD syphon.					
21-Dec-99	Routine		6.9	4140		12	14	1600	55	0.03																		
19-Jan-00	Routine		7.4	635		23	22	190	31	0.48																		
28-Feb-00	Routine		6.3	6270		7	6	2800	73	0.05																		
8-Mar-00	Flow		6.1	5550		27	21	2500	50	0.12																		
9-Mar-00	Flow		6.1	1740		38	28	500	190	0.17																		
22-Mar-00	Flow		6.3	80		260	260	20	1	0.65																		
23-Mar-00	Flow		6.4	125		74	83	27	1	0.70																		
3-Apr-00	Flow		7.2	480		41	39	110	69	0.43																		
4-Apr-00	Flow		7.3	495		38	30	100	86	0.28																		
24-May-00	Routine		7.3	760		60	58	180	120	0.17																		
14-Jun-00	Routine		7.8	1515		8	6	250	550	0.06																		
26-Jun-00	Spot								500																			
3-Jul-00	Spot								270																			
11-Jul-00	Flow		7.1	435		100	90	140	74	0.33																		
12-Jul-00	Flow		7.4	490		28	32	160	12	0.29																		
29-Aug-00	Routine		6.8	5300		2	6	1900	18	0.02																		
20-Sep-00	Routine		7.0	3300		8	3	1200	150	0.19																		
30-Oct-00	Routine	No flow																										
14-Nov-00	Flow		6.4	365		150	120	88	94	0.48																		
15-Nov-00	Flow		6.1	645		44	34	190	120	0.51																		
20-Nov-00	Flow		6.4	420		39	58	100	69	1.10																		
21-Nov-00	Flow		6.6	450		30	63	110	73	0.86																		
8-Dec-00	Flow		6.9	695		15	51	161	14.5	1.20																		
9-Dec-00	Flow		7.0	575		46	23	157	36.5	1.00																		
30-Jan-01	Routine	No flow																										
31-Jan-01	Flow	No flow																										
1-Feb-01	Flow		6.5	7600		15	13	2190	68	0.01																		
2-Feb-01	Flow		6.5	6210		21	6	1920	81	0.01																		
21-Feb-01	Flow		7.1	1960		32	21	399	96	0.51																		
22-Feb-01	Flow		6.3	1285		4	12	287	258	0.32																		
1-Mar-01	Flow		7.0	415		383	340	169	66	1.80																		
2-Mar-01	Flow		6.8	225		50	102	52	13	3.30																		
7-Mar-01	Flow		6.6	161		60	106	32	12	3.30																		
8-Mar-01	Flow		6.7	110		195	151	21	9	2.90																		
9-Mar-01	Flow		6.6	115		36	102	19	6	2.90																		
26-Mar-01	Flow		6.9	180		47	106	23	15	3.70																		
27-Mar-01	Flow		7.1	239		14	58	35	15	2.70																		
23-Apr-01	Flow		7.4	685		26	59	113	37	1.00																		
24-Apr-01	Flow		7.7	1295		36	28	187	86	0.40																		
7-May-01	Flow		6.9	82		162	204	25	3	3.40																		
8-May-01	Flow		6.7	100		72	146	12	3	2.90																		
9-May-01	Flow		6.9	304		32	93	39	18	2.40																		
21-May-01	Flow		7.1	322		35	78	49	35	3.30																		
22-May-01	Flow		7.1	405		29	68	66	49	1.90																		
28-Jun-01	Routine		8.0	2300		3	11	429	534	0.10																		
30-Jul-01	Routine		7.2	605		20	52	118	75	1.70																		
30-Aug-01	Routine		7.1	2980		8	5	735	375	0.10																		
26-Sep-01	Routine		7.1	4620		12	6	1490	111	0.01																		
30-Oct-01	Routine	No flow																										
20-Nov-01	Flow		6.9	1710		20	45	370	3	0.58																		
21-Nov-01	Flow		7.3	1255		7	14	330	393	0.37																		
18-Dec-01	Routine		6.8	5480		4	8	1764	280	0.01																		
30-Jan-02	Routine	No flow																										
1-Feb-02	Flow	No flow																										
2-Feb-02	Flow	No flow																										
5-Feb-02	Flow		5.8	420		248	138	70	44	1.70																		
6-Feb-02	Flow		6.0	535		37	46	70	76	0.30																		
7-Feb-02	Flow		6.6	180		12	25	176	205	0.60																		
20-Mar-02	Routine		7.2	1180		1	13	230	129	0.30																		
30-Mar-02	Flow		6.4	1595		33	23	263	321	0.10																		
31-Mar-02	Flow		6.7	1215		166	26	213	225	0.90																		

Notes:
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DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Total N (mg/L)	Total P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp	DO (mg/L)	DO (% sat)	Turbidity (NTU)
29-Apr-02	Routine		6.6	1400		5	10	275	177	0.30																		
29-May-02	Routine		6.7	4260		3	5	654	299	0.10																		
5-Jun-02	Spot			1850																								
25-Jun-02	Routine		6.6	1475		5	12	380	120	0.02																		
29-Jul-02	Routine		6.5	4060		1	3	1280	120	0.10																		
27-Aug-02	Routine		7.2	6070		1	5	2790	132	0.02																		
27-Sep-02	Routine	No Flow																										
27-Oct-02	Routine	No Flow																										
28-Oct-02	Discharge					10																						
27-Nov-02	Routine	No Flow																										
11-Dec-02	>25mm		6.3	575	380	262	197	150	77	1.30	5.3	0.1	19	18	1	0.002	0.0007	0.01	0.13	0.001	0.97	0.005	6					
12-Dec-02	>25mm		6.4	754	642	43	64	200	84	0.40	3.2	0.16	17	20	0.11	0.002	0.001	0.01	0.06	0.001	0.17	0.007	19					
23-Dec-02	Discharge		6.6	1043		38																						
31-Jan-03	Routine	No flow																										
22-Feb-03	Routine/>25mm		7.1	1180		16	30	260	260	0.22																		
23-Feb-03	Routine/>25mm		6.7	1400		4	8	310	350	0.17																		
12-Mar-03	Discharge		6.6	1367																								
13-Mar-03	Discharge		6.7	1200																								
31-Mar-03	Routine	No flow																										
4-Apr-03	>25mm		6.7	2000	1730	44	13	690	330	0.10	0.73	0.1	84	76	0.03	0.002	0.0002	0.02	0.02	0.0001	2.2	0.005	84					
5-Apr-03	>25mm	No flow																										
29-Apr-03	Routine/>20mm		7.1	564	434	47	66	100	66	0.87	2.7	0.1	14	13	0.01	0.001	0.0002	0.02	0.02	0.0003	0.04	0.005	38					
16-May-03	>25mm		6.7	810		239	68	169	66	0.54																		
17-May-03	>25mm		6.9	416		46	69	109	36	1.03																		
26-May-03	>25mm		7.0	708	664	398	120	160	30	0.51	2.3	0.1	16	17	0.01	0.004	0.0002	0.01	0.02	0.0002	0.15	0.005	32					
27-May-03	>25mm		6.8	115		109	171	17	11	0.56																		
28-May-03	>25mm		ND			54	ND	29	12	0.46																		
26-Jun-03	Routine		7.1	1326	1466	IS	15.1	588	144	1.57	0.54	0.1	64	63	0.01	0.007	0.0002	0.01	0.02	0.0002	0.85	0.005	53					
31-Jul-03	Routine		7.2	3100		5	13.8	830	190	0.20	0.76	0.1	21	15	0.01	0.002	0.0002	0.01	0.01	0.0002	0.81	0.006	58					
28-Aug-03	Routine		7.5	3100	1680	583	4.2	710	280	0.10	2.15	0.1	79	83	0.01	0.004	0.0002	0.01	0.02	0.0002	0.38	0.005	42					
24-Sep-03	Routine	No flow																										
30-Oct-03	Routine	No flow																										
28-Nov-03	Routine	No flow																										
6-Dec-03	>20mm		6.5	4300	4090	20	22	2000	100	0.29	1.81	0.06	190	180	0.01	0.003	0.0002	0.01	0.03	0.0002	4	0.027	21					
17-Jan-04	>20mm		6.9	871	1020	96	104	422	64	0.65	1.9	0.06	36	33	0.01	0.001	0.0002	0.01	0.01	0.0002	0.79	0.005	17					
25-Feb-04	>20mm		7.2	2700	1744	44	34	780	38	0.07	0.5	0.1	64	63	0.01	0.001	0.0002	0.02	0.04	0.0002	1.41	0.005	8.4					
22-Mar-04	>20mm		7.1	620	422	42	59	130	38	1.32	2.1	0.11	11	13	0.01	0.001	0.0002	0.01	0.03	0.0002	0.01	0.005	55					
30-Apr-04	Routine		7.0	2600	1580	6	2.5	700	47	0.05	1.5	0.1	61	68	0.01	0.001	0.0002	0.01	0.02	0.0002	0.02	0.005	130					
31-May-04	Routine	No flow																										
30-Jun-04	Routine	No flow																										
27-Jul-04	Routine		6.7	7100	4470	20	3	2080	100	0.09	0.62	0.1	210	210	0.01	0.001	0.0002	0.02	0.04	0.0002	2.6	0.005	14					
20-Aug-04	>20mm	No flow																										
30-Sep-04	>20mm		6.2	9200	6610	7	14	3720	34	0.05	0.6	0.06	300	300	0.01	0.001	0.001	0.02	0.02	0.0005	11	0.004	10					
19-Oct-04	>20mm		6.8	2300	1530	63	48	610	74	0.30	0.9	0.06	52	55	0.01	0.001	0.001	0.02	0.02	0.0002	0.41	0.005	<5					
20-Oct-04	>20mm		7.7	100	134	116	168	11	14	4.30	0.9	0.07	2	3	0.01	0.001	0.0002	0.02	0.04	0.0002	0.02	0.005	12					
30-Nov-04	Routine	No flow																										
23-Dec-04	Routine	No flow																										
17-Jan-05	>20mm	No flow																										
10-Feb-05	>20mm		6.5	8100	4600	14	10	3100	66	0.01	0.12	0.06	250	240	0.01	0.005	0.001	0.01	0.01	0.0001	2.5	0.024	48					
21-Feb-05	>20mm/Routine		7.2	600	440	60	123	140	54	2.08	1.49	0.1	10	12	0.01	0.001	0.001	0.01	0.04	0.0001	0.05	0.02	28					
18-Mar-05	>20mm		6.7	1400	512	131	363	134	26	0.57	0.6	0.12	11	12	0.01	0.0005	0.0001	0.01	0.01	0.0001	0.21	0.0001	44					
29-Apr-05	Routine	No flow																										
13-May-05	>20mm	No flow																										
31-May-05	Routine		6.9	2500	1500	4	9	680	90	0.32	3.4	0.06	62	66	0.01	0.0005	0.02	0.01	0.01	0.0005	0.16	0.2	56					
24-Jun-05	>20mm		6.8	3500	2200	1	22	830	40	0.01	0.5	0.02	60	59	0.01	0.0005	0.001	0.01	0.01	0.0005	0.77	0.005	20					
29-Jul-05	Routine		7.1	2400	1400	1	5.7	550	150	0.12	0.55	0.06	65	71	0.08	0.0005	0.002	0.01	0.01	0.0005	0.56	0.005	60					
30-Aug-05	Routine		7.0	6900	360	8	7	104	12	0.26	0.8	0.06	19	14	0.01	0.0005	0.001	0.01	0.05	0.0005	0.32	0.006	94					
5-Sep-05	>20mm		7.1	7100	4900	5	6	208	130	0.26	0.72	0.06	230	230	0.01	0.0005	0.001	0.01	0.01	0.0005	2.6	0.002	16					
17-Oct-05	>20mm		6.5	6300	5300	12	6.5	2300	220	0.08	0.5	0.06	220	230	0.04	0.0005	0.002	0.01	0.01	0.0005	1.5	0.02	190					
28-Nov-05	>20mm		6.9	500	230	24	68	84	26	1.10	2.3	0.09	8.7	9.1	0.01	0.0005	0.00002	0.02	0.02	0.0005	0.01	0.0002	32					
29-Dec-05	Routine	No Flow																										
31-Jan-06	Routine	No Flow																										
27-Feb-06	Routine	No Flow																										
28-Feb-06	>20mm	No Flow																										
31-Mar-06	Routine	No Flow																										

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DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Total N (mg/L)	Total P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp	DO (mg/L)	DO (% sat)	Turbidity (NTU)
14-Apr-06	Routine	No Flow																										
31-May-06	Routine	No Flow																										
29-Jun-06	Routine	No Flow																										
27-Jul-06	>20mm		7.7	1900	1300	3	15	270	300	0.15	1.1	0.14	46	56	0.01	0.0005	1	0.01	0.01	0.005	0.01	1	13					
31-Aug-06	Routine		7.6	1300	710	43	40	360	140	0.77	0.78	0.06	16	22	0.01	0.5	0.001	0.02	0.08	0.0005	0.02	0.001	33					
10-Sep-06	>20mm		7.2	700	610	42	104	170	50	1.00	1.18	0.06	12	15	0.01	0.0009	0.001	0.03	0.02	0.0005	0.03	0.004	40					
30-Oct-06	Routine	No flow																										
5-Nov-06	>20mm		7.0	3100	220	10	18	170	16	1.07	1.2	0.14	14	10.6	0.003	0.001	0.001	0.001	0.02	0.0005	0.86	0.003	87					
30-Nov-06	Routine	No flow																										
29-Dec-06	Routine	No flow																										
31-Jan-07	Routine	No flow																										
26-Feb-07	>20mm	No flow																										
28-Feb-07	Routine	No flow																										
26-Mar-07	>20mm	No flow																										
30-Apr-07	Routine	No flow																										
10-May-07	>20mm	No flow																										
8-Jun-07	>20mm		7.4	100	198	378	451	25	13	11.00	1.3	0.48	2	3.7	0.01	0.01	0.001	0.02	0.01	0.01	0.03	0.01	2					
10-Jul-07	>20mm		6.8	370	310	30	79	23	36	3.10	2.9	0.1	7	8.8	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	10					
20-Aug-07	>20mm		6.8	1800	1600	80	110	717	48	0.09	1	0.04	63	71	0.01	0.01	0.01	0.01	0.01	0.01	3.1	0.01	24					
28-Sep-07	Routine	No flow																										
26-Oct-07	>20mm	No flow																										
24-Nov-07	>20mm		7.5	500	388	77	148	117	52	1.09	2	0.14	12	15	0.002	0.001	0.0001	0.001	0.05	0.0001	0.005	0.001	82					
17-Dec-07	>20mm		7.3	260	160	4	52	19	11	1.80	1	0.12	7	8	0.001	0.002	0.0001	0.001	0.05	0.0001	0.18	0.001	65					
17-Jan-08	>20mm		7.7	320	194	30	121	47	29	0.54	1.5	0.02	8	8	0.002	0.001	0.0001	0.001	0.05	0.0001	0.116	0.002	47					
29-Feb-08	>20mm		7.1	390	228	17	26	104	24	1.25	1.1	0.03	10	13	0.001	0.001	0.0001	0.001	0.05	0.0001	0.048	0.001	78					
25-Mar-08	>20mm		8.0	940	615	6	13	218.8	89	0.05	0.5	0.14	21	29	0.001	0.001	0.0001	0.001	0.05	0.0001	0.034	0.001	85					
22-Apr-08	>20mm		7.4	168	155	43	78	47	16	0.93	1.2	0.05	4	5	0.002	0.001	0.0001	0.002	0.05	0.0001	0.017	0.001	56					
29-May-08	Routine		6.9	1280	680	5	10	232	184	0.07	0.6	0.01	31	42	0.001	0.001	0.0001	0.001	0.05	0.0001	0.405	0.001	72					
4-Jun-08	>20mm		7.1	1110	580	61	38	191	200	0.06	0.6	0.04	32	37	0.001	0.001	0.0001	0.001	0.05	0.0001	0.302	0.001	54					
30-Jul-08	Routine		7.4	1420	860	4	5	235	259	0.05	0.7	0.1	35	49	0.001	0.001	0.0001	0.001	0.05	0.0001	0.098	0.001	93					
29-Aug-08	Routine		8.2	830	564	4	7	171	122	0.08	0.4	0.01	21	30	0.001	0.001	0.0001	0.001	0.05	0.0001	0.044	0.001	141					
5-Sep-08	>20mm		8.0	730	500	28	36	146	87	1.60	0.4	0.08	16	24	0.001	0.001	0.0001	0.001	0.05	0.0001	0.089	0.001	124					
31-Oct-08	Routine		7.6	1000	782	32	59	265	28	0.05	1.1	0.04	29	40	0.002	0.001	0.0001	0.001	0.05	0.0001	0.648	0.001	186					
19-Nov-08	>20mm		8.1	1520	970	15	18	352	1	0.08	0.9	0.01	35	51	0.001	0.001	0.0001	0.001	0.05	0.0001	0.747	0.001	215					
13-Dec-08	>20mm		7.2	630	580	216	261	106	126	0.84	2.1	0.11	19	24	0.002	0.002	0.0001	0.003	0.05	0.0002	0.316	0.006	86					
28-Jan-09	Routine	Dry																										
13-Feb-09	>20mm	No Flow	7.4	6720																								
19-Feb-09	Routine	Mod Flow	6.5	180			39	24	23	1.87		0.12	4	4							0.042	0.002						
23-Feb-09	>20mm		5.7	180			323	24	22	1.60		0.1	4	4							0.031	0.003						
24-Mar-09	Routine	Low Flow	7.1	643	360	30	43.3	102	10	2.60	2.4	0.05	17	20	0.001	0.002	0.0001	0.001	0.05	0.0001	0.3	0.001	132					
1-Apr-09	>20mm		6.2	579	410	50	89.9	103	76	3.18	1.1	0.14	14	17	0.001	0.001	0.0001	0.001	0.05	0.0001	0.306	0.002	21					
21-May-09	>20mm		6.9	534	274	15.2	42.2	83	15	0.43	0.4	0.11	10	14	0.001	0.001	0.0001	0.001	0.05	0.0001	0.081	0.001	29	142				
23-Jun-09	>20mm	Mod Flow	6.2	161	156	6	71.5	36	17	0.90	0.2	0.14	3	4	0.002	0.001	0.001	0.001	0.05	0.0001	0.021	0.001	22	197				
31-Jul-09	Routine		7.0	937	578	2	6.39	204	169	0.09	0.3	0.01	24	32	0.001	0.001	0.0001	0.001	0.05	0.0001	0.212	0.001	24	87				
31-Aug-09	Routine	No Flow																										
30-Sep-09	Routine	No Flow																										
6-Oct-09	>20mm	Low Flow	7.0	2090	1000	20	24.2	508	180	0.05	0.6	0.01	49	53	0.001	0.001	0.0001	0.001	0.05	0.0001	1.86	0.001	<1	127				
27-Oct-09	>20mm		7.2	3010	2000	8	16.4	1040	122	0.05	0.8	0.4	95	96	0.001	0.001	0.0001	0.001	0.05	0.0001	11.2	0.001	28					
30-Nov-09	Routine	No Flow																										
27-Dec-09	>20mm	No Flow																										
7-Jan-10	Routine		6.1	332	380	31	93.7	60.8	33.2	1.23	1.7	0.07	6	7	0.001	0.001	0.0001	0.002	0.05	0.0001	0.021	0.002	16					
29-Jan-10	>20mm	No Flow																										
26-Feb-10	Routine	Low Flow	6.7	649	420	5	20.9	106	36.1	1.85	0.8	0.03	17	19	0.001	0.002	0.0004	0.001	0.05	0.0001	0.054	0.001	93		20.7			
15-Mar-10	>20mm	Low Flow	7.0	523	398	44	89.7	112	24.8	0.89	1.6	0.08	15	16	0.001	0.002	0.0001	0.001	0.05	0.0001	0.078	0.002	92	213	19.3			
28-Apr-10	Routine	No Flow																										
31-May-10	Rountine	No Flow																										
4-Jun-10	>20mm	Low Flow	6.6	1060	622	108	254	273	70.9	0.05	1.4	0.04	26	28	0.001	0.001	0.0002	0.002	0.05	0.0001	0.741	0.003	9	249	15.9			
30-Jul-10	Routine	Mod Flow	6.8	515	406	19	44.2	127	39	0.79	1.6	0.27	8	11	0.001	0.001	0.0001	0.001	0.05	0.0001	0.016	0.001	26	179	14.8			
4-Aug-10	>20mm	Mod Flow	6.6	212	271	40	91.5	38	14	1.10	1.8	0.19	3	4	0.002	0.002	0.0001	0.002	0.05	0.0001	0.022	0.001	25	145	14			
30-Sep-10	Routine	No Flow																										
4-Oct-10	>20mm	Low-Mod Flow	6.8	228	302	89	188	49	31	0.52	2.52	0.35	4	6	0.002	0.001	0.0001	0.002	0.05	0.0001	0.081	0.002	21	173	18.2			
18-Oct-10	Macro sample																						67					
6-Nov-10	>20mm	Low-Mod Flow	6.8	491	54	530	138	133	24	0.68	1.8	0.03	10	15	0.003	0.001	0.0001	0.005	0.05	0.0001	0.064	0.004	53	102	15.7			
2-Dec-10	>20mm	High Flow	6.3	111			110																	183	23.1			

Notes:
conc taken as MDL
values reported in 1994 EIS

DATE	EVENT	FLOW	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Total N (mg/L)	Total P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp	DO (mg/L)	DO (% sat)	Turbidity (NTU)
6-Jan-11	Routine	No Flow																										
14-Feb-11	Routine	No Flow																										
21-Feb-11	Event	No Flow																										
22-Mar-11	Event	Mod-High Flow	5.8	829																				148	24.3			
17-Apr-11	Event	Mod Flow	6.4	332	329	46	90.7	56	30	2.36	0.7	0.09	5	6	0.002	0.001	0.0001	0.002	0.05	0.0001	0.025	0.002	27	122				
31-May-11	Event	High Flow	6.8	354	322	126	163	72	26	2.25	0.9	0.07	5	7	0.002	0.001	0.0001	0.001	0.05	0.0001	0.075	0.002	17	124	14.5			
16-Jun-11		High Flow	7.5	120	190	80	174	20	22	2.32	0.1	0.01	3	3	0.002	0.001	0.0001	0.001	0.05	0.0001	0.02	0.003	12	164	15.5			
30-Jun-11	Routine	Mod Flow	6.4	198	120	6	34.1	27	16	1.27	0.4	0.03	5	6	0.001	0.001	0.0001	0.001	0.05	0.0001	0.014	0.001	25	92	12.5			
21-Jul-11	Event	Mod Flow	7.1	504	268	21	60.4	76	74	1.42	0.5	0.07	11	15	0.001	0.001	0.0001	0.001	0.05	0.0001	0.018	0.001	43		12.3			
21-Aug-11	Event	Mod-Low Flow	6.8	487	334	32	88.9	72	74	1.78	0.8	0.17	11	15	0.001	0.001	0.0001	0.001	0.05	0.0001	0.033	0.002	41	131	11.9			
30-Sep-11	Routine	Low Flow	7.9	758			6.48																	119	20.9			
3-Oct-11	Event	Mod Flow	6.5	402			77.9																	128	15.1			
7/06/2011	Aquatic WQ study		6.64	324																			49		12.3	9.57	87.9	45.9

W6
Upstream of Mine on Avondale Creek
(Parkers Road - SCPL)

Notes:
conc taken as MDL
values reported in 1994 EIS

DATE	EVENT	Flow Rate	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP (mg/L)	Temp °C
4-May-94			6.5	1230	620	3		342	1	0.26	2	1	25.9	33.1	0.01	0.002	0.01	0.01	0.03	0.02	0.11	0.01			
10-May-94			6.6	990	636			272	19	0.3															
16-May-94			6.6	1280	710			350	17	0.33															
23-May-94			6.5	1400	750			381	17	0.04															
2-Jun-94			6.5	1700	1030	15		629	14	0.07	2	1	18.7	34.6	0.01	0.002	0.01	0.01	0.01	0.07	0.46	0.01			
16-Jun-94			6.8	1730	870			720	7	0.11															
3-Jan-95			5.4	860	570	140		240	1	0.01		0.5	11	23											
31-Jan-95			7.5	840	970	6		460	1	1.5	3.6	0.43	34	46											
6-Mar-95			6.3	260	260	200		65	1	1.2	7.2	0.58	4	7.4											
3-Apr-95			6.2	2000	1200			590	1	0.38															
3-May-95			7.2	1500	970			440	1	0.14															
3-Jun-95			6.1	1200	640	70			23	0.09															
3-Jul-95			6.2	1200	610	55			19	0.27															
1-Aug-95			6.1	2300	1200	15			26	0.04															
18-Aug-95			#N/A	5200																					
26-Sep-95			5.8	4470																					
20-Nov-95			#N/A	230				70	21	2.3			7.1	12											
20-Nov-95			5.1	720		490		21	210	0.17			12	16											
21-Nov-95			5.5	840		190		240	1	0.26			11	20						(mg/L)					
21-Nov-95			6.4	722																					
22-Nov-95			6.0	430		230		110	3	0.76	3.9	3.1	5.2	9.6	0.01	0.005	0.01	0.01	0.04	0.001	0.61	0.01			
23-Nov-95			5.7	450		140		120	1	0.75			5.2	9.7											
6-Dec-95			6.3	420	320	160		110	**1**	0.99			7.1	13											
11-Dec-95			6.5	300	240	76		77	**1**	1.1			5.1	8.8											
8-Jan-96			6.4	500	340	120		150	2	1.2			6.9	12											
11-Jan-96			6.2	470	320	310		140	1	1.1			6.8	13											
23-Jan-96			5.9	860	440	96		240	1	0.8			13	23											
24-Jan-96			6.1	340	270	64		88	4	1.7			4.6	8.1											
16-Feb-96			6.8	720	520	23		190																	
20-Feb-96			6.7	770	510	26		190	1		4.4	0.24	16	20	0.005	0.007	0.005	0.005	0.03	0.0002	0.33	0.01			
1-Mar-96			6.3	930	420	17		260																	
3-May-96			5.6	1300	650	39		320	17	0.16			24	39											
4-May-96			5.6	1100	590	220		250	15	0.33			17	29											
6-May-96			5.8	730	440	210		170	2	0.47			12	22											
6-May-96			#N/A	350																					
6-May-96			6.2	220	70	170		43	1	0.7			3.4	5.4											
7-May-96			6.3	220	200	83		43																	
15-May-96			6.0	840	430	120		200	4	0.43	3.6	0.23	15	25	0.005	0.003	0.005	0.005	0.03	0.0002	0.4	0.005			
11-Jun-96			5.6	1900	970	14		580	1	0.02			29	58											
12-Jun-96			#N/A	1700																					
14-Jun-96			#N/A	1700																					
17-Jun-96			6.0	590	310	58		160	2	0.77			7.5	15											
19-Jun-96			6.0	860	450	73		240	7	0.71			11	22											
30-Aug-96			5.4	1400	710	110		150	1	0.13			24	46											
31-Aug-96			6.7	260	200	65		79	1	0.72			4	6											
2-Sep-96			6.1	610	350	86		180	1	0.64			10	17											
7-Oct-96			6.0	2030	1040	44		610	22	0.06			30	57											
6-Nov-96			5.8	2300	1100	22		690																	
8-Nov-96			6.1	2400	1300	9		730	24	0.4			39	66											
24-Nov-96			6.3	200	170	100		52	2	1.1			3.1	4.7											
25-Nov-96			6.3	240	190	71		62	4	1.1	26	0.3	4.2	5.8	0.01	0.001	0.01	0.01	0.03	0.0002	0.02	0.01			
26-Nov-96			6.5	340																					
6-Dec-96			6.6	1400	810	50		410	**1**	0.07			27	49											
9-Dec-96			6.6	1200	720	40		350	**8**	0.37			22	35											
30-Jan-97			6.1	1700	940	36		500	26	0.21			27	43											
31-Jan-97			6.0	930	570	130		270	12	0.4			16	26											
12-Feb-97			6.0	850	430	220		240	1	0.23			14	21											
14-Feb-97			6.4	1200	650	110		320	11	0.33			20	28											
6-Mar-97			6.6	160	140	130		39	1	0.96			4.3	5.4											
13-May-97			5.9	260	230	61		75	11	0.38			3.8	4.8											

Notes:
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values reported in 1994 EIS

DATE	EVENT	Flow Rate	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP (mg/L)	Temp °C
14-May-97			6.2	360	220	120		75	12	0.49			4.7	5.9											
16-Jun-97			6.5	93	76	180		25	3	0.54			1.9	2.2											
25-Jul-97			6.4	1300	690	35	9	380	14	0.03			22	32											
22-Sep-97			5.6	3700	2100	11	12	1100	36	0.22															
25-Sep-97			5.7	420	280	58	46	110	9.9	0.51															
7-Oct-97			6.0	1600	750	22	22	460	17	0.11															
8-Oct-97			6.1	350	170	78	70	87	6	0.5															
23-Oct-97		No flow	#N/A																						
24-Nov-97		No flow	#N/A																						
22-Dec-97		No flow	#N/A																						
6-Jan-98		No flow	#N/A																						
7-Jan-98		No flow	#N/A																						
10-Jan-98		No flow	#N/A																						
11-Jan-98		No flow	#N/A																						
20-Jan-98		No flow	#N/A																					8:05am	
27-Jan-98		No flow	#N/A																						
28-Jan-98		No flow	#N/A																						
9-Feb-98			6.6	800	410	150	130	190	6	1.1															
10-Feb-98			6.5	1000	570	78	51	280	8	0.68															
19-Feb-98		No flow	#N/A																						
20-Mar-98		No flow	#N/A																						
21-Apr-98		No flow	#N/A																						
3-May-98			5.4	1000	550	150	130	280	14	0.29															
20-May-98			6.4	200	140	130	110	68	12	0.89															
17-Jun-98			6.7	700	440	220	160	220	11	0.32															
23-Jun-98			6.7	300	250	110	78	83	8	0.76															
24-Jun-98			6.8	200	260	40	120	51	10	1.6															
15-Jul-98	Routine		7.2	750		34	44			0.76															
12-Aug-98	Routine		7.1	300		86	84			1.5															
14-Sep-98	Routine		6.8	300		80	77	77	5	2.2															
14-Oct-98	Routine	No flow	#N/A																						
11-Nov-98	Routine	No flow	#N/A																						
18-Nov-98	Flow		6.5	280		490	280	80	4	0.4															
19-Nov-98	Flow		6.3	165		68	84	37	6	1.3															
24-Nov-98	Flow		6.2	140		63	61	27	4	1.6															
25-Nov-98	Flow		5.8	225		52		47	7	1.5															
10-Dec-98	Routine	No flow	#N/A								1.8	0.05													
31-Dec-98	**Accident**	**No flow**	#N/A																						
1-Jan-99	**Accident**	**No flow**	#N/A																						
7-Jan-99	Routine	No flow	#N/A																						
10-Jan-99	Flow	No flow	#N/A																						
11-Jan-99	Flow	No flow	#N/A																						
21-Jan-99	Flow	No flow	#N/A																						
22-Jan-99	Flow		#N/A	290		78		67	8	0.77															
23-Jan-99	Flow		#N/A	261		110		80	9	0.95															
28-Jan-99	Flow	No flow	#N/A																						
29-Jan-99	Flow		#N/A	380		78		87	8	1.3															
25-Feb-99	Routine	No flow	#N/A																						
30-Mar-99	Routine	No flow	#N/A																						
29-Apr-99	Routine	No flow	#N/A																						
31-May-99	Routine	No flow	#N/A																						
28-Jun-99	Routine		6.5	370		47	51	120	5	1.6															
14-Jul-99	Flow		6.3	138		56	73	26	2	0.81															
15-Jul-99	Flow		6.7	230		40	53	27	2	0.58															
10-Aug-99	Spot		6.9	1170																					
26-Aug-99	Routine	No flow	#N/A																						
28-Sep-99	Flow		7.2	1540		24	5	450	13	0.33															
29-Sep-99	Flow		7.5	1305		10	9	370	6	0.64															
20-Oct-99	Routine		7.2	1410		20	15	400	4	0.27															
25-Oct-99	Flow		6.5	265		84	67	67	2	1.9															
26-Oct-99	Flow		6.3	355		81	60	91	3	2.3															
9-Nov-99	Flow		8.2	360		74	86	110	2	1.5															
10-Nov-99	Flow		7.6	230		56	54	71	2	2															
16-Nov-99	Flow		7.4	620		120	90	180	1	1.1															
17-Nov-99	Flow		6.4	385		36	36	110	2	1.4															

Notes:
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values reported in 1994 EIS

DATE	EVENT	Flow Rate	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP (mg/L)	Temp °C
29-Nov-99	Flow		6.3	460		24	19	120	2	1.2															
30-Nov-99	Flow		7.1	490		16	9		1	1															
21-Dec-99	Routine		7.0	925		45	43	270	6	0.21															
19-Jan-00	Routine		7.5	475		37	24	140	5.4	0.59															
28-Feb-00	Routine	No flow	#N/A																						
8-Mar-00	Flow		5.9	880		26	22	270	36	0.7															
9-Mar-00	Flow		6.6	1525		54	35	490	37	0.17															
22-Mar-00	Flow		6.4	75		54	66	17	1	0.7															
23-Mar-00	Flow		5.8	120		34	43	30	15	1.2															
3-Apr-00	Flow		6.4	440		44	29	110	13	2.2															
4-Apr-00	Flow		6.9	590		68	23	140	17	16															
24-May-00	Routine		6.3	645		9	11	190	1.4	0.02															
14-Jun-00	Routine		5.5	2710		4	3	980	43	0.08															
11-Jul-00	Flow		6.7	365		50	49	120	5.8	0.4															
12-Jul-00	Flow		6.9	490		36	40	160	8.5	0.52															
29-Aug-00	Routine		8.2	3820		7	14	720	1300	0.02															
20-Sep-00	Routine	No flow	#N/A																						
30-Oct-00	Routine	No flow	#N/A																						
14-Nov-00	Flow		6.4	1110		54	37	400	28	0.33															
15-Nov-00	Flow		6.2	830		54	36	320	26	0.86															
20-Nov-00	Flow		6.2	315		45	53	94	16	1.5															
21-Nov-00	Flow		6.4	340		40	58	100	14	1.7															
8-Dec-00	Flow		6.5	425		52	63	124	6	2.3															
9-Dec-00	Flow		6.4	490		19	29	110	4	5															
30-Jan-01	Routine	No flow	#N/A																						
31-Jan-01	Flow	No flow	#N/A																						
1-Feb-01	Flow		7.6	2480		28	23	377	555	0.07															
2-Feb-01	Flow		6.1	1455		22	34	445	26	1.1															
21-Feb-01	Flow		6.3	1215		36	75	364	15	1.5															
22-Feb-01	Flow		5.9	640		37	70	175	8	3.4															
1-Mar-01	Flow		6.3	435		94	125	117	3	2.4															
2-Mar-01	Flow		6.6	190		32	65	40	9	3.7															
7-Mar-01	Flow		6.4	150		26	40	33	6	2.5															
8-Mar-01	Flow		6.8	105		58	68	26	3	1.3															
9-Mar-01	Flow		6.7	105		22	40	15	6	1.7															
26-Mar-01	Flow		6.5	133		35	66	30	3	3.2															
27-Mar-01	Flow		6.7	76		9	48	37	3	4.2															
23-Apr-01	Flow		6.4	1170		19	30	430	8	0.6															
24-Apr-01	Flow		6.7	1799		11	18	555	10	0.2															
7-May-01	Flow		6.4	83		48	88	15	1	1.9															
8-May-01	Flow		6.6	89		120	125	14	2	1.6															
9-May-01	Flow		6.4	134		31	93	25	2	3.3															
21-May-01	Flow		6.9	234		54	90	50	4	2.2															
22-May-01	Flow		7.1	295		29	68	70	9	3.4															
26-Jun-01	Routine	No flow	#N/A																						
30-Jul-01	Routine		7.0	325		27	78	76	9	3.5															
30-Aug-01	Routine	No flow	#N/A																						
26-Sep-01	Routine	No flow	#N/A																						
30-Oct-01	Routine	No flow	#N/A																						
20-Nov-01	Flow	No flow	#N/A																						
21-Nov-01	Flow		6.8	3890		2	8	1200	95	0.12															
18-Dec-01	Routine	No flow	#N/A																						
30-Jan-02	Routine	No flow	#N/A																						
1-Feb-02	Flow	No flow	#N/A																						
2-Feb-02	Flow		6.5	1850		16	30	660	48	0.3															
5-Feb-02	Flow		6.0	246		71	68	35	8	0.4															
6-Feb-02	Flow		5.9	155		48	42	30	6	1.8															
7-Feb-02	Flow		6.0	205		18	41	48	14	0.9															
20-Mar-02	Routine	No flow	#N/A																						
30-Mar-02	Flow		6.5	915		246	250	248	26	5.8															
31-Mar-02	Flow		7.4	250		39	65	50	14	3.5															
29-Apr-02	Routine		6.5	825		125	25	277	23	1.2															
29-May-02	Routine		7.0	2770		14	9	838	26	0.2															
5-Jun-02	Spot		#N/A	1300																					
5-Jun-02	Spot		#N/A	770																					

Notes:
conc taken as MDL
values reported in 1994 EIS

DATE	EVENT	Flow Rate	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP (mg/L)	Temp °C
25-Jun-02	Routine		6.5	960		19	88	270	9	1.2															
29-Jul-02	Routine	No flow	#N/A																						
27-Aug-02	Routine	No flow	#N/A																						
27-Sep-02	Routine	No flow	#N/A																						
27-Oct-02	Routine	No flow	#N/A																						
27-Nov-02	Routine	No flow	#N/A																						
11-Dec-02	Routine; >25mm		6.8	435	335	671	297	130	13	3.2	3	0.27	7	12	0.05	0.003	0.0009	0.01	0.06	0.001	0.2	0.005	6		
12-Dec-02	>25mm		6.7	512	484	55	94	160	18	1.8	3.5	1.6	9	14	0.02	0.002	0.0006	0.01	0.09	0.001	0.31	0.006	13		
31-Jan-03	Routine	No flow	#N/A																						
22-Feb-03	Routine/>25mm	No flow	#N/A																						
23-Feb-03	Routine/>25mm	No flow	#N/A																						
31-Mar-03	Routine	No flow	#N/A																						
29-Apr-03	Routine/>20mm		6.8	547	460	142	220	140	10	1.12	3.9	0.3	8	12	0.01	0.001	0.0002	0.02	0.02	0.0003	0.07	0.005	17		
16-May-03	>25mm		6.8	288		71	64	56	5	0.9															
17-May-03	>25mm		6.9	315		73	94	67	6	1.6															
26-May-03	>25mm		7.1	122	230	424	200	39	11	0.4	2.8	0.1	2	3	0.01	0.002	0.0002	0.01	0.06	0.0002	0.04	0.005	6		
27-May-03	>25mm		7.0	92		57	75	19	4	0.5															
28-May-03	>25mm	ND	#N/A			27	ND	34	5	0.8															
27-Jun-03	Routine		7.6	550		15	13	181	9	1.2															
31-Jul-03	Routine		7.4	1050		7	6.3	310	6	1.4															
28-Aug-03	Routine		7.6	1200	654	19	4	280	6	0.8	2.5	0.1	20	29	0.03	0.004	0.0002	0.01	0.02	0.0002	0.58	0.005	32		
24-Sep-03	Routine	No flow	#N/A																						
31-Oct-03	Routine	No flow	#N/A																						
28-Nov-03	Routine	No flow	#N/A																						
6-Dec-03	>20mm		6.5	990	820	85	112	357	39	1.61	2.13	0.06	20	28	0.01	0.005	0.0002	0.01	0.05	0.0002	0.72	0.013	21		
17-Jan-04	>20mm		7.0	620	732	262	374	258	28	0.77	1.5	0.06	11	18	0.03	0.001	0.0002	0.01	0.03	0.0002	0.33	0.01	8		
25-Feb-04	>20mm		7.1	200	222	100	32	55	14	0.47	1.2	0.1	1.9	3.3	0.01	0.001	0.0002	0.01	0.04	0.0002	0.06	0.005	4.2		
22-Mar-04	>20mm		6.9	200	258	76	115	65	7.1	1.73	2.1	0.14	4.5	6.3	0.01	0.001	0.0002	0.01	0.04	0.0002	0.01	0.005	21		
30-Apr-04	Routine		7.5	560	340	37	5.4	120	5	1.3	2.9	0.11	9	14	0.01	0.001	0.0002	0.01	0.02	0.0002	0.07	0.005	48		
31-May-04	Routine	No flow	#N/A																						
30-Jun-04	Routine	No flow	#N/A																						
27-Jul-04	>20mm	No flow	#N/A																						
20-Aug-04	>20mm		6.9	1600	840	35	66	430	29	0.95	0.8	0.06	22	33	0.01	0.001	0.0002	0.02	0.02	0.0002	0.77	0.005	10		
30-Sep-04	>20mm	No flow	#N/A																						
19-Oct-04	>20mm		7.1	400	252	365	190	87	13	4.8	0.8	0.06	5	8	0.02	0.001	0.001	0.02	0.06	0.0002	0.04	0.007	<5		
30-Nov-04	Routine	No flow	#N/A																						
22-Dec-04	Routine	No flow	#N/A																						
17-Jan-05	>20mm	No flow	#N/A																						
10-Feb-05	>20mm		6.9	700	380	110	181	210	14	2.9	1.1	0.19	12	16	0.03	0.002	0.001	0.02	0.03	0.0001	0.28	0.01	48		
21-Feb-05	>20m/Routine		7.4	200	250	170	210	40	7	1.99	1.4	0.27	3	4.7	0.02	0.001	0.001	0.01	0.04	0.0001	0.06	0.02	8		
18-Mar-05	>20mm		7.4	200	242	166	143	59.6	6	2.79	2.38	0.24	2.1	3.5	0.03	0.0006	0.0001	0.01	0.01	0.0001	0.01	0.0001	80		
29-Apr-05	Routine	No flow	#N/A																						
13-May-05	>20mm	No flow	#N/A																						
31-May-05	Routine		7.2	500	350	55	57	680	90	0.32	3.4	0.06	62	66	0.15	0.0013	0.02	0.01	0.01	0.0005	0.02	0.2	28		
24-Jun-05	>20mm		7.6	500	330	73	50	130	1	1.2	0.5	0.53	7.8	12	0.01	0.0006	0.001	0.01	0.02	0.0005	0.07	0.005	20		
29-Jul-05	Routine		7.6	900	460	6.7	20	190	6	0.39	0.9	0.06	15	23	0.05	0.005	0.002	0.01	0.01	0.0005	0.01	0.005	60		
30-Aug-05	Routine		8.1	500	5800	25	8	2500	140	0.02	0.8	0.06	220	216	0.01	0.0005	0.001	0.01	0.03	0.0005	3.2	0.014	106		
5-Sep-05	>20mm	No flow	#N/A																						
17-Oct-05	>20mm	No flow	#N/A																						
28-Nov-05	>20mm		7.3	200	200	34	55	52	5.4	2.3	3.4	0.27	3.3	4.7	0.02	0.0005	0.00002	0.02	0.03	0.0005	0.01	0.0002	24		
29-Dec-05	Routine	No Flow	#N/A																						
31-Jan-06	Routine	No Flow	#N/A																						
27-Feb-06	Routine	No Flow	#N/A																						
28-Feb-06	>20mm	No Flow	#N/A																						
31-Mar-06	Routine	No Flow	#N/A																						
14-Apr-06	Routine	No Flow	#N/A																						
31-May-06	Routine	No Flow	#N/A																						
29-Jun-06	Routine	No Flow	#N/A																						
17-Jul-06	Routine	No Flow	#N/A																						
31-Aug-06	Routine		7.8	400	280	75	155	200	15	4.7	1.2	0.06	3.4	6.8	0.03	0.0011	0.001	0.01	0.01	0.0005	0.02	0.004	20		
10-Sep-06	>20mm		7.5	200	148	300	120	170	12	1.1	1.4	0.31	4	5.9	0.02	0.0013	0.001	0.07	0.09	0.0005	0.03	0.004	20		
30-Oct-06	Routine	No Flow	#N/A																						
6-Nov-06	>20mm	No flow	#N/A																						

Notes:
conc taken as MDL
values reported in 1994 EIS

DATE	EVENT	Flow Rate	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP (mg/L)	Temp °C
30-Nov-06	Routine	No flow	#N/A																						
29-Dec-06	Routine	No flow	#N/A																						
31-Jan-07	Routine	No flow	#N/A																						
26-Feb-07	>20mm	No flow	#N/A																						
28-Feb-07	Routine	No flow	#N/A																						
26-Mar-07	>20mm	No flow	#N/A																						
30-Apr-07	Routine	No flow	#N/A																						
10-May-07	>20mm	No flow	#N/A																						
8-Jun-07	>20mm		7.3	120	100	57	184	248	3.9	2	1.2	7.1	1.4	2	0.01	0.05	0.001	0.01	0.01	0.01	0.01	0.01	2		
10-Jul-07	>20mm		6.8	350	260	39	72	70	8.7	2.5	1.7	0.4	5	8.3	0.1	0.01	0.1	0.1	0.1	0.01	0.1	0.1	5		
20-Aug-07	>20mm		7.2	250	314	178	133	85	7.2	1.6	2.54	0.1	4.1	6.5	0.02	0.01	0.01	0.01	0.03	0.01	0.09	0.01	7.2		
28-Sep-07	Routine	No flow	#N/A																						
26-Oct-07	>20mm	No flow	#N/A																						
24-Nov-07	>20mm		8.2	280	198	21	92	88	6.4	1.04	1.2	0.03	3	6	0.001	0.001	0.0001	0.001	0.05	0.0001	0.005	0.001	11		
17-Dec-07	>20mm		7.2	280	125	18	26	47	5	1.93	0.4	0.39	2	4	0.001	0.001	0.0001	0.001	0.05	0.0001	0.2	0.001	13		
17-Jan-08	>20mm		7.6	220	110	20	50	38	4	1.2	0.8	0.01	2	5	0.001	0.001	0.0001	0.001	0.05	0.0001	0.052	0.001	32		
29-Feb-08	>20mm		7.6	300	228	9	20	94	3	1.79	1	0.01	3	5	0.001	0.001	0.0001	0.001	0.05	0.0001	0.048	0.0001	22		
25-Mar-08	>20mm		7.1	290	260	20	15	114.6	8	0.28	0.5	0.14	4	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.064	0.0001	8.5		
22-Apr-08	>20mm		7.0	140	190	36	70	31	4	1.05	1.5	0.4	2	3	0.005	0.002	0.0001	0.001	0.05	0.0001	0.012	0.001	22		
29-May-08	Routine		6.7	570	290	10	15	142	2	0.55	0.1	0.01	8	11	0.002	0.001	0.0001	0.001	0.05	0.0001	0.064	0.001	24		
4-Jun-08	>20mm		6.3	460	130	44	58	109	10	0.38	0.7	0.08	5	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.178	0.001	8		
30-Jul-08	Routine		7.1	1550	940	46	4	471	21	0.05	0.3	0.04	31	38	0.004	0.001	0.0001	0.001	0.05	0.0001	0.312	0.002	11		
29-Aug-08	Routine		8.1	540	374	6	8	98	32	0.12	0.5	0.01	14	17	0.001	0.001	0.0001	0.001	0.05	0.0001	0.012	0.001	113		
5-Sep-08	>20mm		7.6	500	300	3	10	99	38	0.26	0.6	0.04	10	14	0.001	0.001	0.0001	0.001	0.05	0.0001	0.005	0.001	83		
31-Oct-08	Routine		7.6	620	600	11	6	94	24	0.26	0.8	0.04	14	18	0.001	0.001	0.0001	0.001	0.05	0.0001	0.017	0.001	107		
19-Nov-08	>20mm		7.4	650	380	7	9	119	22	0.32	0.6	0.01	12	18	0.003	0.001	0.0001	0.001	0.05	0.0001	0.027	0.001	118		
13-Dec-08	>20mm		7.5	440	324	24	12	107	28	0.53	1.1	0.02	6	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.019	0.001	36		
28-Jan-09	Routine		#N/A																						
13-Feb-09	>20mm		#N/A																						
19-Feb-09	routine		6.5	180			56	28	5	0.74		0.03	2	3							0.024	0.001			
23-Feb-09	>20mm		5.9	140			286	25	5	0.89		0.05	3	3							0.036	0.001			
24-Mar-09	Routine		7.6	380	230	20	33.9	84	10	5.61	1.4	0.14	8	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.248	0.001	62		
1-Apr-09	>20mm		6.4	179	150	10	28.8	34	5	1	1	0.05	2	3	0.001	0.001	0.0001	0.001	0.05	0.0001	0.013	0.001	5		
21-May-09	>20mm		7.1	513	234	6.8	14.3	119	10	0.48	0.7	0.02	6	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.034	0.001	12	143	
23-Jun-09	>20mm		6.6	157	102	3	48.3	35	9	0.57	0.6	0.08	2	3	0.001	0.001	0.001	0.001	0.05	0.0001	0.017	0.001	10	213	
31-Jul-09	Routine		7.4	565	414	7	13	194	18.2	0.1	0.3	0.01	9	14	0.001	0.001	0.0001	0.001	0.05	0.0001	0.044	0.001	3	127	9
31-Aug-09	Routine		#N/A																						
30-Sep-09	Routine		#N/A																						
6-Oct-09	>20mm		7.3	1902	890	10	132	532	88.7	0.05	1.6	0.03	30	47	0.001	0.001	0.0001	0.002	0.05	0.0001	0.89	0.001	<1	132	
27-Oct-09	>20mm		7.5	1033	540	14	20.9	287	30.4	0.25	4.9	0.31	20	21	0.002	0.001	0.0003	0.001	0.05	0.0001	0.47	0.001	33		
30-Nov-09	Routine		#N/A																						
27-Dec-09	>20mm		#N/A																						
7-Jan-10			5.8	332	290	24	28.5	74.3	6.57	1.37	1.9	0.25	7	8	0.001	0.002	0.0001	0.001	0.05	0.0001	0.134	0.001	37		
29-Jan-10	>20mm		7.1	476	280	33	41.3	88	190	0.8	1.4	0.07		14	0.001	0.002	0.001	0.001	0.05	0.0001	0.137	0.001	28		31.3
26-Feb-10	Routine		6.3	415	330	45	137	78.7	0.99	2.71	2.1	0.09	10	15	0.001	0.003	0.0001	0.001	0.05	0.0001	0.514	0.002	65		
15-Mar-10	>20mm		6.8	415	366	66	25.9	121	8.26	1.19	1.2	0.08	6	9	0.001	0.001	0.0001	0.001	0.05	0.0001	0.059	0.001	24	275	18.4
28-Apr-10	Routine		#N/A																						
31-May-10	Routine		#N/A																						
4-Jun-10	>20mm		6.2	445	244	12	38.4	104	25.9	0.35	1.4	0.03	5	8	0.001	0.001	0.0001	0.001	0.05	0.0001	0.09	0.001	14	209	16.2
30-Jul-10	Routine		6.6	472	358	12	43.8	117	18	0.79	1.5	0.28	4	8	0.001	0.001	0.001	0.001	0.05	0.0001	0.046	0.001	7	204	12.5
4-Aug-10	>20mm		6.3	184.2	208	14	56.3	35	8	0.86	1.3	0.08	2	3	0.001	0.001	0.0001	0.001	0.05	0.0001	0.018	0.001	5	136	13.5
30-Sep-10	Routine		#N/A																						
4-Oct-10	>20mm		7.3	441	354	10	28.2	131	60	0.36	0.04	0.22	9	14	0.001	0.001	0.0001	0.001	0.05	0.0001	0.061	0.001	33	129	20.2
6-Nov-10	>20mm		6.6	428	26	300	32.9	116	18	0.68	1.2	0.01	5	10	0.001	0.001	0.0001	0.001	0.05	0.0001	0.07	0.001	14	143	16.8
2-Dec-10	>20mm		6.2	122.9			67.9																	190	25.3
6-Jan-11	Routine		#N/A																						
14-Feb-11	Routine		#N/A																						
21-Feb-11	Event		#N/A																						
22-Mar-11	Event		5.4	159			55																	125	26.4
17-Apr-11	Event		6.7	199	246	14	33	42	2	1.22	0.6	0.05	2	4	0.002	0.001	0.0001	0.001	0.05	0.0001	0.025	0.001	10	106	
31-May-11	Event		7.5	80	164	138	232	11	1	3.72	0.9	0.06	1	1	0.003	0.001	0.0001	0.002	0.05	0.0001	0.056	0.003	8	74	13.7
16-Jun-11			6.4	66	149	33	109	10	5	2.05	0.1	0.17	1	2	0.002	0.001	0.0001	0.001	0.05	0.0001	0.018	0.002	5	179	14.6

Notes:
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DATE	EVENT	Flow Rate	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP (mg/L)	Temp °C
30-Jun-11	Routine		6.7	389	304	5	13	72	16	0.56	0.5	0.01	7	10	0.002	0.001	0.0006	0.001	0.05	0.0001	0.007	0.001	45	144	13.3
21-Jul-11	Event		7.0	256	165	7	29	42	20	0.75	0.7	0.06	4	6	0.001	0.001	0.0002	0.001	0.05	0.0001	0.009	0.001	28		13
21-Aug-11	Event		6.8	500	266	5	14	116	25	0.47	0.9	0.24	8	12	0.001	0.001	0.0001	0.001	0.05	0.0001	0.018	0.001	40	103	12.3
30-Sep-11	Routine		6.9	712			7																	67	16.5
3-Oct-11	Event		6.4	314			26																	116	16.2

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Notes:
conc taken as MDL

DATE	Flow	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C	DO (mg/L)	DO (% sat)	Turbidity (NTU)
23-May-95		#N/A	290		220																						
29-May-95		#N/A	690		150																						
26-Sep-95		#N/A	490																								
20-Nov-95		#N/A	220		320		56	1	0.92			3	4														
21-Nov-95		#N/A	1300	870	32		370	34	0.07			24	32	0.01		0.01	0.01			14	0.01						
21-Nov-95		#N/A	860																								
22-Nov-95		#N/A	580		260		150	18	0.11	4	0.18	6.8	11	0.02	0.005	0.01	0.01	0.02	0.001	1.6	0.01						
23-Nov-95		#N/A	370		240		91	13	0.69			4.4	7.3														
30-Nov-95		#N/A	360	230	230		96																				
1-Dec-95		#N/A	290	150	570		110																				
1-Dec-95		#N/A	280	190	420		74																				
6-Dec-95		#N/A	400	270	180			**11**	0.53			6.3	11	0.01		0.01	0.01			0.05	0.01						
11-Dec-95		#N/A	350	260	280		95	**1**	0.7			5	8.9														
7-Jan-96		#N/A	580	300	110		160	1	0.5			8.1	13														
8-Jan-96		#N/A		570	42		270	22	0.25			14	24														
9-Jan-96		#N/A	660	450	92		200																				
11-Jan-96		#N/A		320	180		140	8	0.97			7	12														
12-Jan-96		#N/A	310	250	130		87																				
23-Jan-96		#N/A	560	340	38		150	3	0.7			8.1	15														
24-Jan-96		#N/A	540	300	190		140	18	0.9			6.8	13														
16-Feb-96		#N/A	790	520	24		220																				
20-Feb-96		#N/A	860	450	3		240	15	0.17			13	23														
1-Mar-96		#N/A	1100	500	8		310																				
4-May-96		#N/A	1300	690	52		290	30	0.22			22	33														
6-May-96		#N/A	1200	600	7		280	31	0.11			21	30														
6-May-96		#N/A	630																								
6-May-96		#N/A	600	330	220		130	30	0.17			21	16														
7-May-96		#N/A	220	170	170		47																				
15-May-96		#N/A	590	290	180		130	21	0.39			8.9	13														
11-Jun-96		#N/A	1250																								
17-Jun-96		#N/A	1300	680	34		370	24	0.17			19	34														
19-Jun-96		#N/A	750	350	82		210	22	0.46			9	17														
30-Aug-96		#N/A	1040	600	86		310	21	0.17			18	26														
31-Aug-96		#N/A	420	230	72		110	2	0.55			5	9														
2-Sep-96		#N/A	520	310	72		160	13	0.63			7	12														
7-Oct-96		#N/A	1700	950	22		520	18	0.41			28	47														
8-Oct-96		#N/A	1400	740	19		410																				
6-Nov-96		#N/A	1800	950	11		530																				
8-Nov-96		#N/A	1700	920	8		490	38	0.08			29	48														
12-Nov-96		#N/A	2100																								
24-Nov-96		#N/A	210	180	66		57	1	0.71			2.6	4														
25-Nov-96		#N/A	280	180	70		74	2	1.1			3.7	5.9														
26-Nov-96		#N/A	350																								
6-Dec-96		#N/A	610	380	320		170	**26**	0.47			9.4	15														
9-Dec-96		#N/A	930	490	98		260																				
30-Jan-97		#N/A	1300	730	71		380	54	0.12			24	36														
31-Jan-97		#N/A	1010	540	200		280	33	0.19			16	25														
12-Feb-97		#N/A	370	230	6400		100	8	1.1			13	23														
13-Feb-97		#N/A	720	440	350		200	26	0.32			9.8	14														
14-Feb-97		#N/A	830	470	76		220	43	0.28			13	18														
6-Mar-97		#N/A	450	240	120		110	21	0.53			7.9	13														
12-May-97		#N/A	300	210	38		85	16	0.26			4.4	6.4														
13-May-97		#N/A	340	220	81		75	42	0.18			6	8.3														
14-May-97		#N/A	410	250	62		90	53	0.39			7.1	10														
16-Jun-97		#N/A	200	140	280		50	8	0.36			3.2	4.6														
17-Jun-97		#N/A	240	150	85		45	25	0.45			4.7	5.7														
1-Jul-97		#N/A	870																								
11-Jul-97		#N/A	800																								
25-Jul-97		#N/A	1100	570	15	7	280	89	0.07			22	30														
25-Sep-97		#N/A	1800	970	19	19	510	33	0.04																		
7-Oct-97		#N/A	1200	560	8	12	330	20	0.14																		
8-Oct-97		#N/A	1000	500	38	38	280	15	0.14																		
23-Oct-97		#N/A																									
24-Nov-97		#N/A																									
22-Dec-97		#N/A																									
6-Jan-98		#N/A																									
7-Jan-98		#N/A																									
10-Jan-98		#N/A																									
11-Jan-98		#N/A																									
20-Jan-98		#N/A																									
27-Jan-98		#N/A	1300	620	23	17	330	32	0.14																		

Notes:
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DATE		Flow	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp	DO	DO	Turbidity
				(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C	(mg/L)	(% sat)	(NTU)
28-Jan-98			#N/A	1400	650	10	9	340	31	0.27																		
9-Feb-98			#N/A	800	400	300	280	210	10	0.44																		
10-Feb-98			#N/A	1000	550	99	71	280	9	0.73																		
19-Feb-98			#N/A	1350	700	62	41	380	1	1.8																		
20-May-98			#N/A	400	240	120	100	94	36	0.73																		
17-Jun-98			#N/A	1200	760	6	5	250	240	0.09																		
23-Jun-98			#N/A	730	430	80	61	200	31	0.42																		
24-Jun-98			#N/A	420	310	64	56	110	31	0.96																		
15-Jul-98			#N/A	900																								
1-Feb-99			#N/A	860		12	5																					
25-Feb-99			6.8	990																								
30-Mar-99			#N/A																									
29-Apr-99			7.0	837																								
31-May-99			6.9	1386																								
28-Jun-99			6.8	500																								
14-Jul-99			7.2	690																								
15-Jul-99			6.8	175																								
11-Aug-99			7.0	1190																								
26-Aug-99			7.1	1270																								
28-Sep-99			7.3	878																								
20-Oct-99			7.0	830			50																					
25-Oct-99			6.7	345			51																					
9-Nov-99			7.5	360			47																					
10-Nov-99			7.9	345																								
16-Nov-99			7.9	570			19																					
17-Nov-99			7.5	560			20																					
29-Nov-99			7.3	460			14																					
30-Nov-99			7.3	500																								
21-Dec-99			7.1	830			4																					
19-Jan-00			7.4	585			3																					
28-Feb-00			#N/A																									
8-Mar-00			5.9	325			300																					
9-Mar-00			5.3	2220			7																					
22-Mar-00			5.9	110		60	295																					
3-Apr-00			6.8	355			16																					
4-Apr-00			6.7	580																								
24-May-00			6.5	850			3																					
14-Jun-00			7.1	1490			3																					
11-Jul-00			6.9	845			19																					
12-Jul-00			7.2	530			21																					
29-Aug-00			6.8	1170			4																					
20-Sep-00			#N/A																									
30-Oct-00			#N/A																									
14-Nov-00			5.9	885			17																					
15-Nov-00			6.1	990			10																					
20-Nov-00			6.5	460			53																					
21-Nov-00			6.4	440			54																					
8-Dec-00			6.7	660			31																					
30-Jan-01			#N/A																									
31-Jan-01			#N/A																									
1-Feb-01			6.8	1710			23																					
2-Feb-01			#N/A																									
21-Feb-01			6.4	1060			105																					
22-Feb-01			#N/A																									
1-Mar-01			6.6	445			103																					
7-Mar-01			6.5	157			70																					
26-Mar-01			7.0	198			155																					
23-Apr-01			7.5	1025			6																					
7-May-01			6.4				136																					
8-May-01			8.0	80			80	Main flow																				
8-May-01			6.9	210		1040	665	27	14	5.3	Eastern edge of flow																	
21-May-01			6.9	560			56																					
26-Jun-01			8.2	1770			6																					
30-Aug-01		trickle flow only	7.8	1120																								
26-Sep-01		No flow	#N/A																									
30-Oct-01		No flow	#N/A																									
20-Nov-01			6.7	2100			5																					
18-Dec-01		No flow	#N/A																									
30-Jan-02		No flow	#N/A																									
1-Feb-02		No flow	#N/A																									
2-Feb-02		No flow	#N/A																									
5-Feb-02			8.5	1340			58																					
6-Feb-02			6.3	295			64																					

Notes:
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DATE		Flow	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp	DO	DO	Turbidity
				(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C	(mg/L)	(% sat)	(NTU)
7-Feb-02			5.7	280			27																					
20-Mar-02		No flow	#N/A																									
30-Mar-02			5.6	715			120																					
31-Mar-02			6.9	770			30																					
29-Apr-02			6.7	890			3																					
29-May-02			6.8	2670			4																					
5-Jun-02			#N/A	1840																								
26-Jun-02			6.6	1285			6																					
29-Jul-02		No flow	#N/A																									
27-Aug-03		No flow	#N/A																									
29-Sep-02		No flow	#N/A																									
22-Oct-02		No flow	#N/A																									
27-Nov-02		No flow	#N/A																									
1-Dec-02		No flow	#N/A																									
11-Dec-02			6.5	560			216																					
12-Dec-02			6.3	660			56																					
31-Jan-03		No flow	#N/A																									
22-Feb-03		No flow	#N/A																									
23-Feb-03		No flow	#N/A																									
31-Mar-03		No flow	#N/A																									
4-Apr-03		No flow	#N/A																									
5-Apr-03		No flow	#N/A																									
29-Apr-03			7.1				400																					
16-May-03			6.7	780			60																					
17-May-03			6.9	417			42																					
26-May-03			7.1	343			14																					
27-May-03		Not sampled	#N/A																									
24-Sep-03	Routine	No flow	#N/A																									
31-Jul-03			7.3	1800																								
1-Sep-03			6.4	2400			4																					
31-Oct-03		No flow	#N/A																									
28-Nov-03		No flow	#N/A																									
6-Dec-03		No flow	#N/A																									
18-Jan-04		No flow	#N/A																									
25-Feb-04			7.2	1140			68																					
22-Mar-04			6.9	980			36																					
30-Apr-04		No flow	#N/A																									
31-May-08		No flow	#N/A																									
30-Jun-04		No flow	#N/A																									
27-Jul-04		No flow	#N/A																									
30-Sep-04		No flow	#N/A																									
19-Oct-04			6.9	700	444	716	48	146	44	2.6	2.9	0.15	14	18	0.01	0.001	0.0002	0.02	0.02	0.0002	0.13	0.005						
20-Oct-04			7.5	100	154	126	130	16	9	2.6	1.2	1.3	2	2	0.01	0.001	0.0002	0.02	0.03	0.0002	0.02	0.005						
30-Nov-04		No flow	#N/A																									
22-Dec-04		No flow	#N/A																									
17-Jan-05		No flow	#N/A																									
10-Feb-05			6.9	400	200	270	430	45	52	1.1	3.38	0.39	6	7.7	0.07	0.005	0.001	0.01	0.06	0.0001	0.03	0.005						
18-Mar-05		No flow	#N/A																									
29-Apr-05		No flow	#N/A																									
13-May-05		No flow	#N/A																									
31-May-05			6.9	1000			5																					
24-Jun-05			7.2	1000			4.3																					
29-Jul-05			7.8	3200			2																					
30-Aug-05		No flow	#N/A																									
5-Sep-05			7.6	1800			12																					
17-Oct-05		No flow	#N/A																									
28-Nov-05			6.9	500	340	130	117	110	36	1.01	3.4	0.09	8.6	12	0.03	0.0005	0.00002	0.02	0.03	0.0005	0.01	0.0002						
29-Dec-05		No flow	#N/A																									
31-Jan-06		No flow	#N/A																									
27-Feb-06		No flow	#N/A																									
28-Feb-06		No flow	#N/A																									
31-Mar-06		No flow	#N/A																									
14-Apr-06		No flow	#N/A																									
31-May-06		No flow	#N/A																									
29-Jun-06		No flow	#N/A																									
17-Jul-06		No flow	#N/A																									
31-Aug-06		No flow	#N/A																									
10-Sep-06			7.1	600	350	28	55	150	36	1.1	1.3	0.06	8.2	73	0.01	0.0006	0.0001	0.03	0.11	0.0005	0.03	0.001						
30-Oct-06		No flow	#N/A																									
6-Nov-06		No flow	#N/A																									
30-Nov-06		No flow	#N/A																									
29-Dec-06		No flow	#N/A																									
31-Jan-07		No flow	#N/A																									

Notes:
conc taken as MDL

DATE		Flow	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity	ORP	Temp	DO	DO	Turbidity
				(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)		°C	(mg/L)	(% sat)	(NTU)
26-Feb-07		No flow	#N/A																									
26-Mar-07		No flow	#N/A																									
10-May-07		No flow	#N/A																									
8-Jun-07			7.7	200	214	372	670	74	8.4	18	1.9	1	2	4.5	0.01	0.01	0.001	0.04	0.01	0.01	0.03	0.01						
10-Jul-07			6.7	590	480	22	59	94	66	2.8	2	0.1	10	16	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1						
20-Aug-07			7.2	590	432	38	91	123	28	2.2	2.55	0.18	10	15	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01						
28-Sep-07		No flow	#N/A																									
26-Oct-07		No flow	#N/A																									
24-Nov-07			7.7	470	384	60	137	98	49	0.64	1.7	0.15	8	13	0.003	0.001	0.0001	0.001	0.05	0.0001	0.003	0.001						
17-Dec-07			7.2	410	245	24	46	28	14	1.64	0.1	0.16	10	14	0.002	0.001	0.0001	0.001	0.05	0.0001	0.039	0.001						
17-Jan-08			7.7	480	300	18	42	75	22	0.78	1.529	0.1	13	19	0.001	0.001	0.0001	0.001	0.05	0.0001	0.27	0.001						
29-Feb-08			7.0	580	330	18	47	151	42	0.92	0.6	0.04	15	21	0.001	0.001	0.0001	0.001	0.05	0.0001	0.033	0.001						
25-Mar-08			8.2	880	675	1	5	177.2	80	0.05	0.8	0.1	19	28	0.001	0.001	0.0001	0.001	0.05	0.0001	0.428	0.001						
22-Apr-08			7.3	260	160	8	18	42	27	0.84	0.5	0.01	5	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.011	0.001						
29-May-08			6.8	1230	710	1	4	172	220	0.05	0.3	0.01	30	41	0.001	0.001	0.0001	0.001	0.05	0.0001	0.018	0.001						
4-Jun-08			7.0	1110	543	8	15	166	228	3.99	0.5	0.09	28	37	0.001	0.132	0.0001	0.001	0.05	0.0001	0.047	0.001	58					
30-Jul-08			7.0	1460	850	2	4	231	282	0.05	0.5	0.01	34	50	0.001	0.001	0.0001	0.001	0.05	0.0001	0.008	0.001	102					
29-Aug-08			7.5	810	548	8	5	166	99	0.06	0.5	0.01	19	28	0.001	0.001	0.0001	0.001	0.05	0.0001	0.008	0.001	142					
5-Sep-08			7.6	730	500	1	9	138	94	0.24	0.5	0.02	16	24	0.001	0.001	0.0001	0.001	0.05	0.0001	0.01	0.001	127					
31-Oct-08			7.3	800	670	3	2	166	1	0.05	0.8	0.05	25	35	0.002	0.001	0.0001	0.001	0.05	0.0001	0.608	0.001	243					
19-Nov-08			7.4	1040	590	6	7	178	1	0.24	1.2	0.01	24	38	0.001	0.001	0.0001	0.001	0.05	0.0001	0.699	0.001	256					
13-Dec-08			7.2	670	490	18	41	120	34	0.84	0.8	0.08	18	26	0.001	0.001	0.0001	0.001	0.05	0.0001	0.103	0.001	147					
28-Jan-09		Dry	#N/A																									
13-Feb-09		No flow	#N/A																									
19-Feb-09			6.5	150			104	26	24	1.15		0.11	4	4							0.043	0.001						
23-Feb-09			5.7	180			133	24	21	1.86		0.18	4	4							0.034	0.001						
24-Mar-09		trickle	6.9	610	420	20	4.01	92	10	19.2		0.7	18	22	0.001	0.005	0.0001	0.001	0.05	0.0001	4.13	0.001	157					
1-Apr-09	>20mm	over road	6.1	585	390	30	106.4	136	61	2.91	1	0.16	13	18	0.001	0.001	0.0001	0.001	0.05	0.0001	0.105	0.001	16					
21-May-09	>20mm		6.8	631	342	2.8	6.01	94	53	0.15	0.3	0.05	13	18	0.001	0.001	0.0001	0.001	0.05	0.0001	0.072	0.001	28	159				
23-Jun-09	>20mm	just over road	6.0	158	140	9	47.3	33	14	0.83	0.8	0.13	3	4	0.002	0.001	0.001	0.001	0.05	0.001	0.016	0.0001	23	220				
31-Jul-09	Routine		6.9	861	538	0	0.91	166	195	0.05	0.2	0.01	22	30	0.001	0.001	0.0001	0.001	0.05	0.0001	0.036	0.001	36	167	9.6			
31-Aug-09	Routine	trickle flow only	6.4	1165	620	6	2.73	254	194	0.05	0.3	0.01	29	40	0.001	0.001	0.0001	0.001	0.05	0.0001	0.259	0.001	38	157	12.7			
30-Sep-09	Routine	No flow	#N/A																									
6-Oct-09	>20mm	No flow	#N/A																									
27-Oct-09	>20mm	No flow	#N/A																									
30-Nov-09	Routine	No flow	#N/A																									
27-Feb-09	>20mm	No flow	#N/A																									
7-Jan-10			6.1	446	370	4	28.5	88	48	0.61	1.3	0.06	7	9	0.001	0.001	0.0001	0.001	0.05	0.0001	0.039	0.001	16					
29-Jan-10	>20mm	Trickle Flow	6.8	1253	870	51	91.5	130	469	0.31	2.1	0.08		49	0.002	0.002	0.0018	0.001	0.05	0.0001	0.861	0.002	39		36.8			
1-Feb-10	*ACU	Mod Flow	6.1	750			4.69																					
26-Feb-10	Routine	Low Flow	6.4	698	450	15	17.4	118	0.84	14.3	0.1	0.01	15	20	0.001	0.004	0.0006	0.001	0.05	0.0001	3.11	0.001	139		21.8			
15-Mar-10	>20mm	Low Flow	6.9	688	554	77	67.4	149	2.25	12.4	3.2	0.77	22	25	0.003	0.006	0.001	0.001	0.05	0.0001	4.4	0.001	166	66	23.4			
28-Apr-10	Routine	No Flow	#N/A																									
31-May-10	Routine	No Flow	#N/A																									
4-Jun-10	>20mm	Low Flow	6.4	825	1020	3100		150	136	0.06	2.7	0.39	21	18	0.033	0.014	0.0237	0.005	0.05	0.0001	1.19	0.052	32	205	15.4			
30-Jul-10	Routine	Low-Mod Flow	6.9	562	310	8	28.7	132	42	0.7	1.5	0.18	8	12	0.001	0.001	0.0001	0.004	0.05	0.0001	0.014	0.001	28	197	15.4			
4-Aug-10	>20mm	Mod-High Flow	7.0	251	240	28	70.5	41	18	0.93	1.7	0.35	3	4	0.002	0.001	0.0001	0.002	0.05	0.0001	0.018	0.001	22	103	12.2			
30-Sep-10	Routine	No Flow	#N/A																									
4-Oct-10	>20mm	Low-Mod Flow	7.1	490	372	8	22.3	146	49	0.33	0.28	0.32	9	15	0.002	0.001	0.0001	0.001	0.05	0.0001	0.155	0.001	36	180	17.3			
18-Oct-10	Macro sample		#N/A																				81					
6-Nov-10	>20mm	Mod Flow	6.5	639	16	494	32.7	171	33	0.26	1.1	0.01	14	21	0.001	0.001	0.0001	0.001	0.05	0.0001	0.04	0.001	77	150	14.9			
2-Dec-10	>20mm	Mod-High Flow	6.1	96.4			53.1																	202	22.2			
6-Jan-11	Routine	No flow	#N/A																									
14-Feb-11	Routine	No Flow	#N/A																									
21-Feb-11	Event	No Flow	#N/A																									
22-Mar-11	Event	Mod-High Flow	6.0	1114			28.6																	125	22.4			
17-Apr-11	Event	Mod Flow	6.4	472	376	10	22.5	87	36	1.6	0.8	0.11	8	11	0.002	0.001	0.0001	0.001	0.05	0.0001	0.026	0.001	41	127				
31-May-11	Event	High Flow	6.9	320	316	54	94.3	58	32	1.74	0.7	0.08	5	7	0.001	0.001	0.0001	0.001	0.05	0.0001	0.05	0.001	29	126	15.3			
30-Jun-11	Routine	Low Flow	6.6	211	100	5	27.1	29	18	0.98	0.4	0.02	5	6	0.001	0.001	0.0002	0.001	0.05	0.0001	0.008	0.001	25	123	13			
21-Jul-11	Event	Low Flow	7.1	683	352	10	18.7	117	96	0.76	0.6	0.06	14	20	0.001	0.001	0.0002	0.001	0.05	0.0001	0.013	0.001	61		12.3			
21-Aug-11	Event	Low Flow	7.1	725	426	5	16.5	108	117	0.6	0.5	0.02	16	23	0.001	0.001	0.0001	0.001	0.05	0.0001	0.032	0.001	72	150	13.4			
30-Sep-11	Routine	Low Flow	7.5	774			0.91																	133	18.1			
3-Oct-11	Event	Low Flow	6.9	386			42.4																	149	14.4			
8/06/2011	for Aquatic WQ study		6.9	366																			54		9.36	9.2	77.8	14.1

W9
Upper Avondale Creek
(Off Glen Road - SCPL)

16

Notes:
conc taken as MDL

DATE	Event	Flow	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Mn (mg/L)	Pb (mg/L)	Alkalinity (mg/L)	ORP	Temp °C
29-May-08		No Flow																							
04-Jun-08	>20mm		6.9	370	200	16	51	17	6	1.12	1.5	0.45	3	3	0.004	0.001	0.0001	0.007	0.005	0.0001	0.057	0.001	16		
30-Jul-08	Routine		6.7	300	180	35	19	65	8	0.34	0.8	0.08	6	5	0.001	0.001	0.0001	0.002	0.05	0.0001	0.125	0.001	16		
29-Aug-08	Routine	No Flow																							
05-Sep-08	>20mm		7.8	110	120	21	54.6	23	4	1.41	1	0.19	3	3	0.001	0.001	0.0001	0.001	0.05	0.0001	0.037	0.001	11		
31-Oct-08		No Flow																							
19-Nov-08		No Flow																							
13-Dec-08		No Flow																							
28-Jan-09	Routine	Dry																							
13-Feb-09	>20mm	No flow																							
19-Feb-09	Routine	Low Flow	5.9	110			14	18	1	0.97		0.03	3	2							0.036	0.001			
23-Feb-09	>20mm		5.9	130			80	18	5	1.59		0.32	3	3							0.039	0.001			
24-Mar-09	Routine	No Flow																							
01-Apr-09	>20mm		6.4	65	120	10	51.5	11	2	1.57	1.4	0.1	2	2	0.002	0.001	0.0001	0.001	0.05	0.0001	0.021	0.001	11		
21-May-09	>20mm		7.2	136	110	24	49	31	2	1.08	1.2	0.05	3	3	0.001	0.001	0.0001	0.001	0.05	0.0001	0.024	0.001	13	151	
23-Jun-09	>20mm		6.6	92	114	2	91.6	18	3	0.76	2.1	0.52	2	2	0.004	0.001	0.001	0.003	0.05	0.0001	0.023	0.002	14	206	
31-Jul-09	Routine	No Flow																							
31-Aug-09	Routine	No Flow																							
30-Sep-09	Routine	No flow																							
06-Oct-09	>20mm	No Flow																							
27-Oct-09	>20mm		7.1	1022	570	12	22.8	315	8.04	0.18	1.1	0.22	22	22	0.002	0.001	0.0001	0.001	0.05	0.0001	0.289	0.001	13		
30-Nov-09	Routine	No Flow																							
27-Dec-09	>20mm	No Flow																							
07-Jan-10			5.9	206	210	20	17.6	27.5	0.96	0.4	1.6	0.12	8	6	0.001	0.001	0.0001	0.001	0.05	0.0001	0.646	0.001	50		
29-Jan-10	>20mm	No flow																							
26-Feb-10	Routine	No Flow																							
15-Mar-10	>20mm	No Flow																							
28-Apr-10	Routine	No Flow																							
31-May-10	Routine	No Flow																							
04-Jun-10	>20mm	Mod flow	6.2	144	144	33	99.1	28.1	5.23	0.68	1.4	0.28	2	2	0.002	0.001	0.0001	0.003	0.05	0.0001	0.029	0.001	13	200	16.1
30-Jul-10	Routine	Low Flow	6.5	158.9	166	11	51.1	31	1	0.56	1.2	0.08	4	3	0.003	0.001	0.0001	0.004	0.05	0.0001	0.024	0.001	17	165	13.2
04-Aug-10	>20mm	Mod Flow	6.3	106.9	157	14	66	17	8	0.81	1.2	0.15	2	2	0.003	0.001	0.0001	0.003	0.05	0.0001	0.02	0.001	13	126	15.4
30-Sep-10	Routine	No Flow																							
4-Oct-10	>20mm	Mod flow	6.6	73.5	140	22	42.3	9	10	1.06	0.02	0.37	2	2	0.005	0.001	0.0001	0.001	0.05	0.0001	0.0054	0.001	14	154	19.5
06-Nov-10	>20mm	Low-Mod Flow	6.4	89.2	54	166	88.1	16	10	1.06	1.4	0.04	3	2	0.006	0.001	0.0001	0.002	0.05	0.0001	0.049	0.001	16	136	16.4
02-Dec-10	>20mm	Low Flow	5.9	65.3			73.4																	193	23.8
06-Jan-11	Routine	No Flow																							
14-Feb-11	Routine	No Flow																							
21-Feb-11	Event	No Flow																							
22-Mar-11	Event	Low Flow	5.3	106.8			165																	99	26.9
17-Apr-11	Event	Mod flow	6.2	94	174	18	54.7	15	1	1.98	0.6	0.03	3	2	0.004	0.001	0.0001	0.003	0.05	0.0001	0.03	0.001	14	108	
31-May-11	Event	High Flow	6.9	58	120	40	106.9	8	1	1.4	0.7	0.01	1	1	0.002	0.001	0.0001	0.001	0.05	0.0001	0.044	0.001	9	96	14.6
30-Jun-11	Routine	Trickle Flow	6.2	275	184	24	37	66	3	0.96	0.5	0.03	7	6	0.001	0.001	0.0001	0.001	0.05	0.0001	0.062	0.001	13	149	13.2
21-Jul-11	Event	Low Flow	6.9	103	156	58	155	17	3	3.47	0.8	0.11	2	2	0.004	0.001	0.0001	0.003	0.05	0.0001	0.056	0.002	10		14.2
21-Aug-11	Event	Mod flow	6.6	145	168	18	69.3	29	1	2.2	0.6	0.12	4	3	0.002	0.001	0.0001	0.002	0.05	0.0001	0.088	0.001	13	112	13.1
30-Sep-11	Routine	Trickle Flow	6.6	1371			19.6																	105	22.1
03-Oct-11	Event	Low Flow	6	121			85.8																	109	16.8

Parkers Pit/BRN West

Notes:
conc taken as MDL

DATE	pH	Cond. (uS/cm)	Temp °C	Acidity mg/L	ORP (mV)	Sodium (mg/L)	Chloride (mg/L)	Sulphate (mg/L)	Iron (filt.) (mg/L)	Aluminium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Zinc (mg/L)
7-Sep-98	6.7	600					73	230	0.12					
7-Sep-98	7.2	2200					330	640	0.01					
10-Feb-99	6.7	1175					100	340	0.02					
10-Feb-99	6.4	1042					83	300	0.04					
10-Aug-99	7.4	2860					380	860	0.17					
10-Aug-99	Effectively empty													
22-Feb-00	7.6	3660					540	1200	0.05					
22-Feb-00	6.9	2370					320	660	0.19					
22-Aug-00	7.3	3190					480	1400	0.02					
22-Aug-00	6.9	2220					370	820	0.23					
10-Apr-03	7.9	1700												
30-Apr-03	7.4	1050		10		130	79	300	0.19	0.27				
30-May-03	6.7	1080		6	90	110	230	360	0.1	0.05				
3-Jun-03	6.9	1110			105									
11-Jun-03	No access													
27-Jun-03	7.1	1863		65	154	389	239	961	0.1	0.05				
15-Jul-03	No access													
31-Jul-03	7.3	2220		35	107	280	240	800	0.95	0.05				
19-Aug-03	7.7	3200		65	25	360	290	1100		0.05				
8-Sep-03	7.6	2680			31									
25-Sep-03	7.6	2600		20	-30	370	460	1050	1.86	0.05	280	100	5.4	0.27
20-Oct-03	7.8	2650												
31-Oct-03	7.6	2630		38	83	340	520	1000	0.19	0.05	270	95	4.7	0.26
19-Nov-03	7.4	2900		13		725	625	950	0.38	0.02	270	100	5	0.29
16-Dec-03	6.4	2550		20		300	402	980	0.11	0.05	240	80	4.2	0.28
30-Jan-04	7.2	2040		12		270	300	970	0.05	0.05	210	76	3.1	0.23
27-Feb-04	6.7	2600		34	53	260	228	830	0.05	0.05	200	74	2.8	0.16
31-Mar-04	6.1	2600		130	-36	240	210	760	4.3	0.05	180	71	4	0.25
30-Apr-04	No access													
31-May-04	7.3	3200		24	34	310	400	1090	0.05	0.05	280	100	5.3	0.26
30-Jun-04	7.8	3400		15	24	290	440	1080	0.44	0.05	280	96	4.6	0.3
30-Jul-04	6.6	3200		98	142	270	360	1040	0.05	0.05	260	100	2.9	0.12
27-Aug-04	No access													
30-Sep-04	6.9	3000			127									
5-Oct-04				25		260	340	910	0.05	0.05	250	100	1.8	0.07
29-Oct-04	7.2	1900		10	152	167	179	660	0.05	0.06	155	66	1.16	0.11

Notes:
conc taken as MDL

DATE	pH	Cond. (uS/cm)	Temp °C	Acidity mg/L	ORP (mV)	Sodium (mg/L)	Chloride (mg/L)	Sulphate (mg/L)	Iron (filt.) (mg/L)	Aluminium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Zinc (mg/L)
30-Nov-04	6.6	3100		15	142	255	230	1040	0.05	0.05	240	95	3.06	0.14
22-Dec-04	6.9	3110		10	48	280	320	1160	0.05	0.05	270	110	3.69	0.15
31-Jan-05	7.6	2800		12	158	38	290	980	0.05	0.05	230	94	2.8	0.12
4-Mar-05	7.6	2600		35	-27	220	550	810	0.06	0.05	210	85	3.2	0.2
24-Mar-05	7.6	2000		35	144	163	131.5	756	0.05	0.05	166	68	2.58	0.18
29-Apr-05	7.1	2500		20.6	-4	226	191	1047	0.01	0.02	256	103	3.7	0.23
31-May-05	6.4	2600		60	40	200	300	120	0.04	0.08	100	47	2.2	0.26
19-Jul-05	7.8	1500		15	178	130	120	570	0.44	0.02	130	54	1.9	0.15
28-Jul-05	7.2	1900		100	192	51	120	264	0.01	0.1	64	23	0.64	0.02
30-Aug-05	7.8	2200			156	160	203	708	1.5	0.02	170	70	2.5	0.03
30-Sep-05	7.5	2300		30	172	170	350	110	0.03	0.02	130	24	0.66	0.01
8-Nov-05	7.4	1500		4.9	124	150	140	165	0.08	0.02	140	58	2.2	0.24
28-Nov-05	7.2	1300		12	170	260	50	612	0.01	0.02	91	26	3	0.21
19-Dec-05	7.4	2200		18	122	320	220	1000	0.01	0.02	250	105	3.3	0.14
31-Jan-06	6.5	2700		33	113	240	270	900	0.01	0.02	250	99	1.6	0.01
27-Feb-06	7.6	2700		4.9	169	480	390	1500	0.01	0.02	360	130	1.1	0.01
31-Mar-06	6.6	2400		9.8	203	140	420	320	0.03	0.02	280	33	0.38	0.03
14-Apr-06	7.4	2400		2.5	106	200	300	860	0.01	0.02	190	81	2.8	0.3
31-May-06	7.5	2400		0	167	200	350	140	0.01	0.02	61	14	0.07	0.02
29-Jun-06	7	2400		10	-12	2200	150	920	0.76	1.5	230	100	2.8	0.24
31-Jul-06	7.7	2700		6.7	5	200	460	890	0.01	0.19	210	93	3.1	0.54
31-Aug-06	7	2500		10	27	380	220	1100	0.01	2	200	98	4.5	0.79
29-Sep-06	6.4	2500		250	40	200	240	120	0.22	0.05	220	100	0.5	0.0015
30-Oct-06	3.4	3100		150	160	230	170	1400	4.81	8.8	250	120	9.65	4
30-Nov-06	4	3200		4.5	207	-	210	1800	3	-	300	110	8.8	-
29-Dec-06	3.6	3400		130	14	260	5	1600	0.16	9.6	250	110	9	3.3
31-Jan-07	6.5	2400		46	50	270	290	1800	0.05	2.86	320	140	8.62	2.51
27-Feb-07	3.9	3400		167	231	270	15	1800	0.1	0.06	220	160	10	0.01
29-Mar-07	6.5	3600		270	152	247	252	1600	5	12.2	292	137	12.1	4
3-May-07	3.4	3500		219	150	289	297	2130	8.3	16	415	185	14	3.7
31-May-07	4	3100		161	145	359	248.2	2442	4.7	13	460	189	15	4.4
28-Jun-07	6.1	2700		37	165	223	140.4	1686	0.1	0.87	318	143	8.6	2
30-Jul-07	5.6	2700		23		252	238	1713	0.4	2.9	378	158	11	2.9
20-Aug-07	4.4	2400		78	-540	184	170	1194	0.09	7.4	259	112	8.9	2.6
28-Sep-07	3.3	2100		151	70	281	184		0.95	14	250	124	8.1	3
31-Oct-07	4.2	2500		3	40	228	240		0.27	0.13	116	51	2.13	0.17
31-Nov-07	3.3	2300		164		223	189	1050	4.1	8.02	176	81	6.39	1.9
27-Dec-07	7	1800		170		216	210.4	1090	4.3	7.74	196	143	6.28	1.92

Notes:
conc taken as MDL

DATE	pH	Cond. (uS/cm)	Temp °C	Acidity mg/L	ORP (mV)	Sodium (mg/L)	Chloride (mg/L)	Sulphate (mg/L)	Iron (filt.) (mg/L)	Aluminium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Zinc (mg/L)
30-Jan-08	4.9	1800		356	330	180	160	1090	**11.9**	12.3	186	85	6.41	2.6
29-Feb-08	5.8	1900		164	-780	171	151	992	**6.14**	10.9	166	81	5.37	2.18
25-Mar-08	7.3	2100		225		183	198	1050	2.49	11.8	176	88	6.88	2.52
30-Apr-08	3.7	1800		122		124	94	674	1.9	7.6	127	60	4.46	1.64
28-May-08	4.8	1900		74		192	160	1070	0.05	7.46	202	89	5.54	1.6
30-Jun-08	5.9	2200		28		243	204	1270	0.13	0.62	260	111	6.24	1.35
31-Jul-08	6.4	2600		14		293	1370	1370	0.07	0.22	290	122	5.47	1.22
29-Aug-08	7.4	3200		14		331	363	1470	0.05	0.11	315	127	5.92	0.959
24-Sep-08	5.9	2300		19		269	258	1360	0.05	0.85	227	95	5.03	0.966
31-Oct-08	7.6	3180		9		316	296	1240	0.05	0.31	298	126	5.43	0.75
1-Dec-08	in accessable													
24-Dec-08	7.5	2770		9		292	272	715	0.05	0.28	264	4.64	112	0.692
28-Jan-09	6.9	3200		1		341	329	1410	0.19	0.14	305	125	5.13	0.358
26-Feb-09	7	1000				79	70	480	0.25		94	40	2.72	
19-Mar-09	6.9	1680		Sample lost (spilt) on way to Lab.						0.11			4.59	0.573
27-Apr-09	7.3	1630		10	162	154	135	569	0.05	0.21	155	64	3.39	0.465
14-May-09	7.4	2210		10	161	206	196	588	0.86	0.29	183	77	3.54	0.52
26-Jun-09	6.5	1654	13.3	1	127	164	384	1160	0.05	0.08	153	64	3.21	0.588
15-Jul-09	6.7	2080	15.6	1	74	229	217	932	0.05	0.09	188	82	3.31	0.518
10-Aug-09	6.7	2470	15.3	10	143	246	242	957	0.05	0.07	208	94	3.43	0.646
10-Sep-09	6.4	2670	15.6	15	119	288	296	1230	0.05	0.09	233	99	3.64	0.618
20-Oct-09	7.5	3620		1	163	311	344	1230	0.05	0.13	278	112	3.4	0.485
30-Nov-09	3.6	2850		59		270	263	1550	1	6.77	248	111	6.21	3.57
16-Dec-09	5.3	3230		35		306	238	1210	0.05	0.26	235	118	6.68	2.36
18-Jan-10	3.7	2700		94		241	193	932	2.52	6.31	215	95	5.68	2.73
10-Feb-10	3.7	2090	27.5	72	338	178	168	940	0.98	4.49	163	70	3.92	2.38
11-Mar-10	4.4	2860		33	391	266	236	1170	0.05	5.2	256	108	4.97	2.57
22-Apr-10	4.6	3450	25	59	397	354	300	1470	0.35	5.45	282	120	5.84	2.82
24-May-10	in accessable													
24-Jun-10	4	3100	15.4	68	474	307	268	1360	0.28	3.42	267	111	6.7	2.96
29-Jul-10	3.6	2970	13.7	58	378	307	243	1360	0.4	3.42	235	101	4.17	2.67
17-Aug-10	2.6	3260	15.4	97	395	308	299	1340	0.48	5.83	264	308	5.14	2.84
24-Sep-10	6.8	2430	24.3	12	103	318	267	1360	0.05	3.06	288	119	5.55	2.29
27-Oct-10	7.5	2770	28.7	5	186	434	406	971	0.05	4.22	288	106	0.699	1.62
30-Nov-10	3.9	2960	25.5		327									
21-Dec-10	5.3	2700	25.8	29	182	272	291	875	0.72	3.36	247	101	5.66	2.42
31-Jan-11	3.7	3330	27.7	84		230	341	1060	1.79	6.89	264	111	6.95	3.46
28-Feb-11	3.7	2840	25.5	76	371	323	379	1310	1.5	7.64	270	111	6.21	3.24

Notes:
conc taken as MDL

DATE	pH	Cond. (uS/cm)	Temp °C	Acidity mg/L	ORP (mV)	Sodium (mg/L)	Chloride (mg/L)	Sulphate (mg/L)	Iron (filt.) (mg/L)	Aluminium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Zinc (mg/L)
31-Mar-11	4.2	2580	23.6	62	262	249	308	1100	1.64	6.34	226	89	5.35	3.01
29-Apr-11	5.8	2950		128	181	262	293	1190	1.14	4.39	253	105	5.29	2.19
30-May-11	5.2	3130	14.6	69	248	290	300	1360	0.62	4.2	271	109	5.96	3.29
27-Jun-11	3.9	1808	14.1	74	396	162	152	810	3.07	6.46	157	64	3.16	2.92
27-Jul-11	5.2	1764	14.5	38	175	63	172	892	0.59	4.14	184	74	3.26	2.52
26-Aug-11	6.3	1941	19.2	9	78	240	236	980	0.6	0.19	198	82	2.67	1.55
29-Sep-11	6.7	2490	18.3		65									

Main Pit
Stratford Main Pit

DATE	pH	Cond. (uS/cm)	Temp °C	Acidity (mg/L)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Sodium (mg/L)	Chloride (mg/L)	Sulphate (mg/L)	Al (mg/L)	Fe (filt.) (mg/L)	Ca (mg/L)	Mg (mg/L)	Mn (mg/L)	ORP (mV)	Zn (mg/L)	Temp	RL	Alkalinity (mg/L)	Phosphorus (mg/L)	Nitrogen (mg/L)	Nitrate (mg/L)	Cu (mg/L)	As (mg/L)	B (mg/L)	Cd (mg/L)	Pb (mg/L)	Cr (mg/L)	Hg (mg/L)
3-Apr-95	4.1	530			290				74	84		0.11																		
6-Sep-95	3.7	3310																	Sampled from end of pipe wnich drains into c0-disposal dam											
19-Sep-95	2.5	4340																	Sampled from end of pipe wnich drains into c0-disposal dam											
25-Sep-95	2.5	4390																												
3-Oct-95	2.4	4250																												
9-Oct-95	2.4	4470																												
16-Oct-95	2.5	4340																												
27-Oct-95	6.4	2120																	rainfall during the past 24-36hours											
30-Oct-95	2.4	4010																												
6-Nov-95	2.5	4670																												
29-Nov-95	6.6	2590																	after 130mm of rain previous week, pumped off upper bench?											
7-Dec-95	6.3	1800			980	5				180		0.21	26	32																
18-Dec-95	6.1	2900																												
27-Dec-95	5.7	4000																												
9-Jan-96																														
22-Jan-96	4.8	3950																												
6-Feb-96	3.7																													
13-Feb-96	2.9	4600																												
22-Feb-96	3.0	4500			2400	41			1300										main sump											
22-Feb-96	6.8	4200			2300	4			1000										east sump											
12-Mar-96	3.0	3900																												
27-Mar-96	3.4	4800																												
10-Apr-96	3.6	5300																												
24-Apr-96	5.7	5200																	could reflect quality of groundwater in the area											
14-May-96	6.6	4050																												
28-May-96	5.8	4100																												
11-Jun-96	4.2	5100			2800	37			*	150		100	130	120					composite sample from west and east sumps on pit floor, iron interference on chloride analysis											
25-Jun-96	6.1	4600																	composite sample from west and east sumps on pit floor											
22-Jul-96	6.1	5250																	composite sample from west and east sumps on pit floor											
12-Aug-96	6.4	5000																												
28-Aug-96	6.1	4700																												
10-Sep-96	7.0	1900																	pondage on east side of floor											
10-Sep-96	6.4	5100																	main sump - west side of floor											
26-Sep-96	3.6	6100			5800	52			1900	90		12	150	120					main sump - west side of floor											
28-Oct-96	5.7	5200																	main sump - west side of floor											
12-Nov-96	6.8	6200																	main sump - west side of floor											
22-Nov-96	6.2	5500																	main sump - west side of floor											
16-Dec-96	7.8	2900																												
23-Dec-96	7.0	4700																												
9-Jan-97	6.6	4700																												
21-Jan-97	6.2	5100			3000	220			1500	110		2.9	120	110																
11-Feb-97	6.6	4400																												
18-Apr-97	7.3	3600																												
19-May-97	7.9	2400																												
5-Jun-97	7.1	3800																												
13-Jun-97	7.1	4000																												
23-Jun-97	7.9	2400																												
14-Jul-97	7.3	3900																												
21-Aug-97	7.0	3400																												
22-Aug-97	7.9	3000			1600	22	20		760	63		<0.02																		
11-Sep-97	7.1	3900																												
13-Oct-97	7.8	3700																												
12-Nov-97	7.4	2900			1500	31	18		750	69		<0.02																		
16-Dec-97	5.7	4700																	Very little water in-pit											
14-Jan-98	7.3	3600																												
19-Feb-98	6.8	6500																												
20-Mar-98	7.7	3800																	N/W corner											
24-Apr-98	ACCESSIBLE																													
19-May-98	Being pumped to Co-Disposal																													
7-Oct-98	7.3	2900			2100	8	6		770	370		<0.01																		
10-Feb-99	8.4	2470			1400	9	1		300	410		<0.02																		
10-Aug-99	7.4	2660			1900	6	2		300	520		<0.02							Lot water, clear											
22-Feb-00	7.8	2830			1700	20	30		480	490		0.02							Moderate amount water, clear with film.											
22-Aug-00	7.4	2400			1500	100	91		480	380		<0.02																		
21-Feb-01	7.2	2460					40																							
13-Jan-03	5.9	2350				37			510	360		<0.1				125														
1-May-03	7.4	2950		38				430	740	340	0.06	<0.1																		
19-May-03	7.1	3100														35														
30-May-03	6.7	2840		28				380	260	620	<0.05	<0.1				115														
3-Jun-03	6.8	2514														129														
11-Jun-03		No access																												
27-Jun-03	7.0	1534		13				355	392	716	<0.05	<0.1				146														
15-Jul-03	7.4	2400														84														
31-Jul-03	7.5	2800		40				410	500	470	<0.05	<0.1				118														
28-Aug-03	7.0	2800		18				380	400	680	<0.05	-				53														
8-Sep-03	7.9	2481														163														
25-Sep-03	7.8	2200		10				350	390	560	<0.05	<0.1	150	53	0.43	110	<0.01													
31-Oct-03	7.4	2217		12				350	390	610	<0.05	<0.1	150	51	0.37	83	0.02													
19-Nov-03	7.1	2000		120				329	470	590	<0.02	150	150	51	0.37		0.02													
16-Dec-03	7.4	2200.0		10.0				360	402	690	<0.05	<0.1	160	55	0.69		0.02													
30-Jan-04	7.6	2250.0		22.0				420	410	850	<0.05	<0.05	200	70	0.86		0.04		33											
1-Mar-04	7.6	3100		10				360	402	780	<0.05	<0.05	190	65	0.74	169	<0.02													
30-Mar-04	7.6	3000		7				360	380	750	<0.05	<0.05	190	68	0.76	142	0.02													
30-Apr-04	7.1	3200		17				340	380	830	<0.05	<0.05	190	80	0.92	164	0.02													
31-May-04	7.1	3300		33				390	390	930	<0.05	<0.05	230	79	0.75	26	0.02													
30-Jun-04	7.3	3500		27				404	400	920	<0.05	<0.05	240	82	0.86	23	0.02													

DATE	pH	Cond. (uS/cm)	Temp °C	Acidity (mg/L)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Sodium (mg/L)	Chloride (mg/L)	Sulphate (mg/L)	Al (mg/L)	Fe (filt.) (mg/L)	Ca (mg/L)	Mg (mg/L)	Mn (mg/L)	ORP (mV)	Zn (mg/L)	Temp	RL	Alkalinity (mg/L)	Phosphorus (mg/L)	Nitrogen (mg/L)	Nitrate (mg/L)	Cu (mg/L)	As (mg/L)	B (mg/L)	Cd (mg/L)	Pb (mg/L)	Cr (mg/L)	Hg (mg/L)
30-Jul-04	7.6	3500		39				370	390	880	<0.05	<0.05	240	79	0.9	140	0.04													
28-Aug-04	6.6	3400		9.8				380	400	1000	<0.01	<0.01	260	76	0.67		0.02													
30-Sep-04	6.3	1100														229														
5-Oct-04				10				340	390	1000	<0.05	<0.05	240	76	0.81		0.02													
29-Oct-04	7.3	3200		5				350	270	1040	<0.05	<0.05	250	80	0.9	163	0.09													
30-Nov-04	6.9	3300		10				360	380	1008	<0.05	<0.05	252	81	0.89	141	0.03													
22-Dec-04	6.6	3100		10				350	460	1040	<0.05	<0.05	250	80	0.74	45	0.02													
31-Jan-05	7.4	3200		10				380	370	1050	<0.05	<0.05	260	75	0.56	168	0.03													
4-Mar-05	7.1	3300		18				340	400	980	<0.05	<0.05	240	80	0.62	40	0.02		41.85											
31-Mar-05	7.8	3200		29				349	28385	1080	<0.05	<0.05	262	83	0.64	155	0.04		43											
29-Apr-05	7.3	3100		15.7				358	359	1182	<0.02	<0.01	278	93	0.66	3	<0.01													
31-May-05	6.9	3300		20				420	340	370	<0.02	<0.01	290	100	0.66	88	<0.02		45											
19-Jul-05	7.4	3200		40				370	270	1100	<0.02	0.01	250	104	1	184	0.01		47											
28-Jul-05	7.1	3200		9.8				390	270	2500	<0.1	<0.01	270	108	0.64	193	<0.01		47											
30-Aug-05	7.6	3300		35				350	330	1100	<0.02	0.05	240	98	0.89	164	0.01													
30-Sep-05	7.3	3400		40				420	340	1300	<0.02	0.02	300	110	1.1	177	0.02													
8-Nov-05	7.0	3300		2.5				440	320	390	<0.02	0.04	301	110	0.67	133	0.06													
28-Nov-05	7.0	3300		9.8				420	470	1200	<0.02	<0.01	201	54	1.2	189	0.05		48.2											
19-Dec-05	7.1	3300		15				220	390	280	<0.02	<0.01	130	37	0.42	192	<0.01		48.5											
31-Jan-06	6.6	3300		29				390	380	1100	<0.02	<0.01	280	100	0.38	-37	<0.01		49.4											
13-Feb-06	6.7	3400														150			49.5											
27-Feb-06	7.1	3400		7.4				250	410	260	<0.02	<0.01	130	34	0.3	183	<0.01		49.5											
31-Mar-06	7.4	3300		3.3				420	370	1400	<0.02	<0.01	310	120	0.7	190	<0.01													
14-Apr-06	7.1	3300		1.3				380	410	1300	<0.02	<0.01	270	100	0.9		0.03													
31-May-06	7.1	3500		40				360	450	1400	<0.02	<0.01	280	120	1.02	171	0.02		51											
29-Jun-06	6.8	3500		23				390	400	1400	1.2	0.6	310	162	0.57	-10	0.04		51											
31-Jul-06	7.2	4000		25				360	330	1070	<0.02	<0.01	320	140	1.5	6	0.03													
31-Aug-06	7.4	3300		6.7				380	530	1200	2.5	<0.01	230	100	1	39	<0.01		53											
29-Sep-06	7.4	3200		180				360	707	140	0.03	<0.05	250	107	0.51	52	0.03		54											
30-Oct-06	7.9	3300		16				360	270	1200	0.19	0.08	240	110	0.36	160	0.16		55											
30-Nov-06	8.1	3300		180				-	290	1500	-	0.45	220	103	0.57	161	-		56.2											
29-Dec-06	6.9	3400		9.8				350	47	1200	<0.02	<0.01	200	98	0.1	1	0.02		56.2											
31-Jan-07	6.6	2500		6				370	380	1300	<0.05	<0.05	240	98	0.61	15	0.04		56.2											
27-Feb-07	7.3	3300		10				350	17	1100	<0.02	<0.01	180	190	0.15	178	0.02		57.5											
29-Mar-07	7.0	3400		10				375	403	1400	0.095	<0.1	244	105	12.1	174	0.02													
3-May-07	7.1	3500		39				423	397	1560	<0.01	0.07	350	152	0.69	170	0.02													
31-May-07	6.4	3400		2				386	347.4	1641	<0.01	0.01	331	134	1.4	140	0.01													
28-Jun-07	7.6	3300		103				399	362.7	1505	0.2	<0.1	302	128	1.2	160	<0.01		58.5											
30-Jul-07	6.9	3100		<1				455	476	1488	<0.1	0.13	362	137	1.7		<0.01													
20-Aug-07	6.3	3000		69				346	349	1194	0.08	<0.01	260	106	1.5	-590	0.08													
28-Sep-07	6.8	3200		9.9				3369	391	1340	<0.01	<0.01	1546	709	0.18	15	0.03													
31-Oct-07	7.6	3300		11				496	420	1220	0.02	<0.05	282	126	0.48	140	<0.01													
31-Nov-07	7.4	3200		1750				511	368	1380	0.04	0.08	272	124	0.263		<0.005													
27-Dec-07	7.4	2000		5				464	376.7	1270	0.07	0.02	276	90	0.416		0.01													
30-Jan-08	7.3	2000		22				476	358	1430	0.04	<0.05	300	140	0.465	1000	<0.005													
29-Feb-08	6.3	1800		8				438	358	1300	0.1	0.06	224	125	0.531	-856	<0.005													
25-Mar-08	7.0	1900		19.7				431	406.4	1290	0.02	<0.05	262	122	1.08		0.013		64.7											
30-Apr-08	7.5	3580		5				432	356	1270	0.02	<0.05	272	117	1.41		0.061		66											
28-May-08	6.6	2900		37				416	359	1310	0.02	<0.05	300	136	1.17		0.011		66.8											
30-Jun-08	7.0	2800		19				418	364	1310	0.01	<0.05	289	128	0.447		0.007		67.5											
31-Jul-08	7.0	2900		9				434	1270	1270	0.03	<0.05	268	117	0.79		0.006		67.6											
29-Aug-08	7.9	3290		9				420	437	1290	0.02	<0.05	274	119	1.03		0.008													
24-Sep-08	7.1	2800		9				410	353	1340	0.06	<0.05	252	109	0.95		0.008		68.05											
31-Oct-08	7.6	3260		<1				484	372	1440	0.03	<0.05	271	120	0.79		0.023													
1-Dec-08	7.9	1960		<1				469	382	1150	0.05	<0.05	257	113	0.534		0.006		68.6	174	0.02	1.4	1.05	0.002	0.001	0.05	0.0001	0.001	0.001	0.0001
24-Dec-08	8.1	3190		<1				443	353	853	0.03	<0.05	271	118	0.53		0.006		68.7											
28-Jan-09	7.4	3300		<1				445	374	1350	0.07	<0.05	277	118	0.343		0.006		68.8											
20-Feb-09	8.4	2950		5				430	358	1030	0.08	0.11	270	113	0.546		0.014													
19-Mar-09	7.6	3200		0				436	342	1330	0.02	<0.05	253	107	0.61		0.007		underwater											
27-Apr-09	7.8	2900		<1				403	340	1250	0.04	<0.05	244	105	0.576	139	0.01		underwater											
14-May-09	7.6	3250		8				410	347	962	0.04	<0.05	250	105	0.581	139	0.005		underwater											
26-Jun-09	7.2	2830	14.9	<1				400	337	908	<0.01	<0.05	262	107	0.748	144	<0.005		underwater											

DATE	pH	Cond.	Temp	Acidity	TDS	TSS	Turbidity	Sodium	Chloride	Sulphate	Al	Fe (filt.)	Ca	Mg	Mn	ORP	Zn	Temp	RL	Alkalinity	Phosphorus	Nitrogen	Nitrate	Cu	As	B	Cd	Pb	Cr	Hg
		(uS/cm)	°C	(mg/L)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mV)	(mg/L)			(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
15-Jul-09	7.5	3040	15.6	<1				416	332	1170	0.06	<0.05	263	113	0.782	72	0.01		underwater											
10-Aug-09	7.2	3350	16.3	<1				417	324	1320	0.05	<0.05	267	111	0.791	128	0.015		74.29											
14-Sep-09	7.6	3100	19.5	<1				415	357	1600	0.04	<0.05	272	109	0.763	139	0.016		underwater											
20-Oct-09	7.9	3850		<1				388	386	1400	0.04	<0.05	280	112	0.64	153														
30-Nov-09	7.9	3170		<1				410	387	962	0.03	<0.05	259	108	0.607		0.016		75.3											
16-Dec-09	6.2	3730		<1				463	365	1360	0.04	<0.05	240	111	0.489		0.009		75.1											
18-Jan-10	7.1	3270		<1				407	336	1250	0.03	<0.05	267	103	0.436		0.177		75.8											
10-Feb-10	7.6	3090	29.7	<1				396	405	1560	0.22	<0.05	255	98	0.714	167	0.012		75.455	118										
11-Mar-10	6.9	3570		<1				428	349	1260	0.05	<0.05	290	110	0.737	207	0.012		75.95	114										
22-Apr-10	7.5	3220	25.8	<1				442	347	1400	0.03	<0.05	280	106	0.594	227	<0.005		76.15	104										
24-May-10	7.1	3300	19.9	<1				417	419	1610	0.09	<0.05	298	103	0.549	118	0.007		76	110										
24-Jun-10	7.6	3490	19.4							1370	0.02	<0.05	228	105	0.562	158	0.015		76	111										
30-Jul-10	7.8	3060								1480	0.14	<0.05	284	107	0.354	212	0.012	20.1	76.4	110										
17-Aug-10	7.4	3720								1390	0.08	<0.05	319	115	0.251	81	0.007	20.5	76.5	110										
24-Sep-10	7.7	2610								1370	0.06	<0.05	293	106	0.287	59	0.013	24.2	76.5	98										
27-Oct-10	7.4	2850								951	0.04	<0.05	279	107	0.348	139	0.007	25.7		103										
30-Nov-10	7.7	3390														113		24.1												
21-Dec-10	7.6	3240								16	0.18	0.13	315	111	0.46	-2	0.017	29.9		103										
31-Jan-11	7.8	3630	32.1	5				426	411	973	0.04	0.11	279	101	0.35	64	0.005	32.1		96										
28-Feb-11	7.2	3050	28.2	9				432	398	1410	0.09	0.14	314	113	0.413	66	0.011	28.2		100										
31-Mar-11	7.3	2920	23.8	5				381	364	1240	0.2	<0.50	293	102	0.366	106	0.024	23.8		113										
29-Apr-11	7.2	3630		10				418	408	1400	0.18	0.73	306	106	0.37	185	0.015			87										
30-May-11	7.4	3400	16.2	15				394	353	1370	0.05	0.13	289	102	0.481	140	0.018	16.2		88										
27-Jun-11	7.6	2870	15.9	9				403	382	1370	0.1	<0.05	289	101	0.468	67	0.011	15.9		89										
27-Jul-11	7.9	2820	14.6	5				413	391	1310	0.06	0.09	280	101	0.516	66	0.019	14.6		90										
26-Aug-11	7.8	2700	19.3	<1				376	381	1300	0.02	0.06	277	100	0.462	109	0.015	19.3		94										
29-Sep-11	7.3	3040	16.4													79		16.4												

Roseville Pit

Notes:
conc taken as MDL

DATE	Temp	pH	Cond.	Acidity	Sodium	Chloride	Sulphate	Al	Fe (filt.)	Ca	Mg	Mn	ORP	Zn	Alkalinity	Nitrogen	Nitrate	Phosphorus	B	Cd	Cu	Pb	Cr	Hg	As
	°C		(uS/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mV)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
3-Apr-95		4.1	530			74	84		0.11																
6-Sep-95		3.7	3310																						
19-Sep-95		2.5	4340																						
25-Sep-95		2.5	4390																						
3-Oct-95		2.4	4250																						
9-Oct-95		2.4	4470																						
16-Oct-95		2.5	4340																						
27-Oct-95		6.4	2120																						
30-Oct-95		2.4	4010																						
6-Nov-95		2.5	4670																						
29-Nov-95		6.6	2590																						
7-Dec-95		6.3	1800				180		0.21	26	32														
18-Dec-95		6.1	2900																						
27-Dec-95		5.7	4000																						
9-Jan-96																									
22-Jan-96		4.8	3950																						
6-Feb-96		3.7																							
13-Feb-96		2.9	4600																						
22-Feb-96		3.0	4500			1300																			
22-Feb-96		6.8	4200			1000																			
12-Mar-96		3.0	3900																						
27-Mar-96		3.4	4800																						
10-Apr-96		3.6	5300																						
24-Apr-96		5.7	5200																						
14-May-96		6.6	4050																						
28-May-96		5.8	4100																						
11-Jun-96		4.2	5100			*	150		100	130	120														
25-Jun-96		6.1	4600																						
22-Jul-96		6.1	5250																						
12-Aug-96		6.4	5000																						
28-Aug-96		6.1	4700																						
10-Sep-96		7.0	1900																						
10-Sep-96		6.4	5100																						
26-Sep-96		3.6	6100			1900	90		12	150	120														
28-Oct-96		5.7	5200																						
12-Nov-96		6.8	6200																						
22-Nov-96		6.2	5500																						
16-Dec-96		7.8	2900																						
23-Dec-96		7.0	4700																						
9-Jan-97		6.6	4700																						
21-Jan-97		6.2	5100			1500	110		2.9	120	110														
11-Feb-97		6.6	4400																						
18-Apr-97		7.3	3600																						
19-May-97		7.9	2400																						
5-Jun-97		7.1	3800																						
13-Jun-97		7.1	4000																						
23-Jun-97		7.9	2400																						
14-Jul-97		7.3	3900																						
21-Aug-97		7.0	3400																						
22-Aug-97		7.9	3000			760	63		0.02																
11-Sep-97		7.1	3900																						
13-Oct-97		7.8	3700																						
12-Nov-97		7.4	2900			750	69		0.02																
16-Dec-97		5.7	4700																						
14-Jan-98		7.3	3600																						
19-Feb-98		6.8	6500																						
20-Mar-98		7.7	3800																						
24-Apr-98		INACCESSIBLE																							

Notes:
conc taken as MDL

DATE	Temp °C	pH	Cond. (uS/cm)	Acidity (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Sulphate (mg/L)	Al (mg/L)	Fe (filt.) (mg/L)	Ca (mg/L)	Mg (mg/L)	Mn (mg/L)	ORP (mV)	Zn (mg/L)	Alkalinity (mg/L)	Nitrogen (mg/L)	Nitrate (mg/L)	Phosphorus (mg/L)	B (mg/L)	Cd (mg/L)	Cu (mg/L)	Pb (mg/L)	Cr (mg/L)	Hg (mg/L)	As (mg/L)
19-May-98		INACCESSIBLE - Being pumped to Co-Disposal																							
31-May-06		7.0	6500	20	760	2700	92	0.02	0.01	250	210	0.7	192	0.02											
29-Jun-06		6.1	7400	270	1200	28	120	0.02	50	310	310	6.8		0.19											
31-Jul-06		7.1	7700	37	770	2100	50	0.35	0.34	290	250	1.3	63	0.03											
31-Aug-06		7.4	1700	370	210	530	200	2.6	0.04	46	45	1.2	52	0.17											
29-Sep-06		6.8	5900	66	700	2100	120	0.05	0.05	262	210	0.12	63	0.08											
30-Oct-06		6.9	6400	75	760	2400	100	0.17	0.05	340	230	1.35	170	0.07											
30-Nov-06		6.9	7200	370	-	1900	300	-	2.3	350	250	0.72	198	-											
29-Dec-06		7.3	6900	26	770	60	210	0.02	0.01	280	210	0.19	9												
31-Jan-07		6.8	3900	56	700	2500	310	0.05	0.05	310	200	0.75	140	0.12											
27-Feb-07		6.7	4600	30	1000	65	410	0.02	0.01	350	290	0.1	193	0.01											
29-Mar-07		7.8	1800	83	637	3373	400	0.56	0.82	258	179	0.42	117	0.02											
3-May-07		6.8	5600	98	835	1836	415	0.43	0.67	410	257	0.78	148	0.01											
31-May-07		6.3	5600	19	802	2035	588	0.01	0.01	8.6	262	1.4	148	0.01											
28-Jun-07		7.3	5100	30	693	1568	720	0.28	0.1	347	220	1.3	174	0.01											
30-Jul-07		6.4	4700	11.8	758	1598	855	0.1	0.1	372	239	0.62		0.01											
20-Aug-07		6.7	770	22	89	160	111	0.56	0.09	18	14	0.47	280	0.08											
13-Aug-07		6.9	3500																						
28-Sep-07		6.4	4700	30	849	1457		0.01	0.02	354	216	0.8	125	0.03											
31-Oct-07		6.8	4200	21	726	1640		0.52	1.59	280	168	0.88	180	0.01											
31-Nov-07		7.4	4200	26	714	1292	536	9.54	21.5	250	145	0.824		0.11											
27-Dec-07		7.9	2700	16	663	1238	597	0.01	0.15	252	54	0.666		0.0005											
30-Jan-08		7.0	3900	38	639	1348	520	0.3	0.05	320	145	0.741	500	0.01											
29-Feb-08		6.1	1300	8	326	792	167	0.82	1.7	121	75	0.643	-760	0.044											
25-Mar-08		7.6	4000	196.9	658	1552.9	468	0.27	0.05	276	164	0.428		0.012											
30-Apr-08		7.5	2650	19	333	617	305	0.22	0.05	124	71	0.64		0.021											
28-May-08		7.3	4400	14	722	1950	435	0.1	0.05	343	169	0.567		0.011											
30-Jun-08		7.3	2000	5	289	653	173	0.14	0.05	118	62	0.276		0.011											
31-Jul-08		7.5	4600	9	760	1400	449	0.43	0.05	291	168	0.857		0.009											
29-Aug-08		8.0	6840	14	863	3310	116	0.03	0.05	418	225	0.308		0.01											
24-Sep-08		7.2	5200	28	777	3140	624	0.1	0.05	520	204	0.662		0.009											
31-Oct-08		6.7	6220	5	890	2570	231	0.83	0.05	431	209	0.805		0.021											
1-Dec-08		7.4	3690	1	509	2	547	0.06	0.05	217	122	0.788		0.087	80	4.3	3.31	0.02	0.05	0.0003	0.002	0.001	0.001	0.0001	0.001
24-Dec-08		7.2	6190	5	336	316	579	0.58	0.05	246	68	1.24		0.091	272										
28-Jan-09		6.1	6480	10	802	2390	199	0.17	0.05	419	217	0.812		0.055											
20-Feb-09		8.6	980	1	22	141	127	0.71	0.88	29	22	0.358		0.075											
19-Mar-09		7.1	5070	10	694	1420	530	0.16	0.05	266	153	1.4		0.046											
27-Apr-09		6.9	5210	63	688	1660	496	0.05	0.28	327	186	1.35	171	0.166											
14-May-09		6.5	6600	60	772	2340	302	0.29	0.21	388	211	1.39	176	0.052											
26-Jun-09		no access																							
15-Jul-09	19	6.9	5970	1	749	1990	288	3.32	0.05	404	209	1.12	114	0.061											
10-Aug-09	17.3	6.6	6390	10	757	1960	317	46.6	0.05	387	200	1.26	206	0.43											
	Sump Filled in, Roseville west created																								
	Water stored on old down ramp																								
20-Oct-09				1	1350	3710	63.7	0.09	0.05	440	323	1.66		0.01											
10-Nov-09		7.6	781																						
30-Nov-09		7.5	1215	1	149	267	130	0.08	0.05	34	26	0.379		0.07											
16-Dec-09		7.3	1721	1	194	326	152	0.56	0.05	42	34	0.41		0.03											
18-Jan-10		6.9	1745	1	233	355	182	0.09	0.05	63	48	5.68		0.015											
10-Feb-10	29.3	7.1	4490	1	532	1210	773	0.44	0.05	260	179	1.68	244	0.108											
11-Mar-10		7.2	6710	28	761	1670	931	0.05	0.05	434	261	1.33	196	0.196											
22-Apr-10	23.8	7.2	6520	20	798	1630	887	0.07	0.05	396	264	1.02	155	0.159											
24-May-10	16.9	7.2	6170	39	804	2000	934	0.06	0.05	478	270	1.18	124	0.215											
24-Jun-10	16.9	7.1	6160	19	761	1690	840	0.03	0.05	388	232	1.69	171	0.126											
29-Jul-10	14.8	7.6	5300	19	596	1370	598	0.27	0.05	289	188	1.46	242	0.07											
17-Aug-10	16.4	7.8	6310	10	687	1490	623	0.01	0.05	363	220	1.77	63	0.103											
24-Sep-10	21.8	6.6	4820	69	778	1660	652	0.08	0.05	395	226	1.64	76	0.276											

Notes:
conc taken as MDL

DATE	Temp °C	pH	Cond. (uS/cm)	Acidity (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Sulphate (mg/L)	Al (mg/L)	Fe (filt.) (mg/L)	Ca (mg/L)	Mg (mg/L)	Mn (mg/L)	ORP (mV)	Zn (mg/L)	Alkalinity (mg/L)	Nitrogen (mg/L)	Nitrate (mg/L)	Phosphorus (mg/L)	B (mg/L)	Cd (mg/L)	Cu (mg/L)	Pb (mg/L)	Cr (mg/L)	Hg (mg/L)	As (mg/L)
27-Oct-10	24.8	7.2	4390	10	663	2830	400	0.01	0.05	272	194	1.28	146	0.04											
30-Nov-10	25.2	7.5	5740										208												
21-Dec-10	26.2	6.9	4960	19	640	1440	634	0.34	0.69	277	192	1.49	41	0.122											
31-Jan-11	29.6	7.4	6300	38	771	1680	673	0.02	0.5	336	229	1.08	69	0.068											
Not being pumped into water storage, used for irrigation.																									
27-Jul-11	15.4	7.4	4000	24	587	1070	793	0.67	0.41	268	176	0.303	106	0.012											
26-Aug-11	No access																								
29-Sep-11	19.3	7.4	4680										75												

Roseville West

Notes:
conc taken as MDL

DATE	Temp	pH	Cond.	Acidity	ORP	Sodium	Chloride	Sulphate	Iron (filt.)	Aluminium	Calcium	Magnesium	Manganese	Zinc
	°C		(uS/cm)	mg/L	(mV)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
14-Sep-09	22.2	7.6	10230	<1	135	1730	39900	103	0.5	0.12	431	302	1.1	0.007
02-Oct-09		7.3	12130		161									
12-Oct-09		7.8	10770		96									
20-Oct-09		8	11310		52									
10-Nov-09		7.3	1802											
30-Nov-09		7.5	7220	5		1160	2860	47.3	0.5	0.26	379	228	0.527	0.018
16-Dec-09		6.9	8820	20		1300	2720	33.9	0.5	0.19	586	284	0.27	0.03
18-Jan-10		7.1	7650	<1		1050	2820	166	0.05	0.15	354	205	0.434	0.014
10-Feb-10	28	7.4	6530	<1	179	878	2320	362	0.05	1.74	325	212	0.717	0.044
11-Mar-10		7.2	8340	18	186	1080	2790	160	0.5	0.08	418	226	0.504	0.014
22-Apr-10	25.8	7.4	8860	15	175	1150	2830	81	0.5	0.24	469	238	0.334	0.02
24-May-10	17.2	7.4	7850	10	148	1140	4200	105	0.5	0.15	521	253	0.378	0.022
24-Jun-10	18.9	7.3	6690	<1	208	947	2180	117	0.05	0.65	357	164	0.327	0.007
30-Jul-10	15.4	7.4	5540	14	248	648	1610	176	0.05	0.92	263	129	0.298	0.029
17-Aug-10	19.6	7.8	8270	19	100	1060	2820	16	0.5	0.44	438	184	0.258	0.013
24-Sep-10	24.4	7.2	5652	10	92	941	2520	65	0.5	0.04	457	204	0.162	0.011
27-Oct-10	23.5	7.4	6270	10	175	961	3900	124	0.05	0.14	448	206	0.305	0.058
30-Nov-10	23.1	7.8	4670		181									
21-Dec-10	22.5	7.1	3410	19	64	504	972	20	0.05	0.05	159	60	0.112	0.024
31-Jan-11	28.3	7.4	5350	19	37	668	1560	186	0.12	0.02	283	117	0.105	0.015
28-Feb-11	25.8	7	4220	28	87	690	1510	220	0.5	0.02	298	126	0.225	0.011
31-Mar-11	21.7	6.9	4360	38	146	587	1390	213	3.33	2.28	280	111	0.364	0.044
29-Apr-11		7.4	6830	30	111	630	1720	186	0.5	0.02	334	136	0.289	0.018
30-May-11	14.6	7.4	5540	50	57	664	1400	180	0.05	0.02	350	147	0.215	0.012
27-Jun-11	13.2	7.5	2610	9	42	345	712	289	0.06	0.09	152	68	0.248	0.014
27-Jul-11	16.2	7.8	3710	19	83	526	1120	337	0.3	0.02	251	104	1.61	0.07
26-Aug-11	22.3	7.6	3980	18	113	585	1380	149	0.32	0.4	281	114	0.157	0.009
29-Sep-11	18.5	7.1	5870		91									

Ellis Dam

DATE	pH	Cond. (uS/cm)	TSS (mg/L)	Turbidity (NTU)	
15/03/2004	6.9	200	40	105	Pre-discharge sample

BRN Pit

Notes:
conc taken as MDL
nb- pit water prior to 25/09/03 was sampled at BRNSD

DATE	pH	Cond. (uS/cm)	Temp °C	ORP	TSS (mg/L)	TDS (mg/L)	Al (mg/L)	Ca (mg/L)	Fe (mg/L)	Mg (mg/L)	Mn (mg/L)	Pb (mg/L)	P (mg/L)	Zn (mg/L)	Cl (mg/L)	SO4 (mg/L)	Bicarb. (mg/L)	Alkalinity (mg/L)	Acidity (mg/L)	Total N (mg/L)	Sodium (mg/L)	Arsenic (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Chromium (mg/L)	Mercury (mg/L)
25-Sep-03	7.8	1300		-36	13	982		50	40.9	26	1.7	0.005	0.1	0.08	440	20	29	110	110	1.4	1.4						
31-Oct-03	6.9	1100		-35				49	37.6	24	2.1			0.13	380	18			90								
28-Nov-03	6	1150		25				58	30.3	24	1.7			0.06	490	28			95								
22-Dec-03	7.2	2000		122				65	0.1	36	0.46			0.03	490	61			20								
30-Jan-04	6.6	1240					0.05	77	2.4	25	0.8			0.06	330	98			63								
1/03/2004*	7.5	1200		169			0.05	56	0.05	31	0.94			0.2	164	230			23								
31-Mar-04	6.9	2000		-14			0.05	88	0.05	53	1.8			0.12	370	340			12								
30-Apr-04	7.5	1700		135			0.05	100	0.05	33	0.66			0.02	410	78			12		180						
31-May-04	6.8	1600		-63			0.05	100	3	26	0.75			0.02	400	29			36		140						
30-Jun-04	7.5	1600		33			0.05	120	0.05	31	0.46			0.02	310	29			12		120						
30-Jul-04	7.6	1500		148			0.05	120	0.05	29	0.59			0.11	290	160			34		120						
27-Aug-04	6.9	1500		3			0.05	120	0.05	28	0.42			0.02	320	50			?		130						
30-Sep-04	6.3	1100		229																							
5-Oct-04							0.05	46	0.05	21	0.74			0.26	180	220			44		100						
29-Oct-04	7	1300		145			0.05	83	0.05	30	0.85			0.15	85	330			10		113						
30-Nov-04	7.1	1600		140			1.48	88	1.45	28	0.97			0.06	303	150			10		164						
22-Dec-04	7.2	1700		-29			0.05	130	0.05	31	0.67			0.02	340	80			0		140						
31-Jan-05	7.4	1800		165																							
4-Mar-05	6.9	2000		-48			0.05	180	0.05	44	0.62			0.02	350	290			29		180						
31-Mar-05	7.5	1600		148			0.05	116	0.05	49	1.89			0.31	131.5	528			24		146						
29-Apr-05	7	1900		-3			0.02	158	0.01	38	0.24			0.01	335	204			17.6		180						
31-May-05	6.6	1700		-20			0.59	280	0.07	110	3.3			0.11	230	1100			60		250	Extremely 'muddy' sample					
1-Jun-05	7.6	2100		169			0.02	170	0.29	58	2.2			1	220	609			20		200						
29-Jul-05	6.9	2000		196			0.1	170	0.11	166	1.89			0.04	270	450			19.8		180						
30-Aug-05	7.6	1800		-30			0.02	110	7.6	32	1.6			0.06	360	210			20		160						
30-Sep-05	7.5	1700		151			0.02	210	0.06	86	3.3			0.41	220	890			30		203						
8-Nov-05	7.2	1800		122			0.02	150	0.08	46	2			0.14	190	180			4.9		208						
28-Nov-05	7.2	1300		170			0.11	53	2.4	34	2.6			0.39	74	480			12		200						
19-Dec-05	7.2	2000		133			0.02	230	0.01	105	0.63			0.01	330	1300			13		520						
31-Jan-06	6.5	2100		161			0.02	140	0.01	320	0.16			0.01	500	320			16		240						
27-Feb-06	7.7	2000		164			0.02	280	0.01	110	2.5			0.01	320	1100			9.8		2						
31-Mar-06	7.4	2100		181			0.02	260	0.01	82	3.3			0.57	330	950			13		260						
14-Apr-06	7.1	2200		110			0.02	190	0.01	60	1.8			0.2	250	920			2.5		220						
31-May-06	7.6	1500		166			0.02	200	0.01	86	2.3			0.22	320	950			13		200						
29-Jun-06	7.1	1900		-21			0.02	150	0.35	53	1.8			0.18	260	640			17		220						
31-Jul-06	7.2	2400		7			0.02	140	0.02	42	0.54			0.01	310	300			6.7		250						
31-Aug-06	7.7	2000		30			1.9	120	0.01	41	0.96			0.01	400	380			6.7		220						
29-Sep-06	7.2	2200		70			2.9	177	0.22	86	0.5			0.0014	180	130			96		220						
30-Oct-06	7.6	2100		145			0.38	69	0.38	41	1.78			0.12	300	290			86		190						
30-Nov-06	7.5	2100		183	2	1500	-	130	0.1	51	1.3	0.1	0.14	-	340	560			110	0.06	-						
29-Dec-06	7.1	1800		16			0.14	130	0.01	43	0.4			0.15	27	540			pH>8.3		220						
31-Jan-07	7.1	1900		17			0.05	150	0.05	49	0.51			0.04	300	500			6		270						
27-Feb-07	6.9	1900		171			0.02	110	0.01	56	0.5			0.1	18	760			pH>8.3		210						
29-Mar-07	6.7	5200		149			2.34	96.2	18.7	24	1			0.27	252	440			20		185						
3-May-07	8.3	1400		151			1.3	73	8.8	18	0.46			0.1	273	198			13		189						
31-May-07							0.01	155	0.15	59	2.5			0.08	273	639			22		182						
28-Jun-07	6.3	1500		156			0.4	118	0.1	53	3.3			0.26	117	636			47		146						
30-Jul-07	6.7	1650								65	3.8			0.3	218	690			4.9		206						
20-Aug-07	**3.8**	690		345			1.1	48	0.33	17	0.96			0.36	85	243			55		30						
28-Sep-07	6.1	1800		142			0.04	159	0.05	63	3			0.24	530		55		30		276						
31-Oct-07	6.2	1860		142			**9.49**	217	1.17	104	6.35			2.23	250				103		274						
31-Nov-07	7.5	1700					0.1	111	0.19	49	2.56			0.183	179	611			22		204						
27-Dec-07	9.4	1360					0.01	124	0.22	124	2.71			0.156	176.1	621			5		197						
30-Jan-08	5.6	1340		-90			0.09	131	0.05	60	3.15			0.156	151	715			22		203						
29-Feb-08	6.3	1690		-880			0.22	148	0.51	63	2.54			0.096		170			11		228						
25-Mar-08	7.8	1900					0.34	174	0.05	64	2.71			0.085	187.6	807			22.5		245						
30-Apr-08	7	1303						95	0.05	46	1.37			0.17	59	375			5		112						
28-May-08	6.5	1870					0.06	164	0.05	61	2.73			0.14	157	771			9		205						
30-Jun-08	6.7	2300					0.01	240	0.09	68	2.06			0.04	243	974			5		318						
31-Jul-08	7.3	2100					0.52	183	0.05	42	0.998			0.009	314	473			14		265						
29-Aug-08	7.9	2280					0.1	418	0.05	39	0.64			0.01	440	360			9		252						

Notes:

conc taken as MDL

nb- pit water prior to 25/09/03 was sampled at BRNSD

DATE	pH	Cond.	Temp	ORP	TSS	TDS	Al	Ca	Fe	Mg	Mn	Pb	P	Zn	Cl	SO4	Bicarb.	Alkalinity	Acidity	Total N	Sodium	Arsenic	Boron	Cadmium	Copper	Chromium	Mercury
		(uS/cm)	°C		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
24-Sep-08	7.6	1800					0.02	182	0.05	42	0.982			0.023	232	638			1		217						
31-Oct-08	7.1	1900					0.21	244	0.05	35	0.334			0.0006	312	636			5		223						
1-Dec-08	7.7	1460					0.34	202	0.05	54	0.839	0.001	0.03	0.034	265	828		160	1	2.7	265	0.001	0.05	0.0001	0.002	0.001	0.0001
24-Dec-08	7.4	2620					0.58	246	0.05	68	1.24			0.091	316	579			5		336						
28-Jan-09	7.5	2500					0.07	219	0.05	59	1.15			0.021	362	586			1		336						
20-Feb-09	8.6	980					0.26	65	2.96	31	1.38			0.234	44	268			5		93						
19-Mar-09	7.1	1240					0.41	99	0.05	43	2.06			0.182	76	564			0		133						
27-Apr-09	7.2	2060		92			0.04	202	0.05	64	2.34			0.125	157	662			16		244						
14-May-09	7.4	2640		127			0.04	224	3.29	66	2.2			0.086	259	672			5		294						
26-Jun-09	6.9	2280	15.9	11			0.08	224	0.05	63	1.72			0.085	233	744			1		312						
15-Jul-09	6.9	2580	14.5	2			5.86	238	0.05	71	2.13			0.134	316	919			1		352						
10-Aug-09	7.1	3570	18.5	4			0.09	299	1.62	81	1.2			0.081	380	1420			10		480						
14-Sep-09	6.7	2360		66			0.02	196	0.05	54	0.991			0.101	426	787			15		298						
20-Oct-09	7.8	3350		61			0.06	205	0.05	62	1.66			0.204	395	877			1		374						
30-Nov-09	7.1	2190					0.02	206	0.05	65	2.52			0.186	205	962			5		236						
16-Dec-09	7.1	3020					0.03	209	0.05	74	2.76			0.142	304	938			5		336						
18-Jan-10	7.1	2150					0.11	189	0.05	62	2.95			0.177	180	620			1		221						
10-Feb-10	7.3	1837	30.3	121			0.13	152	0.05	46	1.52			0.134	233	542			1		195						
11-Mar-10	6.7	3100		11			0.28	223	0.08	74	2.73			0.122	354	930			28		353						
22-Apr-10	7.5	3220	25.8	165			0.06	238	0.05	61	1.11			0.061	549	714			1		435						
24-May-10	7.5	3030	16.7	104			0.03	206	0.05	51	0.709			0.046	838	971			1		447						
24-Jun-10	6.9	2600	15.7	72			0.02	228	0.05	65	2.58			0.25	258	920			10		256						
29-Jul-10	7.1	2530	14.5	221			0.1	190	0.05	64	1.96			0.133	275	827			19		248						
17-Aug-10	7.2	3080	19.6	19			0.03	267	0.05	78	2.54			0.13	344	878			1		290						
24-Sep-10	7.5	2390	25.5	69			0.01	258	0.05	74	2			0.065	436	730			1		326						
27-Oct-10	7.7	2260	26.1	155			0.01	234	0.08	65	1.86			0.046	440	546			1		306						
30-Nov-10							0.04	254	0.05	71	2.14			0.119	293	775			16		272						
21-Dec-10	6.9	2650	26.3	-19																							
31-Jan-11	6.6	3270	28.3	3																							
28-Feb-11	6.5	2800	28.7	-9			0.18	129	9.56	32	2.9			0.133	160	366			24		118						
31-Mar-11	6.2	2460	23.5	53			96.3	284	541	94	14.3			2.63	273	1220			67		287						
29-Apr-11	6.9	3220		32			0.33	319	10.1	86	3.1			0.137	380	1140			30		315						
30-May-11	7.5	3330	14.2	48			0.52	290	1.82	64	1.69			0.031	446	879			30		366						
27-Jun-11	7.3	1428	12.8	10			0.43	124	2.85	45	2.11			0.3	116	602			1		136						
27-Jul-11	7.6	1898	14.9	-2			1.68	169	6.83	55	2.15			0.319	272	730			9		231						
26-Aug-11	7.3	2360	21.4	29			0.2	245	2.68	63	2.03			0.143	352	950			9		296						
29-Sep-11	7.4	2740	20.5	61			0.11	265	3.58	62	1.46			0.07	600	815			9		397						
28-Oct-11	6.9	2200	24.6	36			0.08	185	4.34	65	1.69			0.243	358	760			10		289						

Eastern Storage Dam
Stratford East Dam
Dam D2
Notes:
conc taken as MDL

DATE	pH	Cond. (uS/cm)	Temp °C	ORP	Water Level (mRL)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Acidity mg/L	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Sodium (mg/L)
25-Aug-95	7.2	340				250				**1500**	4	**7.8**	
20-Sep-95	7.4	263											
27-Sep-95	7.1	250											
4-Oct-95	7.4	260				310	350			61	1	1	
12-Oct-95	7.3	272											
30-Oct-95	6.8	280											
7-Nov-95	7.1	295											
14-Nov-95	6.6	287											
6-Dec-95	6.7	160											
7-Dec-95	6.6	170				200	670			39	**19**	0.61	
18-Dec-95	6.6	177											
27-Dec-95	6.6	184											
9-Jan-96	6.4	181											
20-Jan-96	6.9	180				170	410				39		
20-Jan-96						170	390				35		
23-Jan-96	6.6	190				**210**	340			35	**17**	3.2	
30-Jan-96	6.8					170	290				32		
2-Feb-96	7.1	181											
14-Feb-96	6.8	185											
22-Feb-96	6.9	220											
12-Mar-96	6.4	180											
27-Mar-96	6.4	220											
10-Apr-96	6.8	220											
24-Apr-96	6.4	220											
14-May-96	6.9	230											
28-May-96	6.7	230											
11-Jun-96	6.7	230				280	230			45	12	3.7	
25-Jun-96	6.9	240											
22-Jul-96	6.7	250											
12-Aug-96	6.9	230											
28-Aug-96	7.1	230											
10-Sep-96	7.3	250											
26-Sep-96	7.1	280				280	300			44	27	4.5	
28-Oct-96	7.6	250											
12-Nov-96	7.6	260											
22-Nov-96	7.5	260											
16-Dec-96	7.5	300											
23-Dec-96	7.8	670											
9-Jan-97	7.7	920											
21-Jan-97	7.8	1200				560	32			250	70	0.75	
11-Feb-97	8.1	980											
12-Mar-97	7.4	1150											
18-Apr-97	7.5	1700											
14-May-97	7.8	1600				1000	3			400			
5-Jun-97	8.0	1900											
13-Jun-97	8.0	1800											
10-Jul-97	8.0	1850											
28-Jul-97	8.0	1800				1000	3	2		380	180	0.02	
21-Aug-97	8.1	1750											
11-Sep-97	8.5	1700											
13-Oct-97	8.5	1600											
12-Nov-97	8.5	1900				1100	21	4		420	170	0.02	
16-Dec-97	8.4	2000											
14-Jan-98	8.5	2000											
19-Feb-98	8.6	1900											
20-Mar-98	8.3	2000											
24-Apr-98	8.1	1800											
19-May-98	7.9	1750											
30-Jun-98	8.7	1830											
6-Jul-98	8.5	1840											
10-Jul-98													280
27-Jul-98	8.5	1900											
17-Aug-98	7.6	860				1300	17	12		380	370	0.01	
21-Sep-98	8.7	1900											
23-Oct-98	8.6												
23-Nov-98	9.0	2080											
22-Dec-98	9.1	2250											
19-Jan-99		2340											
10-Feb-99	8.0	2280				1200	35	5		340	380	0.02	
17-Feb-99	7.8	2240											
23-Mar-99	7.9	2650											
30-Apr-99	8.0	2270											
18-May-99	8.2	2270											
25-May-99						1600	5			340	420	0.03	290
28-Jun-99	7.6	2170											
19-Jul-99	7.9	2100											
10-Aug-99	7.8	2230											
23-Aug-99	7.5	2260				1600	3	2		360	440	0.02	
29-Sep-99	8.3	1725											
25-Oct-99	8.2	2290											
22-Nov-99	8.2	2220											

DATE	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Al (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (ug/L)	Mn (mg/L)	Total Hardness CaCO3)mg	Bicarb Alk (mg/l)	Nitrate (mg/L)	K (mg/l)	Ba (mg/l)	St (mg/l)	Si (mg/l)	Colour (units)	Total Alkalinity (mg/l)	Sulphide (mg/l)	Mo (mg/l)	Zn (mg/l)	Se (mg/l)	Be (mg/l)	Ni (mg/l)	Oil&Grease (mg/l)	Pb (mg/L)
4-Oct-95			7.6		8																								
7-Dec-95			3.4		3.5	0.01		0.01	0.01			0.05																	0.01
23-Jan-96			3		4.6																								
11-Jun-96			4.2		4.7																								
26-Sep-96			4.7		5.7																								
21-Jan-97			24		22																								
25-May-99			100		58							0.08	1100	160	6.6	6.1	0.11	1.5	2.8										

Notes:
conc taken as MDL

DATE	pH	Cond. (uS/cm)	Temp °C	ORP	Water Level (mRL)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Acidity mg/L	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Sodium (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Al (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (ug/L)	Mn (mg/L)	Total Hardness CaCO3)mg	Bicarb Alk (mg/l)	Nitrate (mg/L)	K (mg/l)	Ba (mg/l)	St (mg/l)	Si (mg/l)	Colour (units)	Total Alkalinity (mg/l)	Sulphide (mg/l)	Mo (mg/l)	Zn (mg/l)	Se (mg/l)	Be (mg/l)	Ni (mg/l)	Oil&Grease (mg/l)	Pb (mg/L)
29-Dec-99	7.0	2170																																								
2-Feb-00		2130																																								
22-Feb-00	8.5	2360				1500	2	5		380	530	0.02																														
30-Mar-00	8.2	2010																																								
4-May-00	8.2	1910																																								
29-May-00	8.0	1610																																								
7-Jun-00	8.1	1900				1400	3	2		380	680	0.03	300	1.2	0.11	100		58	0.001	0.001	0.001	0.005	0.01	0.0001	0.17		170	0.8	6.6				4	170	0.004	0.004	0.05	0.001			2	0.01
29-Jun-00	8.1	1890																																								
31-Jul-00	8.4	1920																																								
22-Aug-00	8.5	1930				1400	4	6		360	560	0.02																														
5-Oct-00	8.3	1990																																								
2-Nov-00	8.5	1880																																								
30-Nov-00	8.7	2070																																								
18-Jan-01		1548																																								
21-Feb-01	7.8	2530						18																																		
4-Jun-01	8.0	2050																																								
30-Aug-01	7.4	2090																	0.005	0.008	0.001	0.01		0.0005															0.001	0.02		0.03
30-Nov-01	7.8	2250																																								
19-Dec-01											490																															
31-Dec-01	7.5	2270																																								
11-Feb-02	7.7	2190																																								
3-Apr-02	6.9	2400																																								
28-May-02	7.1	2650																																								
1-Jul-02	7.4	2500																																								
28-Oct-02							12																																			
1-Nov-02	7.8	2250																																								
12-Nov-02	7.9	2178			162.9																																					
18-Nov-02	7.6	2488			162.8																																					
25-Nov-02	7.9	2193			162.7		73																																			
2-Dec-02	8.3	1973			162.7																																					
19-Dec-02	7.6	1944			162.9																																					
30-Dec-02	7.7	1914			162.9																																					
1-Jan-03	7.8	2150			162.9		8																																			
7-Jan-03	7.6	2086			162.9																																					
15-Jan-03	7.4	2024			162.9																																					
22-Jan-03	7.6	1960			162.9																																					
29-Jan-03	7.6	1862			162.8																																					
28-Feb-03	7.1	2400			162.2																																					
3-Mar-03	7.1	2400			162.2																																					
24-Mar-03	7.8	1815			162.2																																					
30-Mar-03	6.6	1650			162.2		26																																			
14-Apr-03	7.3	2400			162																																					
29-Apr-03	7.3	2430			162		6																																			
19-May-03	7.3	2332			161.95																																					
28-May-03	7.1	2430			162.1		3																																			
3-Jun-03	7.1	2100			162																																					
11-Jun-03	7.2	2100			162																																					
27-Jun-03	7.0	2440			162		2																																			
15-Jul-03	7.2	2400			161.7																																					
2-Oct-03	7.4	730			-																																					
8-Sep-03	7.8	2200			-																																					
25-Sep-03	7.5	2400			161																																					
20-Oct-03	7.6	2300			159.6																																					
31-Oct-03	7.4	2100			159.4																																					
19-Nov-03	7.1	2300			159.4																																					
16-Dec-03	8.4	2200			159.6																																					
20-Jan-04							14																																			
30-Jan-04	8.6	2000			159.6																																					
27-Feb-04	7.0	2500			159.6																																					
31-Mar-04	8.5	2400			159.6																																					
30-Apr-04	8.2	2400			159.4																																					
31-May-04	7.8	2400			159.4																																					
30-Jun-04	7.6	1900			159.4			Addition of Eastern Emplacement Waters																																		
30-Jul-04	8.0	2400			159.4																																					
27-Aug-04	7.5	2400			159.4																																					
30-Sep-04	7.1	2400			159.6																																					
29-Oct-04	No access																																									
30-Nov-04	7.4	2400			159.6																																					
22-Dec-04	8.3	2200			160																																					
31-Jan-05	7.8	2300			160.2																																					
27-Feb-05	No access																																									
24-Mar-05	7.4	2200			160.6																																					
29-Apr-05	7.6	2200			160.6																																					
17-Jul-05	7.9	2100			161.4																																					
29-Jul-05	7.8	2200			161.4																																					
30-Aug-05	7.8	2100			161.4																																					
30-Sep-05	7.6	2200			161.4																																					
8-Nov-05	No access																																									
30-Nov-05	7.0	2000			159.6	Corrected RL level																																				
19-Dec-05	7.3	2000			159.55																																					
31-Jan-06	6.9	2100			159.4																																					
27-Feb-06	7.8	2200			159.3																																					

Notes:
conc taken as MDL

DATE	pH	Cond. (uS/cm)	Temp °C	ORP	Water Level (mRL)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Acidity mg/L	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Sodium (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Ca (mg/L)	Al (mg/L)	Mg (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (ug/L)	Mn (mg/L)	Total Hardness CaCO3)mg	Bicarb Alk (mg/l)	Nitrate (mg/L)	K (mg/l)	Ba (mg/l)	St (mg/l)	Si (mg/l)	Colour (units)	Total Alkalinity (mg/l)	Sulphide (mg/l)	Mo (mg/l)	Zn (mg/l)	Se (mg/l)	Be (mg/l)	Ni (mg/l)	Oil&Grease (mg/l)	Pb (mg/L)
31-Mar-06	6.9	2100			159.3																																					
14-Apr-06	7.5	2100			159.3																																					
31-May-06	7.2	2200			159.2																																					
29-Jun-06	7.8	2100			159.2																																					
31-Jul-06	NS																																									
31-Aug-06	NS																																									
29-Sep-06	7.1	2000			158.1																																					
30-Oct-06	7.0	2200			157.8																																					
31-May-07	7.8	2000																																								
28-Sep-07	7.4	1900																																								
27-Dec-07	7.3	1800																																								
25-Mar-08	7.3	2000																																								
30-Jun-08	7.4	2200																																								
31-Jul-08	7.2	2100																																								
29-Aug-08	7.3	2200																																								
24-Sep-08					157.5																																					
31-Oct-08					157.5																																					
1-Dec-08	8.2	1150			157.6					243	162	0.05	323	0.6	0.04	52	0.05	41	0.001	0.001	1E-04	0.001	0.05	0.0001	0.029									135			0.005					0.001
24-Dec-08	8.6	1510				1020	7.5			217	300	0.05		0.6	0.01	56		42	0.002	0.001	1E-04	0.001	0.05	0.0001	0.046									3								0.001
20-Feb-09	7.8	1400			157.6																																					
19-Mar-09	8.4	1340			157.9																																					
27-Apr-09	8.1	1294		149	158.3																																					
14-May-09	8.0	1441		139	158.4																																					
26-Jun-09	7.6	1252	14.4	123																																						
15-Jul-09	7.9	1309	15.1	62																																						
10-Aug-09	7.8	1344	17.1	111	159						271																															
10-Sep-09	7.8	1345	17.9	144																																						
20-Oct-09	8.3	1546		103	158.9																																					
30-Nov-09	8.6	1253			159																																					
16-Dec-09	7.7	1474							1	202	229	0.05	209			42	0.12	37							0.059												0.006					
18-Jan-10	7.7	1307			159.1																																					
10-Feb-10	8.0	1296	30.7	206																																						
11-Mar-10	7.6	1415		153	159.15																																					
22-Apr-10	8.1	1409	24.7	177	159.1																																					
24-May-10	7.8	1305	17.9	115	159.1																																					
24-Jun-10	8.0	1397	17.7	132	158.5				1	193	258	0.05	190			43	0.2	33							0.051												0.035					
29-Jul-10	7.6	1282	14.4	247	158.8																																					
17-Aug-10	7.4	1490	17.9	75	158.9																																					
24-Sep-10	8.2	1018	25.1	55	158.6																																					
27-Oct-10	7.9	136	26.1	136	158.5																																					
30-Nov-10	8.1	1332	24	199	158.9																																					
21-Dec-10	8.2	1284	28.2	53	158.9				1	214	233	0.08	182			38	0.05	32							0.047												0.016					
31-Jan-11	8.2	1391	30.9	193	158.9																																					
28-Feb-11	8.0	1205	28.3	99	158.9																																					
31-Mar-11	7.8	1197	23.8	125	158.9																																					
29-Apr-11	7.9	1350		96	159																																					
30-May-11	7.3	1340	14.9	26	159				10	193	210	0.09	175			37	0.01	31							0.002												0.005					
27-Jun-11	7.6	1067	16.5	41	159.5				1	190	186	0.17	150			37	0.13	28							0.02												0.005					
27-Jul-11	8.2	1105	15.6	32	159.9				1	186	184	0.05	166			38	0.08	29							0.015												0.005					
26-Aug-11	8.0	970	19.8	136	159.9				1	184	182	0.08	152			36	0.08	28							0.019												0.005					
29-Sep-11	7.8	1070	20.5	61	159.9																																					

Dam D1
Return Water Dam

Notes:
conc taken as MDL

DATE	pH	Cond.	Temp	Water Level	Acidity	Alkalinity	TDS	ORP	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Na	Al	Mg	Cu	As	Cd	Zn	Cr	B	Hg	Mn	Pb
		(uS/cm)	°C	(mRL)		(mg/L)	(mg/L)	(mv)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(ug/L)	(mg/L)	(mg/L)
29-May-95	7.1	4510																										
29-May-95	7.8	4560																										
25-Aug-95	4.7	5400					2800				1700	88	**13**															
5-Sep-95	5.4	4590																										
6-Sep-95	5.3	4580																										
7-Sep-95	6.0	4620																										
8-Sep-95	6.0	4620																										
11-Sep-95	6.3	4690																										
12-Sep-95	6.5	4680																										
13-Sep-95	6.5	4680																										
14-Sep-95	5.9	4710																										
15-Sep-95	6.1	4600																										
18-Sep-95	6.7	4560																										
19-Sep-95	6.7	4420																										
20-Sep-95																												
21-Sep-95	6.8	4600																										
22-Sep-95	6.9																											
25-Sep-95	6.4	4660																										
26-Sep-95	6.4	4640																										
27-Sep-95	6.4	4570																										
28-Sep-95	6.4	4650																										
29-Sep-95	6.5	4410																										
3-Oct-95	6.8	4580																										
4-Oct-95	7.0	4610																										
5-Oct-95	7.2	4650																										
6-Oct-95	6.9	4620																										
9-Oct-95	6.9	4560																										
10-Sep-95	6.7	4710																										
11-Oct-95	6.8	4690																										
12-Oct-95	7.0	4730																										
13-Oct-95	7.1	4620																										
16-Oct-95	7.2	4710																										
17-Oct-95	7.1	4660																										
18-Oct-95	7.3	4470																										
20-Oct-95	7.1	4660																										
23-Oct-95	6.9	4530																										
24-Oct-95	6.5	4660																										
27-Oct-95	6.9	4720																										
30-Oct-95	6.8	4790																										
31-Oct-95	7.1	4780																										
1-Nov-95	6.9	4710																										
2-Nov-95	7.0	4890																										
3-Nov-95	6.9	4690																										
6-Nov-95	6.8	4740																										
7-Nov-95	6.5	4890																										
9-Nov-95	7.0	4680																										
10-Nov-95	7.2	4660																										
13-Nov-95	6.8	4670																										
14-Nov-95	6.3	4640																										
15-Nov-95	7.0	4710																										
16-Nov-95	6.6	4760																										
17-Nov-95	6.4	4700																										
22-Nov-95	6.3	4500																										
23-Nov-95	6.1	3720																										
27-Nov-95	6.5	3380																										
28-Nov-95	6.4	3540																										
29-Nov-95	6.5	3640																										
30-Nov-95	6.8	3600																										
1-Dec-95	6.5	3410																										
4-Dec-95	6.6	2960																										
5-Nov-95	6.7	2990																										
6-Dec-95	5.7	2820																										
7-Dec-95	6.6	3100					1600		7		800	260	0.16			87			70	0.01		0.01		0.01			1.5	0.01
8-Dec-95	6.6	2640																										
11-Dec-95	5.4	2760																										
12-Dec-95	6.2	2690																										
13-Dec-95	6.7	2720																										
14-Dec-95	6.0	2710																										
15-Dec-95	5.8	2780																										
18-Dec-95	5.5	2760																										
19-Dec-95	6.1	2750																										
21-Dec-95	6.1	2810																										
22-Dec-95	6.4	2850																										
27-Dec-95	5.4	2850																										
28-Dec-95	6.1	2840																										
29-Dec-95	5.7	2890																										
2-Jan-96	5.1	2800																										
3-Jan-96	4.8	2780																										
5-Jan-96	4.5	2780																										
8-Jan-96	3.9	2780																										
9-Jan-96	3.9	2780																										
10-Jan-96	4.1	2890																										
11-Jan-96	5.5	2830																										
12-Jan-96	6.3	2800																										
15-Jan-96	5.9	2760																										
16-Jan-96	6.6	2780																										

Notes:
conc taken as MDL

DATE	pH	Cond.	Temp	Water Level	Acidity	Alkalinity	TDS	ORP	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Na	Al	Mg	Cu	As	Cd	Zn	Cr	B	Hg	Mn	Pb
		(uS/cm)	°C	(mRL)		(mg/L)	(mg/L)	(mv)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(ug/L)	(mg/L)	(mg/L)
17-Jan-96	6.9	2790																										
18-Jan-96	6.5	2800																										
19-Jan-96	6.8	2810																										
22-Jan-96	6.5	2830																										
23-Jan-96	6.6	2810																										
24-Jan-96	6.7	2800																										
25-Jan-96	6.8	2720																										
29-Jan-96	7.5	2770																										
30-Jan-96	7.1	3100					1900		26		680	510	0.05			97			71									
31-Jan-96	7.5	2870																										
1-Feb-96	7.9	2920																										
2-Feb-96	7.8	2970																										
5-Feb-96	7.7	3080																										
6-Feb-96	7.7	3200																										
7-Feb-96	7.6	3040																										
8-Feb-96	7.3	3160																										
9-Feb-96	7.6	3150																										
12-Feb-96	7.8	3290																										
13-Feb-96	7.9	3300																										
14-Feb-96	7.9	3130																										
15-Feb-96	7.9	3200																										
16-Feb-96	7.9	3180																										
19-Feb-96	8.0	3300																										
20-Feb-96	7.9	3280																										
21-Feb-96	7.9	3300																										
22-Feb-96	7.2	3600					2200		9		740																	
23-Feb-96	7.9	3030																										
26-Feb-96	7.7	3220																										
27-Feb-96	7.8	3300																										
28-Feb-96	7.8	3350																										
29-Feb-96	7.7	3250																										
1-Mar-96	7.7	3300																										
4-Mar-96	7.8	3350																										
5-Mar-96	7.9	3400																										
6-Mar-96	7.4	3500																										
7-Mar-96	7.4	3600																										
8-Mar-96	7.0	3350																										
11-Mar-96	6.9	3340																										
12-Mar-96	6.8	3300																										
13-Mar-96	6.7	3350																										
14-Mar-96	6.9	3350																										
15-Mar-96	6.9	3330																										
19-Mar-96	6.7	3480																										
20-Mar-96	6.6	3500																										
21-Mar-96	6.6	3500																										
22-Mar-96	6.8	3550																										
25-Mar-96	6.8	3600																										
26-Mar-96	7.0	3580																										
27-Mar-96	6.8	3600																										
28-Mar-96	6.9	3600																										
29-Mar-96	6.9	3650																										
1-Apr-96	6.8	3650																										
2-Apr-96	6.9	3660																										
4-Apr-96	6.8	3700																										
10-Apr-96	6.6	4000																										
11-Apr-96	7.0	4020																										
12-Apr-96	6.9	4050																										
15-Apr-96	6.9	4200																										
16-Apr-96	7.0	4240																										
17-Apr-96	7.0	4110																										
19-Apr-96	6.8	4120																										
22-Apr-96	6.9	4250																										
23-Apr-96	6.9	4260																										
24-Apr-96	6.8	4270																										
25-Apr-96	6.9	4300																										
29-Apr-96	6.8	4600																										
30-Apr-96	6.9	4580																										
1-May-96	6.9	4600																										
3-May-96	6.9	4250																										
6-May-96	6.9	3760																										
8-May-96	7.0	3400																										
9-May-96	6.9	3300																										
10-May-96	6.9	3350																										
13-May-96	6.4	3430																										
14-May-96	6.7	3480																										
15-May-96	6.9	3450																										
17-May-96	6.9	3500																										
20-May-96	6.9	3450																										
22-May-96	6.6	3500																										
24-May-96	6.9	3450																										
27-May-96	6.7	3600																										
29-May-96	6.6	3600																										
30-May-96	6.6	3600																										
31-May-96	6.8	3680																										
3-Jun-96	6.6	3650																										
4-Jun-96	6.5	3650																										
5-Jun-96	6.8	3600																										
7-Jun-96	6.7	3700																										
11-Jun-96	7.0	4300					2700		5		890	850	0.01			160			100									

Notes:
conc taken as MDL

DATE	pH	Cond.	Temp	Water Level	Acidity	Alkalinity	TDS	ORP	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Na	Al	Mg	Cu	As	Cd	Zn	Cr	B	Hg	Mn	Pb
		(uS/cm)	°C	(mRL)		(mg/L)	(mg/L)	(mv)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(ug/L)	(mg/L)	(mg/L)
12-Jun-96	6.9	3600																										
13-Jun-96	6.9	3600																										
14-Jun-96	6.9	3600																										
17-Jun-96	6.8	3400																										
19-Jun-96	6.9	3450																										
21-Jun-96	6.7	3600																										
24-Jun-96	6.9	3650																										
25-Jun-96	6.9	3650																										
26-Jun-96	6.9	3800																										
27-Jun-96	6.8	3800																										
28-Jun-96	6.7	3900																										
2-Jul-96	6.0	4210																										
3-Jul-96	6.8	4040																										
8-Jul-96	6.8	4320																										
9-Jul-96	7.0	4350																										
11-Jul-96	7.0	4320																										
12-Jul-96	7.0	4210																										
16-Jul-96	6.9	4300																										
19-Jul-96	6.8	4400																										
22-Jul-96	6.9	4200																										
23-Jul-96	6.9	4000																										
26-Jul-96	6.8	3800																										
29-Jul-96	6.7	3400																										
30-Jul-96	6.8	3500																										
31-Jul-96	6.8	3500																										
2-Aug-96	6.5	3300																										
5-Aug-96	6.8	3600																										
6-Aug-96	6.9	3700																										
7-Aug-96	6.5	3700																										
8-Aug-96	6.8	3800																										
12-Aug-96	6.8	3800																										
13-Aug-96	6.6	3900																										
14-Aug-96	6.3	3900																										
16-Aug-96	6.8	4000																										
19-Aug-96	6.5	4100																										
20-Aug-96	6.8	3900																										
23-Aug-96	6.8	4000																										
26-Aug-96	6.5	4000																										
28-Aug-96	6.8	4000																										
30-Aug-96	6.7	3800																										
2-Sep-96	6.7	3900																										
4-Sep-96	6.6	3900																										
5-Sep-96	6.8	4000																										
6-Sep-96	6.8	4100																										
9-Sep-96	6.8	4100																										
10-Sep-96	6.9	4100																										
11-Sep-96	7.0	4200																										
13-Sep-96	7.0	4200																										
16-Sep-96	7.1	4300																										
18-Sep-96	7.0	4300																										
19-Sep-96	7.9	5100																										
20-Sep-96	7.9	5300																										
23-Sep-96	8.0	5200																										
25-Sep-96	8.1	5300																										
26-Sep-96	8.2	5600					3300		5		1300	1100	0.02			190			140									
27-Sep-96	8.0	5400																										
30-Sep-96	7.9	5400																										
1-Oct-96	7.8	5600																										
2-Oct-96	7.9	5600																										
3-Oct-96	7.8	5600																										
4-Oct-96	7.8	5400																										
9-Oct-96	7.8	5400																										
10-Oct-96	7.8	5300																										
21-Oct-96	7.8	5700																										
22-Oct-96	7.8	5700																										
23-Oct-96	7.7	5650																										
25-Oct-96	7.5	5760																										
28-Oct-96	7.3	5800																										
29-Oct-96	7.4	5800																										
30-Oct-96	7.2	5870																										
31-Oct-96	7.4	5900																										
4-Nov-96	7.6	6000																										
5-Nov-96	7.7	6000																										
7-Nov-96	7.6	5700																										
8-Nov-96	7.6	5650																										
12-Nov-96	7.6	5700																										
19-Nov-96	7.7	5300																										
20-Nov-96	7.8	5400																										
22-Nov-96	7.8	5200																										
25-Nov-96	7.6	4100																										
26-Nov-96	7.6	4300																										
27-Nov-96	7.6	4100																										
3-Dec-96	7.8	4400																										
4-Dec-96	7.8	4400																										
5-Dec-96	7.8	4300																										
6-Dec-96	7.9	4300																										
9-Dec-96	7.8	4100																										
12-Dec-96	8.0	4000																										
13-Dec-96	7.8	4100																										

Notes:
conc taken as MDL

DATE	pH	Cond.	Temp	Water Level	Acidity	Alkalinity	TDS	ORP	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Na	Al	Mg	Cu	As	Cd	Zn	Cr	B	Hg	Mn	Pb
		(uS/cm)	°C	(mRL)		(mg/L)	(mg/L)	(mv)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(ug/L)	(mg/L)	(mg/L)
16-Dec-96	8.0	4200																										
17-Dec-96	7.9	4200																										
18-Dec-96	7.8	4100																										
19-Dec-96	7.9	4100																										
20-Dec-96	7.7	4200																										
23-Dec-96	7.8	4300																										
31-Dec-96	7.7	4400																										
2-Jan-97	7.9	4500																										
3-Jan-97	7.9	4400																										
6-Jan-97	7.8	4600																										
7-Jan-97	7.9	4500																										
8-Jan-97	7.9	4600																										
9-Jan-97	7.9	4700																										
10-Jan-97	7.8	4800																										
20-Jan-97	7.9	5100																										
21-Jan-97	8.0	5100					3300		9		1100	940	0.02			200			140									
23-Jan-97	8.2	5000																										
24-Jan-97	8.1	5000																										
28-Jan-97	7.9	4700																										
30-Jan-97	7.9	4200																										
31-Jan-97	7.9	4100																										
3-Feb-97	7.9	4000																										
4-Feb-97	7.9	4100																										
6-Feb-97	8.0	4000																										
7-Feb-97	7.8	4100																										
10-Jan-97	8.1	4200																										
11-Jan-97	8.1	4200																										
12-Feb-97	8.0	4000																										
14-Feb-97	7.8	3800																										
17-Feb-97	7.8	3800																										
18-Feb-97	7.9	3600																										
19-Feb-97	7.9	3600																										
20-Feb-97	7.8	3500																										
24-Feb-97	7.7	3500																										
28-Feb-97	7.4	3500																										
3-Mar-97	7.8	3400																										
5-Mar-97	7.9	3400																										
10-Mar-97	7.7	3300																										
17-Mar-97	7.6	3300																										
24-Mar-97	7.8	3400																										
26-Mar-97	7.7	3400																										
3-Apr-97	7.6	3600																										
7-Apr-97	7.8	3600																										
16-Apr-97	7.8	3700																										
17-Apr-97	7.7	3600																										
21-Apr-97	7.7	3700																										
22-Apr-97	7.7	3800																										
23-Apr-97	7.6	3800																										
29-Apr-97	7.9	4400																										
1-May-97	7.8	4300																										
2-May-97	7.8	4400																										
5-May-97	8.0	4200																										
6-May-97	8.0	4300																										
9-May-97	8.0	4200																										
14-May-97	8.0	3600					2500		<1		730	1100	0.02			150			96									
15-May-97	8.0	3700																										
16-May-97	7.9	3800																										
20-May-97	8.1	3500																										
28-May-97	8.1	3700																										
29-May-97	8.1	3700																										
30-May-97	8.1	3700																										
2-Jun-97	8.2	3700																										
10-Jun-97	7.9	3700																										
11-Jun-97	8.1	3700																										
17-Jun-97	7.8	3400																										
23-Jun-97	7.8	3000																										
24-Jun-97	7.8	3200																										
30-Jun-97	7.8	3200																										
2-Jul-97	7.9	3300																										
4-Jul-97	7.9	3200																										
14-Jul-97	8.0	3200																										
16-Jul-97	8.0	3100																										
22-Jul-97	7.9	3200																										
28-Jul-97	8.0	3400					2200		3	1	600	780	0.02			140			83									
21-Aug-97	7.6	3400																										
11-Sep-97	8.0	3400																										
22-Sep-97	8.1	3100																										
25-Sep-97	7.8	3100																										
13-Oct-97	7.9	3300																										
12-Nov-97	7.8	3600					2300		<2	2	710	700	0.02															
16-Dec-97	7.6	3500																										
14-Jan-98	7.7	3900																										
19-Feb-98	7.6	3600																										
20-Mar-98	7.7	4000																										
24-Apr-98	8.0	3700																										
20-May-98	7.4	3800																										
25-May-98	7.6																											
1-Jun-98	7.6																											

Notes:
conc taken as MDL

DATE	pH	Cond.	Temp	Water Level	Acidity	Alkalinity	TDS	ORP	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Na	Al	Mg	Cu	As	Cd	Zn	Cr	B	Hg	Mn	Pb
		(uS/cm)	°C	(mRL)		(mg/L)	(mg/L)	(mv)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(ug/L)	(mg/L)	(mg/L)
9-Jun-98	7.5	3300																										
17-Jun-98	7.8	3730																										
22-Jun-98	7.8																											
30-Jun-98	7.8	3400																										
6-Jul-98	7.9	3300																										
13-Jul-98	8.1	3500																										
17-Jul-98	8.0	3400																										
20-Jul-98	8.1	3220																										
27-Jul-98	8.1	3100																										
3-Aug-98	7.9	3370																										
17-Aug-98	7.9	3000																										
24-Aug-98	7.8	2850																										
25-Aug-98	8.1																											
31-Aug-98	7.8	3000																										
7-Sep-98	7.8	2700					2000		4	6.3	570	660	0.01															
14-Sep-98	7.9	2900																										
21-Sep-98	7.8	3000																										
23-Oct-98	7.3																											
17-Nov-98												840																
23-Nov-98	7.5	3160																										
22-Dec-98	7.9	3270										800																
19-Jan-99		3450										850																
10-Feb-99	7.4	3550					2100		2	2	530	840	0.02															
17-Feb-99	7.5	3460																										
17-Mar-99	7.2	3060										850																
23-Mar-99	7.0																											
13-May-99	7.7	3270										750																
16-Jun-99	7.7	3200										740																
28-Jun-99	7.5	3200																										
19-Jul-99	7.5	3050																										
11-Aug-99	7.4	3120																										
16-Aug-99	7.3	3140										800																
23-Aug-99	7.0	3150					2200		30	18	520	820	0.02															
28-Sep-99	7.5	2950																										
14-Oct-99	7.2	3150										910																
25-Oct-99	7.5	2920																										
22-Nov-99	7.7	3170																										
15-Dec-99	7.5	3320										930																
29-Dec-99	6.8	3390																										
2-Feb-00		3300																										
22-Feb-00	7.3	3550					2800		<2	8	590	1200	0.16															
30-Mar-00	7.8	2770																										
10-Apr-00	7.4	2730										1200																
4-May-00	7.4	2780																										
29-May-00	7.4	2870																										
16-Jun-00	7.7	2890										1200																
29-Jun-00	7.5	2910																										
31-Jul-00	7.7	2840																										
18-Aug-00	7.3	3090										1300																
22-Aug-00	7.3	3070					2600		2	8	490	1400	0.02															
5-Oct-00	7.9	2820																										
17-Oct-00	8.0	2790										1100																
2-Nov-00	7.8	2760																										
30-Nov-00	7.8	2910																										
13-Dec-00	7.8	2870										777																
18-Jan-01		2750																										
27-Feb-01	7.8	2960										876																
4-Jun-01	8.2	2170																										
13-Jun-01	8.1	2420										642																
30-Nov-01	7.1	2610																										
7-Dec-01	7.1	2650										735																
31-Dec-01	7.4	2740																										
11-Feb-02	6.9	2540																										
3-Apr-02	7.0	2720																										
28-May-02	6.9	2720																										
24-Jun-02	7.8	2350										766																
1-Jul-02	7.4	2620																										
1-Nov-02	7.4	2970																										
12-Nov-02	7.7	2972		129.0																								
18-Nov-02	7.3	3299		129.0																								
25-Nov-02	7.5	2823		129.0																								
2-Dec-02	8.0	2578		128.9																								
19-Dec-02	7.1	2400		129.3																								
30-Dec-02	7.4	2361		129.6																								
7-Jan-03	7.2	2650		129.5																								
15-Jan-03	6.9	2680		128.9																								
22-Jan-03	7.1	2544		128.7																								
29-Jan-03	7.2	2300		128.6																								
28-Feb-03	6.9	2500		128.6																								
3-Mar-03	6.9	2500		128.6																								
24-Mar-03	7.6	2350		128.6																								
30-Mar-03	7.1	2200		128.5																								
14-Apr-03	6.9	2230		128																								
24-Apr-03	6.9	2300		128																								
29-Apr-03	7.2	3490		128								1020																
19-May-03	6.8	2950		127.9																								
30-May-03	6.6	2790		127.7																								
3-Jun-03	6.8	2253		127.7																								

Notes:
conc taken as MDL

DATE	pH	Cond.	Temp	Water Level	Acidity	Alkalinity	TDS	ORP	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Na	Al	Mg	Cu	As	Cd	Zn	Cr	B	Hg	Mn	Pb
		(uS/cm)	°C	(mRL)		(mg/L)	(mg/L)	(mv)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(ug/L)	(mg/L)	(mg/L)
11-Jun-03	7.0	2248		127.0																								
15-Jul-03	7.3	1850		125.0																								
2-Oct-03	7.4	2090		-																								
8-Sep-03	7.8	2172		128.0																								
25-Sep-03	7.7	2100		128.0																								
20-Oct-03	7.4	2300		127.5																								
31-Oct-03	7.1	2530		127.5				64																				
19-Nov-03	7.5	2330		126.6																								
16-Dec-03	8.1	2225		126.5																								
30-Jan-04	8.2	2390		126.5																								
27-Feb-04	8.2	3000		126.5																								
31-Mar-04	7.4	2700		127.5																								
30-Apr-04	8.2	2400		127.5																								
31-May-04	8.0	3100		128.0																								
30-Jun-04	8.0	3300		127.0																								
30-Jul-04	7.4	3400		127.5				135																				
27-Aug-04	8.1	3400		127.5																								
30-Sep-04	7.1	2800		127.5				155																				
29-Oct-04	7.7	2700		129.0				118																				
30-Nov-04	7.9	2900		129.0																								
22-Dec-04	7.4	3000		129.0				51																				
31-Jan-05	7.6	3000		128.8				161				1000																
4-Mar-05	7.0	3100		129.2				164																				
21-Mar-05	7.1	2800		128.6				130																				
29-Apr-05	7.4	2900		126.6																								
31-May-05	6.7	3300		125.0																								
19-Jul-05	7.7	3200		127.0																								
29-Jul-05	7.1	3200		128.5								360																
30-Aug-05	7.6	3100		128.0																								
30-Sep-05	7.6	3200		128.0				190																				
8-Nov-05	7.8	3300		128.0				106																				
28-Nov-05	6.9	3300		128.0				172																				
19-Dec-05	7.1	2200		127.4	8.0			187			320	1300	0.02			62	410	0.02	54				0.01				0.02	
31-Jan-06	No Access																											
27-Feb-06	7.4	3600		126.2				160																				
31-Mar-06	6.8	3300		125.7				170																				
14-Apr-06	7.5	3300		127.8																								
31-May-06	No Access																											
29-Jun-06	7.6	3200		127.3				134																				
31-Jul-06	NS																											
31-Aug-06	NS																											
29-Sep-06	7.4	3300		127.0				140																				
30-Oct-06	7.4	3600		127.4				34																				
31-May-07	7.9	3400						130																				
30-Jul-07	7.2	3200										1467.0																
28-Sep-07	7.3	3400																										
27-Dec-07	7.4	3200																										
25-Mar-08	7.2	2800																										
30-Jun-08	7.2	2700																										
31-Jul-08	7.4	3000																										
29-Aug-08	7.3	3200		127.1																								
1-Dec-08	7.9	1930			<1	160.0					436	917	0.05	1.3	0.0	270	472	0.03	126	0.002	0.001	0.0001	0.009	0.001	0.05	0.0001	0.108	0.001
24-Dec-08	8.1	3260										1300																
19-Mar-09	8.0	2830																										
27-Apr-09	7.6	2510						168																				
14-May-09	7.8	2970						155																				
26-Jun-09	6.8	2950	14.5		<1			53			342	843	0.3				386	0.05	105				0.02				0.652	
15-Jul-09	7.6	2970	15.8					12																				
10-Aug-09	7.3	3270	15.7	125.0				143																				
10-Sep-09	6.9	3150	16.7					68																				
20-Oct-09	8.2	3870						141																				
10-Nov-09	7.6	3430																										
30-Nov-09	8.0	2990																										
16-Dec-09	6.9	3660			<1						365	1260	0.05				462	0.04	117				0.02				0.275	
18-Jan-10	7.3	3140																										
10-Feb-10	7.4	3000	27.7					202																				
11-Mar-10	7.1	3620						179																				
22-Apr-10	7.1	3750	24.3					215																				
24-May-10	6.9	3250	17.1					79																				
24-Jun-10	7.3	3700	15.8					186			414	1310	0.05				437	0.05	110				0.024				0.344	
29-Jul-10	6.5	3500	14.4	128.4				281																				
17-Aug-10	6.4	3770	16.2	127.0				88																				
24-Sep-10	8.0	2600	24.5	128.2																								
20-Oct-10	7.4	2980	20.8	128.6				125																				
27-Oct-10	7.8	2820	23.6	128.3				159																				
30-Nov-10	7.6	3420	24.8	128.4				235																				
21-Dec-10	8.2	3290	25.9	128.0	<1			118			469	5	0.05				416	0.04	107				0.076				0.32	
31-Jan-11	6.9	3660	29.4	128.4																								
28-Feb-11	6.9	2880	26.5	128.3				200																				
31-Mar-11	7.0	2910	23.3	128.3				185																				
29-Apr-11	7.7	3590		128.5				110																				
30-May-11	7.0	3490	15.2	128.0				178																				
27-Jun-11	6.9	2660	14	128.5	9			277			374	1040	0.13				390	0.09	97				0.014				0.339	
27-Jul-11	7.8	2790	14.5	128.4				132																				
26-Aug-11	8.9	2680	18.5	128.3				94																				
29-Sep-11	7.2	2900	17.4	128.5				206																				

Eastern Emplacement Area

Notes:
conc taken as MDL

Date	Height (mRL)	pH	EC uS/cm	TDS (mg/L)	TSS (mg/L)	Turbidity NTU	ORP	Temp °C	Sulphate (mg/L)	Al (mg/L)	Fe (filt.) (mg/L)	Ca (mg/L)	Mg (mg/L)	Mn (mg/L)	Zn (mg/L)	Alkalinity (mg/L)	Chloride (mg/L)	Tot. N (mg/L)	Tot. P (mg/L)	Cu (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	B (mg/L)	Hg (mg/L)	Pb (mg/L)
6/07/2001		7.9	965			300																				
6/09/2001			1350																							
27/11/2001		8.4	1410																							
12/02/2002		7.0	715			170																				
3/04/2002		6.7	1080			70																				
6/05/2002		7.9	1130																							
19/06/2002		6.9	1485			65																				
15/05/2003	141.00	7.6	1100			3.6	90																			
3/08/2005		7.8	600																							
19/12/2005	144.3	7.1	700																							
31/01/2006	144	7	800																							
27/02/2006	143.8	7.9	800																							
31/03/2006	143.8	7	800																							
14/04/2006	143.8	8	800																							
31/05/2006	143.7	7.1	800																							
29/06/2006	143.6	7.8	800																							
31/07/2006	ns																									
31/08/2006	ns																									
29/09/2006	144.1	7.6	900																							
30/10/2006	143.9	7	900																							
31/05/2007		8.5	1000				86																			
18/09/2008		7.4	400			low																				
31/10/2008		8.4																								
10/11/2008			520			low																				
01-Feb-11		8.8	755				98		31	0.2	0.28	18	20	0.04	0.005	141										
27-Jun-11		7.1	557				99		34	0.22	0.25	15	16	0.06	0.008	101										
27-Jul-11		8.1	526	320	7	11.2	71	14.2	38		0.29	14	16	0.066		97	70	0.8	0.02	0.001	0.001	0.0002	0.001	0.05	0.0001	0.001
26-Aug-11		8.9	534	246	67	129	97	23.8	39	1.07	1.56	12	12	0.233	0.008	83	77	1.4	0.13	0.002	0.001	0.0001	0.001	0.05	0.0001	0.001
07-Sep-11		8.4	537																							
29-Sep-11		7.8	570			12.5	52	18.2																		

SD1
Sediment Dam 1

Notes:
conc taken as MDL

Date	pH	Cond. (uS/cm)	TSS (mg/L)	Turbidity (NTU)
26-May-03	7.2	174	431	200
06-Dec-03	6.9	1050	11	12.2
26-Feb-04	7.3	870	30	20.7
23-Mar-04	6.9	900	27	10
01-Oct-04	6.5	1400	113	180
20-Oct-04	6.9	300	804	700
26-Jan-05	6.7	2200	30	5.2
10-Feb-05	7.1	1200	24	21
18-Mar-05	7.1	1100	22	19
30-Jun-05	7.5	100	130	25
25-Oct-05	7.3	1800	95	52
11-Sep-06	6.8	1500	-	10
08-Jun-07	7.2	140	220	260
20-Aug-07	6.9	280	157	168
25-Apr-08	6.8	420	60	44
06-Sep-08	7	330	42	38
18-Feb-09	7.6	300	81	99
15-Jun-11	7.1	115	235	331

SD2

Notes:

conc taken as MDL

DATE	pH	Cond.	TSS	Turbidity
		(uS/cm)	(mg/L)	(NTU)
26-May-03	7	157	1816	281
06-Dec-03	6.9	990	34	35
26-Feb-04	7.2	1170	81	49
23-Mar-04	7	990	50	8
20-Oct-04	6.8	600	202	140
20-Jan-05	6.7	2500	18	5.4
10-Feb-05	7	1500	27	30
18-Mar-05	7	1000	69	66
30-Jun-05	7.1	500	890	85
11-Sep-06	7	1200	-	47
08-Jun-07	7	1800	55.5	130
20-Aug-07	5	1350	254	260
25-Apr-08	6.6	1100	1102	291
06-Sep-08	6.3	980	23	144
15-Jun-11	7.4	378	426	953

SD3

Notes:

conc taken as MDL

DATE	pH	Cond.	TSS	Turbidity
		(uS/cm)	(mg/L)	(NTU)
6-Dec-03				
23-Mar-04	6.9	920	154	162
20-Oct-04	6.7	1000	61	102
30-Jun-05	7.1	500	78	60
8-Jun-07	7.1	2000	442	461
20-Aug-07	6.6	1290	118	580
7-Jan-10	6.6	1261	1	11.7
15-Jun-11	7.4	338	4480	Err4

SD4

Notes:

conc taken as MDL

DATE	pH	Cond. (uS/cm)	TSS (mg/L)	Turbidity (NTU)
06-Dec-03	No overflow			
23-Mar-04	7.1	310	2,695	680
20-Oct-04	6.8	400	498	600
21-Feb-05	7	1000	5	33
30-Jun-05	7.1	500	130	55
08-Jun-07	6.9	1410	21	46
20-Aug-07	5.6	250	1298	310
25-Apr-08	6.7	810	152	62
06-Sep-08	6.6	680	63	47
16-Feb-09	7.1	970	52	100
09-Nov-09	7.4	1234	33	66.9
15-Jun-11	7.6	587	151	281

SWQ5 (used as SD7 and SD 7A)

Notes:
conc taken as MDL

DATE	comments/pH	pH	Cond.	TSS	Turbidity	DO	DO	Turbidity	Alkalinity	Temp
			(uS/cm)	(mg/L)	(NTU)	(mg/L)	(% sat)	(NTU)	mg CaCO:	(deg C)
27-Nov-02	No flow	#N/A								
11-Dec-02	6.3	6.3	695		27					
12-Dec-02	6.5	6.5	758		25					
31-Jan-03	No flow	#N/A								
22-Feb-03	No flow	#N/A								
23-Feb-03	No flow	#N/A								
31-Mar-03	No flow	#N/A								
4-Apr-03	No flow	#N/A								
29-Apr-03	No flow	#N/A								
16-May-03	6.6	6.6	810		35					
26-May-03	6.9	6.9	780	57	24					
26-Jun-03	No flow	#N/A								
31-Jul-03	No flow	#N/A								
28-Aug-03	No flow	#N/A								
24-Sep-03	No flow	#N/A								
31-Oct-03	No flow	#N/A								
28-Nov-03	No flow	#N/A								
6-Dec-03	No flow	#N/A								
28-Jan-04	No flow	#N/A								
25-Feb-04	No flow	#N/A								
22-Mar-04	No flow	#N/A								
30-Apr-04	No flow	#N/A								
31-May-04	No flow	#N/A								
30-Jun-04	No flow	#N/A								
27-Jul-04	No flow	#N/A								
20-Aug-04	No flow	#N/A								
30-Sep-04	No flow	#N/A								
20-Oct-04	7.1	7.1	400	67	122					
27-Oct-04	7.5	7.5	300	29	47					
30-Nov-04	No flow	#N/A								
22-Dec-04	No flow	#N/A								
17-Jan-05	No flow	#N/A								
10-Feb-05	No flow	#N/A								
22-Feb-05	No flow	#N/A								
18-Mar-05	No flow	#N/A								
5-Apr-05	7.9	7.9	300	21	120					
13-May-05	No flow	#N/A								
30-Jun-05	7.4	7.4	200	62	13					
29-Jul-05	No flow	#N/A								
30-Aug-05	No flow	#N/A								
5-Sep-05	No flow	#N/A								
17-Oct-05	No flow	#N/A								
28-Nov-05	No flow	#N/A								
29-Dec-05	No Flow	#N/A								
31-Jan-06	No Flow	#N/A								
27-Feb-06	No Flow	#N/A								
28-Feb-06	No Flow	#N/A								
31-Mar-06	No Flow	#N/A								
14-Apr-06	No Flow	#N/A								
31-May-06	No Flow	#N/A								
29-Jun-06	No Flow	#N/A								
31-Jul-06	No Flow	#N/A								
31-Aug-06	No Flow	#N/A								
10-Sep-06	No Flow	#N/A								
30-Oct-06	No Flow	#N/A								
5-Nov-06	No Flow	#N/A								
30-Nov-06	No Flow	#N/A								
8-Jun-07	7.2	7.2	400	55	56					
10-Jul-07	6.9	6.9	420		19					
20-Aug-07	7.2	7.2	370	18	35					
7/06/2011	6.44	6.44	267			8.13	90.3	52.9	38	12.91

SD8

Notes:

conc taken as MDL

DATE	pH	Cond.	TSS	Turbidity
		(uS/cm)	(mg/L)	(NTU)
06-Dec-03	No overflow			
15-Mar-04	6.9	500		Clear
20-Oct-04	7.2	100	38	67
30-Jun-05	7.6	100	85	30
08-Jun-07	7.3	140	41	192

Sediment Dam 10
Bowens Road South Sediment Dam

Notes:
conc taken as MDL

DATE	pH	Cond.	TSS	Turbidity
		(uS/cm)	(mg/L)	(NTU)
16/06/2011	7.4	426	380	982

Sediment Dam 11
Roseville Haul Road Sedimentation Dam

Notes:
conc taken as MDL

Date	pH	EC	TSS	TDS	Turbidity	Chloride	Sulphate	Fe (filtered)
		uS/cm	mg/l	mg/l	NTU	mg/l	mg/l	mg/l
7-Oct-98	8.4	2880	24	2900	12	1400	280	0.01
10-Feb-99	8.8	2110	33	1100	21	410	220	0.02
10-Aug-99	faulty	1122	5	750	3	190	150	0.02
22-Feb-00	8.2	1340	4	730	3	220	200	0.02
22-Aug-00	8.3	690	10	430	10	140	160	0.02
5-Mar-01	8.6	960	40					
20-Oct-09	8.2	1830						
10-Nov-09	7.3	905						

Sediment Dam 13- Western Sediment Dam

Notes:
conc taken as MDL
(Constructed October 1996 in accordance w

DATE	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Ca	Mg
		(uS/cm)	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
25-Nov-96	7.0	300	160	480		57	21	0.26	5	5.2
6-Dec-96	7.3	450	250	1080		88				
9-Dec-96	7.2	430	300	1040		78				
23-Dec-96	7.6	450								
9-Jan-97	7.5	480								
28-Jan-97	7.6	500								
30-Jan-97	7.1	500	300	780		93	35	0.28		
11-Feb-97	7.7	550								
14-Feb-97	7.8	480	260	650		72	32	0.11	9.7	8.2
12-Mar-97	8.0	510	310	440		79	76	0.06	10	10
21-Apr-97	8.6	970								
13-May-97	7.8	520								
5-Jun-97	8.0	580								
16-Jun-97	7.2	320								
23-Jun-97										
15-Jul-97	7.6	460								
21-Aug-97	8.4									
11-Sep-97	8.5	1050								
13-Oct-97	8.5	800								
12-Nov-97	8.9	1300	730	17	4	230	180	0.02		
16-Dec-97	8.5	2100								
14-Jan-98	8.4	1300								
19-Feb-98	8.5	1000								
20-Mar-98	8.5	3300								
24-Apr-98	7.9	1300								
19-May-98	7.4	850								
13-Aug-98	BEING PUMPED OUT - therefore not sampled									
7-Oct-98	8.8	870	680	12	11	160	190	0.01		
10-Feb-99	7.8	1000	550	49	35	100	180	0.06		
15-Jul-99	7.7	540		270	280					
5-Aug-99	7.3	570								
10-Aug-99	8.0	616	440	63	99	64	100	0.09		
19-Jan-00	7.8	730		48	55					
22-Feb-00	8.9	1080	660	26	24	140	230	0.08		
22-Mar-00	8.1	670		140	210					
29-Jun-00	8.4	800			23					
22-Aug-00	8.6	890	560	29	19	130	230	0.02		
1-Feb-01	7.6	1165		42	53					
15-Feb-01	7.9	1200								
9-Mar-01	8.1	500		188	620					
26-Mar-01	7.9	565		195						
7-May-01	7.6	315		2244	360	25	16	2.9		
21-May-01	7.4	595		127	165					
7-Sep-01		1345								
26-Sep-01	8.1	1590		12	16					
8-Nov-01	8.4	2060		6	6					
11-Feb-02	7.4	1060		64	65					
31-Mar-02	6.7	950		38	54					
1-May-02	7.6	1180		54						
28-May-03	7.1	761		17						
17-Jan-04	8.2	1070			14					
20-Oct-04	6.6	1100		35	91					
30-Jun-05	7.1	800	470	180	75	57	150	0.17		
19-Sep-06	6.4	1600		9	3					
8-Jun-07	6.8	1020		252	521	74	231	1.1		
24-Apr-08	6.5	990		118	130					
17-Feb-09	8.1	500		36	71					
15-Jun-11		889		86	166	37	111	5.51		

Sediment Dam 14- Haul Road Sediment Dam

Notes:
conc taken as MDL

DATE	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Ca	Mg
		(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
26-Oct-95	4.8	4300	2300	43		1200	190	0.42	88	100
30-Oct-95	5.1	3350								
7-Nov-95	5.1	3400								
14-Nov-95	4.8	3650								
22-Nov-95	5.6	1170								
1-Dec-95	5.5	880	470	92		230				
6-Dec-95	6.5	1222								
18-Dec-95	6.3	1111								
27-Dec-95	6.1	1185								
3-Jan-96	5.4	1460								
10-Jan-96	4.8	1714								
22-Jan-96	6.1	2800								
30-Jan-96	7.5	2310								
6-Feb-96	4.5	2880								
13-Feb-96										
22-Feb-96	3.6	3700	1900	1		1000	230	16	84	91
12-Mar-96	4.3									
27-Mar-96	6.3	3890								
10-Apr-96	4.5	4700								
24-Apr-96	6.6	4300								
2-May-96	6.3	4000								
3-May-96	6.8	3300								
4-May-96	6.8	3100								
6-May-96		1600								
6-May-96	6.5	1330								
28-May-96	6.2	2800								
11-Jun-96	7.9	3100	1800	2		660	400	0.01	71	78
17-Jun-96	7.4	1900	1100	7		410				
25-Jun-96	6.4	1950								
22-Jul-96	6.6	3500								
12-Aug-96	6.7	2400								
28-Aug-96	6.4	2600								
30-Aug-96		1300								
31-Aug-96	6.3	1060								
10-Sep-96	6.6	3500								
26-Sep-96	8.3	6070	4060	12		1300	1800	0.02	180	180
28-Oct-96	7.3	6500								
12-Nov-96	7.9	3200								
22-Nov-96	7.9	2300								
25-Nov-96	7.5	630								
16-Dec-96	8.8	5300								
23-Dec-96	7.0	5100								
9-Jan-97	8.3	3900								
21-Jan-97	8.5	3300	2200	11		600	600	0.02	88	96
11-Feb-97	8.5	3600								
13-Mar-97	8.4	3400								
18-Apr-97	8.6	3400								
12-May-97	7.7	520								
13-Jun-97	8.5	2600								
16-Jun-97	7.7	710								
16-Jul-97	8.3	5000								
28-Jul-97	8.3	3900	2800	4	2	550	1100	0.02		
21-Aug-97	8.4	4700								
11-Sep-97	8.4	4400								
22-Sep-97	8.4	3100								
25-Sep-97	7.3	1500								
13-Oct-97	8.3	4000								
12-Nov-97	DRY	DRY								
16-Dec-97	DRY	DRY								
14-Jan-98	7.7	1900								
19-Feb-98	8.3	1600								
20-Mar-98	8.1	2900								
24-Apr-98	7.9	2000								
19-May-98	6.6	1200								
7-Sep-98	8.0	800	430	260	250	110	140	0.09		

Notes:
conc taken as MDL

DATE	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Ca	Mg
		(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
10-Feb-99	8.3	1170	590	27	19	120	240	0.02		
15-Jul-99	7.8	500		3500	2800					
10-Aug-99	8.6	970	660	6	3	88	170	0.02		
22-Feb-00	8.9	2270	1400	16	21	210	650	0.09		
22-Mar-00	7.8	315		4200	32					
22-Aug-00	8.4	1540	980	49	17	170	490	0.02		
9-Mar-01	7.6	656		204	530					
7-May-01	7.3	360		4880	20	33	21	0.9		
20-Oct-04	6.7	700		78	80					
30-Jun-05	7.1	700	290	140	37	27	100	0.01		
8-Jun-07	6.5	1070		53	107	50	291	0.21		
25-Apr-08	6.9	830		5200	47					
6-Sep-08	7	780		41	53	116	276	0.74		
16-Jun-11	7.7	541		32	130	18	96	1.19		

Sediment Dam 15- Waste Dump Silt Dam

Notes:
conc taken as MDL
(construction largely completed b

DATE	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Ca	Mg
		(uS/cm)	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
4-May-96	6.2	530	310	920		91				
6-May-96	6.1	450	280	1500		79	49	0.44	6.4	8.7
6-May-96	6.8	360								
15-May-96	6.6	520	230	1200		87	80	0.67	7.9	10
28-May-96	6.6	580								
17-Jun-96	6.6	600	310	570		120	70	0.15	7.3	11
25-Jun-96	6.5	630								
22-Jul-96	6.9	620								
12-Aug-96	6.9	650								
28-Aug-96	6.8	600								
30-Aug-96	6.5	680								
2-Sep-96	7.0	600	360	610		150	36	0.48	9	13
10-Sep-96	6.9	730								
26-Sep-96			440	630		150	90	0.58	12	19
28-Oct-96	7.7	920								
12-Nov-96	7.7									
22-Nov-96	7.9	1060								
25-Nov-96	6.8	440	270	2600		91	59	1.7	8	11
6-Dec-96	7.0	570	350	1700		110	**140**	0.78	10	14
9-Dec-96	7.0	590	380	1500		110				
23-Dec-96	7.5	760								
9-Jan-97	7.8	930								
28-Jan-97	7.9	1000								
6-Feb-97	7.6	960								
14-Feb-97	7.3	960	680	150		150	180	0.12	22	22
11-Mar-97	7.3	760								
12-Mar-97	7.3	740	460	340		100	180	0.25	19	21
18-Apr-97	8.3	1500								
13-May-97	7.1	980	580	140		120	220	0.1	36	28
5-Jun-97	8.2	1500								
13-Jun-97	8.2	1600								
16-Jun-97	7.6	1300	750	130		160	300	0.03	47	40
23-Jun-97	7.7	1230								
26-Jun-97	8.0	1220								
1-Jul-97	8.1	1300								
4-Jul-97	8.2	1350								
10-Jul-97	8.2	1520								
14-Jul-97	8.1	1500								
16-Jul-97	8.2	1470								
7-Aug-97	8.7	1700								
21-Aug-97	8.7	1750								
11-Sep-97	8.8	1900								
22-Sep-97	8.7	1900								
25-Sep-97	8.1	1700								
13-Oct-97	8.9	1900								
12-Nov-97	8.3	4100	2700	1400	170	710	920	0.02		
16-Dec-97										
14-Jan-98	8.6	4300								
19-Feb-98	8.2	2900								
20-Mar-98	8.4	3500								
24-Apr-98	8.7	3400								
19-May-98	7.8	2700		14						
23-Jun-98	8.3	2500								
13-Aug-98	8.0	1700	1800	12	10	360	660	0.01		
7-Sep-98	7.5	1700		42						
30-Nov-98	7.7	1630		42						

Notes:
conc taken as MDL
(construction largely completed b

DATE	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Ca	Mg
		(uS/cm)	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
1-Feb-99		1310		79	44		350			
10-Feb-99	7.8	2000	1300	27	14	180	510	0.03		
6-May-99	8.4	3070								
1-Jun-99										
28-Jun-99	8.0	2810		57	16					
15-Jul-99	7.3	1230		120	100					
10-Aug-99	8.0	3280	2300	3	3	300	930	0.02		
26-Oct-99	7.3	1600		30	53					
19-Jan-00	7.8	1460		75	67					
22-Feb-00	8.4	2850	1800	22	23	67	840	0.02		
22-Mar-00	7.3	1005		150	160					
8-Jun-00	8.1	2270		8	7					
21-Jul-00	7.9	1150		88	78					
22-Aug-00	8.1	1980	1200	10	10	230	610	0.02		
14-Nov-00	7.6	1365		19	15					
15-Feb-01	7.6	2940			14					
7-May-01	7.6	1300		111	130	85	102	0.3		
26-Sep-01	7.9	2060		123	21					
5-Nov-01	7.7	3110		20	6					
12-Feb-02	7.4	1760		52	25					
31-Mar-02	7.4	2240		44	25					
6-May-02	7.4	2800								
19-Jun-02	7.0	2690			23					
3-Jun-03	7.2	2770								
24-Jun-05	6.9	2900	2200	8.6	4.8	200	1100	0.01		
1-Mar-06	7.4	3200	2400	9	10	270	940	1.2		
24-Apr-09			1958	6		145	913	0.05		
12-Aug-09	7.6	2790		7	2.29	139	957	0.05		
28-Sep-10	8.2	1894		4	3.97	149	749	0.05		
15-Jun-11	7.7	168		265	399	8	38	4.55		

Sediment Dam 16

Rail Dam - Sediment Dam at end of drain from Railway Cutting

Notes

conc taken as MDL

(construction largely completed by late M

DATE	pH	Cond. (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity	Chloride (mg/L)	Sulphate (mg/L)	Fe (filt.) (mg/L)	Ca (mg/L)	Mg (mg/L)	Cu (mg/L)	Cd (mg/L)	Cr (mg/L)	Mn (mg/L)	Pb (mg/L)
6-Sep-95	6.2	654													
22-Sep-95	6.8	608													
4-Oct-95	6.4	630	360			160	**33**	1.1							
12-Oct-95	7.4	678													
27-Oct-95	6.8	653													
9-Nov-95	7.1	656													
15-Nov-95	7.3	640													
20-Nov-95	6.2	660		1200		150	49	0.42	2.4	9.5	0.01	0.01	0.01	1.2	0.01
21-Nov-95	6.3	670		1200		150	51	1.1	2.2	8.8					
23-Nov-95	5.7	370		1800		81	35	1.1	1.5	7.2					
1-Dec-95	6	290	210	3600		70									
6-Dec-95	5.9	270	170	3900											
11-Dec-95	6.2	240	220	4500		56									
27-Dec-95	6.3	280													
9-Jan-96															
23-Jan-96	6.1	305													
24-Jan-96	6		210	2500		60	**46**	3.6	3.8	28					
6-Feb-96	5.3	420													
15-Feb-96	6.3	410	220	1100		65									
1-Mar-96	5.8	440	170	920		69									
14-Mar-96	6.6	380													
27-Mar-96	7.0	420													
10-Apr-96	6.6	410													
24-Apr-96	7.3	440													
3-May-96	6.2	360	290	1800		55	43	1	3.9	8.9					
6-May-96	6.3	190	120	4400		36	21	1.4	2.5	11					
28-May-96	6.7	310													
25-Jun-96	7.0	320													
22-Jul-96	6.7	320													
12-Aug-96	7.2	360													
28-Aug-96	6.9	330													
10-Sep-96	7.3	280													
26-Sep-96	6.7	280	140	1500		64	27	4.9	1.7	17					
7-Oct-96	6.4	280	270	1300		69	28	5.4	1.4	13					
29-Oct-96	6.9	300													
12-Nov-96	6.9	290													
22-Nov-96	7.2	290													
24-Nov-96	6.4	190	150	2500		47	**18**	2.3	1.2	7.4					
6-Dec-96	6.4	210	**170**	2200		49									
17-Dec-96	6.8	230													
23-Dec-96	6.8	230													
9-Jan-97	6.9	250													
21-Jan-97	7.0	360	230	2030		68	**19**	13	1.7	11					
29-Jan-97	6.0	190	150	2300		46	19	1.9	1.4	7.4					
12-Mar-97	6.5	210													
18-Apr-97	6.8	250													
19-May-97	6.8	210													
13-Jun-97	7.1	210													
16-Jun-97	6.4	110	100	3000		35	7	0.85	0.76	4.5					
17-Jul-97	6.9	190													
21-Aug-97	7.2	200													
11-Sep-97	7.8	200													
13-Oct-97	7.1	250													
12-Nov-97	7.2	240	180	1200	780	54	17	2.5							
16-Dec-97	7.6	240													
14-Jan-98	7.6	200													
19-Feb-98	7.6	200													
20-Mar-98	7.2	200													
24-Apr-98	7.1	210													
19-May-98	6.1	170		1200											
23-Jun-98	6.9	160		1400											
28-Jul-98				720											
7-Sep-98	7.4	150	160	1300	840	33	11	0.77							
18-Nov-98	7.2	160		3400											
1-Feb-99		143		1700	780										
10-Feb-99	6.5	185	170	1600	950	38	11	2.1							
6-May-99	8.3	218													
28-Jun-99	7.3	200		300	280										
14-Jul-99	7.2	78		530	500										
15-Jul-99															
10-Aug-99	8.2	159	130	230	510	30	8	1.5							
25-Oct-99	6.4	130		1400	820										
9-Nov-99	7.9	120		1300	785										
19-Jan-00	7.3	150		1600	820										
22-Feb-00	6.9	205	570	1300	690	44	22	0.5							
9-Mar-00	5.4	145		1200	770										
22-Mar-00	6.9	52		660	700										
24-Jul-00				1200											
22-Aug-00	7.2	160	160	1400	650	40	34	0.87							
14-Nov-00	7.1	138		1800	860										
8-Dec-00	7.1	125		1100	895										
1-Feb-01	7.6	145		1662	900										
21-Feb-01	7.4	148			835										
1-Mar-01	6.9	97		812	845										
7-Mar-01	6.9	96		497	670										

Notes
conc taken as MDL
(construction largely completed by late N

DATE	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Ca	Mg	Cu	Cd	Cr	Mn	Pb
		(uS/cm)	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
26-Mar-01	7.1	73		1186	820										
7-May-01	6.7	50		1084	810	6	3	9.6							
21-May-01	7.8	107		492	715										
31-Jul-01	8	240													
20-Nov-01	7.7	250		1384	875										
12-Feb-02	7.5	155		448	570										
30-Mar-02	6.8	160		720	450										
3-May-02	8.1	175		110	280										
14-Jun-02	6.8	250		512	610										
11-Dec-02	6.5	168		1110	430										
12-Dec-02	6.5	150		826	570										
28-Dec-02	7.2	200			730										
6-Mar-03					677										
16-May-03	6.7	185		329	430	36	14	0.68							
27-May-03	6.8	78.6		390	930	15	6	3.38							
25-Feb-04	7.6	130		1288	770										
9-Mar-04	8.2	100	1060	405	772	124	8	2.1							
23-Mar-04	7.8	140	672	374	230	25	14	3.7							
19-Oct-04	7.4	100		127	840										
30-Jun-05	8.3	100	1190	1060	300	7.4	18	1.09							
24-Oct-05	7.4	200	990	92	1035	45	17	1.8							
8-Jun-07	7.4	60		706	1025	49.6	6.6	21							
20-Aug-07	7.5	60		335	308		335								
25-Apr-08	7.3	80		190	450										
6-Sep-08	7.4	80		261	320	23	4	6.63							
16-Feb-09	8.1	100		280	500										
3-Apr-09	7.1	82	330	400	706										
22-May-09	6.4	117		98	212	26	20	0.74							
9-Nov-09	8.8	76.2		180	385	8.59	2.96	0.84							
30-Dec-09	7.2	108		43	474	17.4	15.3	0.79							
2-Dec-10	6.5	58.7			566										
31-May-11	6.3	81		28		12	1	1.3							
15-Jun-11	7.1	44		760	1684	8	1	12.9							
22-Jul-11	6.1	100		140	346	20	5	6.09							

Sediment Dam 17 (between the two Roseville Waste dumps)

Notes

conc taken as MDL

(construction largely completed by late

Date	pH	EC	ORP
		uS/cm	
12/10/2009	8.2	3410	107
20/10/2009	8.2	3210	
10/11/2009	6.6	770	

SD18
Link Road Sediment Dam

Notes
conc taken as MDL

DATE	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)
		(uS/cm)	(mg/L)	(mg/L)		(mg/L)	(mg/L)	(mg/L)
15-Jun-11				157		61	130	2.44
21-Jul-11	7.1	416		126	246	43	89	3.13

SWQ6

Notes
conc taken as MDL

DATE	pH/notes	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity
			(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
27-Nov-02	No flow																					
11-Dec-02	No flow																					
12-Dec-02	No flow																					
31-Jan-03	No flow																					
22-Feb-03	No flow																					
23-Feb-03	No flow																					
31-Mar-03	No flow																					
4-Apr-03	No flow																					
30-Apr-03	7.1	7.1	1088	623	8	6.4	340	27	1.36	2.6	0.1	5	12	0.01	0.001	0.0002	0.02	0.02	0.0003	0.17	0.005	25
16-May-03	6.6	6.6	585			8																
26-May-03	7.1	7.1	127.5	117	26	32	12	7	0.42	1.2	0.1	1	2	0.01	0.01	0.0022	0.01	0.05	0.0002	0.02	0.005	6
26-Jun-03	No flow																					
31-Jul-03	No flow																					
28-Aug-03	No flow																					
3-Sep-03	7.2	7.2	200			7																
24-Sep-03	No flow																					
31-Oct-03	No flow																					
28-Nov-03	No flow																					
6-Dec-03	No flow																					
28-Jan-04	7.4	7.4	370	342	43	14	150	19	4	2.3	0.1	4.7	7.1	0.03	0.005	0.0003	0.02	0.02	0.0001	0.36	0.005	25
25-Feb-04	6.9	6.9	270	175	27	25	55	14	0.88	0.87	0.1	1.3	2.8	0.01	0.001	0.0002	0.01	0.04	0.0002	0.04	0.005	8.4
22-Mar-04	6.9	6.9	500	462	29	17	115	18	2.6	2.3	0.1	4.8	7.7	0.01	0.001	0.0002	0.01	0.05	0.0002	0.54	0.005	32
30-Apr-04	No flow																					
31-May-04	No flow																					
30-Jun-04	No flow																					
27-Jul-04	No flow																					
20-Aug-04	No flow																					
30-Sep-04	No flow																					
1-Oct-04	7.4	7.4	100	136	22	55	30	7	0.71	3.5	0.06	2	2	0.01	0.001	0.001	0.02	0.02	0.0005	0.02	0.001	10

Notes
conc taken as MDL

DATE	pH/notes	pH	Cond.	TDS	TSS	Turbidity	Chloride	Sulphate	Fe (filt.)	Tot. N	Tot. P	Ca	Mg	Cu	As	Cd	Cr	B	Hg	Mn	Pb	Alkalinity
			(uS/cm)	(mg/L)	(mg/L)	(NTU)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
30-Nov-04	No flow																					
22-Dec-04	No flow																					
17-Jan-05	No flow																					
10-Feb-05	No flow																					
22-Feb-05	No flow																					
18-Mar-05	No flow																					
29-Apr-05	No flow																					
13-May-05	No flow																					
24-Jun-05	No flow																					
29-Jul-05	No flow																					
30-Aug-05	No flow																					
5-Sep-05	No flow																					
17-Oct-05	No flow																					
28-Nov-05	No flow																					
29-Dec-05	No Flow																					
31-Jan-06	No Flow																					
27-Feb-06	No Flow																					
28-Feb-06	No Flow																					
31-Mar-06	No Flow																					
14-Apr-06	No Flow																					
31-May-06	No Flow																					
29-Jun-06	No Flow																					
31-Jul-06	No Flow																					
31-Aug-06	No Flow																					
10-Sep-06	No Flow																					
30-Oct-06	No Flow																					
5-Nov-06	No Flow																					
30-Nov-06	No Flow																					
28/1/2009	No Flow																					