Australasian Groundwater & Environmental Consultants Pty Ltd
ABN 64 080 238 642
36 Jeays Street, Bowen Hills, Qld. 4006 Australia
Phone (617) 3257 2055 Fax (617) 3257 2088
email: brisbane@ageconsultants.com.au
web: www.ageconsultants.com.au

DWI/ae (G1453.Rosewood)
4 March 2009

New Hope Coal Australia Pty Ltd
17 Lowry Street
IPSWICH QLD 4305

Attention: Mr. Ross Bennett

Dear Ross,

RE: NEW OAKLEIGH MINE – NORTH PIT SEEPAGE, TASK 1 DATA REVIEW

1.0 Introduction

New Hope Coal Australia Pty Ltd (New Hope Coal) operates the New Oakleigh Mine which is located some 3km north of the town of Rosewood in South-East Queensland. The Oakleigh North Pit operated until 2000 when it was closed and the void then backfilled with spoil and some tailings. Breakout of seepage was observed a short-time after in a gully located immediately adjacent to the downhill side of the pit, but within a rural residential property along the site's northern boundary.

New Hope Coal commissioned Australasian Groundwater and Environmental Consultants Pty Ltd (AGE) to determine the source of this seepage, the mechanism by which it is occurring, and to identify suitable options (if necessary) that would be available to control the seepage. A staged approach was proposed to undertake this work as a series of iterative tasks, with the scope of work for each task being dependent on the results of the preceding task. The main tasks are as follows:

- Task 1 – Data Review
- Task 2 – Field Investigations
- Task 3 – Analysis and Reporting

This letter report outlines the findings and results of the Task 1 data review. It includes a review of the existing environment, to develop an understanding of the geological stratigraphy of the area and how this controls the movement of groundwater in and around North Pit. It also provides the basis for further investigation of the North Pit site and associated seepage areas to the north, as part of the Task 2 field investigations.

2.0 Data Review

A review of data supplied by New Hope Coal was undertaken to develop an understanding of the existing environment making up the site and surrounds, to develop a conceptual hydrogeological model for the study area. The data review included access to:

- Survey data of the pit floor at the end of mining;
- Survey data of the current landform including the two rural properties to the north;
- Geological logs for drillholes within and north of the site;
- Details of faults mapped in the area;
- Aerial photography of the site and surrounds;
- Published geological mapping for the region;
- Underground mining associated with the site; and
- Water quality data of the tailing pond and seepage areas.

In addition, a site inspection was undertaken on 12 February 2009 to obtain an overview of the site, visually inspect the seepage areas and talk to the owners of the two adjoining rural properties to obtain any anecdotal details about these areas.

2.1 Background

The Oakleigh North Pit is located within the northern slopes of a northeast-southwest trending line of hills north of Rosewood. The northern boundary of the site adjoins two rural properties described as Lot 2 on CC2737 (north-western property) and Lot 526 on CH31539 (north-eastern property). The low wall of the open pit extends in a south-west to north-east direction, reportedly within 5m of the northern boundary of the site. Subsequent to commencement of filling the void with spoil and tailing in 2000, breakout of seepage was observed in the gully located adjacent to the north-west end of the low wall crest alignment. The gully drains northwards through the north-western property which is down slope of the pit.

Later around 2006, a second seepage area was reported within the gully located immediately downslope of the opposite north-eastern end of the low wall crest alignment. This second gully drains to the north-west across to the north-eastern property into the north-western property. The location of the rural properties in relation to the Oakleigh North Pit is shown in Drawing No.1.

Some rehabilitation of the tailing was completed between 6 to 12 months ago and included partial capping of the desiccated western portion of the tailings area. Around the same time these works were completed, a third seepage breakout was observed within the eastern gully near its confluence with the western gully. All seepage breakout areas are defined by dieback of the grass cover and white dessication salt crystals on the ground surface (refer Figures 1 to 3)

Figure 1: First seepage area in gully embankment in southern portion of Lot 2; note slight vegetation dieback and white desiccation crystals

Figure 2: Second seepage area in Lot 526; note vegetation dieback

Figure 3: Third seepage area in Lot 2; note extensive area of white desiccation crystals and vegetation dieback

2.2 Geology

The New Oakleigh Mine is located within the north-west area of the Moreton Basin, which hosts sediments of Late Triassic to Middle Jurassic age. The sediments within the study area making up the North Oakleigh Pit and surrounds typically comprise interbedded sequences of shales, siltstones and sandstones, and contain economic coal seams which make up the Middle Jurrassic aged Walloon Coal Measures that were mined at the site. East of the site, these sediments are overlain by a thin cover of Tertiary basalt and minor breccia flows.

Quaternary alluvium occurs as localized, irregular deposits associated with smaller creeks and more regular continuous deposits along the larger drainages. The Ipswich 1:100,000 geological map (GSQ, 1981)[1] indicates the closest notable alluvial occurrence is that associated with Black Snake Creek located approximately 1km north of the study area.

2.3 Exploration Drillhole Logs

A review of the drillhole data provided by New Hope Coal identified a number of exploration/ resource holes drilled in and around the North Oakleigh Pit, and to the north-west adjacent to the north-western property located to the north of the mine. The locations of these exploration bores are shown in Drawing No. 2.

Details of these boreholes, depth drilled, depths of coal seam intersected, base of weathering and presence of underground workings are summarised in Table 1.

[1] GSQ (1981), *'Australia 1:100,000 Geological Series, Ipswich, Queensland – Sheet 9442'*, published by the Department of Mines, Brisbane.

Table 1: SUMMARY OF NORTH OAKLEIGH PIT EXPLORATION/RESOURCE BOREHOLES DATA										
Borehole	Easting (m)	Northing (m)	Elevation (mAHD)	Total Depth (m)	Base of Weathering (m)	Weathered Coal (m)	Coal Seam Depth (m)		Seams Intersected (m)	Underground Workings (m)
							from	to		
2299	456,479.1	6,943,749.3	102	82	12	-	14.6	24.0	HN3 – RE2	-
2361	458,989.0	6,947,325.2	101	31	9.1	6-7	9.1	21.7	RE1 – RE3	-
2368	458,725.6	6,946,709.6	117	36	-	-	21.0	21.7	-	-
2404	458,857.3	6,947,134.6	107	-	13	-	12.2	36.0	HN1 – RE3	-
2406	458,566.9	6,947,179.4	99	41	12.2	-	-	-	-	-
8016	459,478.6	6,946,162.9	195.9	210	15	-	51.8	193.1	WW – F1	-
8017	459,607.4	6,946,178.7	204.2	75	20	-	65.3	73.5	WW – HR3	73.6 – 75.0
8018	459,490.5	6,946,481.6	178.5	60	18	-	22.9	52.5	WW – RT2	-
8019	459,563.4	6,946,326.1	190.9	110	8.0	3.5-4	41.0	100.8	WW – BT5	-
8020C	459,342.3	6,946,103.6	187.2	66	-	-	46.3	57.1	WW – JN2	59.0 – 60.0
8021	459,438.2	6,946,108.9	192.9	78	18	6-6.2	51.3	75.2	WW – LJ1	-
8022	459,261.9	6,946,138.2	188.8	72	21	-	46.2	58.3	WW – JN2	60 – 61
8023	459,308.6	6,946,122.5	188.6	63	-	-	47.8	59.4	WW – JN2	60 – 63
8024	459,284.4	6,946,129.9	188.8	63.5	20	-	47.3	59.0	WW – JN2	61 – 63.5
8030	459,144.5	6,946,077.4	163.8	60	6	-	17.7	53.5	WW – JY2	-
8031	459,161.5	6,946,138.0	160.2	54	9	-	15.4	50.0	WW – JY2	-
8032	459,197.6	6,946,103.1	171.4	60	9	-	27.9	52.9	WW – RT1	51.8 – 55.5
8039	459,262.0	6,946,078.7	179.8	72	14	-	40.5	51.8	WW – JN2	-
8058	459,460.1	6,946,508.4	170	54	15	-	15.6	44.1	HD1 – RT3	-
OW2	459,504.5	6,946,456.0	181.4	10	-	-	-	-	-	-

Note: - no data available

These show the geology of the study area to be dominated by interbedded sequences of siltstone, sandstone, shale, carbonaceous shale, mudstone and economic coal seams. The coal seam stratigraphy includes up to 63 individual coal seams between the WW Seam and Rea 5 Seams. These seams were intersected in drillhole 8016, the deepest hole drilled within the study area (to 210m). The following comments can be made in regard to the drilling data within the study area:

- Alluvium was intersected within two holes (8030 and 8032) as a surface covering to 1m depth;
- Basalt was intersected within only one hole (8016) as a surface covering to 6m depth;
- The base of weathering ranged from 6m to 21m;
- Coal seam intersections ranged from 15m to 178m depth in and around the North Oakleigh Pit, and 9m to 36m depth for the five holes located north-west of the mine pit;
- Underground mine working were intersected between 51m and 75m in six boreholes located within the eastern portion of the pit highwall. (There is no indication in the data whether these workings were wet or dry).

2.4 Water Quality

New Hope Coal has sampled surface water within the tailings dam pond (NP) and at three locations (BD1 to BD3) along the Lot 2 property creek alignment to determine the source for the seepage. Stiff diagrams generated from the water quality data are shown in Figure 4 and show a similar water type suggesting the source is either the tailings dam within the pit, or discharge from a coal seam aquifer.

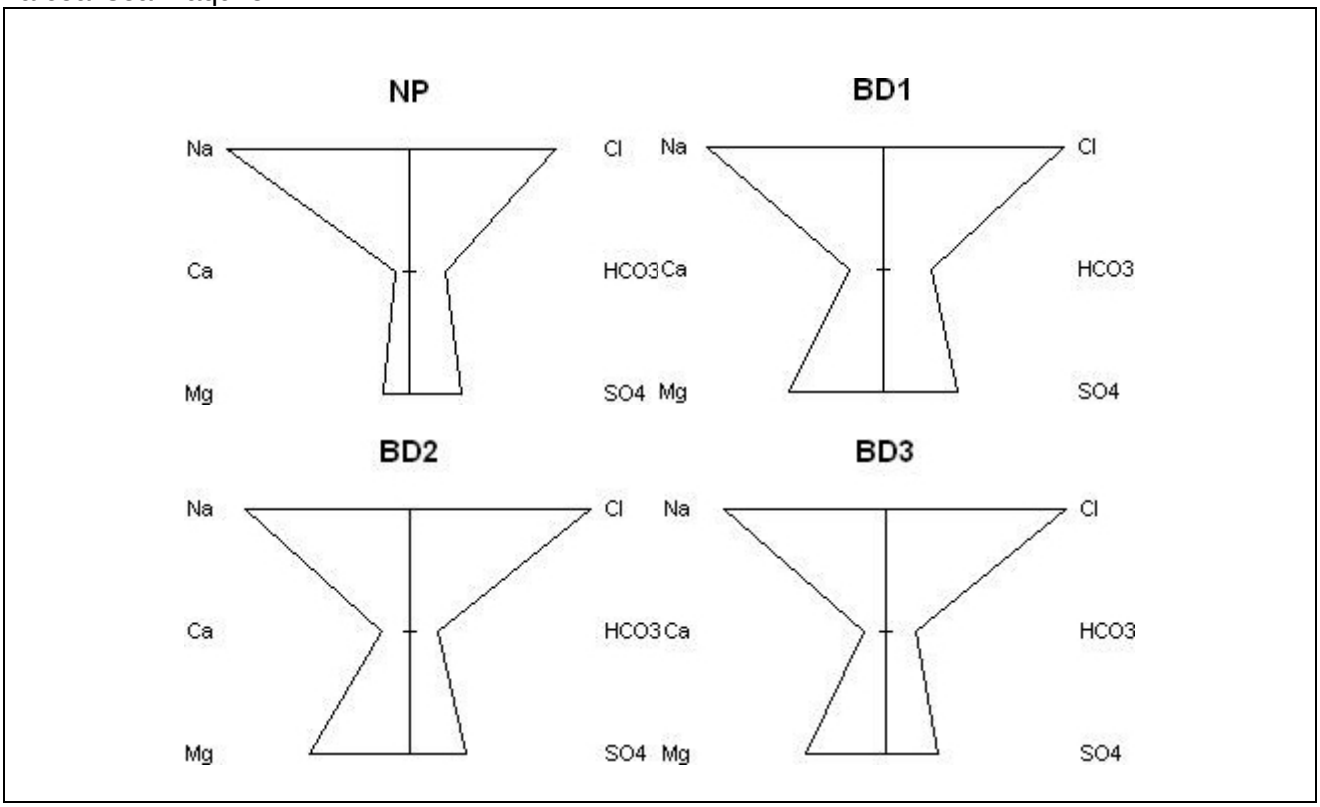


Figure 4: Stiff Diagram Plots for Tailings Dam and Seepage Waters

2.5 Structural Geology

This portion of the Moreton Basin is described as being subjected to minor earth movements that folded the sedimentary sequences into a shallow syncline pitching gently to the south (Cameron, 1970)[2]. The coal seams associated with the North Oakleigh Pit and surrounds dipping around 3º towards the south-east. Mapping by New Hope Coal has identified a number of north-west trending faults, two of which appear to intersect the pit as shown on Drawing No. 2. One has been mapped extending north-west from the northern low wall side of the pit and crossing the western creek alignment, whilst the other extends west from the pits north-western batter. Information about these faults is limited to anecdotal evidence from discussions with New Hope Coal personnel (pers. coms. Mr Bill Drysdale 23 February 2009) who provided the following information:

- the fault that intersected the northern low wall extended across the pit;
- groundwater inflows were experienced in this pit from either the fault or coal seam aquifers; and
- groundwater levels were maintained below the pit floor by pumping from a bore located adjacent to the fault. No details of this bore exist.

2.6 Hydrogeology

The hydrogeological regime of the study area associated with the Walloon Coal Measures can be categorized into the following hydrogeological units:

- hydrogeologically “tight” (i.e., low permeability) and hence essentially dry sandstone, shale and siltstone that comprise the majority of the interburden and overburden;
- low to moderately permeable coal seams which are the prime water bearing strata within the Walloon Coal Measures. Typically these aquifers are semi-confined to confined aquifers which are contained within the low permeability (“tight”) interburden and overburden sedimentary sequences mentioned above.

Recharge of the coal seam aquifers would be from direct infiltration of rainfall where the seams subcrop/outcrop. Groundwater flow would be expected to be a subdued reflection of the ground surface topography in a northerly direction. Information on groundwater levels is limited to a water supply bore located towards the northern end of the north-eastern property. This bore intersected water at 33.3m depth when the bore was drilled in August 2007. In addition, water is reportedly around 150 feet (~45m) within an underground mine air shaft located roughly in the centre of the same property.

The coal seam aquifers are the prime water bearing strata within the study area, and provide the most likely opportunity for groundwater movement either into or out of existing North Oakleigh Pit.

However, on a local scale minor perched aquifers can occur in areas of fill such as spoil heaps and the filled mine void, as well as the regolith zone at the interface between the surficial soils and weathered bedrock, associated with locally increased permeability due to bedrock weathering. The occurrence and depth of this shallow aquifer is likely to be variable and would depend on factors such as:

[2] Cameron, J.B., (1970), *”The Rosewood-Walloon Coalfield’*, Publication N0. 344, Geological Survey of Queensland, Queensland Department of Mines.

- the extent and depth of fill material;
- the depth of weathering; and
- the extent and frequency of fracture systems within the weathered bedrock sequences.

The regolith zone at North Pit would have most probably been unsaturated, but would have become saturated when the void filled, extending particularly beyond the lower sections of the void's crest, forming a pathway for groundwater seepage from the void.

3.0 Conceptual Hydrogeological Model

The available data indicates the following hydrogeological units are present within the study area:

- a perched aquifer associated with backfilled spoil and tailings contained in the mine void footprint;
- a shallow perched aquifer within a higher permeability fractured regolith zone between the surficial soils and weathered bedrock; and
- a deeper semi-confined to confined aquifer contained within low to moderately permeable coal seams which are the prime water bearing strata within the study area.

The perched aquifer associated with the Oakleigh North Pit spoil and tailings are likely to be fully saturated as indicated by the elevation of the ponded surface water within the mine void. Groundwater recharge to this aquifer would be from a combination of groundwater outflow from the mined coal seams intersected within the pit high wall, and surface water inflows from rain events. The extent of these features is shown conceptually in Drawing No. 3.

Outbreaks on the adjacent properties are considered a result of the development of a seepage front along the down slope portions of the pit low wall, via the following potential seepage pathways:

- localized faulting within the coal seam sedimentary sequences;
- coal seam subcrop/outcrop that either intersect the low wall or are interconnected by fractured/ faulted interburden sequences; and
- void overflow 'spillage' via the regolith zone. In particular this would be expected at the eastern and western ends of the low wall where lower ground surface elevations are intersected by the eastern and western rural property creek alignments.

In order to confirm if one or a combination of the above potential pathways are contributing to the seepage breakouts observed in the adjacent property gully alignments, the extent of the shallow seepage pathways (as described above) needs to be investigated. This would allow for identification of appropriate remediation options, to restrict, or minimise further or ongoing discharge from these zones.

4.0 Proposed Seepage Investigation

As mentioned above, it is recommended that further investigation of Oakleigh North Pit area be undertaken. The objective of this work would be to establish an understanding of the current extent, and interconnection between the groundwater regimes in both the coal seam aquifers and the shallow perched aquifers associated with the void fill and regolith zone. To this end, the

investigation would need to address the groundwater conditions up-gradient and down-gradient of the void, as well as within the void. Nominally the investigation has been structured to include drilling and construction of nine groundwater monitoring bores at five locations within the study area, these being:

- One monitoring bore upslope of the pit high wall into the uppermost coal seam aquifer to establish groundwater conditions up-gradient of the void.
- Two monitoring bores within the void along the 'bridge' to establish any variation in groundwater conditions within the void and the underlying coal seam aquifer (GW2).
- Two monitoring bores at the eastern end of the low wall to investigate groundwater conditions within the regolith zone and also within the underlying coal seam aquifer (GW3).
- Two monitoring bores at the western end of the low wall to investigate groundwater conditions within the regolith zone and also within the underlying coal seam aquifer (GW4).
- Two monitoring bores within the Lot 2 property to investigate groundwater conditions within the regolith zone and also within the underlying coal seam aquifer down gradient of the void (GW5).

The proposed locations for these investigation sites are shown in Drawing No. 2.

In addition to the drilling program, the field investigation tasks will also include:

- collection and analysis of water samples from each monitoring bore, from the three seepage outbreaks locations, and from the tailings dam;
- permeability testing in selected boreholes (falling head tests); and
- installation of water level data loggers for baseline monitoring.

Details of each aspect of the proposed Task 2 Field Investigation works are provided in the following sections.

4.1 Monitoring Bore Drilling and Construction

The requirements for the drilling and construction will include bore construction using flush threaded, 50mm, Class 18, uPVC casing and screens. Nominal construction details of these monitoring bores should include but not necessarily be limited to the following:

- Drilling of a nominal 150mm diameter borehole.
- Provision of Class 18 uPVC casing and for 6m of Class 18 uPVC factory slotted screens at the base of the monitoring bore positioned against the zone of groundwater inflow.
- Placement of a 5mm to 10mm sized washed gravel pack filter material around the screened section to 1m above the screen or zone of groundwater inflow (which-ever is the greatest).
- A 1m thick bentonite seal placed above the gravel pack filter material.
- Backfilling of the remaining annulus space with a cement/bentonite grout to ground surface.

Typical monitoring bore construction details are shown in Drawing No. 4.

Following completion of construction of the monitoring bores, each should be airlift developed to remove drilling fines and enhance hydraulic connection between the monitoring bore and aquifer.

These works would be supervised by a hydrogeologist from AGE, with drill cuttings from each bore lithologically logged and reference made to zones of groundwater intersection and inflows measured over a 'V' notch weir (if sufficient flows are encountered). It has not been established whether New Hope Coal would provide a drill rig suitable for undertaking further investigation of the hydrogeological of the site conditions as this would require a Queensland registered and licensed water bore driller to drill and construct of the proposed monitoring bores. In the event New Hope Coal are able to drill these monitoring bores, a bill of quantities of the materials required to undertake this work are provided in Appendix A.

4.2 Permeability Testing

In-situ hydraulic conductivity (permeability) tests will be undertaken in selected boreholes. The methodology will depend on the conditions encountered and will include either variable head (rising or falling head) or slug or water injection. This hydraulic/permeability testing will be typically performed at the end of drilling and monitoring bore construction. Should the selected test technique involve the addition of external water then the test will only be conducted after completion of the groundwater sampling activity to avoid potential groundwater quality interferences.

4.3 Water Quality Sampling

To assess the spatial variability of the groundwater composition, water samples will be collected from each of the monitoring bores, three seepage outbreaks locations, and from the tailings dam. The monitoring bores will be purged and sampled in accordance with the Murray-Darling Basin Groundwater Quality Sampling Guidelines[3] for groundwater sampling.

The following analytical parameter suite is recommended:

- pH, Electrical Conductivity
- Major anions (CO_3, HCO_3, Cl, SO_4) and cations (Ca, Mg, Na, K)
- Dissolved trace metals suite (As, Cd, Cr, Cu, Pb, Ni, Zn, Fe, Hg)

All laboratory analytical work will be performed by a NATA registered laboratory.

4.4 Datalogger Installation

It is recommended that New Hope Coal purchase water level data loggers. Data loggers provide a continuous measurement of water levels data and help to identify seasonal variations in groundwater levels, as well as impact from rainfall events on recharge to each aquifer. At this stage it is recommended to purchase two data loggers and one barometric logger, the docking station for communicating/downloading the data loggers and software, and install them in selected monitoring bores covering the shallow regolith and deeper coal seam aquifer monitoring bores. The data loggers are sealed units which require compensation of barometric influences on the groundwater data, hence the barometric logger.

[3] MDBC (1997), *"Murray-Darling Basin groundwater Quality Sampling Guidelines"*, Technical Report No. 3 Groundwater Working Group, Murray-Darling Basin Commission, August.

4.5 Timing

The Task 2 Field Investigation allows for five days to drill and construct the nine monitoring bores. It should be noted that this timing could increase or decrease depending on the rate of progress of the drilling contractor. As such, should the number of bores be increased, timing to complete this work would most likely also increase.

5.0 Fee and Cost Estimate

An estimate of costs to undertake the works program proposed for the Task 2 is provided below. A breakdown of indicative drilling costs is provided in Appendix A.

Task 2 – Drilling and Supervision of Monitoring Bore Installation and Reporting:		
Subcontractor Costs:		
Mobilisation/demobilisation, Accommodation, Inductions, Water Cartage, Stand-by, etc	See attached breakdown of costs	$8,030.00
Drill & Construct 9 Monitoring Bores	See attached breakdown of costs	$62,200.00
Laboratory Analyses (full water quality suite)	- allow for 13 samples @ $150/each	$1,950.00
	Sub-total	**$72,180.00**
AGE Supervision:		
Senior Hydrogeologist- (D. Irvine)		
- Mobilise/Demobilise to/from Site	- allow 1 day @ $1520/day	$1,520.00
- Field Supervision	- allow 7 days @ $1520/day	$10,640.00
- Monitoring Bore Sampling	- allow 3 days @ $1520/day	$4,560.00
4WD Hire and fuel	- allow 10 days @ $200/day	$2,000.00
Accommodation and meals	- allow 10 nights @ $200/day	$2,000.00
Sample Pump Hire	- allow 3 days @ $300/day	$900.00
Water level dipper	- allow 10 days @ $30/day	$300.00
Electronic water level data loggers	- allow 3 units @ $1080/unit	$3,240.00
Miscellaneous costs (fuel, phone etc)	- allow	$250.00
	Sub-total	**$25,410.00**
	Total Project Stage 2	**$97,590.00**

5.1 Assumptions

- This assumes New Hope Coal would not be providing a drilling rig and a suitable qualified and inducted driller would need to be sourced for this work.
- Allowance has been made for a nominal 7 days to construct the provisional nine monitoring bores at the five locations, however this is very much dependent on the rate of progress of the drilling contractor, and this nominal allowance could be increased or decreased in accordance with the rates given.
- Groundwater sampling and water quality analysis is not part of the scope of work.
- The new bores will need to be surveyed to AMG and AHD, costs for this task have not been included as we have assumed you have surveyors on-site.

- No report will be produced as part of the Task 2 works as this is covered in Task 3.
- All fees and disbursements are exclusive of GST.

5.2 Timing

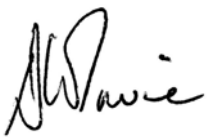
The Task 2 Field Investigation allows for 10 days to complete the scope of work proposed in this letter report, which includes:

- seven days to drill and construct the nine monitoring bores. It should be noted that this timing could increase or decrease depending on the rate of progress of the drilling contractor. Should the number of bores be increased, timing to complete this work would most likely also increase; and
- three days to sample the monitoring bores, tailings dam and seepage areas.

Output from the Task 2 Field Investigation will allow the current understanding of the groundwater regime described in this letter report to be confirmed and refined. The understanding of the system developed form the field investigation will allow appropriate remedial options to be identified to control the seepage from the North Pit area. This subsequent work will form the Task 3 Analysis and Reporting part of the study, which will include a final report that includes the results of the Task 2 Field Investigation, the overall conceptualisation of the seepage regime, and assessment of remedial options to control the seepage. The seepage analysis may require numerical modelling to assess the feasibility of the various remedial options identified, which would be undertaken using the SEEPW code.

Please do not hesitate to contact the undersigned if you require clarification with this report.

Yours faithfully,



DUNCAN W. IRVINE
Senior Hydrogeologist
Australasian Groundwater and Environmental Consultants Pty Ltd

attachments: *Drawing No. 1 – Site Layout*
Drawing No. 2 – Proposed Investigation Sites
Drawing No. 3 – Conceptual Hydrogeological Model
Drawing No. 4 – Example of Monitoring Bore Construction
Appendix A – Bill of Quantities and Indicative Drilling Cost Breakdown

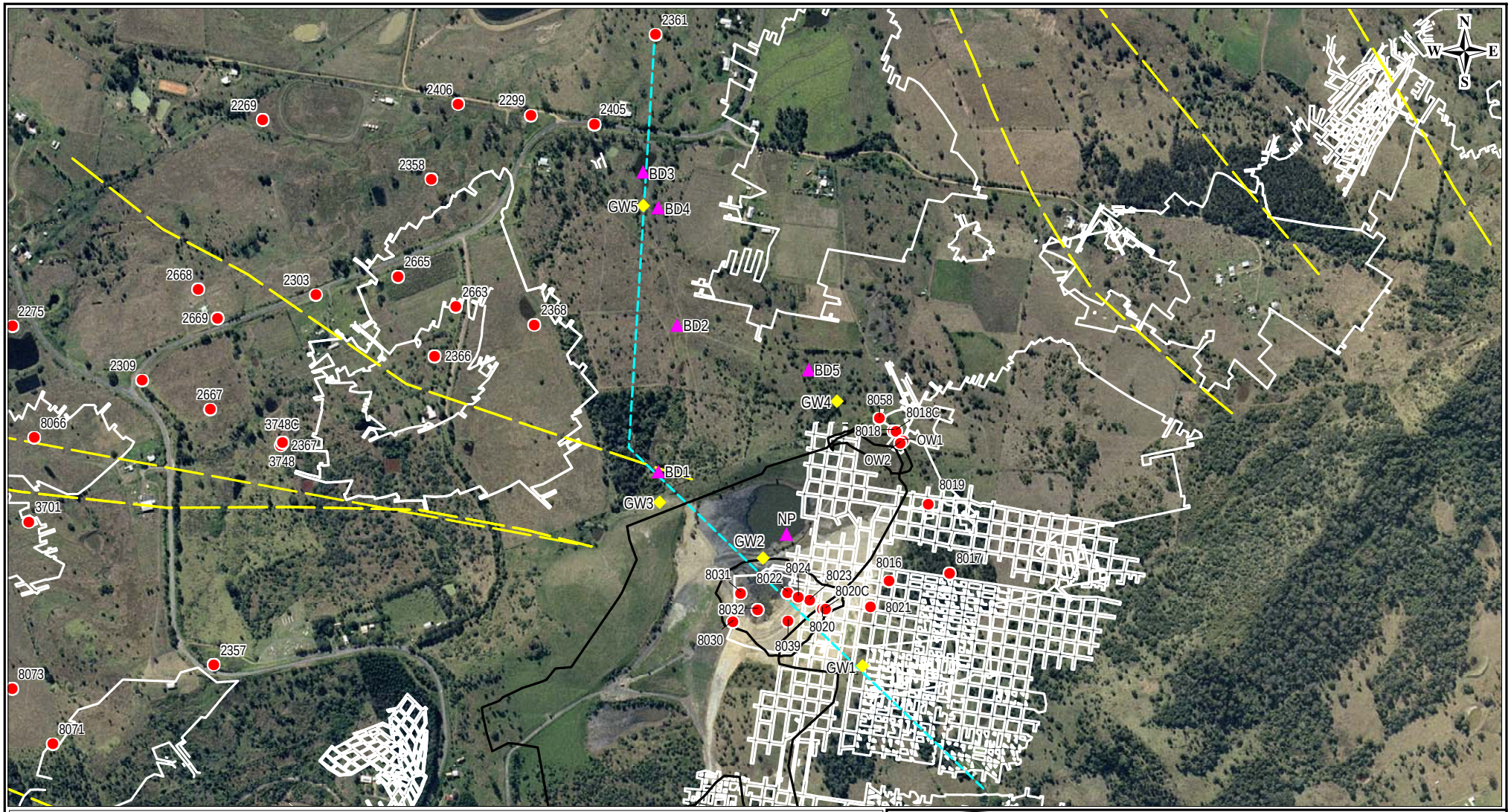
- LEGEND -

- Creek Alignment
- Property Boundary (2004 Data)
- Pit Outline
- Underground Mine Workings

AUSTRALASIAN GROUNDWATER & ENVIRONMENTAL CONSULTANTS PTY LTD
36 JEAYS STREET BOWEN HILLS QLD 4006 AUSTRALIA

TITLE: NEW OAKLEIGH MINE
NORTH PIT SEEPAGE - TASK 1 DATA REVIEW
SITE LAYOUT

CLIENT: New Hope Coal Australia Pty Ltd			OFFICE: Brisbane
DRAWN BY: TMM	SCALE: 1 : 13,000 (A4)	PROJECT No: G1453	DRAWING No: 1
APPROVED BY:	DATE: March 2009		



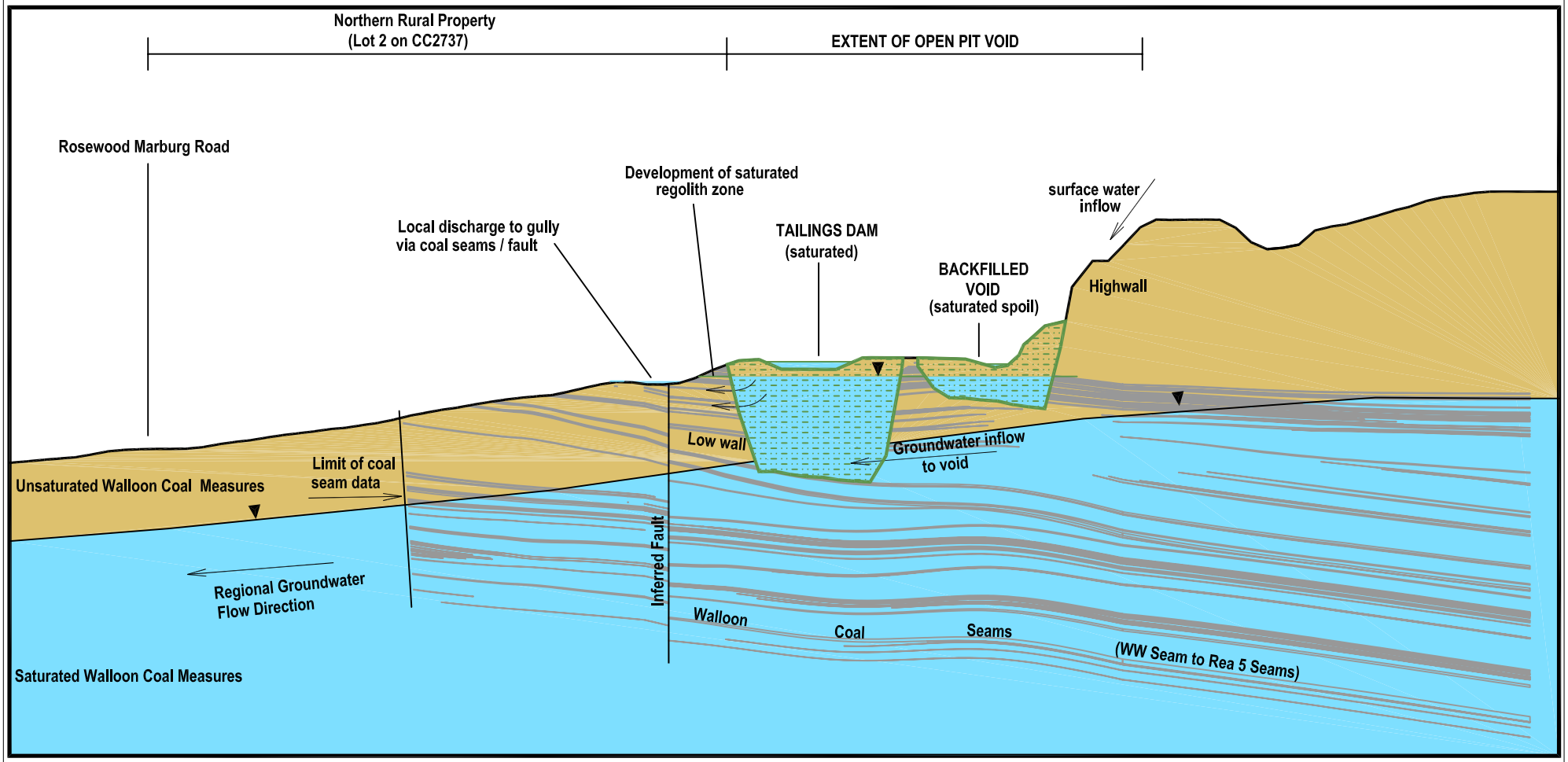
- LEGEND -

- Proposed Investigation Site
- Exploration Drillhole
- Seepage Monitoring Locations
- Cross Section
- Fault
- Underground Mine Workings
- Pit Outline

AUSTRALASIAN GROUNDWATER & ENVIRONMENTAL CONSULTANTS PTY LTD
36 JEAYS STREET BOWEN HILLS QLD 4006 AUSTRALIA

TITLE: NEW OAKLEIGH MINE
NORTH PIT SEEPAGE - TASK 1 DATA REVIEW
PROPOSED INVESTIGATION SITES

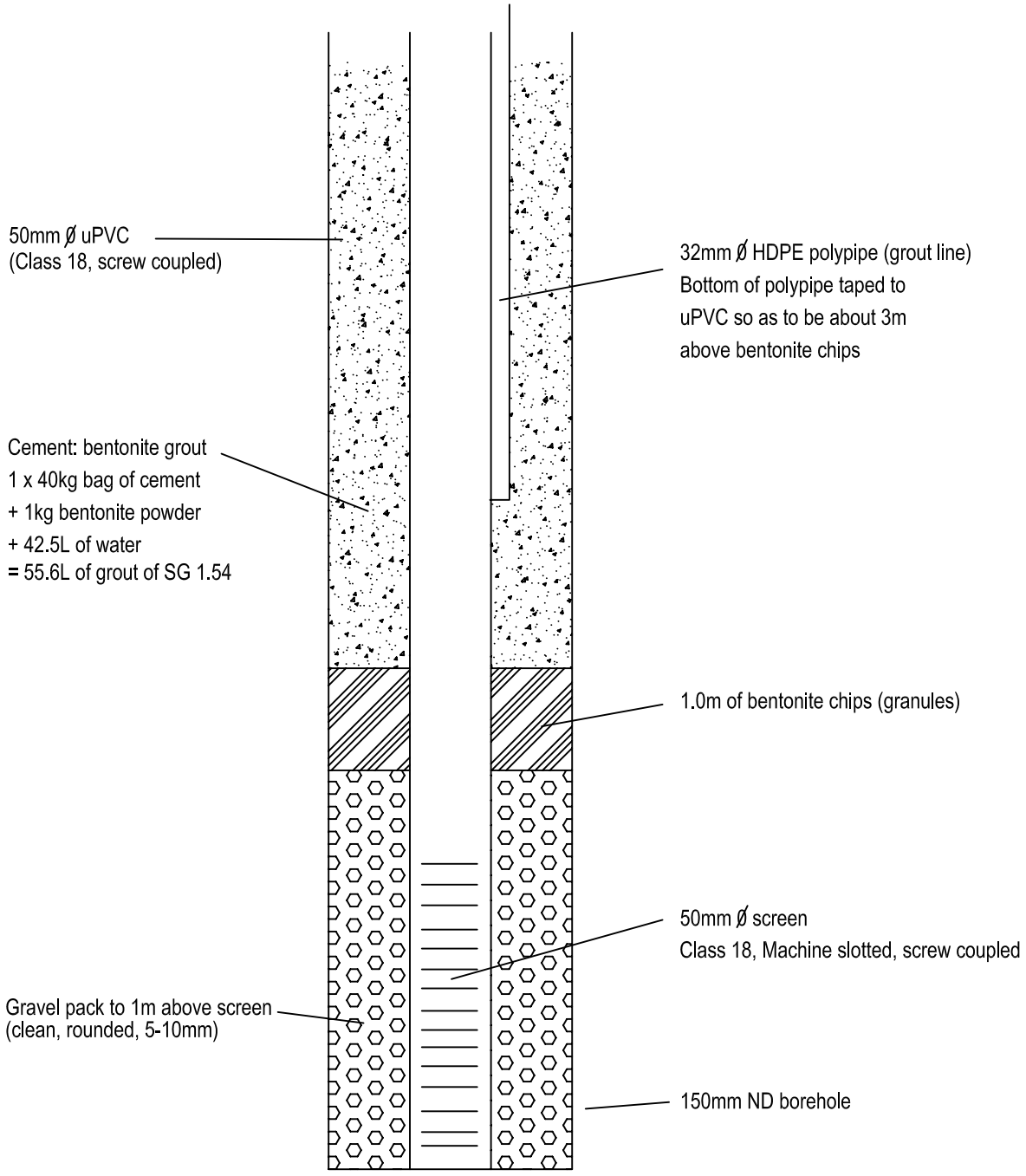
CLIENT: New Hope Coal Australia Pty Ltd				OFFICE: Brisbane
DRAWN BY: TMM	SCALE: 1 : 12,000 (A4)	PROJECT No: G1453		DRAWING No: 2
APPROVED BY:		DATE: March 2009		



AUSTRALASIAN GROUNDWATER & ENVIRONMENTAL CONSULTANTS PTY LTD
36 JEAYS STREET BOWEN HILLS QLD 4006 AUSTRALIA

TITLE: NEW OAKLEIGH MINE
NORTH PIT SEEPAGE - TASK 1 DATA REVIEW
CONCEPTUAL CROSS SECTION

CLIENT: New Hope Coal Australia Pty Ltd			OFFICE: Brisbane
DRAWN BY: JST	SCALE: V:H 3:1	PROJECT No: G1453	DRAWING No: 3
APPROVED BY:		DATE: March 2009	



AUSTRALASIAN GROUNDWATER & ENVIRONMENTAL CONSULTANTS PTY LTD
36 JEAYS STREET BOWEN HILLS QLD 4006 AUSTRALIA

TITLE: NEW OAKLEIGH MINE
NORTH PIT SEEPAGE - TASK 1 DATA REVIEW
EXAMPLE OF MONITORNG BORE CONSTRUCTION

CLIENT: New Hope Coal Australia Pty Ltd			OFFICE: Brisbane
DRAWN BY: DWI	SCALE: NTS	PROJECT No: G1453	DRAWING No: 4
APPROVED BY:		DATE: March 2009	

APPENDIX A - OAKLEIGH NORTH PIT GROUNDWATER AND SEEPAGE INVESTIGATION

HYDROGEOLOGICAL INVESTIGATION - BILL OF QUANTITIES

Monitoring Bore	Easting (m)	Northing (m)	Target Geological Sequence	Approx. Depth (m)	Class 18 uPVC		Filter sand (m3)	Bentonite		Cement (20kg bags)	32mm polypipe (m)	End caps	Steel Protectors
					Casing (m)	Screen (m)		Pellets (buckets)	Powder (kg)				
GW1	459,420	6,945,980	Uppermost Coal Seam Aquifer	100	95	6	0.1	0.5	26	52	89	2	1
GW2A	459,210	6,946,210	Void Fill	50	45	6	0.1	0.5	12	24	39	2	1
GW2B	459,210	6,946,210	Uppermost Coal Seam Aquifer	80	75	6	0.1	0.5	20	41	69	2	1
GW3A	458,990	6,946,330	Regolith/Spoil Fill	20	15	6	0.1	0.5	3	7	9	2	1
GW3B	458,990	6,946,330	Uppermost Coal Seam Aquifer	50	45	6	0.1	0.5	12	24	39	2	1
GW4A	459,370	6,946,542	Regolith/Spoil Fill	20	15	6	0.1	0.5	3	7	9	2	1
GW4B	459,370	6,946,542	Uppermost Coal Seam Aquifer	50	45	6	0.1	0.5	12	24	39	2	1
GW5A	458,960	6,946,960	Regolith/Spoil Fill	15	10	6	0.1	0.5	2	4	4	2	1
GW5B	458,960	6,946,960	Uppermost Coal Seam Aquifer	50	45	6	0.1	0.5	12	24	39	2	1
Quantities				435	390	54	1	5	103	205	336	18	9

Based on the above, the following materials would be required for installation of the monitoring bores:

Item	Description	Quantity	Unit
1	Casing Class 18 uPVC, 50mm ND,	65	6m lengths
3	Screen, Class 18 uPVC, 0.4mm aperture machine slotted	18	3m lengths
4	Filter sand, clean, rounded to sub-rounded - 4-6mm diam.	1	m^3
5	Bentonite - pellets	5	buckets
6	Bentonite - powder	103	kgs
7	Cement	205	20kg bags
8	Polypipe - 32mm diamter, HDPE	336	m
9	End caps - for 50mm ND Class 18 uPVC	18	item
10	Steel Protectors - lockable	9	item
11	Polypipe - 25mm diamter, HDPE for airlift development	150	m

Appendix A: Indicative Drilling Cost Breakdown

Mobilisation/Demobilisation

Item	Unit	Quantity	Unit Price (ex GST)	Total Price (ex GST)
Mobilisation/demobilisation	km	600	$5.88	$3,528.00
Accommodation and meals	days	5	$300.00	$1,500.00
On-site inductions and inspections	days	1	$800.00	$800.00
Water cartage	hour	5	$275.00	$1,375.00
Stand-by allowance for access issues, rain, etc	hour	3	$275.00	$825.00
			Sub-total	**$8,028.00**

9 x Monitoring Bores

drill nominal 200mm dia hole for precollar (air-rotary)	m	18	$60.00	$1,080.00
supply 6m x 150mm class 12 PVC casing	m	18	$30.30	$545.40
drill nominal 140mm dia hole (air-rotary)	m	417	$62.50	$26,062.50
supply 3m x 50mm class 18 PVC casing	m	390	$36.82	$14,359.80
supply 3m x 50mm class 18 PVC screen	m	54	$52.60	$2,840.40
50mm Class 18 endcaps	ea	18	$7.35	$132.30
work rate (run casing, gravel pack, grouting etc)	hr	22.5	$295.00	$6,637.50
cement for grouting upper 6m of annulus	20kg sacks	205	$18.00	$3,693.93
bentonite powder for grout mix	25 kg bags	4	$32.50	$133.39
bentonite pellets	25 kg bags	5	$65.00	$292.50
developing	hr	10	$295.00	$2,950.00
solvent cement and primer	lump	1	$20.00	$20.00
steel surface protector and bore signs	ea	9	$360.00	$3,240.00
6mm washed, rounded river gravel	m3	1	$200.00	$197.92
			sub-total	**$62,185.64**
			TOTAL ex GST	**$70,213.64**