



GROUNDWATER MONITORING - FIELD MEASUREMENT

Section 2.8.2a

Sampling equipment	Dates calibrated
Dipmeter	
Water Quality Checker	2-3/1/2008

Sampling date	Weather conditions	Ambient air temperature, °C	Sample location	As-installed depth of well, m	Reduced level top of well, mPD	Static water depth*, m	Reduced level of water**, mPD	Sampling time	Volume of water purged prior to sampling, m ³	Temperature, °C	pH	Electrical conductivity, mS/m	Dissolved oxygen, mg/l	Appearance of sample taken	
02/01/2008	Sunny	13.9°C	GWQ(A)2	50.150	35.251	10.91	24.341	10:00	0.01	22.0	5.4	15.02	5.18	pale yellow in colour	
			GWQ(A)3	57.940	39.569	6.53	33.039	10:23	0.01	19.3	5.4	22.40	5.87	clear, colourless	
			GWQ(A)4	44.130	46.456	6.34	40.116	10:46	0.01	22.5	5.7	31.90	4.18	pale yellow in colour	
			PWQM9	45.030	52.710	10.98	41.730	11:11	0.01	22.8	5.1	21.00	3.34	pale brown in colour, turbid	
			PWQM2	40.110	83.530	5.31	78.220	11:40	0.01	19.9	5.2	13.28	6.54	beige in colour	
			PWQM3	45.170	84.750	5.23	79.520	13:45	0.01	21.5	4.5	12.25	6.57	clear, colourless	
			PWQM4	30.380	118.950	6.44	112.510	14:08	0.01	21.2	5.1	8.06	6.47	clear, colourless	
			GV4	50.330	166.730	17.73	149.000	14:30	0.01	20.7	5.1	7.96	7.09	clear, colourless	
			GWQ(B)1	31.660	143.844	5.40	138.444	14:52	0.01	20.5	6.1	38.70	5.97	clear, colourless	
			PWQM5	30.140	150.070	8.94	141.130	15:30	0.01	19.9	5.3	12.20	5.80	clear, colourless	
03/01/2008	Sunny	15.0°C	GV5	50.180	156.680	7.33	149.350	09:35	0.01	21.0	5.4	11.15	5.67	clear, colourless	
			PWQM6	45.000	157.080	0.58	156.500	09:57	0.01	18.6	5.3	6.66	5.19	clear, colourless	
			GWQ(B)2	29.350	156.752	8.90	147.852	10:20	0.01	21.3	5.6	10.03	6.75	clear, colourless	
			GWQ(B)3	31.740	156.532	1.18	155.352	10:52	0.01	19.0	5.4	6.46	5.74	clear, colourless	
			PWQM7	50.480	158.830	49.64	109.190	11:15	0.01	19.4	5.6	6.58	6.88	beige in colour	
			GWQ(B)4	30.380	118.950	6.74	112.210	11:45	0.01	23.2	5.6	25.70	3.55	clear, colourless	
			PWQM8	50.150	108.960	22.34	86.620	13:45	0.01	21.3	5.5	15.53	5.51	pale brown in colour, turbid	
			GV2***	50.480	24.450	-	-	-	14:15	-	-	-	-	-	-

Remarks: *Measured from top of monitoring well pipe
 **Reduced level of water = Reduced level top of well - static water depth
 ***Well GV2 is blocked by roots of plants at 16.64 mPD.
 No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
 E.M. Technician *[Signature]*

Checked by: M. H. Law
 Deputy Project Manager *[Signature]*



GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2b

Name of site: Groundwater at PPVL
Name of analysis: GWQ(B) 1 to 4, GWQ(A) 2 to 4

Name of laboratory: Wellab

Sample location	GWQ(B)1	GWQ(B)2	GWQ(B)3	GWQ(B)4	GWQ(A)2	GWQ(A)3	GWQ(A)4
Date of sampling	02/01/2008	03/01/2008	03/01/2008	03/01/2008	02/01/2008	02/01/2008	02/01/2008
Sampling time	14:52	10:20	10:52	11:45	10:00	10:23	10:46
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	12	8	13	10	8	6	12
Ammoniacal-nitrogen, mg NH ₃ -N/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total organic carbon, mg TOC/L	3	<1	<1	<1	2	2	3
Chemical Oxygen Demand, mg-O ₂ /L	12	<5	<5	<5	9	<5	9
Potassium, mg/L	2.0	2.1	1.5	2.2	6.5	7.1	4.1
Sodium, mg/L	11	10	7.9	9.3	18	24	22
Magnesium, mg/L	0.7	0.8	0.4	3.2	0.8	1.0	1.5
Sulphate, mg SO ₄ ²⁻ /L	9	3	5	7	14	14	18
Chloride, mg Cl ⁻ /L	9	7	7	6	10	15	22
Iron, mg/L	0.26	0.96	0.11	0.24	0.11	0.07	1.4
Manganese, mg/L	0.10	0.14	<0.01	0.11	0.10	0.35	0.86
Zinc, mg/L	<0.02	0.10	<0.02	<0.02	0.03	<0.02	0.04
Copper, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead, mg/L	0.01	0.03	<0.01	0.03	<0.01	<0.01	0.01
Cadmium, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Kjeldahl Nitrogen, mg N/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Nitrogen, mg N/L	<0.6	<0.6	<0.6	<0.6	2.0	2.6	<0.6
Calcium, mg/L	2.1	7.7	2.2	34.0	6.3	13.0	39
Phosphorus, mg P/L	<0.05	0.10	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphide, mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver, mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Remarks: No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
E. M. Technician

Checked by: M. H. Law
Deputy Project Manager



GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2c

Name of site: Groundwater at PPVL
Name of analysis: GV 2, 4, 5, PWQM 2 to 5

Name of laboratory: Wellab

Sample location	GV2*	GV4	GV5	PWQM2	PWQM3	PWQM4	PWQM5
Date of sampling	03/01/2008	02/01/2008	03/01/2008	02/01/2008	02/01/2008	02/01/2008	02/01/1980
Sampling time	14:15	14:30	09:35	11:40	13:45	14:08	15:30
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	-	6	14	6	6	4	10
Ammoniacal-nitrogen, mg NH ₃ -N/L	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total organic carbon, mg TOC/L	-	<1	<1	<1	2	3	<1
Chemical Oxygen Demand, mg-O ₂ /L	-	<5	<5	<5	10	16	<5
Potassium, mg/L	-	2.9	1.1	5.4	4	2.0	3.1
Sodium, mg/L	-	9.9	9.7	14	10	11	12
Magnesium, mg/L	-	0.7	0.4	1.8	1.4	0.7	3.2
Sulphate, mg SO ₄ ²⁻ /L	-	3	2	7	6	4	2
Chloride, mg Cl/L	-	8	5	18	21	8	7
Iron, mg/L	-	<0.05	0.14	0.43	0.07	0.23	0.25
Manganese, mg/L	-	0.04	0.01	0.14	0.15	0.10	0.17
Zinc, mg/L	-	0.20	<0.02	0.03	0.06	<0.02	0.06
Copper, mg/L	-	<0.01	<0.01	0.02	<0.01	<0.01	0.01
Nickel, mg/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Chromium, mg/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead, mg/L	-	0.01	<0.01	0.03	<0.01	0.01	0.01
Cadmium, mg/L	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Kjeldahl Nitrogen, mg N/L	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Nitrogen, mg N/L	-	<0.6	<0.6	0.8	<0.6	1.4	0.7
Calcium, mg/L	-	2.8	14.0	5.7	6.7	2.1	8.9
Phosphorus, mg P/L	-	<0.05	<0.05	0.06	<0.05	<0.05	<0.05
Sulphide, mg/L	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury, mg/L	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver, mg/L	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Remarks: No compliance limit of groundwater monitoring
*Well GV2 is blocked by roots of plants. No sample was collected.

Prepared by: Peggy Lo
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Deputy Project Manager



GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2d

Name of site: Groundwater at PPVL Name of laboratory: Wellab
Name of analysis: PWQM 6 to 9

Sample location	PWQM6	PWQM7	PWQM8	PWQM9
Date of sampling	03/01/2008	03/01/2008	03/01/2008	02/01/2008
Sampling time	09:57	11:15	13:45	11:11
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	13	12	16	10
Ammoniacal-nitrogen, mg NH ₃ -N/L	<0.05	<0.05	<0.05	<0.05
Total organic carbon, mg TOC/L	<1	<1	<1	1
Chemical Oxygen Demand, mg-O ₂ /L	<5	<5	<5	<5
Potassium, mg/L	1.2	2.6	4.3	2.5
Sodium, mg/L	9.1	7.9	16	17
Magnesium, mg/L	0.4	0.4	1.1	1.9
Sulphate, mg SO ₄ ²⁻ /L	4	4	11	10
Chloride, mg Cl ⁻ /L	5	7	9	13
Iron, mg/L	0.14	4.4	3.1	<0.05
Manganese, mg/L	<0.01	1.7	0.55	0.58
Zinc, mg/L	<0.02	0.06	0.03	0.09
Copper, mg/L	<0.01	0.05	<0.01	<0.01
Nickel, mg/L	0.02	<0.01	<0.01	<0.1
Chromium, mg/L	<0.01	<0.01	<0.01	<0.1
Lead, mg/L	<0.01	0.11	0.02	0.01
Cadmium, mg/L	<0.001	<0.001	<0.001	<0.001
Total Kjeldahl Nitrogen, mg N/L	<0.5	<0.5	<0.5	2.2
Total Nitrogen, mg N/L	<0.6	<0.6	<0.6	3.5
Calcium, mg/L	1.6	2.7	9.3	15.0
Phosphorus, mg P/L	<0.05	0.11	0.06	0.06
Sulphide, mg/L	<0.1	<0.1	<0.1	<0.1
Mercury, mg/L	<0.001	<0.001	<0.001	<0.001
Silver, mg/L	<0.02	<0.02	<0.02	<0.02

Remarks: No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
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GROUNDWATER MONITORING - FIELD MEASUREMENT

Section 2.8.2a

Sampling equipment	Dates calibrated
Dipmeter	
Water Quality Checker	12/3/2008

Sampling date	Weather conditions	Ambient air temperature, °C	Sample location	As-installed depth of well, m	Reduced level top of well, mPD	Static water depth*, m	Reduced level of water**, mPD	Sampling time	Volume of water purged prior to sampling, m ³	Temperature, °C	pH	Electrical conductivity, mS/m	Dissolved oxygen, mg/l	Appearance of sample taken
12/03/2008	Hazy	24.3	GV2	50.480	24.450	8.20	16.250	14:10	0.01	24.4	5.8	18.42	4.75	grey in colour

Remarks: *Measured from top of monitoring well pipe
**Reduced level of water = Reduced level top of well - static water depth
No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
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Deputy Project Manager



GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2b

Name of laboratory: Wellab

Name of site: Groundwater at PPVL

Name of analysis: GV 2

	GV2
Sample location	12/03/2008
Date of sampling	14:10
Sampling time	12
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	0.16
Ammoniacal-nitrogen, mg NH ₃ -N/L	2
Total organic carbon, mg TOC/L	12
Chemical Oxygen Demand, mg-O ₂ /L	7.8
Potassium, mg/L	23
Sodium, mg/L	2.0
Magnesium, mg/L	6
Sulphate, mg SO ₄ ²⁻ /L	15
Chloride, mg Cl/L	1.5
Iron, mg/L	0.28
Manganese, mg/L	0.04
Zinc, mg/L	0.02
Copper, mg/L	0.02
Nickel, mg/L	<0.01
Chromium, mg/L	0.06
Lead, mg/L	<0.001
Cadmium, mg/L	<0.5
Total Kjeldahl Nitrogen, mg N/L	<0.6
Total Nitrogen, mg N/L	9.2
Calcium, mg/L	<0.05
Phosphorus, mg P/L	<0.05
Sulphide, mg/L	<0.001
Mercury, mg/L	<0.02
Silver, mg/L	

Remarks: No compliance limit of groundwater monitoring

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GROUNDWATER MONITORING - FIELD MEASUREMENT

Section 2.8.2a

Sampling equipment	Dates calibrated
Dipmeter	
Water Quality Checker	1-2/4/2008

Sampling date	Weather conditions	Ambient air temperature, °C	Sample location	As-installed depth of well, m	Reduced level top of well, mPD	Static water depth*, m	Reduced level of water** , mPD	Sampling time	Volume of water purged prior to sampling, m ³	Temperature, °C	pH	Electrical conductivity, mS/m	Dissolved oxygen, mg/l	Appearance of sample taken
01/04/2008	Cloudy	17.5°C	GV4	50.330	166.730	18.77	147.960	08:16	0.01	22.9	5.2	8.66	6.73	clear, colourless
			PWQM5	30.140	150.070	9.00	141.070	08:43	0.01	23.3	5.1	12.31	6.23	pale yellow in colour
			GWQ(B)1	31.660	143.844	5.62	138.224	08:58	0.01	22.8	6.1	38.30	6.29	pale yellow in colour
			PWQM4	30.380	118.950	6.88	112.070	09:15	0.01	22.0	5.2	7.60	7.90	clear, colourless
			PWQM3	45.170	84.750	5.55	79.200	14:10	0.01	22.2	5.5	15.73	7.27	clear, colourless
			PWQM2	40.110	83.530	5.40	78.130	14:27	0.01	22.0	5.4	13.57	7.90	clear, colourless
			PWQM8	50.150	108.960	22.69	88.270	14:50	0.01	25.1	5.1	15.49	7.43	pale brown in colour
			PWQM7	50.490	158.830	41.41	117.420	08:20	0.01	23.1	5.4	27.50	5.00	clear, colourless
02/04/2008	Cloudy	18.8°C	GWQ(B)4	37.610	151.648	7.32	144.328	08:20	0.01	23.3	5.5	7.50	6.81	pale brown in colour
			PWQM7	50.490	158.830	41.41	117.420	08:42	0.01	21.9	5.5	11.04	5.15	clear, colourless
			GV5	50.190	156.680	7.57	149.110	09:11	0.01	22.0	5.1	6.55	5.30	clear, colourless
			PWQM6	45.000	157.080	0.52	156.560	09:25	0.01	22.1	5.5	10.42	6.63	clear, colourless
			GWQ(B)2	29.350	156.752	9.03	147.722	09:46	0.01	20.4	5.4	7.42	4.42	clear, colourless
			GWQ(B)3	31.740	156.532	1.17	155.362	10:04	0.01	23.1	5.0	15.78	4.31	brown in colour
			PWQM9	45.030	52.710	12.33	40.380	10:24	0.01	23.5	5.3	19.95	4.41	turbid, pale yellow in colour
			GWQ(A)4	44.130	46.456	7.53	38.926	10:40	0.01	24.4	5.6	31.70	5.04	turbid, orange in colour
			GWQ(A)3	57.940	39.569	7.20	32.369	10:57	0.01	24.0	5.2	15.22	5.52	pale yellow in colour
			GWQ(A)2	50.160	35.251	11.77	23.481	11:19	0.01	21.0	5.0	13.61	6.06	turbid, pale brown in colour
			GV2	50.480	24.450	8.27	16.180	11:45	0.01					

Remarks: *Measured from top of monitoring well pipe
**Reduced level of water = Reduced level top of well - static water depth
No compliance limit of groundwater monitoring

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GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2b

Name of site: Groundwater at PPVL
Name of analysis: GWQ(B) 1 to 4, GWQ(A) 2 to 4

Name of laboratory: Wellab

Sample location	GWQ(B)1	GWQ(B)2	GWQ(B)3	GWQ(B)4	GWQ(A)2	GWQ(A)3	GWQ(A)4
Date of sampling	01/04/2008	02/04/2008	02/04/2008	02/04/2008	02/04/2008	02/04/2008	02/04/2008
Sampling time	08:58	09:46	10:04	08:20	11:19	10:57	10:40
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	-	-	-	-	-	-	-
Ammoniacal-nitrogen, mg NH ₃ -N/L	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	0.08
Total organic carbon, mg TOC/L	-	-	-	-	-	-	-
Chemical Oxygen Demand, mg-O ₂ /L	5	<5	<5	<5	<5	<5	8
Potassium, mg/L	-	-	-	-	-	-	-
Sodium, mg/L	-	-	-	-	-	-	-
Magnesium, mg/L	-	-	-	-	-	-	-
Sulphate, mg SO ₄ ²⁻ /L	-	-	-	-	-	-	-
Chloride, mg Cl/L	7	6	8	3	6	6	6
Iron, mg/L	-	-	-	-	-	-	-
Manganese, mg/L	-	-	-	-	-	-	-
Zinc, mg/L	-	-	-	-	-	-	-
Copper, mg/L	-	-	-	-	-	-	-
Nickel, mg/L	-	-	-	-	-	-	-
Chromium, mg/L	-	-	-	-	-	-	-
Lead, mg/L	-	-	-	-	-	-	-
Cadmium, mg/L	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, mg N/L	-	-	-	-	-	-	-
Total Nitrogen, mg N/L	0.9	0.7	0.8	<0.6	1.9	2.2	0.9
Calcium, mg/L	-	-	-	-	-	-	-
Phosphorus, mg P/L	-	-	-	-	-	-	-
Sulphide, mg/L	-	-	-	-	-	-	-
Mercury, mg/L	-	-	-	-	-	-	-
Silver, mg/L	-	-	-	-	-	-	-

Remarks: No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
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Checked by: M. H. Law
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GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2c

Name of site: Groundwater at PPVL
Name of analysis: GV 2, 4, 5, PWQM 2 to 5

Name of laboratory: Wellab

Sample location	GV2	GV4	GV5	PWQM2	PWQM3	PWQM4	PWQM5
Date of sampling	02/04/2008	01/04/2008	02/04/2008	01/04/2008	01/04/2008	01/04/2008	01/04/2008
Sampling time	11:45	08:16	09:11	14:27	14:10	09:15	08:43
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	-	-	-	-	-	-	-
Ammoniacal-nitrogen, mg NH ₃ -N/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total organic carbon, mg TOC/L	-	-	-	-	-	-	-
Chemical Oxygen Demand, mg-O ₂ /L	<5	<5	<5	<5	<5	<5	5
Potassium, mg/L	-	-	-	-	-	-	-
Sodium, mg/L	-	-	-	-	-	-	-
Magnesium, mg/L	-	-	-	-	-	-	-
Sulphate, mg SO ₄ ²⁻ /L	-	-	-	-	-	-	-
Chloride, mg Cl ⁻ /L	6	6	4	13	14	13	7
Iron, mg/L	-	-	-	-	-	-	-
Manganese, mg/L	-	-	-	-	-	-	-
Zinc, mg/L	-	-	-	-	-	-	-
Copper, mg/L	-	-	-	-	-	-	-
Nickel, mg/L	-	-	-	-	-	-	-
Chromium, mg/L	-	-	-	-	-	-	-
Lead, mg/L	-	-	-	-	-	-	-
Cadmium, mg/L	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, mg N/L	-	-	-	-	-	-	-
Total Nitrogen, mg N/L	2.5	0.8	0.6	0.8	0.7	1.2	0.9
Calcium, mg/L	-	-	-	-	-	-	-
Phosphorus, mg P/L	-	-	-	-	-	-	-
Sulphide, mg/L	-	-	-	-	-	-	-
Mercury, mg/L	-	-	-	-	-	-	-
Silver, mg/L	-	-	-	-	-	-	-

Remarks: No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
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GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2d

Name of site: Groundwater at PPVL Name of laboratory: Wellab
Name of analysis: PWQM 6 to 9

Sample location	PWQM6	PWQM7	PWQM8	PWQM9
Date of sampling	02/04/2008	02/04/2008	01/04/2008	02/04/2008
Sampling time	09:25	08:42	14:50	10:24
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	-	-	-	-
Ammoniacal-nitrogen, mg NH ₃ -N/L	<0.05	<0.05	<0.05	<0.05
Total organic carbon, mg TOC/L	-	-	-	-
Chemical Oxygen Demand, mg-O ₂ /L	<5	<5	<5	6
Potassium, mg/L	-	-	-	-
Sodium, mg/L	-	-	-	-
Magnesium, mg/L	-	-	-	-
Sulphate, mg SO ₄ ²⁻ /L	-	-	-	-
Chloride, mg Cl ⁻ /L	6	4	11	10
Iron, mg/L	-	-	-	-
Manganese, mg/L	-	-	-	-
Zinc, mg/L	-	-	-	-
Copper, mg/L	-	-	-	-
Nickel, mg/L	-	-	-	-
Chromium, mg/L	-	-	-	-
Lead, mg/L	-	-	-	-
Cadmium, mg/L	-	-	-	-
Total Kjeldahl Nitrogen, mg N/L	-	-	-	-
Total Nitrogen, mg N/L	0.9	<0.6	<0.6	2.7
Calcium, mg/L	-	-	-	-
Phosphorus, mg P/L	-	-	-	-
Sulphide, mg/L	-	-	-	-
Mercury, mg/L	-	-	-	-
Silver, mg/L	-	-	-	-

Remarks: No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
E. M. Technician

Checked by: M. H. Law
Deputy Project Manager



GROUNDWATER MONITORING -FIELD MEASUREMENT

Section 2.8.2a

Sampling equipment	Dates calibrated
Dipmeter	
Water Quality Checker	2/4/7/08

Sampling date	Weather conditions	Ambient air temperature, °C	Sample location	As-installed depth of well, m	Reduced level top of well, mPD	Static water depth*, m	Reduced level of water**, mPD	Sampling time	Volume of water purged prior to sampling, m ³	Temperature, °C	pH	Electrical conductivity, mS/m	Dissolved oxygen, mg/l	Appearance of sample taken
02/07/2008	Sunny	32.2°C	GV2	50.480	24.450	3.95	20.500	10:17	0.01	25.8	4.9	13.60	6.63	turbid, pale yellow in colour
			GWQ(A)2	50.160	35.251	4.71	30.541	10:46	0.01	25.8	5.5	11.99	6.74	clear, colourless
			GWQ(A)3	57.940	39.569	1.49	38.079	11:10	0.01	25.8	5.3	8.20	3.99	clear, colourless
			GWQ(A)4	44.130	46.456	3.49	42.966	11:33	0.01	26.2	5.7	32.40	2.10	turbid, pale orange in colour
			PWQM9	45.030	52.710	6.51	46.200	13:15	0.01	26.3	5.0	14.32	4.83	beige in colour
03/07/2008	Sunny	30.2°C	PWQM2	40.110	83.530	4.86	78.870	13:39	0.01	27.0	5.6	23.50	6.75	beige in colour
			PWQM3	45.170	84.750	2.56	82.190	09:19	0.01	26.1	6.3	6.51	4.73	pale yellow in colour
			PWQM4	30.380	118.950	3.87	115.080	09:57	0.01	25.4	5.6	3.88	5.44	clear, colourless
			GV4	50.330	166.730	12.20	154.530	10:18	0.01	26.9	5.5	8.08	6.07	clear, colourless
			GWQ(B)1	31.660	143.844	2.14	141.704	10:56	0.01	26.7	6.4	23.60	3.22	clear, colourless
			PWQM5	30.140	150.070	8.43	141.640	11:15	0.01	26.4	5.7	9.60	4.05	pale yellow in colour
			GV5	50.180	156.680	3.86	153.020	11:43	0.01	27.6	6.0	9.78	4.66	clear, colourless
			PWQM6	45.000	157.080	0.00	157.080	13:44	0.01	25.6	5.8	6.10	3.36	clear, colourless
			GWQ(B)2	29.350	156.752	6.87	149.882	14:19	0.01	24.7	5.9	11.22	5.85	beige in colour
			GWQ(B)3	31.740	156.532	1.08	155.452	14:42	0.01	26.6	5.7	5.13	3.29	clear, colourless
04/07/2008	Sunny	32.3°C	PWQM8	50.150	108.960	22.58	86.380	09:32	0.01	26.3	6.0	6.98	5.58	pale yellow in colour
			PWQM7	50.460	158.830	38.95	119.880	10:12	0.01	26.0	6.2	6.69	3.98	turbid, pale yellow in colour
			GWQ(B)4	37.610	151.648	4.70	146.946	10:33	0.01	25.3	5.9	8.41	5.16	clear, colourless

Remarks: *Measured from top of monitoring well pipe
**Reduced level of water = Reduced level top of well - static water depth
No compliance limit of groundwater monitoring

Prepared by: Peggy Lo E. M. Technician *[Signature]*

Checked by: M. H. Law Deputy Project Manager *[Signature]*



GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2b

Name of site: Groundwater at PPVL Name of laboratory: Wellab
Name of analysis: GWQ(B) 1 to 4, GWQ(A) 2 to 4

Sample location	GWQ(B)1	GWQ(B)2	GWQ(B)3	GWQ(B)4	GWQ(A)2	GWQ(A)3	GWQ(A)4
Date of sampling	03/07/2008	03/07/2008	03/07/2008	04/07/2008	02/07/2008	02/07/2008	02/07/2008
Sampling time	10:56	14:19	14:42	10:33	10:46	11:10	11:33
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	130	18	7	20	36	34	89
Ammoniacal-nitrogen, mg NH ₃ -N/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.42
Total organic carbon, mg TOC/L	<1	<1	<1	<1	<1	<1	<1
Chemical Oxygen Demand, mg-O ₂ /L	<5	<5	<5	<5	<5	<5	<5
Potassium, mg/L	2.2	2.3	2.3	1.4	6.8	7.0	3.7
Sodium, mg/L	13	8.7	4.9	5.2	19	19	20
Magnesium, mg/L	1.7	0.9	0.6	2.1	1.8	1.5	1.3
Sulphate, mg SO ₄ ²⁻ /L	7	22	6	6	18	5	5
Chloride, mg Cl ⁻ /L	12	13	13	5	25	14	28
Iron, mg/L	0.10	2.5	<0.05	0.33	0.45	0.04	4.1
Manganese, mg/L	0.44	0.28	<0.01	0.15	<0.01	0.03	0.68
Zinc, mg/L	<0.02	0.03	<0.02	<0.02	0.01	<0.02	<0.02
Copper, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead, mg/L	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Kjeldahl Nitrogen, mg N/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Total Nitrogen, mg N/L	0.8	<0.6	0.8	<0.6	<0.6	<0.6	<0.6
Calcium, mg/L	41	5.3	1.5	5.3	5.5	16.0	<0.05
Phosphorus, mg P/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	44
Sulphide, mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver, mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Remarks: No compliance limit of groundwater monitoring

Prepared by: Peggy Lo *[Signature]*
E. M. Technician

Checked by: M. H. Law *[Signature]*
Deputy Project Manager



GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2c

Name of site: Groundwater at PPVL
Name of analysis: GV 2, 4, 5, PWQM 2 to 5

Name of laboratory: Weilab

Sample location	GV2	GV4	GV5	PWQM2	PWQM3	PWQM4	PWQM5
Date of sampling	02/07/2008	03/07/2008	03/07/2008	02/07/2008	03/07/2008	03/07/2008	03/07/2008
Sampling time	10:17	10:18	11:43	13:39	09:19	09:57	11:15
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	12	12	31	15	9	16	22
Ammoniacal-nitrogen, mg NH ₃ -N/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total organic carbon, mg TOC/L	2	<1	<1	<1	<1	<1	<1
Chemical Oxygen Demand, mg-O ₂ /L	11	<5	<5	8	7	<5	<5
Potassium, mg/L	8.3	2.3	1.0	3.4	2.1	1.6	2.4
Sodium, mg/L	18	6.5	9.0	8.2	6.2	13	8.6
Magnesium, mg/L	1.2	0.6	0.5	1.9	0.8	0.6	1.1
Sulphate, mg SO ₄ ²⁻ /L	7	5	6	55	26	5	35
Chloride, mg Cl ⁻ /L	40	13	13	39	10	11	12
Iron, mg/L	0.54	0.16	0.08	3.3	0.96	<0.05	1.1
Manganese, mg/L	0.05	0.03	0.04	0.15	0.01	<0.01	0.26
Zinc, mg/L	0.03	<0.02	<0.02	0.03	0.08	<0.02	<0.02
Copper, mg/L	0.01	<0.01	<0.01	0.03	<0.01	<0.01	0.03
Nickel, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium, mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead, mg/L	0.02	<0.01	<0.01	0.06	0.02	<0.01	<0.01
Cadmium, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Kjeldahl Nitrogen, mg N/L	0.46	<0.5	<0.5	1.1	<0.05	<0.5	<0.5
Total Nitrogen, mg N/L	<0.6	<0.6	<0.6	<0.6	<0.6	1.0	1.2
Calcium, mg/L	3.8	2.0	9.0	0.1	6.5	1.9	6.4
Phosphorus, mg P/L	0.07	<0.05	<0.05	9.60	<0.05	<0.05	<0.05
Sulphide, mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury, mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver, mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Remarks: No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
E. M. Technician

Checked by: M. H. Law
Deputy Project Manager



GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2d

Name of site: Groundwater at PPVL Name of laboratory: Wellab
 Name of analysis: PWQM 6 to 9

Sample location	PWQM6	PWQM7	PWQM8	PWQM9
Date of sampling	03/07/2008	04/07/2008	04/07/2008	02/07/2008
Sampling time	13:44	10:12	09:32	13:15
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	15	20	61	26
Ammoniacal-nitrogen, mg NH ₃ -N/L	<0.05	0.13	<0.05	<0.05
Total organic carbon, mg TOC/L	<1	<1	<1	<1
Chemical Oxygen Demand, mg-O ₂ /L	<5	<5	<5	8
Potassium, mg/L	1.3	2.5	4.5	3.9
Sodium, mg/L	12	6.7	18	13
Magnesium, mg/L	0.7	0.6	1.1	2.4
Sulphate, mg SO ₄ ²⁻ /L	7	<1	6	37
Chloride, mg Cl/L	13	11	17	22
Iron, mg/L	<0.05	3.4	4.3	1.4
Manganese, mg/L	<0.01	0.96	0.50	0.10
Zinc, mg/L	<0.02	<0.02	<0.02	0.04
Copper, mg/L	<0.01	<0.01	<0.01	0.03
Nickel, mg/L	<0.01	<0.01	<0.01	<0.01
Chromium, mg/L	<0.01	<0.01	<0.01	<0.01
Lead, mg/L	<0.01	0.04	0.01	0.06
Cadmium, mg/L	<0.001	<0.001	<0.001	<0.001
Total Kjeldahl Nitrogen, mg N/L	<0.5	<0.5	<0.5	0.7
Total Nitrogen, mg N/L	<0.6	<0.6	<0.6	<0.6
Calcium, mg/L	1.6	3.0	9.9	0.1
Phosphorus, mg P/L	<0.05	<0.05	<0.05	9.4
Sulphide, mg/L	<0.1	<0.1	<0.1	<0.1
Mercury, mg/L	<0.001	<0.001	<0.001	<0.001
Silver, mg/L	<0.02	<0.02	<0.02	<0.02

Remarks: No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
 E. M. Technician

Checked by: M. H. Law
 Deputy Project Manager



GROUNDWATER MONITORING -FIELD MEASUREMENT

Section 2.8.2a

Sampling equipment	Dates calibrated
Dipmeter	
Water Quality Checker	2-3/10/08

Sampling date	Weather conditions	Ambient air temperature, °C	Sample location	As-Installed depth of well, m	Reduced level top of well, mPD	Static water depth*, m	Reduced level of water**, mPD	Sampling time	Volume of water purged prior to sampling, m³	Temperature, °C	pH	Electrical conductivity, mS/m	Dissolved oxygen, mg/l	Appearance of sample taken
02/10/2008	Hazy	26.5°C	PWQM5	30.14	150.070	8.90	141.170	09:44	0.01	25.1	5.6	8.73	5.07	beige in colour
			GV5	50.18	156.680	6.16	150.520	10:00	0.01	25.2	6.1	8.95	5.36	clear, colourless
			PWQM6	45.00	157.080	0.44	156.640	10:10	0.01	25.9	5.8	8.88	4.14	clear, colourless
			GWQ(B)2	29.35	156.752	8.15	148.602	10:28	0.01	24.1	6.2	7.98	8.07	beige in colour
			GWQ(B)3	31.74	156.532	1.11	155.422	10:38	0.01	26.9	5.7	4.75	4.97	clear, colourless
			GWQ(B)4	37.61	151.646	4.72	148.926	10:52	0.01	25.8	5.5	6.31	5.72	clear, colourless
			GWQ(B)1	31.66	143.844	3.97	139.874	11:05	0.01	26.2	6.0	15.27	3.89	clear, colourless
			GV4	50.33	166.730	14.90	151.830	11:34	0.01	24.8	5.6	4.78	6.67	clear, colourless
			PWQM4	30.38	118.950	4.01	114.940	13:21	0.01	26.4	5.3	7.63	6.32	clear, colourless
			PWQM8	50.15	108.960	21.61	87.350	13:50	0.01	27.6	6.3	14.16	6.38	pale yellow in colour
			PWQM3	45.17	84.750	4.06	80.670	14:05	0.01	26.8	5.9	11.21	6.43	pale yellow in colour
			PWQM2	40.11	83.530	5.11	78.420	14:20	0.01	26.7	6.0	10.12	6.22	beige in colour
			PWQM9	45.03	52.710	7.65	45.060	14:35	0.01	25.2	5.6	11.56	4.18	brown in colour
			GWQ(A)4	44.13	46.456	3.98	42.476	14:48	0.01	25.8	6.4	28.00	3.01	clear, colourless
GWQ(A)3	31.74	156.532	5.34	151.192	15:04	0.01	25.7	6.0	19.00	3.72	clear, colourless			
03/10/2008	Hazy	27.8°C	PWQM7	50.46	158.830	39.57	119.260	15:37	0.01	24.3	6.2	9.22	5.88	turbid, brown in colour
			GV2	20.48	24.450	6.32	18.130	09:25	0.01	25.0	5.6	13.18	6.70	turbid, beige in colour
			GWQ(A)2	50.16	35.251	7.98	27.271	09:52	0.01	25.3	6.0	13.08	6.51	pale white in colour

Remarks: *Measured from top of monitoring well pipe
 **Reduced level of water = Reduced level top of well - static water depth
 No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
 E. M. Technician

Checked by: M. H. Law
 Deputy Project Manager



GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2b

Name of site: Groundwater at PPVL
Name of analysis: GWQ(B) 1 to 4, GWQ(A) 2 to 4

Name of laboratory: Wellab

Sample location	GWQ(B)1	GWQ(B)2	GWQ(B)3	GWQ(B)4	GWQ(A)2	GWQ(A)3	GWQ(A)4
Date of sampling	02/10/2008	02/10/2008	02/10/2008	02/10/2008	03/10/2008	02/10/2008	02/10/2008
Sampling time	11:05	10:28	10:38	10:52	09:52	15:04	14:48
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	-	-	-	-	-	-	-
Ammoniacal-nitrogen, mg NH ₃ -N/L	<0.05	<0.05	<0.05	<0.05	0.06	0.09	0.29
Total organic carbon, mg TOC/L	-	-	-	-	-	-	-
Chemical Oxygen Demand, mg-O ₂ /L	<5	<5	<5	<5	9	13	12
Potassium, mg/L	-	-	-	-	-	-	-
Sodium, mg/L	-	-	-	-	-	-	-
Magnesium, mg/L	-	-	-	-	-	-	-
Sulphate, mg SO ₄ ²⁻ /L	-	-	-	-	-	-	-
Chloride, mg Cl ⁻ /L	2	4	4	4	<5	21	19
Iron, mg/L	-	-	-	-	-	-	-
Manganese, mg/L	-	-	-	-	-	-	-
Zinc, mg/L	-	-	-	-	-	-	-
Copper, mg/L	-	-	-	-	-	-	-
Nickel, mg/L	-	-	-	-	-	-	-
Chromium, mg/L	-	-	-	-	-	-	-
Lead, mg/L	-	-	-	-	-	-	-
Cadmium, mg/L	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, mg N/L	-	-	-	-	-	-	-
Total Nitrogen, mg N/L	<0.6	0.7	0.7	<0.6	1.6	2.6	<0.6
Calcium, mg/L	-	-	-	-	-	-	-
Phosphorus, mg P/L	-	-	-	-	-	-	-
Sulphide, mg/L	-	-	-	-	-	-	-
Mercury, mg/L	-	-	-	-	-	-	-
Silver, mg/L	-	-	-	-	-	-	-

Remarks: No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
E. M. Technician

Checked by: M. H. Law
Deputy Project Manager



GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2c

Name of site: Groundwater at PPVL
Name of analysis: GV 2, 4, 5, PWQM 2 to 5

Name of laboratory: Wellab

Sample location	GV2	GV4	GV5	PWQM2	PWQM3	PWQM4	PWQM5
Date of sampling	03/10/2008	02/10/2008	02/10/2008	02/10/2008	02/10/2008	02/10/2008	02/10/2008
Sampling time	09:25	11:34	10:00	14:20	14:05	13:21	09:44
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	-	-	-	-	-	-	-
Ammoniacal-nitrogen, mg NH ₃ -N/L	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total organic carbon, mg TOC/L	-	-	-	-	-	-	-
Chemical Oxygen Demand, mg-O ₂ /L	20	<5	<5	<5	<5	<5	<5
Potassium, mg/L	-	-	-	-	-	-	-
Sodium, mg/L	-	-	-	-	-	-	-
Magnesium, mg/L	-	-	-	-	-	-	-
Sulphate, mg SO ₄ ²⁻ /L	-	-	-	-	-	-	-
Chloride, mg Cl ⁻ /L	20	2	2	12	8	5	4
Iron, mg/L	-	-	-	-	-	-	-
Manganese, mg/L	-	-	-	-	-	-	-
Zinc, mg/L	-	-	-	-	-	-	-
Copper, mg/L	-	-	-	-	-	-	-
Nickel, mg/L	-	-	-	-	-	-	-
Chromium, mg/L	-	-	-	-	-	-	-
Lead, mg/L	-	-	-	-	-	-	-
Cadmium, mg/L	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen, mg N/L	-	-	-	-	-	-	-
Total Nitrogen, mg N/L	2.0	<0.6	<0.6	<0.6	0.9	1.1	1.4
Calcium, mg/L	-	-	-	-	-	-	-
Phosphorus, mg P/L	-	-	-	-	-	-	-
Sulphide, mg/L	-	-	-	-	-	-	-
Mercury, mg/L	-	-	-	-	-	-	-
Silver, mg/L	-	-	-	-	-	-	-

Remarks: No compliance limit of groundwater monitoring

Prepared by: Peggy Lo
E. M. Technician

Checked by: M. H. Law
Deputy Project Manager



GROUNDWATER MONITORING - LABORATORY MEASUREMENT

Section 2.8.2d

Name of site: Groundwater at PPVL Name of laboratory: Welllab
 Name of analysis: PWQM 6 to 9

Sample location	PWQM6	PWQM7	PWQM8	PWQM9
Date of sampling	02/10/2008	02/10/2008	02/10/2008	02/10/2008
Sampling time	10:10	15:37	13:50	14:35
Alkalinity as CaCO ₃ at pH 4.5, mg CaCO ₃ /L	-	-	-	-
Ammoniacal-nitrogen, mg NH ₃ -N/L	<0.05	0.06	<0.05	0.06
Total organic carbon, mg TOC/L	-	-	-	-
Chemical Oxygen Demand, mg-O ₂ /L	<5	8	<5	82
Potassium, mg/L	-	-	-	-
Sodium, mg/L	-	-	-	-
Magnesium, mg/L	-	-	-	-
Sulphate, mg SO ₄ ²⁻ /L	-	-	-	-
Chloride, mg Cl ⁻ /L	3	6	5	5
Iron, mg/L	-	-	-	-
Manganese, mg/L	-	-	-	-
Zinc, mg/L	-	-	-	-
Copper, mg/L	-	-	-	-
Nickel, mg/L	-	-	-	-
Chromium, mg/L	-	-	-	-
Lead, mg/L	-	-	-	-
Cadmium, mg/L	-	-	-	-
Total Kjeldahl Nitrogen, mg N/L	-	-	-	-
Total Nitrogen, mg N/L	<0.6	1.0	<0.6	3.7
Calcium, mg/L	-	-	-	-
Phosphorus, mg P/L	-	-	-	-
Sulphide, mg/L	-	-	-	-
Mercury, mg/L	-	-	-	-
Silver, mg/L	-	-	-	-

Remarks: No compliance limit of groundwater monitoring

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