MECHANIC/SMASH REPAIRS/METAL SPINNING

VACANT LAND

GRASS

POST & RAIL FENCE

CONCRETE

ENTRY
EXIT

SITE SLOPE
~ 1 in 200

CONCRETE

GARDEN

LMW12
(3.53)

LMW8
(3.52)

LMW5
(3.49)

DIESEL
DISPENSER

GRASS

CONCRETE

VENT

CANOPY

FUEL
DISPENSER

SALES ROOM

CHADDERTON STREET

LANDSDOWNE MOTOR INN

LMW11
(3.52)

VACANT LAND

LMW4
(3.49)
0.18

LMW2
(3.49)
0.57

LVB2

AWNING

T4
DIESEL 25KL

T3
ERP 45KL

T2
PULP 45KL

T1
ULP 45KL

LMW6
(3.50)

LMW13
(3.46)

GRASS

LVB6

POST & RAIL FENCE

CANOPY

FUEL
DISPENSER

FUEL
DISPENSER

CONCRETE

CAR YARD

LMW10
(3.53)

LMW1
(3.50)
0.16

GRASS

LVB4

LVB5

LMW3
(3.48)

LMW7
(3.49)

GRASS

LMW14
(3.54)

(3.50)

LMW9

CONCRETE

GARDEN

FOOTPATH

GRASS

FOOTPATH

GRASS

FOOTPATH

GRASS

ENTRY

HUME HIGHWAY

EXIT

3.53
3.52
3.51
3.50
3.49
3.52
3.51

SELF STORAGE WELDERS

DESIGNED:	GM	APPROVED:	cmy
DRAWN:	TT	DATE:	7/7/03
DATE:	06/06/03	STATUS:	FINAL
PROJECT:	51556-144		
CAD FILE:	005.DWG		
REVISION:	A		

0 5 10
1:250 (metres)

LEGEND

- UNDERGROUND STORAGE TANK
- HANDEX INSTALLED MONITORING WELL (MARCH 2001)
- HANDEX INSTALLED MONITORING WELL (JANUARY 2002)
- HANDEX BOREHOLE (MARCH 2001)
- PROPOSED ADDITIONAL MONITORING WELL LOCATIONS
- INFERRED GROUNDWATER FLOW DIRECTION
- SURFACE STAINING
- TELSTRA
- WATER
- ELECTRICITY
- SEWER PIT
- STORMWATER DRAIN
- TELSTRA PIT
- PRODUCT LINES
- 3.50 INFERRED GROUNDWATER CONTOURS (mAHD)
- (3.52) CORRECTED GROUNDWATER ELEVATION (mAHD)
- 0.16 PHASE SEPARATED HYDROCARBON THICKNESS (m)

HYDRAULIC CONDUCTIVITY:
0.34 m/day

HYDRAULIC GRADIENT:
0.0008

SEEPAGE VELOCITY:
0.7 m/year

DATE DATA COLLECTED:
5th to 10th FEBRUARY 2003

CLIENT
MOBIL OIL AUSTRALIA PTY LTD

PROJECT
MOBIL SERVICE STATION, LANSVALE, NSW

TITLE
GROUNDWATER GRADIENT MAP

A3

URS

FIGURE 4

Appendix E
Historical Groundwater Gauging and Water Quality Data

TABLE 10
Groundwater Monitoring & Analytical Results - PAH, Phenols, VCH & Biological Parameters

Sample ID	Sample Date	pH (pH units)	Conductivity µs/cm	TDS (ppm)	DO (%)	Redox Pot. ORP[$] (mV)	Total PAH ^	Total Phenols	VHC	Ferrous Iron	Nitrate (as N)	Sulphate	Methane (@25°C)
LMW1	10-Apr-01	Not sampled - PSH detected (3.4cm thick)											
LMW2	10-Apr-01	Not sampled - PSH detected (4.0cm thick)											
LMW3	10-Apr-01	6.50	4,376	2,976	--	--	**310**	<0.02*	<10*	**71,700**	--	65,000	5,800
LDUP1[L]	10-Apr-01	--	--	--	--	--	**300**	<0.02*	<10*	**73,800**	--	100,000	5,900
LMW4	24-Jul-01	6.73	7,605	5,171	17.6	66	--	--	--	--	--	--	--
LMW5	24-Jul-01	6.59	3,720	2,530	38.4	174	--	--	--	--	--	--	--
LMW6	24-Jul-01	6.55	6,585	4,478	17.8	172	--	--	--	--	--	--	--
LMW7	24-Jul-01	6.57	6,260	4,257	21.3	179	--	--	--	--	--	--	--
LMW8	23-Jul-01	**6.31**	7,465	5,076	24.6	245	--	--	--	--	--	--	--
LMW9	24-Jul-01	6.74	5,705	3,879	-0.7 **	-21	--	--	--	--	--	--	--
LMW10	23-Jul-01	6.61	4,605	3,131	24.0	214	--	--	--	--	--	--	--
LMW11	23-Jul-01	**5.81**	5,630	3,828	15.0	294	--	--	--	--	--	--	--
LMW12	23-Jul-01	**6.03**	5,490	3,733	22.2	248	--	--	--	--	--	--	--

GROUNDWATER ACCEPTANCE CRITERIA (ppb)

Adopted Acceptance Criteria [†]	6.5 - 9.0	NSG	NSG	NSG	NSG	3#	50#	NSG	1,000	NSG	NSG	NSG

Notes:
All results in µg/L (ppb) unless otherwise specified
TDS: Total Dissolved Solids
DO: Dissolved Oxygen (measured with a Pt electrode)
PAH: Polycyclic Aromatic Hydrocarbons
VCH: Volatile Chlorinated Hydrocarbons
--: Not analysed
NSG: No set guideline for the protection of fresh water aquatic ecosystems
nd: non-detect - results less than PQL of analytical method for each compound
* PQL raised due to matrix interference
** Result likely due to instrument error
[$] ORP = Oxidising redox potential for Pt/Ag/AgCl probe (field measurement has not been standardised to SHE)
[L] LDUP1 is a duplicate sample of LMW3 (submitted to AMDEL laboratories)
[†] Australian and New Zealand Guidelines for Fresh and Marine Water Quality
(ANZECC/ARMCANZ Draft National Water Quality Management Strategy, July 1999)
^ Total USEPA Priority PAHs
[†] Criteria based on ANZECC Australian Water Quality Guidelines for Fresh and Marine Waters, 1992 (fresh water criteria)
Criteria based on the NSW EPA threshold concentrations for the protection of fresh water aquatic ecosystems (source: *Guidelines for Assessing Service Station Sites*, December 1994, page 13).

Bold Values Exceed Acceptance Criteria or are outside criteria range

Table 5
Summary of Groundwater Monitoring Results

Well ID	Sample Date	Water Depth (mBTOC)	PSH Depth (mBTOC)	Apparent Thickness (m)	Corrected Depth to Water [1] (mBTOC)	Dissolved Oxygen (% Saturation)	pH	Conductivity (uS/cm)	TDS (mg/L)	Temp (^{0}C)	ORP (Pt/Ag/Cl) (mV)
LMW1	10-Apr-01	3.490	3.519	0.029	3.468	-	-	-	-	-	-
LMW2	10-Apr-01	3.510	3.542	0.032	3.486	-	-	-	-	-	-
LMW3	10-Apr-01	3.495	0	0	3.495	-	6.50	4,376	2,976		-
LMW4	24-Jul-01	3.415	0	0	3.415	17.6	6.73	7,605	5,171		66
LMW5	24-Jul-01	3.595	0	0	3.595	38.4	6.59	3,720	2,530		174
LMW6	24-Jul-01	3.570	0	0	3.570	17.8	6.55	6,585	4,478		172
LMW7	24-Jul-01	3.565	0	0	3.565	21.3	6.57	6,260	4,257		179
LMW8	23-Jul-01	3.535	0	0	3.535	24.6	6.31	7,465	5,076		245
LMW9	24-Jul-01	3.495	0	0	3.495	-0.7 *	6.74	5,705	3,879		-21 *
LMW10	23-Jul-01	3.475	0	0	3.475	24.0	6.61	4,605	3,131		214
LMW11	23-Jul-01	3.490	0	0	3.490	15.0	5.81	5,630	3,828		294
LMW12	23-Jul-01	3.490	0	0	3.490	22.2	6.03	5,490	3,733		248
LMW13	25-Jan-02	3.696	0	0	3.696	43.3	6.14	5,120	3,482	20.3	76
LMW14	25-Jan-02	3.823	0	0	3.823	61.8	5.85	7,840	5,331	18.9	311

Maximum Water Depth = 3.823mBTOC (LMW14)
Minimum Water Depth = 3.415mBTOC (LMW4)

Maximum DO Value = 61.8% saturation (LMW14)
Minimum DO Value = 15% saturation (LMW11)

Maximum pH Value = 6.74 (LMW9)
Minimum pH Value = 5.81 (LMW11)

Maximum Conductivity Value = 7840ug/L (LMW14)
Minimum Conductivity Value = 3720ug/L (LMW5)

Maximum Oxidising Redox Potential Value = 294mV (LMW11
Minimum Oxidising Redox Potential Value = -21mV (LMW9)

Average TDS (average conductivity x 0.68) = 3,989 mg/L

[1] Corrected Depth to Water = water depth (mBTOC) - (product thickness (m) X specific gravity of product (0.75))
* Result likely due to instrument error

TABLE 2
Groundwater Gauging data and Field parameters (September 2002)

Well ID	Sample Date	PSH Depth (mBTOC)	Water Depth (mBTOC)	PSH Thickness (m)	Temp (^{0}C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	pH	Conductivity (µS)	TDS (mg/L)	ORP (Field) (mV)	ORP (SHE) (mV)
LMW1	10-Sep-02	3.810	3.820	0.010	-	--	--	--	--	--	--	--
LMW2	10-Sep-02	3.740	4.200	0.460	--	--	--	--	--	--	--	--
LMW3	9-Sep-02	--	3.660	--	21	4.9	0.46	6.93	2967	2018	-101	98.0
LMW4	10-Sep-02	--	3.870	--	20.8	27.3	2.55	7.08	3560	2421	88.3	287.3
LMW5	9-Sep-02	--	3.735	--	22.2	39.9	3.52	6.29	1577	1072	115.7	314.7
LMW6	9-Sep-02	--	3.625	--	20.5	37.4	3.43	6.89	3415	2322	125.5	324.5
LMW7	9-Sep-02	--	3.520	--	20.7	32.3	2.96	7.18	3247	2208	-36	163.0
LMW8	9-Sep-02	--	3.845	--	22.3	41.3	3.65	6.91	3823	2600	68	267.0
LMW9	10-Sep-02	--	3.760	--	20.9	21.8	1.96	7.15	3053	2076	-84	115.0
LMW10	10-Sep-02	--	3.790	--	19.4	49.2	4.60	7	2405	1635	34	233.0
LMW11	10-Sep-02	--	3.900	--	19.4	40.3	3.84	7.29	2653	1804	68	267.0
LMW12	10-Sep-02	--	3.890	--	20.2	56.3	5.26	7.19	2637	1793	43	242.0
LMW13	9-Sep-02	--	3.950	--	21.5	36.9	3.52	6.36	2140	1455	28	227.0
LMW14	9-Sep-02	--	3.645	--	20.4	42.9	4.01	5.54	3500	2380	143	342.0
				Average	20.8	35.9	3.3	6.8	2914.8	1982.0	41.0	240.0

Notes: DO(mg/L) = DO(%)/100 x Saturation Value

Saturation Value for 19°C = 9.35mg/L*

Saturation Value for 20°C = 9.17mg/L*

Saturation Value for 21°C = 8.99mg/L*

Saturation Value for 22°C = 8.83mg/L*

ORP (SHE) = ORP (Field) + Conversion Factor

Conversion factor for 'ionode' redox probe = +199mV

TDS = Conductivity x 0.68

*Saturation Values from *'Introduction to Environmental Engineering'*, Davis (page 868)

ORP = Oxidised Redox Potential

SHE = Standard Hydrogen Probe

Table 1
Groundwater Gauging Summary
Mobil Service Station Lansvale GME

Date Gauged	Well Depth (mTOC[1])	Casing Diameter (mm)	Screened Interval[7] (mTOC[1])	SWL[2] (mTOC[1])	TOC (mAHD[3])	RWL[4] (mAHD)	PSH[5] (m)	CWL[6] (mAHD)
Handex Monitoring Wells - Installed March 2001 and January 2002								
LMW1	05-Feb-03	6.000	50	1.5 - 6.0	4.050	7.43	3.38	0.16	3.50
LMW2	05-Feb-03	5.900	50	1.5 - 6.0	4.400	7.47	3.07	0.57	3.49
LMW3	05-Feb-03	5.900	50	1.5 - 6.0	3.830	7.31	3.48	0	3.48
LMW4	05-Feb-03	6.270	50	2.0 - 6.5	4.130	7.49	3.36	0.18	3.49
LMW5	05-Feb-03	6.170	50	2.1 - 6.6	3.890	7.38	3.49	0	3.49
LMW6	05-Feb-03	5.930	50	2.2 - 6.7	3.890	7.39	3.50	0	3.50
LMW7	05-Feb-03	6.200	50	2.0 - 6.5	3.670	7.16	3.49	0	3.49
LMW8	05-Feb-03	6.200	50	2.0 - 6.5	3.990	7.51	3.52	0	3.52
LMW9	05-Feb-03	6.330	50	2.0 - 6.5	3.860	7.36	3.50	0	3.50
LMW10	05-Feb-03	5.640	50	3.0 - 6.1	3.890	7.42	3.53	0	3.53
LMW11	05-Feb-03	5.560	50	3.0 - 6.1	4.000	7.52	3.52	0	3.52
LMW12	05-Feb-03	5.850	50	3.0 - 6.1	3.990	7.52	3.53	0	3.53
LMW13	05-Feb-03	6.880	50	1.5 - 6.0	3.800	7.26	3.46	0	3.46
LMW14	05-Feb-03	5.970	50	2.7 - 7.2	3.720	7.26	3.54	0	3.54

Notes:
1. TOC - Top of Casing
2. SWL - Standing Water Level
3. AHD - Australian Height Datum
4. RWL - Reduced Water Level
5. PSH - Phase Separated Hydrocarbon
6. CWL - Corrected Water Level = RWL (m AHD) + PSH (m) x specific gravity of product (0.74)
7. Taken from Handex (January 2002 and September 2002) - Appendices - Environmental Field Logsheets

Appendix F
Historical Soil Analytical Results

TABLE 5
Soil Analytical Results - TPH, BTEX, Lead and TOC

Sample ID	Sample Date	Depth (m)	PID (ppm)	Total Petroleum Hydrocarbons				Total TPH	Benzene	Toluene	Ethylbenzene	Total Xylene	Lead	TOC
				C_6 - C_9	C_{10} - C_{14}	C_{15} - C_{28}	C_{29} - C_{36}	(C_{10} - C_{36})	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
LVB1/0.4	30-Mar-01	0.4	1689	<5	100	<50	<50	100	<0.5	<1	<1	<3	9	--
LVB2/4.2	28-Mar-01	4.2	37.7	<5	<10	<50	<50	<110	<0.5	<1	<1	<3	<5	--
LVB2/4.5	28-Mar-01	4.5	2.3	<5	<10	<50	<50	<110	<0.5	<1	<1	<3	19	--
LVB3/1.5 (LMW1)	28-Mar-01	1.5	48.2	<5	<10	<50	<50	<110	<0.5	<1	<1	<3	11	--
LVDUP1 [1]	28-Mar-01	1.5	48.2	12	<10	<50	<50	<110	<0.5	<1	<1	<3	12	--
LVB3/6.0 (LMW1)	28-Mar-01	6.0	>2000	6500	1900	120	<50	2020	18	300	140	770	9	<0.1
LVB4/3.2	30-Mar-01	3.2	88.2	250	50	<50	<50	50	1.4	17	7	46	<5	--
LVB4/4.2	30-Mar-01	4.2	86.4	17	<10	<50	<50	<110	<0.5	<1	<1	<3	<5	--
LVB5/3.3	30-Mar-01	3.3	54.9	6	10	<50	<50	10	<0.5	<1	<1	<3	19	--
LVB5/4.1	30-Mar-01	4.1	702	5600	1700	<50	<50	1700	63	200	140	630	6	--
LVB6/3.2	30-Mar-01	3.2	10.6	62	10	<50	<50	10	0.4	2	1	10	<5	--
LVB6/4.0	30-Mar-01	4.0	346	460	80	<50	<50	80	5	23	13	81	11	--
LVB7/2.0 (LMW2)	30-Mar-01	2.0	36.1	19	<10	<50	<50	<110	2.2	<1	1	<3	10	--
LVB7/4.0 (LMW2)	30-Mar-01	4.0	>2000	1900	600	80	<50	680	9.4	98	67	380	<5	<0.2
LVDUP2 [2]	30-Mar-01	4.0	>2000	1800	800	90	<50	890	12	89	86	300	<5	--
LVTRIP1 [3]	30-Mar-01	4.0	>2000	1100	1100	90	<50	1190	19	110	75	360	<5	<0.2
LVB8/2.0	30-Mar-01	2.0	12.9	20	<10	<50	<50	<110	<0.5	<1	<1	<3	19	--
LVB8/4.0	30-Mar-01	4.0	165	9	<10	<50	<50	<110	<0.5	<1	<1	<3	<5	--
LVB9/3.5 (LMW3)	30-Mar-01	3.5	382	1400	240	<50	<50	240	1.4	37	41	240	20	--
LVB9/4.2 (LMW3)	30-Mar-01	4.2	121	67	<10	<50	<50	<110	1.4	6	2	15	<5	<0.2
LVB9/0.4 (LMW3)	30-Mar-01	0.4	6.2	<5	--	--	--	--	--	--	--	--	20	--

SOIL ASSESSMENT CRITERIA (ppm)

EPA Acceptance Criteria [†]	65	1000	1	1.4	3.1	14	1500 [††]	0.1 - 0.5 [†††]

Notes:

-- Not Analysed

All results in milligrams/kilogram (ppm)

Bold Values Exceed Acceptance Criteria

[1] LVDUP1 is a duplicate sample of LVB3/1.5 (LMW1) (submitted to AMDEL laboratories)

[2] LVDUP2 is a duplicate sample of LVB7/4.0 (LMW2) (submitted to AMDEL laboratories)

[3] LVTRIP1 is a triplicate sample of LVB7/4.0 (LMW2) (submitted to AGAL)

[†] NSW EPA soil hydrocarbon acceptance criteria for sensitive landuse (source:Guidelines for Assessing Service Station Sites, December 1994, page 10).

[††] NSW EPA health based investigation levels for urban re-development sites in NSW (source: Guidelines for the NSW Site Auditor Scheme, June 1998, page 30, column 4). Criteria based on commercial/industrial zoning of the site.

[†††] Handex Environmental Recovery, INC (Technical Guidance Documents, Volume 2, Control No. 5002).

TABLE 5 (continued)
Soil Analytical Results - TPH, BTEX and Lead

Sample ID	Sample Date	Depth (m)	PID (ppm)	Total Petroleum Hydrocarbons				Total TPH (C_{10} - C_{36})	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Total Xylene (ppm)	Lead (ppm)
				C_6 - C_9	C_{10} - C_{14}	C_{15} - C_{28}	C_{29} - C_{36}						
LMW4/3.4	20-Jun-01	3.4	605	<5	20	<50	<50	20	<0.2	<1	<1	<3	10
LMW4/4.2	20-Jun-01	4.2	>2000	230	260	<50	<50	260	0.6	01	20	140	7
LDUP1[1]	20-Jun-01	4.2	>2000	380	480	<50	<50	480	8.6	110	92	230	6
LTRIP1[2]	20-Jun-01	4.2	>2000	50	110	<50	<50	160	<0.5	3.6	2.4	15	13
LMW5/2.1	20-Jun-01	2.1	3.1	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	8
LMW5/4.4	20-Jun-01	4.4	0.5	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	7
LMW6/0.5	20-Jun-01	0.5	46.4	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	15
LMW6/3.0	20-Jun-01	3.0	22.8	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	<5
LMW6/3.8	20-Jun-01	3.8	23.4	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	<5
LMW7/2.4	20-Jun-01	2.4	5.5	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	7
LMW7/4.0	20-Jun-01	4.0	24.3	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	<5
LMW8/2.3	21-Jun-01	2.3	4.6	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	<5
LMW8/3.6	21-Jun-01	3.6	19.4	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	<5
LMW9/2.6	21-Jun-01	2.6	62.4	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	7
LMW9/3.6	21-Jun-01	3.6	36.8	<5	20	<50	<50	20	<0.2	<1	<1	<3	8
LMW10/1.8	12-Jul-01	1.8	0	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	7
LMW10/3.4	12-Jul-01	3.4	0	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	9
LMW11/1.2	12-Jul-01	1.2	17.7	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	12
LMW11/3.0	12-Jul-01	3.0	10.2	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	12
LDUP2[3]	12-Jul-01	3.0	10.2	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	10
LTRIP2[4]	12-Jul-01	3.0	10.2	<25	<50	<100	<100	<250	<0.5	<0.5	<0.5	<0.5	11
LMW12/2.8	12-Jul-01	3.6	1.2	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	12
LMW12/3.6	12-Jul-01	2.8	0.2	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	10

SOIL ASSESSMENT CRITERIA (ppm)

NSW EPA Acceptance Criteria[†]	65	1000	1	1.4	3.1	14	1500[††]

Notes:
-- Not Analysed
All results in milligrams/kilogram (ppm)
Bold Values Exceed Acceptance Criteria

[1] LDUP1 is a duplicate sample of LMW4/4.2 (submitted to AMDEL laboratories)

[2] LTRIP1 is a triplicate sample of LMW4/4.2 (submitted to Australian Government Analytical Laboratories - AGAL)

[3] LDUP2 is a duplicate sample of LMW11/3.0 (sumbitted to AMDEL laboratories)

[4] LTRIP2 is a triplicate sample of LMW11/3.0 (submitted to Australian Government Analytical Laboratories - AGAL)

[†] NSW EPA soil hydrocarbon acceptance criteria for sensitive landuse (source:Guidelines for Assessing Service Station Sites, December 1994, page 10).

[††] NSW EPA health based investigation levels for urban re-development sites in NSW (source: Guidelines for the NSW Site Auditor Scheme, June 1998, page 30, column 4). Criteria based on commercial/industrial zoning of the site.

[†††] Handex Environmental Recovery, INC (Technical Guidance Documents, Volume 2, Control No. 5002).

TABLE 6
Soil Analytical Results - Heavy Metals

Sample ID	Sample Date	Depth (m)	Arsenic	Cadmium	Chromium	Copper	Nickel	Lead	Zinc	Mercury
LVB1/0.4	28-Mar-01	0.4	<5	<0.5	<5	<5	<2	9	<5	<0.05
LVB7/0.4	30-Mar-01	0.4	<5	<0.5	6	6	2	9	29	<0.05
LVB9/0.4	30-Mar-01	0.4	<5	<0.5	<5	<5	<2	20	51	<0.05
SOIL ASSESSMENT CRITERIA (ppm)										
NSW EPA Acceptance Criteria †			500	100	500	5000	3000	1500	35000	75

Notes:
All results in milligrams/kilogram (ppm)
† NSW EPA Health-based investigation levels for urban re-development sites in NSW (source: Guidelines for the NSW Site Auditor Scheme, June 1998, page 30, column 4). Criteria based on commercial/industrial zoning of the site.

TABLE 7
Soil Analytical Results - PAH, Phenols, VCH and OC/OP Pesticides

Sample ID	Sample Date	Depth (m)	PID Headspace (ppm)	PAHs (ppm)	Phenolics (ppm)	VCH (ppm)	OP's (ppm)	OC's (ppm)
LVB1/0.4	28-Mar-01	0.4	1689	<0.5	0.2	<0.1	<0.5	<0.1
LVB7/0.4	30-Mar-01	0.4	57.2	<0.5	<0.1	<0.1	<0.5	<0.1
LVB9/0.4	30-Mar-01	0.4	6.2	<0.5	<0.1	<0.1	<0.5	<0.1

SOIL ASSESSMENT CRITERIA (ppm)

NSW EPA Acceptance Criteria †	100	42,500	-	50††	50††

Notes:
- No set criteria
All results in milligrams/kilogram (ppm)
† NSW EPA health based investigation levels for urban re-development sites in NSW (source: "Guidelines for the NSW Site Auditor Scheme, June 1998, page 30, column 4). Criteria based on commercial/industrial zoning of the site.
†† Health based investigation levels for Aldrin and Dieldrin

TABLE 4
Soil Analytical Results - TPH, BTEX and Lead

Sample ID	Sample Date	Depth (m)	PID (ppm)	Total Petroleum Hydrocarbons				Total TPH (C_{10} - C_{36})	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Total Xylene (ppm)	Lead (ppm)
				C_6 - C_9	C_{10} - C_{14}	C_{15} - C_{28}	C_{29} - C_{36}						
LMW13/1.0	16-Jan-02	1.0	23.8	49	380	<50	<50	500	<0.2	<1	<1	<3	7
LDUP3[1]	16-Jan-02	1.0	--	54	440	<50	<50	540	<0.2	<1	<1	<3	7
LTRIP3[2]	16-Jan-02	1.0	--	28	300	<100	<100	500	<0.5	<0.5	4.4	31	13
LMW13/6.0	16-Jan-02	6.0	0	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	6
LMW14/5.5	16-Jan-02	5.5	0	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	6
LMW14/7.0	16-Jan-02	7.0	0	<5	<10	<50	<50	<110	<0.2	<1	<1	<3	7

SOIL INVESTIGATION LEVELS (ppm)

Adopted Investigation Levels[†]	65	1000	1	1.4	3.1	14	1500 [††]

Notes:

-- Not Analysed

All results in milligrams/kilogram (ppm)

Bold Values Exceed Adopted Investigation Levels

[1] LDUP3 is a duplicate sample of LMW13/1.0 (submitted to AMDEL laboratories)

[2] LTRIP3 is a triplicate sample of LMW13/1.0 (submitted to AGAL)

[†] NSW EPA soil hydrocarbon acceptance criteria for sensitive landuse (source:*Guidelines for Assessing Service Station Sites*, December 1994, page 10).

[††] National Environment Protection (*Assessment of Site Contamination*) Measure – Column F. National Environment Protection Council, 1999.

Criteria based on continued use of the site as a service station.

Appendix G
Historical Groundwater Analytical Results

Table 5

Groundwater Analytical Results - Mobil Type A Analytes
Mobil Service Station Lansvale GME

Location	LMW3	LMW3	LMW5	LMW6	LMW7	LMW7	LMW8	LMW9	LMW9	LMW9
Sample ID	LMW3_6/2/03	LMW3_6/2/03CHK	LMW5_6/2/03	LMW6_6/2/03	LMW7_10/2/03	LMW7_10/2/03CHK	LMW8_7/2/03	LMW9_6/2/03	QA07	QA08
Date Sampled	06-Feb-03	06-Feb-03	06-Feb-03	06-Feb-03	10-Feb-03	10-Feb-03	07-Feb-03	06-Feb-03	06-Feb-03	06-Feb-03
QAQC Sample Type		LD				LD			FD	FT

Analyte	PQL	Units	ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection	NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)										
TPH														
TPH (C6-C9 Fraction)	20	µg/L			1700	NA	50	70	120	120	<20	2300	2200	2220
TPH (C10-C14 Fraction)	20	µg/L			1200	1100	20	100	100	80	60	320	440	464
TPH (C15-C28 Fraction)	100	µg/L			<100	<100	<100	1030	<100	<100	<100	<100	<100	<100
TPH (C29-C36 Fraction)	100	µg/L			<100	<100	<100	<100	<100	<100	<100	<100	<100	<50
Total TPH (C10-C36 Fraction)		µg/L			1200	1100	20	1130	100	80	60	320	440	464
BTEX														
Benzene	0.5	µg/L	950	300[a]	**1500**	NA	2.2	1.6	39	40	2.2	**1300**	**1200**	**1500**
Toluene	1	µg/L		300[a]	*<20	NA	13	7	<1	<1	<1	350	330	223
Ethylbenzene	1	µg/L		140[a]	*<20	NA	4	1	<1	<1	<1	170	160	142
m- & p-Xylene	2	µg/L			*<40	NA	23	7	<2	<2	<2	230	210	199
o-Xylene	1	µg/L	350		*<20	NA	12	3	<1	<1	<1	82	77	75
Total Xylene		µg/L		380[b]			35	10				312	287	274
Metals														
Lead	0.001	mg/L	0.0034	0.005[c]	0.002	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

LEGEND

Exceeds ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection

Exceeds NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)

NA - Not Analysed
RB - Rinsate Blank
FD - Field Duplicate
FT - Field Triplicate analysed at ALS Environmental, Sydney
LD - Lab Duplicate
* PQL raised due to matrix interference
a ANZECC (1992) 95% Protection of Aquatic Ecosystems Trigger Values
b Netherlands (1994) Maximum Permissible Concentration for total xylenes
c ANZECC (1992) 95% Protection of Aquatic Ecosystems Trigger Value for Lead ranges from 1 to 5 µg/L, dependant on water hardness

Prepared by: LMR
Checked by: AC

Table 5
Groundwater Analytical Results - Mobil Type A Analytes
Mobil Service Station Lansvale GME

Location	LMW10	LMW10	LMW11	LMW12	LMW13	LMW14
Sample ID	LMW10_5/2/03	LMW10_5/2/03CHK	LMW11_5/2/03	LMW12_5/2/03	LMW13_10/2/03	LMW14_10/2/03
Date Sampled	05-Feb-03	05-Feb-03	05-Feb-03	05-Feb-03	10-Feb-03	10-Feb-03
QAQC Sample Type		LD				

Analyte	PQL	Units	ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection	NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)						
TPH										
TPH (C6-C9 Fraction)	20	µg/L			<20	NA	<20	<20	120	<20
TPH (C10-C14 Fraction)	20	µg/L			80	90	180	50	63000	<20
TPH (C15-C28 Fraction)	100	µg/L			<100	<100	<100	<100	1860	<100
TPH (C29-C36 Fraction)	100	µg/L			<100	<100	<100	<100	<100	<100
Total TPH (C10-C36 Fraction)		µg/L			80	90	180	50	64860	
BTEX										
Benzene	0.5	µg/L	950	300[a]	<0.5	NA	<0.5	<0.5	<0.5	0.9
Toluene	1	µg/L		300[a]	<1	NA	<1	<1	<1	11
Ethylbenzene	1	µg/L		140[a]	<1	NA	<1	<1	<1	<1
m- & p-Xylene	2	µg/L			<2	NA	<2	<2	<2	3
o-Xylene	1	µg/L	350		<1	NA	<1	<1	<1	2
Total Xylene		µg/L		380[b]						5
Metals										
Lead	0.001	mg/L	0.0034	0.005[c]	<0.001	<0.001	<0.001	*<0.01	<0.001	*<0.01

LEGEND

Exceeds ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection

Exceeds NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)

NA - Not Analysed
RB - Rinsate Blank
FD - Field Duplicate
FT - Field Triplicate analysed at ALS Environmental, Sydney
LD - Lab Duplicate
* PQL raised due to matrix interference
a ANZECC (1992) 95% Protection of Aquatic Ecosystems Trigger Values
b Netherlands (1994) Maximum Permissible Concentration for total xylenes
c ANZECC (1992) 95% Protection of Aquatic Ecosystems Trigger Value for Lead ranges

Prepared by: LMR
Checked by: AE
URS Australia Pty Ltd

Table 6
Groundwater Analytical Results - Mobil Type B Analytes
Mobil Service Station Lansvale GME

Location	LMW3	LMW3	LMW5	LMW6	LMW6	LMW7	LMW7	LMW8	LMW9
Sample ID	LMW3_6/2/03	LMW3_6/2/03CHK	LMW5_6/2/03	LMW6_6/2/03	LMW6_6/2/03CHK	LMW7_10/2/03	LMW7_10/2/03CHK	LMW8_7/2/03	LMW9_6/2/03
Date Sampled	06-Feb-03	06-Feb-03	06-Feb-03	06-Feb-03	06-Feb-03	10-Feb-03	10-Feb-03	07-Feb-03	07-Feb-03
QAQC Sample Type		LD			LD		LD		

Analyte	PQL	Units	ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection	NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)									
PAHs													
Acenaphthene	1	µg/L			8	NA	<1	<1	<1	<1	NA	<1	<1
Acenaphthylene	1	µg/L			<1	NA	<1	<1	<1	<1	NA	<1	<1
Anthracene	1	µg/L	0.4		<1	NA	<1	<1	<1	<1	NA	<1	<1
Benzo(a)anthracene	1	µg/L			<1	NA	<1	<1	<1	<1	NA	<1	<1
Benzo(a)pyrene	1	µg/L	0.2		<1	NA	<1	<1	<1	<1	NA	<1	<1
Benzo(b) & (k)fluoranthene	2	µg/L			<2	NA	<2	<2	<2	<2	NA	<2	<2
Benzo(g,h,i)perylene	1	µg/L			<1	NA	<1	<1	<1	<1	NA	<1	<1
Chrysene	1	µg/L			<1	NA	<1	<1	<1	<1	NA	<1	<1
Dibenz(a,h)anthracene	1	µg/L			<1	NA	<1	<1	<1	<1	NA	<1	<1
Fluoranthene	1	µg/L	1.4		<1	NA	<1	<1	<1	<1	NA	<1	<1
Fluorene	1	µg/L			7	NA	<1	<1	<1	<1	NA	<1	<1
Indeno(1,2,3-cd)pyrene	1	µg/L			<1	NA	<1	<1	<1	<1	NA	<1	<1
Naphthalene	1	µg/L	16		50	NA	<1	<1	<1	3	NA	<1	15
Phenanthrene	1	µg/L	2		2	NA	<1	<1	<1	<1	NA	<1	<1
Pyrene	1	µg/L			<1	NA	<1	<1	<1	<1	NA	<1	<1
Total PAHs		µg/L		3[a]	67					3			15
Phenols													
Total Phenolics	0.01	mg/L			0.05	0.05	0.01	<0.01	NA	0.03	0.03	0.02	<0.01

LEGEND

Exceeds ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection

Exceeds NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)

NA - Not Analysed
RB - Rinsate Blank
FD - Field Duplicate
FT - Field Triplicate analysed at ALS Environmental, Sydney
LD - Lab Duplicate
* PQL raised due to matrix interference
a ANZECC (1992) 95% Protection of Aquatic Ecosystems Trigger Values

Prepared by: LMR

Table 6
Groundwater Analytical Results - Mobil Type B Analytes
Mobil Service Station Lansvale GME

Location	LMW9	LMW9	LMW10	LMW10	LMW11	LMW12	LMW13	LMW14	LMW14
Sample ID	QA07	QA08	LMW10_5/2/03	LMW10_5/2/03CHK	LMW11_5/2/03	LMW12_5/2/03	LMW13_10/2/03	LMW14_10/2/03	LMW14_10/2/03CHK
Date Sampled	06-Feb-03	06-Feb-03	05-Feb-03	05-Feb-03	05-Feb-03	05-Feb-03	10-Feb-03	10-Feb-03	10-Feb-03
QAQC Sample Type	FD	FT		LD					LD

Analyte	PQL	Units	ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection	NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)									
PAHs													
Acenaphthene	1	µg/L			<1	<2	<1	<1	<1	<1	17	<1	<1
Acenaphthylene	1	µg/L			<1	<2	<1	<1	<1	<1	*<10	<1	<1
Anthracene	1	µg/L	0.4		<1	<2	<1	<1	<1	<1	<1	<1	<1
Benzo(a)anthracene	1	µg/L			<1	<2	<1	<1	<1	<1	<1	<1	<1
Benzo(a)pyrene	1	µg/L	0.2		<1	<2	<1	<1	<1	<1	<1	<1	<1
Benzo(b) & (k)fluoranthene	2	µg/L			<2	<4	<2	<2	<2	<2	<2	<2	<2
Benzo(g,h,I)perylene	1	µg/L			<1	<2	<1	<1	<1	<1	<1	<1	<1
Chrysene	1	µg/L			<1	<2	<1	<1	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L			<1	<2	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	1	µg/L	1.4		<1	<2	<1	<1	<1	<1	<1	<1	<1
Fluorene	1	µg/L			<1	<2	<1	<1	<1	<1	7	<1	<1
Indeno(1,2,3-cd)pyrene	1	µg/L			<1	<2	<1	<1	<1	<1	<1	<1	<1
Naphthalene	1	µg/L	16		10	22	<1	<1	<1	<1	840	<1	<1
Phenanthrene	1	µg/L	2		<1	<2	<1	<1	<1	<1	2	<1	<1
Pyrene	1	µg/L			<1	<2	<1	<1	<1	<1	<1	<1	<1
Total PAHs		µg/L		3[a]	10	22					866		
Phenols													
Total Phenolics	0.01	mg/L			<0.01	NA	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	NA

LEGEND

Exceeds ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection

Exceeds NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)

NA - Not Analysed
RB - Rinsate Blank
FD - Field Duplicate
FT - Field Triplicate analysed at ALS Environmental, Sydney
LD - Lab Duplicate
* PQL raised due to matrix interference
a ANZECC (1992) 95% Protection of Aquatic Ecosystems Trigger Values

Table 7
Groundwater Analytical Results - Mobil Type C Analytes
Mobil Service Station Lansvale GME

Location	LMW3	LMW3	LMW5	LMW6	LMW7	LMW7	LMW8	LMW9	LMW9	LMW9	LMW10
Sample ID	LMW3_6/2/03	LMW3_6/2/03CHK	LMW5_6/2/03	LMW6_6/2/03	LMW7_10/2/03	LMW7_10/2/03CHK	LMW8_7/2/03	LMW9_6/2/03	QA07	QA08	LMW10_5/2/03
Date Sampled	06-Feb-03	06-Feb-03	06-Feb-03	06-Feb-03	10-Feb-03	10-Feb-03	07-Feb-03	07-Feb-03	06-Feb-03	06-Feb-03	05-Feb-03
QAQC Sample Type		LD				LD			FD	FT	

Analyte	PQL	Units	ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection										
Metals													
Arsenic	0.001	mg/L		0.012	0.012	0.013	0.015	0.01	0.011	0.016	0.009	0.01	0.001	0.004
Barium	0.001	mg/L		0.327	0.329	0.24	0.079	0.072	0.056	0.05	0.029	0.03	0.03	0.032
Cadmium	0.0001	mg/L	0.0002	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001
Chromium	0.001	mg/L		0.004	0.005	0.003	0.004	0.007	0.01	0.004	0.006	0.005	<0.001	0.002
Copper	0.001	mg/L	0.0014	**0.002**	**0.002**	**0.006**	**0.003**	**0.003**	**0.002**	**0.003**	0.001	**0.002**	0.002	0.001
Mercury	0.00005	mg/L	0.0006	<0.00005	NA	<0.00005	<0.00005	<0.00005	NA	0.00008	<0.00005	<0.00005	<0.0001	0.00021
Nickel	0.001	mg/L	0.011	0.003	0.003	**0.012**	0.004	0.003	0.003	0.003	0.001	0.001	<0.001	0.001
Vanadium	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.01	<0.001
Zinc	0.002	mg/L	0.008	**0.011**	**0.01**	**0.032**	**0.059**	**0.018**	**0.02**	**0.017**	**0.009**	**0.011**	0.012	**0.013**
VHCs														
1,1,1-Trichloroethane	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
1,1,2,2-Tetrachloroethane	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
1,1,2-Trichloroethane	1	µg/L	6500	*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
1,1-Dichloroethane	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
1,1-Dichloroethene	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
1,2-Dichlorobenzene	1	µg/L	160	*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
1,2-Dichloroethane	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
1,2-Dichloropropane	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
1,3-Dichlorobenzene	1	µg/L	260	*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
1,4-Dichlorobenzene	1	µg/L	60	*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
Bromodichloromethane	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
Bromoform	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
Carbon Tetrachloride	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
Chloroethane	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<50	<1
Chloroform	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	4
cis-1,2-Dichloroethene	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
cis-1,3-Dichloropropene	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
Dibromochloromethane	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
Methylene chloride	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
Tetrachloroethene	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
trans-1,2-Dichloroethene	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
trans-1,3-Dichloropropylene	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<10	<1
Trichloroethene	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<5	<1
Trichlorofluoromethane	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<50	<1
Vinyl chloride	1	µg/L		*<20	NA	<1	<1	<1	NA	<1	*<20	*<20	<50	<1

LEGEND

Exceeds ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection

NA - Not Analysed
FD - Field Duplicate
FT - Field Triplicate analysed at ALS, Sydney
LD - Lab Duplicate
* PQL raised due to matrix interference

Prepared by: LMR
Checked by: AFC

Table 7
Groundwater Analytical Results - Mobil Type C Analytes
Mobil Service Station Lansvale GME

Location	LMW10	LMW11	LMW12	LMW13	LMW14
Sample ID	LMW10_5/2/03CHK	LMW11_5/2/03	LMW12_5/2/03	LMW13_10/2/03	LMW14_10/2/03
Date Sampled	05-Feb-03	05-Feb-03	05-Feb-03	10-Feb-03	10-Feb-03
QAQC Sample Type	LD				

Analyte	PQL	Units	ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection					
Metals								
Arsenic	0.001	mg/L		0.004	0.009	0.011	0.017	*<0.01
Barium	0.001	mg/L		0.031	0.032	0.118	0.038	0.013
Cadmium	0.0001	mg/L	0.0002	<0.0001	<0.0001	*<0.001	<0.0001	*<0.001
Chromium	0.001	mg/L		0.002	0.004	*<0.01	0.01	*<0.01
Copper	0.001	mg/L	0.0014	**0.002**	**0.003**	*<0.01	0.001	*<0.01
Mercury	0.00005	mg/L	0.0006	0.00021	0.00013	<0.00005	<0.00005	<0.00005
Nickel	0.001	mg/L	0.011	0.002	0.002	*<0.01	0.003	*<0.01
Vanadium	0.001	mg/L		<0.001	0.001	*<0.01	0.004	*<0.01
Zinc	0.002	mg/L	0.008	**0.012**	**0.035**	*<0.02	**0.01**	**0.049**
VHCs								
1,1,1-Trichloroethane	1	µg/L		<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	1	µg/L		<1	<1	<1	<1	<1
1,1,2-Trichloroethane	1	µg/L	6500	<1	<1	<1	<1	<1
1,1-Dichloroethane	1	µg/L		<1	<1	<1	<1	<1
1,1-Dichloroethene	1	µg/L		<1	<1	<1	<1	<1
1,2-Dichlorobenzene	1	µg/L	160	<1	<1	<1	<1	<1
1,2-Dichloroethane	1	µg/L		<1	<1	<1	<1	<1
1,2-Dichloropropane	1	µg/L		<1	<1	<1	<1	<1
1,3-Dichlorobenzene	1	µg/L	260	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	1	µg/L	60	<1	<1	<1	<1	<1
Bromodichloromethane	1	µg/L		<1	<1	<1	<1	<1
Bromoform	1	µg/L		<1	<1	<1	<1	<1
Carbon Tetrachloride	1	µg/L		<1	<1	<1	<1	<1
Chloroethane	1	µg/L		<1	<1	<1	<1	<1
Chloroform	1	µg/L		4	<1	<1	<1	<1
cis-1,2-Dichloroethene	1	µg/L		<1	<1	<1	<1	<1
cis-1,3-Dichloropropene	1	µg/L		<1	<1	<1	<1	<1
Dibromochloromethane	1	µg/L		<1	<1	<1	<1	<1
Methylene chloride	1	µg/L		<1	<1	<1	<1	<1
Tetrachloroethene	1	µg/L		<1	<1	<1	<1	<1
trans-1,2-Dichloroethene	1	µg/L		<1	<1	<1	<1	<1
trans-1,3-Dichloropropylene	1	µg/L		<1	<1	<1	<1	<1
Trichloroethene	1	µg/L		<1	<1	<1	<1	<1
Trichlorofluoromethane	1	µg/L		<1	<1	<1	<1	<1
Vinyl chloride	1	µg/L		<1	<1	<1	<1	<1

LEGEND

Exceeds ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection

NA - Not Analysed
FD - Field Duplicate
FT - Field Triplicate analysed at ALS, Sydney
LD - Lab Duplicate
* PQL raised due to matrix interference

Prepared by: LMR
Checked by: AP

Table 8a

Quality Control Analytical Results - Type A and B Analytes

Mobil Service Station Lansvale GME

Sample ID			QA04	QA09	QA05	QA10	QA06	QA11
Date Sampled			06-Feb-03	10-Feb-03	06-Feb-03	10-Feb-03	06-Feb-03	10-Feb-03
QAQC Sample Type			TRIP BLANKS		FIELD BLANKS		RINSATE BLANKS	
Analyte	PQL	Units						
TPH								
TPH (C6-C9 Fraction)	20	µg/L	<20	<20	<20	<20	<20	<20
TPH (C10-C14 Fraction)	20	µg/L	<20	<20	<20	<20	<20	<20
TPH (C15-C28 Fraction)	100	µg/L	<100	<100	<100	<100	<100	<100
TPH (C29-C36 Fraction)	100	µg/L	<100	<100	<100	<100	<100	<100
Total TPH (C10-C36 Fraction)		µg/L						
BTEX								
Benzene	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	1	µg/L	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	µg/L	<1	<1	<1	<1	<1	<1
m- & p-Xylene	2	µg/L	<2	<2	<2	<2	<2	<2
o-Xylene	1	µg/L	<1	<1	<1	<1	<1	<1
Total Xylene		µg/L						
Metals								
Lead	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
PAHs								
Acenaphthene	1	µg/L	NA	NA	<1	<1	<1	<1
Acenaphthylene	1	µg/L	NA	NA	<1	<1	<1	<1
Anthracene	1	µg/L	NA	NA	<1	<1	<1	<1
Benzo(a)anthracene	1	µg/L	NA	NA	<1	<1	<1	<1
Benzo(a)pyrene	1	µg/L	NA	NA	<1	<1	<1	<1
Benzo(b) & (k)fluoranthene	2	µg/L	NA	NA	<2	<2	<2	<2
Benzo(g,h,i)perylene	1	µg/L	NA	NA	<1	<1	<1	<1
Chrysene	1	µg/L	NA	NA	<1	<1	<1	<1
Dibenz(a,h)anthracene	1	µg/L	NA	NA	<1	<1	<1	<1
Fluoranthene	1	µg/L	NA	NA	<1	<1	<1	<1
Fluorene	1	µg/L	NA	NA	<1	<1	<1	<1
Indeno(1,2,3-cd)pyrene	1	µg/L	NA	NA	<1	<1	<1	<1
Naphthalene	1	µg/L	NA	NA	<1	<1	<1	<1
Phenanthrene	1	µg/L	NA	NA	<1	<1	<1	<1
Pyrene	1	µg/L	NA	NA	<1	<1	<1	<1
Total PAHs		µg/L						
Phenols								
Total Phenolics	0.01	mg/L	NA	NA	<0.01	<0.01	<0.01	0.01

LEGEND
NA - Not Analysed

Prepared by: LMR
Checked by: AC

Table 8b
Quality Control Analytical Results - Type C Analytes
Mobil Service Station Lansvale GME

Sample ID	QA04	QA09	QA05	QA10	QA06	QA11
Date Sampled	06-Feb-03	10-Feb-03	06-Feb-03	10-Feb-03	06-Feb-03	10-Feb-03
QAQC Sample Type	TRIP BLANKS		FIELD BLANKS		RINSATE BLANKS	

Analyte	PQL	Units						
Metals								
Arsenic	0.001	mg/L	NA	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	0.001	mg/L	NA	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	0.0001	mg/L	NA	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	0.001	mg/L	NA	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	0.001	mg/L	NA	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury	0.00005	mg/L	NA	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Nickel	0.001	mg/L	NA	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	0.001	mg/L	NA	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	0.002	mg/L	NA	<0.002	<0.002	<0.002	<0.002	<0.002
VHCs								
1,1,1-Trichloroethane	1	µg/L	NA	NA	<1	NA	<1	NA
1,1,2,2-Tetrachloroethane	1	µg/L	NA	NA	<1	NA	<1	NA
1,1,2-Trichloroethane	1	µg/L	NA	NA	<1	NA	<1	NA
1,1-Dichloroethane	1	µg/L	NA	NA	<1	NA	<1	NA
1,1-Dichloroethene	1	µg/L	NA	NA	<1	NA	<1	NA
1,2-Dichlorobenzene	1	µg/L	NA	NA	<1	NA	<1	NA
1,2-Dichloroethane	1	µg/L	NA	NA	<1	NA	<1	NA
1,2-Dichloropropane	1	µg/L	NA	NA	<1	NA	<1	NA
1,3-Dichlorobenzene	1	µg/L	NA	NA	<1	NA	<1	NA
1,4-Dichlorobenzene	1	µg/L	NA	NA	<1	NA	<1	NA
Bromodichloromethane	1	µg/L	NA	NA	<1	NA	<1	NA
Bromoform	1	µg/L	NA	NA	<1	NA	<1	NA
Carbon Tetrachloride	1	µg/L	NA	NA	<1	NA	<1	NA
Chloroethane	1	µg/L	NA	NA	<1	NA	<1	NA
Chloroform	1	µg/L	NA	NA	<1	NA	<1	NA
cis-1,2-Dichloroethene	1	µg/L	NA	NA	<1	NA	<1	NA
cis-1,3-Dichloropropene	1	µg/L	NA	NA	<1	NA	<1	NA
Dibromochloromethane	1	µg/L	NA	NA	<1	NA	<1	NA
Methylene chloride	1	µg/L	NA	NA	<1	NA	<1	NA
Tetrachloroethene	1	µg/L	NA	NA	<1	NA	<1	NA
trans-1,2-Dichloroethene	1	µg/L	NA	NA	<1	NA	<1	NA
trans-1,3-	1	µg/L	NA	NA	<1	NA	<1	NA
Trichloroethene	1	µg/L	NA	NA	<1	NA	<1	NA
Trichlorofluoromethane	1	µg/L	NA	NA	<1	NA	<1	NA
Vinyl chloride	1	µg/L	NA	NA	<1	NA	<1	NA

LEGEND
NA - Not Analysed

Table 9

Groundwater Analytical Results
Mobil Type E and Additional Analytes
Chemical Indicator Parameters
Mobil Service Station Lansvale GME

Location			LMW3	LMW3	LMW5	LMW6	LMW7	LMW7	LMW8	LMW9	LMW9	LMW9	LMW10
Sample ID			LMW3_6/2/03	LMW3_6/2/03CHK	LMW5_6/2/03	LMW6_6/2/03	LMW7_10/2/03	LMW7_10/2/03CHK	LMW8_7/2/03	LMW9_6/2/03	QA07	QA08	LMW10_5/2/03
Date Sampled			06-Feb-03	06-Feb-03	06-Feb-03	06-Feb-03	10-Feb-03	10-Feb-03	07-Feb-03	07-Feb-03	06-Feb-03	06-Feb-03	05-Feb-03
QAQC Sample Type				LD				LD			FD	FT	
Analyte	PQL	Units											
TOC	1	mg/L	10[s]	NA	4[s]	6[s]	6	6	3[s]	4[s]	4[s]	16	5[s]
Dissolved Methane		µg/L @ 25°C	3700	NA	7	130	86	NA	79	440	440	1550	5
Nitrate as N	0.01	mg/L	0.68	0.69	24.3	18.1	11.2	NA	10.7	8.31	7.77	8.9	3.53
Sulfate	1	mg/L	150	150	230	310	170	170	300	260	250	259	110
Iron(II)	0.05	mg/L	2.25	2.25	0.12	<0.05	2	2	0.11	0.84	0.66	4.6	<0.05
Calcium	0.1	mg/L	46	46	46	37	24	24	NA	8	8.4	13	NA
Iron - total	0.05	mg/L	24.6	24.6	3.57	5.71	1.94	1.98	NA	28.9	33.2	375	NA
Magnesium	0.1	mg/L	110	110	130	160	140	NA	NA	48	48	69	NA
Sulfide	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	<0.05	<0.05	<0.1	NA
Ammonia as N	0.01	mg/L	0.02	0.02	<0.01	<0.01	0.02	NA	NA	<0.01	<0.01	0.07	NA
Kjeldahl Nitrogen	0.1	mg/L	3.4	3	6	4.2	0.8	NA	NA	2.4	2.8	7	NA
Nitrite as N	0.01	mg/L	0.04	0.02	0.17	0.3	0.03	NA	NA	0.03	0.04	0.1	NA
Biochemical Oxygen Demand (BOD)	5	mg/L	11	10	<5	<5	<5	<5	NA	<5	7	6	NA
Chemical Oxygen Demand (COD)	50	mg/L	<50	<50	<50	<50	<50	<50	NA	<50	<50	91	NA
Total Dissolved Solids (TDS)	1	mg/L	3600	3600	3900	4300	3700	3600	NA	3500	3400	3000	NA

LEGEND
s - the sample contained significant amounts of sediment - sample aliquots have been taken via decanting in an attempt to avoid including sediment in the analysis portion
NA - Not Analysed

Table 9
Groundwater Analytical Results
Mobil Type E and Additional Analytes
Chemical Indicator Parameters
Mobil Service Station Lansvale GME

Location			LMW10	LMW11	LMW12	LMW13	LMW14
Sample ID			LMW10_5/2/03CHK	LMW11_5/2/03	LMW12_5/2/03	LMW13_10/2/03	LMW14_10/2/03
Date Sampled			05-Feb-03	05-Feb-03	05-Feb-03	10-Feb-03	10-Feb-03
QAQC Sample Type			LD				
Analyte	PQL	Units					
TOC	1	mg/L	NA	4[s]	5[s]	14	3
Dissolved Methane		µg/L @ 25°C	NA	11	7	470	3
Nitrate as N	0.01	mg/L	NA	5.09	16.5	6.89	3.12
Sulfate	1	mg/L	120	190	270	230	230
Iron(II)	0.05	mg/L	<0.05	<0.05	0.32	3.41	<0.05
Calcium	0.1	mg/L	NA	17	NA	6.8	24
Iron - total	0.05	mg/L	NA	18.7	NA	0.43	0.12
Magnesium	0.1	mg/L	NA	95	NA	58	140
Sulfide	0.05	mg/L	NA	<0.05	NA	<0.05	<0.05
Ammonia as N	0.01	mg/L	NA	<0.01	NA	<0.01	0.03
Kjeldahl Nitrogen	0.1	mg/L	NA	15	NA	1.6	1.4
Nitrite as N	0.01	mg/L	NA	<0.01	NA	0.01	0.01
Biochemical Oxygen Demand (BOD)	5	mg/L	<5	<5	NA	130	<5
Chemical Oxygen Demand (COD)	50	mg/L	NA	9[s]	NA	<50	<50
Total Dissolved Solids (TDS)	1	mg/L	3000	3000	NA	3100	5500

LEGEND
s - the sample contained significant amounts of sediment - sample aliquot
NA - Not Analysed

Table 10
Historical Groundwater Analytical Results
Mobil Service Station Lansvale GME
Handex (January 2002), Handex (September 2002)
and Handex (November 2002)

Analyte	PQL	Units	ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection	NSW EPA Guidelines for Assessing Service Station Sites: Protection of Aquatic Ecosystems (Fresh)	LMW1			LMW2			LMW3		LMW4		LMW5		LMW6		LMW7	
					Jan-02	Sep-02	Nov-02	Jan-02	Sep-02	Nov-02	Jan-02	Nov-02	Jan-02	Nov-02	Jan-02	Nov-02	Jan-02	Nov-02	Jan-02	Nov-02
PSH		Y / N			Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N
Thickness		m			0.034	0.029	0.010	0.040	0.032	0.460	--	--	--	--	--	--	--	--	--	--
TPH					--	--	--	--	--	--	10000	4900	19000	14000	<20	<20	1500	220	1100	540
TPH (C6-C9 Fraction)	20	µg/L			--	--	--	--	--	--	3400	1000	7400	8700	40	<20	340	120	1000	160
TPH (C10-C14 Fraction)	20	µg/L			--	--	--	--	--	--	<100	<100	481	731	106	<100	116	1410	130	<100
TPH (C15-C28 Fraction)	100	µg/L			--	--	--	--	--	--	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TPH (C29-C36 Fraction)	100	µg/L			--	--	--	--	--	--	3400	1200	7881	9351	146	<220	456	1630	1300	360
Total TPH (C10-C36 Fraction)		µg/L																		
BTEX					--	--	--	--	--	--	4200	3100	4400	390	<0.5	<0.5	970	7	1000	300
Benzene	0.5	µg/L	950	300[a]	--	--	--	--	--	--	1600	60	7400	1700	<1	<1	250	11	7	<2
Toluene	1	µg/L		300[a]	--	--	--	--	--	--	380	33	800	810	<1	<1	30	3	4	<2
Ethylbenzene	1	µg/L		140[a]	--	--	--	--	--	--	2500	229	6500	5900	<3	<3	300	8	38	8
Total Xylenes		µg/L		380[b]	--	--	--	--	--	--										
Metals					--	--	--	--	--	--	16	--	--	--	--	--	--	--	--	--
Arsenic	1	µg/L			--	--	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--
Cadmium	0.1	µg/L	0.2		--	--	--	--	--	--	23	--	--	--	--	--	--	--	--	--
Chromium	1	µg/L			--	--	--	--	--	--	133	--	--	--	--	--	--	--	--	--
Copper	1	µg/L	1.4		--	--	--	--	--	--	202	2	4	--	--	2	--	--	--	--
Lead	1	µg/L	3.4		--	--	--	--	--	--	0.15	--	--	--	--	--	--	--	--	--
Mercury	0.05	µg/L	0.6		--	--	--	--	--	--	43	--	--	--	--	--	--	--	--	--
Nickel	1	µg/L	11		--	--	--	--	--	--	312	--	--	--	--	--	--	--	--	--
Zinc	2	µg/L	8																	
PAHs				3[c]	--	--	--	--	--	--	310	--	--	--	--	--	--	--	--	--
Total PAHs		µg/L																		
Phenols					--	--	--	--	--	--	*<0.02	--	--	--	--	--	--	--	--	--
Total Phenol	0.01	µg/L																		
VHCs					--	--	--	--	--	--	*<10	--	--	--	--	--	--	--	--	--
Total VHCs		µg/L																		
Chemical Indicator Parameters					--	--	--	--	--	--	5800	--	--	--	--	--	--	--	--	--
Dissolved Methane	µg/L @ 25°C				--	--	--	--	--	--	65000	--	--	--	--	--	--	--	--	--
Sulphate	1	µg/L			--	--	--	--	--	--	71700	--	--	--	--	--	--	--	--	--
Iron(II)	0.05	µg/L																		

LEGEND

Exceeds ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection

Exceeds NSW EPA Guidelines for Assessing Service Station Sites: Protection of Aquatic Ecosystems (Fresh)

NA - Not Analysed
FD - Field Duplicate
FT - Field Triplicate
LD - Lab Duplicate
Y Yes
N No
* PQL raised due to matrix interference
– not analysed
a ANZECC (1992) 95% Protection of Aquatic Ecosystems Trigger Values
b Netherlands (1994) Maximum Permissible Concentration for total xylenes
c ANZECC (1992) 95% Protection of Aquatic Ecosystems Trigger Value for Lead ranges from 1 to 5 µg/L, dependant on water hardness

Table 10
Historical Groundwater Analytical Results
Mobil Service Station Lansvale GME
Handex (January 2002), Handex (September 2002)
and Handex (November 2002)

Analyte	PQL	Units	ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection	NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)	LMW8		LMW9		LMW10		LMW11		LMW12		LMW13		LMW14	
					Jan-02	Nov-02	Jan-02	Nov-02	Jan-02	Nov-02	Jan-02	Nov-02	Jan-02	Nov-02	Sep-02	Nov-02	Sep-02	Nov-02
PSH		Y / N			N	N	N	N	N	N	N	N	N	N	N	N	N	N
Thickness		m			--	--	--	--	--	--	--	--	--	--	--	--	--	--
TPH																		
TPH (C6-C9 Fraction)	20	µg/L			30	140	17000	11000	<20	<20	<20	<20	<20	<20	100	80	<20	<20
TPH (C10-C14 Fraction)	20	µg/L			50	<20	3100	1000	30	70	20	30	40	<20	1500	13000	<20	<20
TPH (C15-C28 Fraction)	100	µg/L			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	128	869	<100	<100
TPH (C29-C36 Fraction)	100	µg/L			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Total TPH (C10-C36 Fraction)		µg/L			50	<220	3100	1200	30	270	20	230	40	<220	1728	13969	<220	<220
BTEX																		
Benzene	0.5	µg/L	950	300[a]	20	15	**5800**	**4900**	<0.5	<0.5	3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	1	µg/L		300[a]	<1	<1	**5200**	**2000**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	1	µg/L		140[a]	2	<1	**500**	**550**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Xylenes		µg/L		380[b]	5	<3	**5100**	**1490**	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Metals																		
Arsenic	1	µg/L			--	--	--	--	--	--	--	--	--	--	9	--	10	--
Cadmium	0.1	µg/L	0.2		--	--	--	--	--	--	--	--	--	--	0.1	--	0.1	--
Chromium	1	µg/L			--	--	--	--	--	--	--	--	--	--	4	--	8	--
Copper	1	µg/L	1.4		--	--	--	--	--	--	--	--	--	--	**3**	--	**47**	--
Lead	1	µg/L	3.4		--	--	2	--	--	--	--	--	--	--	<1	--	<1	--
Mercury	0.05	µg/L	0.6		--	--	--	--	--	--	--	--	--	--	<0.05	--	0.2	--
Nickel	1	µg/L	11		--	--	--	--	--	--	--	--	--	--	8	--	**26**	--
Zinc	2	µg/L	8		--	--	--	--	--	--	--	--	--	--	**24**	--	**56**	--
PAHs																		
Total PAHs		µg/L		3[a]	--	--	--	--	--	--	--	--	--	--	3	--	<1	--
Phenols																		
Total Phenol	0.01	µg/L			--	--	--	--	--	--	--	--	--	--	--	--	--	--
VHCs																		
Total VHCs		µg/L			--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemical Indicator Parameters																		
Dissolved Methane	µg/L @ 25°C				--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulphate	1	µg/L			--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron(II)	0.05	µg/L			--	--	--	--	--	--	--	--	--	--	--	--	--	--

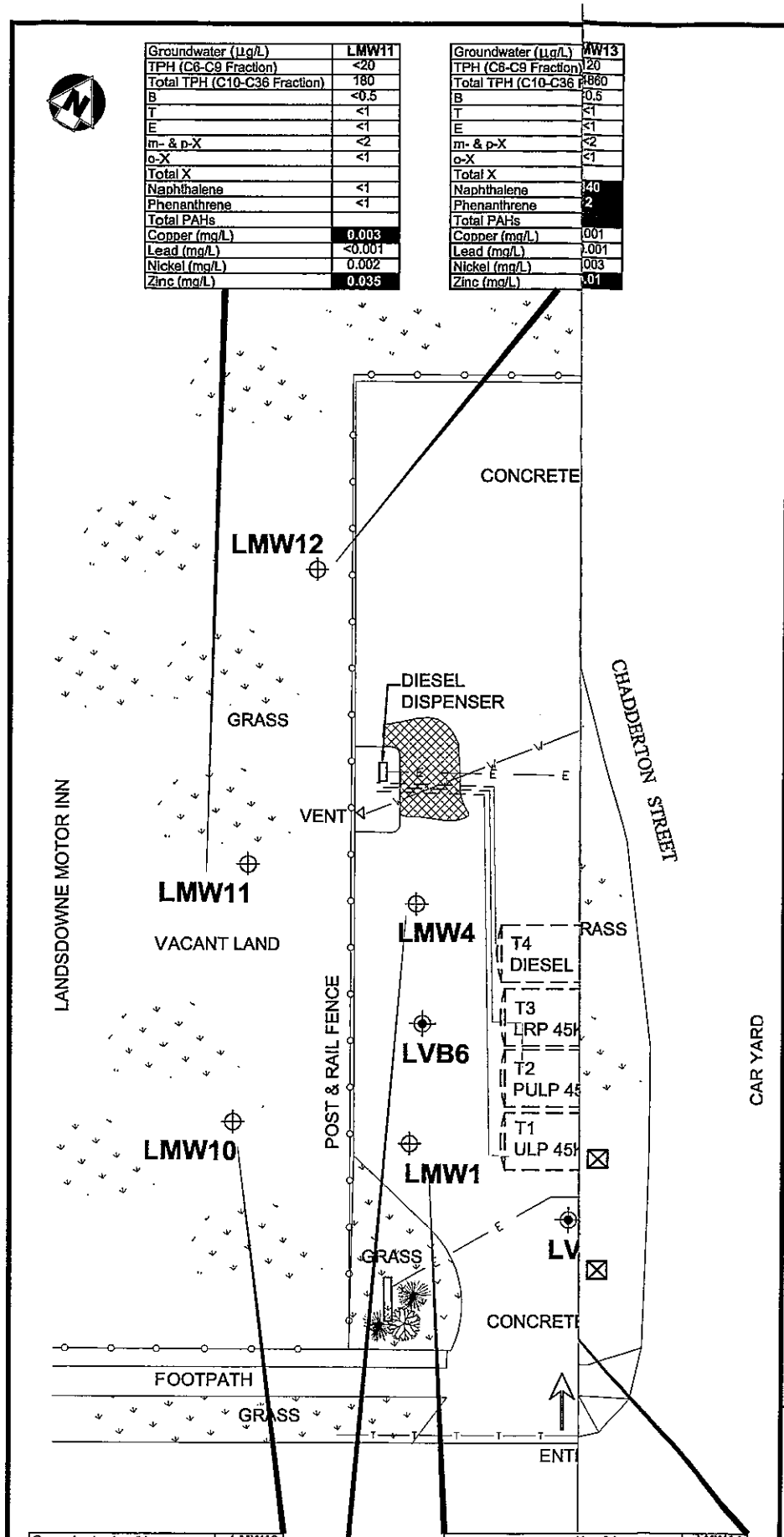
LEGEND

Exceeds ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection

Exceeds NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)

NA - Not Analysed
FD - Field Duplicate
FT - Field Triplicate
LD - Lab Duplicate
Y Yes
N No
* PQL raised due to matrix interference
-- not analysed
a ANZECC (1992) 95% Protection of Aquatic Ecosystems Trigger Values
b Netherlands (1994) Maximum Permissible Concentration for total xylenes
c ANZECC (1992) 95% Protection of Aquatic Ecosystems Trigger Value for Lead ranges from 1 to 5 µg/L,

Appendix H
Figure Illustrating Recent Groundwater Analytical Results



Groundwater (µg/L)	LMW11
TPH (C6-C9 Fraction)	<20
Total TPH (C10-C36 Fraction)	180
B	<0.5
T	<1
E	<1
m- & p-X	<2
o-X	<1
Total X	
Naphthalene	<1
Phenanthrene	<1
Total PAHs	
Copper (mg/L)	0.003
Lead (mg/L)	<0.001
Nickel (mg/L)	0.002
Zinc (mg/L)	0.035

Groundwater (µg/L)	MW13
TPH (C6-C9 Fraction)	20
Total TPH (C10-C36 F	860
B	0.5
T	<1
E	<1
m- & p-X	2
o-X	<1
Total X	
Naphthalene	40
Phenanthrene	2
Total PAHs	
Copper (mg/L)	001
Lead (mg/L)	.001
Nickel (mg/L)	003
Zinc (mg/L)	01

Groundwater (µg/L)	LMW10
TPH (C6-C9 Fraction)	<20
Total TPH (C10-C36 Fraction)	80
B	<0.5
T	<1
E	<1
m- & p-X	<2
o-X	<1
Total X	
Naphthalene	<1
Phenanthrene	<1
Total PAHs	
Copper (mg/L)	0.001
Lead (mg/L)	<0.001
Nickel (mg/L)	0.001
Zinc (mg/L)	0.013

Phase Separated Hydrocarbon (PSH)	LMW4
Apparent PSH Thickness (m)	0.18
Actual PSH Thickness (m)	Capillar
Nature of PSH	Degrad leaded pe
Age of PSH (years)	2 to 8

Phase Separate Hydrocarbon (PS	(µg/L)	LMW14
	raction)	<20
Apparent PSH Thickn	0-C36 Fraction)	
Actual PSH Thickness		0.9
Nature of PSH		11
		<1
Age of PSH (years)		3
		2
		5
		<1
		<1
		*<0.01
		*<0.01
		*<0.01
		0.049

DESIGNED: LR
DRAWN: TT
DATE: 06/06/03
APPROVED: CM
DATE: 7/7/03
STATUS: FINAL
PROJECT: 51556-144
CAD FILE: 006.DWG
REVISION: A

0 5 10
1:250 (metres)

LEGEND

- UNDERGROUND STORAGE TANK
- HANDEX INSTALLED MONITORING WELL (MARCH 2001)
- HANDEX INSTALLED MONITORING WELL (JANUARY 2002)
- HANDEX BOREHOLE (MARCH 2001)
- INFERRED GROUNDWATER FLOW DIRECTION
- SURFACE STAINING
- T TELSTRA
- W WATER
- E ELECTRICITY
- SEWER PIT
- STORMWATER DRAIN
- TELSTRA PIT
- PRODUCT LINES

NOTES

2700 ← Exceeds ANZECC 2000 Protection of Aquatic Ecosystems Fresh Water 95% Protection

← Exceeds NSW EPA Guidelines for Assessing Service Station Sites Protection of Aquatic Ecosystems (Fresh)

NA - not analysed
* PQL raised due to matrix interference

DATE DATA COLLECTED:
5th to 10th FEBRUARY 2003

CLIENT
MOBIL OIL AUSTRALIA PTY LTD

PROJECT
MOBIL SERVICE STATION, LANSVALE, NSW

TITLE
GROUNDWATER CONTAMINANT MAP

A3

URS

FIGURE 6

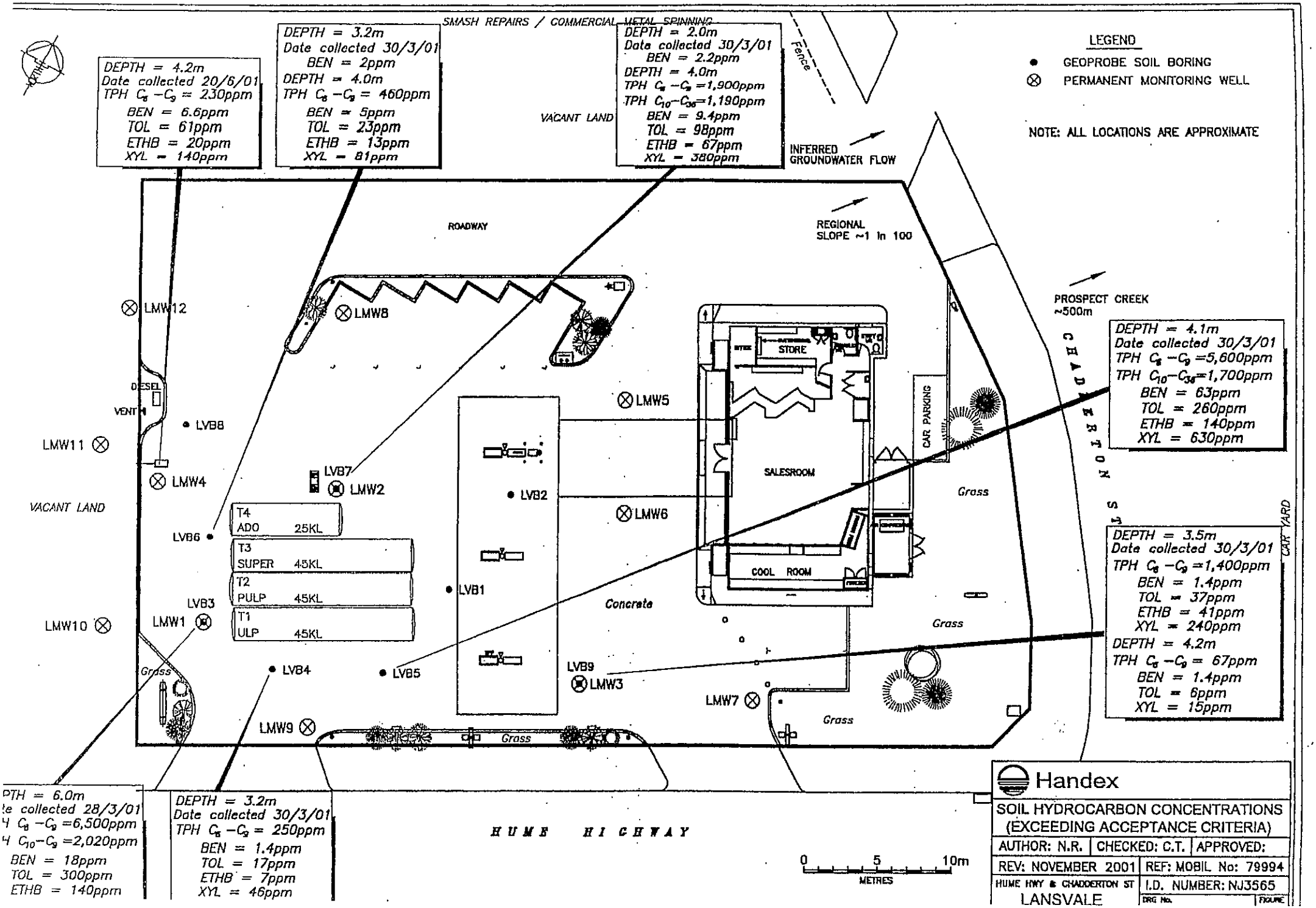
Appendix I
Remediation Technology Review Matrix

REMEDIATION TECHNOLOGY REVIEW MATRIX

Remedial Technology	REMEDIAL TECHNOLOGY ASSESSMENT SCORE AND RANKING												
	Ability to meet Regulatory Requirement	Ability to Achieve Remediation Goal	Ability to achieve Remedial endpoint	Ability to control spread of plume	Ability to Attenuate Plume	Capital Cost	Operating Cost	Time Frame for Goal Attainment	Waste Management Requirements	Environmental Impacts - Noise Odour Other	Aesthetic Impacts - Site Amenity	Total Score	Rank
Unsaturated Zone Treatment													
1. Excavation	3	1	1	1	1	4	1	1	4	4	4	25	2
2. Soil Vapour Extraction (SVE)	1	2	2	2	0	3	4	2	3	3	3	25	1
3. Bio-Venting	2	3	3	3	0	2	3	3	2	2	2	25	1
4. Natural and /or Enhanced Attenuation	4	4	4	4	2	1	2	4	1	1	1	28	3
Saturated Zone Treatment - PSH													
1. Passive Skimming	5	4	5	5	5	2	2	5	2	2	2	39	3
2. Active Skimming	4	3	4	4	4	3	3	4	3	3	3	38	2
3. Pump and Treat - Bore Extraction	1	1	1	1	2	4	4	2	4	4	4	28	1
4. Pump and Treat - Interception Trench	2	5	2	3	3	6	5	3	4	5	6	44	4
5. Mulitphase Extraction	3	2	3	2	1	5	6	1	5	6	5	39	3
6. Reactive Barrier Wall	7	6	6	6	6	8	1	6	1	7	7	61	7
7. Containment	6	8	0	7	8	7	1	8	1	7	7	60	6
8.Natural and/or Enhanced Attenuation	8	7	8	8	7	1	1	7	1	1	1	50	5
Saturated Zone Treatment - Adsorbed and Dissolved Phase Impact													
1. Pump and Treat - Bore Extraction & SVE	4	3	3	3	6	6	4	4	5	4	3	45	3
2. Pump and Treat - Interception Trench & SVE	3	4	4	2	5	7	4	3	5	6	4	47	4
3. Mulitphase Extraction	2	2	2	4	4	4	5	2	6	5	3	39	2
4. Bio-sparge	5	5	5	6	2	2	2	5	2	2	3	39	2
5. Air Sparge with SVE	1	1	1	5	1	3	3	1	3	3	3	25	1
6. Reactive Barrier Wall	6	6	6	3	3	10	1	6	4	8	2	55	5
7. Containment	8	8	8	1	8	5	1	8	4	7	2	60	6
8.Natural and/or Enhanced Attenuation	7	7	7	7	7	1	1	7	1	1	1	47	4

Created By: GM.
Checked By: MH.

Appendix J
Figure Illustrating Soil Exceedences


SMASH REPAIRS / COMMERCIAL METAL SPINNING
DEPTH = 4.2m
Date collected 20/6/01
TPH C_6 –C_9 = 230ppm
BEN = 6.6ppm
TOL = 61ppm
ETHB = 20ppm
XYL = 140ppm
DEPTH = 3.2m
Date collected 30/3/01
BEN = 2ppm
DEPTH = 4.0m
TPH C_6 –C_9 = 460ppm
BEN = 5ppm
TOL = 23ppm
ETHB = 13ppm
XYL = 81ppm
DEPTH = 2.0m
Date collected 30/3/01
BEN = 2.2ppm
DEPTH = 4.0m
TPH C_6 –C_9 =1,900ppm
TPH C_{10}–C_{36}=1,190ppm
BEN = 9.4ppm
TOL = 98ppm
ETHB = 67ppm
XYL = 380ppm
Fence
VACANT LAND
INFERRED GROUNDWATER FLOW
LEGEND
GEOPROBE SOIL BORING
PERMANENT MONITORING WELL
NOTE: ALL LOCATIONS ARE APPROXIMATE
ROADWAY
REGIONAL SLOPE ~1 In 100
PROSPECT CREEK ~500m
CHADDERTON ST
LMW12
LMW8
LMW5
LMW11
LMW4
LMW2
LMW6
LMW10
LMW1
LMW3
LMW7
LMW9
LVB8
LVB7
LVB2
LVB6
LVB1
LVB3
LVB4
LVB5
LVB9
DIESEL VENT
T4 ADO 25KL
T3 SUPER 45KL
T2 PULP 45KL
T1 ULP 45KL
STORE
SALESROOM
COOL ROOM
CAR PARKING
CAR YARD
Concrete
Grass
VACANT LAND
DEPTH = 4.1m
Date collected 30/3/01
TPH C_6 –C_9 =5,600ppm
TPH C_{10}–C_{36}=1,700ppm
BEN = 63ppm
TOL = 260ppm
ETHB = 140ppm
XYL = 630ppm
DEPTH = 3.5m
Date collected 30/3/01
TPH C_6 –C_9 =1,400ppm
BEN = 1.4ppm
TOL = 37ppm
ETHB = 41ppm
XYL = 240ppm
DEPTH = 4.2m
TPH C_6 –C_9 = 67ppm
BEN = 1.4ppm
TOL = 6ppm
XYL = 15ppm
PTH = 6.0m
te collected 28/3/01
H C_6 –C_9 =6,500ppm
H C_{10}–C_9 =2,020ppm
BEN = 18ppm
TOL = 300ppm
ETHB = 140ppm
DEPTH = 3.2m
Date collected 30/3/01
TPH C_6 –C_9 = 250ppm
BEN = 1.4ppm
TOL = 17ppm
ETHB = 7ppm
XYL = 46ppm
HUME HIGHWAY
0 5 10m
METRES
Handex
SOIL HYDROCARBON CONCENTRATIONS (EXCEEDING ACCEPTANCE CRITERIA)
AUTHOR: N.R.
CHECKED: C.T.
APPROVED:
REV: NOVEMBER 2001
REF: MOBIL No: 79994
HUME HWY & CHADDERTON ST
LANSVALE
I.D. NUMBER: NJ3565
DRG No.
FIGURE