PERFORMANCE REVIEW

MAPLE ROAD INTERIM RESPONSE

PALL Life Sciences

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INTRODUCTION

Following is an initial performance review of the Pall Life Sciences (PLS) Maple Road Interim Response (IR). In February 2006, PLS submitted a Performance Monitoring Plan (PMP) for Maple Road IR. The PMP is currently under review by the Michigan Department of Environmental Quality (MDEQ). The PMP proposed that performance of the IR be judged by an evaluation of water level and water quality data from selected wells. PLS further proposed that PMP monitoring data and an analysis of the data be submitted as part of the current PLS quarterly reporting process. This performance review is for the period March 15 through May 31, 2006, which does not correspond to the quarterly reporting cycle. PLS proposes to submit future performance reviews on the

quarterly reporting cycle, beginning with the September 2006 report, assuming the MDEQ approves the PMP.

Performance standards for the IR, as proposed in the PMP, are as follows:

1. The Maple Road Extraction system will establish a capture zone area sufficient to capture concentrations of 1,4-dioxane that are greater than, or equal to, 2,800 microgram per liter (μg/L) (parts per billion [ppb]).
2. All wells downgradient of the TW-19 capture zone remain below 2,800 μg/L.
3. Treated-injection water will contain 1,4-dioxane at concentrations below 85 μg/L.

The location of the Maple Road extraction-injection wells are shown on Figure 1, along with other relevant geographic features.

BACKGROUND

TW-19 is located to intercept 1,4-dioxane concentrations at or above 2,800 μg/), the MDEQ Groundwater Surface Water Interface criterion, which is the primary objective of the IR and a requirement of *Washtenaw County Court Opinion and Order Regarding Remediation of the Contamination of the Unit E Aquifer* (December 17, 2004). The IR involves extraction of approximately 200 gallons per minute (gpm) of groundwater from a single well (TW-19), offsite treatment of the extraction water, and injection of the treated groundwater into two wells at a combined rate of approximately 200 gpm from injection wells IW-3 and IW-4.

Operation of the IR began on March 15, 2006. Initial extraction rates from well TW-19 remained at approximately 200 gpm, while initial injections rates were approximately 100 gpm at IW-3 and IW-4. On March 28, 2006, PLS began adjusting the injection rates due to fouling problems associated with well IW-3. Injection rates needed to be changed as operations continued as a result of screen interval fouling, first at IW-3, then later at IW-4. Injection rates continued to change until both injection wells were taken off-line. Injection

well IW-3 was subsequently replaced with a new injection well, IW-5. After cleaning of IW-4, the system was restarted. The extraction and injection history is discussed later in this report.

NEW WELL INSTALLATIONS

PLS installed one additional monitoring well in close proximity to MW-79 and one additional injection well (IW-5) approximately 50 feet west of IW-3, as a replacement for IW-3.

MW-79D

MW-79 is screened in the Unit E aquifer from 127 to 132 feet below the ground surface (ft bgs). During drilling of MW-79 in July 2002, lower sand was encountered from 178 to 207 ft bgs that is separated from the screened sand by a 31-foot diamicton. Simulprobe groundwater samples from MW-79 at 180 ft bgs and 199 to 200 ft bgs showed 39 µg/L) and 67 µg/L, respectively. The new well, designated MW-79d, was installed in the lower sand, equivalent to the sand unit encountered in MW-79. The former MW-79 is now recognized as MW-79s.

MW-79d was installed during the end of March 2006. The boring for MW-79d was drilled to 201.5 ft bgs using a hollow-stem auger. PLS advanced the soil boring to a depth of 180 ft bgs, equivalent to the top of the lower sand, in MW-79 without collecting soil or groundwater samples. Below this depth, soil/groundwater samples were collected using Simulprobe techniques. Soil samples were described/classified based on their physical characteristics by an onsite geologist. Groundwater samples were analyzed for 1,4-dioxane by PLS.

MW-79d was completed from 181 to 186 ft bgs using a 2-inch galvanized-steel casing, equipped with a 5-foot stainless-steel well screen. MW-79d was finished with flush mounts

and equipped with locking caps and locks. All soil cuttings derived from drilling and development water were transported to PLS for appropriate management.

IW-5 - BORING/WELL INSTALLATION

IW-3 experienced fouling from the time it was put into operation. Due to the smaller diameter of IW-3, and the length of the screen zone, PLS felt replacement of IW-3 was warranted.

Soil boring PLS-06-13 (IW-5) was advanced (May 23 and 24, 2006) to 150 ft bgs using a hollow-stem auger at a location approximately 50 feet west from IW-3, shown on Figure 1. No soil samples were collected from 0 to 79 ft bgs. Below this depth, soil samples were collected using split-spoon techniques. Soil samples were described/classified based on their physical characteristics by an onsite geologist. No groundwater samples were collected.

IW-5 was completed using a 12-inch-diameter black-steel casing, equipped with two 12-inch-diameter stainless-steel well screens from 79 to 96 ft bgs and 124 to 146 ft bgs. The screens are separated by 28 feet of 12-inch-diameter black-steel casing. A #5 Global sand was placed around the well screen annulus and a portion of the well casing annulus (sand pack from 60 ft bgs to 146 ft bgs). Neat cement was placed around the well casing from 0 to 60 ft bgs using tremie pipe. The well was finished with a pitless adapter and flush manhole cover. All soil cuttings derived from the drilling and development water were transported to PLS for appropriate management.

Soil boring logs for MW-79d and IW-5 are provided in Attachment 1.

PERFORMANCE MONITORING

SYSTEM OPERATION DATA

SYSTEM FLOW RATES

PLS routinely collects information regarding extraction and injection rates. Data for the period March through May 2006 are provided in Attachment 2. A plot of the Maple Road area extraction-injection well performance is also provided in Attachment 2.

Operation of the Maple Road extraction system began on March 15, 2006. Extraction rates from well TW-19 remained relatively steady at approximately 200 gpm through March and April 2006. In May 2006, the extraction rates were lowered to and remained relatively steady at approximately 180 gpm through the end of May 2006 and this reporting. The total volume of groundwater extracted from TW-19 and treated during the March through May 2006 interval was 19,872,534 gallons.

Initial injection rates into each injection well were approximately 100 gpm per well. On March 28, 2006, injection rates needed to be changed, as operations continued due to screen interval fouling at IW-3, then later at IW-4. Injection rate adjustments began on March 30th with IW-3 lowered to 52 gpm and IW-4 increased to 150 gpm. Injection rates at both wells continued to change through the remainder of the report period. At IW-4, injection rate values fluctuated from 137 to 171 gpm, ending at 150 gpm on May 31, 2006. At IW-3, injection rate values fluctuated over a range from 21 gpm to 50 gpm, ending at 30 gpm on May 31, 2006.

As a point of interest, the injection rates at both wells continued to fluctuate during June (beyond the end of this report period) until both injection wells were taken off-line on June 8, 2006. Injection well IW-3 was subsequently replaced with a new injection well, IW-5. After cleaning IW-4, the system was restarted on June 27, 2006.

System Influent and Effluent Quality

PLS routinely collects water samples from the influent to the treatment system from TW-19 and the effluent from the treatment system injected into IW-3 and IW-4. Influent and effluent water samples are routinely analyzed for 1,4-dioxane concentrations. Data for the period March through May 2006 are provided in Attachment 2. 1,4-Dioxane concentrations of influent to the treatment system from TW-19 are provided graphically in Attachment 2.

Performance Monitoring Wells

Maple Road Performance Monitoring Wells include MW-72s, MW-72d ,MW-76s, MW-76i, MW-76d, MW-79, MW-79d, MW-81, MW-83s, MW-83d, MW-84s, MW-84d, MW-85, MW-86, MW-87s, MW-87d, MW-89, MW-88, MW-90, MW-91, and MW-101.

Performance monitoring wells are positioned to monitor various portions of the Unit E Plume relative to the IR. The performance monitoring wells have been placed into the following groupings: upgradient, downgradient, lateral expansion, and close proximity to injection wells.

Upgradient Monitoring - MW-85, MW-72s, and MW-72d are located upgradient of the Maple Road extraction-injection system. These wells, along with other upgradient Unit E wells associated with the Wagner Road PMP, will serve as indicators of upgradient water quality.

Downgradient Monitoring - Monitoring wells selected to monitor downgradient water quality and/or water levels data include MW-76s, MW-76i, MW-76d, MW-79, MW-79d, MW-81, MW-83s, MW-83d, MW-84s, MW-84d, MW-86, MW-89, MW-90, and MW-91. PLS believes these wells are well positioned to provide a comprehensive network for monitoring both groundwater quality and water level trends downgradient of the IR. It is

PLS' opinion that careful monitoring of water quality trends in these wells will provide notice whether the IR is meeting its designed objective.

Lateral Expansion - MW-81, MW-89, and MW-90, plus the Prohibition Zone monitoring wells, MW-101 and MW-104, located north of the Maple Road extraction system, are well positioned to monitor groundwater quality trends for potential lateral expansion of the plume and help in decisions regarding modifications of the Prohibition Zone.

Close Proximity to Injection Wells - Monitoring wells MW-87s, MW-87d, and MW-88 are in close proximity to the injection wells. Data from these wells can provide valuable information regarding short-term water level and quality trends and performance of the injection wells.

WATER QUALITY DATA

PLS collected water samples from performance monitoring wells in May 2006. PLS did not implement the water quality monitoring frequency outlined in the PMP, since the PMP was never approved by the MDEQ. PLS proposes to modify the monitoring schedule in the PMP. The proposed modifications are provided in Attachment 3. Data reports showing 1,4-dioxane concentrations and water level data for all performance monitoring wells, along with 1,4-dioxane concentration vs. time graphs, are provided in Attachment 4.

WATER LEVEL DATA

A significant amount of water level data have been collected from the performance monitoring wells during the reporting period.

In e-mail from Ms. Sybil Kolon to Mr. Farsad Fotouhi dated March 3, 2006, the MDEQ indicated its review of the PMP was incomplete. The MDEQ noted that *"PLS had intended to start the Maple Road interim response on February 20, 2006, but agreed to delay start-up to allow the MDEQ time to review the TW-19 aquifer performance test and*

performance monitoring plan (PMP) (received by the DEQ on February 6 and 7, 2006)." and advised PLS as follows:

> *"PLS may begin the interim response, with the addition of the collection of weekly static water levels from the following MWs for at least six weeks: MW-79, MW-84s, MW-84d, MW-85, MW-87s, MW-87d, MW-88 and MW-101."* The MDEQ further noted: *"We will review the need for this more frequent water level monitoring after the system has been running consistently for six weeks. A water quality sample from MW-79 should also be collected prior to start up if it has not been sampled since October 2005. PLS should also proceed to obtain access and schedule installation of MW-79d."*

In compliance with the MDEQ request, PLS began collection of the weekly water-level elevation data over an 8-week period beginning March 7 and ending May 6, 2006. All water level data collected from the performance monitoring wells during March, April, and May 2006, including the weekly water-level elevation data for March 7 through May 6, 2006, are provided in Table 1.

The Maple Road extraction-injection system began operations on March 15, 2006. Well MW-79d was installed and finished March 28 and 29, 2006.

The MDEQ again contacted PLS on April 5, 2006, regarding establishment of a new date for the MDEQ to respond to the PMP. The MDEQ indicated its desire to review the weekly static water-level data from MW-79, MW-84s, MW-84d, MW-85, MW-87s, MW-87d, MW-88, and MW-101 and further requested that MW-79d be added to the list. Additionally, the MDEQ indicated a desire to review water-level and water-quality data from other area wells, including MW-100, MW-101, and MW-104, and requested that an updated potentiometric surface map be constructed once the data were collected.

At a quarterly meeting on May 17, 2006, PLS presented to the MDEQ its interpretations of water-level data collected from wells in the area of the Maple Road IR.

PERFORMANCE ANALYSIS

WATER QUALITY IN TREATMENT SYSTEM INFLUENT AND EFFLUENT

1,4-Dioxane concentrations at TW-19 during the pre-start operations from March 10 through 13, 2006, measured 168 μg/L. 1,4-Dioxane concentrations of influent to the treatment system from TW-19 increased to 736 μg/L, as the system was initiated on March 15, 2006. Through the March 15 to May 31, 2006, reporting period, 1,4-dioxane concentrations ranged from 736 to 1,007 (March 22, 2006). The 1,4-dioxane concentration from the TW-19 influent on May 31, 2006, was 845 μg/L. In general, 1,4-dioxane concentrations in groundwater sampled from TW-19 initially increased after start-up, but slowly declined since start-up.

Concentrations of 1,4-dioxane in the effluent injected at IW-3 and IW-4 during the March through May 2006 reporting period ranged from 8 to 25 μg/L. Treated injection water had 1,4-dioxane at concentrations below 85 μg/L, meeting the proposed performance standards.

WATER QUALITY TRENDS IN PERFORMANCE MONITORING WELLS

Water quality data collected from the Maple Road performance monitoring wells for the reporting period March, April, and May 2006 are provided as Table 2.

UPGRADIENT WELLS

MW-72s showed a very slight decrease in 1,4-dioxane concentration from the pre-system start-up value of 74 μg/L (February 6, 2006) and the May 15, 2006, 64 μg/L value. The 1,4-dioxane concentration at MW-72d increased slightly from its pre-system start-up value of 3,231 μg/L on February 6, 2006, to a value of 3,412 μg/L on May 15, 2006.

MW-72d is a good indicator well regarding what levels of 1,4-dioxane could potentially migrate toward TW-19. Since monitoring began at MW-72d in December 2001, the maximum concentration observed at the well occurred in fall 2003 (3,788 μg/L). Since that time, concentrations decreased slightly and have remained between 3,000 and 3,500 μg/L. Dispersion and other processes will lower concentrations of 1,4-dioxane in the MW-72d area prior to the Maple Road area.

1,4-Dioxane concentrations at MW-85 increased from its pre-system start up value of 1,699 μg/L on February 6, 2006, to a value of 2,354 μg/L on May 6, 2006. This increase is likely due to the influence of the developing capture zone around TW-19.

Prior to operation of TW-19, concentrations of 1,4-dioxane at MW-85 followed a similar trend as MW-72 (peaking in fall 2003 and decreasing afterward).

DOWNGRADIENT WELLS

Monitoring wells selected to monitor downgradient water quality and/or water levels data include MW-76s, MW-76i, MW-76d, MW-79, MW-79d, MW-81, MW-83s, MW-83d, MW-84s, MW-84d, MW-86, MW-89, MW-90, and MW-91. Review of Table 2 data indicates changes in 1,4-dioxane concentrations at all Maple Road downgradient performance monitoring wells were minimal, with the exception of MW-79 and MW-79d. 1,4-Dioxane concentrations at MW-79 were 660 μg/L on March 7, 2006, prior to system start up, and increased to 1,174 μg/L in the May 8, 2006, sample. MW-79d showed an increase in 1,4-dioxane from 2 μg/L on April 7, 2006, to 57 μg/L on May 8, 2006.

LATERAL EXPANSION

MW-81, MW-89, MW-90, and MW-101 are well positioned to monitor groundwater quality trends for potential lateral expansion of the plume. Review of data from these wells suggests there has been little relevant change along the boundaries of the plume during the performance monitoring period.

CLOSE PROXIMITY TO INJECTION WELLS

Monitoring wells MW-87s, MW-87d, and MW-88 are in close proximity to the injection wells. 1,4-Dioxane concentrations at MW-87s increased from its pre-system start-up value of 612 µg/L on February 7, 2006, to a value of 832 µg/L on May 9, 2006. The post-system startup concentration is below the highest historic concentrations observed at MW-87s.

1,4-Dioxane concentrations dropped at MW-87d from its pre-system startup value of 697 µg/L (February 7, 2006) to 229 µg/L (May 9, 2006). This concentration drop is likely due to the proximity of MW-87d to the injection well that is screened in the same interval as IW-3.

1,4-Dioxane concentrations at MW-88 dropped from the pre-system start-up value of 1,197 µg/L (February 7, 2006) to non-detect on May 9, 2006. This concentration drop is likely due to the proximity of injection well IW-4 to monitoring well MW-88 and the fact that both IW-4 and MW-88 are screened in the same interval.

MASS REMOVAL

PLS routinely determines the mass of 1,4-dioxane removed by the IR. As proposed in the February 2006 PMP, the mass of 1,4-dioxane removed by the Maple Road IR will be monitored and reported by PLS in quarterly reports. Mass reduction data are provided to the MDEQ in the PLS Maple Road IR Operation Report. These data are provided for the March, April, and May reporting period as Attachment 5.

Mass removal from the Maple Road system during the March, April, and May 2006 report period totaled 145 pounds of 1,4-dioxane ending May 31, 2006. Thirty-one pounds of 1,4-dioxane were removed during March 2006 with 64 and 50 pounds removed during April and May 2006, respectively. Mean daily mass reduction for the Maple Road system was 1.8, 2.1, and 1.7 pounds, respectively, for March, April, and May 2006.

WATER LEVEL DATA ANALYSIS

PLS routinely collected water level data during the reporting period. Water level data have been used to prepare both hydrographs and potentiometric surface maps. A hydrograph showing combined well data is provided as Figure 2. It is important to stress that extraction rates and injection rates varied during the time the water level data were collected. From the startup time until approximately March 30, 2006, the system was operated as originally proposed (extraction = 200 gpm; injection = 100 gpm/well). After March 30, 2006, extraction/injection rates varied.

The following observations have been made from an analysis of the hydrographs:

- With the exception of MW-87d, all water levels went down from the period March 7, 2006 (before the injection), to March 28, 2006 (approximately 12 days after the injection started). This suggests hydraulic head changes in the vicinity of the IR are subtle.

- Water level changes after startup appeared to stabilize fairly quickly (within days) suggesting steady-state or near steady-state conditions were developed. Collection of weekly data allowed assessment of changes from the different injection rates.

- The water level at MW-87d increased by approximately 4 feet. MW-87d is located very close to IW-3. Water level changes at this location are probably related to partial penetration of the aquifer by the well. As such, it would be localized to the area immediately around the well.

- When injection shifted more to IW-4, water level data at four of the wells (MW-79, MW-88, MW-85, and MW-101) increased.

- Water levels in MW-85, the well closest to TW-19, have decreased relative to nearby wells MW-88 and MW-79. This change results in a reversal of the hydraulic gradient between these wells. The reversal was maintained under all extraction/injection conditions.

Potentiometric surface maps for the dates January 10, 2006 (prior to system start-up), March 20, 2006 (during initial operation when extraction TW-19 = 200 gpm, IW-3 = 100 gpm, and IW-4 = 100 gpm), and May 5, 2006 (TW-19 = 181 gpm, IW-3 = 22 gpm, and IW-4 = 158 gpm) are provided as Figures 3, 4, and 5, respectively. The most significant changes depicted by the maps appear to be in the area of MW-85, where lowered water levels resulted in contour adjustments to the pre-IR operation period.

TW-19 CAPTURE ZONE INTERPRETATIONS

TW-19 was installed along the longitudinal axis of the Unit E plume. Aquifer characteristics in the vicinity of TW-19 have been well-documented by the installing of numerous borings, monitoring wells, and two aquifer performance tests. A cross section depicting the hydrogeological characteristics in the Maple Road area is provided as Figure 6.

Analytical solutions, based on measured field data, have been used to estimate the approximate extent of the TW-19 capture zone operating in concert with the two injection wells. Such methods can only approximate the site conditions, considering the complexity of the hydrogeology in the TW-19 area. PLS has not attempted to model the hydraulic conditions around TW-19 using a 3-dimensional groundwater flow model, nor does it believe such an analysis is necessary at this time. PLS believes the most representative interpretations of the extent of capture will be made through the review of water quality and level data under operating conditions. PLS has estimated the capture zone of TW-19 by analyzing the potentiometric surfaces for pre- and post-IR periods, and comparing these interpretations with the results of an analytical solution for determining capture zones. The capture zone estimate is shown on Figure 7, and the capture zone calculation is provided in

Attachment 6. The interpreted capture zone, as shown on Figure 7, is estimated to be approximately 600 feet wide in the area of TW-19.

The greatest uncertainty regarding the capture zone is in the area south of TW-19, where there is slightly less control data. Available water quality data suggest the plume is more likely to track to the north, rather than to the south. This observation is supported by water quality data from MW-88 and the area of MW-87s/d. Prior to start-up of the IR, water-quality trends in the southern well were generally downward, and 1,4-dioxane concentrations south of TW-19 were consistently lower than north of TW-19.

PLS remains sensitive to the possibility that groundwater injected into IW-4 could circulate toward TW-19. Injection water injected into IW-3//IW-5 appears to be hydraulically isolated from TW-19. PLS has collected samples from TW-19 for bromate analysis, since low levels of bromate could possibly be used as a tracer of injection water. Three (3) samples have been collected from TW-19. No bromate has been detected in TW-19 water at a method detection limit of approximately 2 µg/L. Another possible indicator of injection dilution will be the 1,4-dioxane concentration trend observed using data from TW-19. If there are indications of recirculation, PLS may lower extraction rates for TW-19, assuming plume capture can be maintained.

CONCLUSIONS

The capture zone of TW-19 appears to be sufficient to capture the highest concentrations of 1,4-dioxane migrating along the Unit E Plume axis, including concentrations equal to or greater than 2,800 µg/L. 1,4-Dioxane concentrations in the Maple Road area have not reached 2,800 µg/L. In the event that 1,4-dioxane concentrations reach such levels, TW-19 appears well positioned to intercept such elevated levels. To the extent that hydraulic mounds develop in the areas of the injection wells, the mounds will help focus the longitudinal axis of the Unit E plume toward TW-19.

PLS has consistently been able to keep 1,4-dioxane concentrations in the injected water well below 85 μg/L. Concentrations of 1,4-dioxane in the effluent injected at IW-3 and IW-4 during the March through May 2006 reporting period ranged from 8 μg/L to 25 μg/L, which meet the proposed performance standard for injected effluent (less than 85 ug/L).

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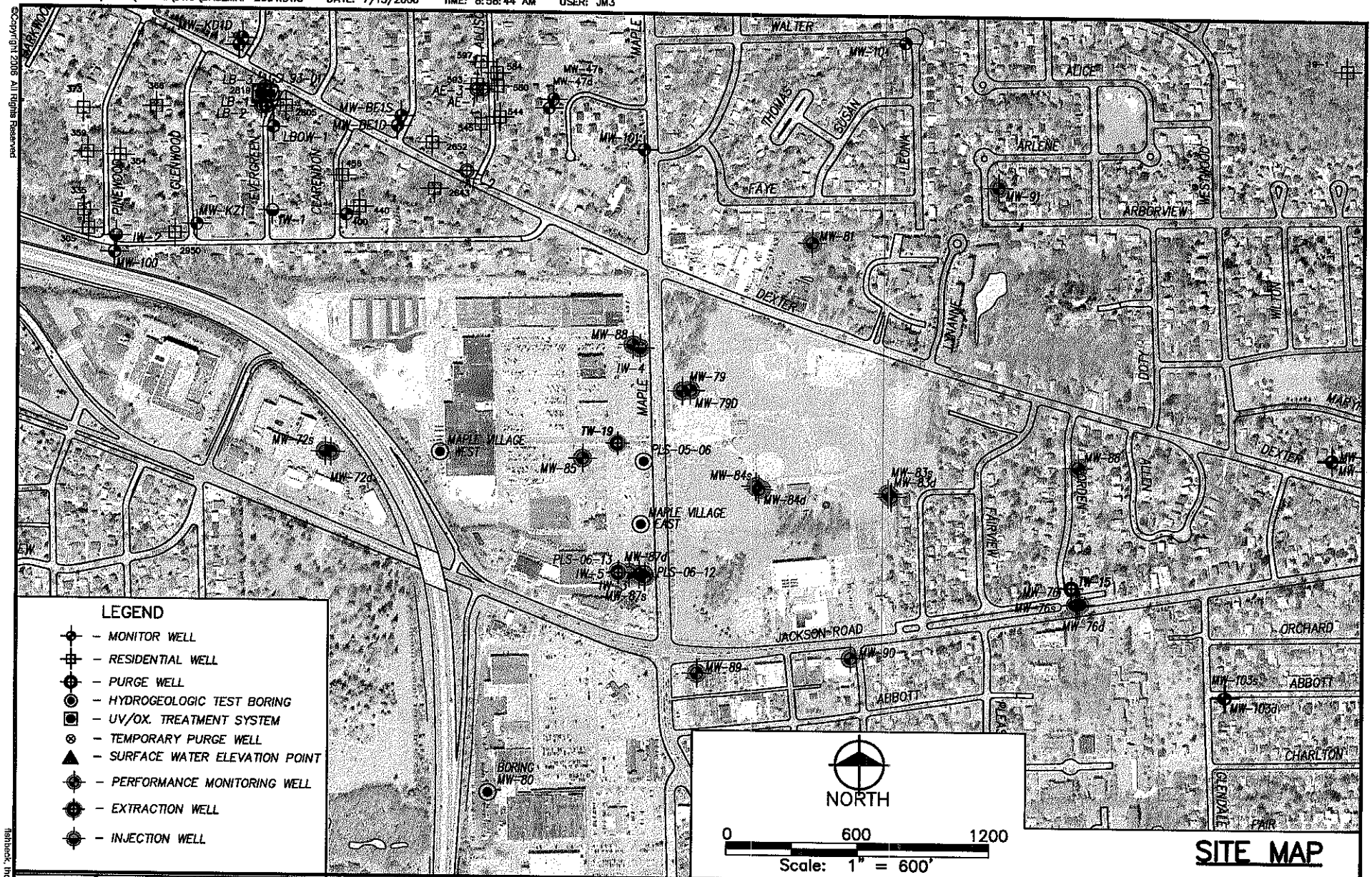
LEGEND
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– RESIDENTIAL WELL
– PURGE WELL
– HYDROGEOLOGIC TEST BORING
– UV/OX. TREATMENT SYSTEM
– TEMPORARY PURGE WELL
– SURFACE WATER ELEVATION POINT
– PERFORMANCE MONITORING WELL
– EXTRACTION WELL
– INJECTION WELL
NORTH
0 600 1200
Scale: 1" = 600'
WALTER
ADICE
THOMAS
SUSAN
LEONA
ARLENE
FAYE
ARBORVIEW
DEXTER
LAVANNE
FLOD
MARYLAND
ORDEN
ALLEN
FAIRVIEW
JACKSON ROAD
ORCHARD
ABBOTT
CHARLTON
GLENDALE
FAIR
MAPLE
MAPLEWOOD
GLENWOOD
EVERGREEN
CLEARWOOD
MAPLE VILLAGE WEST
MAPLE VILLAGE EAST
BORING MW-80
MW-10
MW-47s
MW-47d
MW-101
MW-BE1S
MW-BE1D
LB-3
LB-2
LBOW-1
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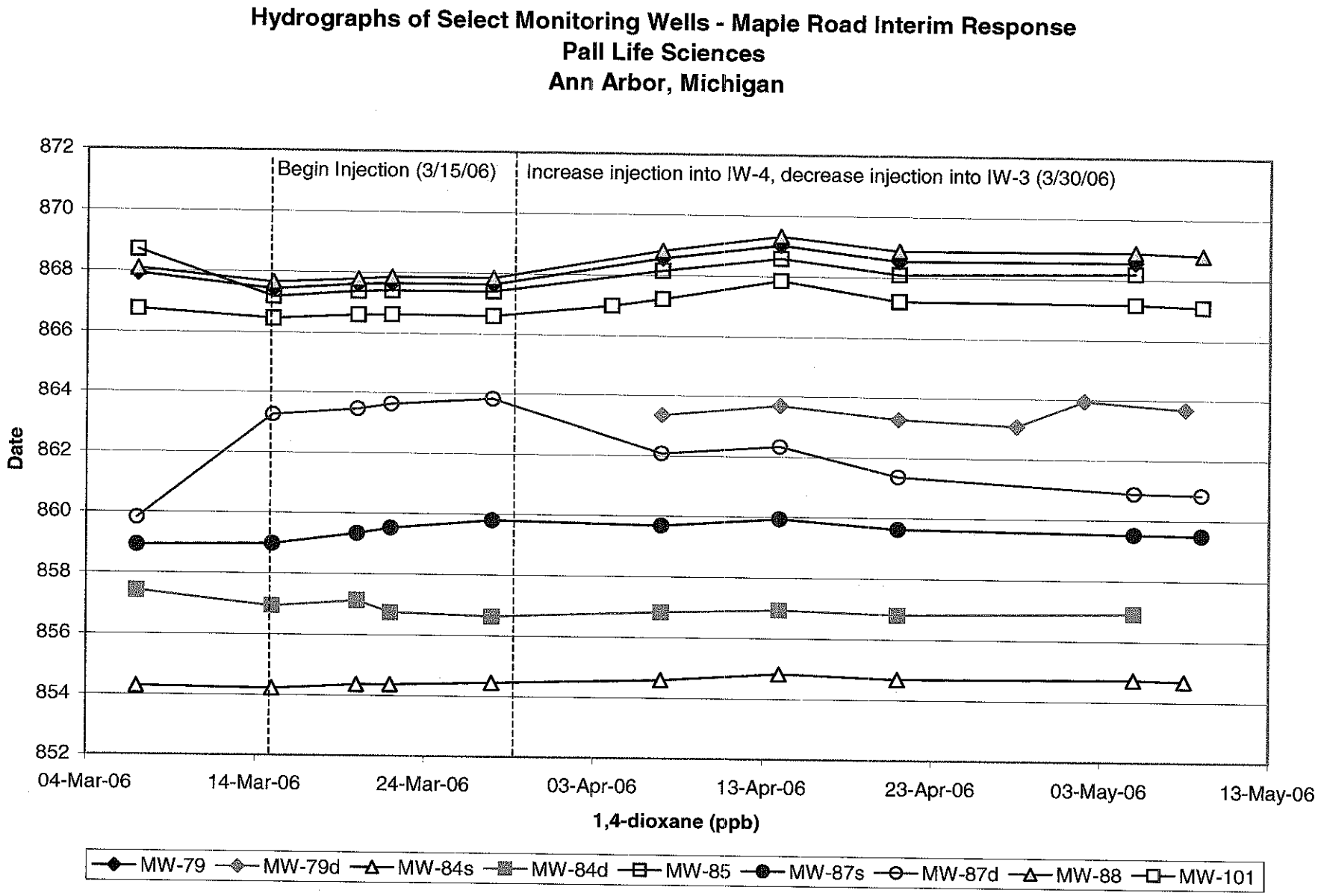
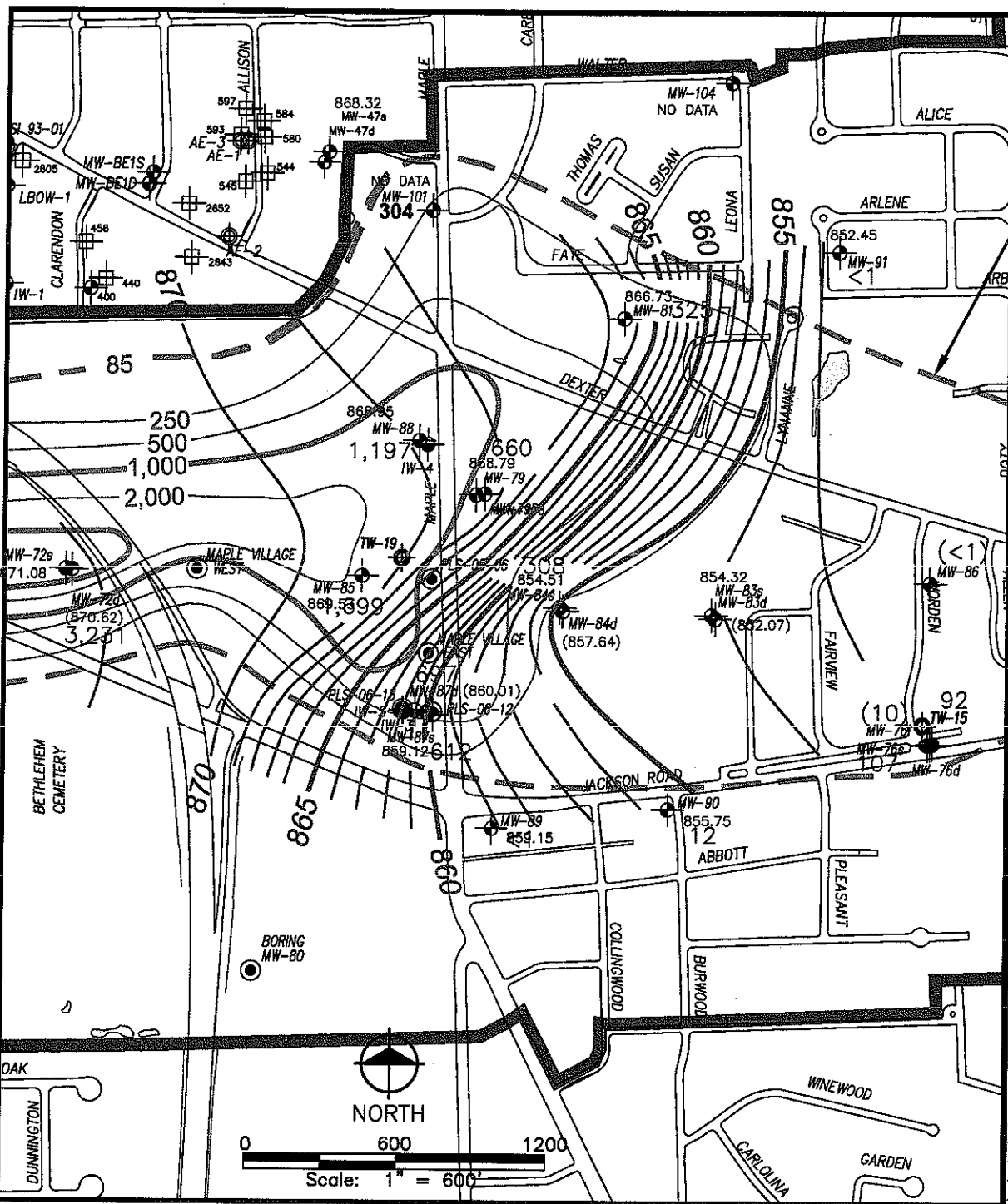


Figure 2. Hydrographs of Combined Water Level Data in Select Wells (March, April and May 2006). Initial Performance Review - Maple Road Interim Response



fitch 50 years

engineers
scientists
architects
constructors

Pall Life Sciences
Scio Twp., Washtenaw County, Michigan

Initial Performance Review
Maple Road Interim Response

LEGEND

- MONITOR WELL
- RESIDENTIAL WELL
- PURGE WELL
- HYDROGEOLOGIC TEST BORING
- UV/OX. TREATMENT SYSTEM
- TEMPORARY PURGE WELL
- SURFACE WATER ELEVATION POINT
- POTENTIOMETRIC SURFACE CONTOUR (FEET AMSL)
- 870.02 – POTENTIOMETRIC SURFACE ELEVATION (FEET AMSL)
- (880.89) – DATA NOT USED
- UNIT E 1,4-DIOXANE ISOCONCENTRATION CONTOUR (ug/L)
- 1,437 – 1,4-DIOXANE CONCENTRATION (ug/L)
- (184) – DATA NOT USED

JANUARY 10, 2006 POTENTIOMETRIC SURFACE WITH JANUARY 2006 1,4 -DIOXANE CONCENTRATION CONTOUR MAP

PROJECT NO.
F96502

FIGURE NO.
3

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fishbeck, thompson, carr & huber, inc.

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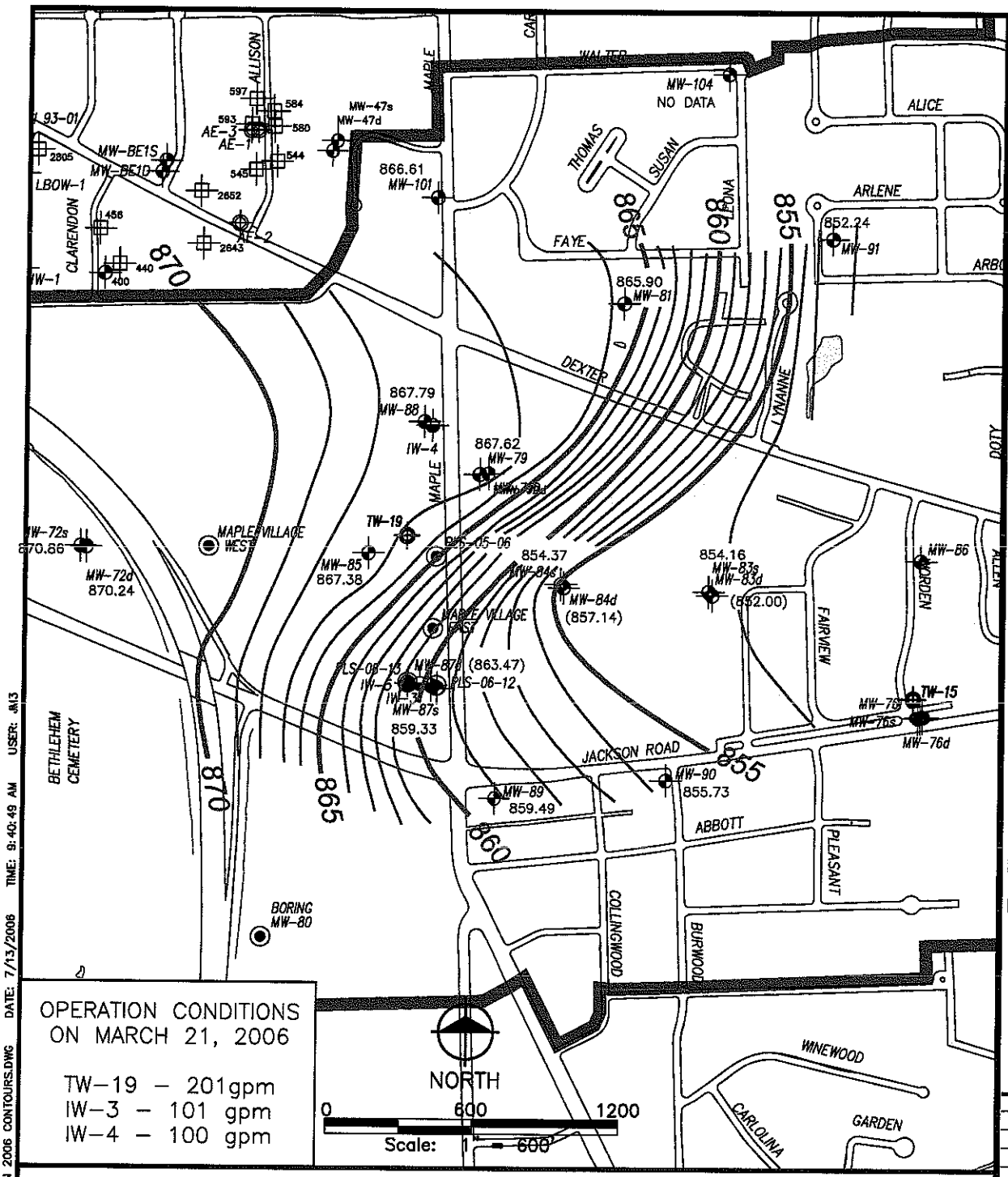

OPERATION CONDITIONS ON MARCH 21, 2006

TW-19 – 201gpm
IW-3 – 101 gpm
IW-4 – 100 gpm

LEGEND

- MONITOR WELL
- RESIDENTIAL WELL
- PURGE WELL
- HYDROGEOLOGIC TEST BORING
- UV/OX. TREATMENT SYSTEM
- TEMPORARY PURGE WELL
- SURFACE WATER ELEVATION POINT
- POTENTIOMETRIC SURFACE CONTOUR (FEET AMSL)
- 870.02 – POTENTIOMETRIC SURFACE ELEVATION (FEET AMSL)
- (880.89) – DATA NOT USED

MARCH 20, 2006 POTENTIOMETRIC SURFACE

fitch 50 years

engineers
scientists
architects
constructors

Pall Life Sciences
Scio Twp., Washtenaw County, Michigan

Initial Performance Review
Maple Road Interim Response

PROJECT NO.
F96502

FIGURE NO.
4

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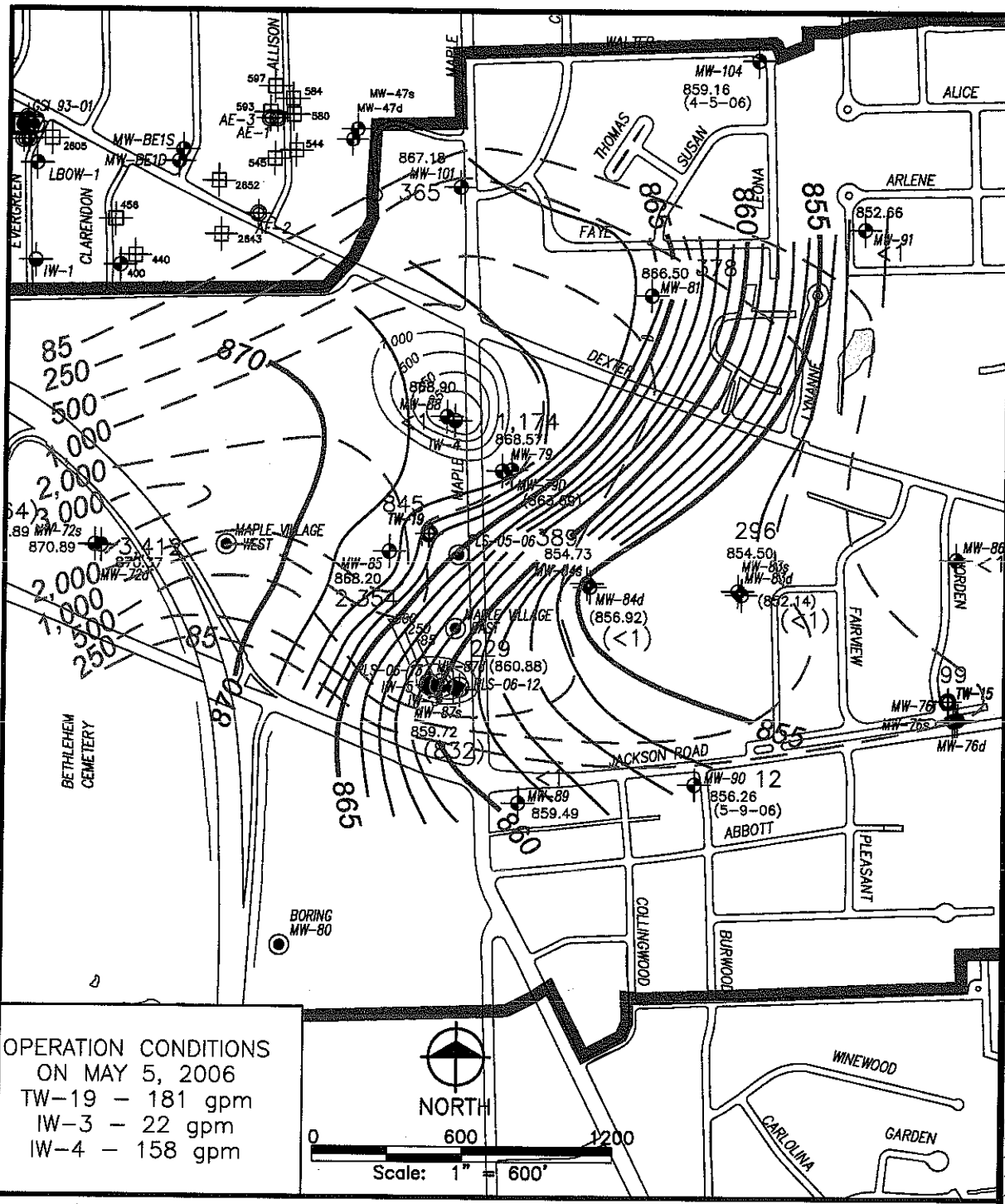
WASHTENAW CNTY PARCELS



Pall Life Sciences
Scio Twp., Washtenaw County, Michigan

Initial Performance Review
Maple Road Interim Response

fitch 50 years

engineers
scientists
architects
constructors

LEGEND

- MONITOR WELL
- RESIDENTIAL WELL
- PURGE WELL
- HYDROGEOLOGIC TEST BORING
- UV/OX. TREATMENT SYSTEM
- TEMPORARY PURGE WELL
- SURFACE WATER ELEVATION POINT
- POTENTIOMETRIC SURFACE CONTOUR (FEET AMSL)
- 870.02 – POTENTIOMETRIC SURFACE ELEVATION (FEET AMSL)
- (880.89) – DATA NOT USED
- UNIT E 1,4-DIOXANE ISOCONCENTRATION CONTOUR (ug/L)
- 1,437 – 1,4-DIOXANE CONCENTRATION (ug/L)
- (184) – DATA NOT USED

MAY 5, 2006 POTENTIOMETRIC SURFACE WITH MAY 2006 1,4 -DIOXANE CONCENTRATION CONTOUR MAP

PROJECT NO.
F96502

FIGURE NO.
5

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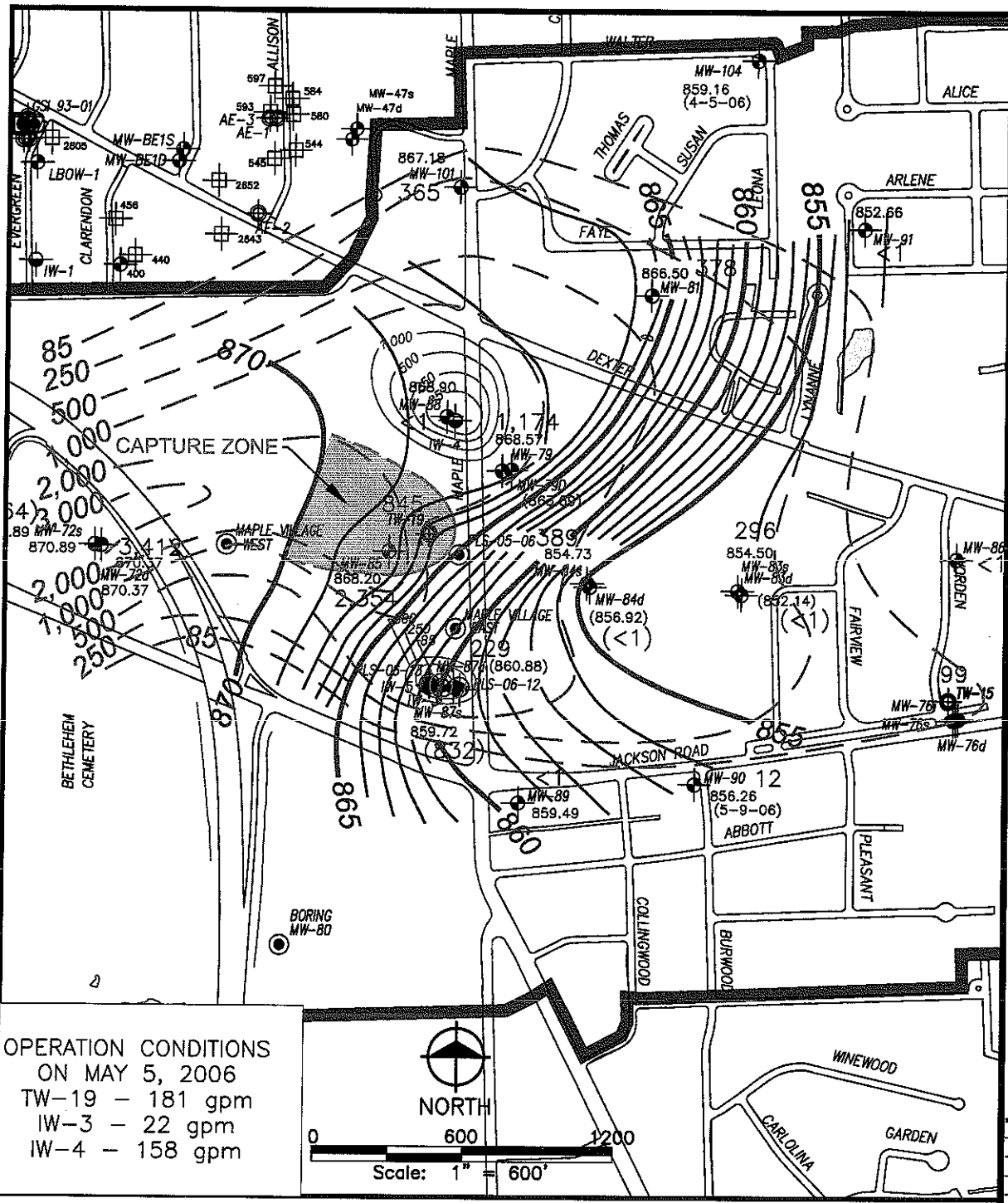
WASHTENAW CNTY PARCELS



LEGEND

- MONITOR WELL
- RESIDENTIAL WELL
- PURGE WELL
- HYDROGEOLOGIC TEST BORING
- UV/OX. TREATMENT SYSTEM
- TEMPORARY PURGE WELL
- SURFACE WATER ELEVATION POINT
- POTENTIOMETRIC SURFACE CONTOUR (FEET AMSL)
- 870.02 – POTENTIOMETRIC SURFACE ELEVATION (FEET AMSL)
- (880.89) – DATA NOT USED
- UNIT E 1,4-DIOXANE ISOCONCENTRATION CONTOUR (ug/L)
- 1,437 – 1,4-DIOXANE CONCENTRATION (ug/L)
- (184) – DATA NOT USED

CAPTURE ZONE INTERPRETATION

fig&h 50 years

engineers
scientists
architects
constructors

Pall Life Sciences
Scio Twp., Washtenaw County, Michigan

Initial Performance Review
Maple Road Interim Response

PROJECT NO.
F96502

FIGURE NO.
7

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TW-18SURF.DWG

Table 1. Initial Performance Review - Water Level Data

Pall Life Sciences, Ann Arbor, Michigan
Maple Road Interim Response

Well I.D.	Measurement Date	Water Level Elevation Data		
		Static Water Level (ft bTOC)	Top of Casing Elevation (ft AMSL)	Groundwater Elevation (ft AMSL)
UPGRADIENT ASSESSMENT WELLS				
MW-72s	06-Feb-06	71.85	942.95	871.10
MW-72s	20-Mar-06	72.09	942.95	870.86
MW-72s	22-Mar-06	72.07	942.95	870.88
MW-72s	15-May-06	72.06	942.95	870.89
MW-72d	06-Feb-06	71.90	942.52	870.62
MW-72d	20-Mar-06	72.28	942.52	870.24
MW-72d	22-Mar-06	72.29	942.52	870.23
MW-72d	15-May-06	72.15	942.52	870.37
MW-85	07-Mar-06	48.93	917.64	868.71
MW-85	15-Mar-06	50.45	917.64	867.19
MW-85	20-Mar-06	50.26	917.64	867.38
MW-85	22-Mar-06	50.23	917.64	867.41
MW-85	28-Mar-06	50.23	917.64	867.41
MW-85	07-Apr-06	49.49	917.64	868.15
MW-85	14-Apr-06	49.05	917.64	868.59
MW-85	21-Apr-06	49.54	917.64	868.10
MW-85	05-May-06	49.44	917.64	868.20
DOWNGRADIENT ASSESSMENT WELLS				
MW-76s	16-Jan-06	72.84	926.7	853.86
MW-76s	03-Feb-06	72.83	926.7	853.87
MW-76s	20-Mar-06	72.76	926.7	853.94
MW-76s	22-Mar-06	72.72	926.7	853.98
MW-76s	11-Apr-06	72.50	926.7	854.20
MW-76i	16-Jan-06	73.15	926.7	853.55
MW-76i	03-Feb-06	73.12	926.7	853.58
MW-76i	20-Mar-06	73.08	926.59	853.51
MW-76i	22-Mar-06	73.00	926.59	853.59
MW-76i	11-Apr-06	72.84	926.59	853.75
MW-76d	05-Oct-06	74.35	926.59	852.24
MW-76d	03-Feb-06	74.27	926.05	851.78
MW-76d	20-Mar-06	74.28	926.05	851.77
MW-76d	22-Mar-06	74.25	926.05	851.80
MW-76d	11-Apr-06	74.19	926.05	851.86
MW-79	07-Mar-06	38.85	906.78	867.93
MW-79	15-Mar-06	39.34	906.78	867.44
MW-79	20-Mar-06	39.16	906.78	867.62
MW-79	22-Mar-06	39.14	906.78	867.64
MW-79	28-Mar-06	39.14	906.78	867.64
MW-79	07-Apr-06	38.21	906.78	868.57
MW-79	14-Apr-06	37.75	906.78	869.03

Table 1. Initial Performance Review - Water Level Data

Pall Life Sciences, Ann Arbor, Michigan
Maple Road Interim Response

Well I.D.	Measurement Date	Water Level Elevation Data		
		Static Water Level (ft bTOC)	Top of Casing Elevation (ft AMSL)	Groundwater Elevation (ft AMSL)
MW-79	21-Apr-06	38.24	906.78	868.54
MW-79	05-May-06	38.21	906.78	868.57
MW-79d	07-Apr-06	43.13	906.49	863.36
MW-79d	14-Apr-06	42.78	906.49	863.71
MW-79d	21-Apr-06	43.21	906.49	863.28
MW-79d	28-Apr-06	43.41	906.49	863.08
MW-79d	02-May-06	42.54	906.49	863.95
MW-79d	08-May-06	42.80	906.49	863.69
MW-83s	03-Nov-05	73.37	927.54	854.17
MW-83s	03-Feb-06	73.47	927.54	854.07
MW-83s	20-Mar-06	73.38	927.54	854.16
MW-83s	22-Mar-06	73.36	927.54	854.18
MW-83s	08-May-05	73.04	927.54	854.50
MW-83d	13-Oct-06	76.12	927.98	851.86
MW-83d	03-Feb-06	75.98	927.98	852.00
MW-83d	20-Mar-06	75.98	927.98	852.00
MW-83d	22-Mar-06	79.95	927.98	848.03
MW-83d	08-May-05	75.84	927.98	852.14
MW-84s	16-Jan-06	51.18	905.52	854.34
MW-84s	03-Feb-06	51.22	905.52	854.30
MW-84s	07-Mar-06	51.23	905.52	854.29
MW-84s	15-Mar-06	51.30	905.52	854.22
MW-84s	20-Mar-06	51.15	905.52	854.37
MW-84s	22-Mar-06	51.14	905.52	854.38
MW-84s	28-Mar-06	51.06	905.52	854.46
MW-84s	07-Apr-06	50.92	905.52	854.60
MW-84s	14-Apr-06	50.69	905.52	854.83
MW-84s	21-Apr-06	50.83	905.52	854.69
MW-84s	05-May-06	50.79	905.52	854.73
MW-84s	08-May-06	50.83	905.52	854.69
MW-84d	07-Mar-06	48.05	905.47	857.42
MW-84d	15-Mar-06	48.53	905.47	856.94
MW-84d	20-Mar-06	48.33	905.47	857.14
MW-84d	22-Mar-06	48.72	905.47	856.75
MW-84d	28-Mar-06	48.83	905.47	856.64
MW-84d	07-Apr-06	48.63	905.47	856.84
MW-84d	14-Apr-06	48.53	905.47	856.94
MW-84d	21-Apr-06	48.66	905.47	856.81
MW-84d	05-May-06	48.55	905.47	856.92
MW-86	16-Jan-06	71.47	923.28	851.81
MW-86	03-Feb-06	71.44	923.28	851.84

Table 1. Initial Performance Review - Water Level Data

Pall Life Sciences, Ann Arbor, Michigan
Maple Road Interim Response

Well I.D.	Measurement Date	Water Level Elevation Data		
		Static Water Level (ft bTOC)	Top of Casing Elevation (ft AMSL)	Groundwater Elevation (ft AMSL)
MW-86	20-Mar-06	71.44	923.28	851.84
MW-86	22-Mar-06	71.38	923.28	851.90
MW-86	17-May-06	70.97	923.28	852.31
CLOSE PROXIMITY TO INJECTION WELLS				
MW-87s	07-Mar-06	68.77	927.69	858.92
MW-87s	15-Mar-06	68.72	927.69	858.97
MW-87s	20-Mar-06	68.36	927.69	859.33
MW-87s	22-Mar-06	68.17	927.69	859.52
MW-87s	28-Mar-06	67.89	927.69	859.80
MW-87s	07-Apr-06	68.01	927.69	859.68
MW-87s	14-Apr-06	67.76	927.69	859.93
MW-87s	21-Apr-06	68.06	927.69	859.63
MW-87s	05-May-06	68.17	927.69	859.52
MW-87s	9-May-06	68.20	927.69	859.49
MW-87d	7-Feb-06	67.82	927.34	859.82
MW-87d	07-Mar-06	67.52	927.34	859.82
MW-87d	15-Mar-06	64.08	927.34	863.26
MW-87d	20-Mar-06	63.87	927.34	863.47
MW-87d	22-Mar-06	63.70	927.34	863.64
MW-87d	28-Mar-06	63.51	927.34	863.83
MW-87d	07-Apr-06	65.26	927.34	862.08
MW-87d	14-Apr-06	65.00	927.34	862.34
MW-87d	21-Apr-06	65.97	927.34	861.37
MW-87d	05-May-06	66.46	927.34	860.88
MW-87d	9-May-06	66.50	927.34	860.84
MW-88	7-Feb-06	52.75	920.74	868.09
MW-88	07-Mar-06	52.65	920.74	868.09
MW-88	15-Mar-06	53.08	920.74	867.66
MW-88	20-Mar-06	52.95	920.74	867.79
MW-88	22-Mar-06	52.88	920.74	867.86
MW-88	28-Mar-06	52.88	920.74	867.86
MW-88	07-Apr-06	51.92	920.74	868.82
MW-88	14-Apr-06	51.41	920.74	869.33
MW-88	21-Apr-06	51.86	920.74	868.88
MW-88	05-May-06	51.84	920.74	868.90
MW-88	09-May-06	51.93	920.74	868.81
LATERAL EXPANSION WELLS				
MW-81	24-Jan-06	54.11	920.63	866.52
MW-81	20-Mar-06	54.73	920.63	865.90
MW-81	22-Mar-06	54.71	920.63	865.92
MW-81	09-May-06	54.13	920.63	866.50

Table 1. Initial Performance Review - Water Level Data

Pall Life Sciences, Ann Arbor, Michigan
Maple Road Interim Response

Well I.D.	Measurement Date	Water Level Elevation Data		
		Static Water Level (ft bTOC)	Top of Casing Elevation (ft AMSL)	Groundwater Elevation (ft AMSL)
MW-89	13-Oct-05	84.45	943.44	858.99
MW-89	03-Feb-06	84.45	943.44	858.99
MW-89	20-Mar-06	83.95	943.44	859.49
MW-89	22-Mar-06	83.74	943.44	859.70
MW-89	09-May-06	83.95	943.44	859.49
MW-90	19-Jan-06	96.18	951.72	855.54
MW-90	03-Feb-06	96.17	951.72	855.55
MW-90	20-Mar-06	95.99	951.72	855.73
MW-90	22-Mar-06	95.94	951.72	855.78
MW-90	09-May-06	95.46	951.72	856.26
MW-91	16-Jan-06	61.61	913.85	852.24
MW-91	03-Feb-06	61.59	913.85	852.26
MW-91	20-Mar-06	61.61	913.85	852.24
MW-91	22-Mar-06	61.54	913.85	852.31
MW-91	09-May-06	61.19	913.85	852.66
MW-101	07-Mar-06	66.32	933.08	866.76
MW-101	15-Mar-06	66.62	933.08	866.46
MW-101	20-Mar-06	66.49	933.08	866.59
MW-101	22-Mar-06	66.47	933.08	866.61
MW-101	28-Mar-06	66.49	933.08	866.59
MW-101	04-Apr-06	66.1	933.08	866.98
MW-101	07-Apr-06	65.86	933.08	867.22
MW-101	14-Apr-06	65.22	933.08	867.86
MW-101	21-Apr-06	65.87	933.08	867.21
MW-101	5-May-06	65.90	933.08	867.18
MW-101	9-May-06	65.98	933.08	867.1
MW-100	20-Mar-06	70.19	940.89	870.70
MW-100	22-Mar-06	70.19	940.89	870.70
MW-100	4-Apr-06	70.04	940.89	870.85
MW-104	5-Apr-06	80.01	939.17	859.16

NOTES:
ft AMSL = feet above mean sea level
ft bTOC = feet below top of casing

Table 2. Initial Performance Review - Water Quality Data

Pall Life Sciences, Ann Arbor, Michigan
Maple Road Interim Response

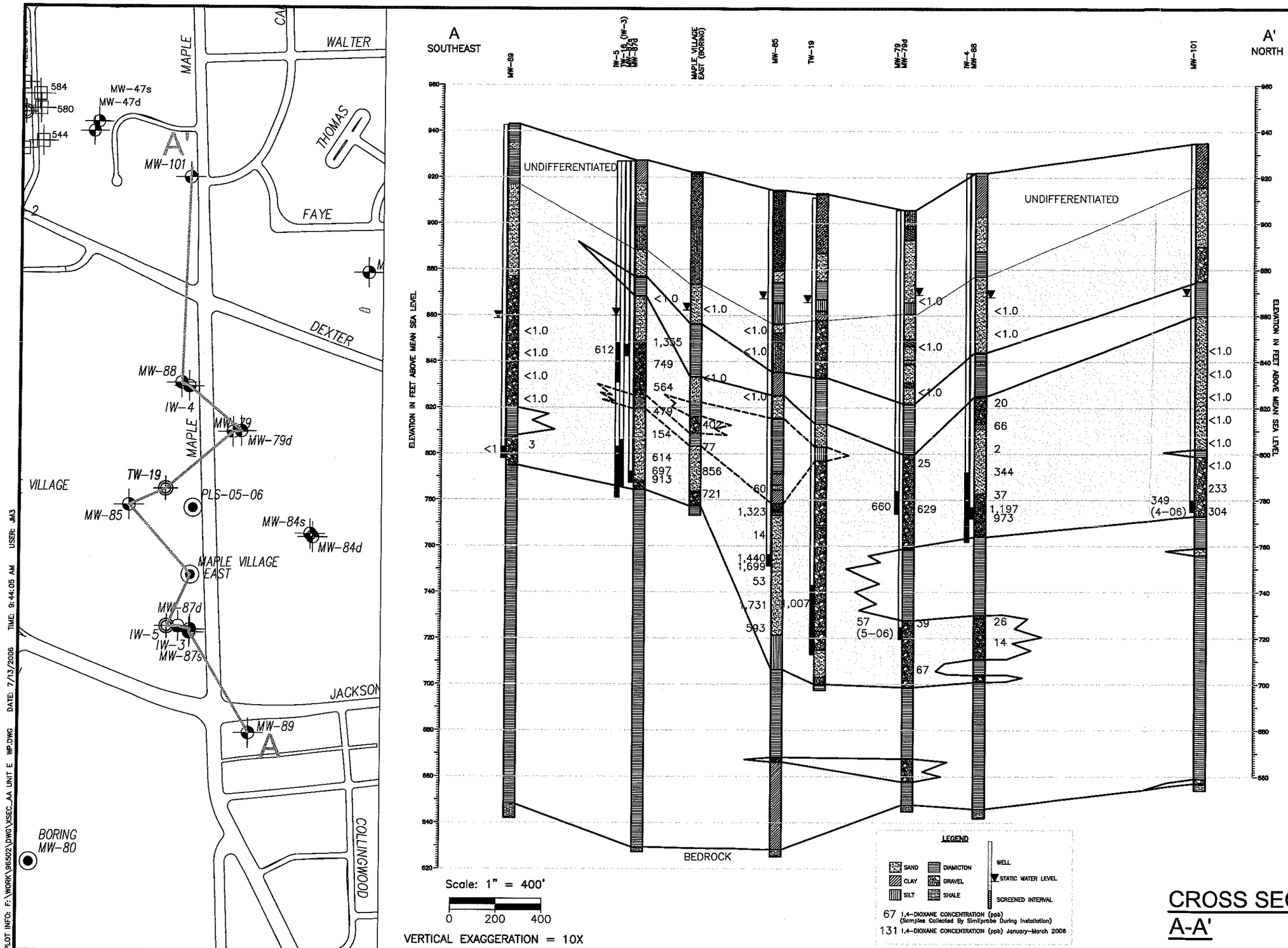
Well ID	Water Quality Data		Change in 1,4-Dioxane Concentration (%)
	Sample Date	1,4-Dioxane Concentration (µg/L)	
UPGRADIENT ASSESSMENT WELLS			
MW-72s	6-Feb-06	74	
MW-72s	15-May-06	64	-13.5%
MW-72d	6-Feb-06	3231	
MW-72d	15-May-06	3412	5.6%
MW-85	6-Feb-06	1699	
MW-85	9-May-06	2354	38.6%
DOWNGRADIENT ASSESSMENT WELLS			
MW-76s	16-Jan-06	107	
MW-76s	11-Apr-06	115	7.5%
MW-76i	16-Jan-06	10	
MW-76i	11-Apr-06	11	10.0%
MW-76d	5-Oct-06	2	
MW-76d	11-Apr-06	2	0.0%
MW-79	7-Mar-06	660	
MW-79	8-May-06	1174	77.9%
MW-79d	7-Apr-06	2	
MW-79d	8-May-06	57	2750.0%
MW-83s	03-Nov-05	245	
MW-83s	08-May-05	296	20.8%
MW-83d	13-Oct-06	nd	
MW-83d	08-May-05	nd	NC
MW-84s	16-Jan-06	308	
MW-84s	08-May-06	389	26.3%
MW-84d	13-Oct-05	nd	
MW-84d	8-May-06	nd	NC
MW-86	16-Jan-06	nd	
MW-86	17-May-06	nd	NC
CLOSE PROXIMITY TO INJECTION WELLS			
MW-87s	7-Feb-06	612	
MW-87s	9-May-06	832	35.9%
MW-87d	7-Feb-06	697	
MW-87d	9-May-06	229	-67.1%
MW-88	7-Feb-06	1197	
MW-88	09-May-06	nd	Not Calculated
LATERAL EXPANSION WELLS			
MW-81	24-Jan-06	325	
MW-81	09-May-06	378	16.3%
MW-89	19-Jan-06	nd	
MW-89	09-May-06	nd	NC

Table 2. Initial Performance Review - Water Quality Data

Pall Life Sciences, Ann Arbor, Michigan
Maple Road Interim Response

Well ID	Water Quality Data		Change in 1,4-Dioxane Concentration (%)
	Sample Date	1,4-Dioxane Concentration (µg/L)	
MW-90	19-Jan-06	12	
MW-90	09-May-06	12	0.0%
MW-91	16-Jan-06	nd	
MW-91	09-May-06	nd	NC
MW-101	4-Apr-06	349	
MW-101	7-Apr-06	349	
MW-101	9-May-06	365	4.6%
MDEQ Data Request (April 2006)			
MW-100			
	4-Apr-06	2	
MW-104	5-Apr-06	nd	Not Calculated

NOTES:
Negative Number - 1,4-Dioxane concentration decreased
Positive Number - 1,4-Dioxane concentration increased
NC = no change



CROSS SECTION A-A'

fitch 50 years

engineers
scientists
architects
constructors

Pall Life Sciences
Scio Twp., Washtenaw County, Michigan

Initial Performance Review
Maple Road Interim Response

PROJECT NO.
F96502

FIGURE NO.
6

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PLOT INFO: F:\WORK\96502\DWG\XSEC_AA UNIT E WP.DWG DATE: 7/13/2006 TIME: 9:44:05 AM USER: JM3
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Attachment 1

fic&h
fishbeck, thompson, carr & huber
engineers • scientists • architects • constructors

Grand Rapids (616) 575-3824
Lansing (517) 627-1141
Kalamazoo (269) 375-3824
Farmington Hills (248) 324-2090

BOREHOLE LOG

BORING/WELL ID: **IW-5**

TOTAL DEPTH (ft.): **150'**

PROJECT: Pall Life Sciences Inc.
SITE LOCATION: Ann Arbor, Michigan
PROJECT NO.: F96502
PROJECT MANAGER: James W. Brode, Jr., C.P.G.
LOGGED BY: Todd C. Campbell, C.P.G.

START DATE: 5-23-06
END DATE: 6-16-06
TOC ELEV.: NA
GROUND ELEV.: App. 928' AMSL
STATIC WATER LVL.: Apprx. 68'

DRILLING CO.: Stearns Drilling
DRILLER: Jerry, Dennis, Joe, Dick, Daryl, Bert
RIG TYPE: CME 95
METHOD OF DRILLING: Hollow Stem Auger/Mud Rotary
SAMPLING METHODS: Split Spoon

NOTES: Maple Village Shopping Center, West of Maple Road. Soil Boring PLS-06-13
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▼ Static Water Level

DESCRIPTION	PID ppm	GRAPHIC LOG	DEPTH (ft. bgl)	Static Water Level	Sample/ Revovery	Sample ID	Blow Counts	WELL CONSTRUCTION DETAIL
ASPHALT: Asphalt			0					
SANDY CLAY TO CLAYEY SAND: Clay with Sand, fine to coarse grained. Dark Brown/Brown, moderately sorted, medium dense, dry			2, 4, 6, 8					50' West of IW-3. Description from 0-79' based on MW-87 and IW-3
SAND: Sand, fine to coarse grained (95%); Gravel, fine (5%). Brown, moderately sorted, dry			10, 12, 14					
SILTY SAND: Sand, fine to medium grained with Silt and trace Clay. Brown, dry			16, 18					
DIAMICTON: Clay; Silt; Sand, fine to coarse grained (10%). Gray, very stiff, dry			20, 22, 24, 26, 28					Neat Cement
SILTY SAND: Sand, fine grained (60%); Silt (40%). Brown, well sorted, medium dense, dry			30, 32, 34, 36, 38					
SAND: Sand, fine to medium grained (60%); Gravel, fine (40%). Brown, moderately sorted, medium dense, dry			40, 42, 44					
DIAMICTON: Clay; Silt, gray			46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68 ▼					12" Black Steel Casing
GRAVEL AND SAND: Sand, fine to coarse grained; Gravel, fine;			70					#5 Global Sand Pack from 69 to 146 feet bgs

fc&h
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engineers • scientists • architects • constructors

Grand Rapids (616) 575-3824
Lansing (517) 627-1141
Kalamazoo (269) 375-3824
Farmington Hills (248) 324-2090

BOREHOLE LOG

BORING/WELL ID: **IW-5**

TOTAL DEPTH (ft.): **150'**

PROJECT: Pall Life Sciences Inc.
SITE LOCATION: Ann Arbor, Michigan
PROJECT NO.: F96502
PROJECT MANAGER: James W. Brode, Jr., C.P.G.
LOGGED BY: Todd C. Campbell, C.P.G.

START DATE: 5-23-06
END DATE: 6-16-06
TOC ELEV.: NA
GROUND ELEV.: App. 928' AMSL
STATIC WATER LVL.: Apprx. 68'

DRILLING CO.: Stearns Drilling
DRILLER: Jerry, Dennis, Joe, Dick, Daryl, Bert
RIG TYPE: CME 95
METHOD OF DRILLING: Hollow Stem Auger/Mud Rotary
SAMPLING METHODS: Split Spoon

NOTES: Maple Village Shopping Center, West of Maple Road. Soil Boring PLS-06-13

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▼ Static Water Level

DESCRIPTION	PID ppm	GRAPHIC LOG	DEPTH (ft. bgl)	Static Water Level	Sample/ Recovery	Sample ID	Blow Counts	WELL CONSTRUCTION DETAIL
Silt (10%). Grayish brown, poorly sorted, very dense, wet			72					
Driller notes Cobbles from 72-88' (Mud Rotary)			74, 76, 78					
Sand, coarse to fine grained; Gravel, fine (10%); Silt. Grayish brown, poorly sorted, very dense, wet			80		0.1'		30,36,15, 11	
As above with trace to no Silt.			82, 84, 86		1.0'		4,7,15,27	12" Stainless Steel Screen (35 Slot) from 79 to 96 feet bgs
			88, 90		0.6'		1,2,4,9	
Driller notes Cobbles from 93-100' (Mud Rotary) Sand, medium to fine grained; Cobbles; Gravel, fine (20%). Grayish brown, moderately sorted, very dense, wet			92, 94		0.5'		3,5,70,78	
Sand, fine to medium grained; Silt (20%). Grayish brown, moderately sorted, dense, wet			96, 98					
SANDY SILT: Silt; Sand, fine grained. Gray, well sorted, hard, moist			100		0.6'		8,12,28,42	
SAND: Sand, medium to fine grained with trace coarse grains; Gravel, fine (5-10%). Grayish brown, moderately sorted, very loose, wet			102, 104, 106		1.2'		2,2,2,2	
			108, 110		0.2'		2,2,4,9	12" Black Steel Casing
Sand, fine with some medium grains. Grayish brown, well sorted, medium dense, wet			112, 114		2.0'		4,10,16,24	
Sand, medium to fine with some coarse grains. Grayish brown, moderately sorted, dense, wet			116, 118					
DIAMICTON: Silt; trace Clay. Grayish brown, well sorted, hard, moist (with interbedded Sand seams starting at 121.5')			120		2.0'		7,16,33,40	
SAND: Sand, medium to fine grained; few interbedded Silt seams (1" thick). Grayish brown, well sorted, dense, wet. Gravelly at 125.9'			122, 124		2.0'		6,21,23,27	
Driller notes Cobbles from 120-140' (Mud Rotary)			126, 128					
Sand, medium to fine grained; Gravel, fine to coarse; trace Silt. Grayish brown, poorly sorted, very dense, wet			130		2.0'		24,19,45, 50 (2")	
			132, 134		1.5'		16,25,80	
Sand, medium to fine grained; Gravel, fine (approximately 10%). Grayish brown, moderately sorted, very dense, wet			136, 138					12" Stainless Steel Screen (35 Slot) from 124 to 146 feet bgs
			140		1.7'		12,16,40, 47	
Sand, medium to fine grained; Gravel, fine to coarse			142					#5 Global Sand Pack from 69 to 146 feet bgs

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BOREHOLE LOG

BORING/WELL ID: **IW-5**

TOTAL DEPTH (ft.): **150'**

PROJECT: Pall Life Sciences Inc.
SITE LOCATION: Ann Arbor, Michigan
PROJECT NO.: F96502
PROJECT MANAGER: James W. Brode, Jr., C.P.G.
LOGGED BY: Todd C. Campbell, C.P.G.

START DATE: 5-23-06
END DATE: 6-16-06
TOC ELEV.: NA
GROUND ELEV.: App. 928' AMSL
STATIC WATER LVL.: Apprx. 68'

DRILLING CO.: Stearns Drilling
DRILLER: Jerry, Dennis, Joe, Dick, Daryl, Bert
RIG TYPE: CME 95
METHOD OF DRILLING: Hollow Stem Auger/Mud Rotary
SAMPLING METHODS: Split Spoon

NOTES: Maple Village Shopping Center, West of Maple Road. Soil Boring PLS-06-13
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▼ Static Water Level

DESCRIPTION	PID ppm	GRAPHIC LOG	DEPTH (ft. bgl)	Static Water Level	Sample/ Revovery	Sample ID	Blow Counts	WELL CONSTRUCTION DETAIL
(approximately 10-15%). Grayish brown, moderately sorted, very dense, wet			144	1.5'			28,40,105	
DIAMICTON: Silt; Sand, fine to medium grained; trace Clay; trace Gravel, fine. Grayish brown, hard, dry			146 148 150	1.0'			90,60 (1")	

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BOREHOLE LOG

BORING/WELL ID: **MW-79D**

TOTAL DEPTH (ft.): **201.5'**

PROJECT: Pall Life Sciences Inc.
SITE LOCATION: Ann Arbor, Michigan
PROJECT NO.: F96502
PROJECT MANAGER: James W. Brode, Jr., C.P.G.
LOGGED BY: Tony Alati

START DATE: 3-28-06
END DATE: 3-29-06
TOC ELEV.: 906.49'
GROUND ELEV.: 906.90'
STATIC WATER LVL.: 43.13' btoc

DRILLING CO.: Stearns Drilling
DRILLER: Dennis/Jerry and Pat
RIG TYPE: CME 95
METHOD OF DRILLING: Hollow Stem Auger
SAMPLING METHODS: Split Spoon, Simulprobe

NOTES: Veteran's Park, East of Maple Road, Approx. 5' East of MW-79.
No soil cores collected from 0-180', log is based on MW-79 to 180'. Copyright 2006.

▼ Static Water Level

DESCRIPTION	PID ppm	GRAPHIC LOG	DEPTH (ft. bgl)	Static Water Level	Sample/ Revovery	Sample ID	Blow Counts	WELL CONSTRUCTION DETAIL
SILTY SAND: Sand, fine to medium grained; fine Gravel; Silt, dry			0, 2, 4					
SAND: Sand, fine to medium grained with fine Gravel and Silt. Brown, dry			6					
CLAY/SILT: Silty Clay to Clayey Silt; with fine Gravel. Brown, dry			8, 10, 12					
SAND: Sand, fine to coarse grained (75%); Silt (20%); fine Gravel (5%). Brown, moderately sorted, medium dense, dry			14, 16, 18, 20, 22, 24, 26, 28					Bentonite Grout
Pushing rock, brown, Silty Sand in split spoon, dry			30, 32, 34					2" Galvanized Casing
Sand, coarse to fine grained. Brown with green tint, moderately sorted, wet			36, 38					
SILT: Silt (100%). Yellowish brown, floury, dry			40, 42, 44	▼				
SAND: Sand, medium to fine grained (100%); trace silt. Brown, well sorted, medium dense, wet			46, 48					
Sand, coarse to fine grained (70%); Gravel, fine (20%); Silt (10%). Brown, moderately sorted, medium dense, wet			50, 52, 54					
CLAY/SILT: Clay/Silt (slow, hard drilling)			56, 58					
SAND: Sand, very coarse to fine grained (100%). Grayish brown, moderately sorted, very loose, wet			60, 62, 64					
CLAY/SILT: Clay/Silt (slow, hard drilling)			66					
SAND: Sand, coarse to fine grained (100%). Grayish brown, moderately sorted, medium dense, wet			68, 70					

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BOREHOLE LOG

BORING/WELL ID: **MW-79D**

TOTAL DEPTH (ft.): **201.5'**

PROJECT: Pall Life Sciences Inc.
SITE LOCATION: Ann Arbor, Michigan
PROJECT NO.: F96502
PROJECT MANAGER: James W. Brode, Jr., C.P.G.
LOGGED BY: Tony Alati

START DATE: 3-28-06
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DRILLER: Dennis/Jerry and Pat
RIG TYPE: CME 95
METHOD OF DRILLING: Hollow Stem Auger
SAMPLING METHODS: Split Spoon, Simulprobe

NOTES: Veteran's Park, East of Maple Road, Approx. 5' East of MW-79.
No soil cores collected from 0-180', log is based on MW-79 to 180'. Copyright 2006.

▼ Static Water Level

DESCRIPTION	PID ppm	GRAPHIC LOG	DEPTH (ft. bgl)	Static Water Level	Sample/ Revovery	Sample ID	Blow Counts	WELL CONSTRUCTION DETAIL
CLAY/SILT: Clay/Silt (slow, hard drilling)			72, 74, 76					
SAND: Sand, coarse to fine grained (95%); fine Gravel (5%). Grayish brown, moderately sorted, very dense, wet			78, 80, 82					Bentonite Grout
DIAMICTON: Clay (70%); Silt (20%); Sand, fine grained (5%); Gravel, fine (5%). Gray, dry Interbedded Sand and Gravel from 84-86'			84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104					2" Galvanized Casing
SAND AND GRAVEL: Sand, coarse to fine grained (50%); Gravel, fine to coarse (50%). Grayish brown, poorly sorted, dense, wet			106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142					

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BOREHOLE LOG

BORING/WELL ID: **MW-79D**

TOTAL DEPTH (ft.): **201.5'**

PROJECT: Pall Life Sciences Inc.
SITE LOCATION: Ann Arbor, Michigan
PROJECT NO.: F96502
PROJECT MANAGER: James W. Brode, Jr., C.P.G.
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START DATE: 3-28-06
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TOC ELEV.: 906.49'
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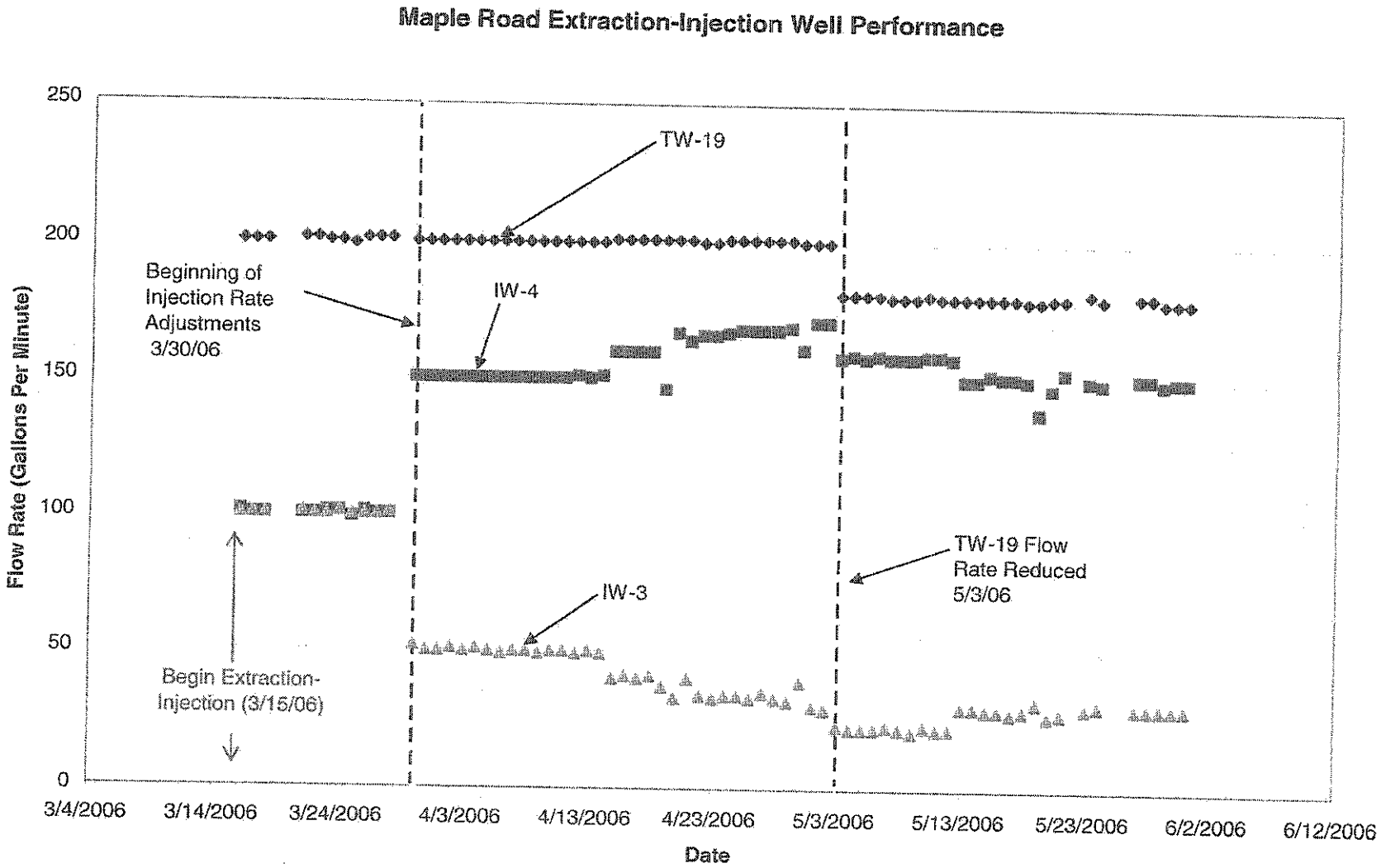
DRILLING CO.: Stearns Drilling
DRILLER: Dennis/Jerry and Pat
RIG TYPE: CME 95
METHOD OF DRILLING: Hollow Stem Auger
SAMPLING METHODS: Split Spoon, Simulprobe

NOTES: Veteran's Park, East of Maple Road, Approx. 5' East of MW-79.
No soil cores collected from 0-180', log is based on MW-79 to 180'. Copyright 2006.

▼ Static Water Level

DESCRIPTION	PID ppm	GRAPHIC LOG	DEPTH (ft. bgl)	Static Water Level	Sample/ Revovery	Sample ID	Blow Counts	WELL CONSTRUCTION DETAIL
DIAMICTON: Silt (60%); Sand, fine grained (30%); Gravel, fine (10%). Grayish brown, well sorted, very dense, dry			144					Bentonite Grout
Sand from 151-153' (based on driller's comments)			146					
			148					
			150					
			152					
			154					
			156					
			158					
			160					
			162					
			164					
			166					
			168					
As above, dark grayish brown			170					
			172					
			174					
			176					
SAND: Sand, medium to fine grained, with Silt. Brown, poorly sorted, wet			178					
			180	1.5'		NA		#5 Sand Pack Simulprobe sample 180-181.5' (68 ug/L) 2" Stainless Steel Screen (10 slot)
			182					
			184					
			186					
			188					
			190	1.5'		NA		Simulprobe sample 190-191.5' (24 ug/L)
			192					
			194					
			196					
			198					
Sand, fine grained, with Silt. Brown, well sorted, moist			200	1.5'		NA		Simulprobe sample 200-201.5' (No water sample recovered)

Attachment 2



Attachment 2. Extraction and Injection Well Performance (March, April and May 2006). Initial Monitoring Review - Maple Road Interim Response.

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Maple Interim Response Operation Report

Month of: Mar-06

Date	Notes	INFLUENT			EFFLUENT								
		TW-19			IW-4			IW-3			1,4-DIOXANE (ppb)	BROMATE (ppb)	H2O2 Eff (ppm)
		Gallons	RunTime	GPM	Gallons	RunTime	GPM	Gallons	RunTime	GPM			
Wed-3/1/2006		-	-	-	-	-	-	-	-	-			
Thu-3/2/2006		-	-	-	-	-	-	-	-	-			
Fri-3/3/2006		-	-	-	-	-	-	-	-	-			
Sat-3/4/2006		-	-	-	-	-	-	-	-	-			
Sun-3/5/2006		-	-	-	-	-	-	-	-	-			
Mon-3/6/2006		-	-	-	-	-	-	-	-	-			
Tue-3/7/2006		-	-	-	-	-	-	-	-	-			
Wed-3/8/2006		-	-	-	-	-	-	-	-	-			
Thu-3/9/2006		-	-	-	-	-	-	-	-	-			
Fri-3/10/2006		-	-	-	-	-	-	-	-	-			
Sat-3/11/2006		-	-	-	-	-	-	-	-	-			
Sun-3/12/2006		-	-	-	-	-	-	-	-	-			
Mon-3/13/2006		-	-	-	-	-	-	-	-	-			
Tue-3/14/2006		12,957	1.40	-	6,514	1.08	-	6,443	1.08	-			
Wed-3/15/2006		206,460	17.48	-	104,061	17.15	-	102,399	17.15	-	8	8	35
Thu-3/16/2006		288,730	24.00	200	145,589	24.00	101	145,471	24.00	100	7, 10	10, 7	35
Fri-3/17/2006		288,262	24.00	200	145,357	24.00	100	145,275	24.00	100	8, 13	8, 5	40
Sat-3/18/2006	(a)	24,940	2.07	200	12,587	2.07	100	12,572	2.07	100			
Sun-3/19/2006	(a)	-	-	-	-	-	-	-	-	-			
Mon-3/20/2006		209,567	17.50	-	105,646	17.48	-	105,628	17.48	-	16	nd	45
Tue-3/21/2006		288,704	24.00	201	145,575	24.00	100	145,502	24.00	101	13	5	50
Wed-3/22/2006		257,099	21.32	201	129,629	21.32	100	129,561	21.32	100	13, 13	5, 7	40
Thu-3/23/2006		289,077	24.00	200	145,744	24.00	101	145,657	24.00	100	14, 18	7, 9	50
Fri-3/24/2006		227,460	18.98	200	114,655	18.93	101	114,699	18.95	101	9	9	45
Sat-3/25/2006	(a)	289,328	24.00	199	145,907	24.00	99	145,740	24.00	100			
Sun-3/26/2006	(a)	289,636	24.00	201	146,049	24.00	101	145,943	24.00	100			
Mon-3/27/2006		289,831	24.00	201	146,129	24.00	100	145,962	24.00	100	12	7	50
Tue-3/28/2006		279,898	23.27	201	141,194	23.25	100	140,969	23.25	101	13	7	45
Wed-3/29/2006		184,693	15.35	-	132,074	15.38	-	53,797	15.40	-	15	7	45
Thu-3/30/2006		273,205	22.73	200	206,087	22.73	150	68,744	22.70	52	12	8	46
Fri-3/31/2006		264,994	22.10	200	199,961	22.08	150	66,629	22.03	50	10	9	47
Average		**127,898**	**11**	**84**	**70,089**	**11**	**45**	**58,742**	**11**	**39**	**12**	**7**	**44**

Note: GPM readings are automated instantaneous readings at 3:00 AM daily. Discharge gallons are recorded higher than extraction due to higher DO levels.

(a) Manual readings were not taken due to weekend and/or holiday.

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Maple Interim Response Operation Report

Month of: Apr-06

Date	INFLUENT			EFFLUENT								
	TW-19			IW-4			IW-3			1,4-DIOXANE (ppb)	BROMATE (ppb)	H2O2 Eff (ppm)
	Gallons	RunTime	GPM	Gallons	RunTime	GPM	Gallons	RunTime	GPM			
Sat-4/1/2006	288,264	24.00	200	217,478	24.00	150	72,513	24.00	50			
Sun-4/2/2006	288,425	24.00	200	217,653	24.00	150	72,566	24.00	51			
Mon-4/3/2006	288,823	24.00	200	217,977	24.00	150	72,659	24.00	50	11	8	46
Tue-4/4/2006	288,965	24.00	200	218,041	24.00	150	72,731	24.00	51	9	9	50
Wed-4/5/2006	289,025	24.00	200	218,050	24.00	150	72,704	24.00	50	10	9	48
Thu-4/6/2006	288,881	24.00	200	217,960	24.00	150	72,671	24.00	49	11	8	48
Fri-4/7/2006	288,778	24.00	200	217,913	24.00	150	72,666	24.00	50	13	7	48
Sat-4/8/2006	288,963	24.00	200	218,072	24.00	150	72,725	24.00	50			
Sun-4/9/2006	288,884	24.00	200	217,982	24.00	150	72,693	24.00	49			
Mon-4/10/2006	288,805	24.00	200	217,918	24.00	150	72,661	24.00	50	10	9	48
Tue-4/11/2006	288,869	24.00	200	217,897	24.00	150	72,692	24.00	50	10	8	48
Wed-4/12/2006	288,851	24.00	200	217,888	24.00	151	72,689	24.00	49	11	9	48
Thu-4/13/2006	288,821	24.00	200	217,893	24.00	150	72,627	24.00	50	11	9	48
Fri-4/14/2006	289,060	24.00	200	225,315	24.00	151	65,390	24.00	49	11	8	48
Sat-4/15/2006	289,261	24.00	201	232,621	24.00	160	58,208	24.00	40			
Sun-4/16/2006	289,379	24.00	201	232,763	24.00	160	58,265	24.00	41			
Mon-4/17/2006	289,489	24.00	201	232,880	24.00	160	58,249	24.00	40	11	8	48
Tue-4/18/2006	289,328	24.00	201	232,689	24.00	160	58,189	24.00	41	12	8	48
Wed-4/19/2006	289,345	24.00	201	234,076	24.00	146	56,829	24.00	37	11	9	48
Thu-4/20/2006	289,369	24.00	201	242,336	24.00	167	48,515	24.00	33	13	7	48
Fri-4/21/2006	289,107	24.00	201	242,173	24.00	164	48,476	24.00	40	11	8	48
Sat-4/22/2006	289,101	24.00	200	242,183	24.00	166	48,490	24.00	34			
Sun-4/23/2006	289,372	24.00	200	242,438	24.00	166	48,532	24.00	33			
Mon-4/24/2006	289,385	24.00	201	242,423	24.00	167	48,505	24.00	34	6, 11, 18	14, 10, 8, 6	48
Tue-4/25/2006	289,496	24.00	201	242,523	24.00	168	48,527	24.00	34	20	7	
Wed-4/26/2006	289,457	24.00	201	242,540	24.00	168	48,482	24.00	33	15	9	
Thu-4/27/2006	289,702	24.00	201	242,676	24.00	168	48,549	24.00	35	18	6	
Fri-4/28/2006	289,616	24.00	201	242,628	24.00	168	48,539	24.00	33	18	6	
Sat-4/29/2006	289,501	24.00	201	243,233	24.00	169	47,816	24.00	32			
Sun-4/30/2006	289,250	24.00	200	244,355	24.00	161	46,383	24.00	39			
Average	**289,119**	**24**	**200**	**229,752**	**24**	**157**	**61,018**	**24**	**43**	**12.38**	**8.08**	

Note: GPM readings are automated instantaneous readings at 3:00 AM daily. Discharge gallons are recorded higher than extraction due to higher DO levels.

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Maple Interim Response
Operation Report

Month of: **May-06**

Date	INFLUENT			EFFLUENT							
	TW-19			IW-4			IW-3			1,4-DIOXANE	BROMATE
	Gallons	RunTime	GPM	Gallons	RunTime	GPM	Gallons	RunTime	GPM	(ppb)	(ppb)
Mon-5/1/2006	288,941	24.00	200	248,082	24.00	171	42,350	23.98	30	25	5
Tue-5/2/2006	269,833	24.00	200	235,843	24.00	171	35,537	24.00	29	20	6
Wed-5/3/2006	261,194	24.00	181	229,835	24.00	158	32,815	24.00	23	12	8
Thu-5/4/2006	261,031	24.00	181	229,624	24.00	159	32,799	23.98	22	15	7
Fri-5/5/2006	260,783	24.00	181	229,492	24.00	158	32,790	24.00	22	12	9
Sat-5/6/2006	260,517	24.00	181	229,263	24.00	159	32,827	24.00	22		
Sun-5/7/2006	260,481	24.00	180	229,224	24.00	158	32,721	24.00	23		
Mon-5/8/2006	260,503	24.00	180	229,658	24.00	158	32,317	23.98	22	13	9
Tue-5/9/2006	260,581	24.00	180	229,714	24.00	158	32,325	23.95	21	15	7
Wed-5/10/2006	260,378	24.00	181	229,685	24.00	159	32,104	24.00	23	22	5
Thu-5/11/2006	257,051	23.80	180	226,799	23.80	159	31,839	23.80	22	17	6
Fri-5/12/2006	259,784	24.00	180	220,711	24.00	158	40,525	23.97	22	15	7
Sat-5/13/2006	259,504	24.00	180	217,446	24.00	150	43,495	24.00	30		
Sun-5/14/2006	259,458	24.00	180	217,826	24.00	150	42,995	24.00	30		
Mon-5/15/2006	259,424	24.00	180	217,528	24.00	152	43,287	23.98	29	18	6
Tue-5/16/2006	259,319	24.00	180	218,544	24.00	151	42,097	24.00	29	16	7
Wed-5/17/2006	259,118	24.00	180	218,751	24.00	151	41,661	23.98	28	18	6
Thu-5/18/2006	258,710	24.00	179	217,085	24.00	150	43,081	24.00	29	19	6
Fri-5/19/2006	258,866	24.00	179	219,080	24.00	138	41,204	24.00	32	15	7
Sat-5/20/2006	260,377	24.00	180	221,121	24.00	147	40,566	24.00	27		
Sun-5/21/2006	37,111	3.43	180	31,419	3.50	153	5,973	3.48	28		
Mon-5/22/2006	127,897	11.85	-	108,486	11.85	0	21,740	11.85	-	16	8
Tue-5/23/2006	259,014	24.00	182	217,410	24.00	150	43,486	24.00	30	14	6
Wed-5/24/2006	211,449	19.62	180	177,227	19.62	149	35,395	19.60	31	14	7
Thu-5/25/2006	-	-	-	-	-	0	-	-	-		
Fri-5/26/2006	142,507	13.17	-	119,631	13.17	0	23,935	13.18	-	10	7
Sat-5/27/2006	249,915	23.00	181	209,373	23.00	151	41,825	22.97	30		
Sun-5/28/2006	254,520	23.58	181	213,036	23.60	151	42,725	23.60	30		
Mon-5/29/2006	259,252	24.00	179	217,160	24.00	149	43,306	24.00	30	16	6
Tue-5/30/2006	259,081	24.00	179	216,950	24.00	150	43,368	24.00	30	14	7
Wed-5/31/2006	197,522	18.32	179	164,772	18.32	150	33,743	18.32	30	13	8
Average	**233,359**	**21**	**164**	**199,702**	**21**	**139**	**34,995**	**21**	**24**	**15.86**	**6.82**

Note: GPM readings are automated instantaneous readings at 3:00 AM daily. Discharge gallons are recorded higher than extraction due to higher DO levels.

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Attachment 3

Revised Attachment 1 - Performance Monitoring Plan - Maple Road Interim Response
Unit E Plume
Pall Life Sciences, Ann Arbor, Michigan

Well I.D.	Purpose of Monitoring	Proposed Maple Road Groundwater Quality and Water Level Measurement Frequency (February 2006)	Revised Maple Rpad Groundwater Quality and Water Level Measurement Frequency
Extraction Well			
TW-19 (treatment system influent)	Mass Removal Calculations plus Operations and Maintenance Monitoring	Weekly (water quality only)	Weekly (water quality only), minimum frequency
Injection Wells			
IW-3	Operation and Maintenance Monitoring	Monitor Water Level/Pressure Daily	IW-3 was taken offine due to problems associated with screen fouling. *IW-3 was replaced by IW-5 .*
IW-4	Operation and Maintenance Monitoring	Monitor Water Level/Pressure Daily	Monitor Water Level/Pressure Daily
IW-5	Operation and Maintenance Monitoring	Monitor Water Level/Pressure Daily	*IW-5 replaces IW-3*
Treatment System			
Treatment System Effluent	Compliance with Injection Rules	To be determined	Weekly, minimum frequency
Monitoring Wells			
Upgradient Assessment			
MW-72s	*1*	Quarterly	Quarterly
MW-72d	*1*	Quarterly	Quarterly
MW-85	1	Quarterly	Quarterly
Downgradient Assessment			
MW-76s	2	Quarterly	Quarterly
MW-76i	2	Quarterly	Quarterly
MW-76d	2	Quarterly	Quarterly
MW-79	2	Monthly	Quarterly
MW-79d	2	Quarterly	Quarterly
MW-83s	2	Quarterly	Quarterly
MW-83d	2	Quarterly	Quarterly
MW-84s	2	Quarterly	Quarterly
MW-84d	2	Quarterly	Quarterly
MW-86	2	Quarterly	Quarterly
Close Proximity to Injection Wells			
MW-87s	3	Monthly for 3 Months then Quarterly	Quarterly
MW-87d	3	Monthly for 3 Months then Quarterly	Quarterly
MW-88	3	Monthly for 3 Months then Quarterly	Quarterly
Lateral Expansion			
MW-81	2 and 4	Monthly for 3 Months then Quarterly	Quarterly
MW-89	2 and 4	Monthly for 3 Months then Quarterly	Quarterly
MW-90	2 and 4	Monthly for 3 Months then Quarterly	Quarterly
MW-91	2 and 4	Quarterly	Quarterly
MW-101	2 and 4	Monthly for 3 Months then Quarterly	Quarterly
MW-104	4	None	Quarterly

1 = Monitor for upgradient water quality changes.
2 = Monitor for downgradient water quality changes.
3 = Monitor within close proximity to injection wells.
4 = Monitoring for potential lateral expansion of the Unit E plume, resulting from IR.
Note: All samples will be analyzed for 1,4-dioxane by PLS (1 ug/L detection limit).

Attachment 4 is available at:

Gelman Sciences, Inc.
Information Repositories

Ann Arbor District Library
Downtown Library
343 South Fifth Avenue
734-327-4200

Scio Township Hall
827 North Zeeb Road, Ann Arbor
734-665-2123

City of Ann Arbor Water Utilities Department
100 North Fifth Avenue
Contact: Venita Harrison 734-994-8286

Washtenaw County Department of Planning
and Environment
705 North Zeeb Road, Ann Arbor
Contact: Michael Gebhard 734-222-3855

Attachment 5

PALL LIFE SCIENCES
MAPLE AREA TREATMENT FACILITY

MASS REDUCTION

Month of:
Mar-06

			MASS REDUCTION			
					UNIT "E"	
	TW-19 Well Gallons Purged	TW-19 GPM	TW-19 1,4 Dioxane PPM	TW-19 1,4 Dioxane Pounds	Daily 1,4 Dioxane Pounds	Total 1,4 Dioxane Pounds
Wed-3/1/06	0	0	0			-
Thu-3/2/06	0	0	0			-
Fri-3/3/06	0	0	0			-
Sat-3/4/06	0	0	0			-
Sun-3/5/06	0	0	0			-
Mon-3/6/06	0	0	0			-
Tue-3/7/06	0	0	0			-
Wed-3/8/06	0	0	0			-
Thu-3/9/06	0	0	0			-
Fri-3/10/06	0	0	168			-
Sat-3/11/06	0	0	168			-
Sun-3/12/06	0	0	168			-
Mon-3/13/06	0	0	168			-
Tue-3/14/06	12957	0	168	0.02	0.02	0.0
Wed-3/15/06	206460	0	736	1.27	1.27	1.3
Thu-3/16/06	288730	200	843	2.03	2.03	3.3
Fri-3/17/06	288262	200	942	2.27	2.27	5.6
Sat-3/18/06	24940	200	942	0.20	0.20	5.8
Sun-3/19/06	0	0	942			5.8
Mon-3/20/06	209567	0	884	1.55	1.55	7.3
Tue-3/21/06	288704	201	986	2.38	2.38	9.7
Wed-3/22/06	257099	201	1007	2.16	2.16	11.9
Thu-3/23/06	289077	200	939	2.39	2.39	14.2
Fri-3/24/06	227460	200	939	1.78	1.78	16.0
Sat-3/25/06	289328	199	939	2.27	2.27	18.3
Sun-3/26/06	289636	201	939	2.27	2.27	20.6
Mon-3/27/06	289831	201	926	2.24	2.24	22.8
Tue-3/28/06	279898	201	942	2.20	2.20	25.0
Wed-3/29/06	184693	0	942	1.45	1.45	26.5
Thu-3/30/06	273205	200	983	2.24	2.24	28.7
Fri-3/31/06	264994	200	868	1.92	1.92	31
AVERAGES		84	535	1.801	1.8	
TOTALS	3,964,841			31	30.6	31

03/10/06-3/13/06 - pre-start operation

PALL LIFE SCIENCES
MAPLE AREA TREATMENT FACILITY
MASS REDUCTION

Month of: **Apr-06**

Last Month's UNIT "E" Total Pounds: **31**

30

			MASS REDUCTION			
					UNIT "E"	
	TW-19 Well Gallons Purged	TW-19 GPM	TW-19 1,4 Dioxane PPM	TW-19 1,4 Dioxane Pounds	Daily 1,4 Dioxane Pounds	Running Total 1,4 Dioxane Pounds
Sat-4/1/06	288264	200	868	2.09	2.09	33.1
Sun-4/2/06	288425	200	868	2.09	2.09	35.2
Mon-4/3/06	288823	200	914	2.20	2.20	37.4
Tue-4/4/06	288965	200	855	2.06	2.06	39.4
Wed-4/5/06	289025	200	949	2.29	2.29	41.7
Thu-4/6/06	288881	200	899	2.17	2.17	43.9
Fri-4/7/06	288778	200	913	2.20	2.20	46.1
Sat-4/8/06	288963	200	913	2.20	2.20	48.3
Sun-4/9/06	288884	200	913	2.20	2.20	50.5
Mon-4/10/06	288805	200	893	2.15	2.15	52.7
Tue-4/11/06	288869	200	893	2.15	2.15	54.8
Wed-4/12/06	288851	200	893	2.15	2.15	57.0
Thu-4/13/06	288821	200	893	2.15	2.15	59.1
Fri-4/14/06	289060	200	893	2.15	2.15	61.3
Sat-4/15/06	289261	201	893	2.16	2.16	63.4
Sun-4/16/06	289379	201	893	2.16	2.16	65.6
Mon-4/17/06	289489	201	868	2.10	2.10	67.7
Tue-4/18/06	289328	201	868	2.10	2.10	69.8
Wed-4/19/06	289345	201	868	2.10	2.10	71.9
Thu-4/20/06	289369	201	868	2.10	2.10	74.0
Fri-4/21/06	289107	201	868	2.09	2.09	76.1
Sat-4/22/06	289101	200	868	2.09	2.09	78.1
Sun-4/23/06	289372	200	868	2.10	2.10	80.2
Mon-4/24/06	289385	201	885	2.14	2.14	82.4
Tue-4/25/06	289496	201	885	2.14	2.14	84.5
Wed-4/26/06	289457	201	885	2.14	2.14	86.7
Thu-4/27/06	289702	201	885	2.14	2.14	88.8
Fri-4/28/06	289616	201	885	2.14	2.14	90.9
Sat-4/29/06	289501	201	885	2.14	2.14	93.1
Sun-4/30/06	289250	200	885	2.14	2.14	95.2
Mon-5/1/06						95.2
AVERAGES		200	887	2.140	2.1	
TOTALS	8,673,572			64	64.2	95

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PALL LIFE SCIENCES
MAPLE AREA TREATMENT FACILITY
MASS REDUCTION

Month of:
May-06

			MASS REDUCTION			
					UNIT "E"	
	TW-19 Well Gallons Purged	TW-19 GPM	TW-19 1,4 Dioxane PPB	TW-19 1,4 Dioxane Pounds	Daily 1,4 Dioxane Pounds	Running Total 1,4 Dioxane Pounds
Mon-5/1/06	288941	200	851	2.05	2.05	97.1
Tue-5/2/06	269833	200	851	1.92	1.92	99.0
Wed-5/3/06	261194	181	851	1.85	1.85	100.8
Thu-5/4/06	261031	181	851	1.85	1.85	102.7
Fri-5/5/06	260783	181	851	1.85	1.85	104.5
Sat-5/6/06	260517	181	851	1.85	1.85	106.4
Sun-5/7/06	260481	180	851	1.85	1.85	108.2
Mon-5/8/06	260503	180	872	1.90	1.90	110.1
Tue-5/9/06	260581	180	872	1.90	1.90	112.0
Wed-5/10/06	260378	181	872	1.89	1.89	113.9
Thu-5/11/06	257051	180	872	1.87	1.87	115.8
Fri-5/12/06	259784	180	872	1.89	1.89	117.7
Sat-5/13/06	259504	180	872	1.89	1.89	119.6
Sun-5/14/06	259458	180	872	1.89	1.89	121.5
Mon-5/15/06	259424	180	837	1.81	1.81	123.3
Tue-5/16/06	259319	180	837	1.81	1.81	125.1
Wed-5/17/06	259118	180	837	1.81	1.81	126.9
Thu-5/18/06	258710	179	837	1.81	1.81	128.7
Fri-5/19/06	258866	179	837	1.81	1.81	130.5
Sat-5/20/06	260377	180	837	1.82	1.82	132.3
Sun-5/21/06	37111	180	837	0.26	0.26	132.6
Mon-5/22/06	127897	0	739	0.79	0.79	133.4
Tue-5/23/06	259014	182	739	1.60	1.60	135.0
Wed-5/24/06	211449	180	739	1.30	1.30	136.3
Thu-5/25/06	0	0	739			136.3
Fri-5/26/06	142507	0	739	0.88	0.88	137.1
Sat-5/27/06	249915	181	739	1.54	1.54	138.7
Sun-5/28/06	254520	181	739	1.57	1.57	140.3
Mon-5/29/06	259252	179	844	1.83	1.83	142.1
Tue-5/30/06	259081	179	845	1.83	1.83	143.9
Wed-5/31/06	197522	179	845	1.39	1.39	145
AVERAGES		164	827	1.677	1.7	
TOTALS	7,234,121			50	50.3	145

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Attachment 6

TW-18 - Capture Zone Analysis Wagner Road Area

Q (gpm)	Q (ft3/day)	gradient = i	T = bK (ft2/day)	b (feet)	K (ft/day)
200	38503	0.00105	20,000	100	200

X (feet)	Y (feet)	**Ymax (ft)**	**stagnation pt**
-288.946	50	**916.738**	**-291.8070452**
-280.294	100		
-244.617	200		
-180.940	300		
-81.095	400		
71.820	500		
316.463	600		
762.411	700		
1891.888	800		

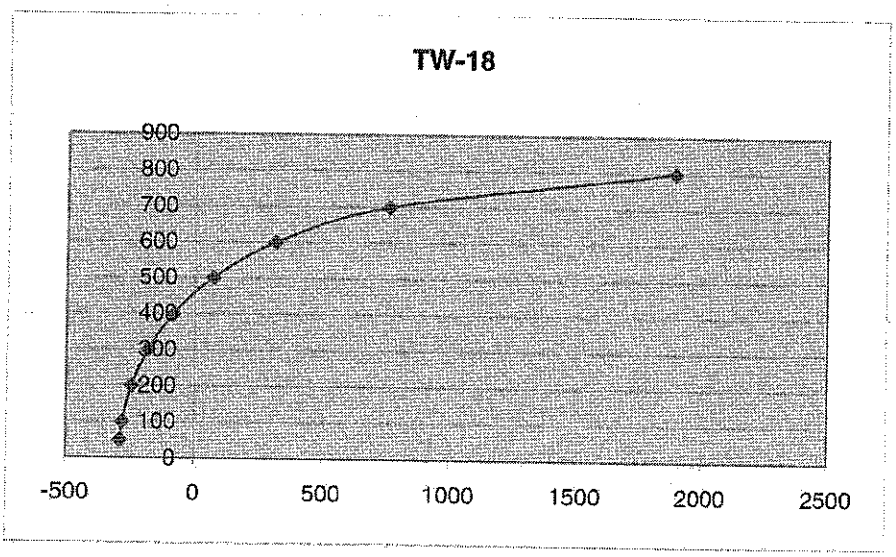
FORMULA

Y max = + or - Q / 2 b K i

stagnation pt = Xo = -(Q / 2 pi K b i)

shape of curve
X = - Y / Tan (2 pi K b i / Q)
tangent must be in radians

Reference: Todd 1980; Grubb 1993



Note: Simplifying assumptions were utilized such as but not limited to the following.
Flow to well screen is horizontal and laminar
Aquifer is homogeneous and isotropic
Aquifer thickness is uniform
Aquifer is of infinite extent
Aquifer is confined
The well screen is fully penetrating

References

Todd, D.K., 1980, Groundwater hydrology, 2nd ed. New York: John Wiley.

Grubb, Stuart, 1993, Analytical model for estimation of steady-state capture zones of pumping wells in confined and unconfined aquifers, *Ground Water,* 31, no. 1:27-32.

Fetter, C.W., 2001, Applied Hydrogeology, 4th ed., Upper Saddle River, New Jersey, Prentice Hall.