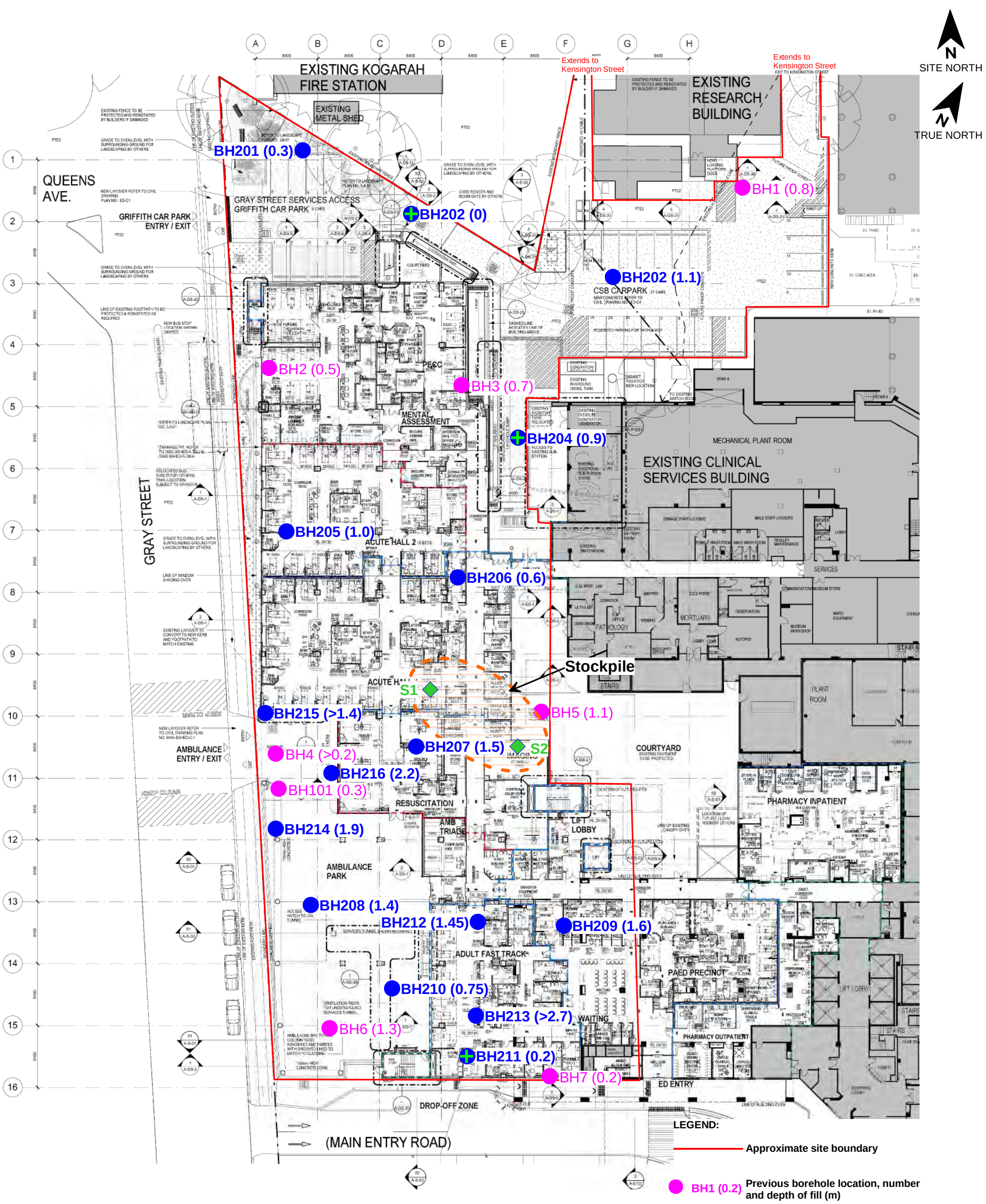

LEGEND:

- Approximate site boundary
- BH1 (0.2) — Previous borehole location, number and depth of fill (m)
- BH211 (0.2) — Additional Environmental Investigation borehole location, number and depth of fill (m)
- S2 — Stockpile sample location and number
- Monitoring well location

NOTES:

Figure 4 has been recreated from drawing SGHED-A-P-G prepared by Health Projects International (Issue T3).

The borehole/sample locations presented on this plan have been established from site measurements only and should not be construed as survey points.

Fill depths include pavement thickness where applicable.

Reference should be made to the report text for a full understanding of this plan.

Approximate Scale (m): 0 5 10 15 20 25

ENVIRONMENTAL INVESTIGATION SERVICES

Project Number:	Title:
E25264KP rpt4	BOREHOLE LOCATION PLAN
Figure: 4	Address: ST GEORGE HOSPITAL, KOGARAH, NSW

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **201** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 28-5-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■		■			0			FILL: Clayey silty sand, fine to medium grained, brown, trace of roots, fine to medium grained ironstone and igneous gravel.	M			
	■		■		N = 9 4,4,5			CH	SILTY CLAY: high plasticity, light brown mottled light grey.	MC>PL			RESIDUAL
	■					1			as above, but light grey mottled orange brown and red brown.				
	■							-	SANDSTONE: fine to medium grained, light grey and yellow brown.	XW	EL		VERY LOW 'TC' BIT RESISTANCE
										DW	VL		LOW RESISTANCE
									END OF BOREHOLE AT 1.5m				
						2							
						3							
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **202** **1/2**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** 30.41m

Date: 28-5-13 **Datum:** AHD

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■		■			0		CH	SILTY CLAY: high plasticity, light brown and orange brown.	MC>PL			RESIDUAL
	■				N = 14 7,7,7			CL	SILTY CLAY: medium plasticity, light grey mottled orange brown and red brown.	MC≈PL			
						1		-	SANDSTONE: fine to medium grained, light grey and yellow brown.	XW-DW	EL-VL		VERY LOW 'TC' BIT RESISTANCE
						2				DW	VL-L		LOW RESISTANCE
▼ AFTER 30 HRS						3							
						4					L-M		MODERATE RESISTANCE
						5					M-H		MODERATE TO HIGH RESISTANCE
						6							HIGH RESISTANCE
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **202** **2/2**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** 30.41m

Date: 28-5-13 **Datum:** AHD

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
						8			SANDSTONE: fine to medium grained, light grey and yellow brown.	DW	M-H		HIGH RESISTANCE
						9			END OF BOREHOLE AT 8.5m				'TC' BIT REFUSAL MONITORING WELL INSTALLED TO 8.5m, CLASS 18 50mm DIA. MACHINE SLOTTED PVC FROM 8.5m TO 2.5m, CASING FROM 2.5m TO SURFACE, 2mm SAND FILTER PACK FROM 8.5m TO 1.5m, BENTONITE SEAL FROM 1.5m TO 1.0m, BACKFILLED WITH SAND (AND/OR CUTTINGS) TO SURFACE AND COMPLETED WITH A STEEL GATIC COVER AND LOCKABLE CAP
						10							
						11							
						12							
						13							
						14							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **203** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 28-5-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0		-	ASPHALTIC CONCRETE: 40mm.t FILL: Gravelly silty sand, fine to medium grained, brown and grey, fine to coarse grained igneous, sandstone and shale gravel, trace of ash.	D			
	■		■		N = 14 7,8,6	1							
	■		■					CL	SILTY CLAY: medium plasticity, light grey mottled orange brown and red brown.	MC>PL			RESIDUAL
	■				N > 18 3,8,10/ 50mm								
						2			END OF BOREHOLE AT 1.85m				
						3							
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **204** **1/2**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** 29.87m

Date: 28-5-13 **Datum:** AHD

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	■		■		PID=0	0		-	BRICK PAVERS: 100mm.t FILL: Gravelly silty sand, fine to medium grained, fine to medium grained, light brown, fine to medium grained igneous, ironstone and sandstone gravel.	M			
	■		■		PID=0 N = 10 5,3,7	1		-	SHALE: grey.	XW	EL		VERY LOW 'TC' BIT RESISTANCE
	■				PID=0								
	■				PID=0 SPT 8/50mm REFUSAL	2			SANDSTONE: fine to medium grained, light grey.				
▼ AFTER 24 HRS	■				PID=0	3				DW	VL-L		LOW TO MODERATE RESISTANCE
	■				PID=0	4							
						5							
						6							MODERATE TO HIGH RESISTANCE
						7							HIGH RESISTANCE

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **204** **2/2**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** 29.87m

Date: 28-5-13 **Datum:** AHD

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
									SANDSTONE: fine to medium grained, light grey.	DW	VL-L		
▶						8							MODERATE RESISTANCE
													HIGH RESISTANCE
									END OF BOREHOLE AT 8.80m				'TC' BIT REFUSAL MONITORING WELL INSTALLED TO 8.8m, CLASS 18 50mm DIA. MACHINE SLOTTED PVC FROM 8.8m TO 2.8m, CASING FROM 2.8m TO SURFACE, 2mm SAND FILTER PACK FROM 8.8m TO 1.5m, BENTONITE SEAL FROM 1.5m TO 0.5m, BACKFILLED WITH SAND (AND/OR CUTTINGS) TO SURFACE AND COMPLETED WITH A STEEL GATIC COVER AND LOCKABLE CAP
						9							
						10							
						11							
						12							
						13							
						14							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **205** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 28-5-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0			FILL: Clayey silty sand, fine to medium grained, dark brown, trace of fine to medium grained ironstone, sandstone and igneous gravel.	M			
	■		■		N = 17 8,9,8				FILL: Silty gravel, fine to medium grained igneous, grey.				
	■		■			1		-	FILL: Gravelly silty sand, fine to medium grained, yellow brown and light grey, fine to coarse grained sandstone gravel, trace of clay.	XW	EL		VERY LOW 'TC' BIT RESISTANCE
	■								SANDSTONE: fine to medium grained, light grey and orange brown.				
									END OF BOREHOLE AT 1.5m				
						2							
						3							
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **206** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 28-5-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0		-	BRICK PAVERS: 100mm.t FILL: Silty gravel, fine to medium grained igneous, grey.	M			ROADBASE
	■				N = 11 3,4,7			CL	FILL: Gravelly silty sand, fine to medium grained, orange brown, fine to coarse grained sandstone gravel. SILTY CLAY: medium plasticity, grey.	MC>PL			RESIDUAL
						1							
									END OF BOREHOLE AT 1.5m				
						2							
						3							
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **207** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 29-5-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Gravelly silty sand, fine to medium grained, dark brown, fine to coarse grained ironstone and igneous gravel.	M			
					N = 12 6,7,5	1			FILL: Gravelly silty sand, fine to medium grained, light brown, fine to coarse grained sandstone and shale gravel, trace of clay and concrete fragments.				
					N > 10 8,10/50mm REFUSAL	2		-	SANDSTONE: fine to medium grained, light grey.	XW	EL		POSSIBLY SANDY CLAY VERY LOW 'TC' BIT RESISTANCE
						3			END OF BOREHOLE AT 3.0m				
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **208** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 5-6-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION	■		■		PID=0	0			FILL: Clayey gravelly sand, fine to medium grained, light brown, fine to coarse grained igneous gravel, trace of brick and concrete fragments, fine to coarse grained sandstone and shale gravel.	M			
	■		■		PID=0 N = 9 3,4,5	1							
								-	CONCRETE: 200mm.t				
	■				PID=0 N = 11 3,3,8			CL	SANDY CLAY: medium plasticity, light grey mottled orange brown, fine to medium grained sand.	MC>PL			RESIDUAL
	■					2		-	SANDSTONE: fine to medium grained, light grey.	XW	EL		VERY LOW 'TC' BIT RESISTANCE
	■				POD=0	3			END OF BOREHOLE AT 3.0m				
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **209** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 29-5-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0			BRICK PAVERS: 100mm.t				
								-	FILL: Silty gravel, fine to medium grained igneous, grey.	M			ROADBASE
	■		■		N = 9 6,5,4	1			FILL: Gravelly silty sand, fine to medium grained, yellow brown, orange brown and light grey, fine to coarse grained sandstone and ironstone gravel, trace of clay and fine to medium grained igneous gravel.				
									FILL: Silty sand, fine to medium grained, light brown, trace of fine to medium grained ironstone gravel.				
	■				N = 6 2,1,5	2		CL	SILTY CLAY: medium plasticity, light grey.	MC>PL			RESIDUAL
									END OF BOREHOLE AT 2.5m				
						3							
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **210** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 5-6-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■		PID=0	0			FILL: Clayey gravelly sand, fine to medium grained, light brown and brown grey, fine to coarse grained igneous, sandstone and shale gravel, trace of brick and concrete fragments.	M			
	■		■		PID=0 N > 9 4,9/150mm								
	■				REFUSAL PID=0	1		-	SANDSTONE: fine to medium grained, light grey and yellow brown.	XW	EL		VERY LOW 'TC' BIT RESISTANCE
	■				PID=0								
									END OF BOREHOLE AT 1.5m				
						2							
						3							
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **211** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** ≈ 27.28m

Date: 11/11/13 **Datum:** AHD

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION & AFTER 1 HR	■		■			0			FILL: Clayey silty sand, fine to medium grained, brown, trace fine to medium grained, ironstone, sandstone, and igneous gravel, ash slag, and concrete fragments.	M			
					N = 11 5,5,6			CL	SANDY CLAY: medium to high plasticity, light brown, light grey, and orange brown, trace fine to medium grained, ironstone gravel.				
						1		-	SANDSTONE: fine to medium grained, light grey, orange brown.	DW	L		'TC' BIT RESISTANCE
											M		MODERATE TO HIGH RESISTANCE
						2					H		HIGH RESISTANCE
	■					3							
						4							Monitoring Well Installed to 6m, Class 18 50mm dia, Machine slotted PVC from 6m to 3m, Casing from 3m to surface, 2mm sand filter pack from 6m to 2m, Bentonite seal from 2m, to 0.5m, Backfilled with sand (and/or cuttings) to surface and completed with a steel gatic cover and lockable cap.
						5							
						6			END OF BOREHOLE AT 6.0m				
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **212** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 29-5-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■		PID=0	0			FILL: Gravelly silty sand, fine to medium grained, light brown, fine to coarse grained igneous, sandstone and shale gravel, trace of brick and concrete fragments.	M			
	■		■		PID=0 N = 11 7,5,6	1							
	■				PID=0 N = 4 2,2,2	2		CL-CH	SILTY CLAY: medium to high plasticity, light grey.	MC>PL			RESIDUAL
	■				PID=0	3			END OF BOREHOLE AT 3.0m				
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **213** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** JK300 **R.L. Surface:** N/A

Date: 11/11/13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0			FILL: Clayey silty sand, fine to medium grained, brown, trace of concrete fragments, ash, slag, and silty clay nodules.	M			
	■		■		N = 17 7,7,10	1			FILL: Silty clay gravel, fine to medium grained, igneous, grey.	M			
	■		■		N = 16 4,8,8	2							
									END OF BOREHOLE AT 2.7m				'TC' BIT REFUSAL ATTEMPTED AT 2 OTHER LOCATIONS FOR SIMILAR DEPTH REFUSAL
						3							
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **214** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 29-5-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Gravelly sandy clay, low to medium plasticity, brown and yellow brown, fine to medium grained sandstone, ironstone, shale and igneous gravel.	MC>PL			
					N = 4 1,2,2	1			FILL: Gravelly silty sand, fine to medium grained, light brown, fine to coarse grained sandstone, shale gravel, trace of concrete fragments.				
								-	CONCRETE				HIFH 'TC' BIT RESISTANCE
					N = 4 3,2,2			-	FILL: Silty sandy clay, low to medium plasticity, brown and grey, trace of fine to medium grained ironstone gravel.	MC>PL			
						2		CL	SANDY SILTY CLAY: medium plasticity, light grey, fine grained sand.	MC>PL			RESIDUAL
						3			END OF BOREHOLE AT 3.0m				
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **215** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 29-5-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0			FILL: Gravelly sandy clay, medium plasticity, light grey, yellow brown and brown, fine to coarse grained sandstone gravel.	MC>PL			
	■		■		N = 4 3,2,2				FILL: Gravelly silty sand, fine to medium grained, light brown, fine to coarse grained sandstone and shale gravel, trace of clay.				
						1			CONCRETE END OF BOREHOLE AT 1.4m				HIGH 'TC' BIT RESISTANCE 'TC' BIT REFUSAL ATTEMPTED IN 3 LOCATIONS WITHIN 1m RADIUS
						2							
						3							
						4							
						5							
						6							
						7							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **216** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: A W EDWARDS PTY LTD

Project: PROPOSED NEW EMERGENCY DEPARTMENT DEVELOPMENT

Location: ST GEORGE HOSPITAL, GRAY STREET, KOGARAH, NSW

Job No. E25264KP **Method:** SPIRAL AUGER JK300 **R.L. Surface:** N/A

Date: 29-5-13 **Datum:**

Logged/Checked by: G.F./B.P.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0			FILL: Gravelly silty sand, fine to medium grained, brown, fine to coarse grained igneous, sandstone, shale and sandstone gravel.	M			
	■		■		N = 15 5,8,7				FILL: Gravelly silty sand, fine to medium grained, light brown, fine to coarse grained sandstone and shale gravel, trace of fine to medium grained igneous gravel, clay and concrete fragments.				
						1							
					SPT 2/0mm REFUSAL				CONCRETE				HIGH 'TC' BIT RESISTANCE
	■		■						FILL: Gravelly sandy clay, low plasticity, light brown, fine to coarse grained sandstone and shale gravel.	M			
						2							
	■							CL	SANDY CLAY: low plasticity, light grey.	MC≈PL			RESIDUAL
						3			END OF BOREHOLE AT 3.0m				
						4							
						5							
						6							
						7							

coffey

Piezometer Installation Log

client:	*Health Infrastructure*
principal:	
project:	*St George Hospital Site Investigation*
location:	*St George Hospital*

Hole ID.	*BH405*
sheet:	1 of 1
project no.	*GEOTLCOV25046AA*
date started:	*17 May 2014*
date completed:	*17 May 2014*
logged by:	*SP*
checked by:	*IT*

position: Not Specified | surface elevation: 28.06 m (AHD) | angle from horizontal: 90°

equipment type: Auger, Truck mounted | hole diameter : 76/100

drilling information | **material substance** | **piezometer construction details**

method & support	water	RL (m)	depth (m)	graphic log	material name
AD/T		28	1		ROAD SURFACE: CONCRETE PAVEMENT
					FILL: Gravelly CLAY
					Gravelly CLAY
		26	2		CLAY
			3		Clayey SAND
					SANDSTONE
					NO CORE
		24	4		SANDSTONE
					NO CORE
					Clayey
			5		SHALE
		22	6		
			7		SANDSTONE
NMLC					SHALE
		20	8		SANDSTONE
			9		
		18	10		
			11		

bore construction license:
drilling company:
driller:
driller's permit no.:

BH405

Grout
Bentonite
Sand
6.60 m

Borehole BH405 terminated at 12.00 m

ID	type	stick up & RL	tip depth & RL	install. date	water level
BH405	standpipe piezo.		12.00 m 16.06 m AHD	17/05/2014	

method & support
see engineering log for details

water
- 10-Oct-12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

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coffey

Piezometer Installation Log

client:	*Health Infrastructure*	Hole ID.	***BH408***
principal:		sheet:	1 of 1
project:	***St George Hospital Site Investigation***	project no.	***GEOTLCOV25046AA***
location:	***St George Hospital***	date started:	***17 Apr 2014***
		date completed:	***17 Apr 2014***
		logged by:	***SP***
		checked by:	***IT***

position: Not Specified | surface elevation: 23.50 m (AHD) | angle from horizontal: 90°

equipment type: Auger, Track mounted | hole diameter : 76/100

drilling information | **material substance** | **piezometer construction details**

method & support	water	RL (m)	depth (m)	graphic log	material name
AD/T		23	0		ROAD SURFACE: Gravelly SAND
			1		SAND
		22			Sandy CLAY
			2		SANDSTONE
NMLC		21			
			3		
		20			
			4		
		19			
			5		
		18			Borehole BH408 terminated at 5.31 m
			6		
		17			
			7		
		16			

BH408

1.00 m

bore construction license:
drilling company:
driller:
driller's permit no.:

Spoil

Bentonite

Sand

method & support
see engineering log for details

water
- 10-Oct-12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

ID	type	stick up & RL	tip depth & RL	install. date	water level
BH408	standpipe piezo.		5.31 m 18.19 m AHD		

coffey

Piezometer Installation Log

Hole ID.	**BH401**
sheet:	1 of 1
project no.	**GEOTLCOV25046AA**
date started:	**16 Apr 2014**
date completed:	**16 Apr 2014**
logged by:	**SP**
checked by:	**IT**

client: ***Health Infrastructure***

principal:

project: ***St George Hospital Site Investigation***

location: ***St George Hospital***

position: Not Specified | surface elevation: 31.80 m (AHD) | angle from horizontal: 90°

equipment type: Auger, Track mounted | hole diameter : 76/100

drilling information				material substance		piezometer construction details
method & support	water	RL (m)	depth (m)	graphic log	material name	BH401
						bore construction license: drilling company: driller: driller's permit no.:
AD/V			0		FILL: Sandy GRAVEL ROAD BASE/BASECOURSE	
					CLAY	Spoil
		30	1			
					SANDSTONE	
			2			Bentonite
		28	3			
			4			4.56 m
NMLC		26	5			
			6			Sand
		24	7			
			8			
		22	9			
			10			
		20	11		Borehole BH401 terminated at 10.54 m	

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method & support
see engineering log for details

water
- 10-Oct-12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

ID	type	stick up & RL	tip depth & RL	install. date	water level
BH401	standpipe piezo.		10.56 m 21.24 m AHD		

APPENDIX C – SITE ASSESSMENT CRITERIA

Appendix C: Site Assessment Criteria

In 2013 and since the PSI conducted by EIS, the NEPM 1999 guidance document has been amended. The NEPM 1999 (2013 amendment) provides for a risk based approach to site investigation which considers potential on and off-site human health and ecological receptors and presents soil and groundwater investigation levels for soil and water quality relating to a number of environmental values.
The NEPM 1999 (2013 amendment) criteria have been adopted for this SI and the following sections outline the assessment criteria to which the collected samples will be compared.

Land Use Scenarios

Four generic land use scenarios were used to develop trigger levels for further investigation and are based on typical settings under which people may be exposed to contaminated land. These are;

- Residential land use scenario with garden/accessible soil;
- Residential scenario with minimal opportunities for soil access;
- Public open space scenario; and
- Commercial/industrial scenario.

The trigger levels associated with each land use are inherently conservative.
Section B7 3.2.5 of the NEPM discusses sensitive populations within these land uses. For a hospital land use scenario adult workers at the hospital and infrequent visitors would be assessed for exposure against the commercial/industrial scenario. However for more sensitive groups such as the immune-suppressed, those with pre-existing illnesses or children and elderly within hospitals, the trigger values associated with commercial/industrial land use may not be sufficiently protective. Given the intended future land use is as a hospital, CH2M HILL considers it appropriate to assess potential contamination at the Site in relation to two separate land use scenarios. For workers and infrequent visitors to the Site the commercial/industrial scenario trigger values will be applied. For hospital patients the residential with minimal opportunities for soil access scenario trigger values will be applied.

Soil Assessment Criteria

Soil sample results will be compared to Tier 1 contaminant levels for both human health and ecological toxicity for commercial/industrial land and residential land use as mentioned in **Section 5.1.8.1**. Soil sample results above the trigger values provided in NEPM 1999 (2013) will require further action.

Human Health Based Criteria

One set of potential receptors are considered to include future commercial/industrial workers, intrusive maintenance workers and infrequent visitors. On this basis, investigation and screening criteria developed for the protection of commercial / industrial receptors in a low-density setting (HIL-D and Health Screening Level (HSL)-D) have been selected for use as criteria.
The second set of potential receptors is the patients at the hospital which are considered more vulnerable than the first set of potential receptors. On this basis, investigation and screening criteria developed for the protection of residential receptors with limited access to soils HIL-B and HSL-B have been selected for use as the criteria.

Health Investigation Levels

For a range of non-volatile contaminants (and not including petroleum hydrocarbons), a set of HIL-D values and a set of HIL-B values are presented in the NEPM 1999 (2013 amendment).

The HIL-D values are protective of pathways of direct contact with soil (i.e. incidental dermal contact and ingestion). These pathways are conservatively considered to be potentially active for commercial / industrial receptors down to 1 m bsl and for intrusive maintenance workers down to a depth of 2 m bsl.
The HIL-B values are protective of pathways of limited direct contact with soils by occupants of the buildings with some potential for occupants to inhale, ingest or come into direct dermal contact with dust particulates derived from the soil.

Heath Screening Levels

Vapour Pathways: For petroleum hydrocarbons, HSLs protective of human health via pathways of vapour intrusion into enclosed spaces (assuming the continued presence of the hospital on the Site) are presented in the NEPM 1999 (2013 amendment). For the purposes of screening, conservative HSLs have been selected for the following scenario:

- Volatilisation into a hospital buildings and subsequent inhalation by the most vulnerable receptors, the hospital patients;
- Volatilisation occurs through sand (the most conservative lithology); and
- Soil impacts are assumed to be present at shallow depth (0.1 m bsl). The selected criteria are therefore conservative for deeper impacts.

Direct Contact: No HSLs for direct contact pathways are presented in the NEPM 1999 (2013 amendment), however values are presented in the guidance document developed by Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) (Friebel & Nadebaum, 2011) from which the HSLs presented in the NEPM 1999 (2013 amendment) have been sourced. These values are independent of soil type and depth. The HSL-D for direct contact has been selected for workers on the Site and the HSL-B limited access to soils has been selected for patients on the Site.
Combined Exposure: To account for the potential for pathways of both vapour intrusion and direct contact to be active, HSLs protective of these pathways combined have been derived, and this derivation is presented in **Appendix B** of **Section 13** at the rear of the report.

Ecological Criteria

The ecological screening levels (ESLs) and ecological investigation levels (EILs) presented in the NEPM 1999 (2013 amendment) are derived to offer protection to the terrestrial ecosystem. Values are presented for a range of land uses and differ in the level of species protection they provide, as detailed below:

- Areas of ecological significance (99% species protection);
- Urban residential /public open space (80% species protection; or 85% species protection if the contaminant biomagnifies); or
- Commercial/industrial (60% species protection; or 65% species protection if the contaminant biomagnifies).

Site flora and fauna were identified as potential receptors on the Site. Site vegetation is sparse and consists of small grassed areas and formed garden beds with few larger trees.
The commercial/industrial land use is considered applicable for the Site. For the purposes of this screening level assessment, the EILs and ESL for commercial/industrial land use have been adopted.

Ecological Investigation Level Selection

EILs are presented in the NEPM 1999 (2013 amendment) for a limited range of contaminants. EILs are generally dependent on the ambient background concentration (ABC), as the ABC is assumed to be negligibly bioavailable, and only added contamination is likely to have adverse effects. The selection of EILs is described further in **Appendix B** of **Section 13** at the end of the report.

Ecological Screening Level Selection

The ESLs for petroleum hydrocarbons are presented for two soil types (coarse and fine grained soils). With the exception of xylenes, the ESLs for coarse grained soils are more stringent. Previous investigation reports have described the unconsolidated strata beneath the Site as either;

- Fill material consisting of gravelly sand, silty sand, sandy gravel, and gravelly clayey sand of variable colour with inclusions of igneous, ironstone and sandstone gravels, concrete fragments, ash and slag gravel and up to 1.3 m in depth; or
- Natural soils which were typically orange brown and or light grey to grey clay and extended to a maximum depth of 3.1 m.

Therefore CH2M HILL has adopted the "coarse" texture ESLs for commercial/industrial land use for samples collected from fill material and the "fine" texture ESLs for commercial/industrial land use for samples collected from natural soils.
It should be noted that ESLs apply mainly to contaminants in the top 2 m of soil at the finished surface / ground level which corresponds to the root and habitation zones of many species and were developed on the basis of fresh contamination.

Petroleum Hydrocarbon Compound Management Criteria

In addition to human health and ecological impacts there are a number of other potential impacts associated with petroleum hydrocarbon compounds (PHCs) which should be managed. PHCs can form observable LNAPL, pose potential fire and explosive hazards or affect buried infrastructure. Management limits aim to avoid or minimise the potential effects of PHCs.
Table 1B(7) within Schedule B1 of NEPM 1999 (2013 amendment) presents the management limits for TPH fractions F1-F4 in soil and these values for coarse soil in a commercial/industrial setting will be utilised for the management criteria.

Asbestos

Although the NEPM 1999 (2013 amendment) presents health screening levels for asbestos in soil, these values are only applicable for sites with historical evidence of asbestos contamination that have been subjected to soil sampling specifically for asbestos. The NEPM guidance is not applicable to asbestos materials which are wastes from demolition materials present on the surface of the land.
EIS 2014 mentions the presence of a single piece of asbestos that was thought to originate from the demolition of Griffith house. EIS 2011 reported the presence of asbestos in one borehole and this below the screening criteria utilised for the analysis. As the Site does not have historical evidence of gross asbestos contamination in the soils, soil samples from this SI will initially be analysed for the presence or absence of asbestos, in accordance with AS 4964-2004, as a screening tool. Should soil samples return positive results for asbestos this will act as a trigger for further soil investigation specifically targeting asbestos.

Aesthetics

During the investigation of soils, if odours, discolouration or deleterious material are found, soils may not be considered suitable for the current land uses and management may be required.

Comparison of Analytical Data

The statistical methodology used for comparison of the soil investigation data (for similar materials, i.e. fill, natural soil) to criteria is based on the methods referred to in the NSW EPA Sampling Design Guidelines (1995) and NEPM 1999 (2013 amendment), namely:

- Comparison of the 95% upper confidence limit of the arithmetic mean concentration (95% UCL values) of each contaminant (with the exception of asbestos) to the nominated site criterion;
- Comparison of individual analytical results to 250% of the nominated site criterion to identify contamination 'hotspots'; and
- Comparison of calculated standard deviations to a value of 50% of the nominated site criteria.

Statistical assessment will only be conducted on a sufficiently large dataset (four or more samples of similar material type). Hotspot results will also be excluded from statistical calculations.

Groundwater Assessment Criteria

The following sections detail the groundwater assessment criteria adopted for this investigation.

Groundwater Investigation Levels

The assessment of groundwater contamination will be undertaken in general accordance with the framework provided in the NEPM 1999 (2013 amendment), which presents groundwater investigation levels (GILs) for water quality relating to a number of environmental values. These values include human health (drinking water GILs are generally protective of human health), fresh water aquatic ecosystems and marine water aquatic ecosystems.
The GILs in the NEPM 1999 (2013 amendment) are based on the Australian Water Quality Guidelines (ANZECC 2000), Australian Drinking Water Guidelines (ADWG, 2011) and Guidelines for Managing Risk in Recreational Waters (GMRRW, 2008) and define acceptable water quality for various contaminants at the point of use. Use of the GILs requires an assessment to give consideration to the appropriate setting for the current and potential uses of groundwater; where available and appropriate, the GILs have been adopted as the investigation criteria for this site investigation.
Further discussion on the selection of GILs for different environmental values associated with the site is presented below.

Human Health

Groundwater beneath the Site is not considered suitable for use as drinking water due to the provision of potable water from urban treatment systems. However, other pathways by which human health receptors could be exposed include:

- Volatilisation of contaminants into buildings on the Site;
- Direct contact with groundwater (at approximately 2.0 m bsl) by intrusive maintenance workers. The potential for exposure is low, but this pathway has been considered as a conservative measure. Given the depth to groundwater over a majority of the Site, direct contact by commercial/industrial users is considered unlikely;
- Recreational contact in the Scarborough Park wetlands, Kogarah Bay or Botany Bay. The potential for exposure via these pathways is considered minimal, given the distance from the Site to these water bodies. However, for the purposes of the screening exercise, criteria protective of these pathways have been selected; and
- Potential exposure associated with groundwater abstraction. It was noted during CH2M HILL 2014 that there were 18 registered bores down gradient of groundwater flow within a radius of 500m from the Site with additional bores beyond this towards Botany Bay. The majority of the 18 bores were installed for domestic use. The abstracted groundwater may be used for various purposes including the filling of swimming pools and watering of gardens. It is also noted that there are 'market-style' gardens approximately 600m east southeast of the

Site which have the potential to use abstracted groundwater on produce grown for human consumption.

The GILs have been utilised as screening criteria as follows:

- Vapour: The GILs presented in the NEPM 1999 (2013 amendment) do not explicitly give consideration of vapour pathways. Appropriate criteria for vapour pathways are discussed below in;
- Recreational: GMRRW (2008) recommends that where the drinking water guidelines are based on a health end-point, they are multiplied by a factor of 10 to account for the reduced exposure associated with recreational water use. As such assessment criteria for recreational uses have been adopted that is equal to 10 times the health based standard for drinking water. These criteria apply to recreational water users for the Scarborough Park wetlands, Kogarah Bay, Botany Bay and groundwater used in swimming pools;
- Direct Contact: The recreational criteria that have been adopted for the protection of human health receptors are also considered appropriate for the protection of maintenance workers via pathways of direct contact with groundwater (these pathways will also be associated with reduced exposure when compared with drinking water use);
- Groundwater Abstraction: As a conservative measure the drinking water GILs have been adopted for the protection of users of abstracted groundwater for irrigation of edible crops in backyard or “market-style” gardens. The conservative nature of the criteria assumes that backyard and market-style gardeners do not follow guidelines for the use of irrigation water on edible skin or salad leaf crops which do not require cooking, making receptors are more susceptible to contamination by microorganisms. It should be noted that there is no criteria for total chromium in the GILs. For this investigation the chromium (VI) criteria has been applied as a conservative measure. Additionally there are no criteria for TRH fractions. The World Health Organisation (2008) explains that no guideline has been established for petroleum products as taste and odour will in most cases be detectable at concentrations below those concentrations of concern for health, particularly with short-term exposure; and
- Groundwater Abstraction: The ANZECC 2000 water quality for irrigation and general use have been adopted as criteria for the protection gardens irrigated with groundwater. The criteria apply to backyard and market-style gardens.

Protection of Ecosystems

Potential offsite receptors include the Scarborough Park wetlands, Botany Bay and Kogarah Bay.
In line with NEPM 1999 (2013 amendment), the ANZECC (2000) trigger values for moderately disturbed marine and freshwater systems have been adopted as screening criteria for the protection of ecosystems within Kogarah and Botany Bays (marine) and Scarborough Ponds (freshwater). Where high or moderate reliability values have been derived, these are also presented in the NEPM 1999 (2013 amendment) as GILs and correspond to the 95% species protection values (or 99% species protection values for PCoC which potentially bio-accumulate). Section 8.3.7 of the ANZECC guidance also provides low-reliability trigger values for some chemicals for which no standard ANZECC trigger values are provided; these are considered by ANZECC to be “indicative interim working levels”. These low-reliability trigger values were derived by ANZECC using either an assessment factor method or a quantitative structure-activity relationships method to calculate the toxicity to the fresh and marine species for which the guidance was developed and often a safety factor was applied. These low-reliability trigger values have been utilised in this report for a number of PCoC in preference to the adoption of standards from other jurisdictions.

Screening Criteria for Vapour Pathways

HSLs for vapour intrusion have been developed for selected petroleum compounds and fractions and are applicable to assessing the human health risk via the inhalation exposure pathway from groundwater contaminants. HSLs for various PHCs were developed by CRC CARE and have been adopted by NEPM 1999 (2013 amendment). HSLs have been adopted for BTEX, naphthalene and four petroleum hydrocarbon chain fractions ($C_6 – C_{10}$, $>C_{10} – C_{16}$, $>C_{16} – C_{34}$ and $>C_{34} – C_{40}$).
The selected HSLs are for the following scenario:

- Volatilisation into a commercial/industrial building, and subsequent inhalation by hospital patients (HSL B);
- Volatilisation occurs through sand (the most conservative lithology); and
- Groundwater present at a depth of 2 – 4m bsl.

Reference to the criteria indicates that, with the exception of benzene and TPH fractions, the HSLs are presented as NL (non-limiting) indicating that the potential risks are below the acceptable level even at solubility limits, and as such, most PHCs potential contamination will not pose risks via vapour pathways regardless of concentrations. The groundwater HSL for vapour intrusion for benzene in these site conditions is 800 µg/L. The groundwater HSL for vapour intrusion for TPH $C_6 – C_{10}$ in these site conditions is 1,000 µg/L and for TPH $C_{10} – C_{16}$ is also 1,000 µg/L.
Iit is noted that no volatile PCoC other than PHCs have been identified beneath the Site. As such, the HSLs are sufficient for the assessment of potential risks via vapour pathways.
It is noted that the potential for exposure via vapour pathways to outdoor air is negligible when compared to the potential for exposure in buildings, given the dilution which occurs in outdoor air spaces. As such, the adopted criteria are particularly conservative for areas away from buildings and vapour risks are likely to be negligible in these areas.

Other Guidelines

For TPH, there are no investigation guidelines nominated in NEPM 1999 (2013 amendment), ANZECC (2000) or ADWG (2011) for the protection of the following receptors:

- Ecological receptors; and
- Human health via direct contact pathways (i.e. for recreational and intrusive workers).

Alternative criteria have been sourced as detailed below:

Ecological

In the absence of ecological criteria for TPH in ANZECC (2000), values from other jurisdictions were considered:

- Dutch National Institute of Public Health and the Environment (Dutch) (2000) Circular on Target Values and Intervention Values for Soil Remediation, Soil Remediation Intervention Values and Indicative Levels for Serious Contamination. This guideline gives a groundwater intervention value of 600 µg/L. There is little clarity on what receptors the Dutch criteria protect and they are of limited relevance, as they are calculated as the concentration corresponding to the soil intervention values, which have little applicability to water ecosystems.
- California Regional Water Board: Californian EPA User's Guide: Derivation and Application of Environmental Screening Levels (CRWB, 2013). The values were derived based on an ecotocity bioassay. Full details of the development could not be sourced. These values have been adopted by the California Environmental Protection Agency (CALEPA), and made available from the CALEPA website at: http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml). The values are known to be utilised in other states and jurisdictions in the absence of alternate criteria.

In the absence of Australian regulatory values, or other identified regulatory values from national jurisdictions which are based on protection of water ecosystems, the CALEPA screening criteria have been adopted. While there is a level of uncertainty associated with the adopted values due to a lack of transparency in their derivation, and the fact that they have not been adopted by a national jurisdiction, these values are considered adequate for use as screening criteria given:

- The adopted values are similar in magnitude to the Dutch values, supporting their general use as screening criteria; and
- The Site is of low ecological sensitivity (it is located in a commercial/urban area and the identified potential receptors include waterways heavily impacted by urban activity).

Human Health

- In the absence of drinking water criteria for TPH in ADWG (2011), the WHO Drinking Water Guidelines (WHO, 2011) have been sourced as alternate drinking water standards. These values have been derived in general accordance with the ADWG (2011), although it is noted that there are some differences with respect to toxicity assessment and the adopted exposure assumptions. These drinking water standards are separately derived for aromatic and aliphatic TPH. In the absence of speciation data, the more stringent values for aromatic TPH have been adopted as a conservative measure. In the absence of alternative health based criteria, it is considered that these values are appropriate for use as screening criteria for drinking water.
- In accordance with GMRRW (2008), and in line with the approach for other COPC, criteria protective of direct contact by human health receptors have been developed by multiplying the health-based drinking water criteria by a factor of 10 in line to account for the reduced exposure potential associated with recreational or intrusive worker exposure (when compared with the exposure assumed in the drinking water standard).

The adopted criteria are presented in the results Tables in **Section 12** at the rear of the report. **Tables B to E** presents soil assessment criteria with **Table F and G** presenting groundwater assessment criteria.

Soil Health Screening Levels

The equation for deriving an HSL for combined pathways of direct contact and vapour intrusion is presented in CRC CARE, 2011 and is as follows:

$$HSL_{overall} = \frac{1}{\frac{1}{HSL_{Vapour}} + \frac{1}{HSL_{Direct\ Contact}}}$$

In some cases, the vapour HSL is presented as NL (or non-limiting) indicating that at Csat (the soil concentration at which the vapour phase becomes saturated) the risks are below the acceptable level, and that the contaminant cannot pose unacceptable risks regardless of concentration, In these cases, the vapour risk at Csat may still contribute to the overall level of risk, and the combined HSL is calculated as follows:

$$HSL_{overall} = HSL_{Direct\ Contact} \times (1 - HQ_{C_{Sat}})$$

If this results in an HSL below Csat, this alternative formula should be adopted:

$$HSL_{overall} = \frac{1}{\frac{HQ_{C_{Sat}}}{C_{Sat}} + \frac{1}{HSL_{Direct\ Contact}}}$$

This approach has been adopted for this site, utilising the values presented in Appendix C of the CRC CARE, 2011 to calculate criteria protective of combined pathways of direct contact and vapour intrusion.

Table 1 below presents the vapour, direct contact values utilized at this Site to calculate the combined exposure values which have been adopted as the assessment criteria.

Table 1: Soil Health Screening Levels – calculations for combined exposure (mg/kg)			
HSL-D Comm/Ind (0-1m)	**Vapour**	**Direct Contact**	**Combined**
Benzene	3	430	3
Toluene	NL	99,000	41,000
Ethylbenzene	NL	27,000	22,000
Xylenes	230	81,000	230
Napththalene	NL	11,000	2,800
C6-C10	260	26,000	260
C10-C16	NL	20,000	1,800

Table 1: Soil Health Screening Levels – calculations for combined exposure (mg/kg)			
HSL-B Residential (0-1m)	**Vapour**	**Direct Contact**	**Combined**
Benzene	11	430	3
Toluene	15000	99,000	41,000
Ethylbenzene	4300	27,000	22,000
Xylenes	3000	81,000	230
Napththalene	12	11,000	2,800
C6-C10	2600	26,000	260
C10-C16	2400	20,000	1,800

Soil Ecological Investigation Levels Selection Detail

For a number of analytes, no EILs or ESLs are presented in NEPM 1999 (2013 amendment). At this stage, no screening criteria have been adopted for these analytes, because values from other jurisdictions may not be relevant. Ecological screening criteria are dependent on the exposed species, and therefore care is required in adopting values from other countries in an Australian context. In addition, the extent to which the methodology utilised to develop screening criteria adopted from other jurisdictions reflects that adopted in the NEPM would need to be reviewed to understand the relevance of the criteria.

At this stage, assessment of those CoPC for which no ecological screening criteria are presented will focus on identifying whether impacts significantly above background are present, and qualitative discussion of the potential environmental values which could be impacted by the measured concentrations. Should impacts be identified for which additional consideration is required, further assessment and/or remediation could be undertaken as an additional phase of works.

CoPC with EILs Dependent on ABC

Added Contaminant Limit (ACL) values are presented for some metals (chromium (III), copper, lead, nickel and zinc), values applicable for areas of ecological concern have been selected, with further details about the selection process provided below. The ambient background

concentration (ABC) can be added to these ACL values to calculate the EIL for comparison with measured concentrations.

For this project, background soil data is unavailable. However, background concentrations have been estimated based on iron content and site setting as detailed in the NEPM 1999 (2013 amendment). The site-specific assumptions are detailed below:

- Iron Content - Laboratory analysis for iron concentration was not conducted as part of this assessment. Therefore CH2M HILL has adopted the most conservative value of 0.1% iron content for the purpose of EIL calculation.
- Site Setting - The site is located within NSW within an old (greater than two years) suburb, and is likely to have experienced low traffic volumes in the past.

For some contaminants, multiple ACL values are presented with the applicable value dependent on soil property data. The dependency of the ACLs to different soil properties is summarised in the Table 2 below:

Table 2: ACL Dependency on Soil Properties

Parameter	Cr (III)	Cu	Ni	Zn	Pb
pH	-	✓	-	✓	-
CEC	-	✓	✓	✓	-
% clay	✓	-	-	-	-

The site-specific assumptions are detailed below:

- CEC - For this site, the soil specific CEC has not been determined for the initial screening process, and therefore the most conservative value of CEC = 5 has been adopted.
- pH - Based on laboratory results (as presented in Section # and discussed further in Section #) the soil pH was relatively consistent across the site, and reported an average of approximately 6.7 pH units. As such CH2M HILL has adopted this value for EIL calculations.
- Clay Content - A particle size analysis was not conducted as part of this assessment, and as such the actual clay content of the soil is unknown. However the test pit logs (Appendix #) describe the soils as silty sands to sands, therefore the minimum clay content of 1% has been adopted as a conservative estimate for the purpose of EIL calculation.
- Contamination Age - As identified in Section 4, the primary potentially contaminating activity at the Site is uncontrolled filling. Given that trees at the site are tall (over 3m) and mature, and the aerial photograph for 2006 shows the site in much the same condition as it is today, CH2M HILL assume (for the purposes of EIL calculation) that the uncontrolled filling (if any) occurred more than two years ago. As such, the “aged” data tables for contaminants of concern will be used to generate the EILs.

These site-specific ACLs are then added to the ABC defined for each site to provide an EIL for comparison with the measured concentrations. For Pb, the ACLs are not dependent on soil properties, and the values for commercial/industrial land use have been selected to be added to the ABC in order to define to EIL for each site.

Selected EILs

Table 3: Ecological Investigation Levels							
	Zinc	**Copper (pH based)**	**Chromium III**	**Nickel;**	**Lead**	**Naphthalene**	**Arsenic**
ACL	230	280	190	30	1100	170	100
ABC	75	20	8	5	100	NA	NA
SQL	305	300	198	35	1200	170	100

CoPC with EILs Independent of ABC

EILs only are presented for arsenic, DDT and naphthalene. This is because the toxicity testing used to define the EIL did not clearly differentiate between background and added contaminants in the tested samples.

For these CoPC, measured concentrations are compared directly to the EILs without adjusting for background concentrations. Only a single set of EILs for these contaminants is presented in the NEPM 1999 (2013 amendment) (i.e. there are no varying values based on soil type). The values for areas of commercial/industrial land use have been selected and are adopted for comparison with measured concentrations.

Groundwater Health Investigation Levels

GMRRW (2008) recommends that where Drinking Water guidelines are based on a health end-point, they are multiplied by a factor of 10 (to account for the reduced exposure associated with recreational water use). Where drinking water guidelines are defined based on aesthetics, they are retained for recreational use. At this site, all drinking water guidelines are based on a health end point, with the exception of zinc.

Table 4 below summarises the original Drinking Water guidelines and their multiplication to the criteria adopted for this Site.

Table 4: Summary of calculation of Human Health Groundwater values				
		Australian Drinking Water Guidelines 2011	WHO Drinking Water Guidelines 2011	
Chemical Name	**Units**	**Human Health – Drinking Water**	**Human Health – Drinking Water**	**Human Health – Recreational and Maintenance Worker Values**
Benzene	µg/L	1		10
Ethylbenzene	µg/L	300		3000
Toluene	µg/L	800		8000
Xylene Total	µg/L	600		6000
C6-C10 less BTEX (F1)	mg/L		0.1[B]	1
Lead (Filtered)	mg/L	0.01		
Arsenic (Filtered)	mg/L	0.01		0.1
Cadmium (Filtered)	mg/L	0.002		0.02
Chromium (III+VI) (Filtered)	mg/L	0.05		0.5
Copper (Filtered)	mg/L	2		20
Mercury (Filtered)	mg/L	0.001		0.01
Nickel (Filtered)	mg/L	0.02		0.2
Zinc (Filtered)	mg/L	3[A]		3
C10-C16	mg/L		0.1[C]	1
C16-C34	mg/L		0.09[C]	0.9
C34-C40	mg/L		NA	NA

A The drinking water standard is driven by aesthetic/taste considerations

B No criterion developed for C6-C10 excluding BTEX. Criterion for C10-C16 adopted as a surrogate

C WHO drinking water standards are separately derived for aromatic and aliphtatic TPH. In the absence of speciation data, the more stringent values for aromatic TPH have been adopted as a conservative measure.

APPENDIX D – CH2M HILL BOREHOLE LOGS

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH501

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.9

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
0	0.0		BH501_0.1	0.1		**FILL** Consisting of Top soil, dark brown. Moist.	No visual contamination, No odour. Gravel inclusions with grass cover and root zone.
						FILL Top soil. Dark brown. Moist.	No visual contamination, No odour.
0.2						**FILL** Consisting of CLAY, medium plasticity, light grey-orange, medium stiff, Moist.	No visual contamination, No odour. Orange sandstone inclusions (possibly reworked natural).
0.4							
	0.0		BH501_0.5	0.5		**FILL** Consisting of GRAVEL, coarse grain sub angular gravel.	No visual contamination, No odour. Concrete and rock gravels.
0.6						**FILL** Consisting of sandy CLAY, medium plasticity, brown, medium stiff, Moist. >30% sub angular medium grain sand.	No visual contamination, No odour. Refusal on unknown object (possibly concrete).
	0.0		BH501_0.7	0.7			
0.8	0.0		BH501_0.8	0.8			
						End of Borehole at 0.90m	

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH501B

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.9

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
						FILL Consisting of Top soil,	No visual contamination, No odour. Gravel inclusions with grass cover and root zone.
						FILL Consisting of Top soil, dark brown. Moist.	No visual contamination, No odour.
0.2						**FILL** Consisting of CLAY, medium plasticity, light grey-orange, medium stiff.	No visual contamination, No odour. Orange sandstone inclusions (possibly reworked natural).
0.4							
						FILL Consisting of GRAVEL, , coarse grain sub angular gravel. Dense.	No visual contamination, No odour. Concrete and rock gravels.
0.6						**FILL** Consisting of CLAY, medium plasticity, brown, medium stiff, Moist.	No visual contamination, No odour. Sandstone and weathered shale gravels.
	0.0						
0.8						**SAND** Light grey, medium grain sub angular sand.	No visual contamination, No odour. Refusal on bedrock (sandstone course grained white). No samples collected as same material as BH501.
						End of Borehole at 0.90m	

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH502

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.85

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
						FILL Consisting of Roadbase with thin asphalt cover.	No obvious contamination.
0.2	0.0		BH502_0.23	0.23		**FILL** Consisting of clayey SAND, brown, medium grain sub angular sand. Some gravel.	No visual contamination, No odour. Inclusions (pink sandstone).
0.4	0.0		BH502_0.45	0.45		**FILL** Consisting of clayey SAND, brown, medium grained, moist.	No visual contamination, No odour. Inclusions (pink sandstone).
0.6	0.1		BH502_0.65	0.65		**sandy CLAY** Medium plasticity, orange, medium stiff. >30% medium grain sand.	No visual contamination, No odour. Inclusions (sandstone and ironstone). Refusal on ironstone at 0.85mbsl.
0.8							

End of Borehole at 0.85m

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH503

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.4

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
0	0.0		BH503_0.1	0.1		**FILL** Consisting of silty SAND, brown, medium grain sand. Moist.	No visual contamination, No odour.
0.2						**FILL** Consisting of GRAVEL, grey, coarse grain angular gravel. With silty sand.	Possible drainage gravel. Gravels falling in hole abandoned.
0.4						End of Borehole at 0.40m	

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH503B

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.8

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
0.2	0.0					**FILL** Consisting of silty SAND, brown, medium grain sand.	No visual contamination, No odour. Brick inclusion.
0.4	0.0		BH503_0.35	0.35		**FILL** Consisting of clayey SAND, light brown, medium grain sub angular sand.	No visual contamination, No odour. Gravel incusions (sandstone and clay cods).
0.6	0.0		BH503_0.5	0.5		**Gravel** Crushed sandstone gravels, with minor sand and clay. Light yellow-white. Moist.mediummm max grain size, highly wearthered, sub angular	No visual contamination, No odour.
0.8	0.0		BH503_0.7	0.7		**CLAY with gravel** High plasticity, light grey. 15-30% coarse grain gravel.	No visual contamination, No odour. Inclusions (sanstone and ironstone). Refusal at 0.8 mbsl on ironstone.
						End of Borehole at 0.80m	

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH504

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.4

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
			BH504_0.1	0.1		**FILL** Consisting of Top soil, dark brown.	No visual contamination, No odour. Silty sand.
0.2						**FILL** Gravelly, silty SAND. Coarse grain sub angular sand. Some coarse grain gravel.	No visual contamination, No odour. Stabilised sand. Gravel inclusions. Possible service trench or top of car park.
0.4						End of Borehole at 0.40m	

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH504B

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.4

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
						FILL Consisting of Top soil, dark brown.	No visual contamination, No odour. Silty sand.
0.2						**FILL** Consisting of gravelly, silty SAND, dark grey, coarse grain sub angular sand. Moist.	No visual contamination, No odour. Stabilised sand. Gravel inclusions. Possible service trench or top of car park.
0.4						End of Borehole at 0.40m	

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH505

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 1.4

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
0.2	0.1		BH505_0.2 and QC201/QC301	0.2		**FILL** Consisting of Bitumen/Asphalt,	No obvious staining.
						FILL Consisting of Roadbase, Moist.	No visual contamination, No odour.
0.4	0.0		BH505_0.5	0.5		**FILL** SAND. Brown, medium grain sub angular sand. Few sub angular medium grain gravel.	No visual contamination, No odour. Inclusions (grey orange mottled clay clod and white sandstone). Brick inclusion (red 1/4 size). Hand auger stopping on metal and unknown object.
0.6							
0.8							
1.0	0.1		BH505_1	1		**FILL** SAND. Yellow, medium grain sub angular sand. Few rounded coarse grain gravel.	No visual contamination, No odour. Red gravel inclusions.
1.2						**CLAY** Low plasticity, yellow, medium stiff.	No visual contamination, No odour.
	0.4		BH505_1.3	1.3		**CLAY** Medium plasticity, light grey, medium stiff.	No visual contamination, No odour.
1.4						End of Borehole at 1.40m	

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH506

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.9

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
	1.4		BH506_0.1	0.1		**FILL** Consisting of Roadbase with thin asphalt cover.	No visual contamination.
0.2	0.0		BH506_0.2 and QC202/QC302	0.2		**FILL** Consisting of SAND, brown, medium grain sub angular sand. Some sub angular medium grain gravel. Moist.	No visual contamination, No odour. Gravel rock inclusions.
0.4							
	0.1		BH506_0.55	0.55		**SAND** Yellow, medium grain sub angular sand. Some sub angular medium grain gravel. Wet.	No visual contamination, No odour. Gravel inclusions (ironstone). Refusal on ironstone at 0.9 mbsl.
0.6							
0.8							
						End of Borehole at 0.90m	

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH507

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.85

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
						FILL Consisting of Concrete,	Wet vacuum used during coring. No visable staining.
0.2	0.0		BH507_0.2	0.2		**FILL** Consisting of Roadbase, Wet.	No visual contamination, No odour.
	0.1		BH507_0.35	0.35		**CLAY** Medium plasticity, orange, stiff.	No visual contamination, No odour. Ironstone inclusions.
0.4							
	0.1		BH507_0.5	0.5		**CLAY** Medium plasticity, light grey with orange mottling, very stiff.	No visual contamination, No odour. Ironstone inclusions.
0.6							
0.8	0.1		BH507_0.8	0.8			

End of Borehole at 0.85m

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH508

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 1.1

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
0	0.0		BH508_0.1	0.1		**FILL** Consisting of Top soil, dark brown. Moist.	No visual contamination, No odour.
0.2							
0.4						**FILL** Consisting of sandy CLAY, low plasticity, dark brown, soft.	No visual contamination, No odour.
						CLAY Medium plasticity, grading from dark orange to orange with depth. Very minor sand.	No visual contamination, No odour. From 0.6 mbsl ironstone inclusions.
0.6	0.0		BH508_0.5	0.5			
0.8							
1.0	0.0		BH508_1 & QC203 & QC303	1			
						End of Borehole at 1.10m	

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

Bore No. BH509

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.71

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
0						**FILL** Consisting of Top soil, dark brown. Moist.	No visual contamination, No odour. Grass surface with root incusions.
	0.4		BH509_0.1	0.1		**silty SAND** Dark brown, medium grain sub angular sand.	No visual contamination, No odour.
0.2	0.5		BH509_0.25	0.25		**CLAY** Medium plasticity, light grey with orange mottling, stiff, Moist.	No visual contamination, No odour. Gravel inclusions (ironstone).
0.4							
0.6							
	0.4		BH509_0.7	0.7		End of Borehole at 0.71m	

Easting:
Northing:
Coordinate System:

CH2MHILL.
Lvl 7, 9 Help Street
Chatswood NSW 2067

Environmental Test Pit Log

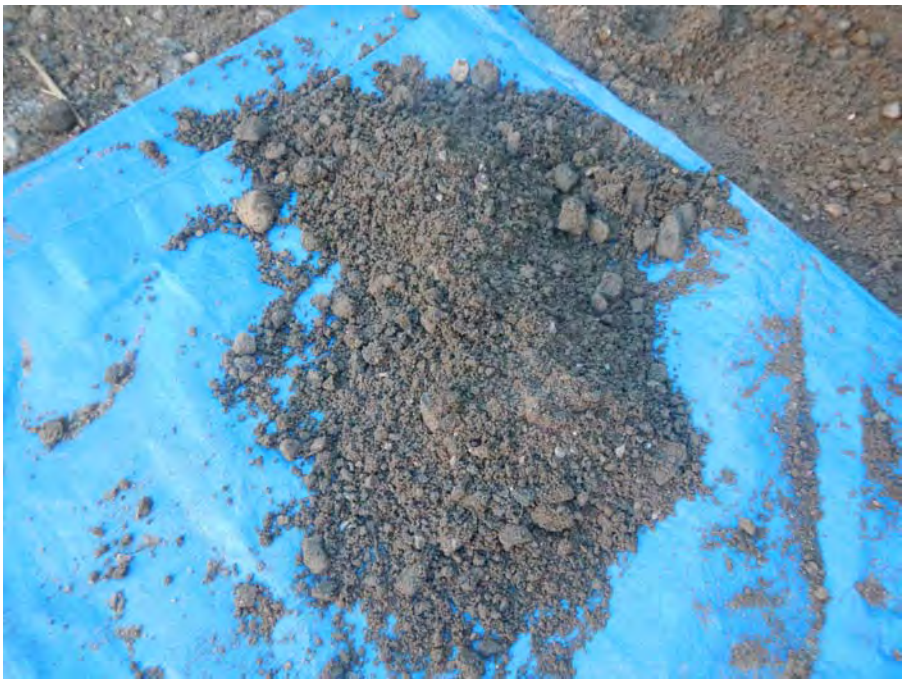
Bore No. BH510

Project No: 490810 - Health Infrastructure
Project Name: St George Hospital
Site: Gray Street, Kogarah, NSW

Date: 6/21/2014
Project Manager: SB
Checked By: LC
Logged By: TM

Drilling Contractor: Epoca Environmental
Drill Rig:
Drill Method: Hand Auger
Final Depth (mbgl): 0.85

Depth (mbgl)	PID	pH	Sample Number	Sample Depth	Graphic Log	Material Description	Comments/ Observations
0	0.3		BH510_0.1	0.1		**FILL** Consisting of gravelly, silty SAND, brown, medium grain sub angular sand. Moist.	No visual contamination, No odour. Gravel <1.5cm.
0.2							
0.4						**CLAY** Medium plasticity, orange-brown, Moist.	No visual contamination, No odour. Ironstone inclusions.
0.6	0.2		BH510_0.5	0.5			
0.8	0.2		BH510_0.75	0.75		**CLAY** Medium plasticity, light grey with orange mottling, stiff, Moist.	No visual contamination, No odour. Ironstone inclusions.
						End of Borehole at 0.85m	



Easting:
Northing:
Coordinate System:

APPENDIX E – CALIBRATION CERTIFICATES

PID Calibration Certificate

Instrument **PhoCheck Tiger**
Serial No. **T-105523**

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	**Low**	**High**	**TWA**	**STEL**
	Settings	✓	50ppm	100ppm		
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		100ppm Isobutylene	NIST	SY35		100.0 ppm

Calibrated by: SB **Sophie Boler**

Calibration date: **18/06/2014**

Next calibration due: **18/07/2014**

Multi Parameter Water Meter

Instrument **YSI Quatro Pro Plus**
Serial No. **13C100781**

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper	✓	
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		LF1041	pH 7.02
2. pH 10.00		pH 10.00		LF1239	pH 9.85
3. pH 4.00		pH 4.00		LD1784	pH 4.03
4. mV		234.0 mV		KH1997/KH1995	234.4 mV
5. EC		2.76 mS		LG1689	2.77mS
6. D.O		0 ppm		142	0.00ppm
7. Temp		20.1°C		MultiTherm	20.0°C

Calibrated by: SB. **Sophie Boler**

Calibration date: **19/06/2014**

Next calibration due: **16/12/2014**

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 11K100829

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 10.00		LG1677	pH 9.86
2. pH 4.00		pH 7.00		LF1041	pH 6.93
3. pH 10.00		pH 4.00		LD1784	pH 3.95
3. ORP		227.4mV		KH1997/KH1995	227.5mV
4. EC		2.76mS		LG1689	2.76mS
6. D.O		0.00 ppm		142	0.00ppm
7. Temp		23.0°C		MultiTherm	22.9°C

Calibrated by: SB **Sophie Boler**

Calibration date: **26/06/2014**

Next calibration due: **26/07/2014**

APPENDIX F – CHAIN OF CUSTODY AND LABORATORY REPORTS

CHAIN OF CUSTODY RECORD

CH2MHILL

COC # 1 of 1

Level 7, 9 Help Street, Chatswood, NSW 2067 Australia Tel (61 2) 9950 0200 Fax (61 2) 9950 0600
ACN 050 070 892

Project # 490810

Purchase Order # CH2M HILL Standard Quote

Project Name: St George Hospital Element 2

Company Name: CH2M HILL

Project Manager or Contact & Phone #: Susan.Barnes@CH2M.com.au

Report Copy to: Tracey.Main@CH2M.com.au

Requested Completion Date: standard turnaround

Site ID: Kogarah

Sample Disposal: water

	Sampling Date	Sampling Time	Type	Matrix	CLIENT SAMPLE ID (9 CHARACTERS)	LAB QC	TOTAL # OF CONTAINERS	Combination-3	PCB	Asbestos	Comments	Lab ID
1	16/04/2014	4:00pm	soil		BH404_0.3-0.6		1	x	x	x	Asbestos presence/absence	
2	17/04/2014	10:00am	soil		BH411_0.2-0.8		1	x	x	x	Asbestos presence/absence	

Requested Analytical Method # / Preservative

QA REQUIREMENTS

Matrix Spike	☐ Yes	☐ No
Matrix Duplicate	☐ Yes	☐ No
Laboratory Duplicate	☑ Yes	☐ No
Lab Blank	☐ Yes	☐ No
Surrogate Spike	☐ Yes	☐ No
RPDs	☐ Yes	☐ No
Spike Recovery Data	☐ Yes	☐ No

LAB USE ONLY

Custody Seals	☐ Yes	☐ No
ICE	☐ Yes	☐ No

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 109861
Date Received: 15.05.04
Time Received: Lira
Received by: 15.00
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Sampled By and Title: Matthew Dundon	(Please sign and print name)	Date / Time: 17/04/2014	
Received by: Lira	(Please sign and print name)	Date / Time: 15/04/14	
Received by	(Please sign and print name)	Date / Time	
Relinquished By: Tracey Main	(Please sign and print name)	Date / Time: 15/05/2014	
Relinquished By	(Please sign and print name)	Date / Time	
Shipped Via	Shipping #		

Special instructions:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

CH2MHILL
PO Box 5392
Chatswood NSW 1515

ph: 02 9950 0200
Fax: 02 9950 0600

Attention: Susan Barnes

Sample log in details:

Your reference:	**490810, St George Hospital Element 2**
Envirolab Reference:	**109861**
Date received:	15/05/2014
Date results expected to be reported:	**22/05/14**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	2 Soils
Turnaround time requested:	Standard
Temperature on receipt (°C)	2.4
Cooling Method:	Ice
Sampling Date Provided:	YES

Comments:

If there is sufficient sample after testing, samples will be held for the following time frames from date of receipt of samples:
Water samples - 1 month
Soil and other solid samples - 2 months
Samples collected in canisters - 1 week. Canisters will then be cleaned.
All other samples are not retained after analysis
If you require samples to be retained for longer periods then retention fees will apply as per our pricelist.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 109861

Client:
CH2MHILL
PO Box 5392
Chatswood
NSW 1515

Attention: Susan Barnes

Sample log in details:

Your Reference:	**490810, St George Hospital Element 2**
No. of samples:	2 Soils
Date samples received / completed instructions received	15/05/2014 / 15/05/2014

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	22/05/14 / 22/05/14
Date of Preliminary Report:	Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	109861-1	109861-2
Your Reference	----------	BH404	BH411
Depth	----------	0.3-0.6	0.2-0.8
Date Sampled		16/04/2014	17/04/2014
Type of sample		Soil	Soil
Date extracted	-	16/05/2014	16/05/2014
Date analysed	-	19/05/2014	19/05/2014
TRHC$_6$ - C$_9$	mg/kg	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	97	96

svTRH (C10-C40) in Soil			
Our Reference:	UNITS	109861-1	109861-2
Your Reference	----------	BH404	BH411
Depth	----------	0.3-0.6	0.2-0.8
Date Sampled		16/04/2014	17/04/2014
Type of sample		Soil	Soil
Date extracted	-	16/05/2014	16/05/2014
Date analysed	-	19/05/2014	19/05/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100
Surrogate o-Terphenyl	%	89	84

PAHs in Soil			
Our Reference:	UNITS	109861-1	109861-2
Your Reference	----------	BH404	BH411
Depth	----------	0.3-0.6	0.2-0.8
Date Sampled		16/04/2014	17/04/2014
Type of sample		Soil	Soil
Date extracted	-	16/05/2014	16/05/2014
Date analysed	-	17/05/2014	17/05/2014
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.4
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.6
Pyrene	mg/kg	0.1	0.7
Benzo(a)anthracene	mg/kg	<0.1	0.3
Chrysene	mg/kg	<0.1	0.3
Benzo(b+k)fluoranthene	mg/kg	<0.2	0.4
Benzo(a)pyrene	mg/kg	0.1	0.29
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.2
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5
Total +ve PAH's	mg/kg	0.40	3.3
Surrogate p-Terphenyl-d14	%	88	84

PCBs in Soil			
Our Reference:	UNITS	109861-1	109861-2
Your Reference	----------	BH404	BH411
Depth	----------	0.3-0.6	0.2-0.8
Date Sampled		16/04/2014	17/04/2014
Type of sample		Soil	Soil
Date extracted	-	16/05/2014	16/05/2014
Date analysed	-	16/05/2014	16/05/2014
Arochlor 1016	mg/kg	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1
Surrogate TCLMX	%	84	96

Acid Extractable metals in soil			
Our Reference:	UNITS	109861-1	109861-2
Your Reference	----------	BH404	BH411
Depth	----------	0.3-0.6	0.2-0.8
Date Sampled		16/04/2014	17/04/2014
Type of sample		Soil	Soil
Date digested	-	16/05/2014	16/05/2014
Date analysed	-	16/05/2014	16/05/2014
Arsenic	mg/kg	10	5
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	27	17
Copper	mg/kg	8	9
Lead	mg/kg	38	38
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	5	5
Zinc	mg/kg	59	38

Moisture			
Our Reference:	UNITS	109861-1	109861-2
Your Reference	----------	BH404	BH411
Depth	----------	0.3-0.6	0.2-0.8
Date Sampled		16/04/2014	17/04/2014
Type of sample		Soil	Soil
Date prepared	-	16/05/2014	16/05/2014
Date analysed	-	19/05/2014	19/05/2014
Moisture	%	12	13

Asbestos ID - soils			
Our Reference:	UNITS	109861-1	109861-2
Your Reference	----------	BH404	BH411
Depth	----------	0.3-0.6	0.2-0.8
Date Sampled		16/04/2014	17/04/2014
Type of sample		Soil	Soil
Date analysed	-	21/05/2014	21/05/2014
Sample mass tested	g	Approx 40g	Approx 40g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/05/2014	[NT]	[NT]	LCS-4	16/05/2014
Date analysed	-			17/05/2014	[NT]	[NT]	LCS-4	17/05/2014
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-4	95%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-4	95%
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	LCS-4	98%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-4	97%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-4	93%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-4	93%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-4	97%
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	93	[NT]	[NT]	LCS-4	103%
QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/05/2014	[NT]	[NT]	LCS-4	16/05/2014
Date analysed	-			19/05/2014	[NT]	[NT]	LCS-4	19/05/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-4	111%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-4	121%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-4	115%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-4	111%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-4	121%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-4	115%
Surrogate o-Terphenyl	%		Org-003	86	[NT]	[NT]	LCS-4	98%
QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/05/2014	[NT]	[NT]	LCS-4	16/05/2014
Date analysed	-			17/05/2014	[NT]	[NT]	LCS-4	17/05/2014
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	98%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	98%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	98%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	95%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	97%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-4	92%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	[NT]	[NT]	LCS-4	101%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	87	[NT]	[NT]	LCS-4	85%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/05/2014	[NT]	[NT]	LCS-4	16/05/2014
Date analysed	-			16/05/2014	[NT]	[NT]	LCS-4	16/05/2014
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-4	113%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	84	[NT]	[NT]	LCS-4	92%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date digested	-			16/05/2014	[NT]	[NT]	LCS-4	16/05/2014
Date analysed	-			16/05/2014	[NT]	[NT]	LCS-4	16/05/2014
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	LCS-4	106%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	LCS-4	110%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-4	108%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-4	108%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-4	106%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	LCS-4	86%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-4	108%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-4	106%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			16/05/2014
Date analysed	-			16/05/2014
Moisture	%	0.1	Inorg-008	[NT]

QUALITY CONTROL Asbestos ID - soils	UNITS	PQL	METHOD	Blank
Date analysed	-			[NT]

Report Comments:

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Asbestos ID was analysed by Approved Identifier: Paul Ching
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NA: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

CHAIN OF CUSTODY RECORD

CH2MHILL

Level 7, 9 Help Street, Chatswood, NSW 2067 Australia Tel (61 2) 9950 0200 Fax (61 2) 9950 0600
ACN 050 070 892

COC # 1 OF 3

Project # 490810	**Purchase Order #**
Project Name: St George Hospital	
Company Name:	
Project Manager or Contact & Phone # Susan Barnes / Tracey Main - 02 9950 0285	Report Copy to: tracey.main@ch2m.com.au susan.barnes@ch2m.com.au
Requested Completion Date: standard turnaround	Site ID:
Sample Disposal: water	

Sampling Date	Sampling Time	Type	Matrix	CLIENT SAMPLE ID (9 CHARACTERS)	LAB QC	TOTAL # OF CONTAINERS	Requested Analytical Method #										QA REQUIREMENTS		
							Combination 3a	Combination 3	PCB	Cyanide	Silver (Ag)	Asbestos	pH						
							Preservative										Matrix Spike	☐ Yes	☐ No
21/06/2014			S	BH501_0.1	1		x		x	x	x		x				Matrix Duplicate	☐ Yes	☐ No
21/06/2014			S	BH501_0.7	2		x		x				x				Laboratory Duplicate	☐ Yes	☐ No
21/06/2014			S	BH502_0.23	3		x		x	x	x		x				Lab Blank	☐ Yes	☐ No
21/06/2014			S	BH502_0.65	4			x	x				x				Surrogate Spike	☐ Yes	☐ No
21/06/2014			S	BH503_0.1	5		x		x	x	x		x				RPDs	☐ Yes	☐ No
21/06/2014			S	BH503_0.5	6			x	x				x				Spike Recovery Data	☐ Yes	☐ No
21/06/2014			S	BH504_0.1	7		x		x	x	x		x				STANDARD QAQC REPORTING		
21/06/2014			S	BH505_0.2	8		x		x	x	x		x				**LAB USE ONLY**		
21/06/2014			S	BH505_0.5	9		x		x				x				Custody Seals	☐ Yes	☐ No
21/06/2014			S	BH505_1.0	10			x	x				x				ICE	☐ Yes	☐ No
21/06/2014			S	BH506_0.1 MS	11							x	x				Comments		Lab ID

Sampled By and Title: Tracey Main (Please sign and print name)	Date / Time: 23/06/2014	Relinquished By: Tracey main (Please sign and print name)	Date / Time: 23/06/2014
Received by: Kevin (Please sign and print name)	Date / Time: 23/6/14	Relinquished By (Please sign and print name)	Date / Time
Received by (Please sign and print name)	Date / Time	Shipped Via	Shipping #
Special instructions:			

ENVIROLAB
12 Ashley St, Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 111995
Date Received: 23/6/14
Time Received: 16:30
Received by:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

CHAIN OF CUSTODY RECORD

CH2MHILL

Level 7, 9 Help Street, Chatswood, NSW 2067 Australia Tel (61 2) 9950 0200 Fax (61 2) 9950 0600
ACN 050 070 892

COC # 2 OF 3

Project # 490810	**Purchase Order #**
Project Name: St George Hospital	
Company Name:	
Project Manager or Contact & Phone # Susan Barnes / Tracey Main - 02 9950 0285	Report Copy to: tracey.main@ch2m.com.au susan.barnes@ch2m.com.au
Requested Completion Date: standard turnaround	Site ID / Sample Disposal: water

Sampling Date	Sampling Time	Type	Matrix	CLIENT SAMPLE ID (9 CHARACTERS)	LAB QC	TOTAL # OF CONTAINERS	Combination 3a	Combination 3	PCB	Cyanide	Silver (Ag)	pH
						Requested Analytical Method #						
						Preservative						
21/06/2014			S	BH506_0.2	12		x		x	x	x	x
21/06/2014			S	BH506_0.55	13			x	x			x
21/06/2014			S	BH507_0.2	14		x		x	x	x	x
21/06/2014			S	BH508_0.1	15		x		x	x	x	x
21/06/2014			S	BH508 ~~1.0~~ 0.5 (Kevin)	16			x	x			x
21/06/2014			S	BH509_0.1	17		x		x	x	x	x
21/06/2014			S	BH509_0.25	18			x	x			x
21/06/2014			S	BH510_0.1	19		x		x			x
21/06/2014			S	QC201	20		x		x	x	x	x
21/06/2014			S	QC202	21		x		x	x	x	x

QA REQUIREMENTS

Matrix Spike	☐ Yes	☐ No
Matrix Duplicate	☐ Yes	☐ No
Laboratory Duplicate	☐ Yes	☐ No
Lab Blank	☐ Yes	☐ No
Surrogate Spike	☐ Yes	☐ No
RPDs	☐ Yes	☐ No
Spike Recovery Data	☐ Yes	☐ No

STANDARD QAQC REPORTING

LAB USE ONLY

Custody Seals	☐ Yes	☐ No
ICE	☐ Yes	☐ No

Comments	Lab ID

Sampled By and Title: Tracey Main (Please sign and print name)	Date / Time 23/06/2014	Relinquished By : Tracey main (Please sign and print name)	Date / Time 23/06/2014
Received by Kevin (Please sign and print name)	Date / Time 23/6/14.	Relinquished By (Please sign and print name)	Date / Time
Received by (Please sign and print name)	Date / Time	Shipped Via	Shipping #

Special instructions:

CHAIN OF CUSTODY RECORD

CH2MHILL

Level 7, 9 Help Street, Chatswood, NSW 2067 Australia Tel (61 2) 9950 0200 Fax (61 2) 9950 0600
ACN 050 070 892

COC # 3 OF 3

Project # 490810	**Purchase Order #**
Project Name: St George Hospital	
Company Name:	
Project Manager or Contact & Phone # Susan Barnes / Tracey Main - 02 9950 0285	Report Copy to: tracey.main@ch2m.com.au susan.barnes@ch2m.com.au
Requested Completion Date: standard turnaround	Site ID / Sample Disposal: water

Sampling Date	Sampling Time	Type	Matrix	CLIENT SAMPLE ID (9 CHARACTERS)	LAB QC	TOTAL # OF CONTAINERS	Combination 3a	Combination 3	PCB	Cyanide	Asbestos	BTEX	Heavy Metals (8)	TRH
				Requested Analytical Method #										
				Preservative										
21/06/2014			W	QCRinsate	22			X	X					
21/06/2014			S	Trip blank	23							X		
21/06/2014			S	Trip spike	24							X		
20/06/2014			W	BH405	25			X		X				
20/06/2014			W	QC101	26			X		X				
20/06/2014			W	QC103	27								X	X

QA REQUIREMENTS

Matrix Spike	☐ Yes	☐ No
Matrix Duplicate	☐ Yes	☐ No
Laboratory Duplicate	☐ Yes	☐ No
Lab Blank	☐ Yes	☐ No
Surrogate Spike	☐ Yes	☐ No
RPDs	☐ Yes	☐ No
Spike Recovery Data	☐ Yes	☐ No

STANDARD QAQC REPORTING

LAB USE ONLY

Custody Seals	☐ Yes	☐ No
ICE	☐ Yes	☐ No

Comments	Lab ID

Sampled By and Title: Tracey Main (Please sign and print name)	Date / Time 23/06/2014	Relinquished By: Tracey main (Please sign and print name)	Date / Time 23/06/2014
Received by (Please sign and print name)	Date / Time 23/6/14	Relinquished By (Please sign and print name)	Date / Time
Received by (Please sign and print name)	Date / Time	Shipped Via	Shipping #

Special instructions:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

CH2MHILL
PO Box 5392
Chatswood NSW 1515

ph: 02 9950 0200
Fax: 02 9950 0600

Attention: Tracey Main, Susan Barnes

Sample log in details:

Your reference:	**490810, St Georges Hospital**
Envirolab Reference:	**111995**
Date received:	23/06/2014
Date results expected to be reported:	**30/06/14**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	23 Soils 4 Waters
Turnaround time requested:	Standard
Temperature on receipt (°C)	7.9
Cooling Method:	Ice
Sampling Date Provided:	YES

Comments:

If there is sufficient sample after testing, samples will be held for the following time frames from date of receipt of samples:
Water samples - 1 month
Soil and other solid samples - 2 months
Samples collected in canisters - 1 week. Canisters will then be cleaned.
All other samples are not retained after analysis
If you require samples to be retained for longer periods then retention fees will apply as per our pricelist.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 111995

Client:
CH2MHILL
PO Box 5392
Chatswood
NSW 1515

Attention: Tracey Main, Susan Barnes

Sample log in details:

Your Reference:	**490810, St George Hospital**
No. of samples:	23 Soils 4 Waters
Date samples received / completed instructions received	23/06/2014 / 23/06/2014

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	30/06/14 / 30/06/14
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	111995-1	111995-2	111995-3	111995-4	111995-5
Your Reference	----------	BH501	BH501	BH502	BH502	BH503
Depth	----------	0.1	0.7	0.23	0.65	0.1
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	97	97	103	96	101

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	111995-6	111995-7	111995-8	111995-9	111995-10
Your Reference	----------	BH503	BH504	BH505	BH505	BH505
Depth	----------	0.5	0.1	0.2	0.5	1.0
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	99	99	102	94	100

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	111995-12	111995-13	111995-14	111995-15	111995-16
Your Reference	----------	BH506	BH506	BH507	BH508	BH508
Depth	----------	0.2	0.55	0.2	0.1	0.5
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	100	98	99	99	98

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	111995-17	111995-18	111995-19	111995-20	111995-21
Your Reference	----------	BH509	BH509	BH510	QC201	QC202
Depth	----------	0.1	0.25	0.1	-	-
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	99	99	102	98	101

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	111995-23	111995-24
Your Reference	----------	Trip Blank	Trip Spike
Depth	----------	-	-
Date Sampled		21/06/2014	21/06/2014
Type of sample		Soil	Soil
Date extracted	-	24/06/2014	24/06/2014
Date analysed	-	27/06/2014	26/06/2014
Benzene	mg/kg	<0.2	100%
Toluene	mg/kg	<0.5	100%
Ethylbenzene	mg/kg	<1	102%
m+p-xylene	mg/kg	<2	102%
o-Xylene	mg/kg	<1	102%
Surrogate aaa-Trifluorotoluene	%	105	97

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	111995-1	111995-2	111995-3	111995-4	111995-5
Your Reference	----------	BH501	BH501	BH502	BH502	BH503
Depth	----------	0.1	0.7	0.23	0.65	0.1
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	95	91	89	89	89

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	111995-6	111995-7	111995-8	111995-9	111995-10
Your Reference	----------	BH503	BH504	BH505	BH505	BH505
Depth	----------	0.5	0.1	0.2	0.5	1.0
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	91	92	90	88	88

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	111995-12	111995-13	111995-14	111995-15	111995-16
Your Reference	----------	BH506	BH506	BH507	BH508	BH508
Depth	----------	0.2	0.55	0.2	0.1	0.5
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	91	88	88	88	87

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	111995-17	111995-18	111995-19	111995-20	111995-21
Your Reference	----------	BH509	BH509	BH510	QC201	QC202
Depth	----------	0.1	0.25	0.1	-	-
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	90	89	91	88	88

PAHs in Soil						
Our Reference:	UNITS	111995-1	111995-2	111995-3	111995-4	111995-5
Your Reference	----------	BH501	BH501	BH502	BH502	BH503
Depth	----------	0.1	0.7	0.23	0.65	0.1
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.9	<0.1	0.8
Anthracene	mg/kg	<0.1	<0.1	0.3	<0.1	0.2
Fluoranthene	mg/kg	<0.1	<0.1	1.8	<0.1	1.0
Pyrene	mg/kg	<0.1	<0.1	1.9	<0.1	1.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.8	<0.1	0.4
Chrysene	mg/kg	<0.1	<0.1	0.9	<0.1	0.5
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	1.6	<0.2	0.7
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.97	<0.05	0.40
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.8	<0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.6	<0.1	0.3
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	1.0	<0.5	1.0
Total +ve PAH's	mg/kg	NIL (+)VE	NIL (+)VE	11	NIL (+)VE	5.8
Surrogate p-Terphenyl-d14	%	110	103	102	102	99

PAHs in Soil						
Our Reference:	UNITS	111995-6	111995-7	111995-8	111995-9	111995-10
Your Reference	----------	BH503	BH504	BH505	BH505	BH505
Depth	----------	0.5	0.1	0.2	0.5	1.0
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	25/06/2014	25/06/2014	25/06/2014	24/06/2014	24/06/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	<0.1	0.2	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.3	0.2	0.4	<0.1	<0.1
Pyrene	mg/kg	0.3	0.3	0.4	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	0.1	0.2	<0.1	<0.1
Chrysene	mg/kg	0.2	0.1	0.2	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.3	0.4	0.5	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.17	0.21	0.26	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.2	0.3	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1	0.2	0.2	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	1.9	1.8	2.5	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	106	112	105	98	90

PAHs in Soil						
Our Reference:	UNITS	111995-12	111995-13	111995-14	111995-15	111995-16
Your Reference	----------	BH506	BH506	BH507	BH508	BH508
Depth	----------	0.2	0.55	0.2	0.1	0.5
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.3	0.2	<0.1	0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.6	0.2	<0.1	0.2	<0.1
Pyrene	mg/kg	0.6	0.2	<0.1	0.2	<0.1
Benzo(a)anthracene	mg/kg	0.2	<0.1	<0.1	0.1	<0.1
Chrysene	mg/kg	0.3	0.1	<0.1	0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.7	0.2	<0.2	0.3	<0.2
Benzo(a)pyrene	mg/kg	0.32	0.11	<0.05	0.13	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	0.1	<0.1	0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.3	<0.1	<0.1	0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	3.5	1.1	NIL (+)VE	1.5	NIL (+)VE
Surrogate p-Terphenyl-d14	%	103	94	97	88	86

PAHs in Soil						
Our Reference:	UNITS	111995-17	111995-18	111995-19	111995-20	111995-21
Your Reference	----------	BH509	BH509	BH510	QC201	QC202
Depth	----------	0.1	0.25	0.1	-	-
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.1	0.5	0.3
Anthracene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.3	0.6	0.5
Pyrene	mg/kg	<0.1	<0.1	0.3	0.6	0.5
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.1	0.2	0.2
Chrysene	mg/kg	<0.1	<0.1	0.2	0.2	0.3
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	0.3	0.4	0.5
Benzo(a)pyrene	mg/kg	0.09	<0.05	0.16	0.16	0.31
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	<0.1	0.2	0.2	0.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1	<0.1	0.1	0.2	0.3
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	0.38	NIL (+)VE	1.7	3.0	3.2
Surrogate p-Terphenyl-d14	%	86	119	103	114	97

PCBs in Soil						
Our Reference:	UNITS	111995-1	111995-2	111995-3	111995-4	111995-5
Your Reference	----------	BH501	BH501	BH502	BH502	BH503
Depth	----------	0.1	0.7	0.23	0.65	0.1
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	98	94	90	88	91

PCBs in Soil						
Our Reference:	UNITS	111995-6	111995-7	111995-8	111995-9	111995-10
Your Reference	----------	BH503	BH504	BH505	BH505	BH505
Depth	----------	0.5	0.1	0.2	0.5	1.0
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	93	92	92	92	90

PCBs in Soil						
Our Reference:	UNITS	111995-12	111995-13	111995-14	111995-15	111995-16
Your Reference	----------	BH506	BH506	BH507	BH508	BH508
Depth	----------	0.2	0.55	0.2	0.1	0.5
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	92	90	90	91	92

PCBs in Soil						
Our Reference:	UNITS	111995-17	111995-18	111995-19	111995-20	111995-21
Your Reference	----------	BH509	BH509	BH510	QC201	QC202
Depth	----------	0.1	0.25	0.1	-	-
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	87	92	92	89	87

Acid Extractable metals in soil						
Our Reference:	UNITS	111995-1	111995-2	111995-3	111995-4	111995-5
Your Reference	----------	BH501	BH501	BH502	BH502	BH503
Depth	----------	0.1	0.7	0.23	0.65	0.1
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Arsenic	mg/kg	<4	4	8	8	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	18	16	20	21	9
Copper	mg/kg	4	17	10	<1	9
Lead	mg/kg	4	88	88	9	21
Mercury	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	11	9	5	1	6
Zinc	mg/kg	7	75	89	5	26
Silver	mg/kg	<1	[NA]	<1	[NA]	<1

Acid Extractable metals in soil						
Our Reference:	UNITS	111995-6	111995-7	111995-8	111995-9	111995-10
Your Reference	----------	BH503	BH504	BH505	BH505	BH505
Depth	----------	0.5	0.1	0.2	0.5	1.0
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Arsenic	mg/kg	4	<4	7	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	11	21	10	12
Copper	mg/kg	13	49	15	2	<1
Lead	mg/kg	38	24	79	21	4
Mercury	mg/kg	0.5	0.3	0.1	<0.1	<0.1
Nickel	mg/kg	6	5	2	<1	1
Zinc	mg/kg	59	58	120	800	5
Silver	mg/kg	[NA]	2	<1	[NA]	[NA]

Acid Extractable metals in soil						
Our Reference:	UNITS	111995-12	111995-13	111995-14	111995-15	111995-16
Your Reference	----------	BH506	BH506	BH507	BH508	BH508
Depth	----------	0.2	0.55	0.2	0.1	0.5
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Arsenic	mg/kg	<4	<4	<4	9	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	7	13	43	41
Copper	mg/kg	20	4	60	21	<1
Lead	mg/kg	93	27	2	76	12
Mercury	mg/kg	<0.1	<0.1	<0.1	0.4	<0.1
Nickel	mg/kg	2	1	120	3	2
Zinc	mg/kg	84	74	37	36	8
Silver	mg/kg	<1	[NA]	<1	<1	[NA]

Acid Extractable metals in soil						
Our Reference:	UNITS	111995-17	111995-18	111995-19	111995-20	111995-21
Your Reference	----------	BH509	BH509	BH510	QC201	QC202
Depth	----------	0.1	0.25	0.1	-	-
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Arsenic	mg/kg	5	5	<4	4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	18	26	10	18	10
Copper	mg/kg	19	21	41	270	21
Lead	mg/kg	26	290	20	120	100
Mercury	mg/kg	<0.1	1.2	<0.1	<0.1	0.1
Nickel	mg/kg	10	1	11	14	3
Zinc	mg/kg	67	180	73	150	100
Silver	mg/kg	<1	[NA]	[NA]	<1	<1

Acid Extractable metals in soil		
Our Reference:	UNITS	111995-28
Your Reference	----------	BH501 TRIPLICATE
Depth	----------	0.1
Date Sampled		21/06/2014
Type of sample		Soil
Date digested	-	24/06/2014
Date analysed	-	24/06/2014
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	12
Copper	mg/kg	14
Lead	mg/kg	7
Mercury	mg/kg	<0.1
Nickel	mg/kg	29
Zinc	mg/kg	20
Silver	mg/kg	<1

Miscellaneous Inorg - soil						
Our Reference:	UNITS	111995-1	111995-2	111995-3	111995-4	111995-5
Your Reference	----------	BH501	BH501	BH502	BH502	BH503
Depth	----------	0.1	0.7	0.23	0.65	0.1
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014
pH 1:5 soil:water	pH Units	7.0	8.2	8.3	7.6	8.4
Total Cyanide	mg/kg	<0.5	[NA]	<0.5	[NA]	<0.5

Miscellaneous Inorg - soil						
Our Reference:	UNITS	111995-6	111995-7	111995-8	111995-9	111995-10
Your Reference	----------	BH503	BH504	BH505	BH505	BH505
Depth	----------	0.5	0.1	0.2	0.5	1.0
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014
pH 1:5 soil:water	pH Units	8.1	7.5	9.1	6.3	6.9
Total Cyanide	mg/kg	[NA]	<0.5	<0.5	[NA]	[NA]

Miscellaneous Inorg - soil						
Our Reference:	UNITS	111995-11	111995-12	111995-13	111995-14	111995-15
Your Reference	----------	BH506	BH506	BH506	BH507	BH508
Depth	----------	0.1	0.2	0.55	0.2	0.1
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014
pH 1:5 soil:water	pH Units	10.5	7.1	6.9	9.1	6.3
Total Cyanide	mg/kg	[NA]	<0.5	[NA]	<0.5	<0.5

Miscellaneous Inorg - soil						
Our Reference:	UNITS	111995-16	111995-17	111995-18	111995-19	111995-20
Your Reference	----------	BH508	BH509	BH509	BH510	QC201
Depth	----------	0.5	0.1	0.25	0.1	-
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014
pH 1:5 soil:water	pH Units	4.9	7.4	7.7	11.3	9.6
Total Cyanide	mg/kg	[NA]	<0.5	[NA]	[NA]	<0.5

Miscellaneous Inorg - soil		
Our Reference:	UNITS	111995-21
Your Reference	----------	QC202
Depth	----------	-
Date Sampled		21/06/2014
Type of sample		Soil
Date prepared	-	24/06/2014
Date analysed	-	27/06/2014
pH 1:5 soil:water	pH Units	7.2
Total Cyanide	mg/kg	<0.5

Moisture						
Our Reference:	UNITS	111995-1	111995-2	111995-3	111995-4	111995-5
Your Reference	----------	BH501	BH501	BH502	BH502	BH503
Depth	----------	0.1	0.7	0.23	0.65	0.1
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
Moisture	%	12	12	9.4	11	7.4

Moisture						
Our Reference:	UNITS	111995-6	111995-7	111995-8	111995-9	111995-10
Your Reference	----------	BH503	BH504	BH505	BH505	BH505
Depth	----------	0.5	0.1	0.2	0.5	1.0
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
Moisture	%	9.9	16	10	17	11

Moisture						
Our Reference:	UNITS	111995-12	111995-13	111995-14	111995-15	111995-16
Your Reference	----------	BH506	BH506	BH507	BH508	BH508
Depth	----------	0.2	0.55	0.2	0.1	0.5
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
Moisture	%	12	13	9.2	14	15

Moisture						
Our Reference:	UNITS	111995-17	111995-18	111995-19	111995-20	111995-21
Your Reference	----------	BH509	BH509	BH510	QC201	QC202
Depth	----------	0.1	0.25	0.1	-	-
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
Moisture	%	12	16	12	13	12

Moisture		
Our Reference:	UNITS	111995-23
Your Reference	----------	Trip Blank
Depth	----------	-
Date Sampled		21/06/2014
Type of sample		Soil
Date prepared	-	24/06/2014
Date analysed	-	25/06/2014
Moisture	%	0.1

Asbestos ID - soils						
Our Reference:	UNITS	111995-1	111995-2	111995-3	111995-5	111995-7
Your Reference	----------	BH501	BH501	BH502	BH503	BH504
Depth	----------	0.1	0.7	0.23	0.1	0.1
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/06/2014	30/06/2014	30/06/2014	30/06/2014	30/06/2014
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Brown/red fine-grained soil	Brown coarse-grained soil & rocks	Brown coarse-grained soil	Brown coarse-grained soil & rocks	Brown fine-grained soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	111995-8	111995-9	111995-11	111995-12	111995-14
Your Reference	----------	BH505	BH505	BH506	BH506	BH507
Depth	----------	0.2	0.5	0.1	0.2	0.2
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/06/2014	30/06/2014	30/06/2014	30/06/2014	30/06/2014
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Grey/beige coarse-grained soil	Beige coarse-grained soil	Brown/grey coarse-grained soil & rocks	Brown fine-grained soil	Green coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils						
Our Reference:	UNITS	111995-15	111995-17	111995-19	111995-20	111995-21
Your Reference	----------	BH508	BH509	BH510	QC201	QC202
Depth	----------	0.1	0.1	0.1	-	-
Date Sampled		21/06/2014	21/06/2014	21/06/2014	21/06/2014	21/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/06/2014	30/06/2014	30/06/2014	30/06/2014	30/06/2014
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Brown coarse-grained soil	Brown fine-grained soil	Grey/beige coarse-grained soil & rocks	Grey/beige coarse-grained soil & rocks	Brown fine-grained sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

vTRH(C6-C10)/BTEXN in Water					
Our Reference:	UNITS	111995-22	111995-25	111995-26	111995-27
Your Reference	----------	QCRinsate	BHJ405	QC101	QC103
Depth	----------	-	-	-	-
Date Sampled		21/06/2014	20/06/2014	20/06/2014	20/06/2014
Type of sample		Water	Water	Water	Water
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014
TRHC$_6$ - C$_9$	µg/L	<10	<10	<10	<10
TRHC$_6$ - C$_{10}$	µg/L	<10	<10	<10	<10
TRHC$_6$ - C$_{10}$ less BTEX (F1)	µg/L	<10	<10	<10	[NA]
Benzene	µg/L	<1	<1	<1	[NA]
Toluene	µg/L	<1	<1	<1	[NA]
Ethylbenzene	µg/L	<1	<1	<1	[NA]
m+p-xylene	µg/L	<2	<2	<2	[NA]
o-xylene	µg/L	<1	<1	<1	[NA]
Naphthalene	µg/L	<1	<1	<1	[NA]
Surrogate Dibromofluoromethane	%	102	101	101	100
Surrogate toluene-d8	%	101	99	98	98
Surrogate 4-BFB	%	101	94	93	94

svTRH (C10-C40) in Water					
Our Reference:	UNITS	111995-22	111995-25	111995-26	111995-27
Your Reference	----------	QCRinsate	BHJ405	QC101	QC103
Depth	----------	-	-	-	-
Date Sampled		21/06/2014	20/06/2014	20/06/2014	20/06/2014
Type of sample		Water	Water	Water	Water
Date extracted	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014	24/06/2014	24/06/2014
TRHC$_{10}$ - C$_{14}$	µg/L	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	µg/L	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	µg/L	<100	<100	<100	<100
TRH>C$_{10}$ - C$_{16}$	µg/L	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	µg/L				[NA]
TRH>C$_{16}$ - C$_{34}$	µg/L	<100	<100	<100	<100
TRH>C$_{34}$ - C$_{40}$	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	99	84	96	106

PAHs in Water Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ---------- -	111995-22 QCRinsate - 21/06/2014 Water	111995-25 BHJ405 - 20/06/2014 Water	111995-26 QC101 - 20/06/2014 Water
Date extracted	-	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014	24/06/2014
Naphthalene	µg/L	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1
Fluorene	µg/L	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1
Anthracene	µg/L	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1
Pyrene	µg/L	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1
Chrysene	µg/L	<1	<1	<1
Benzo(b+k)fluoranthene	µg/L	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	138	95	114

PCBs in Water		
Our Reference:	UNITS	111995-22
Your Reference	----------	QCRinsate
Depth	----------	-
Date Sampled		21/06/2014
Type of sample		Water
Date extracted	-	24/06/2014
Date analysed	-	25/06/2014
Arochlor 1016	µg/L	<2
Arochlor 1221	µg/L	<2
Arochlor 1232	µg/L	<2
Arochlor 1242	µg/L	<2
Arochlor 1248	µg/L	<2
Arochlor 1254	µg/L	<2
Arochlor 1260	µg/L	<2
Surrogate TCLMX	%	106

HM in water - total		
Our Reference:	UNITS	111995-22
Your Reference	----------	QCRinsate
Depth	----------	-
Date Sampled		21/06/2014
Type of sample		Water
Date prepared	-	24/06/2014
Date analysed	-	24/06/2014
Arsenic-Total	µg/L	<1
Cadmium-Total	µg/L	<0.1
Chromium-Total	µg/L	<1
Copper-Total	µg/L	<1
Lead-Total	µg/L	<1
Mercury-Total	µg/L	<0.05
Nickel-Total	µg/L	<1
Zinc-Total	µg/L	<1

HM in water - dissolved				
Our Reference:	UNITS	111995-25	111995-26	111995-27
Your Reference	----------	BHJ405	QC101	QC103
Depth	----------	-	-	-
Date Sampled		20/06/2014	20/06/2014	20/06/2014
Type of sample		Water	Water	Water
Date prepared	-	24/06/2014	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014	24/06/2014
Arsenic-Dissolved	µg/L	<1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1
Copper-Dissolved	µg/L	2	2	<1
Lead-Dissolved	µg/L	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	3	3	<1
Zinc-Dissolved	µg/L	23	23	<1

Miscellaneous Inorganics			
Our Reference:	UNITS	111995-25	111995-26
Your Reference	----------	BHJ405	QC101
Depth	----------	-	-
Date Sampled		20/06/2014	20/06/2014
Type of sample		Water	Water
Date prepared	-	24/06/2014	24/06/2014
Date analysed	-	24/06/2014	24/06/2014
Total Cyanide	mg/L	<0.004	<0.004

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-014	Cyanide - free, total, weak acid dissociable by segmented flow analyser (in line dialysis with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			23/06/2014	111995-1	24/06/2014 || 24/06/2014	LCS-6	23/06/2014
Date analysed	-			26/06/2014	111995-1	26/06/2014 || 26/06/2014	LCS-6	26/06/2014
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	111995-1	<25 || <25	LCS-6	110%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	111995-1	<25 || <25	LCS-6	110%
Benzene	mg/kg	0.2	Org-016	<0.2	111995-1	<0.2 || <0.2	LCS-6	111%
Toluene	mg/kg	0.5	Org-016	<0.5	111995-1	<0.5 || <0.5	LCS-6	112%
Ethylbenzene	mg/kg	1	Org-016	<1	111995-1	<1 || <1	LCS-6	109%
m+p-xylene	mg/kg	2	Org-016	<2	111995-1	<2 || <2	LCS-6	110%
o-Xylene	mg/kg	1	Org-016	<1	111995-1	<1 || <1	LCS-6	111%
naphthalene	mg/kg	1	Org-014	<1	111995-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	94	111995-1	97 || 102 || RPD: 5	LCS-6	105%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/06/2014	111995-1	24/06/2014 || 24/06/2014	LCS-6	24/06/2014
Date analysed	-			25/06/2014	111995-1	25/06/2014 || 25/06/2014	LCS-6	25/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	111995-1	<50 || <50	LCS-6	107%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	111995-1	<100 || <100	LCS-6	121%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	111995-1	<100 || <100	LCS-6	97%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	111995-1	<50 || <50	LCS-6	107%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	111995-1	<100 || <100	LCS-6	121%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	111995-1	<100 || <100	LCS-6	97%
Surrogate o-Terphenyl	%		Org-003	87	111995-1	95 || 86 || RPD: 10	LCS-6	102%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/06/2014	111995-1	24/06/2014 || 24/06/2014	LCS-6	24/06/2014
Date analysed	-			25/06/2014	111995-1	25/06/2014 || 25/06/2014	LCS-6	25/06/2014
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	LCS-6	103%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	LCS-6	98%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	LCS-6	100%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	LCS-6	97%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	LCS-6	102%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	LCS-6	99%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	111995-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	111995-1	<0.05 || <0.05	LCS-6	115%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	91	111995-1	110 || 96 || RPD: 14	LCS-6	101%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/06/2014	111995-1	24/06/2014 || 24/06/2014	LCS-6	24/06/2014
Date analysed	-			23/06/2014	111995-1	26/06/2014 || 26/06/2014	LCS-6	26/06/2014
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	111995-1	<0.1 || <0.1	LCS-6	100%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	111995-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	88	111995-1	98 || 88 || RPD: 11	LCS-6	89%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date digested	-			24/06/2014	111995-1	24/06/2014 || 24/06/2014	LCS-9	24/06/2014
Date analysed	-			24/06/2014	111995-1	24/06/2014 || 24/06/2014	LCS-9	24/06/2014
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	111995-1	<4 || <4	LCS-9	92%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	111995-1	<0.4 || <0.4	LCS-9	100%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	111995-1	18 || 13 || RPD: 32	LCS-9	98%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	111995-1	4 || 12 || RPD: 100	LCS-9	99%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	111995-1	4 || 7 || RPD: 55	LCS-9	96%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	111995-1	<0.1 || <0.1	LCS-9	96%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	111995-1	11 || 27 || RPD: 84	LCS-9	96%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	111995-1	7 || 20 || RPD: 96	LCS-9	97%
Silver	mg/kg	1	Metals-020 ICP-AES	<1	111995-1	<1 || <1	LCS-9	91%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			24/06/2014	111995-1	24/06/2014 || 24/06/2014	LCS-1	24/06/2014
Date analysed	-			27/06/2014	111995-1	27/06/2014 || 27/06/2014	LCS-1	27/06/2014
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	111995-1	7.0 || 6.8 || RPD: 3	LCS-1	101%
Total Cyanide	mg/kg	0.5	Inorg-014	<0.5	111995-1	<0.5 || <0.5	LCS-1	111%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			[NT]
Date analysed	-			[NT]
Moisture	%	0.1	Inorg-008	<0.1

QUALITY CONTROL Asbestos ID - soils	UNITS	PQL	METHOD	Blank
Date analysed	-			[NT]

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/06/2014	[NT]	[NT]	LCS-W1	24/06/2014
Date analysed	-			24/06/2014	[NT]	[NT]	LCS-W1	24/06/2014
TRH C_6 - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	109%
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	109%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	111%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	110%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	110%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W1	108%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	110%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	99	[NT]	[NT]	LCS-W1	99%
Surrogate toluene-d8	%		Org-016	99	[NT]	[NT]	LCS-W1	100%
Surrogate 4-BFB	%		Org-016	97	[NT]	[NT]	LCS-W1	100%

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/06/2014	111995-27	24/06/2014 || 24/06/2014	LCS-W1	24/06/2014
Date analysed	-			24/06/2014	111995-27	24/06/2014 || 24/06/2014	LCS-W1	24/06/2014
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	111995-27	<50 || <50	LCS-W1	68%
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	111995-27	<100 || <100	LCS-W1	66%
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	111995-27	<100 || <100	LCS-W1	91%
TRH>C_{10} - C_{16}	µg/L	50	Org-003	<50	111995-27	<50 || <50	LCS-W1	68%
TRH>C_{16} - C_{34}	µg/L	100	Org-003	<100	111995-27	<100 || <100	LCS-W1	66%
TRH>C_{34} - C_{40}	µg/L	100	Org-003	<100	111995-27	<100 || <100	LCS-W1	91%
Surrogate o-Terphenyl	%		Org-003	115	111995-27	106 || 89 || RPD: 17	LCS-W1	83%
QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/06/2014	[NT]	[NT]	LCS-W1	24/06/2014
Date analysed	-			25/06/2014	[NT]	[NT]	LCS-W1	24/06/2014
Naphthalene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	81%
Acenaphthylene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	73%
Phenanthrene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	72%
Anthracene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	62%
Pyrene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	65%
Benzo(a)anthracene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	73%
Benzo(b+k)fluoranthene	µg/L	2	Org-012 subset	<2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	79%
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	82	[NT]	[NT]	LCS-W1	77%

QUALITY CONTROL PCBs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/06/2014	[NT]	[NT]	LCS-W1	24/06/2014
Date analysed	-			25/06/2014	[NT]	[NT]	LCS-W1	25/06/2014
Arochlor 1016	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	µg/L	2	Org-006	<2	[NT]	[NT]	LCS-W1	116%
Arochlor 1260	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	112	[NT]	[NT]	LCS-W1	99%

QUALITY CONTROL HM in water - total	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			24/06/2014	[NT]	[NT]	LCS-W1	24/06/2014
Date analysed	-			24/06/2014	[NT]	[NT]	LCS-W1	24/06/2014
Arsenic-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	96%
Cadmium-Total	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-W1	97%
Chromium-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	90%
Copper-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	96%
Lead-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	99%
Mercury-Total	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-W1	88%
Nickel-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	93%
Zinc-Total	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	93%

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			24/06/2014	[NT]	[NT]	LCS-W2	24/06/2014
Date analysed	-			24/06/2014	[NT]	[NT]	LCS-W2	24/06/2014
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	96%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-W2	92%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	92%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	98%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	100%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-W2	88%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	96%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W2	94%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			23/06/2014	[NT]	[NT]	LCS-1	24/06/2014
Date analysed	-			23/06/2014	[NT]	[NT]	LCS-1	24/06/2014
Total Cyanide	mg/L	0.004	Inorg-014	<0.004	[NT]	[NT]	LCS-1	108%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	111995-12	24/06/2014 || 24/06/2014	LCS-7	23/06/2014
Date analysed	-	111995-12	26/06/2014 || 26/06/2014	LCS-7	26/06/2014
TRHC_6 - C_9	mg/kg	111995-12	<25 || <25	LCS-7	107%
TRHC_6 - C_{10}	mg/kg	111995-12	<25 || <25	LCS-7	107%
Benzene	mg/kg	111995-12	<0.2 || <0.2	LCS-7	109%
Toluene	mg/kg	111995-12	<0.5 || <0.5	LCS-7	110%
Ethylbenzene	mg/kg	111995-12	<1 || <1	LCS-7	105%
m+p-xylene	mg/kg	111995-12	<2 || <2	LCS-7	106%
o-Xylene	mg/kg	111995-12	<1 || <1	LCS-7	107%
naphthalene	mg/kg	111995-12	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	111995-12	100 || 99 || RPD: 1	LCS-7	99%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	111995-12	24/06/2014 || 24/06/2014	111995-2	24/06/2014
Date analysed	-	111995-12	25/06/2014 || 25/06/2014	111995-2	25/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	111995-12	<50 || <50	111995-2	105%
TRHC$_{15}$ - C$_{28}$	mg/kg	111995-12	<100 || <100	111995-2	120%
TRHC$_{29}$ - C$_{36}$	mg/kg	111995-12	<100 || <100	111995-2	97%
TRH>C$_{10}$-C$_{16}$	mg/kg	111995-12	<50 || <50	111995-2	105%
TRH>C$_{16}$-C$_{34}$	mg/kg	111995-12	<100 || <100	111995-2	121%
TRH>C$_{34}$-C$_{40}$	mg/kg	111995-12	<100 || <100	111995-2	97%
Surrogate o-Terphenyl	%	111995-12	91 || 88 || RPD: 3	111995-2	100%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	111995-12	24/06/2014 || 24/06/2014	111995-2	24/06/2014
Date analysed	-	111995-12	24/06/2014 || 24/06/2014	111995-2	25/06/2014
Naphthalene	mg/kg	111995-12	<0.1 || <0.1	111995-2	101%
Acenaphthylene	mg/kg	111995-12	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	111995-12	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	111995-12	<0.1 || <0.1	111995-2	97%
Phenanthrene	mg/kg	111995-12	0.3 || 0.3 || RPD: 0	111995-2	98%
Anthracene	mg/kg	111995-12	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	111995-12	0.6 || 0.5 || RPD: 18	111995-2	98%
Pyrene	mg/kg	111995-12	0.6 || 0.5 || RPD: 18	111995-2	98%
Benzo(a)anthracene	mg/kg	111995-12	0.2 || 0.2 || RPD: 0	[NR]	[NR]
Chrysene	mg/kg	111995-12	0.3 || 0.3 || RPD: 0	111995-2	98%
Benzo(b+k)fluoranthene	mg/kg	111995-12	0.7 || 0.5 || RPD: 33	[NR]	[NR]
Benzo(a)pyrene	mg/kg	111995-12	0.32 || 0.29 || RPD: 10	111995-2	114%
Indeno(1,2,3-c,d)pyrene	mg/kg	111995-12	0.3 || 0.3 || RPD: 0	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	111995-12	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	111995-12	0.3 || 0.2 || RPD: 40	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	111995-12	103 || 96 || RPD: 7	111995-2	98%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	111995-12	24/06/2014 || 24/06/2014	111995-2	24/06/2014
Date analysed	-	111995-12	26/06/2014 || 26/06/2014	111995-2	26/06/2014
Arochlor 1016	mg/kg	111995-12	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	111995-12	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	111995-12	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	111995-12	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	111995-12	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	111995-12	<0.1 || <0.1	111995-2	99%
Arochlor 1260	mg/kg	111995-12	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	111995-12	92 || 91 || RPD: 1	111995-2	86%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	111995-12	24/06/2014 || 24/06/2014	LCS-10	24/06/2014
Date analysed	-	111995-12	24/06/2014 || 24/06/2014	LCS-10	24/06/2014
Arsenic	mg/kg	111995-12	<4 || <4	LCS-10	93%
Cadmium	mg/kg	111995-12	<0.4 || <0.4	LCS-10	101%
Chromium	mg/kg	111995-12	8 || 7 || RPD: 13	LCS-10	99%
Copper	mg/kg	111995-12	20 || 20 || RPD: 0	LCS-10	99%
Lead	mg/kg	111995-12	93 || 92 || RPD: 1	LCS-10	97%
Mercury	mg/kg	111995-12	<0.1 || 0.1	LCS-10	95%
Nickel	mg/kg	111995-12	2 || 2 || RPD: 0	LCS-10	98%
Zinc	mg/kg	111995-12	84 || 83 || RPD: 1	LCS-10	97%
Silver	mg/kg	111995-12	<1 || <1	LCS-10	87%
QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	111995-21	24/06/2014 || 24/06/2014	111995-3	24/06/2014
Date analysed	-	111995-21	27/06/2014 || 27/06/2014	111995-3	27/06/2014
Total Cyanide	mg/kg	111995-21	<0.5 || <0.5	111995-3	114%
QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	111995-21	24/06/2014 || 24/06/2014	111995-2	23/06/2014
Date analysed	-	111995-21	26/06/2014 || 26/06/2014	111995-2	26/06/2014
$TRHC_6$ - C_9	mg/kg	111995-21	<25 || <25	111995-2	102%
$TRHC_6$ - C_{10}	mg/kg	111995-21	<25 || <25	111995-2	102%
Benzene	mg/kg	111995-21	<0.2 || <0.2	111995-2	103%
Toluene	mg/kg	111995-21	<0.5 || <0.5	111995-2	105%
Ethylbenzene	mg/kg	111995-21	<1 || <1	111995-2	101%
m+p-xylene	mg/kg	111995-21	<2 || <2	111995-2	100%
o-Xylene	mg/kg	111995-21	<1 || <1	111995-2	104%
naphthalene	mg/kg	111995-21	<1 || <1	[NR]	[NR]

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Surrogate aaa-Trifluorotoluene	%	111995-21	101 || 97 || RPD: 4	111995-2	102%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	111995-21	24/06/2014 || 24/06/2014
Date analysed	-	111995-21	25/06/2014 || 25/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	111995-21	<50 || <50
TRHC$_{15}$ - C$_{28}$	mg/kg	111995-21	<100 || <100
TRHC$_{29}$ - C$_{36}$	mg/kg	111995-21	<100 || <100
TRH>C$_{10}$-C$_{16}$	mg/kg	111995-21	<50 || <50
TRH>C$_{16}$-C$_{34}$	mg/kg	111995-21	<100 || <100
TRH>C$_{34}$-C$_{40}$	mg/kg	111995-21	<100 || <100
Surrogate o-Terphenyl	%	111995-21	88 || 88 || RPD: 0

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	111995-21	24/06/2014 || 24/06/2014
Date analysed	-	111995-21	24/06/2014 || 24/06/2014
Naphthalene	mg/kg	111995-21	<0.1 || <0.1
Acenaphthylene	mg/kg	111995-21	<0.1 || <0.1
Acenaphthene	mg/kg	111995-21	<0.1 || <0.1
Fluorene	mg/kg	111995-21	<0.1 || <0.1
Phenanthrene	mg/kg	111995-21	0.3 || 0.2 || RPD: 40
Anthracene	mg/kg	111995-21	<0.1 || <0.1
Fluoranthene	mg/kg	111995-21	0.5 || 0.4 || RPD: 22
Pyrene	mg/kg	111995-21	0.5 || 0.4 || RPD: 22
Benzo(a)anthracene	mg/kg	111995-21	0.2 || 0.1 || RPD: 67
Chrysene	mg/kg	111995-21	0.3 || 0.2 || RPD: 40
Benzo(b+k)fluoranthene	mg/kg	111995-21	0.5 || 0.4 || RPD: 22
Benzo(a)pyrene	mg/kg	111995-21	0.31 || 0.23 || RPD: 30
Indeno(1,2,3-c,d)pyrene	mg/kg	111995-21	0.3 || 0.3 || RPD: 0
Dibenzo(a,h)anthracene	mg/kg	111995-21	<0.1 || <0.1
Benzo(g,h,i)perylene	mg/kg	111995-21	0.3 || 0.2 || RPD: 40
Surrogate p-Terphenyl-d14	%	111995-21	97 || 93 || RPD: 4

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	111995-21	24/06/2014 || 24/06/2014
Date analysed	-	111995-21	26/06/2014 || 26/06/2014
Arochlor 1016	mg/kg	111995-21	<0.1 || <0.1
Arochlor 1221	mg/kg	111995-21	<0.1 || <0.1
Arochlor 1232	mg/kg	111995-21	<0.1 || <0.1
Arochlor 1242	mg/kg	111995-21	<0.1 || <0.1
Arochlor 1248	mg/kg	111995-21	<0.1 || <0.1
Arochlor 1254	mg/kg	111995-21	<0.1 || <0.1
Arochlor 1260	mg/kg	111995-21	<0.1 || <0.1
Surrogate TCLMX	%	111995-21	87 || 90 || RPD: 3

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	111995-21	24/06/2014 || 24/06/2014	111995-2	24/06/2014
Date analysed	-	111995-21	24/06/2014 || 24/06/2014	111995-2	24/06/2014
Arsenic	mg/kg	111995-21	5 || 6 || RPD: 18	111995-2	92%
Cadmium	mg/kg	111995-21	<0.4 || <0.4	111995-2	90%
Chromium	mg/kg	111995-21	10 || 11 || RPD: 10	111995-2	96%
Copper	mg/kg	111995-21	21 || 22 || RPD: 5	111995-2	95%
Lead	mg/kg	111995-21	100 || 110 || RPD: 10	111995-2	82%
Mercury	mg/kg	111995-21	0.1 || 0.1 || RPD: 0	111995-2	96%
Nickel	mg/kg	111995-21	3 || 3 || RPD: 0	111995-2	75%
Zinc	mg/kg	111995-21	100 || 110 || RPD: 10	111995-2	85%
Silver	mg/kg	111995-21	<1 || <1	111995-2	106%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	111995-11	24/06/2014 || 24/06/2014	LCS-2	24/06/2014
Date analysed	-	111995-11	27/06/2014 || 27/06/2014	LCS-2	27/06/2014
pH 1:5 soil:water	pH Units	111995-11	10.5 || 10.5 || RPD: 0	LCS-2	101%
Total Cyanide	mg/kg	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	111995-1	24/06/2014 || 24/06/2014
Date analysed	-	111995-1	27/06/2014 || 27/06/2014
pH 1:5 soil:water	pH Units	111995-1	7.0 || 6.8 || RPD: 3
Total Cyanide	mg/kg	111995-1	<0.5 || <0.5

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	111995-21	24/06/2014 || 24/06/2014
Date analysed	-	111995-21	27/06/2014 || 27/06/2014
pH 1:5 soil:water	pH Units	111995-21	7.2 || [N/T]
Total Cyanide	mg/kg	111995-21	<0.5 || <0.5

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	111995-11	24/06/2014 || 24/06/2014
Date analysed	-	111995-11	27/06/2014 || 27/06/2014
pH 1:5 soil:water	pH Units	111995-11	10.5 || 10.5 || RPD: 0
Total Cyanide	mg/kg	[NT]	[NT]

Report Comments:

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteriae has been exceeded for 111995-1 for Cu, Pb, Ni & Zn. Therefore a triplicate result has been issued as laboratory sample number 111995-28.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Asbestos ID was analysed by Approved Identifier: Matt Mansfield
Asbestos ID was authorised by Approved Signatory: Matt Mansfield

INS: Insufficient sample for this test
NA: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

9-8°C

CHAIN OF CUSTODY RECORD

CH2MHILL

Level 7, 9 Help Street, Chatswood, NSW 2067 Australia Tel (61 2) 9950 0200 Fax (61 2) 9950 0600
ACN 050 070 892

COC # 1 OF 1

Project # 490810

Purchase Order #

Project Name: St George Hospital

Company Name:

Project Manager or Contact & Phone #: Susan Barnes / Tracey Main - 02 9950 0285

Report Copy to: tracey.main@ch2m.com.au, susan.barnes@ch2m.com.au

Requested Completion Date: 48 hour TAT

Site ID:

Sample Disposal: water

Requested Analytical Method #: Combination 3a, PCB, pH

	Sampling Date	Sampling Time	Type	Matrix	CLIENT SAMPLE ID (9 CHARACTERS)	LAB QC	TOTAL # OF CONTAINERS	Combination 3a	PCB	pH
1	25/06/2014			S	BH406_0.15-0.2			x	x	x
2	25/06/2014			S	BH406_0.4-0.5			x	x	x

Preservative:

QA REQUIREMENTS

Matrix Spike	☐ Yes	☐ No
Matrix Duplicate	☐ Yes	☐ No
Laboratory Duplicate	☐ Yes	☐ No
Lab Blank	☐ Yes	☐ No
Surrogate Spike	☐ Yes	☐ No
RPDs	☐ Yes	☐ No
Spike Recovery Data	☐ Yes	☐ No

STANDARD QAQC REPORTING

LAB USE ONLY

Custody Seals	☐ Yes	☐ No
ICE	☐ Yes	☐ No

Comments	Lab ID

Sampled By and Title: Stefano Pirello (Coffey) (Please sign and print name)	Date / Time 25/06/2014	Relinquished By : Tracey main (Please sign and print name)		Date / Time 26/06/2014
Received by Sophie (Please sign and print name)	Date / Time 26/06	Relinquished By (Please sign and print name)		Date / Time
Received by (Please sign and print name)	Date / Time	Shipped Via	Shipping #	

Special instructions:

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6…

Job No: 112191
Date Received: 26/06
Time Received: 16:00
Received by: SK
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

CH2MHILL
PO Box 5392
Chatswood NSW 1515

ph: 02 9950 0200
Fax: 02 9950 0600

Attention: Susan Barnes

Sample log in details:

Your reference:	**490810, St George Hospital**
Envirolab Reference:	**112191**
Date received:	26/06/14
Date results expected to be reported:	**30/06/14**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	2 Soils
Turnaround time requested:	48hr
Temperature on receipt (°C)	9.8
Cooling Method:	Ice
Sampling Date Provided:	YES

Comments:

If there is sufficient sample after testing, samples will be held for the following time frames from date of receipt of samples:
Water samples - 1 month
Soil and other solid samples - 2 months
Samples collected in canisters - 1 week. Canisters will then be cleaned.
All other samples are not retained after analysis
If you require samples to be retained for longer periods then retention fees will apply as per our pricelist.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 112191

Client:
CH2MHILL
PO Box 5392
Chatswood
NSW 1515

Attention: Susan Barnes

Sample log in details:

Your Reference:	**490810, St George Hospital**		
No. of samples:	2 Soils		
Date samples received / completed instructions received	26/06/14	/	26/06/14

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	30/06/14	/	30/06/14
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	112191-1	112191-2
Your Reference	----------	BH406	BH406
Depth	----------	0.15-0.2	0.4-0.5
Date Sampled		25/06/2014	25/06/2014
Type of sample		Soil	Soil
Date extracted	-	27/06/2014	27/06/2014
Date analysed	-	29/06/2014	29/06/2014
TRHC$_6$ - C$_9$	mg/kg	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	1	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	89	95

svTRH (C10-C40) in Soil			
Our Reference:	UNITS	112191-1	112191-2
Your Reference	----------	BH406	BH406
Depth	----------	0.15-0.2	0.4-0.5
Date Sampled		25/06/2014	25/06/2014
Type of sample		Soil	Soil
Date extracted	-	27/06/2014	27/06/2014
Date analysed	-	27/06/2014	27/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100
Surrogate o-Terphenyl	%	103	99

PAHs in Soil			
Our Reference:	UNITS	112191-1	112191-2
Your Reference	----------	BH406	BH406
Depth	----------	0.15-0.2	0.4-0.5
Date Sampled		25/06/2014	25/06/2014
Type of sample		Soil	Soil
Date extracted	-	27/06/2014	27/06/2014
Date analysed	-	28/06/2014	28/06/2014
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.1
Pyrene	mg/kg	0.1	0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.1	0.07
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5
Total +ve PAH's	mg/kg	0.39	0.27
Surrogate p-Terphenyl-d14	%	104	106

PCBs in Soil			
Our Reference:	UNITS	112191-1	112191-2
Your Reference	----------	BH406	BH406
Depth	----------	0.15-0.2	0.4-0.5
Date Sampled		25/06/2014	25/06/2014
Type of sample		Soil	Soil
Date extracted	-	27/06/2014	27/06/2014
Date analysed	-	30/06/2014	30/06/2014
Arochlor 1016	mg/kg	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1
Surrogate TCLMX	%	100	100

Acid Extractable metals in soil			
Our Reference:	UNITS	112191-1	112191-2
Your Reference	----------	BH406	BH406
Depth	----------	0.15-0.2	0.4-0.5
Date Sampled		25/06/2014	25/06/2014
Type of sample		Soil	Soil
Date digested	-	27/06/2014	27/06/2014
Date analysed	-	30/06/2014	30/06/2014
Arsenic	mg/kg	8	20
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	19	21
Copper	mg/kg	4	8
Lead	mg/kg	75	140
Mercury	mg/kg	<0.1	0.3
Nickel	mg/kg	3	5
Zinc	mg/kg	36	96

Miscellaneous Inorg - soil			
Our Reference:	UNITS	112191-1	112191-2
Your Reference	----------	BH406	BH406
Depth	----------	0.15-0.2	0.4-0.5
Date Sampled		25/06/2014	25/06/2014
Type of sample		Soil	Soil
Date prepared	-	27/06/2014	27/06/2014
Date analysed	-	27/06/2014	27/06/2014
pH 1:5 soil:water	pH Units	7.9	8.3

Moisture			
Our Reference:	UNITS	112191-1	112191-2
Your Reference	----------	BH406	BH406
Depth	----------	0.15-0.2	0.4-0.5
Date Sampled		25/06/2014	25/06/2014
Type of sample		Soil	Soil
Date prepared	-	27/06/2014	27/06/2014
Date analysed	-	30/06/2014	30/06/2014
Moisture	%	18	13

Asbestos ID - soils			
Our Reference:	UNITS	112191-1	112191-2
Your Reference	----------	BH406	BH406
Depth	----------	0.15-0.2	0.4-0.5
Date Sampled		25/06/2014	25/06/2014
Type of sample		Soil	Soil
Date analysed	-	30/06/2014	30/06/2014
Sample mass tested	g	Approx 40g	Approx 40g
Sample Description	-	Beige/red coarse-grained soil	Beige/red coarse-grained soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			27/06/2014	[NT]	[NT]	LCS-4	27/06/2014
Date analysed	-			29/06/2014	[NT]	[NT]	LCS-4	29/06/2014
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-4	112%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-4	112%
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	LCS-4	112%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-4	115%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-4	110%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-4	111%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-4	113%
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	107	[NT]	[NT]	LCS-4	109%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			27/06/2014	[NT]	[NT]	LCS-3	27/06/2014
Date analysed	-			27/06/2014	[NT]	[NT]	LCS-3	27/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-3	107%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-3	117%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-3	96%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-3	107%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-3	117%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-3	96%
Surrogate o-Terphenyl	%		Org-003	102	[NT]	[NT]	LCS-3	61%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			27/06/2014	[NT]	[NT]	LCS-3	27/06/2014
Date analysed	-			28/06/2014	[NT]	[NT]	LCS-3	28/06/2014
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-3	95%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-3	94%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-3	95%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-3	93%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-3	95%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-3	91%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	[NT]	[NT]	LCS-3	102%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	89	[NT]	[NT]	LCS-3	106%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			27/06/2014	[NT]	[NT]	LCS-2	27/06/2014
Date analysed	-			30/06/2014	[NT]	[NT]	LCS-2	30/06/2014
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-2	125%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	100	[NT]	[NT]	LCS-2	90%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			27/06/2014	[NT]	[NT]	LCS-2	27/06/2014
Date analysed	-			30/06/2014	[NT]	[NT]	LCS-2	30/06/2014
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	LCS-2	115%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	LCS-2	116%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-2	113%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-2	110%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-2	111%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	LCS-2	92%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-2	113%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-2	114%
QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			[NT]	[NT]	[NT]	LCS-1	27/06/2014
Date analysed	-			[NT]	[NT]	[NT]	LCS-1	27/06/2014
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-1	101%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			27/06/2014
Date analysed	-			28/06/2014
Moisture	%	0.1	Inorg-008	[NT]

QUALITY CONTROL Asbestos ID - soils	UNITS	PQL	METHOD	Blank
Date analysed	-			[NT]

Report Comments:

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Asbestos ID was analysed by Approved Identifier: Matt Mansfield
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NA: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

CHAIN OF CUSTODY RECORD

CH2MHILL

Level 7, 9 Help Street, Chatswood, NSW 2067 Australia Tel (61 2) 9950 0200 Fax (61 2) 9950 0600
ACN 050 070 892

COC # 1 OF 1

Project # 490810	**Purchase Order #**
Project Name: St George Hospital	
Company Name:	
Project Manager or Contact & Phone # Susan Barnes / Tracey Main - 02 9950 0285	Report Copy to: tracey.main@ch2m.com.au susan.barnes@ch2m.com.au
Requested Completion Date: 48 hour TAT	Site ID / Sample Disposal: water

Sampling Date	Sampling Time	Type	Matrix	CLIENT SAMPLE ID (9 CHARACTERS)	LAB QC	TOTAL # OF CONTAINERS	Combination 3	Cyanide	Dissolved Ag	Comments	Lab ID
Requested Analytical Method #											
Preservative											
1. 28/06/2014			W	BH401			X	X	X		
2. 28/06/2014			W	BH408			X	X	X		

QA REQUIREMENTS

Matrix Spike	☐ Yes	☐ No
Matrix Duplicate	☐ Yes	☐ No
Laboratory Duplicate	☐ Yes	☐ No
Lab Blank	☐ Yes	☐ No
Surrogate Spike	☐ Yes	☐ No
RPDs	☐ Yes	☐ No
Spike Recovery Data	☐ Yes	☐ No

STANDARD QAQC REPORTING

LAB USE ONLY

Custody Seals	☐ Yes	☐ No
ICE	☐ Yes	☐ No

Sampled By and Title: Tracey Main	(Please sign and print name)	Date / Time 28/06/2014	Relinquished By : Tracey main (Please sign and print name) Date / Time 30/06/2014
Received by D.F.R.D	(Please sign and print name)	Date / Time 30.6.14/10:30	Relinquished By (Please sign and print name) Date / Time
Received by	(Please sign and print name)	Date / Time	Shipped Via / Shipping #

Special instructions:

Enviro lab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 112276
Date Received: 30.6.14
Time Received: 10:30
Received by: D.F.
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

CH2MHILL
PO Box 5392
Chatswood NSW 1515

ph: 02 9950 0200
Fax: 02 9950 0600

Attention: Tracey Main, Susan Barnes

Sample log in details:

Your reference:	**490810, St George Hospital**
Envirolab Reference:	**112276**
Date received:	30/06/2014
Date results expected to be reported:	**2/07/14**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	2 Waters
Turnaround time requested:	48hr
Temperature on receipt (°C)	8.8
Cooling Method:	Ice
Sampling Date Provided:	YES

Comments:

If there is sufficient sample after testing, samples will be held for the following time frames from date of receipt of samples:
Water samples - 1 month
Soil and other solid samples - 2 months
Samples collected in canisters - 1 week. Canisters will then be cleaned.
All other samples are not retained after analysis
If you require samples to be retained for longer periods then retention fees will apply as per our pricelist.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 112276

Client:
CH2MHILL
PO Box 5392
Chatswood
NSW 1515

Attention: Tracey Main, Susan Barnes

Sample log in details:

Your Reference:	**490810, St George Hospital**
No. of samples:	2 Waters
Date samples received / completed instructions received	30/06/2014 / 30/06/2014

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	2/07/14 / 2/07/14
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Water			
Our Reference:	UNITS	112276-1	112276-2
Your Reference	----------	BH401	BH408
Date Sampled	----------	28/06/2014	28/06/2014
Type of sample		Water	Water
Date extracted	-	30/06/2014	30/06/2014
Date analysed	-	1/07/2014	1/07/2014
TRHC$_6$ - C$_9$	µg/L	<10	19
TRHC$_6$ - C$_{10}$	µg/L	<10	21
TRHC$_6$ - C$_{10}$ less BTEX (F1)	µg/L	<10	21
Benzene	µg/L	<1	<1
Toluene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Naphthalene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	99	99
Surrogate toluene-d8	%	99	99
Surrogate 4-BFB	%	96	96

svTRH (C10-C40) in Water			
Our Reference:	UNITS	112276-1	112276-2
Your Reference	----------	BH401	BH408
Date Sampled	----------	28/06/2014	28/06/2014
Type of sample		Water	Water
Date extracted	-	01/07/2014	01/07/2014
Date analysed	-	02/07/2014	02/07/2014
TRHC$_{10}$ - C$_{14}$	µg/L	<50	<50
TRHC$_{15}$ - C$_{28}$	µg/L	100	<100
TRHC$_{29}$ - C$_{36}$	µg/L	<100	<100
TRH>C$_{10}$ - C$_{16}$	µg/L	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	µg/L	<50	<50
TRH>C$_{16}$ - C$_{34}$	µg/L	110	<100
TRH>C$_{34}$ - C$_{40}$	µg/L	<100	<100
Surrogate o-Terphenyl	%	90	100

PAHs in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ---------- 	112276-1 BH401 28/06/2014 Water	112276-2 BH408 28/06/2014 Water
Date extracted	-	1/07/2014	1/07/2014
Date analysed	-	2/07/2014	2/07/2014
Naphthalene	µg/L	<1	<1
Acenaphthylene	µg/L	<1	<1
Acenaphthene	µg/L	<1	<1
Fluorene	µg/L	<1	<1
Phenanthrene	µg/L	<1	<1
Anthracene	µg/L	<1	<1
Fluoranthene	µg/L	<1	<1
Pyrene	µg/L	<1	<1
Benzo(a)anthracene	µg/L	<1	<1
Chrysene	µg/L	<1	<1
Benzo(b+k)fluoranthene	µg/L	<2	<2
Benzo(a)pyrene	µg/L	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	88	102

HM in water - dissolved Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	112276-1 BH401 28/06/2014 Water	112276-2 BH408 28/06/2014 Water
Date prepared	-	01/07/2014	01/07/2014
Date analysed	-	01/07/2014	01/07/2014
Arsenic-Dissolved	µg/L	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	2
Copper-Dissolved	µg/L	1	3
Lead-Dissolved	µg/L	<1	4
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	<1	6
Zinc-Dissolved	µg/L	46	43
Silver-Dissolved	µg/L	<1	<1

Miscellaneous Inorganics			
Our Reference:	UNITS	112276-1	112276-2
Your Reference	----------	BH401	BH408
Date Sampled	----------	28/06/2014	28/06/2014
Type of sample		Water	Water
Date prepared	-	30/06/2014	30/06/2014
Date analysed	-	30/06/2014	30/06/2014
Total Cyanide	mg/L	<0.004	<0.004

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-014	Cyanide - free, total, weak acid dissociable by segmented flow analyser (in line dialysis with colourimetric finish). Solids are extracted in a caustic media prior to analysis.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/06/2014	[NT]	[NT]	LCS-W1	30/06/2014
Date analysed	-			01/07/2014	[NT]	[NT]	LCS-W1	01/07/2014
TRH C_6 - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	97%
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	97%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	100%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	99%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	96%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W1	94%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	96%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	100	[NT]	[NT]	LCS-W1	99%
Surrogate toluene-d8	%		Org-016	99	[NT]	[NT]	LCS-W1	102%
Surrogate 4-BFB	%		Org-016	96	[NT]	[NT]	LCS-W1	98%

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			01/07/2014	112276-1	01/07/2014 || 01/07/2014	LCS-W1	01/07/2014
Date analysed	-			01/07/2014	112276-1	02/07/2014 || 02/07/2014	LCS-W1	01/07/2014
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	112276-1	<50 || <50	LCS-W1	100%
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	112276-1	100 || 130 || RPD: 26	LCS-W1	103%
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	112276-1	<100 || <100	LCS-W1	94%
TRH>C_{10} - C_{16}	µg/L	50	Org-003	<50	112276-1	<50 || <50	LCS-W1	100%
TRH>C_{16} - C_{34}	µg/L	100	Org-003	<100	112276-1	110 || 140 || RPD: 24	LCS-W1	103%
TRH>C_{34} - C_{40}	µg/L	100	Org-003	<100	112276-1	<100 || <100	LCS-W1	94%
Surrogate o-Terphenyl	%		Org-003	95	112276-1	90 || 100 || RPD: 11	LCS-W1	123%

QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			01/07/2014	112276-1	1/07/2014 || 1/07/2014	LCS-W1	01/07/2014
Date analysed	-			02/07/2014	112276-1	2/07/2014 || 2/07/2014	LCS-W1	02/07/2014
Naphthalene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	LCS-W1	90%
Acenaphthylene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	[NR]	[NR]
Acenaphthene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	[NR]	[NR]
Fluorene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	LCS-W1	89%
Phenanthrene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	LCS-W1	87%

QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Anthracene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	[NR]	[NR]
Fluoranthene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	LCS-W1	85%
Pyrene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	LCS-W1	87%
Benzo(a)anthracene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	[NR]	[NR]
Chrysene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	LCS-W1	83%
Benzo(b+k)fluoranthene	µg/L	2	Org-012 subset	<2	112276-1	<2 || <2	[NR]	[NR]
Benzo(a)pyrene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	LCS-W1	90%
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	1	Org-012 subset	<1	112276-1	<1 || <1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	73	112276-1	88 || 109 || RPD: 21	LCS-W1	100%

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			01/07/2014	[NT]	[NT]	LCS-W1	01/07/2014
Date analysed	-			01/07/2014	[NT]	[NT]	LCS-W1	01/07/2014
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	100%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-W1	106%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	95%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	105%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	105%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-W1	100%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	102%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	105%
Silver-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	116%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			30/6/2014	112276-1	30/06/2014 || 30/06/2014	LCS-W1	30/06/2014
Date analysed	-			30/06/2014	112276-1	30/06/2014 || 30/06/2014	LCS-W1	30/06/2014
Total Cyanide	mg/L	0.004	Inorg-014	<0.004	112276-1	<0.004 || <0.004	LCS-W1	110%

QUALITY CONTROL PAHs in Water	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	112276-2	01/07/2014
Date analysed	-	[NT]	[NT]	112276-2	02/07/2014
Naphthalene	µg/L	[NT]	[NT]	112276-2	91%
Acenaphthylene	µg/L	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	[NT]	[NT]	112276-2	93%
Phenanthrene	µg/L	[NT]	[NT]	112276-2	93%
Anthracene	µg/L	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	[NT]	[NT]	112276-2	92%
Pyrene	µg/L	[NT]	[NT]	112276-2	94%
Benzo(a)anthracene	µg/L	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	[NT]	[NT]	112276-2	90%
Benzo(b+k)fluoranthene	µg/L	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	[NT]	[NT]	112276-2	100%
Indeno(1,2,3-c,d)pyrene	µg/L	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	[NT]	[NT]	112276-2	103%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Aileen Hie

From: Tracey.Main@ch2m.com
Sent: Tuesday, 1 July 2014 1:40 PM
To: Aileen Hie
Subject: TCLP Request - 490810 St George Hospital

Hi Aileen

Would you please arrange to schedule a TCLP test for the following samples? For turnaround time we need the results as soon as possible.

Sample Code	Sample ID	Analyte	Sampled Date
112191-2	BH406_0.4-0.5	Lead	25/06/2014
111995-3	BH502_0.23	Benzo(a) pyrene	21/06/2014
111995-14	BH507_0.2	Nickel	21/06/2014
111995-18	BH509_0.25	Lead	21/06/2014

If you have any question please do not hesitate to contact me on (02) 9950 0285

Regards

Tracey Main
Graduate Environmental Engineer, Environment & Nuclear

CH2M HILL
Level 7, 9 Help Street,
Chatswood, NSW 2067, Australia
Tel +61 2 9950 0200
Direct +61 2 9950 0285
www.ch2mhill.com/australia

* Envirolab Ref: 112191 A
Due: 2/7/14
24hr TAT.