

**QUARTERLY MONITORING REPORT
OCTOBER 2004 SAMPLING**

**City of Patterson Wastewater Treatment Plant
Groundwater Monitoring Program**

Conducted in Accordance with
Waste Discharge Requirements Order No. 5-00-146

Prepared by:



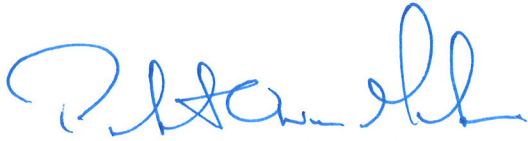
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Prepared for:

City of Patterson
Department of Public Works
33 South Del Puerto Avenue
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DECEMBER 2004

REPORT PREPARED BY:



12/17/04

Robert O. Godwin
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(DATE)
California No. C48045



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1. INTRODUCTION

This Quarterly Groundwater Monitoring Report has been prepared in accordance with the Waste Discharge Requirements for the City of Patterson Wastewater Treatment Plant in the City of Patterson, Stanislaus County, California. The wells were installed as part of the groundwater monitoring program developed to determine if groundwater has been, or has the potential to be, adversely impacted by wastewater treatment and disposal operations. The monitoring program will include an assessment of background conditions and a determination if there has been any impact from wastewater disposal. The groundwater monitoring program consists of the construction and quarterly sampling of ten monitoring wells.

Monitoring wells MW-1 to MW-5 were constructed in March 2001. Samples have been collected on a quarterly basis since April 2001. In conjunction with the 1.25 mgd wastewater treatment plant expansion, five new monitoring wells were constructed between the months of July and August of 2004. Borehole logs for the new monitoring wells are presented in **Appendix C**.

This report presents the results of the quarterly samples collected on October 18, 2004 for the existing wells and the initial sampling of the new wells during the construction phase for the 1.25 mgd expansion. Included in this report will be groundwater elevation summaries and contour maps.

2. GROUNDWATER MONITORING WELLS

Figure 1 shows the monitoring well locations.

All ten wells have 15 feet of screen with total depths ranging from 28 to 31.5 feet below ground surface (bgs). A summary of well characteristics is provided in **Table 1**.

3. GROUNDWATER ELEVATIONS

Groundwater elevations measured to date are summarized in **Figure 2**.

Groundwater elevations measured in this sampling round are presented in **Table 1** and contoured on the map presented in **Figure 3**.

4. MONITORING WELL SAMPLING

The wells were purged and sampled on October 18, 2004 in accordance with the procedures specified in the workplan. Sampling was conducted by Richard Chrun of GeoAnalytical Laboratories. Purge logs are presented in **Appendix A**.

5. GROUNDWATER QUALITY RESULTS

The samples were analyzed by GeoAnalytical Laboratories, a state-certified environmental laboratory. Analytical results for the 2004 quarterly samples are summarized in **Table 2**. Laboratory reports for the October 2004 quarterly samples are presented in **Appendix B**.

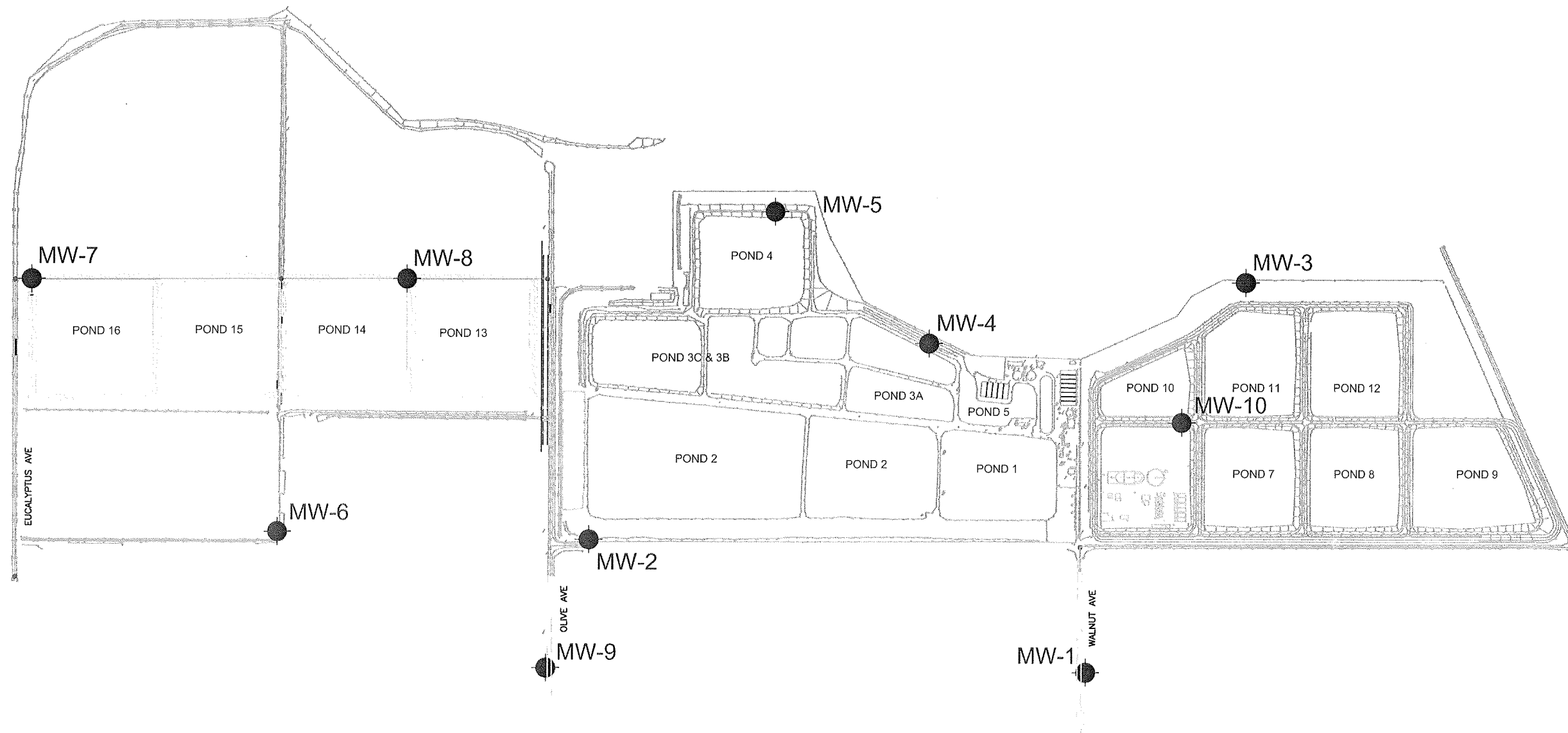
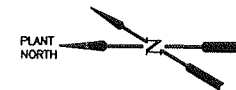
Table 1
Well Construction Summary

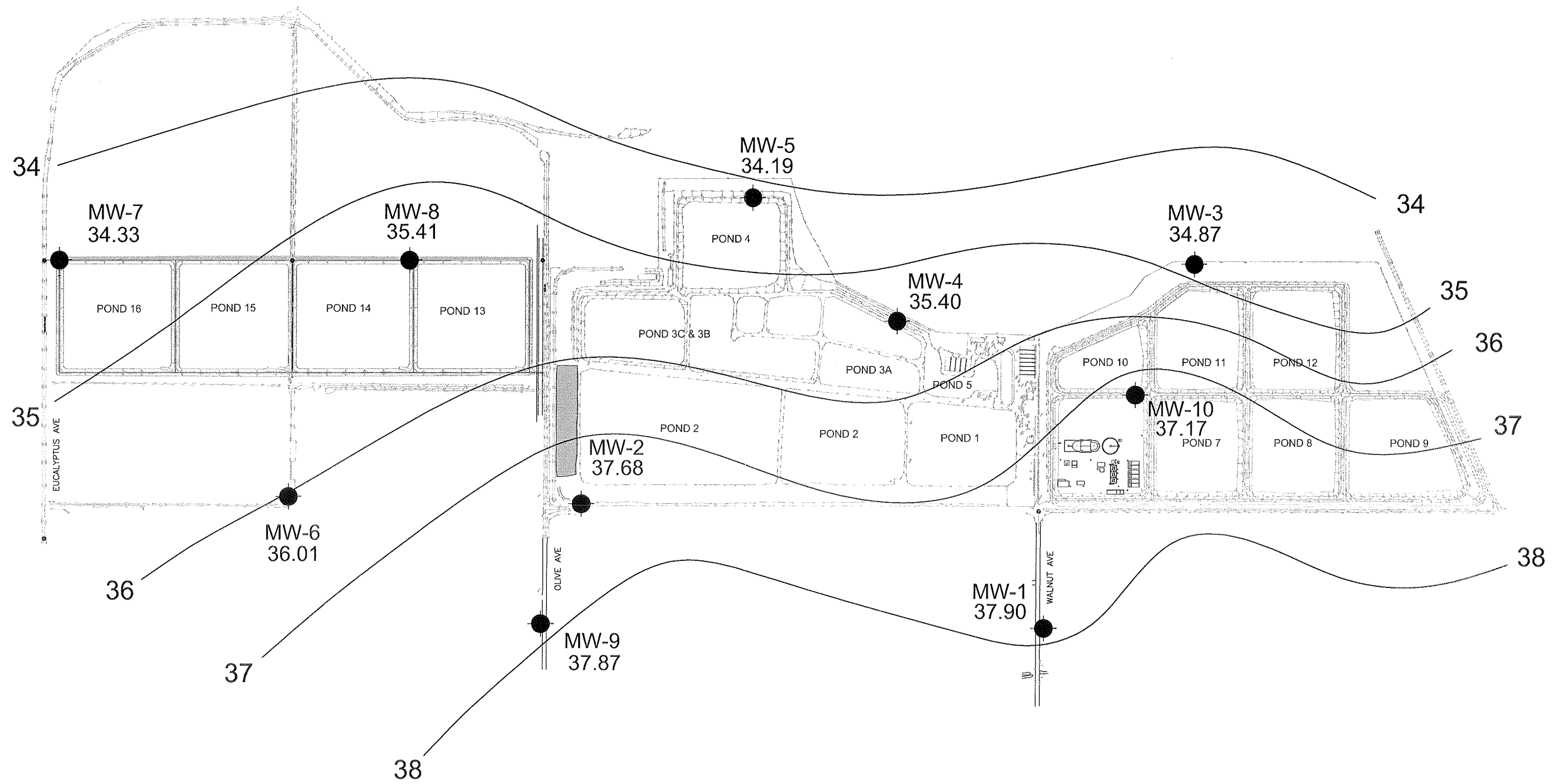
	Well Depth (ft)	Completion Type	Slab Surface Elevation	Top of Casing Elevation	Water Elevation 10/18/04 (ft msl)
MW-1	27.5	Below	55.58	54.93	37.90
MW-2	29.0	Above	57.93	59.68	37.68
MW-3	28.0	Above	52.18	53.80	34.87
MW-4	30.0	Above	56.99	58.58	35.40
MW-5	29.0	Above	53.79	55.21	34.19
MW-6	30.0	Above	51.81	55.23	36.01
MW-7	31.5	Above	54.62	58.04	34.33
MW-8	29.5	Above	55.91	59.33	35.41
MW-9	30.0	Below	53.84	53.63	38.08
MW-10	30.0	Below	58.33	58.12	37.38

Table 2
Analytical Results

	PH	Electric Conductivity	Total Dissolved Solids	Nitrate as Nitrogen	Coliform Organisms	
	(Std. Units)	(umhos/cm)	(mg/L)	(mg/L)	Total Coliform Method 9221B (MPN/100ml)	Fecal Coliform Method 9221E (MPN/100ml)
MW-1	7.6	2000	1310	10.0	<2	<2
MW-2	7.3	3040	1870	8.4	7.0	4
MW-3	7.4	3890	2450	11.0	2.0	<2
MW-4	6.9	2990	1510	ND	4.0	<2
MW-5	6.9	2080	1250	2.7	9.0	<2
MW-6	7.6	1820	1160	4.1	17.0	17
MW-7	7.2	1920	1190	5.3	23.0	<2
MW-8	7.0	3330	1940	8.6	8.0	<2
MW-9	7.6	2750	1510	3.3	300	300
MW-10	7.2	3040	1810	12.0	<2	<2

ND = Not Detected





**APPENDIX A
PURGE LOGS**

Report # _____

Field Log / Groundwater Sampling Form

Date 10/18/04

Client City of Patterson

Well Name MW-1

Project Name Quarterly Monitoring Wells

Well Type: Monitor Extraction Other _____

Consultant _____

Sampler Ray Azevedo / Richard Chrun

Proj. Manager Richard Chrun

WELL PURGING

Purge Method

- Bailer - Type _____
- Pump - Type 2"
- Other _____

Multiplier

I.D. (in.)	Gal/Ft.
2.0	0.1632
4.0	0.6527
6.0	1.4686

Purge Volume

Well Casing Diameter

- 2 - inch
- 4 - inch
- other _____

Well Volume Purged

- 3 volumes
- 4 volumes
- other _____

Total Well Depth 27.50

Depth to Water 17.03

Water Column Length 10.47

10.47 X 0.6527 X 3 = 20.50
 Water column length Multiplier No. Volumes CALCULATED. Purge Vol.

20.50 / 2.5 = 8.20
 Purge Vol / Purge Rate TOTAL PURGE TIME

8.20 / 3 = 2.73
 Total Purge Time # Volumes PURGE TIME/VOL.

Actual Values

Purge Time /Vol.	<u>3</u>
X	
No. Volumes	<u>3</u>
=	
Total Purge Time	<u>9</u>
X	
Purge Rate	<u>2.5</u>
=	
Actual Purge Vol.	<u>22.5</u>

GROUNDWATER PARAMETER MEASUREMENTS

	Time	Gallons	pH	Conductivity µmhos/cm	Temp. <input checked="" type="checkbox"/> deg C <input type="checkbox"/> deg F	DO	ORP	Color / Odor
Start	<u>11:09</u>	-	-	-	-	-	-	-
Vol 1	<u>11:12</u>	<u>7.5</u>	<u>7.58</u>	<u>2.17 ms</u>	<u>20.6</u>			<u>clear / none</u>
Vol 2	<u>11:15</u>	<u>15</u>	<u>7.52</u>	<u>2.14 ms</u>	<u>20.9</u>			
Vol 3	<u>11:18</u>	<u>22.5</u>	<u>7.63</u>	<u>2.10 ms</u>	<u>20.8</u>			
Vol 4								
Vol 5								

Meter Type IQ Scientific

Purge Water Storage / Disposal

- Drummed onsite
- Onsite Treatment System
- Other _____

COMMENTS/purge: _____

WELL SAMPLING

Sampling Method

- Bailer - Type _____
- Pump - Type _____
- Other _____

Time	Sample ID	Org	Dup	Split	Blank	Container Type	Number of Containers	Preservative
<u>11:18am</u>	<u>MW-1</u>	<u>X</u>				<u>Pl Litre</u>	<u>1</u>	<u>4°C</u>
						<u>100ml sterile</u>	<u>1</u>	<u>4°C</u>

COMMENTS/sampling: _____

Report # _____

Field Log / Groundwater Sampling Form

Date 10/18/04

Client City of Patterson

Well Name MW-2

Project Name Quarterly Monitoring Wells

Well Type : Monitor Extraction Other _____

Consultant _____

Proj. Manager Richard Chrun

Sampler Ray Azevedo

WELL PURGING

Purge Method

- Bailer - Type _____
- Pump - Type 2"
- Other _____

Multiplier

Well Casing	
I.D. (in.)	Gal/Ft.
2.0	0.1632
4.0	0.6527
6.0	1.4686

Purge Volume

Well Casing Diameter

- 2 - inch
- 4 - inch
- other _____

Well Volume Purged

- 3 volumes
- 4 volumes
- other _____

Total Well Depth 31.40

Depth to Water 22.0

Water Column Length 9.40

$$\frac{9.40}{\text{Water column length}} \times \frac{0.6527}{\text{Multiplier}} \times \frac{3}{\text{No. Volumes}} = \frac{18.38}{\text{CALCULATED Purge Vol.}}$$

$$\frac{18.38}{\text{Purge Vol}} \div \frac{2.5}{\text{Purge Rate}} = \frac{7.35}{\text{TOTAL PURGE TIME}}$$

$$\frac{7.35}{\text{Total Purge Time}} \div \frac{3}{\text{\# Volumes}} = \frac{2.45}{\text{PURGE TIME/VOL.}}$$

Actual Values

Purge Time /Vol.	<u>3</u>
No. Volumes	<u>3</u>
Total Purge Time	<u>4</u>
Purge Rate	<u>2.5</u>
Actual Purge Vol.	<u>22.5</u>

GROUNDWATER PARAMETER MEASUREMENTS

	Time	Gallons	pH	Conductivity µmhos/cm	Temp. <input checked="" type="checkbox"/> deg C <input type="checkbox"/> deg F	ID	ORP	Color / Odor
Start	<u>11:45</u>	-	-	-	-	-	-	-
Vol 1	<u>11:48</u>	<u>7.5</u>	<u>7.38</u>	<u>296ms</u>	<u>20.3</u>			<u>clear / none</u>
Vol 2	<u>11:51</u>	<u>15</u>	<u>7.30</u>	<u>294ms</u>	<u>20.0</u>			<u>Turbid / none</u>
Vol 3	<u>11:54</u>	<u>22.5</u>	<u>7.33</u>	<u>300ms</u>	<u>20.0</u>			<u>Turbid / none</u>
Vol 4								
Vol 5								

Meter Type IQ Scientific

Purge Water Storage / Disposal

- Drummed onsite
- Onsite Treatment System
- Other _____

COMMENTS/purge: _____

WELL SAMPLING

Sampling Method

- Bailer - Type _____
- Pump - Type _____
- Other _____

Time	Sample ID	Org	Dup	Split	Blank	Container Type	Number of Containers	Preservative
<u>11:54am</u>	<u>MW-2</u>	<u>X</u>				<u>Pl Litre</u>	<u>1</u>	<u>4°C</u>
						<u>100ml sterile</u>	<u>1</u>	<u>4°C</u>

COMMENTS/sampling: _____

Report # _____

Field Log / Groundwater Sampling Form

Date 10/18/04

Client City of Patterson

Well Name MW-3

Project Name Quarterly Monitoring Wells

Well Type: Monitor Extraction Other _____

Consultant _____

Proj. Manager Richard Chron

Sampler Ray Azevedo

WELL PURGING

Purge Method

- Bailer - Type _____
- Pump - Type 2"
- Other _____

Multiplier

Well Casing	
I.D. (in.)	Gal/Ft.
2.0	0.1632
4.0	0.6527
6.0	1.4686

Purge Volume

Well Casing Diameter

- 2 - inch
- 4 - inch
- other _____

Well Volume Purged

- 3 volumes
- 4 volumes
- other _____

Total Well Depth 31.00
 Depth to Water 18.93
 Water Column Length 12.07

12.07 x 0.6527 x 3 = 23.63
 Water column length Multiplier No. Volumes CALCULATED. Purge Vol.

23.63 / 2.5 = 9.45
 Purge Vol / Purge Rate TOTAL PURGE TIME

9.45 / 3 = 3.15
 Total Purge Time # Volumes PURGE TIME/VOL.

Actual Values

Purge Time / Vol. 3
 X
 No. Volumes 3
 =
 Total Purge Time 9
 X
 Purge Rate 2.5
 =
 Actual Purge Vol. 22.5

GROUNDWATER PARAMETER MEASUREMENTS

	Time	Gallons	pH	Conductivity µmhos/cm	Temp. <input checked="" type="checkbox"/> deg C <input type="checkbox"/> deg F	ID	ORP	Color / Odor
Start	<u>12:45</u>	-	-	-	-	-	-	-
Vol 1	<u>12:48</u>	<u>7.5</u>	<u>7.19</u>	<u>3.64 ms</u>	<u>19.2</u>			<u>clear / none</u>
Vol 2	<u>12:51</u>	<u>15</u>	<u>7.21</u>	<u>3.77 ms</u>	<u>19.4</u>			<u>"</u>
Vol 3	<u>12:54</u>	<u>22.5</u>	<u>7.19</u>	<u>3.81 ms</u>	<u>19.4</u>			<u>"</u>
Vol 4								
Vol 5								

Meter Type IQ Scientific

Purge Water Storage / Disposal

- Drummed onsite
- Onsite Treatment System
- Other _____

COMMENTS/purge: _____

WELL SAMPLING

Sampling Method

- Bailer - Type _____
- Pump - Type _____
- Other _____

Time	Sample ID	Org	Dup	Split	Blank	Container Type	Number of Containers	Preservative
<u>12:54pm</u>	<u>MW-3</u>	<u>X</u>				<u>Pl Litre</u>	<u>1</u>	<u>4°C</u>
						<u>100ml sterile</u>	<u>1</u>	<u>4°C</u>

COMMENTS/sampling: _____

Report # _____

Field Log / Groundwater Sampling Form

Date 10/18/04

Client City of Patterson

Well Name MW-4

Project Name Quarterly Monitoring Wells

Well Type: Monitor Extraction Other _____

Consultant _____

Proj. Manager Richard Chron

Sampler Ray Azevedo

WELL PURGING

Purge Method

- Bailer - Type _____
- Pump - Type 2"
- Other _____

Purge Volume

- Well Casing Diameter _____ Well Volume Purged _____
- 2 - inch
 - 4 - inch
 - other _____
 - 3 volumes
 - 4 volumes
 - other _____

Multiplier

Well Casing I.D. (in.)	Gal/Ft.
2.0	0.1632
4.0	0.6527
6.0	1.4686

Total Well Depth 31.00
 Depth to Water 23.18
 Water Column Length 7.82

7.82 x 0.6527 x 3 = 15.31
 Water column length Multiplier No. Volumes CALCULATED Purge Vol.

15.31 / 2.5 = 6.12
 Purge Vol / Purge Rate TOTAL PURGE TIME

6.12 / 3 = 2.04
 Total Purge Time # Volumes PURGE TIME/VOL.

Actual Values

Purge Time / Vol. 2
 No. Volumes 3
 Total Purge Time 6
 Purge Rate 2.5
 Actual Purge Vol. 15

GROUNDWATER PARAMETER MEASUREMENTS

	Time	Gallons	pH	Conductivity µmhos/cm	Temp. <input checked="" type="checkbox"/> deg C <input type="checkbox"/> deg F	ID	ORP	Color / Odor
Start	<u>12:30</u>	-	-	-	-	-	-	-
Vol 1	<u>12:32</u>	<u>5</u>	<u>6.93</u>	<u>2.32ms</u>	<u>19.1</u>			<u>clear/none</u>
Vol 2	<u>12:34</u>	<u>10</u>	<u>6.92</u>	<u>2.60ms</u>	<u>19.0</u>			<u>"</u>
Vol 3	<u>12:36</u>	<u>15</u>	<u>7.01</u>	<u>2.59ms</u>	<u>19.0</u>			<u>"</u>
Vol 4								
Vol 5								

Meter Type IQ Scientific

Purge Water Storage / Disposal

- Drummed onsite
- Onsite Treatment System
- Other _____

COMMENTS/purge: _____

WELL SAMPLING

Sampling Method

- Bailer - Type _____
- Pump - Type _____
- Other _____

Time	Sample ID	Org	Dup	Split	Blank	Container Type	Number of Containers	Preservative
<u>12:36pm</u>	<u>MW-4</u>	<u>X</u>				<u>Pl Litre</u>	<u>1</u>	<u>4°C</u>
						<u>100ml sterile</u>	<u>1</u>	<u>4°C</u>

COMMENTS/sampling: _____

Report # _____

Field Log / Groundwater Sampling Form

Date 12/18/04

Client City of Patterson

Well Name MW-5

Project Name Quarterly Monitoring Wells

Well Type: Monitor Extraction Other _____

Consultant _____

Proj. Manager Richard Chron

Sampler Ray Azevedo

WELL PURGING

Purge Method

- Bailer - Type _____
- Pump - Type 2"
- Other _____

Purge Volume

- Well Casing Diameter _____ Well Volume Purged
- 2 - inch 3 volumes
 - 4 - inch 4 volumes
 - other _____ other _____

Multiplier

I.D. (in.)	Gal/Ft.
2.0	0.1632
4.0	0.6527
6.0	1.4686

Total Well Depth 31.00
 Depth to Water 21.02
 Water Column Length 9.98

9.98 x 0.6527 x 3 = 19.54
 Water column length Multiplier No. Volumes CALCULATED. Purge Vol.

19.54 / 2.5 = 7.81
 Purge Vol / Purge Rate TOTAL PURGE TIME

7.81 / 3 = 2.60
 Total Purge Time # Volumes PURGE TIME/VOL.

Actual Values

Purge Time / Vol. 3
 X
 No. Volumes 3
 =
 Total Purge Time 9
 X
 Purge Rate 2.5
 =
 Actual Purge Vol. 22.5

GROUNDWATER PARAMETER MEASUREMENTS

	Time	Gallons	pH	Conductivity µmhos/cm	Temp. <input checked="" type="checkbox"/> deg C <input type="checkbox"/> deg F	DO	ORP	Color / Odor
Start	12:10	-	-	-	-	-	-	-
Vol 1	12:13	7.5	6.72	2.06 ms	18.0			clear / none
Vol 2	12:16	15	6.62	2.12 ms	18.2			"
Vol 3	12:19	22.5	6.60	2.15 ms	18.1			"
Vol 4								
Vol 5								

Meter Type IQ Scientific

Purge Water Storage / Disposal

- Drummed onsite
- Onsite Treatment System
- Other _____

COMMENTS/purge: _____

WELL SAMPLING

Sampling Method

- Bailer - Type _____
- Pump - Type _____
- Other _____

Time	Sample ID	Org	Dup	Split	Blank	Container Type	Number of Containers	Preservative
12:19 pm	MW-5	X				Pl Litre	1	4°C
						100ml sterile	1	4°C

COMMENTS/sampling: _____

Report # 0292-11 Field Log / Groundwater Sampling Form Date 10/18/04
 Client City of Patterson Well Name MW-6
 Project Name Quarterly Monitoring Wells Well Type: Monitor Extraction Other _____
 Consultant _____
 Proj. Manager Rich Chron Sampler Ray Azevedo

WELL PURGING

Purge Method
 Bailer - Type _____
 Pump - Type 2"
 Other _____

Purge Volume
 Well Casing Diameter _____ Well Volume Purged _____
 2 - inch 3 volumes
 4 - inch 4 volumes
 other _____ other _____

Multiplier	
Well Casing I.D. (in.)	Gal/Ft.
2.0	0.1632
4.0	0.6527
6.0	1.4686

Total Well Depth 29.20
 Depth to Water 19.22
 Water Column Length 9.98

9.98 x 0.1632 x 3 = 4.88
 Water column length Multiplier No. Volumes CALCULATED. Purge Vol.

4.88 / 2.5 = 1.95
 Purge Vol / Purge Rate TOTAL PURGE TIME

1.95 / 3 = 0.65
 Total Purge Time # Volumes PURGE TIME/VOL.

Actual Values	
Purge Time /Vol.	<u>1</u>
No. Volumes	<u>3</u>
Total Purge Time	<u>3</u>
Purge Rate	<u>2.5</u>
Actual Purge Vol.	<u>7.5</u>

GROUNDWATER PARAMETER MEASUREMENTS

	Time	Gallons	pH	Conductivity µmhos/cm	Temp. <input checked="" type="checkbox"/> deg C <input type="checkbox"/> deg F	ID	ORP	Color / Odor
Start	<u>2:25</u>	-	-	-	-	-	-	-
Vol 1	<u>2:26</u>	<u>2.5</u>	<u>7.73</u>	<u>1470µs</u>	<u>19.3</u>			<u>Brown / none</u>
Vol 2	<u>2:27</u>	<u>5.0</u>	<u>7.54</u>	<u>1700µs</u>	<u>19.4</u>			
Vol 3	<u>2:28</u>	<u>7.5</u>	<u>7.52</u>	<u>1710µs</u>	<u>19.5</u>			
Vol 4								
Vol 5								

Meter Type IQ Scientific Purge Water Storage / Disposal
 Drummed onsite
 Onsite Treatment System
 Other _____

COMMENTS/purge: _____

WELL SAMPLING

Sampling Method
 Bailer - Type _____
 Pump - Type _____
 Other _____

Time	Sample ID	Org	Dup	Split	Blank	Container Type	Number of Containers	Preservative
<u>2:28pm</u>	<u>MW-6</u>	<u>X</u>				<u>Pl Litre</u>	<u>1</u>	<u>4°C</u>
						<u>100ml sterile</u>	<u>1</u>	<u>4°C</u>

COMMENTS/sampling: _____

Report # _____ **Field Log / Groundwater Sampling Form** Date 10/18/04
 Client City of Patterson Well Name MW-7
 Project Name Quarterly Monitoring Wells Well Type: Monitor Extraction Other _____
 Consultant _____
 Proj. Manager Rich Chrun Sampler Ray Azevedo

WELL PURGING

Purge Method
 Bailer - Type _____
 Pump - Type 2"
 Other _____

Purge Volume
 Well Casing Diameter _____ Well Volume Purged _____
 2 - inch 3 volumes
 4 - inch 4 volumes
 other _____ other _____

Multiplier	
Well Casing I.D. (in.)	Gal/Ft.
2.0	0.1632
4.0	0.6527
6.0	1.4686

Total Well Depth 31.00
 Depth to Water 23.71
 Water Column Length 7.29

7.29 x 0.1632 x 3 = 3.56
 Water column length Multiplier No. Volumes CALCULATED. Purge Vol.

3.56 / 2.5 = 1.42
 Purge Vol / Purge Rate TOTAL PURGE TIME

1.42 / 3 = 0.47
 Total Purge Time # Volumes PURGE TIME/VOL.

Actual Values	
Purge Time /Vol.	<u>1</u>
X No. Volumes	<u>3</u>
= Total Purge Time	<u>3</u>
X Purge Rate	<u>2.5</u>
= Actual Purge Vol.	<u>7.5</u>

GROUNDWATER PARAMETER MEASUREMENTS

	Time	Gallons	pH	Conductivity µmhos/cm	Temp. <input checked="" type="checkbox"/> deg C <input type="checkbox"/> deg F	DO	ORP	Color / Odor
Start	<u>2:10</u>	-	-	-	-	-	-	-
Vol 1	<u>2:11</u>	<u>2.5</u>	<u>7.22</u>	<u>1565µs</u>	<u>18.6</u>			<u>Brown / none</u>
Vol 2	<u>2:12</u>	<u>5.0</u>	<u>7.27</u>	<u>1897µs</u>	<u>18.4</u>			<u>turbid / none</u>
Vol 3	<u>2:13</u>	<u>7.5</u>	<u>7.29</u>	<u>1890µs</u>	<u>18.5</u>			<u>turbid / none</u>
Vol 4								
Vol 5								

Meter Type IQ Scientific Purge Water Storage / Disposal
 Drummed onsite
 Onsite Treatment System
 Other _____

COMMENTS/purge: _____

WELL SAMPLING

Sampling Method
 Bailer - Type _____
 Pump - Type _____
 Other _____

Time	Sample ID	Org	Dup	Split	Blank	Container Type	Number of Containers	Preservative
<u>2:13 pm</u>	<u>MW-7</u>	<u>X</u>				<u>Pl Litre</u>	<u>1</u>	<u>4°C</u>
						<u>100ml sterile</u>	<u>1</u>	<u>4°C</u>

COMMENTS/sampling: _____

Report # _____

Field Log / Groundwater Sampling Form

Date 10/18/04

Client City of Patterson

Well Name MW-8

Project Name Quarterly Monitoring Wells

Well Type: Monitor Extraction Other _____

Consultant _____

Proj. Manager Rich Chron

Sampler Ray Azevedo

WELL PURGING

Purge Method

- Bailer - Type _____
- Pump - Type 2"
- Other _____

Purge Volume

- Well Casing Diameter _____ Well Volume Purged
- 2 - inch 3 volumes
 - 4 - inch 4 volumes
 - other _____ other _____

Multiplier

Well Casing I.D. (in.)	Gal/Ft.
2.0	0.1632
4.0	0.6527
6.0	1.4686

Total Well Depth 30.70

Depth to Water 23.92

Water Column Length 6.78

$$\frac{6.78}{\text{Water column length}} \times \frac{0.1632}{\text{Multiplier}} \times \frac{3}{\text{No. Volumes}} = \frac{3.31}{\text{CALCULATED Purge Vol.}}$$

$$\frac{3.31}{\text{Purge Vol}} \div \frac{2.5}{\text{Purge Rate}} = \frac{1.32}{\text{TOTAL PURGE TIME}}$$

$$\frac{1.32}{\text{Total Purge Time}} \div \frac{3}{\text{\# Volumes}} = \frac{0.44}{\text{PURGE TIME/VOL.}}$$

Actual Values	
Purge Time /Vol.	<u>1</u>
X	
No. Volumes	<u>3</u>
=	
Total Purge Time	<u>3</u>
X	
Purge Rate	<u>2.5</u>
=	
Actual Purge Vol.	<u>7.5</u>

GROUNDWATER PARAMETER MEASUREMENTS

	Time	Gallons	pH	Conductivity µmhos/cm	Temp. <input checked="" type="checkbox"/> deg C <input type="checkbox"/> deg F	ID	ORP	Color / Odor
Start	<u>1:57</u>	-	-	-	-	-	-	-
Vol 1	<u>1:58</u>	<u>2.5</u>	<u>7.24</u>	<u>2.39ms</u>	<u>18.8</u>			<u>turbid / none</u>
Vol 2	<u>1:59</u>	<u>5.0</u>	<u>7.13</u>	<u>2.88ms</u>	<u>18.6</u>			<u>"</u>
Vol 3	<u>2:00</u>	<u>7.5</u>	<u>7.06</u>	<u>3.02ms</u>	<u>18.3</u>			<u>"</u>
Vol 4								
Vol 5								

Meter Type IQ Scientific

Purge Water Storage / Disposal

- Drummed onsite
- Onsite Treatment System
- Other _____

COMMENTS/purge: _____

WELL SAMPLING

Sampling Method

- Bailer - Type _____
- Pump - Type _____
- Other _____

Time	Sample ID	Org	Dup	Split	Blank	Container Type	Number of Containers	Preservative
<u>2:00pm</u>	<u>MW-8</u>	<u>X</u>				<u>Pl Litre</u>	<u>1</u>	<u>4°C</u>
						<u>100ml sterile</u>	<u>1</u>	<u>4°C</u>

COMMENTS/sampling: _____

Report # _____

Field Log / Groundwater Sampling Form

Date 10/18/04

Client City of Patterson

Well Name MW-9

Project Name Quarterly Monitoring Wells

Well Type: Monitor Extraction Other _____

Consultant _____

Proj. Manager Rich Chrun

Sampler Ray Azevedo

WELL PURGING

Purge Method

- Bailer - Type _____
- Pump - Type 2"
- Other _____

Multiplier

Well Casing	
I.D. (in.)	Gal/Ft.
2.0	0.1632
4.0	0.6527
6.0	1.4686

Purge Volume

Well Casing Diameter _____

Well Volume Purged _____

- 2 - inch
- 4 - inch
- other _____

- 3 volumes
- 4 volumes
- other _____

Total Well Depth 19.30

Depth to Water 15.76

Water Column Length 3.54

$$\underline{3.54} \times \underline{0.1632} \times \underline{3} = \underline{1.73}$$

Water column length Multiplier No. Volumes CALCULATED. Purge Vol.

$$\underline{1.73} / \underline{2.5} = \underline{0.69}$$

Purge Vol / Purge Rate TOTAL PURGE TIME

$$\underline{0.69} / \underline{3} = \underline{0.23}$$

Total Purge Time # Volumes PURGE TIME/VOL.

Actual Values

Purge Time /Vol.	<u>1</u>
X	
No. Volumes	<u>3</u>
=	
Total Purge Time	<u>3</u>
X	
Purge Rate	<u>2.5</u>
=	
Actual Purge Vol.	<u>7.5</u>

GROUNDWATER PARAMETER MEASUREMENTS

	Time	Gallons	pH	Conductivity µmhos/cm	Temp.		ID	ORP	Color / Odor
					<input checked="" type="checkbox"/> deg C	<input type="checkbox"/> deg F			
Start	<u>1:30</u>	-	-	-	-	-	-	-	-
Vol 1	<u>1:31</u>	<u>2.5</u>	<u>7.71</u>	<u>754 µs</u>	<u>19.7</u>				<u>Brown / none</u>
Vol 2	<u>1:32</u>	<u>5.0</u>	<u>7.50</u>	<u>2.49 ms</u>	<u>19.8</u>				<u>"</u>
Vol 3	<u>1:33</u>	<u>7.5</u>	<u>7.49</u>	<u>2.64 ms</u>	<u>20.0</u>				<u>"</u>
Vol 4									
Vol 5									

Meter Type IQ Scientific

Purge Water Storage / Disposal

- Drummed onsite
- Onsite Treatment System
- Other _____

COMMENTS/purge: _____

WELL SAMPLING

Sampling Method

- Bailer - Type _____
- Pump - Type _____
- Other _____

Time	Sample ID	Org	Dup	Split	Blank	Container Type	Number of Containers	Preservative
<u>1:33pm</u>	<u>MW-9</u>	<u>X</u>				<u>Pl Litre</u>	<u>1</u>	<u>4°C</u>
						<u>100ml sterile</u>	<u>1</u>	<u>4°C</u>

COMMENTS/sampling: _____

Report # _____

Field Log / Groundwater Sampling Form

Date 10/18/04

Client City of Patterson

Well Name MW-10

Project Name Quarterly Monitoring Wells

Well Type: Monitor Extraction Other _____

Consultant _____

Proj. Manager Rich Chrun

Sampler Ray Azevedo

WELL PURGING

Purge Method

- Bailer - Type _____
- Pump - Type 2"
- Other _____

Purge Volume

- Well Casing Diameter _____ Well Volume Purged _____
- 2 - inch 3 volumes
 - 4 - inch 4 volumes
 - other _____ other _____

Multiplier	
Well Casing I.D. (in.)	Gal/Ft.
2.0	0.1632
4.0	0.6527
6.0	1.4686

Total Well Depth 30'00
 Depth to Water 20.95
 Water Column Length 9.05

9.05 x 0.1632 x 3 = 4.43
 Water column length Multiplier No. Volumes CALCULATED. Purge Vol.

4.43 / 2.5 = 1.77
 Purge Vol / Purge Rate TOTAL PURGE TIME

1.77 / 3 = 0.59
 Total Purge Time # Volumes PURGE TIME/VOL.

Actual Values	
Purge Time /Vol.	<u>1</u>
X	
No. Volumes	<u>3</u>
=	
Total Purge Time	<u>3</u>
X	
Purge Rate	<u>2.5</u>
=	
Actual Purge Vol.	<u>7.5</u>

GROUNDWATER PARAMETER MEASUREMENTS

	Time	Gallons	pH	Conductivity µmhos/cm	Temp. <input checked="" type="checkbox"/> deg C <input type="checkbox"/> deg F	ID	ORP	Color / Odor
Start	<u>1:10</u>	-	-	-	-	-	-	-
Vol 1	<u>1:11</u>	<u>2.5</u>	<u>7.77</u>	<u>603 µs</u>	<u>20.1</u>			<u>turbid / none</u>
Vol 2	<u>1:12</u>	<u>5.0</u>	<u>7.13</u>	<u>276 ms</u>	<u>19.2</u>			<u>Brown / none</u>
Vol 3	<u>1:13</u>	<u>7.5</u>	<u>7.09</u>	<u>2.89 ms</u>	<u>19.4</u>			<u>Brown / none</u>
Vol 4								
Vol 5								

Meter Type IQ Scientific

Purge Water Storage / Disposal

- Drummed onsite
- Onsite Treatment System
- Other _____

COMMENTS/purge: _____

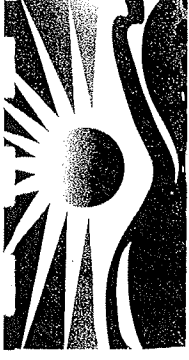
WELL SAMPLING

Sampling Method

- Bailer - Type _____
- Pump - Type _____
- Other _____

Time	Sample ID	Org	Dup	Split	Blank	Container Type	Number of Containers	Preservative
<u>1:13 pm</u>	<u>MW-10</u>	<u>X</u>				<u>Pl Litre</u>	<u>1</u>	<u>4°C</u>
						<u>100ml sterile</u>	<u>1</u>	<u>4°C</u>

COMMENTS/sampling: _____



GeoAnalytical Laboratories, Inc.
 1405 Kansas Avenue
 Modesto, CA 95351
 Phone: (209) 572-0900
 Fax: (209) 572-0916

Lab Report # Q292-11
 Regulatory Yes No CC: Yes No
 Regulator: _____

Phone: () _____
 Fax: () _____
 Original To: _____
 C.C To: _____

Client: City of Patterson
 Address: 33 S. Del Puerto
 City: Patterson Zip: 95363
CHAIN OF CUSTODY
 EDF EDT FIELD LOGS

Project ID	Sampled By	Date	Time	Sample type		Matrix	Sample ID	Container		No. Of Containers	ANALYSIS	Remarks	Lab Use Only	
				Grab	Comp			Type	Size				Lab ID #	Preservative
10-18-04	Richard Chrus	11:18 Am	X			MW-1	P	LTR	100 ml	2	X		Q307130	
		11:54 Am				MW-2					X		Q307131	
		12:54 pm				MW-3					X		Q307132	
		12:36 pm				MW-4					X		Q307133	
		12:19 pm				MW-5					X		Q307134	
		2:08 pm				MW-6					X		Q307135	
		2:13 pm				MW-7					X		Q307136	
		2:00 pm				MW-8					X		Q307137	
		1:33 pm				MW-9					X		Q307138	
		1:13 pm				MW-10					X		Q307139	
		12:00 pm				Mitigation Well					X		Q307140	

Remarks: _____
 Relinquished by (Signature) Richard Chrus Date 10-18-04 Time 330
 Relinquished by (Signature) _____ Date _____ Time _____
 Received by (Signature) Richard Padella Date 10/18/04 Time 330
 Received by (Signature) _____ Date _____ Time _____

Preservative: 1 4°C 2 HCL 3 NaOH 4 Na₂S₂O₃ 5 HNO₃ 6 H₂O₂ 7 Other
 Baiters: _____ 55 Gallon Drums _____
 Turnaround Time: _____
 Standard Silver Rush Gold Rush Platinum Rush Other
 Matrix: H₂O Drinking Water Waste Water Hazardous Waste (Water) Soil/Solid
 Pump Truck Mileage 37 miles
 Time DAY 1/2

Approved By: _____

APPENDIX B
LABORATORY ANALYTICAL REPORT

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

CERTIFICATE OF ANALYSIS

Report # Q292-11

Date: 10/25/04

City of Patterson
33 S. Del Puerto
Patterson CA 95363

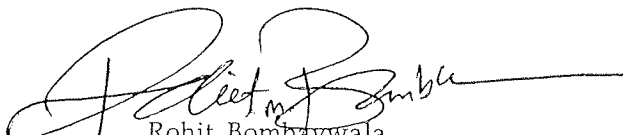
Project: Quarterly Monitoring Wells

Date Rec'd: 10/18/04
Date Started: 10/18/04
Date Completed: 10/22/04


PO#

Date Sampled: 10/18/04
Time:
Sampler: R. Chrun (Geo)

Sample ID	Lab ID	RL	Method	Analyte	Results	Units
MW-1	Q307130	NA	150.1	pH	7.6	Std. Units
		1.0	120.1	Specific Conductance (EC)	2000	μ mhos/cm
		0.25	300.0	Nitrate as N	10	mg/L
		10	160.1	TDS (Filterable Residue)	1310	mg/L
MW-2	Q307131	NA	150.1	pH	7.3	Std. Units
		1.0	120.1	Specific Conductance (EC)	3040	μ mhos/cm
		0.25	300.0	Nitrate as N	8.4	mg/L
		10	160.1	TDS (Filterable Residue)	1870	mg/L
MW-3	Q307132	NA	150.1	pH	7.4	Std. Units
		1.0	120.1	Specific Conductance (EC)	3890	μ mhos/cm
		0.25	300.0	Nitrate as N	11	mg/L
		10	160.1	TDS (Filterable Residue)	2450	mg/L
MW-4	Q307133	NA	150.1	pH	6.9	Std. Units
		1.0	120.1	Specific Conductance (EC)	2990	μ mhos/cm
		0.25	300.0	Nitrate as N	ND	mg/L
		10	160.1	TDS (Filterable Residue)	1510	mg/L
MW-5	Q307134	NA	150.1	pH	6.9	Std. Units
		1.0	120.1	Specific Conductance (EC)	2080	μ mhos/cm
		0.25	300.0	Nitrate as N	2.7	mg/L
		10	160.1	TDS (Filterable Residue)	1250	mg/L


Rohit Bombaywala
Inorganic Supervisor

Certification # 1157


Donna Keller
Laboratory Director

GeoAnalytical Laboratories, Inc.

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Date: 10/25/04

City of Patterson
33 S. Del Puerto
Patterson CA 95363

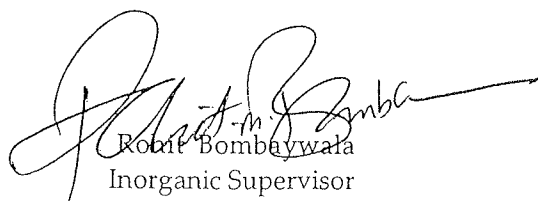
Project: Quarterly Monitoring Wells

Date Rec'd: 10/18/04
Date Started: 10/18/04
Date Completed: 10/22/04


PO#

Date Sampled: 10/18/04
Time:
Sampler: R. Chrun (Geo)

Sample ID	Lab ID	RL	Method	Analyte	Results	Units
MW-6	Q307135	NA	150.1	pH	7.6	Std. Units
		1.0	120.1	Specific Conductance (EC)	1820	μ mhos/cm
		0.25	300.0	Nitrate as N	4.1	mg/L
		10	160.1	TDS (Filterable Residue)	1160	mg/L
MW-7	Q307136	NA	150.1	pH	7.2	Std. Units
		1.0	120.1	Specific Conductance (EC)	1920	μ mhos/cm
		0.25	300.0	Nitrate as N	5.3	mg/L
		10	160.1	TDS (Filterable Residue)	1190	mg/L
MW-8	Q307137	NA	150.1	pH	7.0	Std. Units
		1.0	120.1	Specific Conductance (EC)	3330	μ mhos/cm
		0.25	300.0	Nitrate as N	8.6	mg/L
		10	160.1	TDS (Filterable Residue)	1940	mg/L
MW-9	Q307138	NA	150.1	pH	7.6	Std. Units
		1.0	120.1	Specific Conductance (EC)	2750	μ mhos/cm
		0.25	300.0	Nitrate as N	3.3	mg/L
		10	160.1	TDS (Filterable Residue)	1510	mg/L
MW-10	Q307139	NA	150.1	pH	7.2	Std. Units
		1.0	120.1	Specific Conductance (EC)	3040	μ mhos/cm
		0.25	300.0	Nitrate as N	12	mg/L
		10	160.1	TDS (Filterable Residue)	1810	mg/L


Robin Bombaywala
Inorganic Supervisor

Certification # 1157


Donna Keller
Laboratory Director

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Date: 10/25/04

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33 S. Del Puerto
Patterson CA 95363

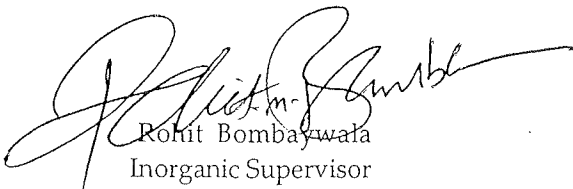
Project: Quarterly Monitoring Wells

Date Rec'd: 10/18/04
Date Started: 10/18/04
Date Completed: 10/22/04


PO#

Date Sampled: 10/18/04
Time:
Sampler: R. Chrun (Geo)

Sample ID	Lab ID	RL	Method	Analyte	Results	Units
Mitigation Well	Q307140	NA	150.1	pH	7.3	Std. Units
		1.0	120.1	Specific Conductance (EC)	2800	μ mhos/cm
		0.25	300.0	Nitrate as N	4.7	mg/L
		10	160.1	TDS (Filterable Residue)	1540	mg/L


Rohit Bombaywala
Inorganic Supervisor

Certification # 1157


Donna Keller
Laboratory Director

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City of Patterson
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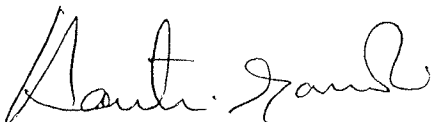
Project: Quarterly Monitoring Wells

PO#

Date Rec'd: 10/18/04
Date Started: 10/18/04
Date Completed: 10/22/04

Date Sampled: 10/18/04
Time:
Sampler: R. Chrun (Geo)

Sample ID	Lab ID	RL	Method	Analyte	Results	Units
MW-1	Q307130		9221B	Total Coliform	<2	MPN/100ml
			9221E	Fecal Coliform	<2	MPN/100ml
MW-2	Q307131		9221B	Total Coliform	7	MPN/100ml
			9221E	Fecal Coliform	4	MPN/100ml
MW-3	Q307132		9221B	Total Coliform	2	MPN/100ml
			9221E	Fecal Coliform	<2	MPN/100ml
MW-4	Q307133		9221B	Total Coliform	4	MPN/100ml
			9221E	Fecal Coliform	<2	MPN/100ml
MW-5	Q307134		9221B	Total Coliform	9	MPN/100ml
			9221E	Fecal Coliform	<2	MPN/100ml
MW-6	Q307135		9221B	Total Coliform	17	MPN/100ml
			9221E	Fecal Coliform	17	MPN/100ml
MW-7	Q307136		9221B	Total Coliform	23	MPN/100ml
			9221E	Fecal Coliform	<2	MPN/100ml
MW-8	Q307137		9221B	Total Coliform	8	MPN/100ml
			9221E	Fecal Coliform	<2	MPN/100ml
MW-9	Q307138		9221B	Total Coliform	300	MPN/100ml
			9221E	Fecal Coliform	300	MPN/100ml
MW-10	Q307139		9221B	Total Coliform	<2	MPN/100ml
			9221E	Fecal Coliform	<2	MPN/100ml



Kanti Gandhi
Chemist



Donna Keller
Laboratory Director

Certification # 1157

GeoAnalytical Laboratories, Inc.

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CERTIFICATE OF ANALYSIS

Report # Q292-11

Date: 10/25/04

City of Patterson
33 S. Del Puerto
Patterson

CA 95363

Project: Quarterly Monitoring Wells

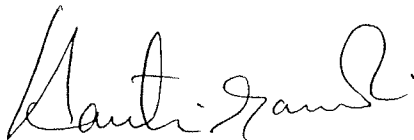
PO#

Date Rec'd: 10/18/04
Date Started: 10/18/04
Date Completed: 10/22/04

Date Sampled: 10/18/04
Time:

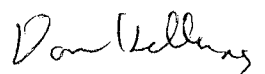
Sampler: R. Chrun (Geo)

Sample ID	Lab ID	RL	Method	Analyte	Results	Units
Mitigation Well	Q307140		9221B	Total Coliform	<2	MPN/100ml
			9221E	Fecal Coliform	<2	MPN/100ml



Kanti Gandhi
Chemist

Certification # 1157



Donna Keller
Laboratory Director

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

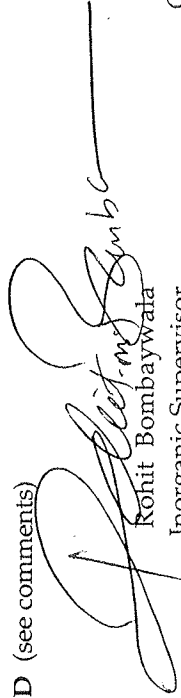
QC REPORT

Report# Q292-11


City of Patterson
 33 S. Del Puerto
 Patterson CA 95363

Analyte	Method	Batch #	Dates Analyzed	Orig.	Dupl.	MS %Rec	MSD %Rec	RPD	LCS %Rec	Blank	Comments
pH	150.1	I06757	10/18/04	7.5	7.5			0.0		NA	
Specific Conductance (EC)	120.1	I06740	10/18/04-10/19/04	49700	49800			0.2		ND	
Nitrate as N	300.0	I06823	10/19/04			102.0	100.0 *	2.0		ND	Sample analyte concentration too high to spike.
TDS (Filterable Residue)	160.1	I06845	10/19/04	1270	1310			3.1		ND	

* LCS/LCSD (see comments)



Rohit Bombaywala
 Inorganic Supervisor



Donna Keller
 Laboratory Director

Certification # 1157

GeoAnalytical Laboratories, Inc.

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QC REPORT

Report# Q292-11

City of Patterson
33 S. Del Puerto
Patterson

CA 95363

Analyte	Method	Batch #	Dates Analyzed	Orig.	Dupl.	MS %Rec	MSD %Rec	RPD	LCS %Rec	Blank	Comments
Total Coliform	9221B	B00555	10/18/04-10/22/04	<2	<2			0.0		<2	

* LCS/LCSD (see comments)



Kanti Gandhi
Chemist



Donna Keller
Laboratory Director

Certification # 1157

APPENDIX C
MONITORING WELL LOGS
MW-6 TO MW-10



DEFINITION OF TERMS

PRIMARY DIVISIONS		SYMBOLS		SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS < 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES LITTLE OR NO FINES
		GRAVELS WITH FINES	GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OF NO FINES
			GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS < 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES
			ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SLIGHTLY PLASTIC CLAYEY SILTS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, SILTS OR LEAN CLAYS
SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50	OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY		
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTY CLAYS	
HIGHLY ORGANIC SOILS		PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

Very dense, moist, light brown with orange mottling,
poorly graded fine SAND with gravels.

GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILTS AND CLAYS
		COARSE	FINE	COARSE	MEDIUM	FINE	
12"	3"	3/4"	4	10	40	200	
CLEAR SQUARE SIEVE OPENING				U.S. STANDARD SIEVE SIZE			

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
 GS- Grain Size Distribution
 SE- Sand Equivalent
 EI- Expansion Index
 CHM- Sulfate and Chloride
 Content, pH, Resistivity
 COR - Corrosivity

PM- Permeability
 SG- Specific Gravity
 HA- Hydrometer Analysis
 AL- Atterberg Limits
 RV- R-Value
 CN- Consolidation

PP- Pocket Penetrometer
 WA- Wash Analysis
 DS- Direct Shear
 UC- Unconfined Compression
 MD- Moisture/Density
 M- Moisture
 SC- Swell Compression
 OI- Organic Impurities



CONSTRUCTION TESTING & ENGINEERING, INC.

GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
 2414 VINEYARD AVENUE, SUITE G ESCONDIDO CA. 92029 (760) 746-4955

PROJECT:
 CTE JOB NO:
 LOGGED BY:

DRILLER:
 DRILL METHOD:
 SAMPLE METHOD:

SHEET: of
 DRILLING DATE:
 ELEVATION:

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING LEGEND	
							DESCRIPTION	Laboratory Tests
0							Block or Chunk Sample	
							Bulk Sample	
5							2-inch diam. Solid PVC	
							Standard Penetration Test	
10							Modified Split-Barrel Drive Sampler (Cal Sampler)	
							Thin Walled Army Corp. of Engineers Sample	
15							Very dense, moist, light brown with orange mottling, poorly graded fine SAND with gravels. Groundwater Table	
							Soil Type or Classification Change	
20							? — ? — ? — ? — ? — ? — ? — ? — ? — Formation Change [(Approximate boundaries queried (?))]	
25					"SM"		Quotes are placed around classifications where the soils exist in situ as bedrock	

FIGURE:

BL2



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PROJECT: Patterson WWTP Expansion DRILLER: Frontier Drilling SHEET: 1 of 1
 CTE JOB NO: 20-1497 DRILL METHOD: 8" Hollow Auger DRILLING DATE: 7/8/2004
 LOGGED BY: T. Alan Krause SAMPLE METHOD: Cal Mod ELEVATION: Levee Crown

Boring #: 7A (Log Only, No Well Installed; See MW-7B For Well Installation at Location #7.

Depth (Feet)	Bulk Sample	Drive Sample Type	# Blows/6-inch	Sample ID / #	Sample Size / Quantity	DESCRIPTION	U.S.C.S. Symbol	Depth (Feet)	Log Existing Soils	No Monitoring Well Constructed in Boring (Soil Log Provided for Supplemental Information)	Log Existing Soils	Groundwater Level
0						(Loose) Silty, Sandy Fine Angular GRAVEL, Fill	GM	0				
5			5 5 6	7A/1		Stiff, Dry-Damp, Dark Brown, Silty CLAY/CLAY (Low-Medium Plasticity) (Fill -- Pond Dike)	CL	5				
10			5 5 5	7A/2		Loose, Dry, Light Brown, Silty Fine SAND	SM	10				
15			4 6 6	7A/3				15				
20			5 6 10	7A/4		Medium Dense, Wet, Light Gray, Fine SAND with Silt	SP	20				▼
25			5 9 10	7A/5				25				
30			6 8 12	7A/6				30				

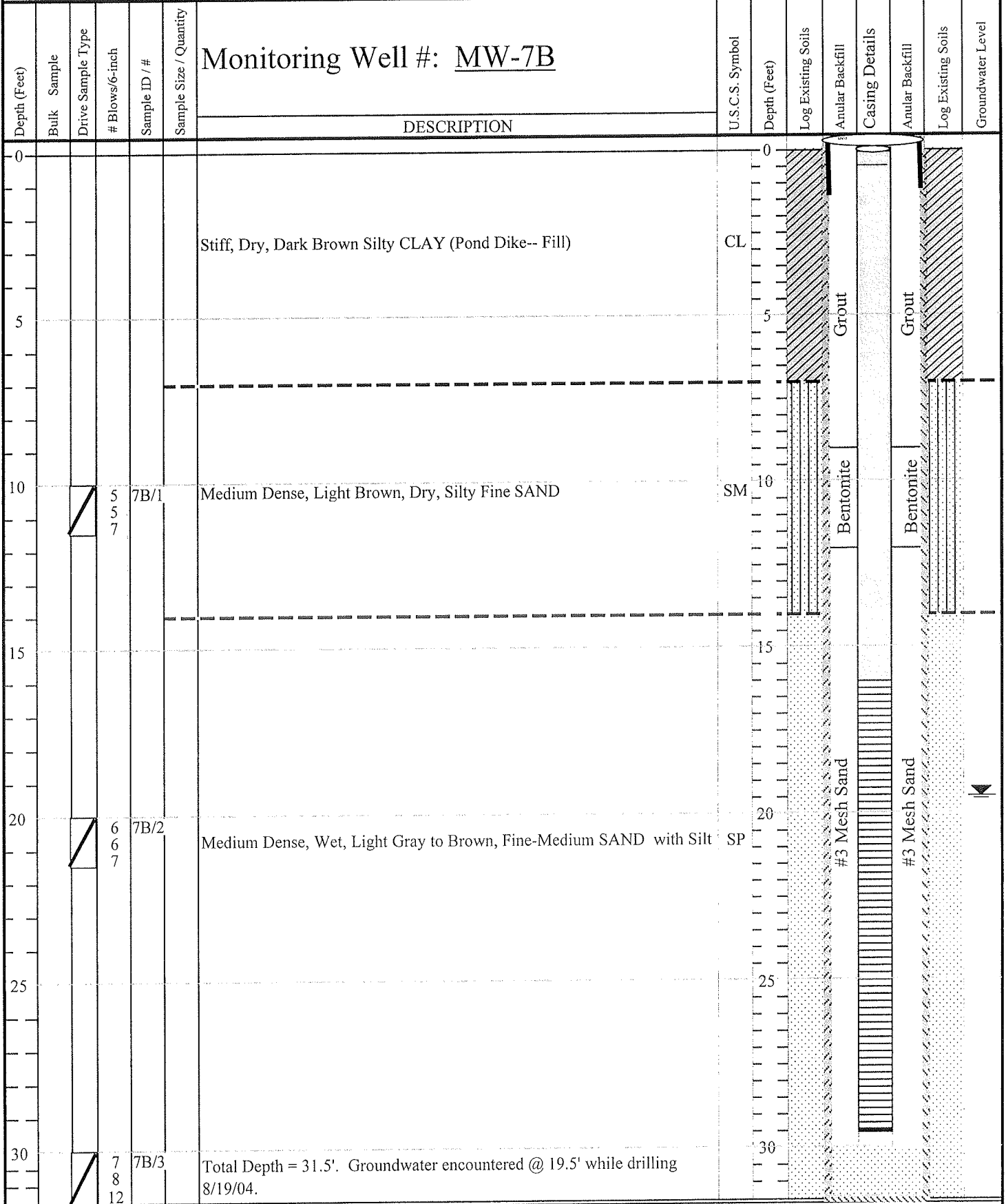
Total depth 31.5, Groundwater Encountered at 20.5, Boring Grout Backfilled 7/8/04.



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PROJECT: Patterson WWTP Expansion	DRILLER: Frontier Drilling	SHEET: 1 of 1
CTE JOB NO: 20-1497	DRILL METHOD: 8" Hollow Auger	DRILLING DATE: 7/8/2004
LOGGED BY: T. Alan Krause	SAMPLE METHOD: Cal Mod	ELEVATION: Levee Crown





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GEOTECHNICAL AND CONSTRUCTION ENGINEERING TESTING AND INSPECTION
2414 VINEYARD AVENUE, SUITE G ESCONDIDO CA. 92029 (760) 746-4955

PROJECT: Patterson WWTP Expansion DRILLER: Frontier Drilling SHEET: 1 of 1
 CTE JOB NO: 20-1497 DRILL METHOD: 8" Hollow Auger DRILLING DATE: 7/12/2004
 LOGGED BY: T. Alan Krause SAMPLE METHOD: Cal Mod ELEVATION: 1' +/- Below Top Dike

Depth (Feet)	Bulk Sample	Drive Sample Type	# Blows/6-inch	Sample ID / #	Sample Size / Quantity	DESCRIPTION	U.S.C.S. Symbol	Depth (Feet)	Log Existing Soils	Anular Backfill	Casing Details	Anular Backfill	Log Existing Soils	Groundwater Level
0						Stiff, Dry, Brown, Silty CLAY, Low Plasticity (Pond Dike-- Fill)	CL	0						
5						? ? ? ? ? ? ?		5		Grout		Grout		
10			8 9 10	8/1		Medium Dense, Dry, Brown, Very Fine-Sand SILT	ML	10		Bentonite		Bentonite		
15			13 19 21	8/2		Dense, Dry, Light Gray, Silty, Very Fine SAND to Fine-Medium SAND with Silt	SM	15						
20								20		#3 Mesh Sand		#3 Mesh Sand		
25								25						
30						Total Depth = 29.5'. Groundwater encountered @ 18.5' while drilling and same @ 1 hour after drilling 7/13/04.		30						



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PROJECT: Patterson WWTP Expansion DRILLER: Frontier Drilling SHEET: 1 of 1
 CTE JOB NO: 20-1497 DRILL METHOD: 8" Hollow Auger DRILLING DATE: 8/19/2004
 LOGGED BY: T. Alan Krause SAMPLE METHOD: Cal Mod ELEVATION: Existing Native Ground

Depth (Feet)	Bulk Sample	Drive Sample Type	# Blows/6-inch	Sample ID / #	Sample Size / Quantity	Monitoring Well #: <u>MW-9</u>	U.S.C.S. Symbol	Depth (Feet)	Log Existing Soils	Annular Backfill	Casing Details	Annular Backfill	Log Existing Soils	Groundwater Level
0						Stiff, Dry, Brown Clayey SILT	CL	0						
5			4 5 8	9/1		Stiff, Damp, Brown, Clayey SILT	CL	5		Grout		Grout		
10								10		Bentomite		Bentomite		
15			5 8 10	9/2		Very Stiff, Damp-Moist, Brown, Silty CLAY to Fine Sandy CLAY	CL	15						▼
20								20		#3 Mesh Sand		#3 Mesh Sand		
25								25						
30						Total Depth = 30.0'. Groundwater encountered @ 15.0' while drilling 8/19/04.		30						

