CLIENTS | PEOPLE | PERFORMANCE

Melbourne Water Corporation

Report for Kelletts Road Wetland

Detailed Design

June 2009

Contents

Table Index

Figure Index

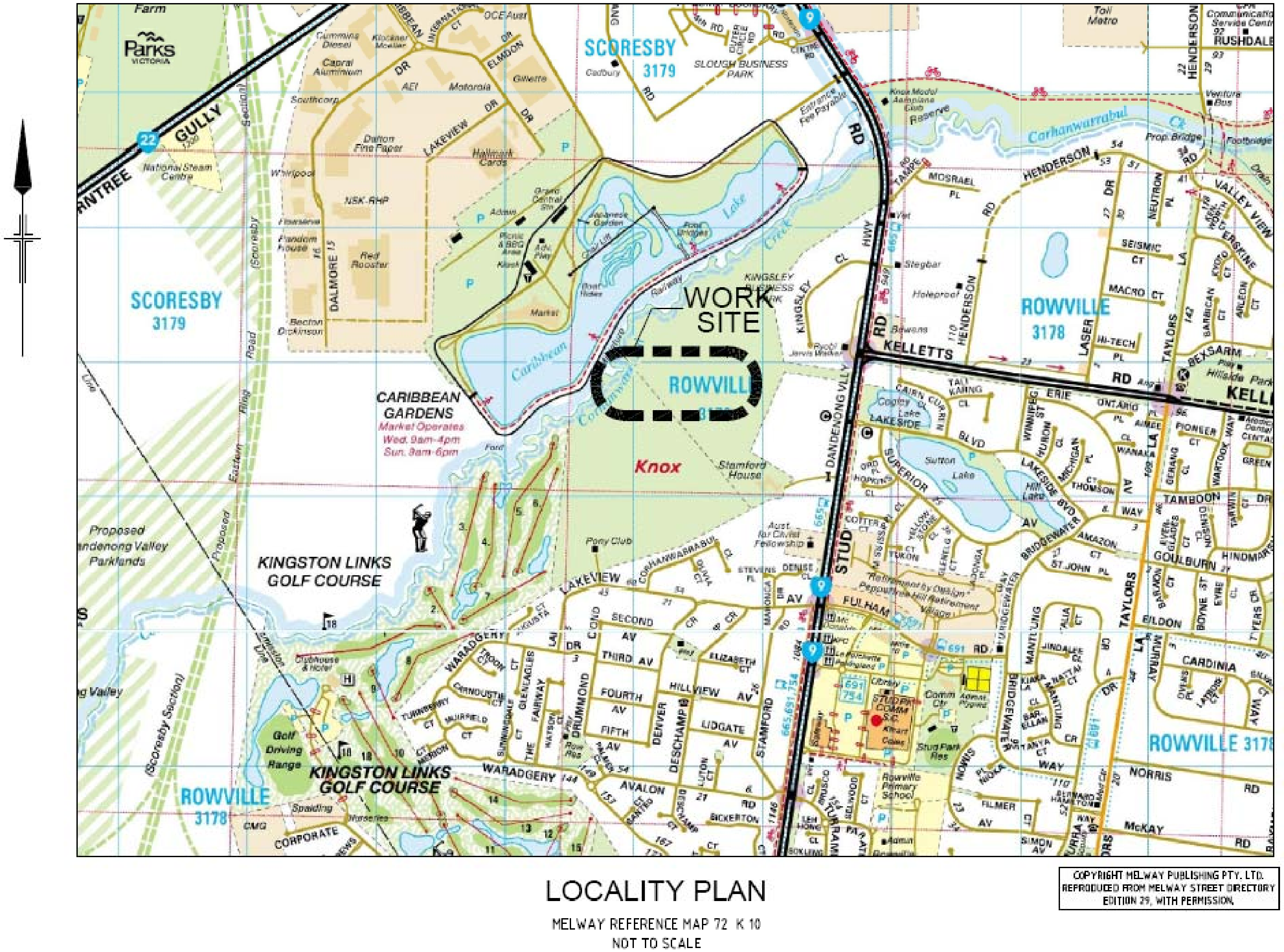
Appendices

1. Introduction

In July 2005, Melbourne Water Corporation (MWC) commissioned GHD Pty Ltd (GHD) to undertake the Design for a wetland for the Kelletts Road Drain that currently discharges into Corhanwarrabul Creek untreated.

This proposed stormwater treatment system consists of a 4 ha size wetland with sediment pond and a Gross Pollutant Trap (GPT) and diversion structure from the low flow pipe. The proposed treatment system is located between Stud Road and Corhanwarrabul Creek and within the proposed Knox City Council Stamford Park development. The location of the wetland is illustrated in Figure 1.

Figure 1 Site Location



2. Objectives and Design Criteria

2.1 Objectives

The project objectives as set out in the Assignment Specification include the following:

- To improve water quality of flows from Kelletts Road Outfall Drain, which discharges into Corhanwarrabul Creek by providing water quality treatment wetlands at the outfall to the drain;
- To assess the feasibility of achieving stormwater treatment objectives in accordance with State Environment Protection Policy (SEPP) and Best Practice Management Environmental Guidelines (BPEMG 1999);
- To design a treatment facility within the identified site that satisfies the requirements of MWC and Knox City Council; and
- To prepare detail design documentation so that tender documentation and construction contracts can be prepared.

2.2 Design Criteria

The following design criteria has been established for the proposed wetland:

- Stormwater treatment in accordance with Environment Protection Authority (EPA) Best Practice Requirements;
- Provision of a sustainable wetland for environmental, aesthetic and flow control purposes; and
- Ease of management and maintenance of the stormwater treatment system and the sustainability and cost effectiveness of the ongoing management of the system.

The stormwater treatment targets can be considered in two categories as follows.

2.2.1 Best Practice Performance Objectives

The Best Practice Performance Objectives are the main criteria that are used in the Best Practice Environmental Management Guidelines (BPEMG 1999) published by the CSIRO for the design of stormwater treatment systems. The objectives relate to target reductions in annual pollutant loads compared with typical urban pollutant loads. The treatment objectives are listed in Table 1 below.

Table 1 **Best Practice Stormwater Treatment Objectives**

Pollutant	Best Practice Objective
Total Suspended Solids (TSS)	80 % retention of the typical urban load
Total Phosphorus (TP)	45 % retention of the typical urban load
Total Nitrogen (TN)	45 % retention of the typical urban load
Litter	70 % retention of the typical urban load
Flows	Maintain discharges for the 1.5 year ARI at pre-development levels

2.2.2 Receiving Waters Objectives

The State Environment Protection Policies (Waters of Victoria) (SEPP) specify objectives for receiving waters in the State of Victoria. These objectives are also referred to in the Urban Stormwater BPEMG. The receiving waters objectives refer to all of catchment objectives for water quality in receiving waters based on the beneficial uses of the receiving waters, rather than setting specific objectives for every part of a catchment. On this point the EPA's Draft Policy and Policy Impact Statement on SEPP states 'It is important to remember that the environmental objectives specify desired levels within the surrounding water, not levels in runoff from land or discharge from drains and pipes'. The SEPP pollutant levels are therefore not intended to be applied directly to runoff from urban areas.

The Stormwater Agreement between the EPA, Municipal Association of Victoria (MAV) and Melbourne Water allows for urban areas to be 'deemed to comply' with SEPP if Best Practice Stormwater Management is used.

We have therefore used the Best Practice Objectives listed above as the benchmark for the design of the stormwater treatment system.

3. Background Investigations

The key findings relevant for this site from the various investigations are summarised below:

- *Cultural Heritage* – The investigation for the area was limited to the creek corridor and in this area no sites were identified. However the excavation works performed for the adjacent Enterprise Estate did discover potential heritage items;

  It is understood that MWC and the Waterways Alliance will proceed with Cultural Heritage investigation as per MWC's policy; and

- *Geotechnical and Environmental Assessment* – GHD undertook environmental sampling at eight locations within the site in July 2003. Soil analysis showed that all tested chemical parameters were below the relevant EPA "Fill material" criteria. However one sample was classified as acid sulphate soil. If the site is subject to a Statutory Environmental Audit, a site history assessment and additional sampling and analysis will be required.

  A second environmental investigation was completed in April 2009. The investigation indicated that contaminant concentrations were within the adopted guidelines and no potential acid sulfate soils were identified at the site. The soil generated during constructions may be removed from the site as fill material in accordance with EPA Publication 448.3. However, due to the sampling density and soil pH ranging from 5.0 to 6.3 pre-approval from a receiving landfill is recommended before any soil is removed from the site.

  A complete summary of the environmental investigation can be found in Appendix A.

3.1 Survey

MWC provided GHD with the following survey information for the project:

- Aerial Laser Survey (ALS) information for the site with 20-meter grid resolution (Received 31 May 2005); and
- A Feature Survey and Cross-Section Survey of Corhanwarrabul Creek at approximate 100 metre spacing by Connell Wagner (Aurecon). Intermediate structures and alignment changes were also included in the survey (Received 4 August 2005).

To determine the Kelletts Road Main Drain pipe levels and alignment, GHD commissioned Geomatic Services to survey the alignment and invert profile of the main pipe drain, and the wetland footprint.

3.2 Services

Efforts have been made to locate existing services in the vicinity of the proposed facility through the MOCS. There does not appear to be any services located within the site aside from the Kelletts Road stormwater drain.

4. Stakeholder Involvement

4.1 City of Knox

GHD has worked with the City of Knox in preparing the design of the wetland. These include meetings with Peter Kavan and the design plan reviewed by Council.

The initial concept for the wetland was developed to be incorporated into Council's masterplan for Stanford Park. Due to the alteration of the masterplan, Council requested MWC and GHD to revise the design of the wetland to match the proposed changes to the revised masterplan.

A result of Council's involvement the concept design was revised to reflect the change in the masterplan, which is included in the final footprint.

A meeting was held with City of Knox, MWC and the Waterway Alliance on 18 November 2008 to agree on the final design and provide approval to move the project from functional design into detailed design. As part of this meeting, City of Knox nominated that spoil from the site can be deposed of to the south of the proposed Stanford park area and be used for the fill platform for a future residential estate.

4.2 Enterprise Estate

During the investigation period, the adjacent land has been developed. A meeting with MWC, Knox Council and the developer's representatives (Brown Consulting and St Hillers) was held on 9 September 2008 and 9 December 2008 to discuss the interface of the wetland and the development. An outcome of this meeting was that the wetland is to accommodate the equivalent ARI capacity from the Enterprise Development to that provided for the Kelletts Road catchment, for water quality treatment. Flows that exceed the three-month ARI event should be directed away from the wetland or have sufficient detention provided to minimise potential flooding caused by a restricted outlet.

4.3 Community Consultation

Community consultation has been undertaken by MWC's Michael Brown for the overall development project.

5. Hydrologic and Hydraulic Modelling

Hydrologic and hydraulic modelling was undertaken to provide a design basis of the wetland and identify potential design constrains. The investigation consisted of the following assessments:

- Estimate the inflow to the wetland from the Kelletts Road Main Drain;
- Identify the downstream stage/flow conditions at the outlet of the wetland into Corhanwarrabul Creek through 1D hydraulic modelling;
- Review of daily stage data of Corhanwarrabul Creek to provide an indication of the typical flows within the creek; and
- Assess the design velocities through the wetland.

A summary of the assessments is included below.

5.1 Hydraulic Assessment of the Low Flow Kelletts Road Drain

The design flow into the wetland has been defined by the capacity of the existing low flow 1050 mm pipe. Information provided by detailed survey of the alignment and inverts indicates the grade of the Kelletts Road pipe to vary between 1 in 500 (0.2%) and 1 in 790 (0.13%).

A hydraulic model of the pipe was developed to estimate the full flow capacity for the low flow pipe along the entire length between Kelletts Road and the proposed wetland diversion. Based on this assessment, the estimated capacity of this low flow pipe is 1.4 m^3/s where any flows above this value caused surcharging into the main floodway channel.

This flow has been used as the design treatment flow for the Kelletts Road wetland.

5.2 Catchment Hydrology

Based on the catchment size, impervious fraction and estimated time of concentration an estimate of the 1, 10 and 100-year ARI flow rates as made with the rational method[1] and is summarised in Table 2.

[1] It is noted that the rational method should only be used for large catchments (>25 km) but is used in this investigation as a guide to obtain the equivalent treatment capacity of the wetland.

Table 2 Estimated Peak Flow Rates for the Kelletts Road Main Drain

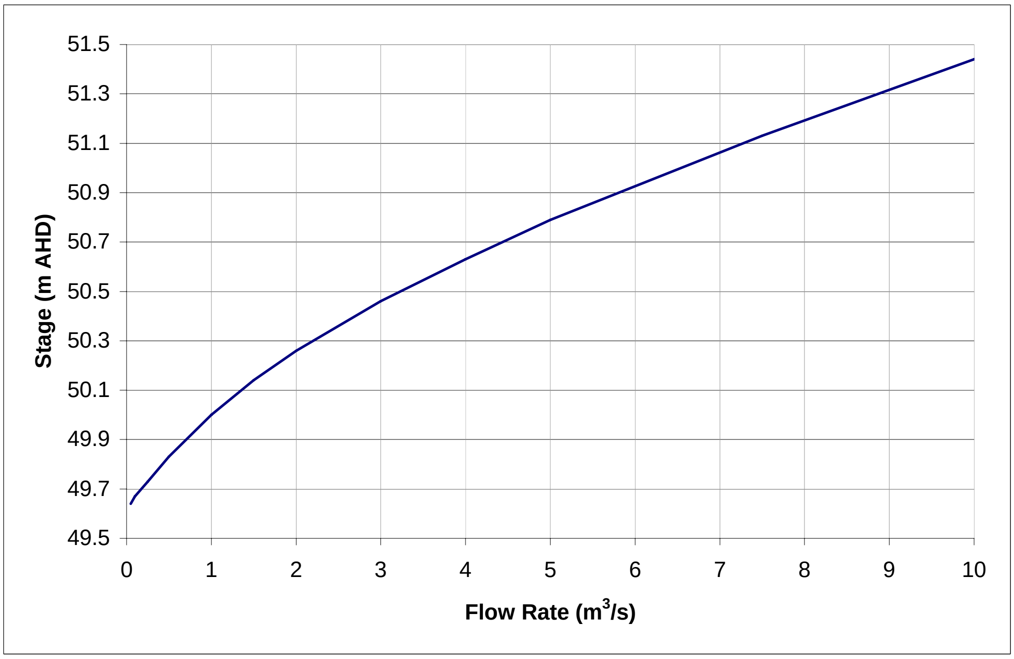
ARI	Area	% Imp.	Tc (min)	Intensity (mm/hr)	C_{10}	C_y	Peak Flow (m^3/s)
1	289.6	55%	32	19.72	0.55	0.44	7.0
10	289.6	55%	32	40.14	0.55	0.55	17.9
100	289.6	55%	32	67.39	0.55	0.66	36.0

Based on the above data, the low flow pipe can only convey approximately 20% of the one-year flow and approximately represents the equivalent of between a one to three month ARI event for the catchment.

5.3 Hydraulic Assessment of Corhanwarrabul Creek

The 1D HEC-RAS (ver 3.1.3) model developed for Corhanwarrabul Creek rehabilitation works the creek was analysed with different flow rates ranging from 0.1 m^3/s to 10 m^3/s. For a range of flows assessed the estimated stage level of the creek at the proposed wetland outlet location is presented in Figure 2.

Figure 2 Stage/Flow Relationship for Corhanwarrabul Creek at the Wetland Outlet



Based on these results, the standing water level of the creek is approximately 49.6 m AHD which is influenced by a grade control structure located downstream of the outlet and would represent the absolute minimum the wetland could drain down without pumping.

For a flow in Corhanwarrabul Creek of 1.3 m^3/s, the tail water is approximately 50.10 m AHD.

To provide some hydraulic grade between the wetland and the creek and gain an indication of the frequency for the wetland to freely drain into the creek a hydrologic assessment was performed.

5.4 Hydrologic Assessment of Corhanwarrabul Creek

MWC provided GHD with the stage data for Corhanwarrabul Creek for the period July 1998 to September 2005. This stage data was converted to flow rates based on a rating curve for the station with the flow rate illustrated in Figure 3. Based on this flow data the Creek's flow rate fluctuates and after larger flows, the rates decrease down to a nominal flow. Based on this data, the wetland should be able to drain to the NWL typically within 24 to 48 hours after a large flow event. Within this period, the Months of August and September in 2000 indicate an extended flow period where the levels in the Creek may have an extended and potentially reduce capacity for the wetland to drain. On closer review of this period (Figure 4) the flows within the creek do recede back to the base flow levels within 24 hours of the peak which indicate that the wetland would be able to draw down to the NWL for the period assessed.

Further to this assessment, an exceedance curve for the creek is included in Figure 5. This indicates that approximately 95% the flow within the assessment period was below 1.3 m^3/s. Therefore for 95% of the time it is expected that the wetland should be able to freely drawdown to the NWL after a rain event.

Figure 3 Corhanwarrabul Creek 2 hourly Flow Data 1998-2001

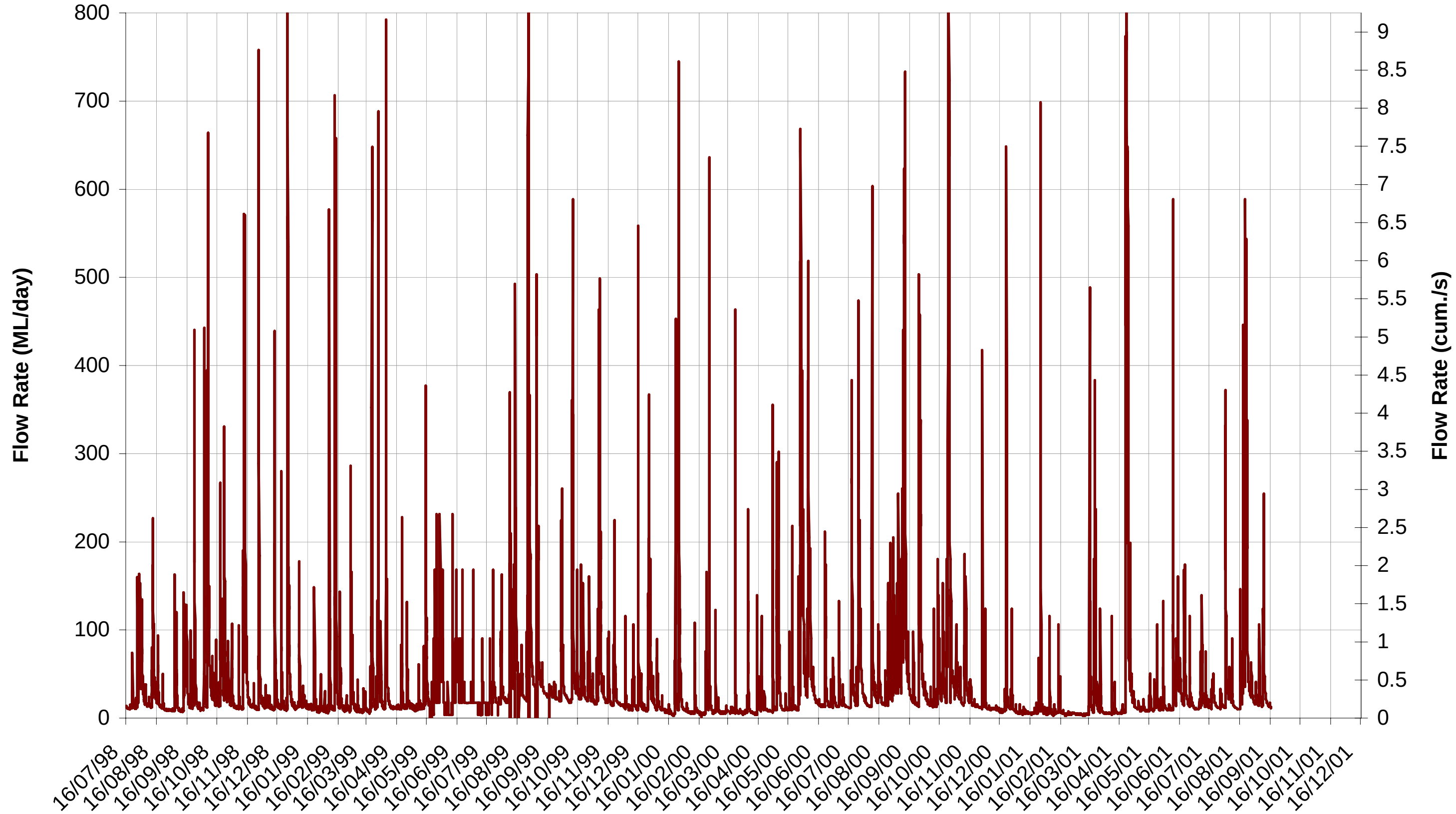


Figure 4 Corhanwarrabul Creek Flow Data between July and December 2000

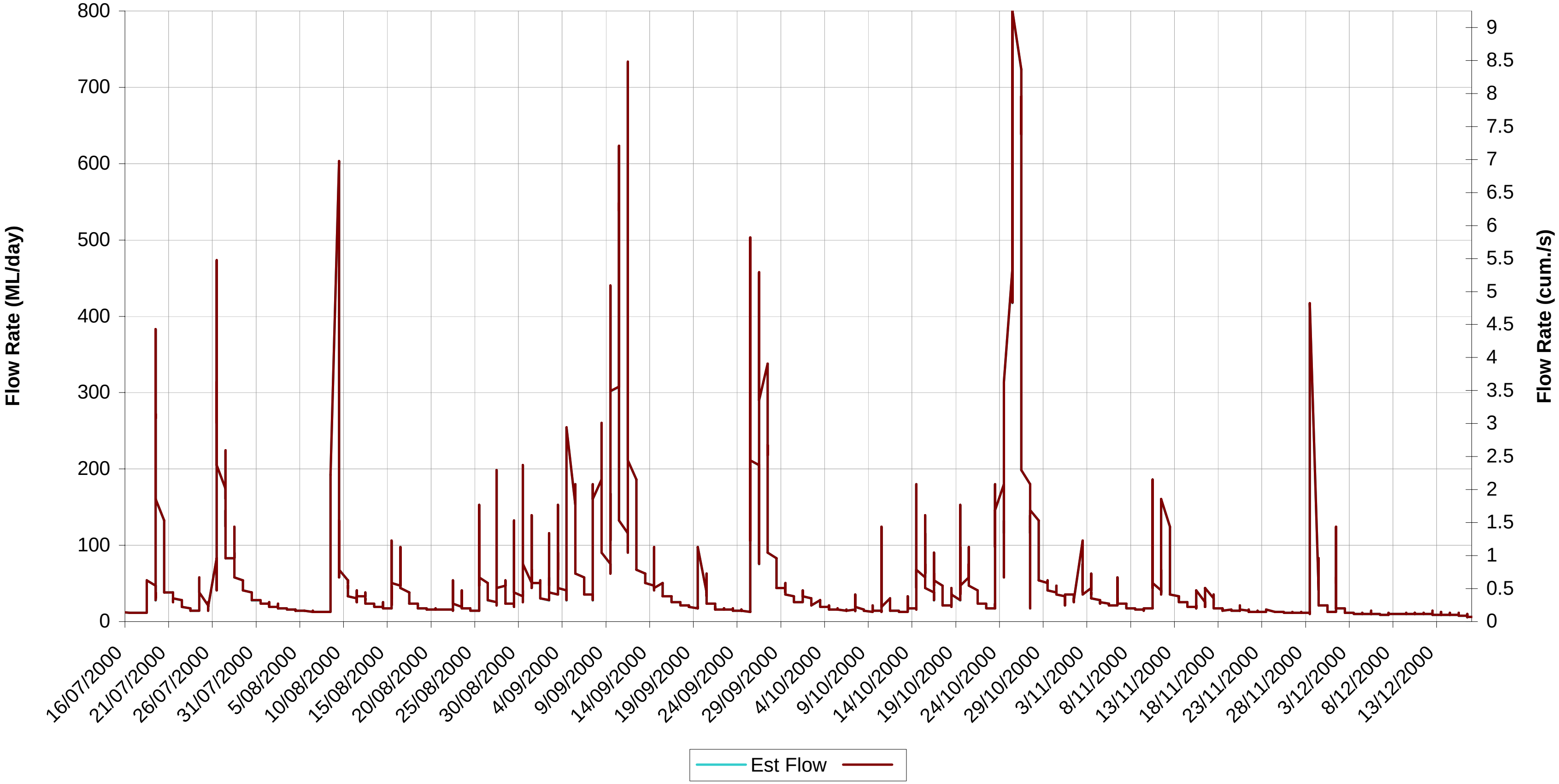
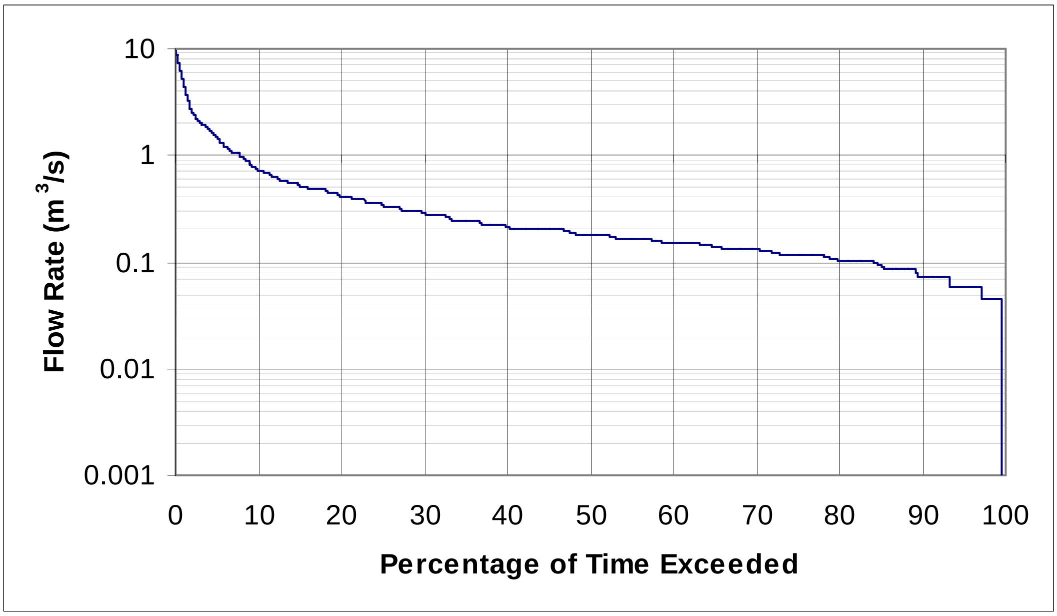


Figure 5 Flow Exceedance Curve for Corhanwarrabul Creek between July 1998 to September 2001



5.5 Hydraulic Assessment of Flow through the Wetland

To assess the potential for wetland scour, a HEC-RAS (Ver 3.1.3) hydraulic model was created to model the design flow through the wetland. The tailwater level for this assessment was assumed to be the normal water level (RL 50.10 m AHD). This represents the initial inflow conditions that would develop the greatest hydraulic grade through the wetland and subsequently would be the "worst case" scenario.

The HEC-RAS hydraulic model indicates that the velocity through the wetland would be below 0.1 m/s for majority of the structure. The locations where the velocity is higher than 0.1 m/s are limited to the ephemeral zones where velocities reach 0.3 m/s but once the water level reaches the Operating Water Level (OWL) of RL 50.60 m, the velocities through the whole facility are less than 0.05 m/s, including the ephemeral/shallow marsh areas) for the design flow.

6. Wetland Design

6.1 Catchment Area

The upstream catchment for the proposed facility is approximately 290 ha consisting primarily of residential development and some industrial land use along Stud Road.

6.2 Design Flows

As detailed in Section 5.1, the estimated inflow from the Kelletts Road Main Drain would be approximately 1.4 m^3/s. In additional to this flow, a second inlet pipe will convey flows from the adjacent industrial subdivision.

Based on the provided flows from Brown Consulting, an additional 375 mm inlet pipe has been included in the wetland with an estimated capacity of 0.3 m^3/s, which corresponds to the 1 year ARI event.

Subsequently, the wetland has been designed to convey a peak flow of 1.7 m^3/s into Corhanwarrabul Creek.

6.3 Wetland Arrangement

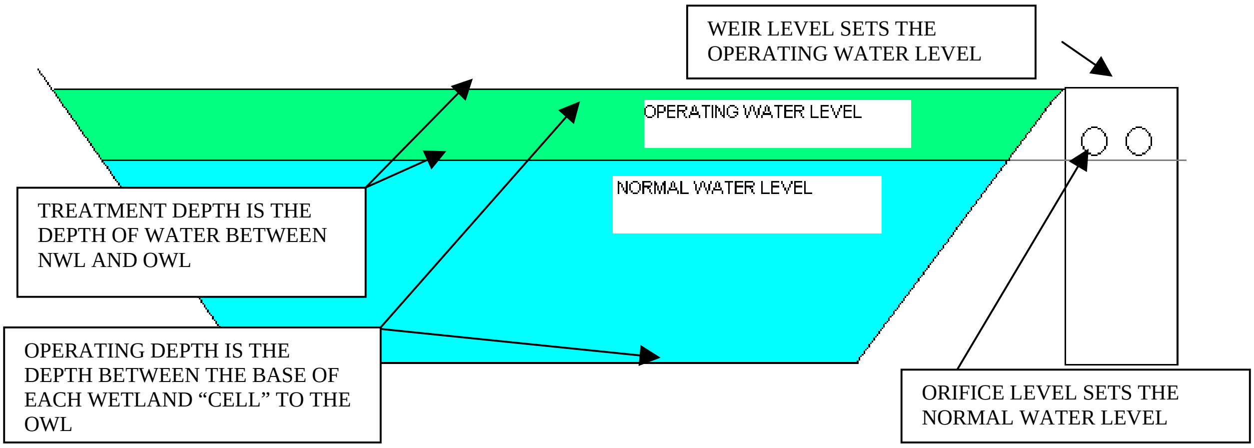
The proposed wetland systems will consist of a single wetland with an initial sediment pond or inlet zone followed by a banding of macrophyte marshes of varying depths and open water zones. The layout of this system is shown in Appendix D.

These water features are proposed to have the following general arrangements:

- Permanent water body with a multi level orifice outlet control structure set at the Normal Water Level (NWL) of 50.10 m AHD; and
- Operating Water Level (OWL), which will incorporate a treatment volume above the NWL that will temporarily store stormwater to allow it to be treated in the wetlands to a level of 50.60 m AHD.

A schematic of a wetland's operation is provided in Figure 6.

Figure 6 Wetland Schematic



Note: Figure not to Scale

Design Water Levels

The water levels for the wetland have been designed to provide optimal operating conditions based on the hydraulic constraints of the upstream and downstream conditions as follows:

- The incoming pipe has an invert of 50.3 m AHD, to minimise the potential hydraulic interaction of the wetland and the pipe under low flow conditions. It was identified that the NWL should be below the invert level of the pipe to allow the initial flows from the catchment to have a free outfall into the wetland. This would maximise the treatment volume prior to the upstream pipe system backwatering and bypassing.

  Additionally, having the pipe above the NWL allows for simpler maintenance of the main drain pipe and the GPT. This would allow “dry inspections” as the pipe would not be submerged and not require dewatering; and

- The downstream conditions of Corhanwarrabul Creek indicate that the minimum level the wetland can freely drain to is 49.60 m AHD as controlled by a grade control structure downstream of the outlet. However, if Corhanwarrabul Creek has a base flow, then levels in the creek would rise and potentially limit the outflow of the wetland. Subsequently, based on the assessment detailed in Section 5, it was deemed suitable to have a 95% expectation that the downstream tail water conditions would facilitate a free draining wetland. It is noted that 90% of the estimated flow rate of 0.7 m^3/s and a corresponding stage of 49.9 m AHD, will provide the wetland with approximately 200 mm of grade between the wetland and the creek.

Based on the constraint of the inlet pipe invert (50.30 m AHD) and the downstream levels of Corhanwarrabul Creek (49.60 m AHD under no flow), the Wetland NWL was designed to be 50.10m AHD. Should there be operating problems within the wetland caused by hydraulic conditions, the variable orifice gate can alter the NWL between 49.90 m AHD and 50.20 m AHD.

6.3.1 Sediment Pond

The sediment or inlet zones to the wetland have been designed to dissipate energy into the wetland and to remove coarse to medium sediments. This would be achieved by reducing the inflow velocities to below 0.05 m/s, which would allow deposition of sediment material. Under ideal design flow conditions, the sediment pond would have a residence time of approximately 45 minutes and typically able to remove silt-sized sediments.

By providing this pre-treatment, sediment build-up within the wetland would be minimised and subsequently maintain the wetland treatment effectiveness.

Stage/Storage and Area of the Sediment pond is provided in Table 3.

Table 3 Sediment Storage Properties

Stage (m AHD)	Volume (m^3)	Area (m2)
48.6	0	0
48.7	162	1669
48.8	334	1773
48.9	517	1882
49.0	711	1995
49.1	916	2111
49.2	1133	2227
49.3	1361	2343
49.4	1601	2459
49.5	1853	2575
49.6	2116	2693
49.7	2392	2814
49.8	2681	2973
49.9	2987	3165
50.0	3315	3385

Based on the MUSIC modelling (Section 7.1), the estimated annual sediment volume captured in the structure would be approximately 150 m^3. The minimum maintenance period required by MWC maintenance is five years, which would result in a total volume of 750 m^3. Subsequently the estimated depth of sediment for removal is 500 mm depth from the invert or a longer maintenance interval adopted.

6.3.2 Macrophyte Marsh

The wetland consists of a number of macrophyte zones that include a number of marsh and ephemeral cells to aid in the biological removal of pollutants. The wetland has been designed with varying depths to promote the establishment of a variety of wetland species. The range of water body depths is presented in Table 4.

The edges of the proposed water bodies will have relatively flat slopes (1 vertical to 8 horizontal). This will provide an environment for an ephemeral wet edge that will be planted with macrophytes and other wetland plants to enhance the perimeter and provide a passive barrier from potential access.

6.3.3 Deep Open Water

The final component in the system will be a deep water zones with island features. These have been included to provide a:

- Water quality benefit to allow some minor UV treatment of stormwater and slow velocities to allow fine particle removal; and
- Habitat refuge within the wetland for wetland fauna to exist and minimise potential problems caused by feral animals. This deep-water zone and island area has been design to allow platypus to utilise the wetland and would also provide an area for platypus habitat within this reach of Corhanwarrabul Creek and the proposed Stamford Park.

Table 4 Waterbody Depths

	Normal Depth (m)	Treatment Depth (m)	Operating Depth (m)
Sediment Pond	1.5	0.5	2.0
Ephemeral	0	0.6	0.6
Shallow Marsh	0 – 0.2	0.6	0.6 – 0.8
Deep Marsh	0.2 – 0.4	0.6	0.8 – 1.0
Submerged Marsh	0.4 – 0.9	0.6	1.0 – 1.50
Open Water	1.6	0.6	2.2

6.3.4 Wetland Sustainability

To assess the potential for the wetland to either dry out over the summer months or be permanently inundated during the winter months, a water balance was set up for the years 1990 to 1999. The level fluctuations of the wetland are detailed in Figure 7 showing a series of wetting and drying cycles that would replicate a natural wetland system.

Figure 7 Wetland Water Level Fluctuations

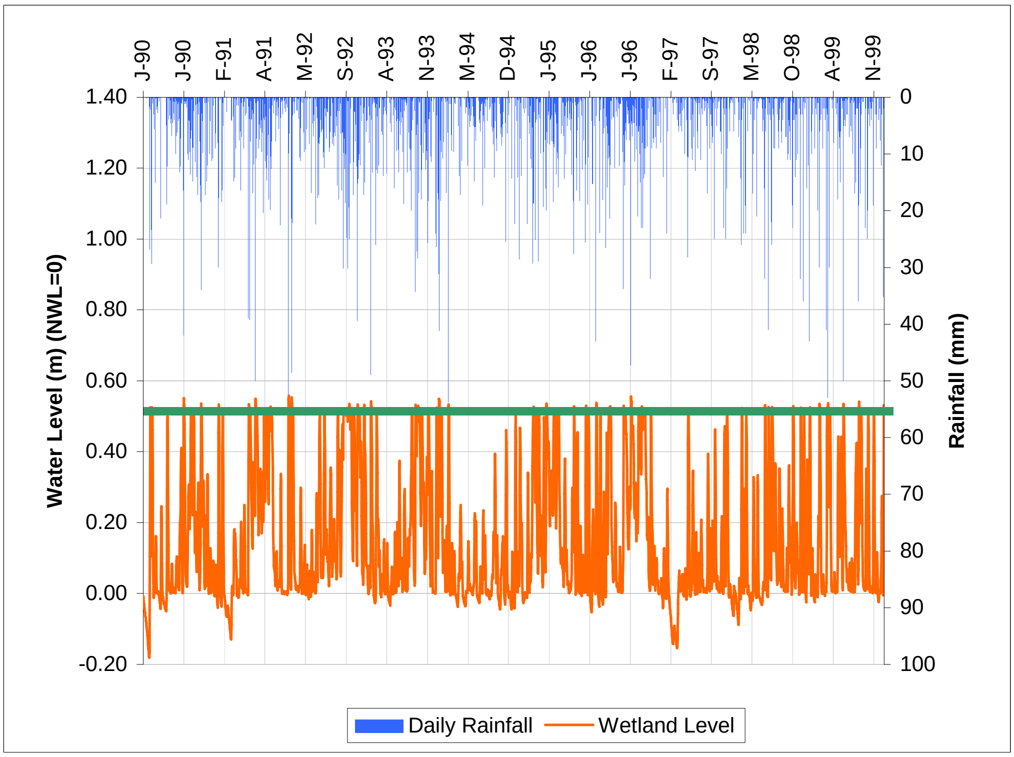


Figure 7 indicates seasonal water level variability within the wetland where:

- The summer months shows draw down below the NWL by between 100 and 200 mm which is considered acceptable; and
- The winter months indicates the NWL can be raised for extended periods of time. During these periods there is potential for the ephemeral planting to die. To mitigate these potential problems, the wetland should be consistently monitored and if the is noticeable problem with the ephemeral planting, the orifice plate should be lowered so the NWL is set to 49.90 m AHD (90% stage level in the Creek). Additionally, the circular orifice plugs can be removed from the outlet to reduce the retention time within the wetland. This flexibility with the control pit would allow an adaptive maintenance regime to implemented without retrofitting the wetland control pit.

6.4 Flow Control Structures

6.4.1 1050 mm Inflow Diversion

To divert the flows into the wetland, a diversion pit is proposed on the existing low flow pipe for the Kelletts Road Main Drain. This diversion pit would direct the pipe flow into the wetland.

To allow the wetland to be brought on and offline during the establishment and future maintenance the diversion pit be fitted with watergates. When the wetland is brought offline, flows would continue along the existing 1050 mm pipe into Corhanwarrabul Creek, bypassing the wetland but flows still being treated for pollutants by the GPT.

6.4.2 Wetland Outflow

Flow from the wetland will be controlled via the outlet pit, which consists of an adjustable plate with orifice holes and a raised pipe grill. The control structure has been designed to incorporate the following operational requirements of the wetland:

- An extended detention time of 50 hours for the operating water volume stored in the wetland. This would be achieved with a variable weir plate with the following orifice configuration:
  - Single 300 (w) x 150 (h) rectangular orifice set at the Normal Water Level of 50.10 m;
  - Single 150 (w) x 75 (h) rectangular orifice set at 50.30 m;
  - Single 150 (w) x 75 (h) rectangular orifice set at 50.425 m;
- Provide simplified maintenance requirements and easy access that has been adopted for adjacent wetland designs;
- Reduce the potential for the outlet to become blocked in high flow events through the use of:
  - An aluminium hood to prevent floatable debris blocking the orifice holes for the low flows; and
  - A concrete slot recessed below the pit grate to have large openings to prevent vegetation material and litter blocking the outlet.

The proposed configuration of the wetland high flow weir outlet has been designed to convey the inflow of 1.7 m^3/s with an estimated head of 400 mm. This provides the design Top Water Level (TWL) of the wetland at 51.00 m.

This TWL assumes that there is a limited tailwater condition from Corhanwarrabul Creek. Should Corhanwarrabul Creek be flowing above the levels of the wetland, then the outflow from the wetland will be limited. Under these conditions, due to the high water level of the wetland, the flow into the wetland would be limited due to the hydraulics of the low flow 1050 mm pipe, which would cause additional surcharging into the main channel drain.

6.4.3 Flood Gate

As detailed previously, there is a definite potential for Corhanwarrabul Creek to have a higher water level than the wetland. Should this occur there is potential that the wetland is filled with water from the creek. To prevent backflows from the creek into the wetland a floodgate is to be placed on the on the outlet pipe. To minimise the potential for vandalism and damage from flood debris the flood valve will be located within a pit away from the creek.

6.5 Gross Pollutant Traps

To prevent gross pollutants entering the wetland and Corhanwarrabul Creek, two types of GPT options were assessed:

- MWC's preferred litter removal option of a Net solution. For this assessment it was assumed the location is to be at the culvert headwall on Stud Road; and
- Underground proprietary systems, similar to a CDS™[2] or Cleansall™ arrangement located near the wetland.

The configuration of both systems is detailed below.

6.5.1 Net Tech

The Net Tech solution would need to be located near Stud Road prior to flows being discharged into the low flow pipe to prevent litter entering the proposed wetland.

The number of nets is limited by the width of the existing headwall. This is due to the high flow culverts located to the north and the size of the easement to the south. The existing width of the headwall is 10 metres, which equates to 7 Net Tech Litter Nets.

Based on the estimated annual litter load for the catchment, a monthly maintenance frequency is likely to be required.

The capacity of each net has been estimate to contain approximately 1.10 cubic metres in volume based on the following parameters:

- Each net has dimensions of 0.6(H) x 1.2(W) x 2.0(L); and
- The nets will effectively bypass when they are 75% full.

The hydraulic capacity of the culverts under Stud Road will be reduced. It's estimated that the culverts at full flow (not pressurised) have a capacity of approximately 5 m^3/s (~3 month flow). With the same flow capacity and litter nets full it's estimated that the headwater could be increased by 1.4 metres. This increase in flow depth is based on the following:

- 600 mm due to the height of the nets that are blocked;
- 200 mm due to the thickness of the maintenance access pad;
- 550 mm weir flow over the litter nets; and
- Significant modification to the existing outlet structure to accommodate the nets

[2] For the purposes of this report, the identification of proprietary products does not indicate a preference for the unit but identifies the preferred performance specifications of the device.

The following alternative locations for the Net Tech solutions were considered and discounted:

- Positioning a net structure on the outlet of the pipe into the wetland but given the operating levels of the wetland and the low grade of the pipe, there is a possibility that the net would be submerged for extended periods creating maintenance and aesthetic problems, and when the bags become full between maintenance periods, there is the potential that flows would be forced to bypass the wetland resulting in a in an underperformance of the wetland; and
- Locating the nets downstream of the new Enterprise Road culvert crossing. However the invert of the low flow pipe at this location is 50.45 m AHD and the channel has an invert of 52.0 m AHD. This would require the channel to be lowered by 1.5 metres to match the pipe invert, which was not considered a practical solution.

6.5.2 Underground Proprietary Gross Pollutant Trap

A proposed underground GPT such as a CDS or Cleansall type unit could be located below ground adjacent to the wetland system within the existing MWC easement. The proposed maintenance access for the wetland will be from the Enterprise Road onto a suitable path, which connects to the access track to the wetland. This access would also be used to allow maintenance of the underground GPT system.

The maintenance frequency of the underground device can be altered to suit MWC long-term requirements. As a guide, for the largest Cleansall model 1350, the sump has a diameter of 3 metres and depth of ~3 metres and provides a total volume within the structure of 20 m^3. This sized storage would result in a maintenance frequency of once every two to three months or 4 times per year. The CDS model P3030 has 11.2 m^3 of sump storage, which results in a monthly maintenance routine, however it can be configured with a larger sump to accommodate an extended maintenance period.

The limitation of the underground GPT is that the treatment flow rate is restricted to an estimated 1.5 m^3/s, which corresponds to the pipe capacity. This results in an estimate effective reduction of gross pollutants into Corhanwarrabul Creek by 80%. With the Net Tech option, which has an estimated high flow bypass of 5 m^3/s, the reduction of Gross Pollutants is increased to 90%, however this assumes that the nets are always available for litter capture during all events which is typically not the case (i.e. if the nets are full).

6.5.3 Preferred GPT option

MWC advised GHD that the underground GPT option would be the preferred option for this development.

6.6 Terrain Modelling of Wetlands

6.6.1 Existing Ground Survey

The information provided by MWC as detailed in Section 3.1 was developed into a Digital Terrain Model (DTM) for the existing surface.

6.6.2 Design DTM

The design surface was compared to the existing surface to estimate the level of earthworks required for the development. Based on this comparison, there will be a surplus of excavated material from the site, (Table 5). This volume of material does not make an allowance for:

- Preparation of the sub-grade;
- Placement of rock;
- Boxing quantities and topsoil stripping/placement as required as part of the detailed design; and
- Bulking factors required as part of the earthworks.

Table 5 Earthwork Volumes

	Total Cut (m^3)	Total Fill (m^3)	Surplus (m^3)
TOTAL	**113 100**	**130**	**112 970**

6.7 Other Design Features

6.7.1 Platypus Connection to Corhanwarrabul Creek

By request of MWC, provision has been made for Platypus to access the wetland. Due to the floodgate, orifice plate and other obstructions in the wetland outlet it is not suitable as a platypus access route. As such, a separate connection between Corhanwarrabul Creek and the wetland has been designed in accordance with the 'Preliminary Guidelines for Design of Lakes and Other New Water Bodies' published by the Australian Platypus Conservancy.

Key design features of the platypus connections are:

- Endwalls sheltered by partially de-limbed large woody debris and located in areas of natural vegetation to help provide shelter from predators and more closely emulate a natural arrangement;
- A 375 mm diameter passage, which is a sufficient diameter to allow a platypus to turn around without become trapped;
- The downstream end of the passage has an invert level that results in the passage remaining between one-third and two-thirds full on 80% of occasions (based on the hydraulic data presented in Section 5.3). This should encourage platypus to use the connection;

- The upstream end of the passage has an invert level that results in a minimum of 50 mm of water whilst the wetland is at normal water level and gradually fills as the wetland approaches operating water level;
- “Breathing bays” area located at least every 30 metres, these allow platypus to breathe in situations where the pipe is fully inundated; and
- A ‘platypus pit’ incorporating a weir that allow platypus passage via rocked ramps, whilst preventing ingress of creek water into the wetland 99% of the time (based on the hydraulic data presented in Section 5.3).

Platypus friendly features that have been included in the wetland itself include:

- Large woody debris anchored at regular intervals around the banks of the wetland, these not only provide potential shelter for platypus, but help stabilise the banks;
- A large hollow log adjacent to where the platypus connection enters the wetland, this provides a point of shelter near to the entrance; and
- Areas of riparian vegetation will be planted along sections of the wetland verge to provide shelter from predators and provide a food source for the invertebrates on which the platypus feed.

6.7.2 Access Tracks from the Enterprise Estate

The access track from the Enterprise estate will be upgraded to a standard that allows access for wetland maintenance and GPT cleaning as well as being of a standard suitable for use as a bicycle path.

7. Stormwater Treatment Effectiveness

7.1 MUSIC Model

MUSIC (Ver 3.01) was used to estimate the pollutant load and performance of the proposed stormwater treatment system.

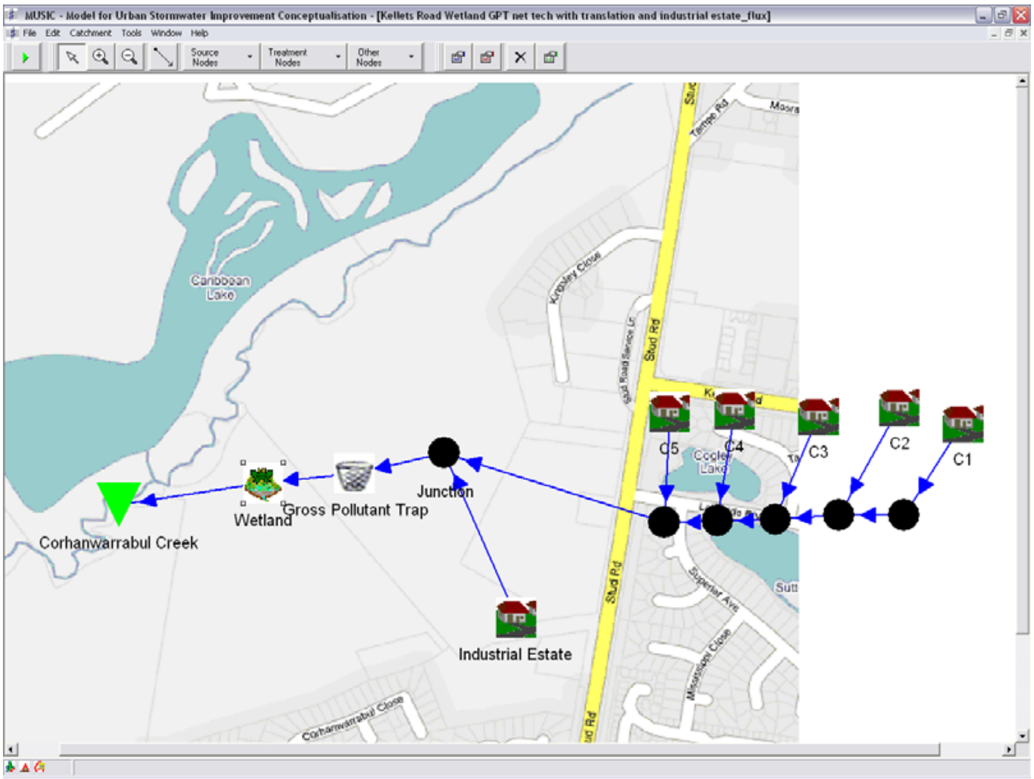
7.1.1 Climate Data

Climate data for the model was obtained from the Croydon data provided in MUSIC. Croydon was chosen as it was the closest station in the same rainfall band as detailed in the MWC MUSIC guidelines. The period assessed in the MUSIC model is for the period January 1990 to December 1990 with a 6-minute time step.

7.1.2 MODEL Configuration

This arrangement has been modelled in MUSIC using the treatment train sequence as shown in Figure 8.

Figure 8 MUSIC Model Configuration



7.1.3 Source Node Parameters

The source node areas for the model were estimated from individual catchments as identified from regional 2 metre contours as supplied by MWC for the project. Catchment areas and impervious fraction is summarised in Table 6.

Table 6 Source Node Parameters

Catchment	Area (ha)	Impervious
C1	30.27	55%
C2	46.51	55%
C3	69.43	55%
C4	77.38	55%
C5	65.41	55%
Industrial Estate	8.0	90%
TOTAL Catchment	298	56%

7.1.4 Treatment Node Parameters

The treatment train process utilises a GPT to collect litter, a sediment pond to capture larger sediment particles and a wetland to remove suspended solids and nutrients. The parameters used in the MUSIC model are summarised below.

Gross Pollutant Traps

MWC has advised that an underground litter trap is to be used as part of the control to capture gross pollutants in the wetland. These GPTs have been simulated in MUSIC with the parameters detailed in Table 7.

Table 7 Gross Pollutant Trap Parameters

Pollutant	Parameter
High Flow Bypass	1.75 m^3/s
Gross Pollutants	100% retention
Suspended Solids	40% retention
Total Nitrogen	0% retention
Total Phosphorus	0% retention

Wetland Parameters

The wetland parameters for the MUSIC model are detailed in Table 8.

Table 8 Wetland Parameters

Parameter	Values for Wetland
High Flow Bypass	1.7 m^3/s
Inlet Pond	3 300 m^3
Surface Area	39 900 m^2
Extended Detention Depth	0.50 m
Permanent Pool Volume	23 800 m^3
Equivalent Pipe Diameter	255 mm (~50 hr detention period)

7.2 Stormwater Treatment Results

Based on the proposed configuration of the stormwater treatment process, the MUSIC model estimates that the wetland and GPT would not achieve the required pollutant reductions to meet the Best Practice Guidelines. The results for the Kelletts Road Wetland system are detailed in Table 9.

Table 9 Treatment Train Results

Pollutant	Pollution Generation	Treated Polluted Load	Percentage Reduction	Best Management Reduction
Total Suspended Solids (kg/yr)	273 000	65 800	76%	80%
Total Phosphorus (kg/yr)	595	238	60%	45%
Total Nitrogen (kg/yr)	4 470	2 640	41%	45%
Gross Pollutants (kg/yr)	59 000	4 820	92%	70%

From the estimated performance of the stormwater treatment train, the wetland does not achieve the best management guidelines for Total Suspended Solids and Nitrogen removal. This is mainly due to the size of the wetland compared to the contributing catchment and the limited flow rate that is actually able to enter the wetland.

During the Concept Design Phase of the project, the wetland area was derived to achieve the required treatment level for nitrogen. These parameters that derived the wetland were based on typical configuration and an estimated flow rate. Due to the further detail available, the treatment is limited by the volume of stormwater able to enter the wetland and the configuration of the earthworks, which was not available at the concept design phase.

Based on this system, the addition of the proposed treatment train would improve the water quality within Corhanwarrabul Creek and ultimately Port Phillip Bay as shown bellow:

- The mass of suspended solids removed each year is 207 200 kg;
- A reduction in approximately 357 kg/year of phosphorus;
- A reduction of approximately 1 830 kg/yr of nitrogen; and
- A reduction of approximately 54 180 kg/yr of gross pollutants.

8. Planting and Landscape Design

8.1 Landscape Issues

The broad landscape issues have been identified as:

- Integration of the proposed works to reflect the local landscape character populated with plant species associated with grassy woodland and swamp scrub environmental vegetation classes;
- Planting of the wetland system to achieve the expected water quality outcomes;
- Enrichment of wildlife habitat values; and
- Provide an open space asset that offers the local community a place suitable for active and passive recreation.

8.2 Existing Site Conditions

The site currently consists mostly of mown exotic grasses with little native vegetation except for some scattered patches of native species growing within the drainage line.

Due to the urbanisation that surrounds the study area and the site containing mainly exotic vegetation the study area is considered to offer negligible value for native fauna except for common and adaptable native and non-native fauna that are typical of urban environments.

8.3 Proposed Wetland Development

All wetland areas will be completely planted with indigenous aquatic species except those areas designated sedimentation ponds and open water, which will have perimeter fringe planting only.

Wetland planting and species composition will vary according to the depth of standing water within the various depth zones, which comprise each cell.

Typically, the proposed planting could include:

Ephemeral Marsh (banks, levees, occasionally inundated areas)

Carex appressa
Cyperus lucidus
Eucalyptus ovata
Melaleuca ericifolia
Juncus gregiflorus
Juncus pauciflorus
Juncus procerus
Persicaria decipiens
Poa ensiformis
Poa labillardieri

Shallow Marsh: water depth 0-200 mm, nominal

Carex appressa
Isolepis inundata
Juncus amabilis
Juncus pallidus
Lythrum hyssopifolia
Triglochin striata

Deep Marsh: water depth 200-400 mm, nominal

Alisma plantago-aquatica
Baumea rubiginosa
Triglochin procera

Submerged Marsh: water depth 400-900 mm, nominal

Eleocharis sphacelata
Schoenoplectus validus

All aquatic and semi-aquatic plants should be supplied in Viro cells or standard tubes, or as divisions. Eucalyptus and Melaleuca species should be supplied in standard tubes.

The whole of the area for aquatic and semi-aquatic planting should be topsoiled with a 150-200 m thick layer of local soil with high organic content, having a pH of 6.5 – 8.5.

Planting density for all aquatic and semi-aquatic species should be not less than 4 plants/m^2 in the case of deep marsh zones and 6 plants/m^2 for all other zones.

8.4 Landscaped Areas Above Wetland Cells

Beyond the wetland cells, all bare earth surfaces created by construction works shall be stabilised by topsoiling, planting and grassing to provide suitable groundcover. Ideally, normal pasture or parkland grasses should be separated from semi-aquatic plant species by a buffer strip of native grasses such as local Danthonia, Poa and Themeda species, planted as Viro cells into mulched beds.

The use of clumping native grasses should also be encourage so to minimise the need for mowing of the wetland. It has been observed that maintenance mowing of the wetland perimeter area has a detrimental impact on fauna such a frogs, reptiles and turtles that may reside within wetland fringes.

8.5 Tree Planting

The plan proposes tree and shrub planting around the perimeter of each wetland cell and beside the open channel. This planting should be undertaken for the following reasons:

- To compensate for vegetation lost in construction of the wetlands;
- To augment the existing vegetation, and compensate for the lack of natural regeneration;

- To enrich wildlife habitat values;
- To provide wind protection for the wetlands;
- To create a buffer between other land uses and the wetlands; and
- To aid the visual integration of the wetlands with the broader landscape.

For this planting, the major species should comprise:

Acacia dealbata
Acacia melanoxylon
Eucalyptus ovata
Eucalyptus viminalis
Melaleuca ericifolia

As noted for wetland species, all trees and shrubs should be propagated from local provenance seed or cuttings. Plantings should be grouped into mulched beds and should consist of tube stock protected by plastic guards.

8.6 Rock Weirs

Rock for the construction of rivers, chutes, spillways and the like should be obtained from the local district. Wherever practicable, rock should comprise mixed-size or single size material as appropriate, with a proportion of large boulders included. Efforts should be made to make the rock construction appear similar to a natural rock outcrop.

8.7 Rocks Found on Site

Large rocks found on site should be stockpiled in an appropriate location to be used in the landscape construction works.

8.8 Maintenance

Consistent, regular monitoring and maintenance of all plant material is vital to the success of the project, with weed suppression being of prime concern. Particular attention should be given to weed control prior to planting and during the plant establishment phase.

9. Establishment, Maintenance and Lifecycle Issues

9.1 Water Level Control and Maintenance

9.1.1 Wetland Establishment

To plant out the wetland, the typical process would be to plant the deeper areas first and manipulate the water levels upwards as the other planting bands are established. Previous wetland designs (Knoxfield and Tanti Creek) provide an outlet pit, which can lower the NWL/OWL to suit the initial planting depths. The gate can then be raised to allow the established of the next band of planting. However due to the invert level of the Kelletts Road Main Drain and the level of Corhanwarrabul Creek, it is impractical to provide a variable gate to allow such a system and mechanical pumping will be required. The practical limit to the lowering of the NWL is to 300 mm, which would be more susceptible to backwater influences from Corhanwarrabul Creek.

The following process to control the water levels is recommend to be adopted for establishment and ongoing maintenance:

- Initially, allow the wetland to fill above the nominated levels;
- Once achieved, pumping of the wetland down to the level required. To minimise the locations of pumping, a low flow maintenance pipe has been specified to allow low flows to drain to the deep water area located at the outlet pit with the water discharged into the creek; and
- To prevent inflows to the wetland when maintenance is occurring, the sluice gate located in the diversion pit should be closed and the gate on the main line opened. This will allow the GPT to continue to provide some form of water quality treatment while the wetland is brought off line. This arrangement would maintain a low water during the establishment and maintenance period.

9.1.2 Sediment Pond Maintenance

The maintenance of the sediment pond would be similar to that of the wetland with the effluent pumped from the sediment pond. The gates in the diversion pit configured to prevent inflows into the sediment pond.

9.2 Ongoing Maintenance

There are items in the proposed wetland system that will require ongoing attention and maintenance. The key maintenance and lifecycle issues are expected to be as follows:

Table 10 Maintenance Requirements

Description	Assets	Maintenance Works	Frequency of Maintenance Works
Gross Pollutant Trap	Underground GPT	Removal of Captured Litter	Litter removal typically once every month
Wetlands	Wetland and associated water bodies including aquatic planting zones and plating areas up to the top water level.	Removal of litter	Litter removal typically a minimum of twice a year or as required.
	Aquatic Plants	Macrophyte harvesting	As required.
		Weed Removal	As a minimum 4 times a year.
		Lower the Orifice Plate during winter and remove plugs	During winter months when the NWL is raised for extended periods.
Sediment Ponds		Removal of litter	Litter removal as required.
		Removal of litter, sediment, weed control and nuisance species management (including algae, exotic fish, etc…)	Sediment removal once accumulation is 500 mm below the normal water level or when it is significantly compromising the operation of the asset. Weed control generally four (4) times per year or as required
Rock Weir	Flow Control Structure	Removal of litter	Twice a year minimum
		Removal of sediment, silt, litter and organic material	Once accumulation compromises the pilot channel/low flow chase.

Description	Assets	Maintenance Works	Frequency of Maintenance Works
		Weed Removal	As a minimum 4 times a year.
		Rock Replacement	Inspection after storm events and as required.
Grassed Areas	All Terrestrial Grass Areas	Mowing	Monthly
		Removal of litter	As required
		Broad leaf weed spray	As a minimum 4 times per year.
Flow Control Structures	Inlet Structures	Clear blockages upstream pipe diversion at Kelletts Road.	Inspect monthly. Inspect integrity of structure annually.
	Outlet Structures	Clear blockages from orifice plate, and hood.	Inspect orifice plate and hood monthly. Inspect integrity of structure annually.
Path	3 m Wide Maintenance Track	Replacement of surface material.	Inspect annually.
		Broad leaf weed spray	As required.
Landscape Furniture	Signage	Repair of vandalised components	As required
	Entry Signage	Repair of vandalised components	As required
Fencing	Post and wire fence and tube fencing.	Maintenance and replacement.	As required to ensure that fence continues to serve intended function.

During the construction phase of the project the site will need to be managed to minimise the generation of pollutants and to trap pollutants prior to discharge to receiving waters. Minimisation of exposed soils, and the use of temporary filter zones, hay bales, silt fence and sediment traps will be required. Staging of works needs to be planned to provide for the trapping of sediments and monitoring of site practices.

10. Cost Estimates

A preliminary cost estimate has been prepared for the construction of the Kelletts Road Wetland, as outlined in the table below. The total estimated cost for the civil construction of the wetlands and associated infrastructure is **$** 2 836 000.

The budget cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, budget quotes for some equipment items, industry unit rates and GHD experience. The accuracy of these estimates is not expected to be better than about ± 15% for the scope of work described in this report.

Table 11 Kelletts Road Wetland: Civil Cost Estimates

Item	Description	Quantity	Unit	Rate	Total
1	**PRELIMINARIES AND SITE ESTABLISHMENT**				
1.1	Preliminaries, including site setup, insurances, Construction Plan, Quality Plan, OHS Plan, Environmental Management Plan, Set out and As Constructed Survey and all deliveries (not included elsewhere), all audits required and all permits required to commence and complete the contract.	1.0	Item	$22 000.00	$22 000
1.2	Geotechnical investigation (PROVISIONAL)	1.0	Item	$5 000.00	$5 000
1.3	Supply and install of all signage required, both for construction works and permanently around the site.	1.0	Item	$2 200.00	$2 200
1.4	Supply and construct tracks for construction vehicles (includes crossings as necessary) and any other access tracks	1.0	Item	$2 200.00	$2 200
1.5	Traffic Management	1.0	Item	$1 100.00	$1 100
1.6	Tree and vegetation clearing	1.0	item	$1 100.00	$1 100
2	**EARTHWORKS**				
2.1	Strip topsoil, screen and stockpile on site (150 mm depth approx.)	6,331.0	m^3	$3.00	$18 993
2.2	Strip topsoil and dispose LOCALLY off site (150 mm depth approx allowance.)	3,129.0	m^3	$12.00	$37 548
2.3	Cut to fill	200.0	m^3	$16.70	$3 340
2.4	Cut to spoil (including cartage and disposal LOCALLY)	116,877.0	m^3	$12.00	$1 402 524
2.5	Trim and compact subgrade	62,792.0	m^2	$2.00	$125 584
2.6	Supply and place and compact 600 mm thick clay liner for wetland base	11,600.0	m^3	$9.55	$110 780
3	**MAINTENANCE TRACKS & PATHS**				
3.1	*Maintenance track*				
3.1.1	Supply and place 200 mm thick compacted 40 mm Class 3 crushed rock	719.0	m^3	$50.04	$35 979
3.2	*Compacted Granitic Sand Path*				
3.2.1	Supply, place and compact cement stabilised 75 mm thick granitic sand	24.9	m^3	$64.00	$1 594
3.2.2	Supply, place and compact 75 mm Class 2 crushed rock	24.9	m^3	$50.00	$1 245
4	**SEDIMENTATION POND No. 1**				
4.1	Supply and place 300 mm thick compacted rock D_{50} = 130, D_{max} = 200 mm	497.0	m^3	$84.00	$41 748
4.2	Supply and place 600 mm thick graded rock	1,260.0	m^3	$75.00	$94 500
5	**WETLAND INLET WORKS**				
5.1	Excavation for drainage structures	240.0	m^3	$35.00	$8 400
5.2	Remove existing pipe (incl excavation and disposal fees)	6.0	m	$100.00	$600
5.3	Supply and install CDS P3030 or Equivalent GPT	1.0	each	$230 000.00	$230 000
5.4	Supply and install reinforced Sediment Pond Diversion Inlet Pit	1.0	each	$15 000.00	$15 000
5.5	Supply and install and backfill 375 mm dia RCP	67.0	m	$250.00	$16 750
5.6	Supply, install and backfill 1050 mm dia. RCP FJ	58.0	m	$730.00	$42 340
5.7	Supply and install 50 mm thick concrete blinding	1.0	m^3	$268.80	$269
5.8	Supply and install 600 mm thick graded rock D_{50}=300 mm	53.0	m^3	$84.00	$4 452

Item	Description	Quantity	Unit	Rate	Total
5.9	Supply and install 200 mm thick concrete maintenance pad	75.0	m^3	$236.25	$17 719
5.10	*End Wall*				
5.10.1	Supply and place min. 900 mm dia large toe rock	14.0	m^2	$100.00	$1 400
5.10.2	Supply and place 150 mm thick 50-150 mm min shot rock bedding	2.5	m^3	$50.00	$125
5.10.3	Supply and place mortar pad	0.5	m^3	$150.00	$75
5.10.4	Supply and place fine crushed rock	3.0	m^3	$84.00	$252
5.10.5	Supply and install Geotextile filtercloth	15.0	m^2	$2.50	$38
5.10.6	Supply and install Geogrid reinforcement	15.0	m^2	$3.00	$45
5.10.7	Supply and install 200 mm thick concrete cut off wall incl SL81 mesh	0.7	m^3	$236.25	$165
6	**WETLAND OUTLET WORKS**				
6.1	Excavation for drainage structures	340.0	m^3	$35.00	$11 900
6.2	Supply, install 1050 mm dia FJ RCP (incl backfilling and cut off wall at levee)	70.5	m	$750.00	$52 875
6.3	Supply and install reinforced wetland outlet concrete pit	1.0	each	$25 000.00	$25 000
6.4	Supply and install reinforced Junction pit with flood valve and orifice plate	1.0	each	$10 000.00	$10 000
6.5	Supply and place 50 mm thick concrete blinding	1.0	m^3	$286.80	$287
6.6	*End Wall*				
6.6.1	Supply and place min. 900 mm dia large toe rock	14.0	m^2	$120.00	$1 680
6.6.2	Supply and place 150 mm thick 50-150 mm min shot rock bedding	2.5	m^3	$90.00	$225
6.6.3	Supply and place mortar pad	0.5	m^3	$150.00	$75
6.6.4	Supply and place Fine crushed rock	3.0	m^3	$84.00	$252
6.6.5	Supply and install Geotextile filtercloth	15.0	m^2	$2.50	$38
6.6.6	Supply and install Geogrid reinforcement	15.0	m^2	$3.00	$45
6.6.7	Supply and install 200 mm thick concrete cut off wall incl SL81 mesh	0.5	m^3	$236.25	$118
7	**PLATYPUS ACCESS**				
7.1	Excavation for drainage	170.0	m^3	$35.00	$5 950
7.2	Supply, install and backfill 375 mm dia. J RCP Class 2	86.0	m	$250.00	$21 500
7.3	Supply and install Platypus pit	1.0	each	$5 000.00	$5 000
7.4	Supply and install reinforced 900 x 900 Junction pit with pipe grate	2.0	each	$3 500.00	$7 000
7.5	Supply and place 150 mm (nom) grouted rock in platypus pit	1.5	m^3	$500.00	$750
7.6	Supply and install Hollow core Large woody debris	1.0	each	$750.00	$750
7.7	*End Walls*				
7.7.1	Supply and place min. 900 mm dia large toe rock	28.0	m^2	$120.00	$3 360
7.7.2	Supply and place 150 mm thick 50-150 mm min shot rock bedding	5.0	m^3	$90.00	$450
7.7.3	Supply and place mortar pad	0.5	m^3	$150.00	$75
7.7.4	Supply and place fine crushed rock	6.0	m^3	$84.00	$504
7.7.5	Supply and install Geotextile filtercloth	30.0	m^2	$2.50	$75
7.7.6	Supply and install Geogrid reinforcement	30.0	m^2	$3.00	$90

Item	Description	Quantity	Unit	Rate	Total
7.7.7	Supply and install 200 mm thick concrete cut off wall incl SL81 mesh	1.0	m^3	$500.00	$500
7.7.8	Supply and install Large woody debris	2.0	each	$100.00	$200
7.7.9	Supply and install 100% recycled plastic post	8.0	m	$120.00	$960
7.7.10	Supply and install 5 mm galvanised wire	2.0	m	$20.00	$40
8	**LANDSCAPING (Not covered in drawings)**				
8.1	Supply and install inter dispersed large woody debris/stump	31.0	each	$750.00	$23,250
8.2	Supply and install 100% recycled plastic posts for large woody debris	112.0	m	$40.00	$4 480
8.3	Reinstate screened topsoil to wetland zone (150 mm thick min)	4,645.0	m^3	$3.00	$13 935
8.4	Reinstate screened topsoil to remaining wetland and disturbed surrounds	1,690.0	m^3	$3.00	$5 070
9	**MISCELLANEOUS**				
9.1	Supply and install treated pine post fence and farm gate	122.0	m	$120.00	$14 640
9.2	Reconstruct levee	1.0	item	$10 000.00	$10 000
SUB-TOTAL					**$2 466 137**
CONTINGENCY (15%)					**$369 921**
TOTAL (incl. Contingency)					**$2 840 000**

11. Conclusion

Kelletts Road Wetland and retarding basin has been designed to utilise the space to provide stormwater quality for the Kelletts Road catchment through the use of GPT, sediment pond and 4 ha wetland.

The wetland will be constructed between the Enterprise Estate and Corhanwarrabul Creek. The normal water level of the wetland is set at 50.10 m AHD and an operating water level of 50.60 m AHD. Whilst the wetland system does not meet best practice targets for pollution reduction they will provide the following potential reductions of pollutants entering Corhanwarrabul Creek:

- The mass of suspended solids removed each year is over 200 tonne;
- A reduction in approximately 0.4 tonne/year of phosphorus;
- A reduction of approximately 2 tonne/yr of nitrogen; and
- A reduction of approximately 54 180 kg/yr of gross pollutants.

The design and operation of the wetland is constrained within a narrow depth range defined by the invert level of the inlet diversion pipe and the tailwater conditions within Corhanwarrabul Creek. This may at times result in prolonged extended detention of the wetland, but not expected to affect the long-term performance.

The estimated civil costs of the wetland system are $2.84 million, which includes the civil elements of the design.

Appendix A
Preliminary Environmental Investigation

May 2009

CLIENTS | PEOPLE | PERFORMANCE

Melbourne Water Corporation

Kelletts Road Drain Wetland

Preliminary Environmental Investigation

May 2009

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

Contents

Table Index

Figure Index

Appendices

1. Introduction

1.1 General

GHD was engaged by Melbourne Water Corporation to undertake a preliminary environmental investigation to assist in the design and construction of a wetland for the Kelletts Road Drain that currently discharges into Corhanwarrabul Creek untreated. The wetland will act as a stormwater treatment system and comprise a sediment pond, and gross pollutant trap and diversion structure.

The purpose of the investigation was to investigate the presence of soil contamination and acid sulfate soils to characterise the excavated soil for re-use on site or off-site disposal.

1.2 Scope of Work

The scope of the preliminary investigation included the following:

- Excavation of seven test pits using a 12 ton excavator;
- Visual logging of retrieved soil samples in accordance with GHD standard logging procedures, which are based on AS1726-1993 (‘Geotechnical Site Investigations’);
- Collection of representative samples of soil for laboratory testing including Suspended Peroxide Oxidisable Combined Acidity and Sulfate (SPOCAS) and a broad screen of potential inorganic and organic contaminants;
- Preparation of a report, including:
  - Description of the investigation methodology;
  - Assessment of subsurface conditions;
  - Laboratory test results;
  - Assessment of the presence of soil contamination and acid sulfate soils; and
  - Recommendations for sail management and/or further investigations at the site.

The fieldwork was undertaken in conjunction with a geotechnical investigation also being conducted for the site. The geotechnical investigation works have been reported separately.

2. Site Characterisation

2.1 Site Description

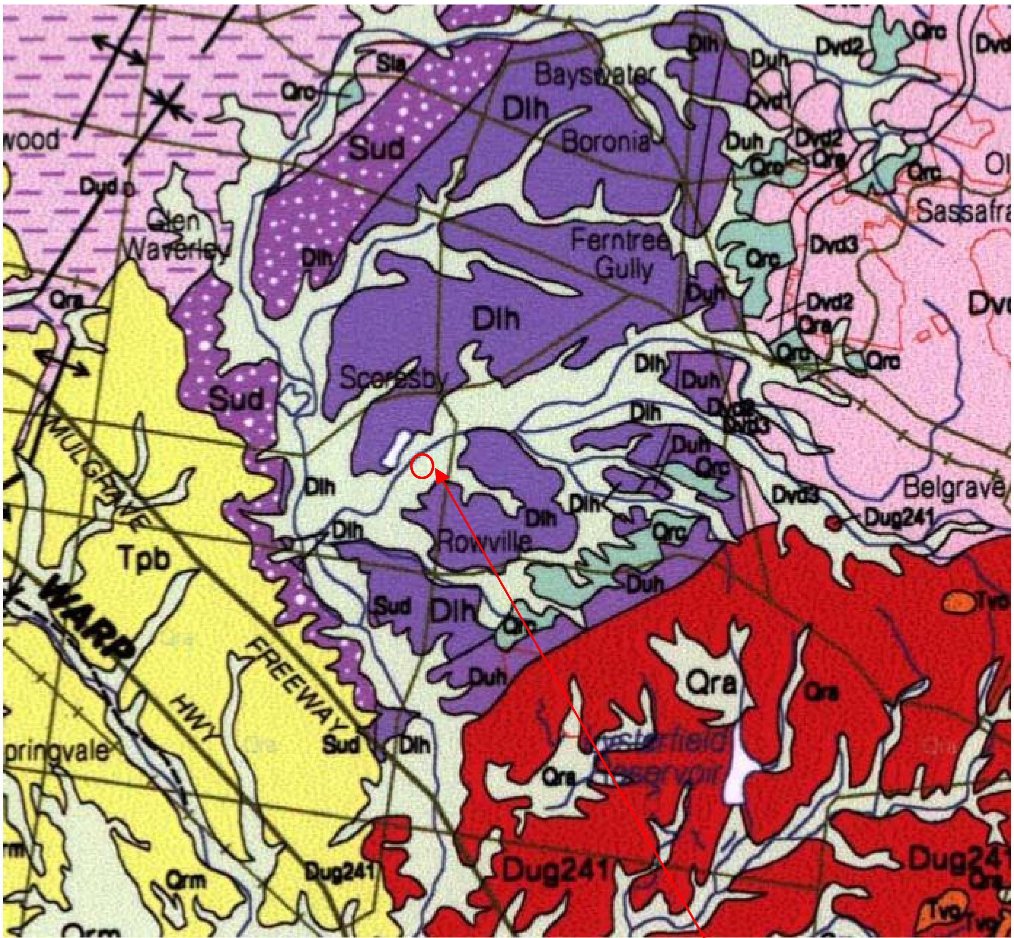
The site is located between Stud Road and Corhanwarrabul Creek and within the proposed Knox City Council Stamford Park development, approximately 27 km southeast from the Melbourne CBD. The proposed stormwater treatment system consists of a wetland extending across approximately 4 ha with a sediment pond and a gross pollutant trap and diversion structure. The site currently consists of a generally flat, grassed area sloping towards Corhanwarrabul Creek to the immediate north and north-west of the site.

2.2 Geology and Hydrogeology

The immediate geology of the area as indicated by the Australia 1:250,000 Geological Series Melbourne Map (Sheet No. SJ55-5) consists of the following geological units:

- Quaternary River Alluvium (Qra and Qrc) – Sand, silt and clay and minor gravel;
- Devonian Humevale Siltstone (Dlh) – Marine siltstone and minor sandstone;
- Silurian Dargile Formation (Sud) – Marine siltstone and thin bedded sandstone

Australia 1:250,000 Geological Series Melbourne Map (Sheet No. SJ55-5)



Site Location

The project site is located within the alluvial flats and the Quaternary River Alluvium is expected to underlie the site to a significant depth.

2.2.1 Hydrogeology

According to the Department of Natural Resources and Environment (DNRE) (1995) South Western Victoria water-table aquifers map, groundwater beneath the site would be classified as Segment B with a salinity range of 1 001-3 500 mg/L TDS. As the site is within river alluvium, and low lying, the groundwater depth at the site is considered to be relatively shallow within five metres of the surface. The nearest surface water body is Corhanwarrabul Creek, which is immediately adjacent to the site. Local groundwater is expected to be influenced by

Corhanwarrabul Creek to the immediate north and northwest of the site. However, it is likely that the regional groundwater flow direction is towards Port Phillip Bay in a Southwesterly direction.

3. Guidelines for Investigation

3.1 Environmental Assessment Guidelines

3.1.1 Land Beneficial Uses

The State Environment Protection Policy (SEPP) (Prevention and Management of Contaminated Land) 2002, applies to all land in the State of Victoria and is enforceable under Section 16 of the Environment Protection Act 1970. Commonly referred to as the 'Land SEPP', the policy provides beneficial uses to be protected under a number of different land use scenarios and provides indicators and objectives for protection of land. The Land SEPP endorses the National Environment Protection (Assessment of Site Contamination) Measure-1999 (herein referred to as the NEPM) as the key guidance document in contamination assessment and confirms that the ecological and human health investigation levels provided in the NEPM are the key objectives to be met for the protection of the beneficial uses of land.

The Land SEPP provides a framework for deciding which beneficial uses need to be protected having regard for the existing and intended uses of a site. Given the current and likely future use of the site for recreation/open space purposes, the Land SEPP identifies the following protected beneficial uses under this land use category:

- Maintenance of Ecosystems (highly modified ecosystems);
- Human Health;
- Buildings and structures; and
- Aesthetics.

3.1.2 Environmental Screening Criteria

In accordance with the Land SEPP, the Ecological Investigation Levels (EILs) provided in the NEPM have been adopted as the environmental screening criteria for the protection of Maintenance of Ecosystems.

3.1.3 Human Health Criteria

The Health Investigation Levels (HILs) provided in the NEPM (1999) have been adopted for the assessment of Human health in accordance with the requirements of the Land SEPP. The relevant HIL for this investigation is the NEPM 'E' HIL, which is relevant to parks, recreational open space and playing fields. This is based on the proposed on-going use of the site for recreational/open space purposes.

3.1.4 Other Beneficial Uses

With regard to the Buildings and Structures beneficial use, the Land SEPP defines the objectives to be met as 'Contamination must not cause the land to be corrosive to or adversely affect the integrity of structures of building materials'. This is normally assessed with reference to pH and sulfate.

With regard to the Aesthetics beneficial use, the Land SEPP defines the objectives to be met as "Contamination must not cause the land to be offensive to the senses of human beings". This generally refers to the presence of building rubble, odours and staining.

3.1.5 Waste Soil Classification

Concentrations of contaminants in soil samples have been compared to waste classification criteria provided in the Victorian Environmental Protection Agency (Vic EPA) Publication 448.3, *Classification of Wastes* (May 2007). This EPA guideline is used to classify soils for disposal offsite.

Publication 448.3 classifies soil into one of four categories, depending on hazard, these being fill material or, Category-C, Category-B or Category-A contaminated soil. Soil is categorised based on prescribed contaminant concentrations outlined in the following tables in Vic EPA Publication 448.3:

- Table 2 of Publication 448.3: Maximum contaminant concentrations allowed in soil to be disposed of as fill material;
- Table 3 of Publication 448.3: Maximum contaminant concentrations and leachable concentrations allowed in soil to be disposed of as Category C (contaminated soil); and
- Table 4 of Publication 448.3: Maximum contaminant concentrations and leachable concentrations allowed in soil to be disposed of as Category B (contaminated soil).

3.2 Acid Sulfate Soil Assessment Guidelines

Acid Sulfate Soils (ASS) are naturally occurring soils containing iron sulphides. The natural soils were formed within the last 10 000 years during the last sea level rise and intrusion. Due to the high level of sulfate within seawater and organic and iron rich sediments, iron sulphides were deposited in soils. ASS is produced when the iron sulphide rich sediments (which are generally in low lying and waterlogged areas) are exposed to air to produce sulphuric acid. The following state legislation and policies apply to ASS assessment and management in Victoria.

3.2.1 Industrial Waste Management Policy (Waste ASS)

The Industrial waste policy (Waste acid sulfate soils) 1999, provides a framework to prevent and regulate pollution from ASS in Victoria.

The Industrial waste management policy sets out the management regime for disposal and reuse of waste acid sulfate soils and specifies the responsibilities of those involved.

3.2.2 EPA Publication 655 Acid Sulfate Soil and Rock

EPA Publication 655 Acid Sulfate Soil and Rock (August 1999) is a guideline for assessment and provides definitions as well as an outline of identification, assessment, classification and management requirements and methodologies.

3.2.3 Draft Strategy for Coastal Acid Sulfate Soils in Victoria 2008

It was recognised that the above EPA policies and guidelines provided a hierarchy for management of acid sulfate soils, but focused largely on safe disposal and reuse. As such a state wide coastal mapping program was undertaken in by DPI (2003) to provide guidance on the potential occurrence of coastal acid sulfate soils (CASS).

Since this pilot mapping study, a draft strategy for the management of coastal acid sulfate soils has been developed and was released in June 2008.

The draft strategy for coastal acid sulfate soils in Victoria builds on a number of policies and legislative initiatives. It relies on a risk-based assessment that follows four phases through from desktop reviews to best practise management plans.

As this draft management strategy considers previous policies and guidelines, it has been adopted as the assessment guideline for this investigation.

The objective of this strategy is to protect the environment, humans and infrastructure from the potential harmful impacts of disturbing CASS. This involves the protection of environment, social and economic, values of the coast and the avoidance of pollution and other activities that negatively impact on these values.

The draft strategy provides decision-making principles and a series of actions to achieve this objective. A risk management approach (Risk Management Process) to CASS is proposed in order that through greater awareness and understanding, decisions can be made around known risk. The implementation of best practise assessment and management techniques can ensure the consequences of activities in CASS areas can be reduced or eliminated.

4. Results of Environmental Investigation

4.1 Field Investigation

The field investigation work was undertaken on Wednesday 1st April 2009. A 12 tonne excavator was used to conduct the fieldwork supplied by Fulton Hogan. Fieldwork including soil sampling and logging was undertaken by a GHD geotechnical engineer and environmental scientist.

On-site underground service clearances of existing services and utilities were undertaken prior to the excavation of the test pits by Fulton Hogan.

Soil sampling was conducted in accordance with GHD Quality Assurance and Quality Control (QAQC) procedures, which was in general accordance with:

- National Environment Protection Council, National Environment Protection (Assessment of Site Contamination) Measures 1999 (NEPM 1999); and
- Australian Standard AS4482.1 Guide to the investigation and sampling of sites with potentially contaminated soil, 2005 (AS4482.1-2005).

Based on an area of 4 ha, the Australian Standard AS4482.1 recommends a minimum of 50 sample locations; however on the basis that this is a preliminary investigation, and that the site is currently used for grazing, a total of seven investigation locations were considered appropriate. It is further noted that EPA publication 1178 provides guidance on the minimum number of samples required per volume of soil for disposal or re-use. As this is a preliminary investigation, and the volume of soil to be excavated is subject to final design of the wetland, this guideline has not been considered in this investigation.

A total of seven test pits were excavated for the investigation, to a maximum depth of 5.6 m below the existing ground surface. Samples were collected directly from the excavator bucket or small stockpile created (representative of the soil sampling depth) to avoid directly entering the pit. Samples were collected at near surface (approximately 0.1 m below ground level - mbgl) and subsurface intervals (0.5 mbgl, 1.0 mbgl and every metre thereafter), or where soil conditions changed within the soil profile or where contamination was suspected based on field observations. A total of 46 samples were collected, from the seven test pit locations.

The co-ordinate position of test pits was measured with a hand held GPS with a horizontal accuracy of +/- 5 m, however it is expected that the actual accuracy of the GPS would be +/- 1 m (see Appendix A for GPS co-ordinates on Test Pit Logs). The location of sampling points is shown on Figure 1.

Soils encountered were visually logged in accordance with the GHD Logging Procedures, based on the Australian Standard AS1726-1993.

Test pit logs are provided in Appendix A together with cross-sectional views of site lithology.

4.2 Field Observations

A description of lithology encountered at each location, including samples collected, is presented in the test pit logs provided in Appendix A.

Soils across the site appeared to be sedimentary alluvial soils consisting of a brown grey silt with abundant roots (at surface) to clay mottled brown, yellow, pale grey (generally from 0.4 to 4.0 m) with trace rootlets (to approximately 0.6 m), to clayey sand and sand (at depths greater than 4.0 m), consistent with the expected geology and natural soils of the area. Soils also became moist to saturated at approximately 4 m depth.

4.3 Laboratory Analysis

The analysed samples covered depths varying from 0.1 mbgl to 5.0 mbgl. All soil samples were submitted to the ALS Laboratory Group (ALS) for analysis. Sixteen samples were selected for acid sulfate soil analysis, and seven were selected for a Victorian EPA 448.3 Screen (refer to note 2 on Table 1). Samples not selected for analysis were placed on "hold" at the laboratory to allow them to be analysed at a later date, if required. ALS is accredited by the National Association of Testing Authorities (NATA) to perform the analysis undertaken in this investigation. All samples were submitted under Chain of Custody (COC) documentation.

NATA certified analytical results and COC documentation are provided in Appendix B. The analysis undertaken on selected samples, as part of the soil analysis program is listed in Table 1. Prior to selecting samples for SPOCAS analysis, all sub-surface samples were analysed for pHField and pHFox, a screening technique that assesses changes in pH due to oxidisation and aids in selecting samples for SPOCAS analysis. Where results reported a >2 pH unit change, it as considered possible that oxidation could occur. The pHfield and pHFox results are provided in Appendix C Table D1. Based on these results, soil composition and reaction rate, sixteen samples were selected for SPOCAS analysis. In addition to the primary soil samples, one (1) blind field duplicate sample was also collected and submitted for analysis as part of the QA/QC program.

SPOCAS is an acid base accounting test that includes measurement of the maximum oxidisable sulfur, Titratable Actual Acidity (TAA) and Titratable Peroxide Acidity (TPA) and the potential Acid Neutralising Capacity (ANC) present in the soil sample. The TPA result of SPOCAS represents a measure of the net acidity, effectively equivalent to the sum of the soil's potential sulfidic acidity and actual acidity. The calculated Titratable Sulfidic Acidity (TSA) is the difference between TPA and TAA. The peroxide oxidisable sulfur content (S_{POS}) provides a measure of the maximum amount of potentially oxidisable sulfur in the soil sample and represents the sulfur trail.

Table 1 Summary of Soil Analytical Program

Test pit ID	Sample ID	Sample Depth	Analysis
TP01	TP01_0.5-0.6	0.5-0.6 m	SPOCAS (1),
	TP01_3.0-3.1	3.0-3.1 m	
	TP01_3.0-3.1	3.0-3.1 m	EPA 448.3 Screen (2)
	TP01_0.5-0.6	0.5-0.6 m	Heavy Metals as per EPA 448.3 Screen

Test pit ID	Sample ID	Sample Depth	Analysis
TP02	TP02_0.5-0.6	0.5-0.6 m	SPOCAS (1)
	TP02_2.0-2.1	2.0-2.1 m	
	TP02_0.5-0.6	0.5-0.6 m	EPA 448.3 Screen (2)
	TP02_3.0-3.1	3.0-3.1 m	Heavy Metals as per EPA 448.3 Screen
TP03	TP03_0.5-0.6	0.5-0.6 m	SPOCAS (1)
	TP03_2.0-2.1	2.0-2.1 m	
	TP03_1.0-1.1	1.0-1.1 m	EPA 448.3 Screen (2)
	TP03_4.0-4.1	4.0-4.1 m	Heavy Metals as per EPA 448.3 Screen
TP04	TP04_0.5-0.6	0.5-0.6 m	SPOCAS (1)
	TP04_2.0-2.1	2.0-2.1 m	
	TP04_0.5-0.6	0.5-0.6 m	EPA 448.3 Screen (2)
	TP04_4.0-4.1	4.0-4.1 m	Heavy Metals as per EPA 448.3 Screen
TP05	TP05_0.5-0.6	0.5-0.6 m	SPOCAS (1)
	TP05_4.0-4.1	4.0-4.1 m	
	TP05_0.1-0.2	0.1-0.2 m	EPA 448.3 Screen (2)
	TP05_0.5-0.6	0.5-0.6 m	Heavy Metals as per EPA 448.3 Screen
TP06	TP06_0.5-0.6	0.5-0.6 m	SPOCAS (1)
	TP06_3.0-3.1	3.0-3.1 m	
	TP06_4.0-4.1	4.0-4.1 m	
	TP06_0.1-0.2	0.1-0.2 m	EPA 448.3 Screen (2)
	TP06_1.0-1.1	1.0-1.1 m	Heavy Metals as per EPA 448.3 Screen
TP07	TP07_0.5-0.6	0.5-0.6 m	SPOCAS (1)
	TP07_2.0-2.1	2.0-2.1 m	
	TP07_5.0-5.1	5.0-5.1 m	
	TP07_0.5-0.6	0.5-0.6 m	EPA 448.3 Screen (2)
	TP07_2.0-2.1	2.0-2.1 m	Heavy Metals as per EPA 448.3 Screen

Notes

1. Suspension Peroxide Oxidation Combined Acidity and Sulfate (SPOCAS)

2. Vic EPA 448.3 Screen comprises Heavy Metals (Ag, As, Cd, Cu, Hg, Cr^{6+}, Mo, Ni, Pb, Se, Sn & Zn), Cyanide, Fluoride, Polychlorinated Biphenyls (PCBs), Monocyclic Aromatic Hydrocarbons (MAHs), Volatile Halogenated Compounds (VHCs), Phenols, Polynuclear Aromatic Hydrocarbons (PAHs), Organochlorine Pesticides (OCPs), Total Petroleum Hydrocarbons (TPH)

4.4 Results

4.4.1 Contamination Assessment

The analytical results of samples obtained and analysed from the site are tabulated in Appendix C. As described in Section 3.1 the concentrations of the targeted contaminants were compared against environmental screening criteria and human health criteria.

All contaminants analysed reported concentrations below laboratory limits of reporting or below the adopted criteria.

4.4.2 Soil Disposal Assessment

Analytical results were compared to Vic EPA Publication 448.3, Classification of Wastes (May 2007).

All samples reported concentrations below the maximum concentrations for 'fill material'. The analytical results indicate that this would classify as fill material in accordance with EPA Publication 448.3. However, due to the limited sampling density and soil pH ranging from 5.0 to 6.3 pre-approval from the receiving landfill will need to be obtained before any soil is disposed from the site.

4.4.3 Acid Sulfate Soils Assessment

In accordance with the Draft CASS Strategy (DSE 2008) the following phases were conducted as part of the acid sulfate soil assessment.

Phase 1 - Desktop Acid Sulfate Soils Assessment

A review of the National Acid Sulfate Soils Map indicated that the site is situated within an area of low probability of containing acid sulfate soils. However, an area immediately north of Corhanwarrabul Creek is indicated to have a high probability of containing acid sulfate soils.

Given the proximity of this site to the probable acid sulfate soils, the presence of Quaternary sediments, and the low lying nature of the area, it was considered necessary to undertake assessment for coastal acid sulfate soils.

Phase 2 Acid Sulfate Soil Assessment

The Phase 2 ASS assessment included the following:

- Excavation of seven test pits to a maximum depth of 5.6 m to investigate the subsurface conditions (performed in conjunction with the geotechnical assessment);
- Logging of materials encountered within the test pits (performed in conjunction with the geotechnical assessment);
- Collection of representative soil samples for laboratory testing;
- Laboratory testing of the soil samples recovered from the test pits; and
- Assessment and classification of soils based on the analytical results.

Table 7 of Appendix 3b of the CASS Draft Strategy (DSE 2008) provides soil sulfide hazard classes, which are determined by the sulfur concentrations and net acidity, reported in the

SPOCAS analysis. Results from this investigation have been classified using this system. The Soil Sulfide Hazard Classes are reproduced in Table 2 below.

Table 2 Soil Sulfide Hazard Classes

Risk Class		**No Risk Class**			**Risk Class**			
Hazard class	"No Sulfur"		Non-Reactive		Moderate Risk		High Risk	
Texture Group	Sulfur	Net Acidity	Sulfur	Net Acidity	Sulfur	Net Acidity	Sulfur	Net Acidity
1 (Coarse)	1	N/A	>1 (<10)	<3	>1	>3	>10	>5
2 (Medium)	2	N/A	>2 (<20)	<6	>2	>6	>20	>10
3 (Fine)	3	N/A	>3 (<30)	<9	>3	>9	>30	>15

Source: Draft Strategy for Coastal Acid Sulfate Soils in Victoria, Victorian Steering Committee for Coastal Acid Sulfate Soils, Victorian Government Department of Sustainability and Environment, Melbourne, June 2008. All units in kg H_2SO_4/t

Laboratory Results

A summary of SPOCAS results is provided in Table 3.

Table 3 Summary of Results and Classification of Soils.

Sample ID	pH	Texture Group	Acidity - Peroxide Oxidisable Sulfur		Net Acidity (Acidity Units)		Hazard Class
			moles H+/t	kg H_2SO_4/t	moles H+/t	kg H_2SO_4/t	
TP01_0.5-0.6_PartB	5.9	3	<10	**<0.49**	18	**0.882**	No Sulfur
TP01_3.0-3.1_PartB	5.8	3	<10	**<0.49**	11	**0.539**	No Sulfur
TP02_0.5-0.6_PartB	5.7	3	<10	**<0.49**	42	**2.058**	No Sulfur
TP02_2.0-2.1_PartB	5	3	<10	**<0.49**	24	**1.176**	No Sulfur
TP03_0.5-0.6_PartB	5.9	3	14	**0.686**	38	**1.862**	No Sulfur
TP03_2.0-2.1_PartB	5.6	3	<10	**<0.49**	13	**0.637**	No Sulfur
TP04_0.5-0.6_PartB	6	3	<10	**<0.49**	26	**1.274**	No Sulfur
TP04_2.0-2.1_PartB	5.8	3	<10	**<0.49**	10	**0.49**	No Sulfur
TP05_0.5-0.6_PartB	5.9	3	<10	**<0.49**	29	**1.421**	No Sulfur
TP05_4.0-4.1_PartB	5.6	3	<10	**<0.49**	13	**0.637**	No Sulfur
TP06_0.5-0.6_PartB	5.8	2	<10	**<0.49**	30	**1.47**	No Sulfur
TP06_3.0-3.1_PartB	5.6	3	<10	**<0.49**	13	**0.637**	No Sulfur
TP06_4.0-4.1_PartB	6.3	2	<10	**<0.49**	<10	**<0.49**	No Sulfur
TP07_0.5-0.6_PartB	5.3	3	<10	**<0.49**	20	**0.98**	No Sulfur
TP07_2.0-2.1_PartB	5.9	3	<10	**<0.49**	20	**0.98**	No Sulfur
TP07_5.0-5.1_PartB	5.8	1	<10	**<0.49**	<10	**<0.49**	No Sulfur

Note:
Texture Group 1 – Sands
Texture Group 2 – Loams/Silts-Light Clays
Texture Group 3 – Medium to Heavy Clays, Silty Clays

All SPOCAS results reported concentrations of peroxide oxidisable sulfur below 2 kg H_2SO_4/t, indicating that the soils are within the 'No Risk' category.

The pH of the soils ranged from 5.0 to 6.3 indicating that soils are slightly acidic. In such conditions, metals such as aluminium and iron, as well as trace heavy metals can become more soluble and more easily mobilised by infiltrating waters. Whilst there is no evidence that high concentrations of heavy metals exist at the site, the surrounding land (soil), underlying groundwater and nearby waterways has the potential to be impacted if the site is not managed appropriately. Acidic soils may also cause impacts to construction materials through corrosion (such as concrete, steel and asphalt).

Phase 3 and 4 - Management

As the soil has been indicated as 'No risk', no management plan is required under the CASS draft strategy (DSE 2008).

4.5 Quality Assurance / Quality Control

Established quality assurance/quality control (QA/QC) procedures to assess data quality were maintained throughout the project. The QA/QC program undertaken as part of the assessment included the following:

- Use of qualified and trained staff;
- Preservation of samples with ice during transport from the field to the laboratory;
- Transportation of samples with accompanying chain-of-custody documentation;
- Compliance with sample holding times;
- Review of results of a blind duplicate sample;
- Review of internal analysis of laboratory duplicates, spikes and blanks.

The QC program employed during this investigation was in accordance with the general requirements set out in the Australian Standard AS4482.1 (2005). QC samples provide information that discounts or potentially identifies errors due to possible sources of cross contamination, inconsistencies in sampling and analytical techniques used. The QC program completed included the collection and analysis of duplicate samples. The samples collected as part of the quality assurance program for this project are described below:

- **Blind Duplicate Samples:** These are coded duplicate samples submitted to the primary laboratory for analysis as individual samples without any indication to the laboratory that they have been duplicated.
- **Split Samples:** These are duplicate samples split in the field, with one sample being sent to a secondary laboratory for check analysis. The same parameters are analysed utilising similar analytical techniques. No split samples were undertaken during sampling.
- **Rinsate Samples:** Rinsate Blanks or equipment blanks monitor possible contamination that may be introduced by inadequate equipment decontamination. Samples are collected at a frequency of 1 per 20 samples or 1 per day whichever is the greater. Equipment blanks should not return any positive results on analysis. No rinsate samples were collected during

sampling, due to direct collection of soil samples from the excavator bucket or small stockpile by hand.

4.5.1 Quality Control Assessment Results

A quantitative measure of the accuracy of the check analyses results obtained was made using calculated relative percentage difference (RPD) values. The RPD values were calculated using the following equation.

$$\text{RPD}(\%) = \frac{\langle Co - Cs \rangle}{\left\langle \frac{Co + Cs}{2} \right\rangle} \times 100$$

where Co = concentration obtained from the original sample

Cs = concentration obtained from the duplicate sample

Blind Duplicate

A summary of RPDs for field QAQC samples for the soil analysis is shown in Table D3 (Appendix C). A total of 111 primary/duplicate pairs had RPDs calculated for them. All 111 RPD values calculated between the primary sample (TP01_3.0-3.1_Part A) and laboratory blind duplicate sample (DUP01_Part A) were within the acceptable limits (<50%).

Laboratory Internal Quality Control

Internal QC results consisted of matrix spikes, method blanks and internal duplicate RPDs and were reported within acceptable limits.

Holding Times

No sample to extraction holding times were exceeded.

Conclusions of QA/QC Program

Based on the QA/QC program, it is concluded that the analytical data of the soil sampling is of reliable quality and suitable for the assessment made in this report.

5. Conclusion and Recommendations

The environmental investigation undertaken at Kelletts Road Drain indicated that contaminant concentrations were within the adopted guidelines and no potential acid sulfate soils were identified at the site.

The soil generated during construction may be removed from the site as fill material in accordance with EPA Publication 448.3. However, due to the sampling density and soil pH ranging from 5.0 to 6.3. Pre-approval from a receiving landfill is recommended before any soil is removed from the site.

6. Limitations

This report presents the results of an investigation and assessment program to determine the presence of a broad range of potential contaminants in site soils, and was produced specifically for Melbourne Water Corporation and for the purposes of this commission. No warranties, expressed or implied, are offered to any third parties and no liability will be accepted for use of this report by any third party.

This report presents the results of a contaminated site investigation conducted specifically for the purposes of this commission. The data and advice provided herein relate only to the project and structures described herein and must be reviewed by a competent Environmental Scientist or Engineer, experienced in contaminated site investigations, before being used for any other purposes. GHD accepts no responsibility for other use of the data.

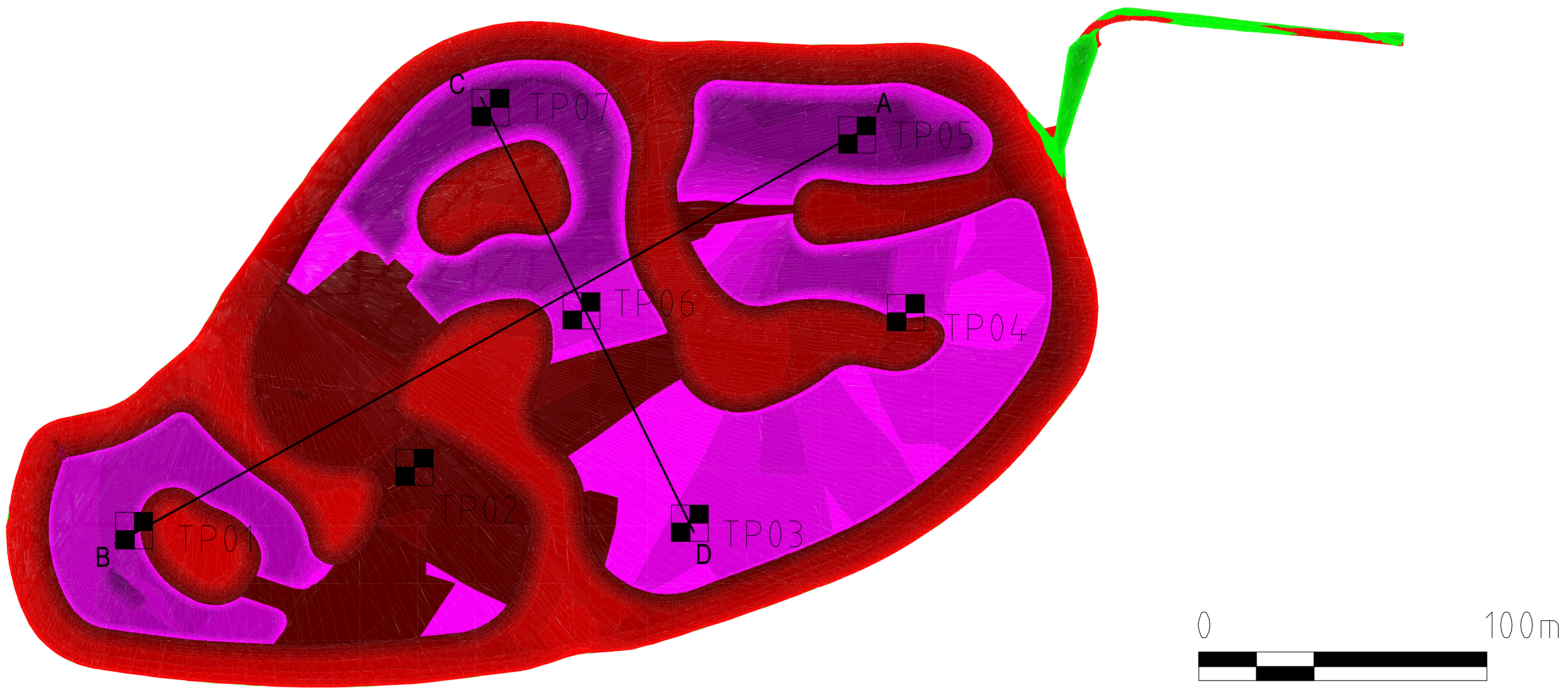
Where drill hole or test pit logs, laboratory tests, geophysical tests and similar work have been performed and recorded by others the data is included and used in the form provided by others. The responsibility for the accuracy of such data remains with the issuing authority, not with GHD.

The advice tendered in this report is based on information obtained from the investigation locations, test points and sample points and is not warranted in respect to the conditions that may be encountered across the site at other than these locations. It is emphasised that the actual characteristics of the subsurface and surface materials may vary significantly between adjacent test points and sample intervals and at locations other than where observations, explorations and investigations have been made. Sub-surface conditions, including groundwater levels and contaminant concentrations can change in a limited time. This should be borne in mind when assessing the data. However, it is our opinion that the test points chosen are representative of conditions on the site.

It should be noted that because of the inherent uncertainties in the sub-surface evaluations, changed or unanticipated sub-surface conditions may occur that could affect total project costs and/or execution. GHD does not accept responsibility for the consequences of significant variations in the conditions.

An understanding of the site conditions depends on the integration of many pieces of information, some regional, some site specific, some structure-specific and some experienced based. Hence this report must be read in full and should not be altered, amended or abbreviated, issued in part or issued incomplete in any way without prior checking and approval by GHD. GHD accepts no responsibility for any circumstances that arise from the issue of the report that has been modified other than by GHD.

Figures



MELBOURNE WATER CORPORATION
KELLETS ROAD DRAIN WERLANDS

CLIENTS | PEOPLE | PERFORMANCE

TEST PITS LOCATION PLAN

scale | for A4 date | April 2009

job no. | 31-22036
rev no. | 0

Figure 01

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com.au

Plot Date: 28 April, 2009 - 11:28 AM Cad File No: TP location_Plan_Sections.dwg

Appendix A

Test pits Logs

TEST PIT LOG SHEET

Client :	Melbourne Water Corporation
Project :	Kellets Road Drain Wetland
Location :	Rowville

TEST PIT No. TP01

SHEET 1 **OF** 1

Position : 344213.0 E,5802362.0 N	MGA94	**Surface RL:** 0.0m	**Pit Width:** 0.7m	**Processed:** ASF	
Excavator : 12T Excavator		**Contractor :** Fulton Hogan	**Pit Length:** 5.0m	**Checked:**	
Date : 1/4/09			**Logged by :** ASF	**Date:**	

EXCAVATION			MATERIAL						
Scale (m)	Water	Samples & Tests	Depth (m)	Graphic Log	Group Symbol	**Description** SOIL TYPE, colour, structure, minor components (origin) and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Relative Density	**Comments Observations**
	GNE	TP01_0.1-0.2m			ML	TOPSOIL- SILT Brown grey, abundant rootlets.	D	F	
		TP01_0.5-0.6m	0.40 -0.40		CH	CLAY Dark brown grey, some yellowish brown staining, occasional cacarious material inclusions.			
1		TP01_1.0-1.1m B @ 1.0m	0.70 -0.70			Brown, mottled yellowish brown, some dark brown patches.	M	St	1
2		TP01_2.0-2.1m B @ 2.0m							2
3		TP01_3.0-3.1m B @ 3.0m	3.00 -3.00			Occasional dark brown moist to wet bloches.			3
		TP01_4.0-4.1m	3.70 -3.70			Trace medium grained sand.			
4		B @ 4.0m	4.00 -4.00			Test Pit Terminated at 4.0m.			4
5									5
6									6
7									7

See standard sheets for details of abbreviations & basis of descriptions

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Job No.
31\22036

TEST PIT LOG SHEET

Client :	Melbourne Water Corporation
Project :	Kellets Road Drain Wetland
Location :	Rowville

TEST PIT No. TP02

SHEET 1 **OF** 1

Position : 344311.0 E,5802384.0 N	MGA94	**Surface RL:** 0.0m	**Pit Width:** 0.7m	**Processed:**	ASF
Excavator : 12T Excavator		**Contractor :** Fulton Hogan	**Pit Length:** 4.2m	**Checked:**	
Date : 1/4/09			**Logged by :** ASF	**Date:**	

Scale (m)	Water	Samples & Tests	Depth (m)	Graphic Log	Group Symbol	Description SOIL TYPE, colour, structure, minor components (origin) and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Relative Density	Comments Observations
		TP02_0.1-0.2m	0.40 -0.40		ML	TOPSOIL- SILT Brown grey, abundant rootlets, trace fine grained sand.	D	F	
		TP02_0.5-0.6m	0.70 -0.70		CH	CLAY Dark brown grey, trace yellowish brown staining.			
1		TP02_1.0-1.1m B @ 1.0m				Dark brown, mottled pale grey, mottled yellowish brown.	M	St	1
2		TP02_2.0-2.1m B @ 2.0	2.00 -2.00			Yellowish brown mottled pale grey, occasional brown spots.		F	2
			2.70 -2.70			Trace medium to coarse grained sand.			
3		TP02_3.0-3.1m B @ 3.0	3.00 -3.00			Test Pit Terminated at 3.0m.			3
4									4
5									5
6									6
7									7

See standard sheets for details of abbreviations & basis of descriptions

GHD GEOTECHNICS
Lvl 8, 180 Lonsdale Street, Melbourne VIC 3000
T: 61 3 8687 8000 F: 61 3 8687 8111 E: melmail@ghd.com.au
CONSULTING GEOTECHNICAL ENGINEERS AND GEOLOGISTS

Job No.

31\22036

TEST PIT LOG SHEET

Client : Melbourne Water Corporation
Project : Kellets Road Drain Wetland
Location : Rowville

TEST PIT No. TP03

SHEET 1 **OF** 1

Position : 344406.0 E,5802365.0 N	MGA94	**Surface RL:** 0.0m		**Pit Width:** 0.6m	**Processed:** ASF
Excavator : 12T Excavator		**Contractor :** Fulton Hogan		**Pit Length:** 4.5m	**Checked:**
Date : 1/4/09				**Logged by :** ASF	**Date:**

Scale (m)	Water	Samples & Tests	Depth (m)	Graphic Log	Group Symbol	Description (SOIL TYPE, colour, structure, minor components (origin) and ROCK TYPE, colour, grain size, structure, weathering, strength)	Moisture Condition	Consistency / Relative Density	Comments Observations
	GNE	TP03_0.1-0.2m			ML	TOPSOIL- SILT Pale brown pale grey, abundant rootlets.	D	F	
		TP03_0.5-0.6m	0.40 -0.40		CH	CLAY Brown, mottled yellowish brown, some rootlets.			
1		TP03_1.0-1.1m B @ 1.0m	0.70 -0.70			Pale grey, mottled yellowish brown, trace rootlets.	M	St	1
2		TP03_2.0-2.1m B @ 2.0m							2
3		TP03_3.0-3.1m B @ 3.0m	2.70 -2.70			Grey, mottled yellowish brown, occasional brown patches.	M-W		3
4		TP03_4.0-4.1m B @ 4.0m	4.00 -4.00			Test Pit Terminated at 4.0m			4
5									5
6									6
7									7

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CONSULTING GEOTECHNICAL ENGINEERS AND GEOLOGISTS

Job No. 31\22036

TEST PIT LOG SHEET

Client : Melbourne Water Corporation
Project : Kellets Road Drain Wetland
Location : Rowville

TEST PIT No. TP04

SHEET 1 **OF** 1

Position : 344481.0 E,5802438.0 N	MGA94	**Surface RL:** 0.0m	**Pit Width:** 0.8m	**Processed:** ASF
Excavator : 12T Excavator		**Contractor :** Fulton Hogan	**Pit Length:** 6.0m	**Checked:**
Date : 1/4/09			**Logged by :** ASF	**Date:**

Scale (m)	Water	Samples & Tests	Depth (m)	Graphic Log	Group Symbol	Description SOIL TYPE, colour, structure, minor components (origin) and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Relative Density	Comments Observations
	GNE	TP04_0.1-0.2m TP04_0.5-0.6m	0.60 -0.60		ML	TOPSOIL- SILT Pale brown grey, abundant rootlets.	M-D	F	
1		TP04_1.0-1.1m B @ 1.0m	1.00 -1.00		CH	CLAY Dark brown grey, orangish brown staining, some rootlets.			1
			1.70 -1.70			Orangish yellowish brown, mottled grey.	M	St	
2		TP04_2.0-2.1m B @ 2.0m				Yellowish brown mottled pale grey, trace medium grained sand.		F	2
3		TP04_3.0-3.1m B @ 3.0m							3
4		TP04_4.0-4.1m B @ 4.0m	4.00 -4.00			Test Pit Terminated at 4.0m			4
5									5
6									6
7									7

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Job No. 31\22036

TEST PIT LOG SHEET

Client : Melbourne Water Corporation		**TEST PIT No. TP05**
Project : Kellets Road Drain Wetland		
Location : Rowville		**SHEET** 1 **OF** 1
Position : 344464.0 E,5802500.0 N MGA94	**Surface RL:** 0.0m	**Pit Width:** 0.8m / **Processed:** ASF
Excavator : 12T Excavator	**Contractor :** Fulton Hogan	**Pit Length:** 6.1m / **Checked:**
Date : 1/4/09		**Logged by :** ASF / **Date:**

Scale (m)	Water	Samples & Tests	Depth (m)	Graphic Log	Group Symbol	Description: SOIL TYPE, colour, structure, minor components (origin) and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Relative Density	Comments Observations
		TP05_0.1-0.2m			ML	TOPSOIL- SILT with SAND Pale brown pale grey, medium grained sand, abundant rootlets.	D	F	
		TP05_0.5-0.6m	0.40 -0.40		CH	CLAY Brown, mottled pale grey, some yellowish brown staining.		St	
1		TP05_1.0-1.1m B @ 1.0m	1.00 -1.00			Yellowish brown, mottled pale grey, occasional rootlets.	M		1
2		TP05_2.0-2.1m B @ 2.0m	2.00 -2.00			Occasional dark brown patches.			2
3		TP05_3.0-3.1m B @ 3.0m	3.00 -3.00			Some coarse angular grained sand inclusions.			3
4		TP05_4.0-4.1m B @ 4.0m	4.00 -4.00			Grey, mottled yellowish brown.			4
5	▶	B @ 5.0m TP05_5.0-5.1m	5.00 -5.00		SC	CLAYEY SAND Grey, some orangish brown patches, coarse angular grained sand.	W	L	5
		TP05_5.5-5.6m B @ 5.5m	5.50 5.60 -5.60		CH	CLAY with SAND Yellowish brown, mottled grey, coarse grained sand. Test Pit Terminated at 5.6m	M	St	
6									6
7									7

See standard sheets for details of abbreviations & basis of descriptions

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Job No. 31\22036

TEST PIT LOG SHEET

Client : Melbourne Water Corporation
Project : Kellets Road Drain Wetland
Location : Rowville

TEST PIT No. TP06

SHEET 1 **OF** 1

Position : 344369.0 E,5802439.0 N MGA94	**Surface RL:** 0.0m	**Pit Width:** 0.7m	**Processed:** ASF
Excavator : 12T Excavator	**Contractor :** Fulton Hogan	**Pit Length:** 5.0m	**Checked:**
Date : 1/4/09		**Logged by :** ASF	**Date:**

Scale (m)	Water	Samples & Tests	Depth (m)	Graphic Log	Group Symbol	Description (SOIL TYPE, colour, structure, minor components (origin) and ROCK TYPE, colour, grain size, structure, weathering, strength)	Moisture Condition	Consistency / Relative Density	Comments Observations
	GNE	TP06_0.1-0.2m			ML	TOPSOIL- SILT Brown grey, trace sand, abundant rootlets.	D	F	
		TP06_0.5-0.6m	0.40 -0.40		ML	SILT Dark brown grey, some rootlets.	M		
1		TP06_1.0-1.1m B @ 1.0m	0.70 -0.70		CH	CLAY Brown, mottled pale grey, mottled pale yellowish brown.		St-F	1
2		TP06_2.0-2.1m B @ 2.0m	2.00 -2.00		CH	Trace fine to medium grained sand.		F	2
3		TP06_3.0-3.1m B @ 3.0m							3
4		TP06_4.0-4.1m B @ 4.0m	3.70 -3.70		SC	CLAYEY SAND Grey, mottled brown, coarse angular grained sand.	M-W	L	4
5		TP06_5.0-5.1m B @ 5.0m	5.00 -5.00			Test Pit Terminated at 5.0m.			5
6									6
7									7

See standard sheets for details of abbreviations & basis of descriptions

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CONSULTING GEOTECHNICAL ENGINEERS AND GEOLOGISTS

Job No. 31\22036

TEST PIT LOG SHEET

Client :	Melbourne Water Corporation
Project :	Kellets Road Drain Wetland
Location :	Rowville

TEST PIT No. TP07

SHEET 1 **OF** 1

Position : 344337.0 E,5802509.0 N MGA94	**Surface RL:** 0.0m	**Pit Width:** 0.7m	**Processed:** ASF
Excavator : 12T Excavator	**Contractor :** Fulton Hogan	**Pit Length:** 5.0m	**Checked:**
Date : 1/4/09		**Logged by :** ASF	**Date:**

Water	Samples & Tests	Depth (m)	Group Symbol	Description (SOIL TYPE, colour, structure, minor components (origin) and ROCK TYPE, colour, grain size, structure, weathering, strength)	Moisture Condition	Consistency / Relative Density	Comments Observations
GNE	TP07_0.1-0.2m	0.30 / -0.30	ML	TOPSOIL- SILT Pale brown pale grey, abundant rootlets.	D	F	
	TP07_0.5-0.6m	0.70 / -0.70	CH	CLAY Brown grey, mottled yellowish brown, some rootlets.			
	TP07_1.0-1.1m B@ 1.0m	2.00 / -2.00		Grey, mottled yellowish brown, trace rootlets.	M	St	
	TP07_2.0-2.1m B@ 2.0m	3.00 / -3.00		Yellowish brown, mottled pale grey, occasional calcarious material inclusions.		F	
	TP07_3.0-3.1m B@ 3.0m TP07_4.0-4.1m B@ 4.0m	4.10 / -4.10		Occasional dark brown spots, occasional medium grained sand.			
		4.70 / -4.70	SC	CLAYEY SAND Grey, occasional yellowish brown spots, coarse angular grained sand.	W	L	
	TP07_5.0-5.5m B@ 5.0m	5.50 / -5.50	SP	SAND Grey, some brown patches, coarse angular elongated grained sand.			
	TP07_5.5-5.6m B@ 5.5m	5.60 / -5.60	CI	CLAY with SAND Yellowish brown, mottled pale grey, medium to coarse grained sand.	M	F-St	
				Test Pit Terminated at 5.6m.			

GEO_TEST PIT_TESTPIT LOGS.GPJ_GHD_GEO_TEMPLATE_VICDESAL.GDT_27/4/09

See standard sheets for details of abbreviations & basis of descriptions

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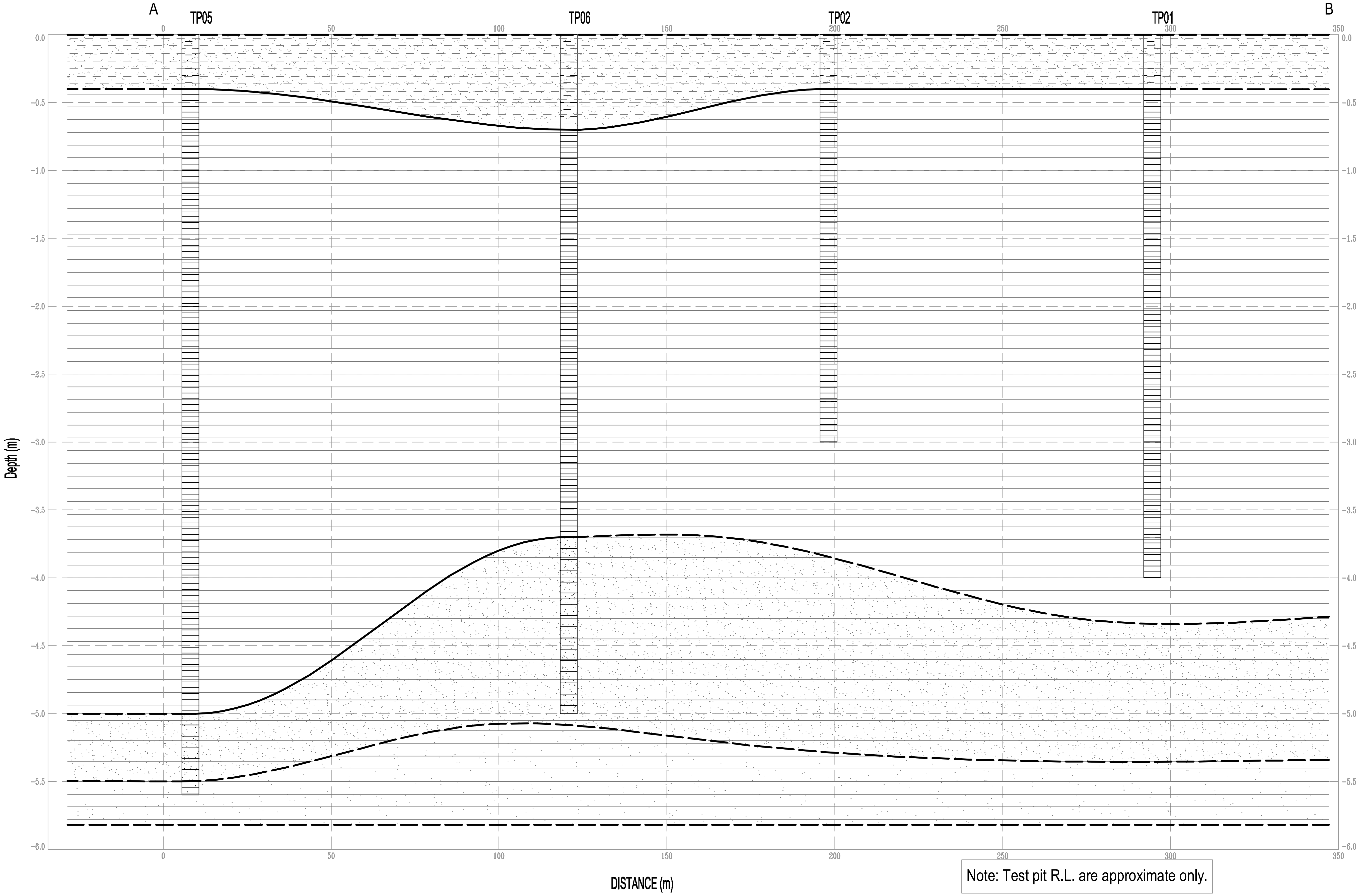
Job No. 31\22036



Note: Test pit R.L. are approximate only.

LEGEND

SILT with SAND

CLAY

CLAYEY SAND

CLAY with SAND

CLIENTS | PEOPLE | PERFORMANCE

Melbourne Water Corporation
Kellets Road Drain Wetland

Approximate Underground Profile
Section AB

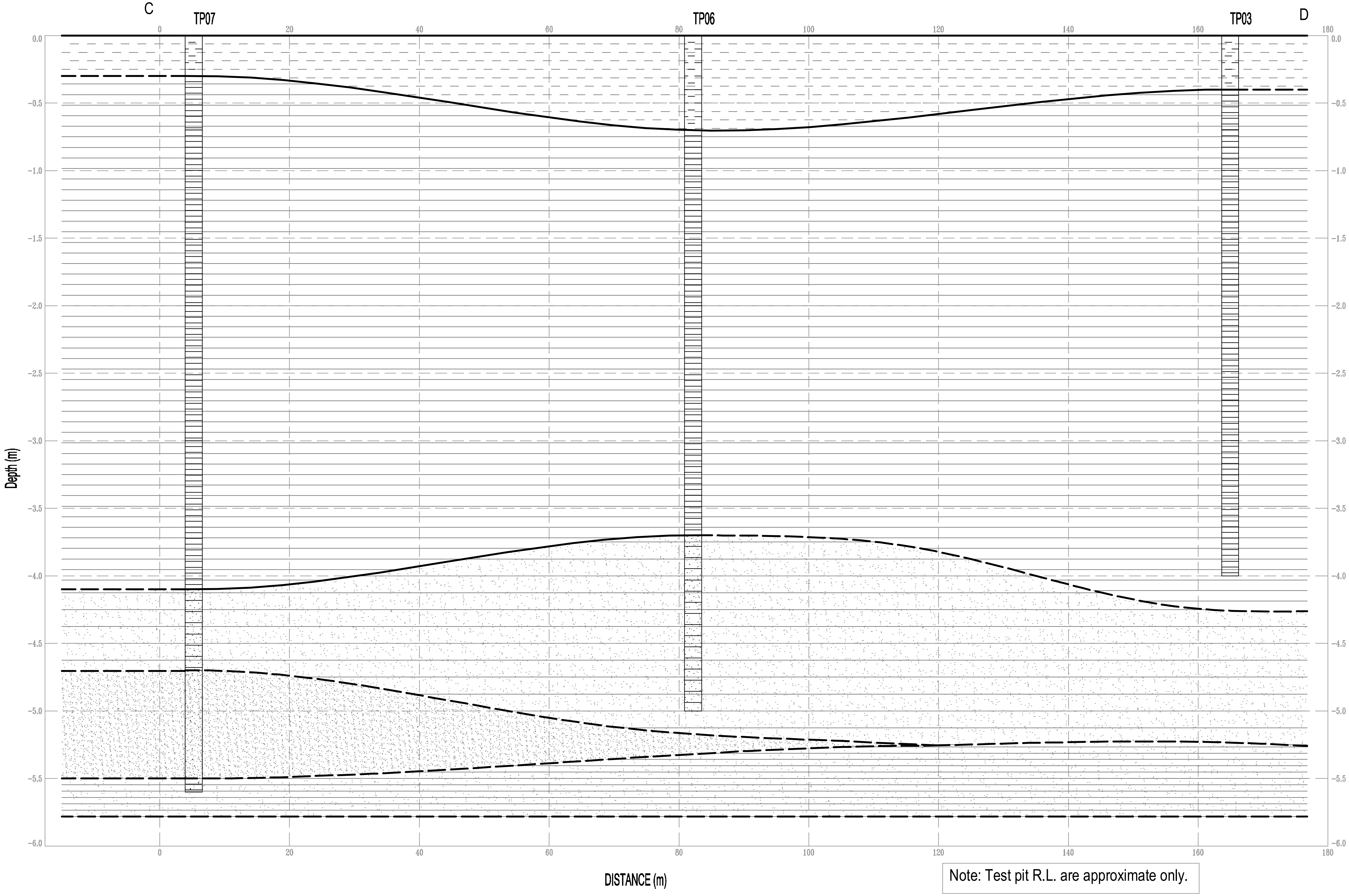
scale | for A4 date | April 2009

job no. | 31-22036
rev no. | 0

Figure 02

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com.au

Plot Date: 28 April, 2009 - 11:24 AM Cad File No: Section AB.dwg



Note: Test pit R.L. are approximate only.

LEGEND

SILT

CLAY

SAND

CLAYEY SAND

CLAY with SAND

CLIENTS | PEOPLE | PERFORMANCE

Melbourne Water Corporation
Kellets Road Drain Wetland

Approximate Underground Profile
Section CD

scale | for A4   date | April 2009

job no. | 31-23036
rev no. | 0

Figure 03

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com.au

Plot Date: 28 April, 2009 - 11:26 AM   Cad File No: Section CD.dwg

Appendix B

NATA Laboratory Results and Chain of Custody Documentation

MELBOURNE WATER WATERWAYS ALLIANCE (MWWA) **CHAIN OF CUSTODY** SPLIT BATCH OF EM0902845

C/O FULTON HOGAN
10-30 DANA COURT DANDENONG
Tel: 0418 572 137
Fax: CONTACT PHIL RILEY
E-mail: phil.riley@fultonhogan.com.au; justin.rhodes@melbournewater.com.au

Laboratory Details
Lab. Name: ALS
Lab. Address: 2-4 Westall Rd, Springvale, VIC 3171
Contact Name: Graeme Jablonskas
Lab. Ref:
Tel: 61 3 8549 9600
Fax: 61 3 8549 9601
Preliminary Report by: **8 Apr 09**
Final Report by: **15 April 09**
Lab Quote No: **ME/363/08**

Sampled By: **PHIL RILEY**
MWWA Project No: PD4008
Project Name: **PD4008 Kelletts Road Drain Wetland**

Specifications:	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 3days) **URGENT 5 DAY PRELIM BY 8APR09 PLEASE**	
2. Fast TAT Guarantee Required? **NO**	
3. Is any sediment layer present in waters to be excluded from extractions?: **N/A**	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?: **NO**	
5. Special storage requirements: **Please provide in esdat format (GHD)**	
6. Report Format: Fax: **NO** Hardcopy: **YES** .CSV Format: **YES** Email: **YES** **EMAIL TO: justin.rhodes@melbournewater.com.au; and phil.riley@fultonhogan.com.au**	X

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	stream sediment	Preservation: filt'ed	acid	ice	other	Container (No. & type)	EPA BULLETIN 448.3 SCREEN (TABLE 2)	SPOCAS	pHField and pHFox	Metals (As, Cd, Cr(VI), Cu, Pb, Hg, Mo, Ni, Se, Ag, Zn) as per EPA 448									KEEP FROZEN	STORE UNTIL FURTHER INSTRUCTIONS OR FOR 6 WEEKS PRIOR TO DISPOSAL	Other		
	TP01_0.1_0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP01_0.1_0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
1	TP01_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP01_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP01_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP01_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP01_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP01_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
2	TP01_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP01_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP01_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP01_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP02_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP02_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
3	TP02_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP02_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP02_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP02_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP02_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP02_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
4	TP02_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP02_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP03_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP03_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
	TP03_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP03_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
5	TP03_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP03_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			

Environmental Division
Melbourne
Work Order
EM0902969
Telephone : + 61-3-8549 9600

Rec'd 6/04/09 3:20pm 20 – 22° DW 6/4/09

	TP03_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR													[illegible]	X			
	TP03_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP03_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP03_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
6	TP03_4.0_4.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP03_4.0_4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP04_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP04_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
67	TP04_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP04_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP04_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP04_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP04_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP04_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP04_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP04_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
8	TP04_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP04_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
9	TP05_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP05_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
10	TP05_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP05_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP05_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP05_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP05_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP05_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP05_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
11	TP06_0.1_0.2_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP06_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
	TP06_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP06_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
12	TP06_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP06_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP06_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP06_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP06_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP06_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP06_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			

[File]

Ra(AW) 01/04/09 20 - 23°c

	TP06_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP06_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP06_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP07_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
13	TP07_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP07_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP07_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
14	TP07_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP07_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP07_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP07_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP07_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
15	DUP01_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	DUP01_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			

Lab Report No. Esky ID

Relinquished by: PHIL RILEY Signed: P. J. R. Date: 1/04/2009 Relinquished by: Signed: Date:
Received by: Signed: Date: Received by: Signed: Date:

RU(AUS)

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20-23.0°C.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EM0902969**	Page	: 1 of 16
Client	: **FULTON HOGAN**	Laboratory	: Environmental Division Melbourne
Contact	: MR PHIL RILEY	Contact	: Steven McGrath
Address	: 10-30 DANA COURT DANDENONG VIC 3175	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: phil.riley@fultonhogan.com.au	E-mail	: steven.mcgrath@alsenviro.com
Telephone	: ----	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9601
Project	: PD4008 - Kelletts Road Drain Wetland	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 01-APR-2009
Sampler	: ----	Issue Date	: 08-APR-2009
Site	: ----		
		No. of samples received	: 15
Quote number	: ME/363/08	No. of samples analysed	: 15

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Senior Inorganic Instrument Chemist	Inorganics
Herman Lin	Senior Inorganic Chemist	Inorganics
Peter Donaghy	Laboratory Supervisor	Newcastle
Xingbin Lin	Instrument Chemist	Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Fluoride conducted by ALS Newcastle, NATA accreditation no. 825, site no 1656**
- **SPLIT BATCH OF EM0902848**

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP01_0.5-0.6_PART A	TP01_3.0-3.1_PART A	TP02_0.5-0.6_PART A	TP02_3.0-3.1_PART A	TP03_1.0-1.1_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0902969-001	EM0902969-002	EM0902969-003	EM0902969-004	EM0902969-005
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**11.2**	**17.7**	**25.3**	**16.6**	**30.0**
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Copper	7440-50-8	5	mg/kg	**7**	**9**	**8**	**5**	**9**
Lead	7439-92-1	5	mg/kg	**10**	**10**	**11**	**7**	**10**
Molybdenum	7439-98-7	2	mg/kg	<2	<2	<2	<2	<2
Nickel	7440-02-0	2	mg/kg	**5**	**8**	**4**	**5**	**9**
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Silver	7440-22-4	2	mg/kg	<2	<2	<2	<2	<2
Tin	7440-31-5	5	mg/kg	----	<5	<5	----	<5
Zinc	7440-66-6	5	mg/kg	<5	**11**	**5**	**7**	**8**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EK026G: Total Cyanide By Discrete Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	<1	<1	----	<1
EK040T: Fluoride Total								
Fluoride	16984-48-8	40	mg/kg	----	**90**	**60**	----	**100**
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.10	mg/kg	----	<0.10	<0.10	----	<0.10
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Styrene	100-42-5	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
^ Sum of monocyclic aromatic hydrocarbons	----	0.2	mg/kg	----	<0.2	<0.2	----	<0.2
EP074I: Volatile Halogenated Compounds								
Vinyl chloride	75-01-4	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
1.1-Dichloroethene	75-35-4	0.01	mg/kg	----	<0.01	<0.01	----	<0.01
Methylene chloride	75-09-2	0.4	mg/kg	----	<0.4	<0.4	----	<0.4
trans-1.2-Dichloroethene	156-60-5	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
cis-1.2-Dichloroethene	156-59-2	0.01	mg/kg	----	<0.01	<0.01	----	<0.01

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP01_0.5-0.6_PART A	TP01_3.0-3.1_PART A	TP02_0.5-0.6_PART A	TP02_3.0-3.1_PART A	TP03_1.0-1.1_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0902969-001	EM0902969-002	EM0902969-003	EM0902969-004	EM0902969-005
EP074I: Volatile Halogenated Compounds - Continued								
Chloroform	67-66-3	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
1.1.1-Trichloroethane	71-55-6	0.01	mg/kg	----	<0.01	<0.01	----	<0.01
Carbon Tetrachloride	56-23-5	0.01	mg/kg	----	<0.01	<0.01	----	<0.01
1.2-Dichloroethane	107-06-2	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
Trichloroethene	79-01-6	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
1.1.2-Trichloroethane	79-00-5	0.04	mg/kg	----	<0.04	<0.04	----	<0.04
Tetrachloroethene	127-18-4	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
1.1.1.2-Tetrachloroethane	630-20-6	0.01	mg/kg	----	<0.01	<0.01	----	<0.01
1.1.2.2-Tetrachloroethane	79-34-5	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
Hexachlorobutadiene	87-68-3	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
Chlorobenzene	108-90-7	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
1.4-Dichlorobenzene	106-46-7	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
1.2-Dichlorobenzene	95-50-1	0.02	mg/kg	----	<0.02	<0.02	----	<0.02
1.2.4-Trichlorobenzene	120-82-1	0.01	mg/kg	----	<0.01	<0.01	----	<0.01
^ Sum of volatile chlorinated hydrocarbons	----	0.01	mg/kg	----	<0.01	<0.01	----	<0.01
^ Sum of other chlorinated hydrocarbons (VIC EPA 448.3)	----	0.01	mg/kg	----	<0.01	<0.01	----	<0.01
EP075A: Phenolic Compounds (Halogenated)								
2-Chlorophenol	95-57-8	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
2.4-Dichlorophenol	120-83-2	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
2.6-Dichlorophenol	87-65-0	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
4-Chloro-3-Methylphenol	59-50-7	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
2.4.5-Trichlorophenol	95-95-4	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
2.4.6-Trichlorophenol	88-06-2	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
2.3.5.6-Tetrachlorophenol	935-95-5	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
2.3.4.5 & 2.3.4.6-Tetrachlorophenol	4901-51-3/58-90-2	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Pentachlorophenol	87-86-5	0.2	mg/kg	----	<0.2	<0.2	----	<0.2
^ Sum of Phenols (halogenated)	----	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
EP075A: Phenolic Compounds (Non-halogenated)								
Phenol	108-95-2	1	mg/kg	----	<1	<1	----	<1
2-Methylphenol	95-48-7	1	mg/kg	----	<1	<1	----	<1
3- & 4-Methylphenol	1319-77-3	1	mg/kg	----	<1	<1	----	<1
2-Nitrophenol	88-75-5	1	mg/kg	----	<1	<1	----	<1
2.4-Dimethylphenol	105-67-9	1	mg/kg	----	<1	<1	----	<1
2.4-Dinitrophenol	51-28-5	5	mg/kg	----	<5	<5	----	<5
4-Nitrophenol	100-02-7	5	mg/kg	----	<5	<5	----	<5

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP01_0.5-0.6_PART A	TP01_3.0-3.1_PART A	TP02_0.5-0.6_PART A	TP02_3.0-3.1_PART A	TP03_1.0-1.1_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0902969-001	EM0902969-002	EM0902969-003	EM0902969-004	EM0902969-005
EP075A: Phenolic Compounds (Non-halogenated) - Continued								
2-Methyl-4.6-dinitrophenol	8071-51-0	5	mg/kg	----	<5	<5	----	<5
Dinoseb	88-85-7	5	mg/kg	----	<5	<5	----	<5
2-Cyclohexyl-4.6-Dinitrophenol	131-89-5	5	mg/kg	----	<5	<5	----	<5
^ Sum of Phenols (non-halogenated)	----	1	mg/kg	----	<1	<1	----	<1
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	<0.5	----	<0.5
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
Hexachlorobenzene (HCB)	118-74-1	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
beta-BHC	319-85-7	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
gamma-BHC	58-89-9	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
delta-BHC	319-86-8	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
Heptachlor	76-44-8	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
Aldrin	309-00-2	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
Heptachlor epoxide	1024-57-3	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
cis-Chlordane	5103-71-9	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
trans-Chlordane	5103-74-2	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
Endosulfan 1	959-98-8	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
4.4`-DDE	72-55-9	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Dieldrin	60-57-1	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
Endrin aldehyde	7421-93-4	0.03	mg/kg	----	<0.03	<0.03	----	<0.03

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP01_0.5-0.6_PART A	TP01_3.0-3.1_PART A	TP02_0.5-0.6_PART A	TP02_3.0-3.1_PART A	TP03_1.0-1.1_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0902969-001	EM0902969-002	EM0902969-003	EM0902969-004	EM0902969-005
EP075I: Organochlorine Pesticides - Continued								
Endrin	72-20-8	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
Endosulfan 2	33213-65-9	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
4.4`-DDD	72-54-8	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Endosulfan sulfate	1031-07-8	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
4.4`-DDT	50-29-3	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
Methoxychlor	72-43-5	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
^ Sum of organochlorine pesticides	----	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
^ Sum of DDD + DDE + DDT	----	0.05	mg/kg	----	<0.05	<0.05	----	<0.05
^ Chlordane	57-74-9	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
^ Sum of other organochlorine pesticides	----	0.03	mg/kg	----	<0.03	<0.03	----	<0.03
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg	----	<50	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg	----	<100	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg	----	<100	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	<50	----	<50
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	**78.2**	**81.2**	----	**75.9**
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	----	**91.0**	**95.6**	----	**73.2**
Toluene-D8	2037-26-5	0.1	%	----	**92.0**	**96.6**	----	**75.0**
4-Bromofluorobenzene	460-00-4	0.1	%	----	**101**	**104**	----	**87.3**
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	0.1	%	----	**94.1**	**95.2**	----	**89.8**
Phenol-d6	13127-88-3	0.1	%	----	**77.2**	**80.5**	----	**75.0**
2-Chlorophenol-D4	93951-73-6	0.1	%	----	**76.7**	**78.6**	----	**73.5**
2.4.6-Tribromophenol	118-79-6	0.1	%	----	**76.7**	**87.2**	----	**76.4**
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.1	%	----	**63.1**	**63.2**	----	**59.1**
1.2-Dichlorobenzene-D4	2199-69-1	0.1	%	----	**60.0**	**59.8**	----	**55.7**
2-Fluorobiphenyl	321-60-8	0.1	%	----	**60.6**	**64.3**	----	**57.6**
Anthracene-d10	1719-06-8	0.1	%	----	**72.2**	**72.6**	----	**69.6**
4-Terphenyl-d14	1718-51-0	0.1	%	----	**65.4**	**65.0**	----	**61.8**

Analytical Results

Sub-Matrix: SOIL

Compound	CAS Number	LOR	Unit	TP03_4.0-4.1_PART A	TP04_0.5-0.6_PART A	TP04_4.0-4.1_PART A	TP05_0.1-0.2_PART A	TP05_0.5-0.6_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
				EM0902969-006	EM0902969-007	EM0902969-008	EM0902969-009	EM0902969-010
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**19.1**	**11.9**	**17.9**	**11.3**	**12.3**
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Copper	7440-50-8	5	mg/kg	**10**	**6**	**6**	**8**	**6**
Lead	7439-92-1	5	mg/kg	**11**	**10**	**6**	**19**	**9**
Molybdenum	7439-98-7	2	mg/kg	<2	<2	<2	<2	<2
Nickel	7440-02-0	2	mg/kg	**7**	**4**	**5**	**4**	**3**
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Silver	7440-22-4	2	mg/kg	<2	<2	<2	<2	<2
Tin	7440-31-5	5	mg/kg	----	<5	----	<5	----
Zinc	7440-66-6	5	mg/kg	**12**	<5	**13**	**15**	<5
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EK026G: Total Cyanide By Discrete Analyser								
Total Cyanide	57-12-5	1	mg/kg	----	<1	----	**1**	----
EK040T: Fluoride Total								
Fluoride	16984-48-8	40	mg/kg	----	**50**	----	**90**	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.10	mg/kg	----	<0.10	----	<0.10	----
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg	----	<0.5	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	----	<0.5	----
Styrene	100-42-5	0.5	mg/kg	----	<0.5	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	----	<0.5	----
^ Sum of monocyclic aromatic hydrocarbons	----	0.2	mg/kg	----	<0.2	----	<0.2	----
EP074I: Volatile Halogenated Compounds								
Vinyl chloride	75-01-4	0.02	mg/kg	----	<0.02	----	<0.02	----
1.1-Dichloroethene	75-35-4	0.01	mg/kg	----	<0.01	----	<0.01	----
Methylene chloride	75-09-2	0.4	mg/kg	----	<0.4	----	<0.4	----
trans-1.2-Dichloroethene	156-60-5	0.02	mg/kg	----	<0.02	----	<0.02	----
cis-1.2-Dichloroethene	156-59-2	0.01	mg/kg	----	<0.01	----	<0.01	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	TP03_4.0-4.1_PART A	TP04_0.5-0.6_PART A	TP04_4.0-4.1_PART A	TP05_0.1-0.2_PART A	TP05_0.5-0.6_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
				EM0902969-006	**EM0902969-007**	**EM0902969-008**	**EM0902969-009**	**EM0902969-010**
EP074I: Volatile Halogenated Compounds - Continued								
Chloroform	67-66-3	0.02	mg/kg	----	<0.02	----	<0.02	----
1.1.1-Trichloroethane	71-55-6	0.01	mg/kg	----	<0.01	----	<0.01	----
Carbon Tetrachloride	56-23-5	0.01	mg/kg	----	<0.01	----	<0.01	----
1.2-Dichloroethane	107-06-2	0.02	mg/kg	----	<0.02	----	<0.02	----
Trichloroethene	79-01-6	0.02	mg/kg	----	<0.02	----	<0.02	----
1.1.2-Trichloroethane	79-00-5	0.04	mg/kg	----	<0.04	----	<0.04	----
Tetrachloroethene	127-18-4	0.02	mg/kg	----	<0.02	----	<0.02	----
1.1.1.2-Tetrachloroethane	630-20-6	0.01	mg/kg	----	<0.01	----	<0.01	----
1.1.2.2-Tetrachloroethane	79-34-5	0.02	mg/kg	----	<0.02	----	<0.02	----
Hexachlorobutadiene	87-68-3	0.02	mg/kg	----	<0.02	----	<0.02	----
Chlorobenzene	108-90-7	0.02	mg/kg	----	<0.02	----	<0.02	----
1.4-Dichlorobenzene	106-46-7	0.02	mg/kg	----	<0.02	----	<0.02	----
1.2-Dichlorobenzene	95-50-1	0.02	mg/kg	----	<0.02	----	<0.02	----
1.2.4-Trichlorobenzene	120-82-1	0.01	mg/kg	----	<0.01	----	<0.01	----
^ Sum of volatile chlorinated hydrocarbons	----	0.01	mg/kg	----	<0.01	----	<0.01	----
^ Sum of other chlorinated hydrocarbons (VIC EPA 448.3)	----	0.01	mg/kg	----	<0.01	----	<0.01	----
EP075A: Phenolic Compounds (Halogenated)								
2-Chlorophenol	95-57-8	0.03	mg/kg	----	<0.03	----	<0.03	----
2.4-Dichlorophenol	120-83-2	0.03	mg/kg	----	<0.03	----	<0.03	----
2.6-Dichlorophenol	87-65-0	0.03	mg/kg	----	<0.03	----	<0.03	----
4-Chloro-3-Methylphenol	59-50-7	0.03	mg/kg	----	<0.03	----	<0.03	----
2.4.5-Trichlorophenol	95-95-4	0.05	mg/kg	----	<0.05	----	<0.05	----
2.4.6-Trichlorophenol	88-06-2	0.05	mg/kg	----	<0.05	----	<0.05	----
2.3.5.6-Tetrachlorophenol	935-95-5	0.03	mg/kg	----	<0.03	----	<0.03	----
2.3.4.5 & 2.3.4.6-Tetrachlorophenol	4901-51-3/58-90-2	0.05	mg/kg	----	<0.05	----	<0.05	----
Pentachlorophenol	87-86-5	0.2	mg/kg	----	<0.2	----	<0.2	----
^ Sum of Phenols (halogenated)	----	0.03	mg/kg	----	<0.03	----	<0.03	----
EP075A: Phenolic Compounds (Non-halogenated)								
Phenol	108-95-2	1	mg/kg	----	<1	----	<1	----
2-Methylphenol	95-48-7	1	mg/kg	----	<1	----	<1	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	----	<1	----	<1	----
2-Nitrophenol	88-75-5	1	mg/kg	----	<1	----	<1	----
2.4-Dimethylphenol	105-67-9	1	mg/kg	----	<1	----	<1	----
2.4-Dinitrophenol	51-28-5	5	mg/kg	----	<5	----	<5	----
4-Nitrophenol	100-02-7	5	mg/kg	----	<5	----	<5	----

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP03_4.0-4.1_PART A	TP04_0.5-0.6_PART A	TP04_4.0-4.1_PART A	TP05_0.1-0.2_PART A	TP05_0.5-0.6_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	*CAS Number*	*LOR*	*Unit*	EM0902969-006	EM0902969-007	EM0902969-008	EM0902969-009	EM0902969-010
EP075A: Phenolic Compounds (Non-halogenated) - Continued								
2-Methyl-4.6-dinitrophenol	8071-51-0	5	mg/kg	----	<5	----	<5	----
Dinoseb	88-85-7	5	mg/kg	----	<5	----	<5	----
2-Cyclohexyl-4.6-Dinitrophenol	131-89-5	5	mg/kg	----	<5	----	<5	----
^ Sum of Phenols (non-halogenated)	----	1	mg/kg	----	<1	----	<1	----
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	----	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	----	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	----	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	----	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	----	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	----	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	----	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	----	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	----	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	----	<0.5	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	0.5	mg/kg	----	<0.5	----	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	----	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	----	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	----	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	----	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	----	<0.5	----
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.03	mg/kg	----	<0.03	----	<0.03	----
Hexachlorobenzene (HCB)	118-74-1	0.03	mg/kg	----	<0.03	----	<0.03	----
beta-BHC	319-85-7	0.03	mg/kg	----	<0.03	----	<0.03	----
gamma-BHC	58-89-9	0.03	mg/kg	----	<0.03	----	<0.03	----
delta-BHC	319-86-8	0.03	mg/kg	----	<0.03	----	<0.03	----
Heptachlor	76-44-8	0.03	mg/kg	----	<0.03	----	<0.03	----
Aldrin	309-00-2	0.03	mg/kg	----	<0.03	----	<0.03	----
Heptachlor epoxide	1024-57-3	0.03	mg/kg	----	<0.03	----	<0.03	----
cis-Chlordane	5103-71-9	0.03	mg/kg	----	<0.03	----	<0.03	----
trans-Chlordane	5103-74-2	0.03	mg/kg	----	<0.03	----	<0.03	----
Endosulfan 1	959-98-8	0.03	mg/kg	----	<0.03	----	<0.03	----
4.4`-DDE	72-55-9	0.05	mg/kg	----	<0.05	----	<0.05	----
Dieldrin	60-57-1	0.03	mg/kg	----	<0.03	----	<0.03	----
Endrin aldehyde	7421-93-4	0.03	mg/kg	----	<0.03	----	<0.03	----

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP03_4.0-4.1_PART A	TP04_0.5-0.6_PART A	TP04_4.0-4.1_PART A	TP05_0.1-0.2_PART A	TP05_0.5-0.6_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0902969-006	EM0902969-007	EM0902969-008	EM0902969-009	EM0902969-010
EP075I: Organochlorine Pesticides - Continued								
Endrin	72-20-8	0.03	mg/kg	----	<0.03	----	<0.03	----
Endosulfan 2	33213-65-9	0.03	mg/kg	----	<0.03	----	<0.03	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	<0.05	----	<0.05	----
Endosulfan sulfate	1031-07-8	0.03	mg/kg	----	<0.03	----	<0.03	----
4.4`-DDT	50-29-3	0.05	mg/kg	----	<0.05	----	<0.05	----
Methoxychlor	72-43-5	0.03	mg/kg	----	<0.03	----	<0.03	----
^ Sum of organochlorine pesticides	----	0.03	mg/kg	----	<0.03	----	<0.03	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.03	mg/kg	----	<0.03	----	<0.03	----
^ Sum of DDD + DDE + DDT	----	0.05	mg/kg	----	<0.05	----	<0.05	----
^ Chlordane	57-74-9	0.03	mg/kg	----	<0.03	----	<0.03	----
^ Sum of other organochlorine pesticides	----	0.03	mg/kg	----	<0.03	----	<0.03	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	<10	----	<10	----
C10 - C14 Fraction	----	50	mg/kg	----	<50	----	<50	----
C15 - C28 Fraction	----	100	mg/kg	----	<100	----	<100	----
C29 - C36 Fraction	----	100	mg/kg	----	<100	----	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	----	<50	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	**86.9**	----	**104**	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	----	**73.8**	----	**84.2**	----
Toluene-D8	2037-26-5	0.1	%	----	**78.1**	----	**87.4**	----
4-Bromofluorobenzene	460-00-4	0.1	%	----	**85.4**	----	**95.2**	----
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	0.1	%	----	**98.9**	----	**119**	----
Phenol-d6	13127-88-3	0.1	%	----	**82.8**	----	**108**	----
2-Chlorophenol-D4	93951-73-6	0.1	%	----	**81.0**	----	**99.0**	----
2.4.6-Tribromophenol	118-79-6	0.1	%	----	**91.0**	----	**118**	----
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.1	%	----	**65.9**	----	**80.7**	----
1.2-Dichlorobenzene-D4	2199-69-1	0.1	%	----	**63.0**	----	**75.1**	----
2-Fluorobiphenyl	321-60-8	0.1	%	----	**70.7**	----	**82.8**	----
Anthracene-d10	1719-06-8	0.1	%	----	**77.0**	----	**90.6**	----
4-Terphenyl-d14	1718-51-0	0.1	%	----	**67.8**	----	**81.0**	----

Analytical Results

Sub-Matrix: SOIL

Compound	CAS Number	LOR	Unit	TP06_0.1-0.2_PART A	TP06_1.0-1.1_PART A	TP07_0.5-0.6_PART A	TP07_2.0-2.1_PART A	DUP01_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
				EM0902969-011	EM0902969-012	EM0902969-013	EM0902969-014	EM0902969-015
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**13.7**	**16.2**	**30.2**	**18.8**	**18.5**
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Copper	7440-50-8	5	mg/kg	**10**	**5**	<5	**8**	**10**
Lead	7439-92-1	5	mg/kg	**20**	**9**	**7**	**8**	**9**
Molybdenum	7439-98-7	2	mg/kg	<2	<2	<2	<2	<2
Nickel	7440-02-0	2	mg/kg	**5**	**3**	**3**	**8**	**8**
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	<5
Silver	7440-22-4	2	mg/kg	<2	<2	<2	<2	<2
Tin	7440-31-5	5	mg/kg	<5	----	<5	----	<5
Zinc	7440-66-6	5	mg/kg	**22**	<5	<5	**16**	**10**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EG048: Hexavalent Chromium (Alkaline Digest)								
Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EK026G: Total Cyanide By Discrete Analyser								
Total Cyanide	57-12-5	1	mg/kg	**1**	----	<1	----	<1
EK040T: Fluoride Total								
Fluoride	16984-48-8	40	mg/kg	**70**	----	<40	----	**110**
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.10	mg/kg	<0.10	----	<0.10	----	<0.10
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Styrene	100-42-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
^ Sum of monocyclic aromatic hydrocarbons	----	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
EP074I: Volatile Halogenated Compounds								
Vinyl chloride	75-01-4	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
1.1-Dichloroethene	75-35-4	0.01	mg/kg	<0.01	----	<0.01	----	<0.01
Methylene chloride	75-09-2	0.4	mg/kg	<0.4	----	<0.4	----	<0.4
trans-1.2-Dichloroethene	156-60-5	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
cis-1.2-Dichloroethene	156-59-2	0.01	mg/kg	<0.01	----	<0.01	----	<0.01

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	TP06_0.1-0.2_PART A	TP06_1.0-1.1_PART A	TP07_0.5-0.6_PART A	TP07_2.0-2.1_PART A	DUP01_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
				EM0902969-011	EM0902969-012	EM0902969-013	EM0902969-014	EM0902969-015
EP074I: Volatile Halogenated Compounds - Continued								
Chloroform	67-66-3	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
1.1.1-Trichloroethane	71-55-6	0.01	mg/kg	<0.01	----	<0.01	----	<0.01
Carbon Tetrachloride	56-23-5	0.01	mg/kg	<0.01	----	<0.01	----	<0.01
1.2-Dichloroethane	107-06-2	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
Trichloroethene	79-01-6	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
1.1.2-Trichloroethane	79-00-5	0.04	mg/kg	<0.04	----	<0.04	----	<0.04
Tetrachloroethene	127-18-4	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
1.1.1.2-Tetrachloroethane	630-20-6	0.01	mg/kg	<0.01	----	<0.01	----	<0.01
1.1.2.2-Tetrachloroethane	79-34-5	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
Hexachlorobutadiene	87-68-3	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
Chlorobenzene	108-90-7	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
1.4-Dichlorobenzene	106-46-7	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
1.2-Dichlorobenzene	95-50-1	0.02	mg/kg	<0.02	----	<0.02	----	<0.02
1.2.4-Trichlorobenzene	120-82-1	0.01	mg/kg	<0.01	----	<0.01	----	<0.01
^ Sum of volatile chlorinated hydrocarbons	----	0.01	mg/kg	<0.01	----	<0.01	----	<0.01
^ Sum of other chlorinated hydrocarbons (VIC EPA 448.3)	----	0.01	mg/kg	<0.01	----	<0.01	----	<0.01
EP075A: Phenolic Compounds (Halogenated)								
2-Chlorophenol	95-57-8	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
2.4-Dichlorophenol	120-83-2	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
2.6-Dichlorophenol	87-65-0	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
4-Chloro-3-Methylphenol	59-50-7	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
2.4.5-Trichlorophenol	95-95-4	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
2.4.6-Trichlorophenol	88-06-2	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
2.3.5.6-Tetrachlorophenol	935-95-5	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
2.3.4.5 & 2.3.4.6-Tetrachlorophenol	4901-51-3/58-90-2	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Pentachlorophenol	87-86-5	0.2	mg/kg	<0.2	----	<0.2	----	<0.2
^ Sum of Phenols (halogenated)	----	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
EP075A: Phenolic Compounds (Non-halogenated)								
Phenol	108-95-2	1	mg/kg	<1	----	<1	----	<1
2-Methylphenol	95-48-7	1	mg/kg	<1	----	<1	----	<1
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	----	<1	----	<1
2-Nitrophenol	88-75-5	1	mg/kg	<1	----	<1	----	<1
2.4-Dimethylphenol	105-67-9	1	mg/kg	<1	----	<1	----	<1
2.4-Dinitrophenol	51-28-5	5	mg/kg	<5	----	<5	----	<5
4-Nitrophenol	100-02-7	5	mg/kg	<5	----	<5	----	<5

Analytical Results

Sub-Matrix: **SOIL**

			Client sample ID	TP06_0.1-0.2_PART A	TP06_1.0-1.1_PART A	TP07_0.5-0.6_PART A	TP07_2.0-2.1_PART A	DUP01_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	*CAS Number*	*LOR*	*Unit*	**EM0902969-011**	**EM0902969-012**	**EM0902969-013**	**EM0902969-014**	**EM0902969-015**
EP075A: Phenolic Compounds (Non-halogenated) - Continued								
2-Methyl-4.6-dinitrophenol	8071-51-0	5	mg/kg	<5	----	<5	----	<5
Dinoseb	88-85-7	5	mg/kg	<5	----	<5	----	<5
2-Cyclohexyl-4.6-Dinitrophenol	131-89-5	5	mg/kg	<5	----	<5	----	<5
^ Sum of Phenols (non-halogenated)	----	1	mg/kg	<1	----	<1	----	<1
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	<0.5	----	<0.5
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
Hexachlorobenzene (HCB)	118-74-1	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
beta-BHC	319-85-7	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
gamma-BHC	58-89-9	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
delta-BHC	319-86-8	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
Heptachlor	76-44-8	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
Aldrin	309-00-2	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
Heptachlor epoxide	1024-57-3	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
cis-Chlordane	5103-71-9	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
trans-Chlordane	5103-74-2	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
Endosulfan 1	959-98-8	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Dieldrin	60-57-1	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
Endrin aldehyde	7421-93-4	0.03	mg/kg	<0.03	----	<0.03	----	<0.03

Analytical Results

Sub-Matrix: **SOIL**

			Client sample ID	TP06_0.1-0.2_PART A	TP06_1.0-1.1_PART A	TP07_0.5-0.6_PART A	TP07_2.0-2.1_PART A	DUP01_PART A
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0902969-011	EM0902969-012	EM0902969-013	EM0902969-014	EM0902969-015
EP075I: Organochlorine Pesticides - Continued								
Endrin	72-20-8	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
Endosulfan 2	33213-65-9	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Endosulfan sulfate	1031-07-8	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
4.4`-DDT	50-29-3	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
Methoxychlor	72-43-5	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
^ Sum of organochlorine pesticides	----	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
^ Sum of DDD + DDE + DDT	----	0.05	mg/kg	<0.05	----	<0.05	----	<0.05
^ Chlordane	57-74-9	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
^ Sum of other organochlorine pesticides	----	0.03	mg/kg	<0.03	----	<0.03	----	<0.03
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg	<50	----	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg	<100	----	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg	<100	----	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	<50	----	<50
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	**93.2**	----	**74.0**	----	**89.2**
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**90.2**	----	**81.5**	----	**103**
Toluene-D8	2037-26-5	0.1	%	**91.9**	----	**80.7**	----	**104**
4-Bromofluorobenzene	460-00-4	0.1	%	**100**	----	**87.9**	----	**114**
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	0.1	%	**112**	----	**100**	----	**93.0**
Phenol-d6	13127-88-3	0.1	%	**99.4**	----	**79.6**	----	**87.0**
2-Chlorophenol-D4	93951-73-6	0.1	%	**90.7**	----	**77.1**	----	**85.1**
2.4.6-Tribromophenol	118-79-6	0.1	%	**109**	----	**73.5**	----	**62.2**
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.1	%	**74.8**	----	**60.2**	----	**66.4**
1.2-Dichlorobenzene-D4	2199-69-1	0.1	%	**70.2**	----	**57.7**	----	**69.0**
2-Fluorobiphenyl	321-60-8	0.1	%	**74.3**	----	**62.2**	----	**76.6**
Anthracene-d10	1719-06-8	0.1	%	**82.5**	----	**68.4**	----	**83.6**
4-Terphenyl-d14	1718-51-0	0.1	%	**74.9**	----	**60.5**	----	**70.7**

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	42.4	131
EP074S: VOC Surrogates			
1.2-Dichloroethane-D4	17060-07-0	70	130
Toluene-D8	2037-26-5	70	130
4-Bromofluorobenzene	460-00-4	70	130
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	27	130
Phenol-d6	13127-88-3	22	126
2-Chlorophenol-D4	93951-73-6	25	126
2.4.6-Tribromophenol	118-79-6	11	108
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	21	134
1.2-Dichlorobenzene-D4	2199-69-1	22	119
2-Fluorobiphenyl	321-60-8	23	133
Anthracene-d10	1719-06-8	49	133
4-Terphenyl-d14	1718-51-0	43	141

QUALITY CONTROL REPORT

Work Order	: **EM0902969**	Page	: 1 of 13
Client	: **FULTON HOGAN**	Laboratory	: Environmental Division Melbourne
Contact	: MR PHIL RILEY	Contact	: Steven McGrath
Address	: 10-30 DANA COURT DANDENONG VIC 3175	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: phil.riley@fultonhogan.com.au	E-mail	: steven.mcgrath@alsenviro.com
Telephone	: ----	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9601
Project	: PD4008 - Kelletts Road Drain Wetland	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 01-APR-2009
Sampler	: ----	Issue Date	: 08-APR-2009
Order number	: ----		
		No. of samples received	: 15
Quote number	: ME/363/08	No. of samples analysed	: 15

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA

WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Senior Inorganic Instrument Chemist	Inorganics
Herman Lin	Senior Inorganic Chemist	Inorganics
Peter Donaghy	Laboratory Supervisor	Newcastle
Xingbin Lin	Instrument Chemist	Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 941231)									
EM0902967-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	15.1	15.5	2.2	0% - 50%
EM0902969-007	TP04_0.5-0.6_PART A	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	11.9	11.9	0.0	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 941224)									
EM0902967-002	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	21	17	18.7	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	<5	42.6	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	22	14	46.7	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	32	20	48.8	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	52	35	38.2	No Limit
EM0902969-009	TP05_0.1-0.2_PART A	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	4	4	0.0	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	8	8	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	19	19	0.0	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	15	15	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 941225)									
EM0902967-002	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EM0902969-009	TP05_0.1-0.2_PART A	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG048: Hexavalent Chromium (Alkaline Digest) (QC Lot: 941229)									
EM0902969-001	TP01_0.5-0.6_PART A	EG048: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EM0902969-010	TP05_0.5-0.6_PART A	EG048: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EK026G: Total Cyanide By Discrete Analyser (QC Lot: 941228)									
EM0902967-002	Anonymous	EK026G: Total Cyanide	57-12-5	1	mg/kg	<1	<1	0.0	No Limit
EK040T: Fluoride Total (QC Lot: 942182)									
EM0902759-002	Anonymous	EK040T: Fluoride	16984-48-8	40	mg/kg	150	210	31.7	No Limit
EM0902969-005	TP03_1.0-1.1_PART A	EK040T: Fluoride	16984-48-8	40	mg/kg	100	140	30.2	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 941221)									
EM0902969-002	TP01_3.0-3.1_PART A	EP066-EM: Total Polychlorinated biphenyls	----	0.10	mg/kg	<0.10	<0.10	0.0	No Limit
EP074A: Monocyclic Aromatic Hydrocarbons (QC Lot: 941223)									
EM0902969-002	TP01_3.0-3.1_PART A	EP074-UT: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP074-UT: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074-UT: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074-UT: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074-UT: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074-UT: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP074I: Volatile Halogenated Compounds (QC Lot: 941223)									
EM0902969-002	TP01_3.0-3.1_PART A	EP074-UT: 1.1-Dichloroethene	75-35-4	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EP074-UT: cis-1.2-Dichloroethene	156-59-2	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EP074-UT: 1.1.1-Trichloroethane	71-55-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EP074-UT: Carbon Tetrachloride	56-23-5	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EP074-UT: 1.1.1.2-Tetrachloroethane	630-20-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EP074-UT: 1.2.4-Trichlorobenzene	120-82-1	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
		EP074-UT: Vinyl chloride	75-01-4	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: trans-1.2-Dichloroethene	156-60-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: Chloroform	67-66-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: 1.2-Dichloroethane	107-06-2	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: Trichloroethene	79-01-6	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: Tetrachloroethene	127-18-4	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: 1.1.2.2-Tetrachloroethane	79-34-5	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: Hexachlorobutadiene	87-68-3	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: Chlorobenzene	108-90-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: 1.4-Dichlorobenzene	106-46-7	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: 1.2-Dichlorobenzene	95-50-1	0.02	mg/kg	<0.02	<0.02	0.0	No Limit
		EP074-UT: 1.1.2-Trichloroethane	79-00-5	0.04	mg/kg	<0.04	<0.04	0.0	No Limit
		EP074-UT: Methylene chloride	75-09-2	0.4	mg/kg	<0.4	<0.4	0.0	No Limit
EP075A: Phenolic Compounds (Halogenated) (QC Lot: 941220)									
EM0902969-002	TP01_3.0-3.1_PART A	EP075-EM: 2-Chlorophenol	95-57-8	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: 2.4-Dichlorophenol	120-83-2	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: 2.6-Dichlorophenol	87-65-0	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: 4-Chloro-3-Methylphenol	59-50-7	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: 2.3.5.6-Tetrachlorophenol	935-95-5	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: 2.4.5-Trichlorophenol	95-95-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP075-EM: 2.4.6-Trichlorophenol	88-06-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP075-EM: 2.3.4.5 & 2.3.4.6-Tetrachlorophenol	4901-51-3/58-9 0-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP075A: Phenolic Compounds (Halogenated) (QC Lot: 941220) - continued									
EM0902969-002	TP01_3.0-3.1_PART A	EP075-EM: Pentachlorophenol	87-86-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP075A: Phenolic Compounds (Non-halogenated) (QC Lot: 941220)									
EM0902969-002	TP01_3.0-3.1_PART A	EP075-EM: Phenol	108-95-2	1	mg/kg	<1	<1	0.0	No Limit
		EP075-EM: 2-Methylphenol	95-48-7	1	mg/kg	<1	<1	0.0	No Limit
		EP075-EM: 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.0	No Limit
		EP075-EM: 2-Nitrophenol	88-75-5	1	mg/kg	<1	<1	0.0	No Limit
		EP075-EM: 2.4-Dimethylphenol	105-67-9	1	mg/kg	<1	<1	0.0	No Limit
		EP075-EM: 2.4-Dinitrophenol	51-28-5	5	mg/kg	<5	<5	0.0	No Limit
		EP075-EM: 4-Nitrophenol	100-02-7	5	mg/kg	<5	<5	0.0	No Limit
		EP075-EM: 2-Methyl-4.6-dinitrophenol	8071-51-0	5	mg/kg	<5	<5	0.0	No Limit
		EP075-EM: Dinoseb	88-85-7	5	mg/kg	<5	<5	0.0	No Limit
		EP075-EM: 2-Cyclohexyl-4.6-Dinitrophenol	131-89-5	5	mg/kg	<5	<5	0.0	No Limit
EP075B: Polynuclear Aromatic Hydrocarbons (QC Lot: 941220)									
EM0902969-002	TP01_3.0-3.1_PART A	EP075-EM: Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075-EM: Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075I: Organochlorine Pesticides (QC Lot: 941220)									
EM0902969-002	TP01_3.0-3.1_PART A	EP075-EM: alpha-BHC	319-84-6	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Hexachlorobenzene (HCB)	118-74-1	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: beta-BHC	319-85-7	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: gamma-BHC	58-89-9	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: delta-BHC	319-86-8	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Heptachlor	76-44-8	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Aldrin	309-00-2	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Heptachlor epoxide	1024-57-3	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: cis-Chlordane	5103-71-9	0.03	mg/kg	<0.03	<0.03	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075I: Organochlorine Pesticides (QC Lot: 941220) - continued									
EM0902969-002	TP01_3.0-3.1_PART A	EP075-EM: trans-Chlordane	5103-74-2	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Endosulfan 1	959-98-8	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Dieldrin	60-57-1	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Endrin aldehyde	7421-93-4	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Endrin	72-20-8	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Endosulfan 2	33213-65-9	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Endosulfan sulfate	1031-07-8	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: Methoxychlor	72-43-5	0.03	mg/kg	<0.03	<0.03	0.0	No Limit
		EP075-EM: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP075-EM: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP075-EM: 4.4`-DDT	50-29-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 941218)									
EM0902967-002	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EM0902969-013	TP07_0.5-0.6_PART A	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 941223)									
EM0902969-002	TP01_3.0-3.1_PART A	EP074-UT: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EG005T: Total Metals by ICP-AES (QCLot: 941224)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	13.6 mg/kg	102	82.8	119
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2.8 mg/kg	102	85.4	117
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.1 mg/kg	107	85.5	116
EG005T: Lead	7439-92-1	5	mg/kg	<5	54.9 mg/kg	102	85.4	115
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	----	----	----	----
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.1 mg/kg	99.6	86.6	113
EG005T: Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
EG005T: Silver	7440-22-4	2	mg/kg	<2	5.23 mg/kg	96.2	80.5	119
EG005T: Tin	7440-31-5	5	mg/kg	<5	----	----	----	----
EG005T: Zinc	7440-66-6	5	mg/kg	<5	105 mg/kg	91.7	81.3	111
EG035T: Total Recoverable Mercury by FIMS (QCLot: 941225)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	1.47 mg/kg	117	71.9	119
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 941229)								
EG048: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	40 mg/kg	98.3	80	120
EK026G: Total Cyanide By Discrete Analyser (QCLot: 941228)								
EK026G: Total Cyanide	57-12-5	1	mg/kg	<1	50 mg/kg	106	86.3	118
EK040T: Fluoride Total (QCLot: 942182)								
EK040T: Fluoride	16984-48-8	40	mg/kg	<40	110 mg/kg	94.5	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 941221)								
EP066-EM: Total Polychlorinated biphenyls	----	0.1	mg/kg	----	0.5 mg/kg	116	61.2	123
		0.10	mg/kg	<0.10	----	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 941223)								
EP074-UT: Benzene	71-43-2	0.2	mg/kg	<0.2	2.1 mg/kg	101	80.0	120
EP074-UT: Toluene	108-88-3	0.5	mg/kg	<0.5	2.1 mg/kg	103	80.0	120
EP074-UT: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2.1 mg/kg	104	80.0	120
EP074-UT: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4.2 mg/kg	104	80.0	120
EP074-UT: Styrene	100-42-5	0.5	mg/kg	<0.5	0.1 mg/kg	103	76.0	117
EP074-UT: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2.1 mg/kg	102	80.0	120
EP074I: Volatile Halogenated Compounds (QCLot: 941223)								
EP074-UT: Vinyl chloride	75-01-4	0.02	mg/kg	<0.02	0.1 mg/kg	111	65.6	112
EP074-UT: 1.1-Dichloroethene	75-35-4	0.01	mg/kg	<0.01	0.1 mg/kg	108	70.8	122
EP074-UT: Methylene chloride	75-09-2	0.4	mg/kg	<0.4	2.1 mg/kg	# 61.9	75.3	131
EP074-UT: trans-1.2-Dichloroethene	156-60-5	0.02	mg/kg	<0.02	0.1 mg/kg	107	79.0	121

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP074I: Volatile Halogenated Compounds (QCLot: 941223) - continued								
EP074-UT: cis-1.2-Dichloroethene	156-59-2	0.01	mg/kg	<0.01	0.1 mg/kg	104	80.0	122
EP074-UT: Chloroform	67-66-3	0.02	mg/kg	<0.02	0.1 mg/kg	99.1	70.4	115
EP074-UT: 1.1.1-Trichloroethane	71-55-6	0.01	mg/kg	<0.01	0.1 mg/kg	104	72.0	120
EP074-UT: Carbon Tetrachloride	56-23-5	0.01	mg/kg	<0.01	0.1 mg/kg	103	65.5	120
EP074-UT: 1.2-Dichloroethane	107-06-2	0.02	mg/kg	<0.02	0.1 mg/kg	101	71.6	128
EP074-UT: Trichloroethene	79-01-6	0.02	mg/kg	<0.02	0.1 mg/kg	105	75.7	124
EP074-UT: 1.1.2-Trichloroethane	79-00-5	0.04	mg/kg	<0.04	0.1 mg/kg	108	80.0	120
EP074-UT: Tetrachloroethene	127-18-4	0.02	mg/kg	<0.02	0.1 mg/kg	120	70.0	130
EP074-UT: 1.1.1.2-Tetrachloroethane	630-20-6	0.01	mg/kg	<0.01	----	----	----	----
EP074-UT: 1.1.2.2-Tetrachloroethane	79-34-5	0.02	mg/kg	<0.02	0.1 mg/kg	108	75.7	126
EP074-UT: Hexachlorobutadiene	87-68-3	0.02	mg/kg	<0.02	0.1 mg/kg	97.2	68.4	118
EP074-UT: Chlorobenzene	108-90-7	0.02	mg/kg	<0.02	0.1 mg/kg	107	79.7	124
EP074-UT: 1.4-Dichlorobenzene	106-46-7	0.02	mg/kg	<0.02	0.1 mg/kg	89.7	72.3	116
EP074-UT: 1.2-Dichlorobenzene	95-50-1	0.02	mg/kg	<0.02	0.1 mg/kg	98.6	80.0	120
EP074-UT: 1.2.4-Trichlorobenzene	120-82-1	0.01	mg/kg	<0.01	0.1 mg/kg	100	73.0	118
EP075A: Phenolic Compounds (Halogenated) (QCLot: 941220)								
EP075-EM: 2-Chlorophenol	95-57-8	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	81.4	39.8	139
EP075-EM: 2.4-Dichlorophenol	120-83-2	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	81.8	35	135
EP075-EM: 2.6-Dichlorophenol	87-65-0	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	75.5	36.7	136
EP075-EM: 4-Chloro-3-Methylphenol	59-50-7	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	82.8	45.2	141
EP075-EM: 2.4.5-Trichlorophenol	95-95-4	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	75.9	41.4	137
EP075-EM: 2.4.6-Trichlorophenol	88-06-2	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	75.0	42.2	143
EP075-EM: 2.3.5.6-Tetrachlorophenol	935-95-5	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	63.1	41	139
EP075-EM: 2.3.4.5 & 2.3.4.6-Tetrachlorophenol	4901-51-3/5 8-90-2	0.05	mg/kg	<0.05	1 mg/kg	70.3	23.6	145
EP075-EM: Pentachlorophenol	87-86-5	0.02	mg/kg	<0.1	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	60.2	25	144
EP075A: Phenolic Compounds (Non-halogenated) (QCLot: 941220)								
EP075-EM: Phenol	108-95-2	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	86.9	44	144
EP075-EM: 2-Methylphenol	95-48-7	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	81.6	39.1	135

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High
EP075A: Phenolic Compounds (Non-halogenated) (QCLot: 941220) - continued								
EP075-EM: 3- & 4-Methylphenol	1319-77-3	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	1.0 mg/kg	86.2	33.8	176
EP075-EM: 2-Nitrophenol	88-75-5	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	80.1	25.6	145
EP075-EM: 2.4-Dimethylphenol	105-67-9	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	95.9	10	138
EP075-EM: 2.4-Dinitrophenol	51-28-5	2	mg/kg	<2	3 mg/kg	45.8	15.9	136
EP075-EM: 4-Nitrophenol	100-02-7	2	mg/kg	<2	3 mg/kg	81.0	41.1	155
EP075-EM: 2-Methyl-4.6-dinitrophenol	8071-51-0	2	mg/kg	<2	3 mg/kg	54.0	15.4	133
EP075-EM: Dinoseb	88-85-7	2	mg/kg	<2	3 mg/kg	64.6	32	136
EP075-EM: 2-Cyclohexyl-4.6-Dinitrophenol	131-89-5	2	mg/kg	<2	2.5 mg/kg	46.4	10	169
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 941220)								
EP075-EM: Naphthalene	91-20-3	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	74.3	41.2	136
EP075-EM: Acenaphthene	83-32-9	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	76.0	48	133
EP075-EM: Acenaphthylene	208-96-8	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	78.4	45.2	137
EP075-EM: Fluorene	86-73-7	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	77.8	49.6	136
EP075-EM: Phenanthrene	85-01-8	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	73.5	61.8	132
EP075-EM: Anthracene	120-12-7	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	71.9	61.3	127
EP075-EM: Fluoranthene	206-44-0	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	73.6	66.2	134
EP075-EM: Pyrene	129-00-0	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	73.8	67.5	132
EP075-EM: Benz(a)anthracene	56-55-3	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	74.8	64.9	133
EP075-EM: Chrysene	218-01-9	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	75.4	66.2	136
EP075-EM: Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	0.05	mg/kg	<0.05	1.0 mg/kg	78.0	65.4	133
EP075-EM: Benzo(a)pyrene	50-32-8	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	77.4	62.4	131
EP075-EM: Indeno(1.2.3.cd)pyrene	193-39-5	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	79.2	31.5	148
EP075-EM: Dibenz(a.h)anthracene	53-70-3	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	79.7	33.3	145

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 941220) - continued								
EP075-EM: Benzo(g.h.i)perylene	191-24-2	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	78.2	28.9	153
EP075I: Organochlorine Pesticides (QCLot: 941220)								
EP075-EM: alpha-BHC	319-84-6	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	80.9	54.9	137
EP075-EM: Hexachlorobenzene (HCB)	118-74-1	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	83.2	24.4	133
EP075-EM: beta-BHC	319-85-7	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	81.5	47	138
EP075-EM: gamma-BHC	58-89-9	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	80.2	60.3	135
EP075-EM: delta-BHC	319-86-8	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	75.3	68.1	132
EP075-EM: Heptachlor	76-44-8	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	75.1	61.4	132
EP075-EM: Aldrin	309-00-2	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	71.6	63.1	131
EP075-EM: Heptachlor epoxide	1024-57-3	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	74.2	67.9	129
EP075-EM: cis-Chlordane	5103-71-9	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	74.5	38.8	137
EP075-EM: trans-Chlordane	5103-74-2	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	74.5	65	133
EP075-EM: Endosulfan 1	959-98-8	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	79.2	63.5	136
EP075-EM: 4.4`-DDE	72-55-9	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	78.6	62.3	133
EP075-EM: Dieldrin	60-57-1	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	75.2	67.6	134
EP075-EM: Endrin aldehyde	7421-93-4	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	51.0	25.1	177
EP075-EM: Endrin	72-20-8	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	76.9	60.7	137
EP075-EM: Endosulfan 2	33213-65-9	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	73.6	67.8	138
EP075-EM: 4.4`-DDD	72-54-8	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	76.3	66.5	135
EP075-EM: Endosulfan sulfate	1031-07-8	0.02	mg/kg	<0.02	----	----	----	----
EP075-EM: 4.4`-DDT	50-29-3	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	76.1	61	139

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low	High
EP075I: Organochlorine Pesticides (QCLot: 941220) - continued								
EP075-EM: Methoxychlor	72-43-5	0.02	mg/kg	<0.02	----	----	----	----
		0.025	mg/kg	----	0.5 mg/kg	76.3	64.2	138
EP080/071: Total Petroleum Hydrocarbons (QCLot: 941218)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	606 mg/kg	76.3	69	123
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	1460 mg/kg	97.7	69	127
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	342 mg/kg	93.9	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 941223)								
EP074-UT: C6 - C9 Fraction	----	10	mg/kg	<10	33.1 mg/kg	96.3	73.2	120

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 941224)							
EM0902969-001	TP01_0.5-0.6_PART A	EG005T: Arsenic	7440-38-2	50 mg/kg	82.2	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	91.7	70	130
		EG005T: Copper	7440-50-8	50 mg/kg	102	70	130
		EG005T: Lead	7439-92-1	50 mg/kg	93.3	70	130
		EG005T: Molybdenum	7439-98-7	50 mg/kg	70.7	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	90.1	70	130
		EG005T: Selenium	7782-49-2	50 mg/kg	77.9	70	130
		EG005T: Zinc	7440-66-6	50 mg/kg	84.7	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 941225)							
EM0902969-001	TP01_0.5-0.6_PART A	EG035T: Mercury	7439-97-6	5.0 mg/kg	116	70	130
EG048: Hexavalent Chromium (Alkaline Digest) (QCLot: 941229)							
EM0902969-002	TP01_3.0-3.1_PART A	EG048: Hexavalent Chromium	18540-29-9	40 mg/kg	101	70	130
EK026G: Total Cyanide By Discrete Analyser (QCLot: 941228)							
EM0902969-002	TP01_3.0-3.1_PART A	EK026G: Total Cyanide	57-12-5	50 mg/kg	97.3	70	130
EK040T: Fluoride Total (QCLot: 942182)							
EM0902759-002	Anonymous	EK040T: Fluoride	16984-48-8	500 mg/kg	79.0	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 941221)							
EM0902969-005	TP03_1.0-1.1_PART A	EP066-EM: Total Polychlorinated biphenyls	----	0.5 mg/kg	72.3	67	123
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 941223)							
EM0902969-003	TP02_0.5-0.6_PART A	EP074-UT: Benzene	71-43-2	2 mg/kg	77.0	70	130
		EP074-UT: Toluene	108-88-3	2 mg/kg	84.3	70	130
EP074I: Volatile Halogenated Compounds (QCLot: 941223)							
EM0902969-003	TP02_0.5-0.6_PART A	EP074-UT: 1.1-Dichloroethene	75-35-4	2 mg/kg	81.4	70	130
		EP074-UT: Trichloroethene	79-01-6	2 mg/kg	85.6	70	130
		EP074-UT: Chlorobenzene	108-90-7	2 mg/kg	100	70	130
EP075A: Phenolic Compounds (Halogenated) (QCLot: 941220)							
EM0902969-003	TP02_0.5-0.6_PART A	EP075-EM: 2-Chlorophenol	95-57-8	1 mg/kg	79.2	70	130
		EP075-EM: 4-Chloro-3-Methylphenol	59-50-7	1 mg/kg	79.8	70	130
		EP075-EM: Pentachlorophenol	87-86-5	1 mg/kg	123	70	130
EP075A: Phenolic Compounds (Non-halogenated) (QCLot: 941220)							
EM0902969-003	TP02_0.5-0.6_PART A	EP075-EM: Phenol	108-95-2	1 mg/kg	79.5	70	130
		EP075-EM: 2-Nitrophenol	88-75-5	1 mg/kg	# 62.1	70	130
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 941220)							

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%) Low	Recovery Limits (%) High
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 941220) - continued							
EM0902969-003	TP02_0.5-0.6_PART A	EP075-EM: Acenaphthene	83-32-9	1 mg/kg	77.5	70	130
		EP075-EM: Pyrene	129-00-0	1 mg/kg	75.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 941218)							
EM0902967-002	Anonymous	EP071: C10 - C14 Fraction	----	606 mg/kg	76.3	60	130
		EP071: C15 - C28 Fraction	----	1460 mg/kg	96.7	60	130
		EP071: C29 - C36 Fraction	----	342 mg/kg	93.9	60	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 941223)							
EM0902969-003	TP02_0.5-0.6_PART A	EP074-UT: C6 - C9 Fraction	----	28 mg/kg	71.2	70	130

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EM0902969**	Page	: 1 of 9
Client	: FULTON HOGAN	Laboratory	: Environmental Division Melbourne
Contact	: MR PHIL RILEY	Contact	: Steven McGrath
Address	: 10-30 DANA COURT DANDENONG VIC 3175	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: phil.riley@fultonhogan.com.au	E-mail	: steven.mcgrath@alsenviro.com
Telephone	: ----	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9601
Project	: PD4008 - Kelletts Road Drain Wetland	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 01-APR-2009
Sampler	: ----	Issue Date	: 08-APR-2009
Order number	: ----		
		No. of samples received	: 15
Quote number	: ME/363/08	No. of samples analysed	: 15

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non -volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Soil Glass Jar - Unpreserved								
TP01_0.5-0.6_PART A,	TP01_3.0-3.1_PART A,	**01-APR-2009**	----	----	----	**06-APR-2009**	08-APR-2009	✓
TP02_0.5-0.6_PART A,	TP02_3.0-3.1_PART A,							
TP03_1.0-1.1_PART A,	TP03_4.0-4.1_PART A,							
TP04_0.5-0.6_PART A,	TP04_4.0-4.1_PART A,							
TP05_0.1-0.2_PART A,	TP05_0.5-0.6_PART A,							
TP06_0.1-0.2_PART A,	TP06_1.0-1.1_PART A,							
TP07_0.5-0.6_PART A,	TP07_2.0-2.1_PART A,							
DUP01_PART A								
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved								
TP01_0.5-0.6_PART A,	TP01_3.0-3.1_PART A,	**01-APR-2009**	**07-APR-2009**	28-SEP-2009	✓	**07-APR-2009**	28-SEP-2009	✓
TP02_0.5-0.6_PART A,	TP02_3.0-3.1_PART A,							
TP03_1.0-1.1_PART A,	TP03_4.0-4.1_PART A,							
TP04_0.5-0.6_PART A,	TP04_4.0-4.1_PART A,							
TP05_0.1-0.2_PART A,	TP05_0.5-0.6_PART A,							
TP06_0.1-0.2_PART A,	TP06_1.0-1.1_PART A,							
TP07_0.5-0.6_PART A,	TP07_2.0-2.1_PART A,							
DUP01_PART A								
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved								
TP01_0.5-0.6_PART A,	TP01_3.0-3.1_PART A,	**01-APR-2009**	**07-APR-2009**	28-SEP-2009	✓	**08-APR-2009**	29-APR-2009	✓
TP02_0.5-0.6_PART A,	TP02_3.0-3.1_PART A,							
TP03_1.0-1.1_PART A,	TP03_4.0-4.1_PART A,							
TP04_0.5-0.6_PART A,	TP04_4.0-4.1_PART A,							
TP05_0.1-0.2_PART A,	TP05_0.5-0.6_PART A,							
TP06_0.1-0.2_PART A,	TP06_1.0-1.1_PART A,							
TP07_0.5-0.6_PART A,	TP07_2.0-2.1_PART A,							
DUP01_PART A								

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG048: Hexavalent Chromium (Alkaline Digest)								
Soil Glass Jar - Unpreserved								
TP01_0.5-0.6_PART A, TP02_0.5-0.6_PART A, TP03_1.0-1.1_PART A, TP04_0.5-0.6_PART A, TP05_0.1-0.2_PART A, TP06_0.1-0.2_PART A, TP07_0.5-0.6_PART A, DUP01_PART A	TP01_3.0-3.1_PART A, TP02_3.0-3.1_PART A, TP03_4.0-4.1_PART A, TP04_4.0-4.1_PART A, TP05_0.5-0.6_PART A, TP06_1.0-1.1_PART A, TP07_2.0-2.1_PART A,	**01-APR-2009**	**07-APR-2009**	29-APR-2009	✓	**08-APR-2009**	14-APR-2009	✓
EK026G: Total Cyanide By Discrete Analyser								
Soil Glass Jar - Unpreserved								
TP01_3.0-3.1_PART A, TP03_1.0-1.1_PART A, TP05_0.1-0.2_PART A, TP07_0.5-0.6_PART A,	TP02_0.5-0.6_PART A, TP04_0.5-0.6_PART A, TP06_0.1-0.2_PART A, DUP01_PART A	**01-APR-2009**	**07-APR-2009**	08-APR-2009	✓	**08-APR-2009**	21-APR-2009	✓
EK040T: Fluoride Total								
Pulp Bag								
TP01_3.0-3.1_PART A, TP03_1.0-1.1_PART A, TP05_0.1-0.2_PART A, TP07_0.5-0.6_PART A,	TP02_0.5-0.6_PART A, TP04_0.5-0.6_PART A, TP06_0.1-0.2_PART A, DUP01_PART A	**01-APR-2009**	**----**	----	----	**03-APR-2009**	08-APR-2009	✓
EP066: Polychlorinated Biphenyls (PCB)								
Soil Glass Jar - Unpreserved								
TP01_3.0-3.1_PART A, TP03_1.0-1.1_PART A, TP05_0.1-0.2_PART A, TP07_0.5-0.6_PART A,	TP02_0.5-0.6_PART A, TP04_0.5-0.6_PART A, TP06_0.1-0.2_PART A, DUP01_PART A	**01-APR-2009**	**07-APR-2009**	15-APR-2009	✓	**07-APR-2009**	17-MAY-2009	✓
EP074A: Monocyclic Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved								
TP01_3.0-3.1_PART A, TP03_1.0-1.1_PART A, TP05_0.1-0.2_PART A, TP07_0.5-0.6_PART A,	TP02_0.5-0.6_PART A, TP04_0.5-0.6_PART A, TP06_0.1-0.2_PART A, DUP01_PART A	**01-APR-2009**	**07-APR-2009**	15-APR-2009	✓	**07-APR-2009**	15-APR-2009	✓
EP074I: Volatile Halogenated Compounds								
Soil Glass Jar - Unpreserved								
TP01_3.0-3.1_PART A, TP03_1.0-1.1_PART A, TP05_0.1-0.2_PART A, TP07_0.5-0.6_PART A,	TP02_0.5-0.6_PART A, TP04_0.5-0.6_PART A, TP06_0.1-0.2_PART A, DUP01_PART A	**01-APR-2009**	**07-APR-2009**	15-APR-2009	✓	**07-APR-2009**	15-APR-2009	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075A: Phenolic Compounds (Halogenated)								
Soil Glass Jar - Unpreserved								
TP01_3.0-3.1_PART A,	TP02_0.5-0.6_PART A,	**01-APR-2009**	**07-APR-2009**	15-APR-2009	✓	**07-APR-2009**	17-MAY-2009	✓
TP03_1.0-1.1_PART A,	TP04_0.5-0.6_PART A,							
TP05_0.1-0.2_PART A,	TP06_0.1-0.2_PART A,							
TP07_0.5-0.6_PART A,	DUP01_PART A							
EP075A: Phenolic Compounds (Non-halogenated)								
Soil Glass Jar - Unpreserved								
TP01_3.0-3.1_PART A,	TP02_0.5-0.6_PART A,	**01-APR-2009**	**07-APR-2009**	15-APR-2009	✓	**07-APR-2009**	17-MAY-2009	✓
TP03_1.0-1.1_PART A,	TP04_0.5-0.6_PART A,							
TP05_0.1-0.2_PART A,	TP06_0.1-0.2_PART A,							
TP07_0.5-0.6_PART A,	DUP01_PART A							
EP075B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved								
TP01_3.0-3.1_PART A,	TP02_0.5-0.6_PART A,	**01-APR-2009**	**07-APR-2009**	15-APR-2009	✓	**07-APR-2009**	17-MAY-2009	✓
TP03_1.0-1.1_PART A,	TP04_0.5-0.6_PART A,							
TP05_0.1-0.2_PART A,	TP06_0.1-0.2_PART A,							
TP07_0.5-0.6_PART A,	DUP01_PART A							
EP075I: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved								
TP01_3.0-3.1_PART A,	TP02_0.5-0.6_PART A,	**01-APR-2009**	**07-APR-2009**	15-APR-2009	✓	**07-APR-2009**	17-MAY-2009	✓
TP03_1.0-1.1_PART A,	TP04_0.5-0.6_PART A,							
TP05_0.1-0.2_PART A,	TP06_0.1-0.2_PART A,							
TP07_0.5-0.6_PART A,	DUP01_PART A							
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved								
TP01_3.0-3.1_PART A,	TP02_0.5-0.6_PART A,	**01-APR-2009**	**07-APR-2009**	15-APR-2009	✓	**07-APR-2009**	15-APR-2009	✓
TP03_1.0-1.1_PART A,	TP04_0.5-0.6_PART A,							
TP05_0.1-0.2_PART A,	TP06_0.1-0.2_PART A,							
TP07_0.5-0.6_PART A,	DUP01_PART A							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type / *Analytical Methods*	*Method*	*Count* QC	Regular	*Rate (%)* **Actual**	**Expected**	*Evaluation*	*Quality Control Specification*
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	19	**10.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB - VIC EPA 448.3 Screen	EP066-EM	1	8	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Semivolatile Organic Compounds - Waste Classification	EP075-EM	1	8	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Cyanide By Discrete Analyser	EK026G	1	9	**11.1**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	2	20	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Hexavalent Chromium by Alkaline Digestion	EG048	2	15	**13.3**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	16	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	16	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	12	**16.7**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds - Ultra-trace	EP074-UT	1	8	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
PCB - VIC EPA 448.3 Screen	EP066-EM	1	8	**12.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Semivolatile Organic Compounds - Waste Classification	EP075-EM	1	8	**12.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Cyanide By Discrete Analyser	EK026G	1	9	**11.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	20	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Hexavalent Chromium by Alkaline Digestion	EG048	1	15	**6.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	12	**8.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds - Ultra-trace	EP074-UT	1	8	**12.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
PCB - VIC EPA 448.3 Screen	EP066-EM	1	8	**12.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Semivolatile Organic Compounds - Waste Classification	EP075-EM	1	8	**12.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Cyanide By Discrete Analyser	EK026G	1	9	**11.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fluoride	EK040T	1	20	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Hexavalent Chromium by Alkaline Digestion	EG048	1	15	**6.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	12	**8.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds - Ultra-trace	EP074-UT	1	8	**12.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
PCB - VIC EPA 448.3 Screen	EP066-EM	1	8	**12.5**	**5.0**	✓	ALS QCS3 requirement
Semivolatile Organic Compounds - Waste Classification	EP075-EM	1	8	**12.5**	**5.0**	✓	ALS QCS3 requirement
Total Cyanide By Discrete Analyser	EK026G	1	9	**11.1**	**5.0**	✓	ALS QCS3 requirement
Total Fluoride	EK040T	1	20	**5.0**	**5.0**	✓	ALS QCS3 requirement

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Matrix Spikes (MS) - Continued							
Total Hexavalent Chromium by Alkaline Digestion	EG048	1	15	**6.7**	**5.0**	✓	ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	16	**6.3**	**5.0**	✓	ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	16	**6.3**	**5.0**	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	12	**8.3**	**5.0**	✓	ALS QCS3 requirement
Volatile Organic Compounds - Ultra-trace	EP074-UT	1	8	**12.5**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
Total Hexavalent Chromium by Alkaline Digestion	EG048	SOIL	USEPA SW846, Method 3060A. Hexavalent chromium is extracted by alkaline digestion. The digest is determined by UV-VIS spectrophotometer following pH adjustment and colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Cyanide By Discrete Analyser	EK026G	SOIL	APHA 21st 4500 CN - C & N. Caustic leach extracts of the sample are distilled with sulphuric acid, converting all CN species to HCN. The distillates are analyzed for CN by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Method 403)
Total Fluoride	EK040T	SOIL	(In-house) Total fluoride is determined by ion specific electrode (ISE) in a solution obtained after a Sodium Carbonate / Potassium Carbonate fusion dissolution.
PCB - VIC EPA 448.3 Screen	EP066-EM	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (1999) Schedule B(3) (Method 506.1)
TPH (C10 - C36) Sum	EP071-SUM	SOIL	In-house: Summation of the results of the semivolatile TPH bands. Results less than the level of reporting contribute zero to the sum.
Volatile Organic Compounds - Ultra-trace	* EP074-UT	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS in partial SIM/Scan mode. Quantification is by comparison against an established multi-point calibration curves. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Volatile Organic Compounds - Ultra-trace - Summations	EP074-UT-SUM	SOIL	Summation of MAHs and VHCs
Semivolatile Organic Compounds - Waste Classification	* EP075-EM	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (1999) Schedule B(3) (Method 502)
SVOC - Waste Classification (Sums)	EP075-EM-SUM	SOIL	Summations for EP075 (EM variation)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Alkaline digestion for Hexavalent Chromium	EG048PR	SOIL	USEPA SW846, Method 3060A.
NaOH leach for TCN in Soils	EK026PR	SOIL	APHA 21st ed., 4500 CN- C & N. Samples are extracted by end-over-end tumbling with NaOH.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils - Ultra-trace.	ORG16-UT	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids - VIC EPA Screen	ORG17A-EM	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP074I: Volatile Halogenated Compounds	1076472-001	----	**Methylene chloride**	75-09-2	61.9 %	75.3-131%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
EP075A: Phenolic Compounds (Non-halogenated)	EM0902969-003	TP02_0.5-0.6_PART A	**2-Nitrophenol**	88-75-5	62.1 %	70-130%	**Recovery less than lower data quality objective**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075S: Acid Extractable Surrogates	EM0902969-009	TP05_0.1-0.2_PART A	**2.4.6-Tribromophenol**	118-79-6	118 %	11-108 %	**Recovery greater than upper data quality objective**
EP075S: Acid Extractable Surrogates	EM0902969-011	TP06_0.1-0.2_PART A	**2.4.6-Tribromophenol**	118-79-6	109 %	11-108 %	**Recovery greater than upper data quality objective**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

MELBOURNE WATER WATERWAYS ALLIANCE (MWWA)

CHAIN OF CUSTODY

C/O FULTON HOGAN
10-30 DANA COURT DANDENONG

Tel: 0418 572 137
Fax: CONTACT PHIL RILEY
E-mail: phil.riley@fultonhogan.com.au; justin.rhodes@melbournewater.com.au

Sampled By: **PHIL RILEY**
MWWA Project No: PD4008

Laboratory Details
Lab. Name: ALS
Lab. Address: 2-4 Westall Rd, Springvale, VIC 3171
Contact Name: Graeme Jablonskas
Lab. Ref:

Tel: 61 3 8549 9600
Fax: 61 3 8549 9601
Preliminary Report by: **8 Apr 09**
Final Report by: **15 April 09**
Lab Quote No: **ME/363/08**

Project Name: **PD4008 Kelletts Road Drain Wetland**

Specifications:

	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 3days) **URGENT 5 DAY PRELIM BY 8APR09 PLEASE**	
2. Fast TAT Guarantee Required? **NO**	
3. Is any sediment layer present in waters to be excluded from extractions?: **N/A**	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.17: **NO**	
5. Special storage requirements: **Please provide in esdat format (GHD)**	
6. Report Format: Fax: **NO** Hardcopy: **YES** .CSV Format: **YES** Email: **YES** **EMAIL TO: justin.rhodes@melbournewater.com.au; and phil.riley@fultonhogan.com.au**	X

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: stream sediment	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	EPA BULLETIN 448.3 SCREEN (TABLE 2)	SPOCAS	pHField and pHFox	Metals (As, Cd, Cr(VI), Cu, Pb, Hg, Mo, Ni, Se, Ag, Zn) as per EPA 448	KEEP FROZEN	STORE UNTIL FURTHER INSTRUCTIONS OR FOR 6 WEEKS PRIOR TO DISPOSAL	Other
1	TP01_0.1_0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
2	TP01_0.1_0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
3	TP01_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR				X		X	
4	TP01_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
5	TP01_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
6	TP01_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
7	TP01_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
8	TP01_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
9	TP01_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR	X					X	
10	TP01_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
11	TP01_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR						X	
12	TP01_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
13	TP02_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
14	TP02_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
15	TP02_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR	X					X	
16	TP02_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
17	TP02_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
18	TP02_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
19	TP02_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
20	TP02_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
21	TP02_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR				X		X	
22	TP02_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
23	TP03_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
24	TP03_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
25	TP03_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR						X	
26	TP03_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
27	TP03_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR	X					X	
28	TP03_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	

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Environmental Division
Melbourne
Work Order
EM0902848
Telephone : + 61-3-8549 9600

2/4/09

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29	TP03_2.0-2.1_PartA	1/04/2009	X					X	GLASS JAR														X			
30	TP03_2.0-2.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
31	TP03_3.0-3.1_PartA	1/04/2009	X					X	GLASS JAR														X			
32	TP03_3.0-3.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
33	TP03_4.0_4.1_PartA	1/04/2009	X					X	GLASS JAR				X										X			
34	TP03_4.0_4.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
35	TP04_0.1-0.2_PartA	1/04/2009	X					X	GLASS JAR														X			
36	TP04_0.1-0.2_PartB	1/04/2009	X					X	ZIPLOCK BAG													X	X			
37	TP04_0.5-0.6_PartA	1/04/2009	X					X	GLASS JAR	X													X			
38	TP04_0.5-0.6_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
39	TP04_1.0-1.1_PartA	1/04/2009	X					X	GLASS JAR														X			
40	TP04_1.0-1.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
41	TP04_2.0-2.1_PartA	1/04/2009	X					X	GLASS JAR														X			
42	TP04_2.0-2.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
43	TP04_3.0-3.1_PartA	1/04/2009	X					X	GLASS JAR														X			
44	TP04_3.0-3.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
45	TP04_4.0-4.1_PartA	1/04/2009	X					X	GLASS JAR				X										X			
46	TP04_4.0-4.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
47	TP05_0.1-0.2_PartA	1/04/2009	X					X	GLASS JAR	X													X			
48	TP05_0.1-0.2_PartB	1/04/2009	X					X	ZIPLOCK BAG													X	X			
49	TP05_0.5-0.6_PartA	1/04/2009	X					X	GLASS JAR				X										X			
50	TP05_0.5-0.6_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
51	TP05_1.0-1.1_PartA	1/04/2009	X					X	GLASS JAR														X			
52	TP05_1.0-1.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
53	TP05_2.0-2.1_PartA	1/04/2009	X					X	GLASS JAR														X			
54	TP05_2.0-2.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
55	TP05_3.0-3.1_PartA	1/04/2009	X					X	GLASS JAR														X			
56	TP05_3.0-3.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
57	TP05_4.0-4.1_PartA	1/04/2009	X					X	GLASS JAR														X			
58	TP05_4.0-4.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
59	TP05_5.0-5.1_PartA	1/04/2009	X					X	GLASS JAR														X			
60	TP05_5.0-5.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
61	TP06_0.1_0.2_PartA	1/04/2009	X					X	GLASS JAR	X													X			
62	TP06_0.1-0.2_PartB	1/04/2009	X					X	ZIPLOCK BAG													X	X			
63	TP06_0.5-0.6_PartA	1/04/2009	X					X	GLASS JAR														X			
64	TP06_0.5-0.6_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
65	TP06_1.0-1.1_PartA	1/04/2009	X					X	GLASS JAR				X										X			
66	TP06_1.0-1.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
67	TP06_2.0-2.1_PartA	1/04/2009	X					X	GLASS JAR														X			
68	TP06_2.0-2.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
69	TP06_3.0-3.1_PartA	1/04/2009	X					X	GLASS JAR														X			
70	TP06_3.0-3.1_PartB	1/04/2009	X					X	ZIPLOCK BAG			X										X	X			
71	TP06_4.0-4.1_PartA	1/04/2009	X					X	GLASS JAR														X			

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72	TP06_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
73	TP06_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
74	TP06_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
75	TP07_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
76	TP07_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
77	TP07_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR	X													X			
78	TP07_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
79	TP07_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
80	TP07_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
81	TP07_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
82	TP07_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
83	TP07_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
84	TP07_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
85	TP07_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			
86	TP07_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
87	TP07_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
88	TP07_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
89	DUP01_PartA	1/04/2009	X					X		GLASS JAR	X													X			
90	DUP01_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
91																											

Lab Report No. | Esky ID

Relinquished by: PHIL RILEY Signed: P. J. R Date: 1/04/2009 | Relinquished by: Signed: Date:

Received by: Signed: Date: | Received by: Signed: Date:

RU (AW)

01/04/09.
3.20pm

20 - 23.0°C.

[File]

MELBOURNE WATER WATERWAYS ALLIANCE (MWWA) **CHAIN OF CUSTODY**

C/O FULTON HOGAN 10-30 DANA COURT DANDENONG	Tel: 0418 572 137 Fax: CONTACT PHIL RILEY **E-mail: phil.riley@fultonhogan.com.au; justin.rhodes@melbournewater.com.au**	**Laboratory Details** Lab. Name: ALS Lab. Address: 2-4 Westall Rd, Springvale, VIC 3171 Contact Name: Graeme Jablonskas Lab. Ref:	Tel: 61 3 8549 9600 Fax: 61 3 8549 9601 Preliminary Report by: **8 Apr 09** Final Report by: **15 April 09** Lab Quote No: **ME/363/08**
Sampled By: **PHIL RILEY**	MWWA Project No: PD4008	Project Name: **PD4008 Kelletts Road Drain Wetland**	

Specifications:	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 3days) **URGENT 5 DAY PRELIM BY 8APR09 PLEASE**	
2. Fast TAT Guarantee Required? **NO**	
3. Is any sediment layer present in waters to be excluded from extractions?: **N/A**	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?: **NO**	
5. Special storage requirements: **Please provide in esdat format (GHD)**	
6. Report Format: Fax: **NO** Hardcopy: **YES** .CSV Format: **YES** Email: **YES** **EMAIL TO: justin.rhodes@melbournewater.com.au; and phil.riley@fultonhogan.com.au**	X

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: stream sediment	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	EPA BULLETIN 448.3 SCREEN (TABLE 2)	SPOGAS	pHField and pHFox	Metals (As, Cd, Cr(VI), Cu, Pb, Hg, Mo, Ni, Se, Ag, Zn) as per EPA 448									KEEP FROZEN	STORE UNTIL FURTHER INSTRUCTIONS OR FOR 6 WEEKS PRIOR TO DISPOSAL	Other		
	TP01_0.1_0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP01_0.1_0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP01_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP01_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP01_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP01_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP01_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP01_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP01_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP01_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP01_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP01_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP02_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP02_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
	TP02_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP02_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP02_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP02_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP02_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP02_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP02_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP02_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP03_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP03_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
	TP03_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP03_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP03_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP03_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			

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	TP03_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP03_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP03_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP03_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP03_4.0_4.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP03_4.0_4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP04_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP04_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
	TP04_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP04_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP04_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP04_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP04_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP04_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP04_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP04_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP04_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP04_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP05_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
	TP05_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP05_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP05_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP05_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP05_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP05_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP05_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP05_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP06_0.1_0.2_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP06_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
	TP06_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP06_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP06_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP06_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP06_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP06_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP06_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP06_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP06_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			

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	TP06_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP06_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP06_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP07_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
	TP07_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	TP07_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP07_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR				X										X			
	TP07_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP07_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP07_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	TP07_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
	TP07_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
	DUP01_PartA	1/04/2009	X					X		GLASS JAR	X													X			
	DUP01_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			

Lab Report No.: Esky ID:

Relinquished by: PHIL RILEY Signed: P. J. Riley Date: 1/04/2009 | Relinquished by: Signed: Date:

Received by: Signed: Date: | Received by: Signed: Date:

RU(AU)

01/04/09.
3.20pm

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MELBOURNE WATER WATERWAYS ALLIANCE (MWWA) — **CHAIN OF CUSTODY** — SPLIT BATCH OF EM0902969

C/O FULTON HOGAN
10-30 DANA COURT DANDENONG

Tel: 0418 572 137
Fax: CONTACT PHIL RILEY
E-mail: phil.riley@fultonhogan.com.au; justin.rhodes@melbournewater.com.au

Sampled By: **PHIL RILEY**
MWWA Project No: PD4008

Laboratory Details
Lab. Name: ALS
Lab. Address: 2-4 Westall Rd, Springvale, VIC 3171
Contact Name: Graeme Jablonskas
Lab. Ref:
Tel: 61 3 8549 9600
Fax: 61 3 8549 9601
Preliminary Report by: **8 Apr 09**
Final Report by: **15 April 09**
Lab Quote No: **ME/363/08**

Project Name: **PD4008 Kelletts Road Drain Wetland**

Specifications:	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 3days) **URGENT 5 DAY PRELIM BY 8APR09 PLEASE**	
2. Fast TAT Guarantee Required? **NO**	
3. Is any sediment layer present in waters to be excluded from extractions?: **N/A**	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?: **NO**	
5. Special storage requirements: **Please provide in esdat format (GHD)**	
6. Report Format: Fax: **NO** Hardcopy: **YES** .CSV Format: **YES** Email: **YES** **EMAIL TO: justin.rhodes@melbournewater.com.au; and phil.riley@fultonhogan.com.au**	X

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: stream sediment	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	EPA BULLETIN 448.3 SCREEN (TABLE 2)	SPOCAS	pHField and pHFox	Metals (As, Cd, Cr(VI), Cu, Pb, Hg, Mo, Ni, Se, Ag, Zn) as per EPA 448	KEEP FROZEN	STORE UNTIL FURTHER INSTRUCTIONS OR FOR 6 WEEKS PRIOR TO DISPOSAL	Other
1	TP01_0.1_0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
2	TP01_0.1_0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
~~3~~	~~TP01_0.5-0.6_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~				X		X	
4	TP01_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
5	TP01_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
6	TP01_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
7	TP01_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
8	TP01_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
~~9~~	~~TP01_3.0-3.1_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~	X					X	
10	TP01_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
11	TP01_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR						X	
12	TP01_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
13	TP02_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
14	TP02_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
~~15~~	~~TP02_0.5-0.6_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~	X					X	
16	TP02_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
17	TP02_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
18	TP02_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
19	TP02_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
20	TP02_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
~~21~~	~~TP02_3.0-3.1_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~				X		X	
22	TP02_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
23	TP03_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
24	TP03_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
25	TP03_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR						X	
26	TP03_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	
~~27~~	~~TP03_1.0-1.1_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~	X					X	
28	TP03_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X		X	X	

moved to EM0902969

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Environmental Division
Melbourne
Work Order **EM0902848**
Telephone : +61-3-8549 9600

RL
DW 7/4/09

SCANNED

Rec (Acc) 2/04/09 3.20pm 20 – 22° DW 6/4/09

29	TP03_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
30	TP03_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
31	TP03_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
32	TP03_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
~~33~~	~~TP03_4.0_4.1_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~				X										X			
34	TP03_4.0_4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
35	TP04_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
36	TP04_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
~~37~~	~~TP04_0.5-0.6_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~	X													X			
38	TP04_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
39	TP04_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
40	TP04_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
41	TP04_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
42	TP04_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
43	TP04_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
44	TP04_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
~~45~~	~~TP04_4.0-4.1_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~				X										X			
46	TP04_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X					Moved to EM0902969					X	X			
~~47~~	~~TP05_0.1-0.2_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~	X													X			
48	TP05_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
~~49~~	~~TP05_0.5-0.6_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~				X										X			
50	TP05_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
51	TP05_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
52	TP05_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
53	TP05_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
54	TP05_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
55	TP05_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
56	TP05_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
57	TP05_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			
58	TP05_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
59	TP05_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
60	TP05_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
~~61~~	~~TP06_0.1-0.2_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~	X													X			
62	TP06_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
63	TP06_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR														X			
64	TP06_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
~~65~~	~~TP06_1.0-1.1_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~				X										X			
66	TP06_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
67	TP06_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR														X			
68	TP06_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
69	TP06_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
70	TP06_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
71	TP06_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			

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72	TP06_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
73	TP06_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
74	TP06_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
75	TP07_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR														X			
76	TP07_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
~~77~~	~~TP07_0.5-0.6_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~	X													X			
78	TP07_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
79	TP07_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR														X			
80	TP07_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
~~81~~	~~TP07_2.0-2.1_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~				X										X			
82	TP07_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
83	TP07_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR														X			
84	TP07_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
85	TP07_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR														X			
86	TP07_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
87	TP07_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR														X			
88	TP07_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG			X										X	X			
~~89~~	~~DUP01_PartA~~	~~1/04/2009~~	~~X~~					~~X~~		~~GLASS JAR~~	X													X			
90	DUP01_PartB	1/04/2009	X					X		ZIPLOCK BAG													X	X			
91																											

moved to EM0902969

				Lab Report No.	Esky ID
Relinquished by: PHIL RILEY	Signed: P. J. R	Date: 1/04/2009	Relinquished by:	Signed:	Date:
Received by:	Signed:	Date:	Received by:	Signed:	Date:

RU (AU)

01/04/09.

3:20pm

20 - 23.0C.

[File]

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EM0902848**	Page	: 1 of 10
Client	: **FULTON HOGAN**	Laboratory	: Environmental Division Melbourne
Contact	: MR JUSTIN RHODES	Contact	: Steven McGrath
Address	: 10-30 DANA COURT DANDENONG VIC 3175	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: justin.rhodes@melbournewater.com.au	E-mail	: steven.mcgrath@alsenviro.com
Telephone	: ----	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9601
Project	: PD4008 - Kelletts Road Drain Wetland	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 01-APR-2009
Sampler	: PR	Issue Date	: 10-APR-2009
Site	: ----		
		No. of samples received	: 75
Quote number	: ME/363/08	No. of samples analysed	: 38

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **pH Field/pH Fox analysis conducted by ALS Brisbane, NATA Site No. 818.**
- **pH FOX Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Vigorous; 4 - Very Vigorous**
- **This is a split batch to EM0902969**

Analytical Results

Sub-Matrix: **SOIL**

			Client sample ID	TP01_0.1-0.2_PartB	TP01_0.5-0.6_PartB	TP01_1.0-1.1_PartB	TP01_2.0-2.1_PartB	TP01_3.0-3.1_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	*CAS Number*	*LOR*	*Unit*	**EM0902848-002**	**EM0902848-004**	**EM0902848-006**	**EM0902848-008**	**EM0902848-010**
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**5.8**	**7.1**	**7.4**	**7.6**	**7.4**
pH (Fox)	----	0.1	pH Unit	**2.4**	**4.3**	**5.3**	**7.6**	**5.8**
Reaction Rate	----	1	Reaction Uni	**3**	**3**	**2**	**1**	**2**

Analytical Results

Sub-Matrix: **SOIL**

			Client sample ID	TP01_4.0-4.1_PartB	TP02_0.5-0.6_PartB	TP02_1.0-1.1_PartB	TP02_2.0-2.1_PartB	TP02_3.0-3.1_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	*CAS Number*	*LOR*	*Unit*	EM0902848-012	EM0902848-016	EM0902848-018	EM0902848-020	EM0902848-022
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	8.2	5.7	5.6	5.5	6.6
pH (Fox)	----	0.1	pH Unit	6.0	3.2	3.0	3.7	6.5
Reaction Rate	----	1	Reaction Uni	2	2	3	1	4

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP03_0.5-0.6_PartB	TP03_1.0-1.1_PartB	TP03_2.0-2.1_PartB	TP03_3.0-3.1_PartB	TP03_4.0-4.1_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0902848-026	EM0902848-028	EM0902848-030	EM0902848-032	EM0902848-034
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**6.2**	**7.2**	**7.2**	**7.4**	**7.5**
pH (Fox)	----	0.1	pH Unit	**3.8**	**5.2**	**5.8**	**6.2**	**7.7**
Reaction Rate	----	1	Reaction Uni	**3**	**2**	**2**	**2**	**1**

Analytical Results

Sub-Matrix: **SOIL**

			Client sample ID	TP04_0.5-0.6_PartB	TP04_1.0-1.1_PartB	TP04_2.0-2.1_PartB	TP04_3.0-3.1_PartB	TP04_4.0-4.1_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	*CAS Number*	*LOR*	*Unit*	**EM0902848-038**	**EM0902848-040**	**EM0902848-042**	**EM0902848-044**	**EM0902848-046**
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**6.5**	**7.4**	**7.4**	**7.4**	**7.5**
pH (Fox)	----	0.1	pH Unit	**4.1**	**5.4**	**6.0**	**7.3**	**6.5**
Reaction Rate	----	1	Reaction Uni	**3**	**1**	**2**	**1**	**2**

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP05_0.5-0.6_PartB	TP05_1.0-1.1_PartB	TP05_2.0-2.1_PartB	TP05_3.0-3.1_PartB	TP05_4.0-4.1_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0902848-050	EM0902848-052	EM0902848-054	EM0902848-056	EM0902848-058
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**6.2**	**6.9**	**6.9**	**6.9**	**7.1**
pH (Fox)	----	0.1	pH Unit	**3.3**	**4.7**	**5.7**	**6.9**	**5.4**
Reaction Rate	----	1	Reaction Uni	**3**	**2**	**2**	**2**	**2**

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP05_5.0-5.1_PartB	TP06_0.5-0.6_PartB	TP06_1.0-1.1_PartB	TP06_2.0-2.1_PartB	TP06_3.0-3.1_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0902848-060	EM0902848-064	EM0902848-066	EM0902848-068	EM0902848-070
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**7.3**	**6.6**	**6.5**	**6.7**	**7.0**
pH (Fox)	----	0.1	pH Unit	**5.1**	**3.6**	**3.9**	**7.2**	**5.1**
Reaction Rate	----	1	Reaction Uni	**1**	**3**	**2**	**1**	**2**

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP06_4.0-4.1_PartB	TP06_5.0-5.1_PartB	TP07_0.5-0.6_PartB	TP07_1.0-1.1_PartB	TP07_2.0-2.1_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0902848-072	EM0902848-074	EM0902848-078	EM0902848-080	EM0902848-082
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**7.8**	**7.6**	**6.5**	**7.4**	**7.6**
pH (Fox)	----	0.1	pH Unit	**5.5**	**5.5**	**3.7**	**5.3**	**5.5**
Reaction Rate	----	1	Reaction Uni	**2**	**2**	**3**	**2**	**2**

Analytical Results

Sub-Matrix: **SOIL**			Client sample ID	**TP07_3.0-3.1_PartB**	**TP07_4.0-4.1_PartB**	**TP07_5.0-5.1_PartB**	----	----
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EM0902848-084**	**EM0902848-086**	**EM0902848-088**	**----**	**----**
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**7.5**	**7.5**	**7.5**	----	----
pH (Fox)	----	0.1	pH Unit	**5.8**	**5.6**	**5.8**	----	----
Reaction Rate	----	1	Reaction Uni	**2**	**1**	**1**	----	----

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EM0902848**	Page	: 1 of 5
Client	: **FULTON HOGAN**	Laboratory	: Environmental Division Melbourne
Contact	: MR JUSTIN RHODES	Contact	: Steven McGrath
Address	: 10-30 DANA COURT DANDENONG VIC 3175	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: justin.rhodes@melbournewater.com.au	E-mail	: steven.mcgrath@alsenviro.com
Telephone	: ----	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9601
Project	: PD4008 - Kelletts Road Drain Wetland	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 01-APR-2009
Sampler	: PR	Issue Date	: 10-APR-2009
Order number	: ----		
		No. of samples received	: 75
Quote number	: ME/363/08	No. of samples analysed	: 38

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA
WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA003 :pH (field/fox) (QC Lot: 943644)									
EM0902848-002	TP01_0.1-0.2_PartB	EA003: Reaction Rate	----	1	--	3	3	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	5.8	5.7	1.7	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	2.4	2.4	0.0	0% - 20%
EM0902848-022	TP02_3.0-3.1_PartB	EA003: Reaction Rate	----	1	--	4	4	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	6.6	6.6	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	6.5	6.4	1.6	0% - 20%
EA003 :pH (field/fox) (QC Lot: 943645)									
EM0902848-050	TP05_0.5-0.6_PartB	EA003: Reaction Rate	----	1	--	3	3	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	6.2	6.2	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	3.3	3.4	3.0	0% - 20%
EM0902848-070	TP06_3.0-3.1_PartB	EA003: Reaction Rate	----	1	--	2	2	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	7.0	7.0	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	5.1	5.2	1.9	0% - 20%

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EM0902848**	Page	: 1 of 5
Client	: FULTON HOGAN	Laboratory	: Environmental Division Melbourne
Contact	: MR JUSTIN RHODES	Contact	: Steven McGrath
Address	: 10-30 DANA COURT DANDENONG VIC 3175	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: justin.rhodes@melbournewater.com.au	E-mail	: steven.mcgrath@alsenviro.com
Telephone	: ----	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9601
Project	: PD4008 - Kelletts Road Drain Wetland	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 01-APR-2009
Sampler	: PR	Issue Date	: 10-APR-2009
Order number	: ----		
		No. of samples received	: 75
Quote number	: ME/363/08	No. of samples analysed	: 38

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL** Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA003 :pH (field/fox)								
Snap Lock Bag - frozen								
TP01_0.1-0.2_PartB,	TP01_0.5-0.6_PartB,	**01-APR-2009**	**----**	----	----	**09-APR-2009**	01-APR-2010	✓
TP01_1.0-1.1_PartB,	TP01_2.0-2.1_PartB,							
TP01_3.0-3.1_PartB,	TP01_4.0-4.1_PartB,							
TP02_0.5-0.6_PartB,	TP02_1.0-1.1_PartB,							
TP02_2.0-2.1_PartB,	TP02_3.0-3.1_PartB,							
TP03_0.5-0.6_PartB,	TP03_1.0-1.1_PartB,							
TP03_2.0-2.1_PartB,	TP03_3.0-3.1_PartB,							
TP03_4.0-4.1_PartB,	TP04_0.5-0.6_PartB,							
TP04_1.0-1.1_PartB,	TP04_2.0-2.1_PartB,							
TP04_3.0-3.1_PartB,	TP04_4.0-4.1_PartB,							
TP05_0.5-0.6_PartB,	TP05_1.0-1.1_PartB,							
TP05_2.0-2.1_PartB,	TP05_3.0-3.1_PartB,							
TP05_4.0-4.1_PartB,	TP05_5.0-5.1_PartB,							
TP06_0.5-0.6_PartB,	TP06_1.0-1.1_PartB,							
TP06_2.0-2.1_PartB,	TP06_3.0-3.1_PartB,							
TP06_4.0-4.1_PartB,	TP06_5.0-5.1_PartB,							
TP07_0.5-0.6_PartB,	TP07_1.0-1.1_PartB,							
TP07_2.0-2.1_PartB,	TP07_3.0-3.1_PartB,							
TP07_4.0-4.1_PartB,	TP07_5.0-5.1_PartB							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
pH field/fox	EA003	4	38	**10.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH field/fox	EA003	SOIL	Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Drying only	EN020D	SOIL	In House

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

REBATCH OF EM0902848

MELBOURNE WATER WATERWAYS ALLIANCE (MWWA)	
C/O FULTON HOGAN	Tel: 0418 572 137
10-30 DANA COURT DANE	Fax: CONTACT PHIL RILEY
	E-mail: phil.riley@fultonhogan.com.au; justin.rhodes@melbournewater.com.au
Sampled By: **PHIL RILEY**	MWWA Project No: PD4008

Environmental Division
Melbourne
Work Order
EM0903402
Telephone : + 61-3-8549 9600

CHAIN OF CUSTODY
Laboratory Details
Lab. Name:
Lab. Address:
Contact Name:
Lab. Ref:
Project Name: **PD4008 Kell**

Specifications:	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 3days) **URGENT 5 DAY PRELIM BY 25APR09**	
2. Fast TAT Guarantee Required? **NO**	
3. Is any sediment layer present in waters to be excluded from extractions?: **N/A**	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?: **NO**	
5. Special storage requirements: **Please provide in esdat format (GHD)**	
6. Report Format: Fax: **NO** Hardcopy: **YES** .CSV Format: **YES** Email: **YES**	X

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	stream sediment	Preservation: filt'ed	acid	ice	other	Container No. & type	EPA BULLETIN 448.3 SCREEN (TABLE 2)	SPOCAS
	P01_0.1_0.2_Part	1/04/2009	X					X		GLASS JAR		
	P01_0.1_0.2_Part	1/04/2009	X					X		ZIPLOCK BAG		
	TP01_0.5-	1/04/2009	X					X		GLASS JAR		
1	TP01_0.5-	1/04/2009	X					X		ZIPLOCK BAG		X
	P01_1.0-1.1_Part	1/04/2009	X					X		GLASS JAR		
	P01_1.0-1.1_Part	1/04/2009	X					X		ZIPLOCK BAG		
	P01_2.0-2.1_Part	1/04/2009	X					X		GLASS JAR		
	P01_2.0-2.1_Part	1/04/2009	X					X		ZIPLOCK BAG		

Analysis rec'd 20/4/9 3:40 Peter

	TP01_3.0-3.1_PartA	1/04/2009	X					X	GLASS JAR	
2	TP01_3.0-3.1_PartB	1/04/2009	X					X	ZIPLOCK BAG	X
	TP01_4.0-4.1_PartA	1/04/2009	X					X	GLASS JAR	
	TP01_4.0-4.1_PartB	1/04/2009	X					X	ZIPLOCK BAG	
	TP02_0.1-	1/04/2009	X					X	GLASS JAR	
	TP02_0.1-	1/04/2009	X					X	ZIPLOCK BAG	
	TP02_0.5-	1/04/2009	X					X	GLASS JAR	
3	TP02_0.5-	1/04/2009	X					X	ZIPLOCK BAG	X
	TP02_1.0-1.1_PartA	1/04/2009	X					X	GLASS JAR	
	TP02_1.0-1.1_PartB	1/04/2009	X					X	ZIPLOCK BAG	
	TP02_2.0-2.1_PartA	1/04/2009	X					X	GLASS JAR	
4	TP02_2.0-2.1_PartB	1/04/2009	X					X	ZIPLOCK BAG	X
	TP02_3.0-3.1_PartA	1/04/2009	X					X	GLASS JAR	
	TP02_3.0-3.1_PartB	1/04/2009	X					X	ZIPLOCK BAG	
	TP03_0.1-	1/04/2009	X					X	GLASS JAR	
	TP03_0.1-	1/04/2009	X					X	ZIPLOCK BAG	
	TP03_0.5-	1/04/2009	X					X	GLASS JAR	
5	TP03_0.5-	1/04/2009	X					X	ZIPLOCK BAG	X
	TP03_1.0-1.1_PartA	1/04/2009	X					X	GLASS JAR	
	TP03_1.0-1.1_PartB	1/04/2009	X					X	ZIPLOCK BAG	
	TP03_2.0-2.1_PartA	1/04/2009	X					X	GLASS JAR	
6	TP03_2.0-2.1_PartB	1/04/2009	X					X	ZIPLOCK BAG	X
	TP03_3.0-3.1_PartA	1/04/2009	X					X	GLASS JAR	
	TP03_3.0-3.1_PartB	1/04/2009	X					X	ZIPLOCK BAG	
	TP03_4.0_4.1_PartA	1/04/2009	X					X	GLASS JAR	
	TP03_4.0_4.1_PartB	1/04/2009	X					X	ZIPLOCK BAG	
	TP04_0.1-	1/04/2009	X					X	GLASS JAR	
	TP04_0.1-	1/04/2009	X					X	ZIPLOCK BAG	
	TP04_0.5-	1/04/2009	X					X	GLASS JAR	

7	TP04_0.5-	1/04/2009	X					X	ZIPLOCK BAG	X
	P04_1.0-1.1_Part	1/04/2009	X					X	GLASS JAR	
	P04_1.0-1.1_Part	1/04/2009	X					X	ZIPLOCK BAG	
	P04_2.0-2.1_Part	1/04/2009	X					X	GLASS JAR	
8	P04_2.0-2.1_Part	1/04/2009	X					X	ZIPLOCK BAG	X
	P04_3.0-3.1_Part	1/04/2009	X					X	GLASS JAR	
	P04_3.0-3.1_Part	1/04/2009	X					X	ZIPLOCK BAG	
	P04_4.0-4.1_Part	1/04/2009	X					X	GLASS JAR	
	P04_4.0-4.1_Part	1/04/2009	X					X	ZIPLOCK BAG	
	TP05_0.1-	1/04/2009	X					X	GLASS JAR	
	TP05_0.1-	1/04/2009	X					X	ZIPLOCK BAG	
	TP05_0.5-	1/04/2009	X					X	GLASS JAR	
9	TP05_0.5-	1/04/2009	X					X	ZIPLOCK BAG	X
	P05_1.0-1.1_Part	1/04/2009	X					X	GLASS JAR	
	P05_1.0-1.1_Part	1/04/2009	X					X	ZIPLOCK BAG	
	P05_2.0-2.1_Part	1/04/2009	X					X	GLASS JAR	
	P05_2.0-2.1_Part	1/04/2009	X					X	ZIPLOCK BAG	
	P05_3.0-3.1_Part	1/04/2009	X					X	GLASS JAR	
	P05_3.0-3.1_Part	1/04/2009	X					X	ZIPLOCK BAG	
	P05_4.0-4.1_Part	1/04/2009	X					X	GLASS JAR	
10	P05_4.0-4.1_Part	1/04/2009	X					X	ZIPLOCK BAG	X
	P05_5.0-5.1_Part	1/04/2009	X					X	GLASS JAR	
	P05_5.0-5.1_Part	1/04/2009	X					X	ZIPLOCK BAG	
	TP06_0.1_0.2_Pa	1/04/2009	X					X	GLASS JAR	
	TP06_0.1-	1/04/2009	X					X	ZIPLOCK BAG	
	TP06_0.5-	1/04/2009	X					X	GLASS JAR	
11	TP06_0.5-	1/04/2009	X					X	ZIPLOCK BAG	X
	P06_1.0-1.1_Part	1/04/2009	X					X	GLASS JAR	
	P06_1.0-1.1_Part	1/04/2009	X					X	ZIPLOCK BAG	

	TP06_2.0-2.1_Part/	1/04/2009	X					X	GLASS JAR	
	TP06_2.0-2.1_PartI	1/04/2009	X					X	ZIPLOCK BAG	
	TP06_3.0-3.1_Part/	1/04/2009	X					X	GLASS JAR	
12	TP06_3.0-3.1_PartI	1/04/2009	X					X	ZIPLOCK BAG	X
	TP06_4.0-4.1_Part/	1/04/2009	X					X	GLASS JAR	
13	TP06_4.0-4.1_PartI	1/04/2009	X					X	ZIPLOCK BAG	X
	TP06_5.0-5.1_Part/	1/04/2009	X					X	GLASS JAR	
	TP06_5.0-5.1_PartI	1/04/2009	X					X	ZIPLOCK BAG	
	TP07_0.1-	1/04/2009	X					X	GLASS JAR	
	TP07_0.1-	1/04/2009	X					X	ZIPLOCK BAG	
	TP07_0.5-	1/04/2009	X					X	GLASS JAR	
14	TP07_0.5-	1/04/2009	X					X	ZIPLOCK BAG	X
	TP07_1.0-1.1_Part/	1/04/2009	X					X	GLASS JAR	
	TP07_1.0-1.1_PartI	1/04/2009	X					X	ZIPLOCK BAG	
	TP07_2.0-2.1_Part/	1/04/2009	X					X	GLASS JAR	
15	TP07_2.0-2.1_PartI	1/04/2009	X					X	ZIPLOCK BAG	X
	TP07_3.0-3.1_Part/	1/04/2009	X					X	GLASS JAR	
	TP07_3.0-3.1_PartI	1/04/2009	X					X	ZIPLOCK BAG	
	TP07_4.0-4.1_Part/	1/04/2009	X					X	GLASS JAR	
	TP07_4.0-4.1_PartI	1/04/2009	X					X	ZIPLOCK BAG	
	TP07_5.0-5.1_Part/	1/04/2009	X					X	GLASS JAR	
16	TP07_5.0-5.1_PartI	1/04/2009	X					X	ZIPLOCK BAG	X
	DUP01_PartA	1/04/2009	X					X	GLASS JAR	
	DUP01_PartB	1/04/2009	X					X	ZIPLOCK BAG	

Relinquis PHIL RILEY	Signed:	Date:	20/04/2009	Relinquished by:
Received by:	Signed:	Date:		Received by:

MELBOURNE WATER WATERWAYS ALLIANCE (MWWA) — CHAIN OF CUSTODY

C/O FULTON HOGAN
16-38 DANA COURT DANDENONG
Tel: 0416 372 137
Fax: CONTACT PHIL RILEY
E-mail: phil.riley@fultonhogan.com.au; justin.rhodes@melbournewater.com.au

Sampled By: PHIL RILEY
MWWA Project No: PD4008

Laboratory Details
Lab. Name: ALS
Lab. Address: 2-4 Westall Rd, Springvale, VIC 3171
Contact Name: Graeme Jablonskas
Lab. Ref:
Tel: 61 3 8549 9600
Fax: 61 3 8549 9601
Preliminary Report by: 20 Apr 09
Final Report by: 25 April 09
Lab Quote No. ME/383/08

Project Name: PD4008 Kelletts Road Drain Wetland

Specifications: Yes (tick)

1. Urgent TAT required? (please circle: 24hr 48hr 3days) URGENT 5 DAY PRELIM BY 25APR09 PLEASE
2. Fast TAT Guarantee Required? NO
3. Is any sediment layer present in waters to be excluded from extractions?: N/A
4. % extraneous material removed from samples to be reported as per NEPM 5.1.17: NO
5. Special storage requirements: Please provide in esdat format (GHD)
6. Report Format: Fax: NO Hardcopy: YES .CSV Format: YES Email: YES — X
EMAIL TO: justin.rhodes@melbournewater.com.au and phil.riley@fultonhogan.com.au

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: stream sediment	Preservation: filtered	Preservation: acid	Preservation: ice	Preservation: other	Container No. & type	EPA BULLETIN 448.3 SCREEN (TABLE 2)	SPOCAS	pHField and pHFox	Metals (As, Cd, Cr(VI), Cu, Pb, Hg, Mo, Ni, Se, Ag, Zn) as per	KEEP FROZEN	STORE UNTIL FURTHER INSTRUCTIONS OR FOR 6 WEEKS PRIOR TO DISPOSAL	Other
	TP01_0.1_0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP01_0.1_0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP01_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP01_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP01_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP01_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP01_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP01_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP01_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP01_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP01_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP01_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP02_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP02_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP02_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP02_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP02_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP02_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP02_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP02_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP02_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP02_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP03_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP03_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP03_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP03_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP03_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP03_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP03_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP03_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP03_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP03_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP03_4.0_4.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP03_4.0_4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP04_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP04_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP04_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP04_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP04_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP04_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP04_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP04_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP04_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP04_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP04_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP04_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP05_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP05_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP05_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP05_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP05_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP05_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP05_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP05_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP05_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP05_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP05_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP05_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP05_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP05_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP06_0.1_0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP06_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP06_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP06_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP06_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP06_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP06_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP06_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP06_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP06_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP06_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP06_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP06_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP06_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP07_0.1-0.2_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP07_0.1-0.2_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP07_0.5-0.6_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP07_0.5-0.6_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP07_1.0-1.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP07_1.0-1.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP07_2.0-2.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP07_2.0-2.1_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	TP07_3.0-3.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP07_3.0-3.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP07_4.0-4.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP07_4.0-4.1_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	
	TP07_5.0-5.1_PartA	1/04/2009	X					X		GLASS JAR						X	
	TP07_5.0-5.1_PartB	1/04/2009	X					X		ZIPLOCK BAG		X			X	X	
	DUP01_PartA	1/04/2009	X					X		GLASS JAR						X	
	DUP01_PartB	1/04/2009	X					X		ZIPLOCK BAG					X	X	

Lab Report No.: Esky ID:

Relinquished by: PHIL RILEY Signed: Date: ######## Relinquished by: Signed: Date:
Received by: Signed: Date: Received by: Signed: Date:

CERTIFICATE OF ANALYSIS

Work Order	: **EM0903402**	Page	: 1 of 9
Client	: **FULTON HOGAN**	Laboratory	: Environmental Division Melbourne
Contact	: MR JUSTIN RHODES	Contact	: Steven McGrath
Address	: 10-30 DANA COURT DANDENONG VIC 3175	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: justin.rhodes@melbournewater.com.au	E-mail	: steven.mcgrath@alsenviro.com
Telephone	: ----	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9601
Project	: PD4008 - Kelletts Road Drain Wetland - Melbourne Water Waterways Alliance Project REBATCH EM0902848	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 21-APR-2009
Sampler	: PR	Issue Date	: 23-APR-2009
Site	: ----		
		No. of samples received	: 16
Quote number	: ME/363/08	No. of samples analysed	: 16

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m3'.**
- **Retained Acidity not required because pH KCl greater than or equal to 4.5**
- **SPOCAS analysis conducted by ALS Brisbane, NATA Site No. 818.**

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP01_0.5-0.6_PartB	TP01_3.0-3.1_PartB	TP02_0.5-0.6_PartB	TP02_2.0-2.1_PartB	TP03_0.5-0.6_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0903402-001	EM0903402-002	EM0903402-003	EM0903402-004	EM0903402-005
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	5.9	5.8	5.7	5.0	5.9
pH OX (23B)	----	0.1	pH Unit	5.0	6.9	4.6	5.8	4.6
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	18	11	42	24	24
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	9	<2	19	23	10
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.03	<0.02	0.07	0.04	0.04
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.03	0.04	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	14
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.05	0.06	0.07	0.07	0.05
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.07	0.07	0.10	0.10	0.07
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.03	0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	14	12	<10
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.02	<0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.08	0.12	0.07	0.11	0.08
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.10	0.14	0.10	0.14	0.10
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.03	0.03	0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	16	16	24	26	18
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	0.02	0.02	0.04	0.04	0.03
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	0.05	----	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	<10	----	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	<0.02	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP01_0.5-0.6_PartB	TP01_3.0-3.1_PartB	TP02_0.5-0.6_PartB	TP02_2.0-2.1_PartB	TP03_0.5-0.6_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0903402-001	EM0903402-002	EM0903402-003	EM0903402-004	EM0903402-005
EA029-H: Acid Base Accounting - Continued								
Net Acidity (sulfur units)	----	0.02	% S	**0.03**	<0.02	**0.07**	**0.04**	**0.06**
Net Acidity (acidity units)	----	10	mole H+ / t	**18**	**11**	**42**	**24**	**38**
Liming Rate	----	1	kg CaCO3/t	**1**	<1	**3**	**2**	**3**

Analytical Results

Sub-Matrix: **SOIL**

Client sample ID				TP03_2.0-2.1_PartB	TP04_0.5-0.6_PartB	TP04_2.0-2.1_PartB	TP05_0.5-0.6_PartB	TP05_4.0-4.1_PartB
Client sampling date / time				01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	*CAS Number*	*LOR*	*Unit*	EM0903402-006	EM0903402-007	EM0903402-008	EM0903402-009	EM0903402-010
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	5.6	6.0	5.8	5.9	5.6
pH OX (23B)	----	0.1	pH Unit	6.8	4.9	6.9	4.9	6.3
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	13	26	10	29	13
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	11	<2	11	10
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.02	0.04	<0.02	0.05	0.02
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.05	0.05	0.06	0.05	0.05
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.07	0.06	0.07	0.07	0.06
Acid Reacted Calcium (23X)	----	0.02	% Ca	0.02	<0.02	<0.02	0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	10	<10	<10	10	<10
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.11	0.07	0.14	0.05	0.09
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.14	0.08	0.16	0.08	0.10
Acid Reacted Magnesium (23U)	----	0.02	% Mg	0.03	<0.02	0.03	0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	27	10	23	18	14
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	0.04	<0.02	0.04	0.03	0.02
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	<0.02	----	0.12	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	<10	----	25	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	<0.02	----	0.04	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP03_2.0-2.1_PartB	TP04_0.5-0.6_PartB	TP04_2.0-2.1_PartB	TP05_0.5-0.6_PartB	TP05_4.0-4.1_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0903402-006	EM0903402-007	EM0903402-008	EM0903402-009	EM0903402-010
EA029-H: Acid Base Accounting - Continued								
Net Acidity (sulfur units)	----	0.02	% S	**0.02**	**0.04**	<0.02	**0.05**	**0.02**
Net Acidity (acidity units)	----	10	mole H+ / t	**13**	**26**	**10**	**29**	**13**
Liming Rate	----	1	kg CaCO3/t	<1	**2**	<1	**2**	<1

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP06_0.5-0.6_PartB	TP06_3.0-3.1_PartB	TP06_4.0-4.1_PartB	TP07_0.5-0.6_PartB	TP07_2.0-2.1_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	*CAS Number*	*LOR*	*Unit*	**EM0903402-011**	**EM0903402-012**	**EM0903402-013**	**EM0903402-014**	**EM0903402-015**
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**5.8**	**5.6**	**6.3**	**5.3**	**5.9**
pH OX (23B)	----	0.1	pH Unit	**4.8**	**6.6**	**6.4**	**4.0**	**6.7**
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**30**	**13**	**6**	**20**	**20**
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	**9**	<2	**5**	**9**	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	**0.05**	**0.02**	<0.02	**0.03**	**0.03**
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.07**	**0.05**	**0.03**	**0.06**	**0.04**
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.09**	**0.06**	**0.04**	**0.07**	**0.05**
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	<10	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.06**	**0.09**	**0.05**	**0.06**	**0.09**
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.08**	**0.11**	**0.06**	**0.07**	**0.11**
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	<0.02	<0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	**16**	**15**	<10	<10	**15**
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	**0.02**	**0.02**	<0.02	<0.02	**0.02**
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	<0.02	----	----	<0.02
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	<10	----	----	<10
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	<0.02	----	----	<0.02
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP06_0.5-0.6_PartB	TP06_3.0-3.1_PartB	TP06_4.0-4.1_PartB	TP07_0.5-0.6_PartB	TP07_2.0-2.1_PartB
			Client sampling date / time	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00	01-APR-2009 15:00
Compound	CAS Number	LOR	Unit	EM0903402-011	EM0903402-012	EM0903402-013	EM0903402-014	EM0903402-015
EA029-H: Acid Base Accounting - Continued								
Net Acidity (sulfur units)	----	0.02	% S	**0.05**	**0.02**	<0.02	**0.03**	**0.03**
Net Acidity (acidity units)	----	10	mole H+ / t	**30**	**13**	<10	**20**	**20**
Liming Rate	----	1	kg CaCO3/t	**2**	<1	<1	**2**	**2**

Analytical Results

Sub-Matrix: SOIL			Client sample ID	TP07_5.0-5.1_PartB	----	----	----	----
			Client sampling date / time	01-APR-2009 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM0903402-016	----	----	----	----
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**5.8**	----	----	----	----
pH OX (23B)	----	0.1	pH Unit	**6.5**	----	----	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	**8**	----	----	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	**4**	----	----	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	**0.03**	----	----	----	----
Peroxide Calcium (23Wh)	----	0.02	% Ca	**0.04**	----	----	----	----
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	**0.06**	----	----	----	----
Peroxide Magnesium (23Tm)	----	0.02	% Mg	**0.06**	----	----	----	----
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EM0903402**	Page	: 1 of 6
Client	: **FULTON HOGAN**	Laboratory	: Environmental Division Melbourne
Contact	: MR JUSTIN RHODES	Contact	: Steven McGrath
Address	: 10-30 DANA COURT DANDENONG VIC 3175	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: justin.rhodes@melbournewater.com.au	E-mail	: steven.mcgrath@alsenviro.com
Telephone	: ----	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9601
Project	: PD4008 - Kelletts Road Drain Wetland - Melbourne Water Waterways Alliance Project REBATCH EM0902848	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 21-APR-2009
Sampler	: PR	Issue Date	: 23-APR-2009
Order number	: ----		
		No. of samples received	: 16
Quote number	: ME/363/08	No. of samples analysed	: 16

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA
WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
- CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
- LOR = Limit of reporting
- RPD = Relative Percentage Difference
- \# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-A: pH Measurements (QC Lot: 957197)									
EM0903402-001	TP01_0.5-0.6_PartB	EA029: pH KCl (23A)	----	0.1	pH Unit	5.9	6.0	1.7	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	5.0	5.0	0.0	0% - 20%
EM0903402-011	TP06_0.5-0.6_PartB	EA029: pH KCl (23A)	----	0.1	pH Unit	5.8	5.9	1.7	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	4.8	4.9	2.1	0% - 20%
EA029-B: Acidity Trail (QC Lot: 957197)									
EM0903402-001	TP01_0.5-0.6_PartB	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.03	0.03	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	18	20	7.5	0% - 50%
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	9	10	13.3	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EM0903402-011	TP06_0.5-0.6_PartB	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.05	0.05	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	30	30	0.0	0% - 50%
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	9	8	15.4	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EA029-C: Sulfur Trail (QC Lot: 957197)									
EM0903402-001	TP01_0.5-0.6_PartB	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EM0903402-011	TP06_0.5-0.6_PartB	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-D: Calcium Values (QC Lot: 957197)									
EM0903402-001	TP01_0.5-0.6_PartB	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.05	0.04	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.07	0.06	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA029-D: Calcium Values (QC Lot: 957197) - continued									
EM0903402-001	TP01_0.5-0.6_PartB	EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EM0903402-011	TP06_0.5-0.6_PartB	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.07	0.07	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.09	0.08	0.0	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-E: Magnesium Values (QC Lot: 957197)									
EM0903402-001	TP01_0.5-0.6_PartB	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.08	0.07	17.7	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.10	0.09	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	0.02	0.03	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	16	20	22.8	No Limit
EM0903402-011	TP06_0.5-0.6_PartB	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.06	0.06	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.08	0.08	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	0.02	<0.02	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	16	10	40.8	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EA029-B: Acidity Trail (QCLot: 957197)								
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA029-C: Sulfur Trail (QCLot: 957197)								
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-D: Calcium Values (QCLot: 957197)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----
EA029-E: Magnesium Values (QCLot: 957197)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----
EA029-F: Excess Acid Neutralising Capacity (QCLot: 957197)								
EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	<0.02	----	----	----	----
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	<0.02	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EM0903402**	Page	: 1 of 7
Client	: FULTON HOGAN	Laboratory	: Environmental Division Melbourne
Contact	: MR JUSTIN RHODES	Contact	: Steven McGrath
Address	: 10-30 DANA COURT DANDENONG VIC 3175	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: justin.rhodes@melbournewater.com.au	E-mail	: steven.mcgrath@alsenviro.com
Telephone	: ----	Telephone	: +61-3-8549 9600
Facsimile	: ----	Facsimile	: +61-3-8549 9601
Project	: PD4008 - Kelletts Road Drain Wetland - Melbourne Water Waterways Alliance Project REBATCH EM0902848	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 21-APR-2009
Sampler	: PR	Issue Date	: 23-APR-2009
Order number	: ----		
		No. of samples received	: 16
Quote number	: ME/363/08	No. of samples analysed	: 16

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non -volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method		*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)			*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA029-A: pH Measurements								
Snap Lock Bag - frozen on receipt at ALS								
TP01_0.5-0.6_PartB,	TP01_3.0-3.1_PartB,	**01-APR-2009**	**21-APR-2009**	01-APR-2010	✓	**23-APR-2009**	22-JUL-2009	✓
TP02_0.5-0.6_PartB,	TP02_2.0-2.1_PartB,							
TP03_0.5-0.6_PartB,	TP03_2.0-2.1_PartB,							
TP04_0.5-0.6_PartB,	TP04_2.0-2.1_PartB,							
TP05_0.5-0.6_PartB,	TP05_4.0-4.1_PartB,							
TP06_0.5-0.6_PartB,	TP06_3.0-3.1_PartB,							
TP06_4.0-4.1_PartB,	TP07_0.5-0.6_PartB,							
TP07_2.0-2.1_PartB,	TP07_5.0-5.1_PartB							
EA029-B: Acidity Trail								
Snap Lock Bag - frozen on receipt at ALS								
TP01_0.5-0.6_PartB,	TP01_3.0-3.1_PartB,	**01-APR-2009**	**21-APR-2009**	01-APR-2010	✓	**23-APR-2009**	22-JUL-2009	✓
TP02_0.5-0.6_PartB,	TP02_2.0-2.1_PartB,							
TP03_0.5-0.6_PartB,	TP03_2.0-2.1_PartB,							
TP04_0.5-0.6_PartB,	TP04_2.0-2.1_PartB,							
TP05_0.5-0.6_PartB,	TP05_4.0-4.1_PartB,							
TP06_0.5-0.6_PartB,	TP06_3.0-3.1_PartB,							
TP06_4.0-4.1_PartB,	TP07_0.5-0.6_PartB,							
TP07_2.0-2.1_PartB,	TP07_5.0-5.1_PartB							
EA029-C: Sulfur Trail								
Snap Lock Bag - frozen on receipt at ALS								
TP01_0.5-0.6_PartB,	TP01_3.0-3.1_PartB,	**01-APR-2009**	**21-APR-2009**	01-APR-2010	✓	**23-APR-2009**	22-JUL-2009	✓
TP02_0.5-0.6_PartB,	TP02_2.0-2.1_PartB,							
TP03_0.5-0.6_PartB,	TP03_2.0-2.1_PartB,							
TP04_0.5-0.6_PartB,	TP04_2.0-2.1_PartB,							
TP05_0.5-0.6_PartB,	TP05_4.0-4.1_PartB,							
TP06_0.5-0.6_PartB,	TP06_3.0-3.1_PartB,							
TP06_4.0-4.1_PartB,	TP07_0.5-0.6_PartB,							
TP07_2.0-2.1_PartB,	TP07_5.0-5.1_PartB							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA029-D: Calcium Values								
Snap Lock Bag - frozen on receipt at ALS								
TP01_0.5-0.6_PartB,	TP01_3.0-3.1_PartB,	**01-APR-2009**	**21-APR-2009**	01-APR-2010	✓	**23-APR-2009**	22-JUL-2009	✓
TP02_0.5-0.6_PartB,	TP02_2.0-2.1_PartB,							
TP03_0.5-0.6_PartB,	TP03_2.0-2.1_PartB,							
TP04_0.5-0.6_PartB,	TP04_2.0-2.1_PartB,							
TP05_0.5-0.6_PartB,	TP05_4.0-4.1_PartB,							
TP06_0.5-0.6_PartB,	TP06_3.0-3.1_PartB,							
TP06_4.0-4.1_PartB,	TP07_0.5-0.6_PartB,							
TP07_2.0-2.1_PartB,	TP07_5.0-5.1_PartB							
EA029-E: Magnesium Values								
Snap Lock Bag - frozen on receipt at ALS								
TP01_0.5-0.6_PartB,	TP01_3.0-3.1_PartB,	**01-APR-2009**	**21-APR-2009**	01-APR-2010	✓	**23-APR-2009**	22-JUL-2009	✓
TP02_0.5-0.6_PartB,	TP02_2.0-2.1_PartB,							
TP03_0.5-0.6_PartB,	TP03_2.0-2.1_PartB,							
TP04_0.5-0.6_PartB,	TP04_2.0-2.1_PartB,							
TP05_0.5-0.6_PartB,	TP05_4.0-4.1_PartB,							
TP06_0.5-0.6_PartB,	TP06_3.0-3.1_PartB,							
TP06_4.0-4.1_PartB,	TP07_0.5-0.6_PartB,							
TP07_2.0-2.1_PartB,	TP07_5.0-5.1_PartB							
EA029-F: Excess Acid Neutralising Capacity								
Snap Lock Bag - frozen on receipt at ALS								
TP01_0.5-0.6_PartB,	TP01_3.0-3.1_PartB,	**01-APR-2009**	**21-APR-2009**	01-APR-2010	✓	**23-APR-2009**	22-JUL-2009	✓
TP02_0.5-0.6_PartB,	TP02_2.0-2.1_PartB,							
TP03_0.5-0.6_PartB,	TP03_2.0-2.1_PartB,							
TP04_0.5-0.6_PartB,	TP04_2.0-2.1_PartB,							
TP05_0.5-0.6_PartB,	TP05_4.0-4.1_PartB,							
TP06_0.5-0.6_PartB,	TP06_3.0-3.1_PartB,							
TP06_4.0-4.1_PartB,	TP07_0.5-0.6_PartB,							
TP07_2.0-2.1_PartB,	TP07_5.0-5.1_PartB							
EA029-G: Retained Acidity								
Snap Lock Bag - frozen on receipt at ALS								
TP01_0.5-0.6_PartB,	TP01_3.0-3.1_PartB,	**01-APR-2009**	**21-APR-2009**	01-APR-2010	✓	**23-APR-2009**	22-JUL-2009	✓
TP02_0.5-0.6_PartB,	TP02_2.0-2.1_PartB,							
TP03_0.5-0.6_PartB,	TP03_2.0-2.1_PartB,							
TP04_0.5-0.6_PartB,	TP04_2.0-2.1_PartB,							
TP05_0.5-0.6_PartB,	TP05_4.0-4.1_PartB,							
TP06_0.5-0.6_PartB,	TP06_3.0-3.1_PartB,							
TP06_4.0-4.1_PartB,	TP07_0.5-0.6_PartB,							
TP07_2.0-2.1_PartB,	TP07_5.0-5.1_PartB							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA029-H: Acid Base Accounting								
Snap Lock Bag - frozen on receipt at ALS								
TP01_0.5-0.6_PartB,	TP01_3.0-3.1_PartB,	**01-APR-2009**	**21-APR-2009**	01-APR-2010	✓	**23-APR-2009**	22-JUL-2009	✓
TP02_0.5-0.6_PartB,	TP02_2.0-2.1_PartB,							
TP03_0.5-0.6_PartB,	TP03_2.0-2.1_PartB,							
TP04_0.5-0.6_PartB,	TP04_2.0-2.1_PartB,							
TP05_0.5-0.6_PartB,	TP05_4.0-4.1_PartB,							
TP06_0.5-0.6_PartB,	TP06_3.0-3.1_PartB,							
TP06_4.0-4.1_PartB,	TP07_0.5-0.6_PartB,							
TP07_2.0-2.1_PartB,	TP07_5.0-5.1_PartB							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	2	16	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	16	**6.3**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Appendix C

Tabulated Analytical Results

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180 Lonsdale Street Melbourne Vic 3000

Table D1 Kelletts Road Drain Wetland
Melbourne Water

						SampleCode	EM0902848002	EM0902848004	EM0902848006	EM0902848008	EM0902848010	EM0902848012	EM0902848016	EM0902848018	EM0902848020	EM0902848022	EM0902848026	EM0902848028
						Field_ID	TP01_0.1-0.2_PartB	TP01_0.5-0.6_PartB	TP01_1.0-1.1_PartB	TP01_2.0-2.1_PartB	TP01_3.0-3.1_PartB	TP01_4.0-4.1_PartB	TP02_0.5-0.6_PartB	TP02_1.0-1.1_PartB	TP02_2.0-2.1_PartB	TP02_3.0-3.1_PartB	TP03_0.5-0.6_PartB	TP03_1.0-1.1_PartB
						LocCode	TP01	TP01	TP01	TP01	TP01	TP01	TP02	TP02	TP02	TP02	TP03	TP03
Chem_Group	**ChemName**	**Units**	**EQL**	**EPA448 Fill**	***NEPM 1999 EIL***	**NEPM 1999 HIL E**												
	2,3,5,6-Tetrachlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2.3.4.5 & 2.3.4.6-Tetrachlorophenol	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	4,6-Dinitro-o-cyclohexyl phenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	Chlorinated hydrocarbons	mg/kg	0.01	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Dinoseb	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor (including its epoxide)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
	Monocylic aromatic hydrocarbons	mg/kg	0.2	**7**			-	-	-	-	-	-	-	-	-	-	-	-
	Organochlorine pesticides	mg/kg	0.03	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Other chlorinated hydrocarbons	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	Other organochlorine pesticides	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	PAH Total (NSW, 1999)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
	pH (F)	mg/kg	0.1				5.8	7.1	7.4	7.6	7.4	8.2	5.7	5.6	5.5	6.6	6.2	7.2
	pH (Fox)	mg/kg	0.1				2.4	4.3	5.3	7.6	5.8	6	3.2	3	3.7	6.5	3.8	5.2
	Phenols (non-halogenated)	mg/kg	1	**60**			-	-	-	-	-	-	-	-	-	-	-	-
	Phenols(halogenated)	mg/kg	0.03	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Polycylic aromatic hydrocarbons	mg/kg	0.5	**20**			-	-	-	-	-	-	-	-	-	-	-	-
	Reaction Rate	mg/kg	1				3	3	2	1	2	2	2	3	1	4	3	2
	Scheduled Chemicals (NSW, 1999)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
	Trihalomethanes (ADW 2004)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
BTEX	Benzene	mg/kg	0.2	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Ethylbenzene	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
Inorganics	Cyanide Total	mg/kg	1	**50**		1000	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoride	mg/kg	40	**450**			-	-	-	-	-	-	-	-	-	-	-	-
	Moisture	%	1				-	-	-	-	-	-	-	-	-	-	-	-
Lead	Lead	mg/kg	5	**300**	*600*	600	-	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	5	**20**	*20*	200	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	mg/kg	1	**3**	*3*	40	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium (hexavalent)	mg/kg	0.5	**1**	*1*	200	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	5	**100**	*100*	2000	-	-	-	-	-	-	-	-	-	-	-	-
	Mercury	mg/kg	0.1	**1**	*1*	30	-	-	-	-	-	-	-	-	-	-	-	-
	Molybdenum	mg/kg	2	**40**			-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	mg/kg	2	**60**	*60*	600	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	5	**10**			-	-	-	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	2	**10**			-	-	-	-	-	-	-	-	-	-	-	-
	Tin	mg/kg	5	**50**			-	-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	5	**200**	*200*	14000	-	-	-	-	-	-	-	-	-	-	-	-
OCP	4,4-DDE	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	a-BHC	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Aldrin	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Aldrin + Dieldrin	mg/kg	0.03			20	-	-	-	-	-	-	-	-	-	-	-	-
	b-BHC	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	chlordane	mg/kg	0.03			100	-	-	-	-	-	-	-	-	-	-	-	-
	Chlordane (cis)	mg/kg	0.03			100	-	-	-	-	-	-	-	-	-	-	-	-
	Chlordane (trans)	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	d-BHC	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	DDD	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	DDT	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg	0.05			400	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan I	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan II	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan sulphate	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endrin aldehyde	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor	mg/kg	0.03			20	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobenzene	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-

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Table D1 Kelletts Road Drain Wetland
Melbourne Water

						SampleCode	EM0902848002	EM0902848004	EM0902848006	EM0902848008	EM0902848010	EM0902848012	EM0902848016	EM0902848018	EM0902848020	EM0902848022	EM0902848026	EM0902848028
						Field_ID	TP01_0.1-0.2_PartB	TP01_0.5-0.6_PartB	TP01_1.0-1.1_PartB	TP01_2.0-2.1_PartB	TP01_3.0-3.1_PartB	TP01_4.0-4.1_PartB	TP02_0.5-0.6_PartB	TP02_1.0-1.1_PartB	TP02_2.0-2.1_PartB	TP02_3.0-3.1_PartB	TP03_0.5-0.6_PartB	TP03_1.0-1.1_PartB
						LocCode	TP01	TP01	TP01	TP01	TP01	TP01	TP02	TP02	TP02	TP02	TP03	TP03
Chem_Group	**ChemName**	**Units**	**EQL**	**EPA448 Fill**	***NEPM 1999 EIL***	**NEPM 1999 HIL E**												
	Methoxychlor	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
PAH/Phenols	2,4,5-trichlorophenol	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	2,4-dichlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2,4-dimethylphenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	2-chlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2-methylphenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	3-&4-methylphenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	0.5	1		2	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)&(k)fluoranthene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Phenol	mg/kg	1			17000	-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
PCB	PCBs (Sum of total)	mg/kg	0.1	2		20	-	-	-	-	-	-	-	-	-	-	-	-
SVOC	2,4,6-trichlorophenol	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	2,4-dinitrophenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	2,6-dichlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2-nitrophenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	4,6-Dinitro-2-methylphenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	4-chloro-3-methylphenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	4-nitrophenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorophenol	mg/kg	0.2				-	-	-	-	-	-	-	-	-	-	-	-
TPH	TPH C 6 - C 9 Fraction	mg/kg	10	100			-	-	-	-	-	-	-	-	-	-	-	-
	TPH C10 - C14 Fraction	mg/kg	50				-	-	-	-	-	-	-	-	-	-	-	-
	TPH C15 - C28 Fraction	mg/kg	100				-	-	-	-	-	-	-	-	-	-	-	-
	TPH C29-C36 Fraction	mg/kg	100				-	-	-	-	-	-	-	-	-	-	-	-
	TPH+C10 - C36 (Sum of total)	mg/kg	50	1000			-	-	-	-	-	-	-	-	-	-	-	-
VOC	1,1,1,2-tetrachloroethane	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.04				-	-	-	-	-	-	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,2,4-trichlorobenzene	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichloroethane	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Carbon tetrachloride	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	Chlorobenzene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	cis-1,2-dichloroethene	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	Dichloromethane	mg/kg	0.4				-	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobutadiene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Styrene	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	TCE	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachloroethene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	trans-1,2-dichloroethene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Vinyl chloride	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-

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Table D1 Kelletts Road Drain Wetland
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						SampleCode	EM0902848030	EM0902848032	EM0902848034	EM0902848038	EM0902848040	EM0902848042	EM0902848044	EM0902848046	EM0902848050	EM0902848052	EM0902848054	EM0902848056
						Field_ID	TP03_2.0-2.1_PartB	TP03_3.0-3.1_PartB	TP03_4.0-4.1_PartB	TP04_0.5-0.6_PartB	TP04_1.0-1.1_PartB	TP04_2.0-2.1_PartB	TP04_3.0-3.1_PartB	TP04_4.0-4.1_PartB	TP05_0.5-0.6_PartB	TP05_1.0-1.1_PartB	TP05_2.0-2.1_PartB	TP05_3.0-3.1_PartB
						LocCode	TP03	TP03	TP03	TP04	TP04	TP04	TP04	TP04	TP05	TP05	TP05	TP05
Chem_Group	**ChemName**	**Units**	**EQL**	**EPA448 Fill**	***NEPM 1999 EIL***	**NEPM 1999 HIL E**												
	2,3,5,6-Tetrachlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2.3.4.5 & 2.3.4.6-Tetrachlorophenol	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	4,6-Dinitro-o-cyclohexyl phenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	Chlorinated hydrocarbons	mg/kg	0.01	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Dinoseb	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor (including its epoxide)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
	Monocylic aromatic hydrocarbons	mg/kg	0.2	**7**			-	-	-	-	-	-	-	-	-	-	-	-
	Organochlorine pesticides	mg/kg	0.03	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Other chlorinated hydrocarbons	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	Other organochlorine pesticides	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	PAH Total (NSW, 1999)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
	pH (F)	mg/kg	0.1				7.2	7.4	7.5	6.5	7.4	7.4	7.4	7.5	6.2	6.9	6.9	6.9
	pH (Fox)	mg/kg	0.1				5.8	6.2	7.7	4.1	5.4	6	7.3	6.5	3.3	4.7	5.7	6.9
	Phenols (non-halogenated)	mg/kg	1	**60**			-	-	-	-	-	-	-	-	-	-	-	-
	Phenols(halogenated)	mg/kg	0.03	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Polycylic aromatic hydrocarbons	mg/kg	0.5	**20**			-	-	-	-	-	-	-	-	-	-	-	-
	Reaction Rate	mg/kg	1				2	2	1	3	1	2	1	2	3	2	2	2
	Scheduled Chemicals (NSW, 1999)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
	Trihalomethanes (ADW 2004)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
BTEX	Benzene	mg/kg	0.2	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Ethylbenzene	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
Inorganics	Cyanide Total	mg/kg	1	**50**		1000	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoride	mg/kg	40	**450**			-	-	-	-	-	-	-	-	-	-	-	-
	Moisture	%	1				-	-	-	-	-	-	-	-	-	-	-	-
Lead	Lead	mg/kg	5	**300**	*600*	600	-	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	5	**20**	*20*	200	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	mg/kg	1	**3**	*3*	40	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium (hexavalent)	mg/kg	0.5	**1**	*1*	200	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	5	**100**	*100*	2000	-	-	-	-	-	-	-	-	-	-	-	-
	Mercury	mg/kg	0.1	**1**	*1*	30	-	-	-	-	-	-	-	-	-	-	-	-
	Molybdenum	mg/kg	2	**40**			-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	mg/kg	2	**60**	*60*	600	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	5	**10**			-	-	-	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	2	**10**			-	-	-	-	-	-	-	-	-	-	-	-
	Tin	mg/kg	5	**50**			-	-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	5	**200**	*200*	14000	-	-	-	-	-	-	-	-	-	-	-	-
OCP	4,4-DDE	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	a-BHC	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Aldrin	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Aldrin + Dieldrin	mg/kg	0.03			20	-	-	-	-	-	-	-	-	-	-	-	-
	b-BHC	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	chlordane	mg/kg	0.03			100	-	-	-	-	-	-	-	-	-	-	-	-
	Chlordane (cis)	mg/kg	0.03			100	-	-	-	-	-	-	-	-	-	-	-	-
	Chlordane (trans)	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	d-BHC	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	DDD	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	DDT	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg	0.05			400	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan I	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan II	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan sulphate	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endrin aldehyde	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor	mg/kg	0.03			20	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobenzene	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-

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Table D1 Kelletts Road Drain Wetland
Melbourne Water

						SampleCode	EM0902848030	EM0902848032	EM0902848034	EM0902848038	EM0902848040	EM0902848042	EM0902848044	EM0902848046	EM0902848050	EM0902848052	EM0902848054	EM0902848056
						Field_ID	TP03_2.0-2.1_PartB	TP03_3.0-3.1_PartB	TP03_4.0-4.1_PartB	TP04_0.5-0.6_PartB	TP04_1.0-1.1_PartB	TP04_2.0-2.1_PartB	TP04_3.0-3.1_PartB	TP04_4.0-4.1_PartB	TP05_0.5-0.6_PartB	TP05_1.0-1.1_PartB	TP05_2.0-2.1_PartB	TP05_3.0-3.1_PartB
						LocCode	TP03	TP03	TP03	TP04	TP04	TP04	TP04	TP04	TP05	TP05	TP05	TP05
Chem_Group	**ChemName**	**Units**	**EQL**	**EPA448 Fill**	***NEPM 1999 EIL***	**NEPM 1999 HIL E**												
	Methoxychlor	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
PAH/Phenols	2,4,5-trichlorophenol	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	2,4-dichlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2,4-dimethylphenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	2-chlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2-methylphenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	3-&4-methylphenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	0.5	**1**		2	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)&(k)fluoranthene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Phenol	mg/kg	1			17000	-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
PCB	PCBs (Sum of total)	mg/kg	0.1	**2**		20	-	-	-	-	-	-	-	-	-	-	-	-
SVOC	2,4,6-trichlorophenol	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	2,4-dinitrophenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	2,6-dichlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2-nitrophenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	4,6-Dinitro-2-methylphenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	4-chloro-3-methylphenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	4-nitrophenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorophenol	mg/kg	0.2				-	-	-	-	-	-	-	-	-	-	-	-
TPH	TPH C 6 - C 9 Fraction	mg/kg	10	**100**			-	-	-	-	-	-	-	-	-	-	-	-
	TPH C10 - C14 Fraction	mg/kg	50				-	-	-	-	-	-	-	-	-	-	-	-
	TPH C15 - C28 Fraction	mg/kg	100				-	-	-	-	-	-	-	-	-	-	-	-
	TPH C29-C36 Fraction	mg/kg	100				-	-	-	-	-	-	-	-	-	-	-	-
	TPH+C10 - C36 (Sum of total)	mg/kg	50	**1000**			-	-	-	-	-	-	-	-	-	-	-	-
VOC	1,1,1,2-tetrachloroethane	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.04				-	-	-	-	-	-	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,2,4-trichlorobenzene	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichloroethane	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Carbon tetrachloride	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	Chlorobenzene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	cis-1,2-dichloroethene	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	Dichloromethane	mg/kg	0.4				-	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobutadiene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Styrene	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	TCE	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachloroethene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	trans-1,2-dichloroethene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Vinyl chloride	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-

Table D1 Kelletts Road Drain Wetland
Melbourne Water

						SampleCode	EM0902848058	EM0902848060	EM0902848064	EM0902848066	EM0902848068	EM0902848070	EM0902848072	EM0902848074	EM0902848078	EM0902848080	EM0902848082	EM0902848084
						Field_ID	TP05_4.0-4.1_PartB	TP05_5.0-5.1_PartB	TP06_0.5-0.6_PartB	TP06_1.0-1.1_PartB	TP06_2.0-2.1_PartB	TP06_3.0-3.1_PartB	TP06_4.0-4.1_PartB	TP06_5.0-5.1_PartB	TP07_0.5-0.6_PartB	TP07_1.0-1.1_PartB	TP07_2.0-2.1_PartB	TP07_3.0-3.1_PartB
						LocCode	TP05	TP05	TP06	TP06	TP06	TP06	TP06	TP06	TP07	TP07	TP07	TP07
Chem_Group	**ChemName**	**Units**	**EQL**	**EPA448 Fill**	***NEPM 1999 EIL***	**NEPM 1999 HIL E**												
	2,3,5,6-Tetrachlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2.3.4.5 & 2.3.4.6-Tetrachlorophenol	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	4,6-Dinitro-o-cyclohexyl phenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	Chlorinated hydrocarbons	mg/kg	0.01	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Dinoseb	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor (including its epoxide)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
	Monocylic aromatic hydrocarbons	mg/kg	0.2	**7**			-	-	-	-	-	-	-	-	-	-	-	-
	Organochlorine pesticides	mg/kg	0.03	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Other chlorinated hydrocarbons	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	Other organochlorine pesticides	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	PAH Total (NSW, 1999)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
	pH (F)	mg/kg	0.1				7.1	7.3	6.6	6.5	6.7	7	7.8	7.6	6.5	7.4	7.6	7.5
	pH (Fox)	mg/kg	0.1				5.4	5.1	3.6	3.9	7.2	5.1	5.5	5.5	3.7	5.3	5.5	5.8
	Phenols (non-halogenated)	mg/kg	1	**60**			-	-	-	-	-	-	-	-	-	-	-	-
	Phenols(halogenated)	mg/kg	0.03	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Polycylic aromatic hydrocarbons	mg/kg	0.5	**20**			-	-	-	-	-	-	-	-	-	-	-	-
	Reaction Rate	mg/kg	1				2	1	3	2	1	2	2	2	3	2	2	2
	Scheduled Chemicals (NSW, 1999)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
	Trihalomethanes (ADW 2004)	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
BTEX	Benzene	mg/kg	0.2	**1**			-	-	-	-	-	-	-	-	-	-	-	-
	Ethylbenzene	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
Inorganics	Cyanide Total	mg/kg	1	**50**		1000	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoride	mg/kg	40	**450**			-	-	-	-	-	-	-	-	-	-	-	-
	Moisture	%	1				-	-	-	-	-	-	-	-	-	-	-	-
Lead	Lead	mg/kg	5	**300**	*600*	600	-	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	5	**20**	*20*	200	-	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	mg/kg	1	**3**	*3*	40	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium (hexavalent)	mg/kg	0.5	**1**	*1*	200	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	5	**100**	*100*	2000	-	-	-	-	-	-	-	-	-	-	-	-
	Mercury	mg/kg	0.1	**1**	*1*	30	-	-	-	-	-	-	-	-	-	-	-	-
	Molybdenum	mg/kg	2	**40**			-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	mg/kg	2	**60**	*60*	600	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	5	**10**			-	-	-	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	2	**10**			-	-	-	-	-	-	-	-	-	-	-	-
	Tin	mg/kg	5	**50**			-	-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	5	**200**	*200*	14000	-	-	-	-	-	-	-	-	-	-	-	-
OCP	4,4-DDE	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	a-BHC	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Aldrin	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Aldrin + Dieldrin	mg/kg	0.03			20	-	-	-	-	-	-	-	-	-	-	-	-
	b-BHC	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	chlordane	mg/kg	0.03			100	-	-	-	-	-	-	-	-	-	-	-	-
	Chlordane (cis)	mg/kg	0.03			100	-	-	-	-	-	-	-	-	-	-	-	-
	Chlordane (trans)	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	d-BHC	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	DDD	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	DDT	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg	0.05			400	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan I	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan II	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endosulfan sulphate	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Endrin aldehyde	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor	mg/kg	0.03			20	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobenzene	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-

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Table D1 Kelletts Road Drain Wetland
Melbourne Water

Chem_Group	ChemName	Units	EQL	EPA448 Fill	NEPM 1999 EIL	NEPM 1999 HIL E												
						SampleCode	EM0902848058	EM0902848060	EM0902848064	EM0902848066	EM0902848068	EM0902848070	EM0902848072	EM0902848074	EM0902848078	EM0902848080	EM0902848082	EM0902848084
						Field_ID	TP05_4.0-4.1_PartB	TP05_5.0-5.1_PartB	TP06_0.5-0.6_PartB	TP06_1.0-1.1_PartB	TP06_2.0-2.1_PartB	TP06_3.0-3.1_PartB	TP06_4.0-4.1_PartB	TP06_5.0-5.1_PartB	TP07_0.5-0.6_PartB	TP07_1.0-1.1_PartB	TP07_2.0-2.1_PartB	TP07_3.0-3.1_PartB
						LocCode	TP05	TP05	TP06	TP06	TP06	TP06	TP06	TP06	TP07	TP07	TP07	TP07
	Methoxychlor	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
PAH/Phenols	2,4,5-trichlorophenol	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	2,4-dichlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2,4-dimethylphenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	2-chlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2-methylphenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	3-&4-methylphenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	0.5	1		2	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)&(k)fluoranthene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
	Phenol	mg/kg	1			17000	-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	0.5			40	-	-	-	-	-	-	-	-	-	-	-	-
PCB	PCBs (Sum of total)	mg/kg	0.1	2		20	-	-	-	-	-	-	-	-	-	-	-	-
SVOC	2,4,6-trichlorophenol	mg/kg	0.05				-	-	-	-	-	-	-	-	-	-	-	-
	2,4-dinitrophenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	2,6-dichlorophenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	2-nitrophenol	mg/kg	1				-	-	-	-	-	-	-	-	-	-	-	-
	4,6-Dinitro-2-methylphenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	4-chloro-3-methylphenol	mg/kg	0.03				-	-	-	-	-	-	-	-	-	-	-	-
	4-nitrophenol	mg/kg	5				-	-	-	-	-	-	-	-	-	-	-	-
	Pentachlorophenol	mg/kg	0.2				-	-	-	-	-	-	-	-	-	-	-	-
TPH	TPH C 6 - C 9 Fraction	mg/kg	10	100			-	-	-	-	-	-	-	-	-	-	-	-
	TPH C10 - C14 Fraction	mg/kg	50				-	-	-	-	-	-	-	-	-	-	-	-
	TPH C15 - C28 Fraction	mg/kg	100				-	-	-	-	-	-	-	-	-	-	-	-
	TPH C29-C36 Fraction	mg/kg	100				-	-	-	-	-	-	-	-	-	-	-	-
	TPH+C10 - C36 (Sum of total)	mg/kg	50	1000			-	-	-	-	-	-	-	-	-	-	-	-
VOC	1,1,1,2-tetrachloroethane	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,1,1-trichloroethane	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2,2-tetrachloroethane	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	1,1,2-trichloroethane	mg/kg	0.04				-	-	-	-	-	-	-	-	-	-	-	-
	1,1-dichloroethene	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,2,4-trichlorobenzene	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichlorobenzene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	1,2-dichloroethane	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	1,4-dichlorobenzene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Carbon tetrachloride	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	Chlorobenzene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	cis-1,2-dichloroethene	mg/kg	0.01				-	-	-	-	-	-	-	-	-	-	-	-
	Dichloromethane	mg/kg	0.4				-	-	-	-	-	-	-	-	-	-	-	-
	Hexachlorobutadiene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Styrene	mg/kg	0.5				-	-	-	-	-	-	-	-	-	-	-	-
	TCE	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachloroethene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	trans-1,2-dichloroethene	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-
	Vinyl chloride	mg/kg	0.02				-	-	-	-	-	-	-	-	-	-	-	-

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Table D1 Kelletts Road Drain Wetland
Melbourne Water

Chem_Group	ChemName	Units	EQL	EPA448 Fill	*NEPM 1999 EIL*	NEPM 1999 HIL E	EM0902848086	EM0902848088	EM0902969001	EM0902969002	EM0902969003	EM0902969004	EM0902969005	EM0902969006	EM0902969007	EM0902969008	EM0902969009
	Field_ID						TP07_4.0-4.1_PartB	TP07_5.0-5.1_PartB	TP01_0.5-0.6_PART A	TP01_3.0-3.1_PART A	TP02_0.5-0.6_PART A	TP02_3.0-3.1_PART A	TP03_1.0-1.1_PART A	TP03_4.0-4.1_PART A	TP04_0.5-0.6_PART A	TP04_4.0-4.1_PART A	TP05_0.1-0.2_PART A
	LocCode						TP07	TP07	TP01	TP01	TP02	TP02	TP03	TP03	TP04	TP04	TP05
	2,3,5,6-Tetrachlorophenol	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	2.3.4.5 & 2.3.4.6-Tetrachlorophenol	mg/kg	0.05				-	-	-	<0.05	<0.05	-	<0.05	-	<0.05	-	<0.05
	4,6-Dinitro-o-cyclohexyl phenol	mg/kg	5				-	-	-	<5	<5	-	<5	-	<5	-	<5
	Chlorinated hydrocarbons	mg/kg	0.01	**1**			-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01
	Dinoseb	mg/kg	5				-	-	-	<5	<5	-	<5	-	<5	-	<5
	Heptachlor (including its epoxide)	mg/kg					-	-	-	<0.06	<0.06	-	<0.06	-	<0.06	-	<0.06
	Monocylic aromatic hydrocarbons	mg/kg	0.2	**7**			-	-	-	<0.2	<0.2	-	<0.2	-	<0.2	-	<0.2
	Organochlorine pesticides	mg/kg	0.03	**1**			-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Other chlorinated hydrocarbons	mg/kg	0.01				-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01
	Other organochlorine pesticides	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	PAH Total (NSW, 1999)	mg/kg					-	-	-	<6.5	<6.5	-	<6.5	-	<6.5	-	<6.5
	pH (F)	mg/kg	0.1				7.5	7.5	-	-	-	-	-	-	-	-	-
	pH (Fox)	mg/kg	0.1				5.6	5.8	-	-	-	-	-	-	-	-	-
	Phenols (non-halogenated)	mg/kg	1	**60**			-	-	-	<1	<1	-	<1	-	<1	-	<1
	Phenols(halogenated)	mg/kg	0.03	**1**			-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Polycylic aromatic hydrocarbons	mg/kg	0.5	**20**			-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Reaction Rate	mg/kg	1				1	1	-	-	-	-	-	-	-	-	-
	Scheduled Chemicals (NSW, 1999)	mg/kg					-	-	-	<0.67	<0.67	-	<0.67	-	<0.67	-	<0.67
	Trihalomethanes (ADW 2004)	mg/kg					-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
BTEX	Benzene	mg/kg	0.2	**1**			-	-	-	<0.2	<0.2	-	<0.2	-	<0.2	-	<0.2
	Ethylbenzene	mg/kg	0.5				-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Toluene	mg/kg	0.5				-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Xylene (m & p)	mg/kg	0.5				-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Xylene (o)	mg/kg	0.5				-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Xylene Total	mg/kg					-	-	-	<1	<1	-	<1	-	<1	-	<1
Inorganics	Cyanide Total	mg/kg	1	**50**		1000	-	-	-	<1	<1	-	<1	-	<1	-	1
	Fluoride	mg/kg	40	**450**			-	-	-	90	60	-	100	-	50	-	90
	Moisture	%	1				-	-	11.2	17.7	25.3	16.6	30	19.1	11.9	17.9	11.3
Lead	Lead	mg/kg	5	**300**	*600*	600	-	-	10	10	11	7	10	11	10	6	19
Metals	Arsenic	mg/kg	5	**20**	*20*	200	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Cadmium	mg/kg	1	**3**	*3*	40	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	**1**	*1*	200	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Copper	mg/kg	5	**100**	*100*	2000	-	-	7	9	8	5	9	10	6	6	8
	Mercury	mg/kg	0.1	**1**	*1*	30	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Molybdenum	mg/kg	2	**40**			-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Nickel	mg/kg	2	**60**	*60*	600	-	-	5	8	4	5	9	7	4	5	4
	Selenium	mg/kg	5	**10**			-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Silver	mg/kg	2	**10**			-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Tin	mg/kg	5	**50**			-	-	-	<5	<5	-	<5	-	<5	-	<5
	Zinc	mg/kg	5	**200**	*200*	14000	-	-	<5	11	5	7	8	12	<5	13	15
OCP	4,4-DDE	mg/kg	0.05				-	-	-	<0.05	<0.05	-	<0.05	-	<0.05	-	<0.05
	a-BHC	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Aldrin	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Aldrin + Dieldrin	mg/kg	0.03			20	-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	b-BHC	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	chlordane	mg/kg	0.03			100	-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Chlordane (cis)	mg/kg	0.03			100	-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Chlordane (trans)	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	d-BHC	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	DDD	mg/kg	0.05				-	-	-	<0.05	<0.05	-	<0.05	-	<0.05	-	<0.05
	DDT	mg/kg	0.05				-	-	-	<0.05	<0.05	-	<0.05	-	<0.05	-	<0.05
	DDT+DDE+DDD	mg/kg	0.05			400	-	-	-	<0.05	<0.05	-	<0.05	-	<0.05	-	<0.05
	Dieldrin	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Endosulfan I	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Endosulfan II	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Endosulfan sulphate	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Endrin	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Endrin aldehyde	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	g-BHC (Lindane)	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Heptachlor	mg/kg	0.03			20	-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Heptachlor epoxide	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	Hexachlorobenzene	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03

Table D1 Kelletts Road Drain Wetland
Melbourne Water

						SampleCode	EM0902848086	EM0902848088	EM0902969001	EM0902969002	EM0902969003	EM0902969004	EM0902969005	EM0902969006	EM0902969007	EM0902969008	EM0902969009
						Field_ID	TP07_4.0-4.1_PartB	TP07_5.0-5.1_PartB	TP01_0.5-0.6_PART A	TP01_3.0-3.1_PART A	TP02_0.5-0.6_PART A	TP02_3.0-3.1_PART A	TP03_1.0-1.1_PART A	TP03_4.0-4.1_PART A	TP04_0.5-0.6_PART A	TP04_4.0-4.1_PART A	TP05_0.1-0.2_PART A
						LocCode	TP07	TP07	TP01	TP01	TP02	TP02	TP03	TP03	TP04	TP04	TP05
Chem_Group	**ChemName**	**Units**	**EQL**	**EPA448 Fill**	***NEPM 1999 EIL***	**NEPM 1999 HIL E**											
	Methoxychlor	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
PAH/Phenols	2,4,5-trichlorophenol	mg/kg	0.05				-	-	-	<0.05	<0.05	-	<0.05	-	<0.05	-	<0.05
	2,4-dichlorophenol	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	2,4-dimethylphenol	mg/kg	1				-	-	-	<1	<1	-	<1	-	<1	-	<1
	2-chlorophenol	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	2-methylphenol	mg/kg	1				-	-	-	<1	<1	-	<1	-	<1	-	<1
	3-&4-methylphenol	mg/kg	1				-	-	-	<1	<1	-	<1	-	<1	-	<1
	Acenaphthene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Acenaphthylene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Anthracene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Benz(a)anthracene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Benzo(a) pyrene	mg/kg	0.5	1		2	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Benzo(b)&(k)fluoranthene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Benzo(g,h,i)perylene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Chrysene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Fluoranthene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Fluorene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Naphthalene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Phenanthrene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	Phenol	mg/kg	1			17000	-	-	-	<1	<1	-	<1	-	<1	-	<1
	Pyrene	mg/kg	0.5			40	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
PCB	PCBs (Sum of total)	mg/kg	0.1	2		20	-	-	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1
SVOC	2,4,6-trichlorophenol	mg/kg	0.05				-	-	-	<0.05	<0.05	-	<0.05	-	<0.05	-	<0.05
	2,4-dinitrophenol	mg/kg	5				-	-	-	<5	<5	-	<5	-	<5	-	<5
	2,6-dichlorophenol	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	2-nitrophenol	mg/kg	1				-	-	-	<1	<1	-	<1	-	<1	-	<1
	4,6-Dinitro-2-methylphenol	mg/kg	5				-	-	-	<5	<5	-	<5	-	<5	-	<5
	4-chloro-3-methylphenol	mg/kg	0.03				-	-	-	<0.03	<0.03	-	<0.03	-	<0.03	-	<0.03
	4-nitrophenol	mg/kg	5				-	-	-	<5	<5	-	<5	-	<5	-	<5
	Pentachlorophenol	mg/kg	0.2				-	-	-	<0.2	<0.2	-	<0.2	-	<0.2	-	<0.2
TPH	TPH C 6 - C 9 Fraction	mg/kg	10	100			-	-	-	<10	<10	-	<10	-	<10	-	<10
	TPH C10 - C14 Fraction	mg/kg	50				-	-	-	<50	<50	-	<50	-	<50	-	<50
	TPH C15 - C28 Fraction	mg/kg	100				-	-	-	<100	<100	-	<100	-	<100	-	<100
	TPH C29-C36 Fraction	mg/kg	100				-	-	-	<100	<100	-	<100	-	<100	-	<100
	TPH+C10 - C36 (Sum of total)	mg/kg	50	1000			-	-	-	<50	<50	-	<50	-	<50	-	<50
VOC	1,1,1,2-tetrachloroethane	mg/kg	0.01				-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01
	1,1,1-trichloroethane	mg/kg	0.01				-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01
	1,1,2,2-tetrachloroethane	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
	1,1,2-trichloroethane	mg/kg	0.04				-	-	-	<0.04	<0.04	-	<0.04	-	<0.04	-	<0.04
	1,1-dichloroethene	mg/kg	0.01				-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01
	1,2,4-trichlorobenzene	mg/kg	0.01				-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01
	1,2-dichlorobenzene	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
	1,2-dichloroethane	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
	1,4-dichlorobenzene	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
	Carbon tetrachloride	mg/kg	0.01				-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01
	Chlorobenzene	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
	Chloroform	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
	cis-1,2-dichloroethene	mg/kg	0.01				-	-	-	<0.01	<0.01	-	<0.01	-	<0.01	-	<0.01
	Dichloromethane	mg/kg	0.4				-	-	-	<0.4	<0.4	-	<0.4	-	<0.4	-	<0.4
	Hexachlorobutadiene	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
	Styrene	mg/kg	0.5				-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	-	<0.5
	TCE	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
	Tetrachloroethene	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
	trans-1,2-dichloroethene	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02
	Vinyl chloride	mg/kg	0.02				-	-	-	<0.02	<0.02	-	<0.02	-	<0.02	-	<0.02

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Table D1 Kelletts Road Drain Wetland
Melbourne Water

Chem_Group	ChemName	Units	EQL	EPA448 Fill	NEPM 1999 EIL	NEPM 1999 HIL E	EM0902969010	EM0902969011	EM0902969012	EM0902969013	EM0902969014
						Field_ID	TP05_0.5-0.6_PART A	TP06_0.1-0.2_PART A	TP06_1.0-1.1_PART A	TP07_0.5-0.6_PART A	TP07_2.0-2.1_PART A
						LocCode	TP05	TP06	TP06	TP07	TP07
	2,3,5,6-Tetrachlorophenol	mg/kg	0.03				-	<0.03	-	<0.03	-
	2.3.4.5 & 2.3.4.6-Tetrachlorophenol	mg/kg	0.05				-	<0.05	-	<0.05	-
	4,6-Dinitro-o-cyclohexyl phenol	mg/kg	5				-	<5	-	<5	-
	Chlorinated hydrocarbons	mg/kg	0.01	**1**			-	<0.01	-	<0.01	-
	Dinoseb	mg/kg	5				-	<5	-	<5	-
	Heptachlor (including its epoxide)	mg/kg					-	<0.06	-	<0.06	-
	Monocylic aromatic hydrocarbons	mg/kg	0.2	**7**			-	<0.2	-	<0.2	-
	Organochlorine pesticides	mg/kg	0.03	**1**			-	<0.03	-	<0.03	-
	Other chlorinated hydrocarbons	mg/kg	0.01				-	<0.01	-	<0.01	-
	Other organochlorine pesticides	mg/kg	0.03				-	<0.03	-	<0.03	-
	PAH Total (NSW, 1999)	mg/kg					-	<6.5	-	<6.5	-
	pH (F)	mg/kg	0.1				-	-	-	-	-
	pH (Fox)	mg/kg	0.1				-	-	-	-	-
	Phenols (non-halogenated)	mg/kg	1	**60**			-	<1	-	<1	-
	Phenols(halogenated)	mg/kg	0.03	**1**			-	<0.03	-	<0.03	-
	Polycylic aromatic hydrocarbons	mg/kg	0.5	**20**			-	<0.5	-	<0.5	-
	Reaction Rate	mg/kg	1				-	-	-	-	-
	Scheduled Chemicals (NSW, 1999)	mg/kg					-	<0.67	-	<0.67	-
	Trihalomethanes (ADW 2004)	mg/kg					-	<0.02	-	<0.02	-
BTEX	Benzene	mg/kg	0.2	**1**			-	<0.2	-	<0.2	-
	Ethylbenzene	mg/kg	0.5				-	<0.5	-	<0.5	-
	Toluene	mg/kg	0.5				-	<0.5	-	<0.5	-
	Xylene (m & p)	mg/kg	0.5				-	<0.5	-	<0.5	-
	Xylene (o)	mg/kg	0.5				-	<0.5	-	<0.5	-
	Xylene Total	mg/kg					-	<1	-	<1	-
Inorganics	Cyanide Total	mg/kg	1	**50**		1000	-	1	-	<1	-
	Fluoride	mg/kg	40	**450**			-	70	-	<40	-
	Moisture	%	1				12.3	13.7	16.2	30.2	18.8
Lead	Lead	mg/kg	5	**300**	*600*	600	9	20	9	7	8
Metals	Arsenic	mg/kg	5	**20**	*20*	200	<5	<5	<5	<5	<5
	Cadmium	mg/kg	1	**3**	*3*	40	<1	<1	<1	<1	<1
	Chromium (hexavalent)	mg/kg	0.5	**1**	*1*	200	<0.5	<0.5	<0.5	<0.5	<0.5
	Copper	mg/kg	5	**100**	*100*	2000	6	10	5	<5	8
	Mercury	mg/kg	0.1	**1**	*1*	30	<0.1	<0.1	<0.1	<0.1	<0.1
	Molybdenum	mg/kg	2	**40**			<2	<2	<2	<2	<2
	Nickel	mg/kg	2	**60**	*60*	600	3	5	3	3	8
	Selenium	mg/kg	5	**10**			<5	<5	<5	<5	<5
	Silver	mg/kg	2	**10**			<2	<2	<2	<2	<2
	Tin	mg/kg	5	**50**			-	<5	-	<5	-
	Zinc	mg/kg	5	**200**	*200*	14000	<5	22	<5	<5	16
OCP	4,4-DDE	mg/kg	0.05				-	<0.05	-	<0.05	-
	a-BHC	mg/kg	0.03				-	<0.03	-	<0.03	-
	Aldrin	mg/kg	0.03				-	<0.03	-	<0.03	-
	Aldrin + Dieldrin	mg/kg	0.03			20	-	<0.03	-	<0.03	-
	b-BHC	mg/kg	0.03				-	<0.03	-	<0.03	-
	chlordane	mg/kg	0.03			100	-	<0.03	-	<0.03	-
	Chlordane (cis)	mg/kg	0.03			100	-	<0.03	-	<0.03	-
	Chlordane (trans)	mg/kg	0.03				-	<0.03	-	<0.03	-
	d-BHC	mg/kg	0.03				-	<0.03	-	<0.03	-
	DDD	mg/kg	0.05				-	<0.05	-	<0.05	-
	DDT	mg/kg	0.05				-	<0.05	-	<0.05	-
	DDT+DDE+DDD	mg/kg	0.05			400	-	<0.05	-	<0.05	-
	Dieldrin	mg/kg	0.03				-	<0.03	-	<0.03	-
	Endosulfan I	mg/kg	0.03				-	<0.03	-	<0.03	-
	Endosulfan II	mg/kg	0.03				-	<0.03	-	<0.03	-
	Endosulfan sulphate	mg/kg	0.03				-	<0.03	-	<0.03	-
	Endrin	mg/kg	0.03				-	<0.03	-	<0.03	-
	Endrin aldehyde	mg/kg	0.03				-	<0.03	-	<0.03	-
	g-BHC (Lindane)	mg/kg	0.03				-	<0.03	-	<0.03	-
	Heptachlor	mg/kg	0.03			20	-	<0.03	-	<0.03	-
	Heptachlor epoxide	mg/kg	0.03				-	<0.03	-	<0.03	-
	Hexachlorobenzene	mg/kg	0.03				-	<0.03	-	<0.03	-

Table D1 Kelletts Road Drain Wetland
Melbourne Water

Chem_Group	ChemName	Units	EQL	EPA448 Fill	NEPM 1999 EIL	NEPM 1999 HIL E	EM0902969010	EM0902969011	EM0902969012	EM0902969013	EM0902969014
						Field_ID	TP05_0.5-0.6_PART A	TP06_0.1-0.2_PART A	TP06_1.0-1.1_PART A	TP07_0.5-0.6_PART A	TP07_2.0-2.1_PART A
						LocCode	TP05	TP06	TP06	TP07	TP07
	Methoxychlor	mg/kg	0.03				-	<0.03	-	<0.03	-
PAH/Phenols	2,4,5-trichlorophenol	mg/kg	0.05				-	<0.05	-	<0.05	-
	2,4-dichlorophenol	mg/kg	0.03				-	<0.03	-	<0.03	-
	2,4-dimethylphenol	mg/kg	1				-	<1	-	<1	-
	2-chlorophenol	mg/kg	0.03				-	<0.03	-	<0.03	-
	2-methylphenol	mg/kg	1				-	<1	-	<1	-
	3-&4-methylphenol	mg/kg	1				-	<1	-	<1	-
	Acenaphthene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Acenaphthylene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Anthracene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Benz(a)anthracene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Benzo(a) pyrene	mg/kg	0.5	1		2	-	<0.5	-	<0.5	-
	Benzo(b)&(k)fluoranthene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Benzo(g,h,i)perylene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Chrysene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Dibenz(a,h)anthracene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Fluoranthene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Fluorene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Naphthalene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Phenanthrene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
	Phenol	mg/kg	1			17000	-	<1	-	<1	-
	Pyrene	mg/kg	0.5			40	-	<0.5	-	<0.5	-
PCB	PCBs (Sum of total)	mg/kg	0.1	2		20	-	<0.1	-	<0.1	-
SVOC	2,4,6-trichlorophenol	mg/kg	0.05				-	<0.05	-	<0.05	-
	2,4-dinitrophenol	mg/kg	5				-	<5	-	<5	-
	2,6-dichlorophenol	mg/kg	0.03				-	<0.03	-	<0.03	-
	2-nitrophenol	mg/kg	1				-	<1	-	<1	-
	4,6-Dinitro-2-methylphenol	mg/kg	5				-	<5	-	<5	-
	4-chloro-3-methylphenol	mg/kg	0.03				-	<0.03	-	<0.03	-
	4-nitrophenol	mg/kg	5				-	<5	-	<5	-
	Pentachlorophenol	mg/kg	0.2				-	<0.2	-	<0.2	-
TPH	TPH C 6 - C 9 Fraction	mg/kg	10	100			-	<10	-	<10	-
	TPH C10 - C14 Fraction	mg/kg	50				-	<50	-	<50	-
	TPH C15 - C28 Fraction	mg/kg	100				-	<100	-	<100	-
	TPH C29-C36 Fraction	mg/kg	100				-	<100	-	<100	-
	TPH+C10 - C36 (Sum of total)	mg/kg	50	1000			-	<50	-	<50	-
VOC	1,1,1,2-tetrachloroethane	mg/kg	0.01				-	<0.01	-	<0.01	-
	1,1,1-trichloroethane	mg/kg	0.01				-	<0.01	-	<0.01	-
	1,1,2,2-tetrachloroethane	mg/kg	0.02				-	<0.02	-	<0.02	-
	1,1,2-trichloroethane	mg/kg	0.04				-	<0.04	-	<0.04	-
	1,1-dichloroethene	mg/kg	0.01				-	<0.01	-	<0.01	-
	1,2,4-trichlorobenzene	mg/kg	0.01				-	<0.01	-	<0.01	-
	1,2-dichlorobenzene	mg/kg	0.02				-	<0.02	-	<0.02	-
	1,2-dichloroethane	mg/kg	0.02				-	<0.02	-	<0.02	-
	1,4-dichlorobenzene	mg/kg	0.02				-	<0.02	-	<0.02	-
	Carbon tetrachloride	mg/kg	0.01				-	<0.01	-	<0.01	-
	Chlorobenzene	mg/kg	0.02				-	<0.02	-	<0.02	-
	Chloroform	mg/kg	0.02				-	<0.02	-	<0.02	-
	cis-1,2-dichloroethene	mg/kg	0.01				-	<0.01	-	<0.01	-
	Dichloromethane	mg/kg	0.4				-	<0.4	-	<0.4	-
	Hexachlorobutadiene	mg/kg	0.02				-	<0.02	-	<0.02	-
	Styrene	mg/kg	0.5				-	<0.5	-	<0.5	-
	TCE	mg/kg	0.02				-	<0.02	-	<0.02	-
	Tetrachloroethene	mg/kg	0.02				-	<0.02	-	<0.02	-
	trans-1,2-dichloroethene	mg/kg	0.02				-	<0.02	-	<0.02	-
	Vinyl chloride	mg/kg	0.02				-	<0.02	-	<0.02	-

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Table D2 Kelletts Road Drain Wetland SPOCAS Testing
Melbourne Water

		Field_ID	TP01_0.5-0.6_PartB	TP01_3.0-3.1_PartB	TP02_0.5-0.6_PartB	TP02_2.0-2.1_PartB	TP03_0.5-0.6_PartB	TP03_2.0-2.1_PartB	TP04_0.5-0.6_PartB	TP04_2.0-2.1_PartB
		LocCode	TP01	TP01	TP02	TP02	TP03	TP03	TP04	TP04
		Sampled_Date-Time	1/04/2009	1/04/2009	1/04/2009	1/04/2009	1/04/2009	1/04/2009	1/04/2009	1/04/2009
ChemName	**Units**	**EQL**								
pH Measurements										
pH KCl	pH Unit	0.1	5.9	5.8	5.7	5	5.9	5.6	6	5.8
pH OX	pH Unit	0.1	5	6.9	4.6	5.8	4.6	6.8	4.9	6.9
Acidity Trails										
Titratable Actual Acidity	mole H+/t	2	18	11	42	24	24	13	26	10
Titratable Peroxide Acidity	mole H+/t	2	9	<2	19	23	10	<2	11	<2
Titratable Sulfidic Acidity	mole H+/t	2	<2	<2	<2	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity	%S	0.02	0.03	<0.02	0.07	0.04	0.04	0.02	0.04	<0.02
sulfidic - Titratable Peroxide Acidity	%S	0.02	<0.02	<0.02	0.03	0.04	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity	%S	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sulfur Trail										
KCl Extractable Sulfur	%	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sulfur in Peroxide	%	0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur	%	0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur	mole H+/t	10	<10	<10	<10	<10	14	<10	<10	<10
Calcium Values										
KCl Extractable Calcium	%	0.02	0.05	0.06	0.07	0.07	0.05	0.05	0.05	0.06
Calcium in Peroxide	%	0.02	0.07	0.07	0.1	0.1	0.07	0.07	0.06	0.07
Acid Reacted Calcium	%	0.02	<0.02	<0.02	0.03	0.02	<0.02	0.02	<0.02	<0.02
acidity - Acid Reacted Calcium	mole H+/t	10	<10	<10	14	12	<10	10	<10	<10
sulfidic - Acid Reacted Calcium	%	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium Values										
KCl Extractable Magnesium	%	0.02	0.08	0.12	0.07	0.11	0.08	0.11	0.07	0.14
Magnesium in Peroxide	%	0.02	0.1	0.14	0.1	0.14	0.1	0.14	0.08	0.16
Acid Reacted Magnesium	%	0.02	<0.02	<0.02	0.03	0.03	0.02	0.03	<0.02	0.03
acidity - Acid Reacted Magnesium	mole H+/t	10	16	16	24	26	18	27	10	23
sulfidic - Acid Reacted Magnesium	%S	0.02	0.02	0.02	0.04	0.04	0.03	0.04	<0.02	0.04
Excess Acid Neutralising Capacity										
Excess Acid Neutralising Capacity	%S	0.02	-	0.05	-	-	-	<0.02	-	0.12
acidity - Excess Acid Neutralising Capacity	mole H+/t	10	-	<10	-	-	-	<10	-	25
sulfidic - Excess Acid Neutralising Capacity	%S	0.02	-	<0.02	-	-	-	<0.02	-	0.04
Acid Base Accounting										
ANC Fineness Factor	-	0.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Liming Rate	kg CaCO3/t	1	1	<1	3	2	3	<1	2	<1
Net Acidity (acidity units)	mole H+/t	10	18	11	42	24	38	13	26	10
Net Acidity (sulfur units)	%S	0.02	0.03	<0.02	0.07	0.04	0.06	0.02	0.04	<0.02

Table D2 Kelletts Road Drain Wetland SPOCAS Testing
Melbourne Water

		Field_ID	TP05_0.5-0.6_PartB	TP05_4.0-4.1_PartB	TP06_0.5-0.6_PartB	TP06_3.0-3.1_PartB	TP06_4.0-4.1_PartB	TP07_0.5-0.6_PartB	TP07_2.0-2.1_PartB	TP07_5.0-5.1_PartB
		LocCode	TP05	TP05	TP06	TP06	TP06	TP07	TP07	TP07
		Sampled_Date-Time	1/04/2009	1/04/2009	1/04/2009	1/04/2009	1/04/2009	1/04/2009	1/04/2009	1/04/2009
ChemName	**Units**	**EQL**								
pH Measurements										
pH KCl	pH Unit	0.1	5.9	5.6	5.8	5.6	6.3	5.3	5.9	5.8
pH OX	pH Unit	0.1	4.9	6.3	4.8	6.6	6.4	4	6.7	6.5
Acidity Trails										
Titratable Actual Acidity	mole H+/t	2	29	13	30	13	6	20	20	8
Titratable Peroxide Acidity	mole H+/t	2	11	10	9	<2	5	9	<2	4
Titratable Sulfidic Acidity	mole H+/t	2	<2	<2	<2	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity	%S	0.02	0.05	0.02	0.05	0.02	<0.02	0.03	0.03	<0.02
sulfidic - Titratable Peroxide Acidity	%S	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titratable Sulfidic Acidity	%S	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sulfur Trail										
KCl Extractable Sulfur	%	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sulfur in Peroxide	%	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur	%	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur	mole H+/t	10	<10	<10	<10	<10	<10	<10	<10	<10
Calcium Values										
KCl Extractable Calcium	%	0.02	0.05	0.05	0.07	0.05	0.03	0.06	0.04	0.03
Calcium in Peroxide	%	0.02	0.07	0.06	0.09	0.06	0.04	0.07	0.05	0.04
Acid Reacted Calcium	%	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Acid Reacted Calcium	mole H+/t	10	10	<10	<10	<10	<10	<10	<10	<10
sulfidic - Acid Reacted Calcium	%	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Magnesium Values										
KCl Extractable Magnesium	%	0.02	0.05	0.09	0.06	0.09	0.05	0.06	0.09	0.06
Magnesium in Peroxide	%	0.02	0.08	0.1	0.08	0.11	0.06	0.07	0.11	0.06
Acid Reacted Magnesium	%	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Acid Reacted Magnesium	mole H+/t	10	18	14	16	15	<10	<10	15	<10
sulfidic - Acid Reacted Magnesium	%S	0.02	0.03	0.02	0.02	0.02	<0.02	<0.02	0.02	<0.02
Excess Acid Neutralising Capacity										
Excess Acid Neutralising Capacity	%S	0.02	-	-	-	<0.02	-	-	<0.02	-
acidity - Excess Acid Neutralising Capacity	mole H+/t	10	-	-	-	<10	-	-	<10	-
sulfidic - Excess Acid Neutralising Capacity	%S	0.02	-	-	-	<0.02	-	-	<0.02	-
Acid Base Accounting										
ANC Fineness Factor	-	0.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Liming Rate	kg CaCO3/t	1	2	<1	2	<1	<1	2	2	<1
Net Acidity (acidity units)	mole H+/t	10	29	13	30	13	<10	20	20	<10
Net Acidity (sulfur units)	%S	0.02	0.05	0.02	0.05	0.02	<0.02	0.03	0.03	<0.02

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Table D3 RPDs forKelletts Road Drain Wetland
Melbourne Water
Field Duplicates (SOIL)

			SDG	EM0902969	EM0902969	
			Field_ID	TP01_3.0-3.1_PART A	DUP01_PART A	**RPD**
			Sampled_Date-Time	1/04/2009	1/04/2009	
Chem_Group	**ChemName**	**Units**	**EQL**			
	2,3,5,6-Tetrachlorophenol	mg/kg	0.03	<0.03	<0.03	0
	2.3.4.5 & 2.3.4.6-Tetrachlorophenol	mg/kg	0.05	<0.05	<0.05	0
	4,6-Dinitro-o-cyclohexyl phenol	mg/kg	5	<5.0	<5.0	0
	Chlorinated hydrocarbons	mg/kg	0.01	<0.01	<0.01	0
	Dinoseb	mg/kg	5	<5.0	<5.0	0
	Monocylic aromatic hydrocarbons	mg/kg	0.2	<0.2	<0.2	0
	Organochlorine pesticides	mg/kg	0.03	<0.03	<0.03	0
	Other chlorinated hydrocarbons	mg/kg	0.01	<0.01	<0.01	0
	Other organochlorine pesticides	mg/kg	0.03	<0.03	<0.03	0
	Phenols (non-halogenated)	mg/kg	1	<1.0	<1.0	0
	Phenols(halogenated)	mg/kg	0.03	<0.03	<0.03	0
	Polycylic aromatic hydrocarbons	mg/kg	0.5	<0.5	<0.5	0
BTEX	Benzene	mg/kg	0.2	<0.2	<0.2	0
	Ethylbenzene	mg/kg	0.5	<0.5	<0.5	0
	Toluene	mg/kg	0.5	<0.5	<0.5	0
	Xylene (m & p)	mg/kg	0.5	<0.5	<0.5	0
	Xylene (o)	mg/kg	0.5	<0.5	<0.5	0
Inorganics	Cyanide Total	mg/kg	1	<1.0	<1.0	0
	Fluoride	mg/kg	40	90.0	110.0	20
	Moisture	%	1	17.7	18.5	4
Lead	Lead	mg/kg	5	10.0	9.0	11
Metals	Arsenic	mg/kg	5	<5.0	<5.0	0
	Cadmium	mg/kg	1	<1.0	<1.0	0
	Chromium (hexavalent)	mg/kg	0.5	<0.5	<0.5	0
	Copper	mg/kg	5	9.0	10.0	11
	Mercury	mg/kg	0.1	<0.1	<0.1	0
	Molybdenum	mg/kg	2	<2.0	<2.0	0
	Nickel	mg/kg	2	8.0	8.0	0
	Selenium	mg/kg	5	<5.0	<5.0	0
	Silver	mg/kg	2	<2.0	<2.0	0
	Tin	mg/kg	5	<5.0	<5.0	0
	Zinc	mg/kg	5	11.0	10.0	10
OCP	4,4-DDE	mg/kg	0.05	<0.05	<0.05	0
	a-BHC	mg/kg	0.03	<0.03	<0.03	0
	Aldrin	mg/kg	0.03	<0.03	<0.03	0
	Aldrin + Dieldrin	mg/kg	0.03	<0.03	<0.03	0
	b-BHC	mg/kg	0.03	<0.03	<0.03	0
	chlordane	mg/kg	0.03	<0.03	<0.03	0
	Chlordane (cis)	mg/kg	0.03	<0.03	<0.03	0
	Chlordane (trans)	mg/kg	0.03	<0.03	<0.03	0
	d-BHC	mg/kg	0.03	<0.03	<0.03	0
	DDD	mg/kg	0.05	<0.05	<0.05	0
	DDT	mg/kg	0.05	<0.05	<0.05	0
	DDT+DDE+DDD	mg/kg	0.05	<0.05	<0.05	0
	Dieldrin	mg/kg	0.03	<0.03	<0.03	0
	Endosulfan I	mg/kg	0.03	<0.03	<0.03	0
	Endosulfan II	mg/kg	0.03	<0.03	<0.03	0
	Endosulfan sulphate	mg/kg	0.03	<0.03	<0.03	0
	Endrin	mg/kg	0.03	<0.03	<0.03	0
	Endrin aldehyde	mg/kg	0.03	<0.03	<0.03	0
	g-BHC (Lindane)	mg/kg	0.03	<0.03	<0.03	0
	Heptachlor	mg/kg	0.03	<0.03	<0.03	0
	Heptachlor epoxide	mg/kg	0.03	<0.03	<0.03	0
	Hexachlorobenzene	mg/kg	0.03	<0.03	<0.03	0
	Methoxychlor	mg/kg	0.03	<0.03	<0.03	0
PAH/Phenols	2,4,5-trichlorophenol	mg/kg	0.05	<0.05	<0.05	0
	2,4-dichlorophenol	mg/kg	0.03	<0.03	<0.03	0
	2,4-dimethylphenol	mg/kg	1	<1.0	<1.0	0
	2-chlorophenol	mg/kg	0.03	<0.03	<0.03	0
	2-methylphenol	mg/kg	1	<1.0	<1.0	0
	3-&4-methylphenol	mg/kg	1	<1.0	<1.0	0
	Acenaphthene	mg/kg	0.5	<0.5	<0.5	0
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0
	Anthracene	mg/kg	0.5	<0.5	<0.5	0
	Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	0
	Benzo(a) pyrene	mg/kg	0.5	<0.5	<0.5	0
	Benzo(b)&(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0
	Chrysene	mg/kg	0.5	<0.5	<0.5	0
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	0
	Fluorene	mg/kg	0.5	<0.5	<0.5	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	0
	Naphthalene	mg/kg	0.5	<0.5	<0.5	0
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	0
	Phenol	mg/kg	1	<1.0	<1.0	0
	Pyrene	mg/kg	0.5	<0.5	<0.5	0
PCB	PCBs (Sum of total)	mg/kg	0.1	<0.1	<0.1	0
SVOC	2,4,6-trichlorophenol	mg/kg	0.05	<0.05	<0.05	0
	2,4-dinitrophenol	mg/kg	5	<5.0	<5.0	0
	2,6-dichlorophenol	mg/kg	0.03	<0.03	<0.03	0
	2-nitrophenol	mg/kg	1	<1.0	<1.0	0
	4,6-Dinitro-2-methylphenol	mg/kg	5	<5.0	<5.0	0
	4-chloro-3-methylphenol	mg/kg	0.03	<0.03	<0.03	0
	4-nitrophenol	mg/kg	5	<5.0	<5.0	0
	Pentachlorophenol	mg/kg	0.2	<0.2	<0.2	0
TPH	TPH C 6 - C 9 Fraction	mg/kg	10	<10.0	<10.0	0
	TPH C10 - C14 Fraction	mg/kg	50	<50.0	<50.0	0
	TPH C15 - C28 Fraction	mg/kg	100	<100.0	<100.0	0
	TPH C29-C36 Fraction	mg/kg	100	<100.0	<100.0	0
	TPH+C10 - C36 (Sum of total)	mg/kg	50	<50.0	<50.0	0
VOC	1,1,1,2-tetrachloroethane	mg/kg	0.01	<0.01	<0.01	0
	1,1,1-trichloroethane	mg/kg	0.01	<0.01	<0.01	0
	1,1,2,2-tetrachloroethane	mg/kg	0.02	<0.02	<0.02	0
	1,1,2-trichloroethane	mg/kg	0.04	<0.04	<0.04	0
	1,1-dichloroethene	mg/kg	0.01	<0.01	<0.01	0
	1,2,4-trichlorobenzene	mg/kg	0.01	<0.01	<0.01	0
	1,2-dichlorobenzene	mg/kg	0.02	<0.02	<0.02	0
	1,2-dichloroethane	mg/kg	0.02	<0.02	<0.02	0
	1,4-dichlorobenzene	mg/kg	0.02	<0.02	<0.02	0
	Carbon tetrachloride	mg/kg	0.01	<0.01	<0.01	0
	Chlorobenzene	mg/kg	0.02	<0.02	<0.02	0
	Chloroform	mg/kg	0.02	<0.02	<0.02	0
	cis-1,2-dichloroethene	mg/kg	0.01	<0.01	<0.01	0
	Dichloromethane	mg/kg	0.4	<0.4	<0.4	0
	Hexachlorobutadiene	mg/kg	0.02	<0.02	<0.02	0
	Styrene	mg/kg	0.5	<0.5	<0.5	0
	TCE	mg/kg	0.02	<0.02	<0.02	0
	Tetrachloroethene	mg/kg	0.02	<0.02	<0.02	0
	trans-1,2-dichloroethene	mg/kg	0.02	<0.02	<0.02	0
	Vinyl chloride	mg/kg	0.02	<0.02	<0.02	0

BOLD Indicates RPD Exceedance
*RPDs have only been considered where a concentration is greater than 10 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 30 (5-10 x EQL); 30 (10-30 x EQL); 30 (> 30 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories.
Any methods in the row header relate to those used in the primary laboratory

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