APPENDIX B
TIDAL STUDY DATA AND AQUIFER CHARACTERIZATION RESULTS

REVISED DRAFT
REMEDIAL INVESTIGATION REPORT
Capital Industries, Inc.
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-004

FARALLON consulting

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March 3, 2011

Mr. Ed Jones
Washington State Department of Ecology
3190 160th Avenue Southeast
Bellevue Washington 98008-5452

RE: TIDAL STUDY AND AQUIFER CHARACTERIZATION RESULTS
CAPITAL INDUSTRIES, INC.
5801 THIRD AVENUE SOUTH, SEATTLE, WASHINGTON
FARALLON PN: 457-004

Dear Mr. Jones:

This letter report has been prepared on behalf of Capital Industries, Inc. (Capital) to present the results of the tidal study and aquifer characterization conducted at the Capital Area of Investigation. Work was completed in accordance with the methods described in the Groundwater Monitoring Plan dated May 19, 2010, prepared by Farallon Consulting, L.L.C. (Farallon) (2010). Field activities were completed in July and August 2010 and consisted of a multi-well tidal study and aquifer characterization using slug tests in selected monitoring wells. The monitoring wells used in the studies are shown on Figure 1. A description of the study methods and results is presented below.

TIDAL STUDY

A tidal study was performed to assess tidal influences on groundwater elevations and gradients near the Duwamish Waterway. The tidal study evaluated the effects of the inland propagation of the pressure wave caused by the rise in the surface water in the Duwamish Waterway that can cause groundwater levels and gradients (both horizontal and vertical) to fluctuate. Filtering methods developed by Serfes (1991) were used to determine tidally averaged groundwater elevations. These data were then used to calculate the mean hydraulic gradients (horizontal and vertical) and the direction of groundwater flow at various times during the tidal cycle. Hydraulic conductivity also was estimated from the tidal data using the methods of Ferris (1963).

DATA COLLECTION

Water levels were measured in 15 monitoring wells located down-gradient of the Capital property for the tidal study:

- Water Table Interval: monitoring wells C-10-WT, CI-11-WT, CI-12-WT, CI-13-WT, and CI-14-WT;
- Shallow Interval: monitoring wells C-10-35, CI-11-30, CI-12-30, CI-13-30, and CI-14-35; and

- Intermediate Interval: monitoring wells C-10-65, CI-11-60, CI-12-60, CI-13-60, and CI-14-70.

Data were collected over a 14-day period between July 22 and August 5, 2010 using down-hole pressure transducers/data loggers placed in each monitoring well. A pressure transducer/data logger was deployed also in the Duwamish Waterway near South Front Street to record fluctuations in river stage. Water level data were collected at 5-minute intervals at each location over the 14-day test period. Vented pressure transducers were used to compensate for atmospheric pressure changes so barometric corrections to water level data were not required. A barometric pressure transducer was deployed to record barometric pressure fluctuations over the test period in the event that barometric corrections were required (e.g., if a transducer vent line became obstructed). Water levels were measured manually in each well before the data loggers were installed and before the loggers were removed to establish baseline groundwater elevations from the pressure transducer readings.

Data loggers were anchored securely in the wells to avoid slippage during the test and well boxes were secured after the test was started to prevent damage to the data loggers and cables. The wells were equipped with In-Situ, Inc. Level TROLL 700 pressure transducers/data loggers. A Level TROLL 700 pressure transducer/data logger was deployed also in the Duwamish Waterway by securely attaching the instrument to an offshore piling. Barometric pressure was recorded using a BaroTROLL 500 instrument. Manufacturer specifications for these instruments are provided in Appendix A.

DATA ANALYSIS

Water-level data obtained during the 14-day test period were downloaded from the data loggers and converted to groundwater elevations using the depth-to-water measurements obtained in each well at the beginning of the tidal study. Surface water level fluctuations recorded in the Duwamish Waterway are shown on Figure 2. The vertical elevation of the transducer in the Duwamish Waterway was not surveyed because only timing and magnitude of changes of river stage, not absolute elevations, are required for the tidal analyses discussed below.

The tidal filtering process developed by Serfes (1991) requires either a 25- or 72-hour data collection period. The 25-hour analysis is considered to be less accurate than the 72-hour process. Two 72-hour periods were selected over the 14-day tidal study, one reflective of a relatively high-peak tidal amplitude (high to low tide) in the Duwamish (approximately 13 feet), and the other of a relatively smaller tidal amplitude (approximately 9 feet). The two filtering periods were selected to determine whether the magnitude of the tidal amplitude in the river had an impact on average elevations/gradients calculated inland of the waterway. The two tidal analysis periods are illustrated on Figure 2. The first 72-hour period extended from July 24 to 27, 2010 (Tidal Study 1); the second period extended from August 1 to 4, 2010 (Tidal Study 2). The following calculations were completed using each of the datasets:

- Tidally averaged groundwater elevations in each monitoring well included in the tidal study, using the Serfes (1991) method;

- Horizontal hydraulic gradient and flow direction in each aquifer zone using monitoring well clusters CI-11, CI-13, and CI-14;
- Vertical hydraulic gradients in each aquifer zone, calculated using monitoring well pairs; and
- Aquifer hydraulic conductivity estimates using the stage-ratio and time-lag methods of Ferris (1963).

Average Groundwater Elevations

Tidally averaged groundwater elevations calculated for each aquifer zone during the two tidal study periods are presented in Table 1. Graphs showing groundwater elevation fluctuations and the tidal filtering process for each well are included in Appendix B. Using the average groundwater elevations in each aquifer zone, groundwater contour maps were developed for each of the two tidal study periods. These contour maps are presented in Figures 3 through 8.

The groundwater flow patterns interpreted from average groundwater elevations in each aquifer zone are similar to those interpreted from previous groundwater measurement events. Flow is generally to the southwest toward the Duwamish Waterway in each zone. The tidal study data indicate virtually no tidal response in monitoring well cluster CI-10, indicating that tidal influence does not extend beyond monitoring well CI-10. Tidal response was relatively minor in monitoring well cluster CI-14, suggesting that tidal influence extends to a point between these two monitoring well clusters (approximately 600 to 700 feet from the Duwamish Waterway).

Horizontal Gradient and Flow Direction

The horizontal gradient and flow direction in each aquifer zone near the Duwamish Waterway was calculated for both 72-hour tidal study periods using monitoring well clusters CI-11, CI-13, and CI-14. The gradient and flow direction were calculated using a solution to the standard "3-point problem" for groundwater flow. Calculations were made for every 5-minute measurement interval during the 72-hour test periods. The average gradient and flow direction in each zone for the July 24 through 27, and August 1 through 4, 2010 time periods are presented in Table 2. Rose diagrams showing the flow direction and relative frequency of flow in each aquifer zone are presented in Appendix C.

The average hydraulic gradient was fairly consistent between zones and time periods. The average gradients were 0.0035 (July 24 through 27) and 0.0036 (August 1 through 4) in the Water Table Zone; 0.0043 (July 24 through 27) and 0.0037 (August 1 through 4) in the Shallow Zone; and 0.0044 (July 24 through 27) and 0.0043 (August 1 through 4) in the Intermediate Zone. Average groundwater flow directions also were fairly consistent, with averages ranging from approximately 217 degrees (clockwise from north) to 219 degrees in the Water Table Zone, 216 degrees to 220 degrees in the Shallow Zone, and 222 degrees to 223 degrees in the Intermediate Zone. As illustrated by the Rose diagrams in Appendix C, the flow direction varied in each zone across a range of approximately 20 to 30 degrees during the tidal cycle, with very minor flow in some zones at higher ranges, although flow was predominantly in the average directions noted above.

Vertical Gradient Calculations

Vertical hydraulic gradients were calculated for both 72-hour tidal study periods using the tidally averaged groundwater elevations for monitoring well pairs screened in each aquifer zone. Vertical gradients were calculated by dividing the head difference between monitoring wells by the difference in well screen elevation mid-points. A negative value indicates a downward vertical gradient and a positive value indicates and upward gradient. If a well screen was not fully saturated, the well screen mid-point elevation was taken as the midpoint of the saturated interval of the well screen.

Table 3 lists the average vertical gradients calculated for each monitoring well pair. The vertical gradient was calculated also for each 5-minute measurement interval during each tidal study to determine the variations in vertical gradient over time. The maximum and minimum vertical gradients calculated for each tidal study period are listed in Table 3. As shown in this table, the average vertical gradients are relatively small, and fluctuate between upward flow and downward flow in most monitoring well pairs. These data suggest that the vertical gradient and flow direction is somewhat variable during a tidal cycle.

Hydraulic Conductivity Estimates

The tidal study data were used to estimate the hydraulic conductivity of each aquifer zone using the stage-ratio and time-lag methods developed by Ferris (1963). The stage-ratio method uses the ratio of the range in water-level fluctuation measured in observation wells to the corresponding range in stage of a nearby river. The ratio of groundwater fluctuation to change in river stage is computed for the rising and falling limb of each tidal cycle. These calculations were performed for monitoring well clusters CI-11, CI-13, and CI-14 located near the Duwamish Waterway and incorporated into the equations for hydraulic conductivity presented by Ferris. Table 4 presents the hydraulic conductivity values estimated using this method.

The time-lag method uses the time lag between the maximum and minimum stages of the Duwamish Waterway and corresponding maximum and minimum water levels in observation monitoring well clusters CI-11, CI-13, and CI-14. These time-lag values are then incorporated into the appropriate equations for hydraulic conductivity. The average time-lag values calculated for monitoring wells are listed in Table 5. The hydraulic conductivity values obtained using the time-lag method are presented in Table 6.

The hydraulic conductivity estimates are very sensitive to the assumed storativity values for both methods. The hydraulic conductivity calculated using a range of storativity values is presented in Table 6 to illustrate the impact of storativity ranging from 0.1 (unconfined) to 0.001 (semi-confined). Using a mid-range storativity value of 0.01, hydraulic conductivity ranges from approximately 50 feet per day to 230 feet per day. For the stage-ratio method, the hydraulic conductivity ranges from approximately 100 to 200 feet per day in each aquifer zone, assuming a storativity value of 0.1 (unconfined). In general, the results indicate a relatively high hydraulic conductivity across all aquifer zones.

AQUIFER CHARACTERIZATION

To further evaluate hydraulic conductivity in aquifer zones within the Capital Area of Investigation, slug tests were performed in a total of 12 monitoring wells situated near the Site and extending toward the Duwamish Waterway. Slug tests were completed in the following monitoring wells:

- Water Table Interval: monitoring wells MW-8, CI-9-WT, CI-10-WT, and CI-14-WT;
- Shallow Interval: monitoring wells C-8-40, CI-9-40, CI-10-35, and CI-14-35; and
- Intermediate Interval: monitoring wells C-8-60, CI-9-70, CI-10-65, and CI-14-70.

Hydraulic conductivity estimates obtained from the slug testing are presented in Table 7. The mean hydraulic conductivity for each aquifer zone was calculated and also is provided in Table 7. Slug test analysis plots are provided in Appendix D. The Bouwer and Rice method was used to analyze the slug test data for most wells (Bouwer and Rice 1976; Bouwer 1989). The Springer and Gelhar (1991) method was used for wells that showed an oscillating response.

The mean hydraulic conductivity was 99.1 feet per day in the Water Table Zone, 71.8 feet per day in the Shallow Zone, and 6.8 feet per day in the Intermediate Zone. The hydraulic conductivity estimates indicate a decreasing trend in hydraulic conductivity from the Water Table Zone to the Intermediate Zone.

CONCLUSIONS

The tidal study results indicate that the hydraulic gradient and groundwater flow directions in the three aquifer zones are relatively consistent during a tidal cycle and that tidal influence extends approximately 600 to 700 feet inland from the Duwamish Waterway. Minor variations in flow direction occur as a result of tidal influence; however, the flow direction remains predominantly toward the Duwamish Waterway (to the southwest from the Capital Site) during a tidal cycle. This suggests that routine long-term monitoring of water levels is not required to obtain accurate groundwater elevation and flow measurements in the area near the Duwamish Waterway.

Hydraulic conductivity estimates obtained using both tidal data and slug test results indicate relatively high hydraulic conductivity in the Water Table and Shallow Zones (in the range of 100 to 200 feet per day). The hydraulic conductivity in the Intermediate Zone appears to be somewhat lower based on slug test results (roughly 5 to 10 feet per day).

Sincerely,

Farallon Consulting, L.L.C.

Norm Colby, L.G., L.H.G.
Senior Hydrogeologist

Peter Jewett, L.G., L.E.G.
Principal

Attachments: Figure 1, *Site Plan Showing Monitoring Well Locations*
Figure 2, *Water Level Fluctuations Recorded in the Duwamish Waterway and Intervals Selected for Tidal Analysis*
Figure 3, *Water Table Zone Groundwater Elevation Contours Interpreted from Tidally Averaged Groundwater Elevations – July 24-27, 2010*
Figure 4, *Water Table Zone Groundwater Elevation Contours Interpreted from Tidally Averaged Groundwater Elevations – August 1-4, 2010*
Figure 5, *Shallow Zone Groundwater Elevation Contours Interpreted from Tidally Averaged Groundwater Elevations – July 24-27, 2010*
Figure 6, *Shallow Zone Groundwater Elevation Contours Interpreted from Tidally Averaged Groundwater Elevations – August 1-4, 2010*
Figure 7, *Intermediate Zone Groundwater Elevation Contours Interpreted from Tidally Averaged Groundwater Elevations – July 24-27, 2010*
Figure 8, *Intermediate Zone Groundwater Elevation Contours Interpreted from Tidally Averaged Groundwater Elevations – August 1-4, 2010*

Table 1, *Tidally Averaged Groundwater Elevations*
Table 2, *Average Hydraulic Gradient and Flow Direction*
Table 3, *Vertical Gradients Calculated from Paired Monitoring Wells*
Table 4, *Summary of Hydraulic Conductivity Estimates Using Stage-Ratio Method*
Table 5, *Average Time Lag Values in Monitoring Wells*
Table 6, *Summary of Hydraulic Conductivity Estimates Using Time Lag Method*
Table 7, *Hydraulic Conductivity Estimates from Slug Testing*

Attachment A, Manufacturer Specifications for Data Logging Instruments
Attachment B, Graphs Showing Groundwater Elevation Fluctuations and Tidal Filtering Process
Attachment C, Rose Diagrams Showing Groundwater Flow Direction and Relative Frequency of Flow
Attachment D, Slug Test Analysis Plots
Attachment E, References

cc: Ron Taylor, Capital Industries, Inc.
Don Verfurth, Gordon and Rees LLP
Tong Li, GWS

NC/PJ:bjj

FIGURES

TIDAL STUDY AND
AQUIFER CHARACTERIZATION RESULTS
Capital Industries
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-004

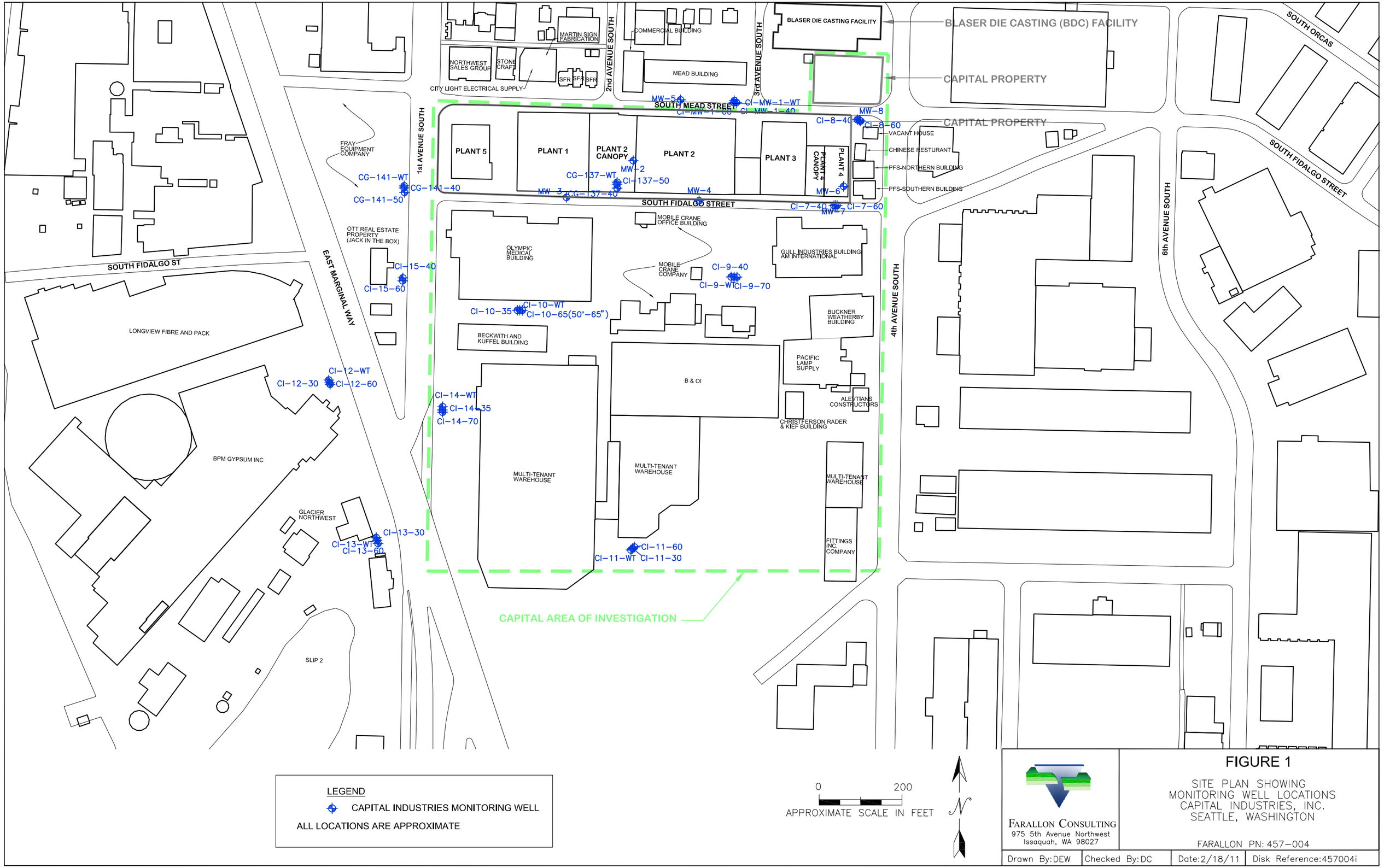

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FIGURE 1

SITE PLAN SHOWING
MONITORING WELL LOCATIONS
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

FARALLON PN: 457-004

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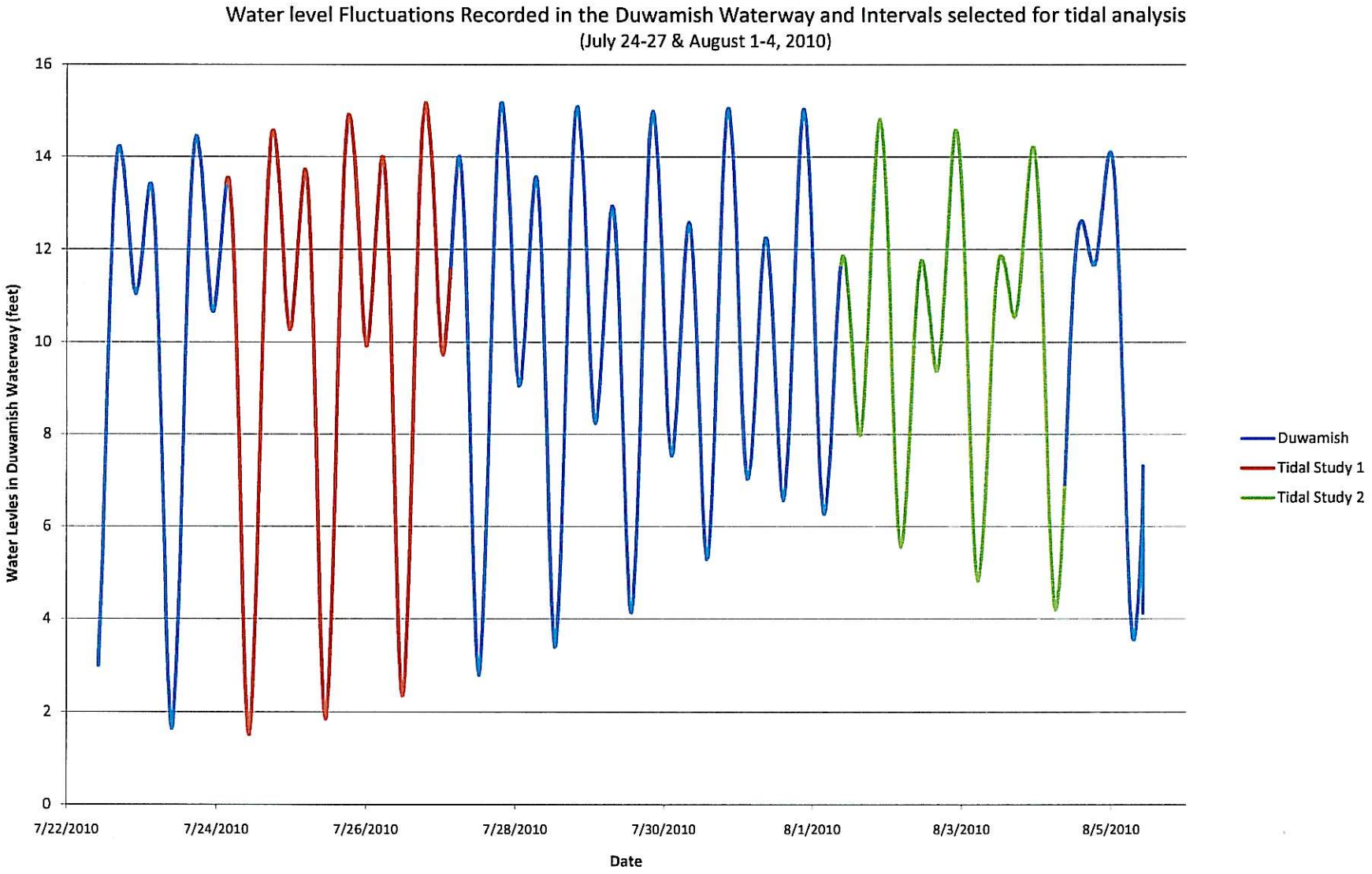
Figure 2


Water level Fluctuations Recorded in the Duwamish Waterway and Intervals selected for tidal analysis
(July 24-27 & August 1-4, 2010)
Water Levles in Duwamish Waterway (feet)
16
14
12
10
8
6
4
2
0
7/22/2010
7/24/2010
7/26/2010
7/28/2010
7/30/2010
8/1/2010
8/3/2010
8/5/2010
Date
Duwamish
Tidal Study 1
Tidal Study 2

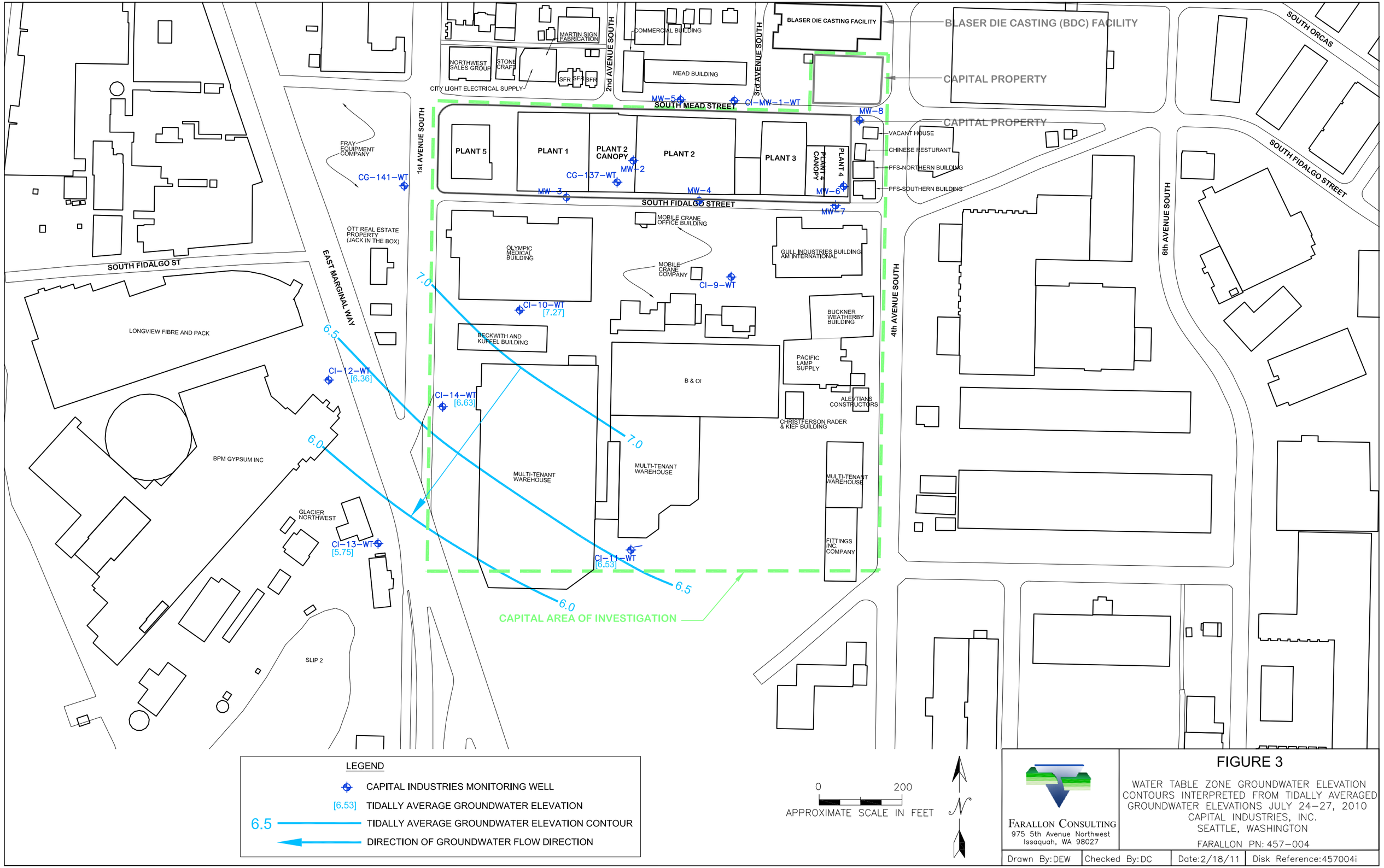


FIGURE 3

WATER TABLE ZONE GROUNDWATER ELEVATION CONTOURS INTERPRETED FROM TIDALLY AVERAGED GROUNDWATER ELEVATIONS JULY 24–27, 2010
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

FARALLON PN: 457-004

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Issaquah, WA 98027

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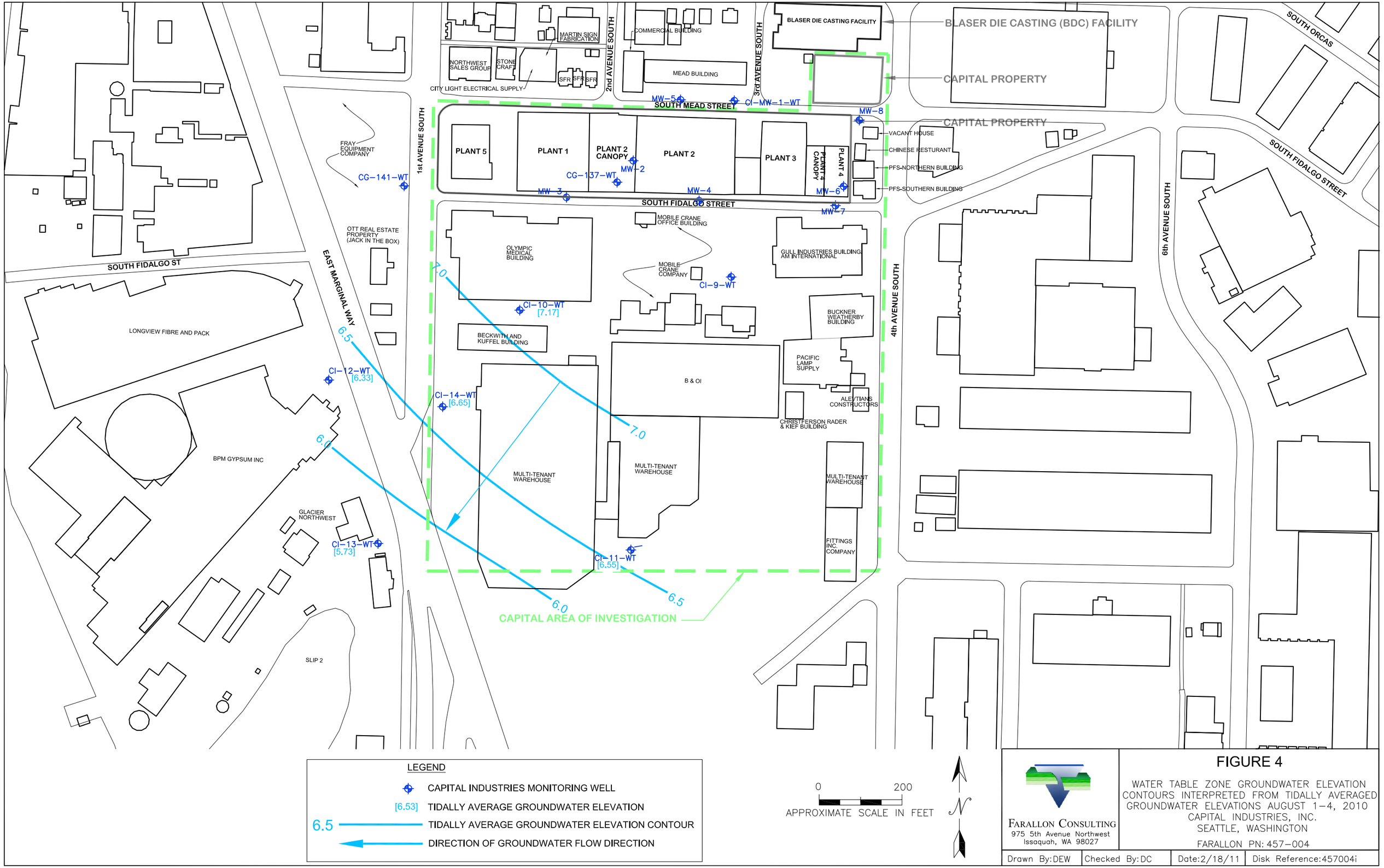

FIGURE 4

WATER TABLE ZONE GROUNDWATER ELEVATION CONTOURS INTERPRETED FROM TIDALLY AVERAGED GROUNDWATER ELEVATIONS AUGUST 1–4, 2010
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

FARALLON PN: 457-004

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975 5th Avenue Northwest
Issaquah, WA 98027

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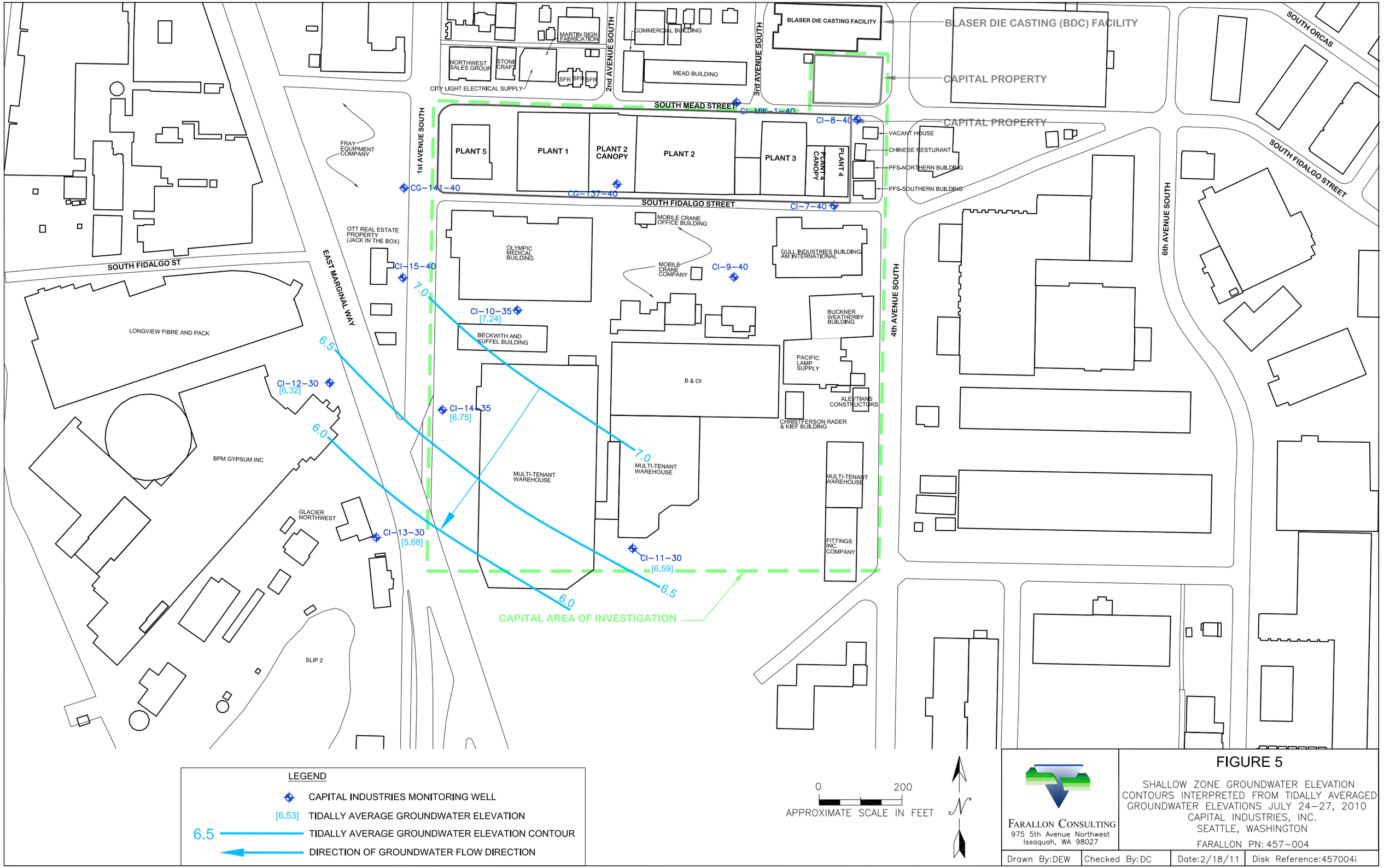

FIGURE 5

SHALLOW ZONE GROUNDWATER ELEVATION CONTOURS INTERPRETED FROM TIDALLY AVERAGED GROUNDWATER ELEVATIONS JULY 24–27, 2010
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

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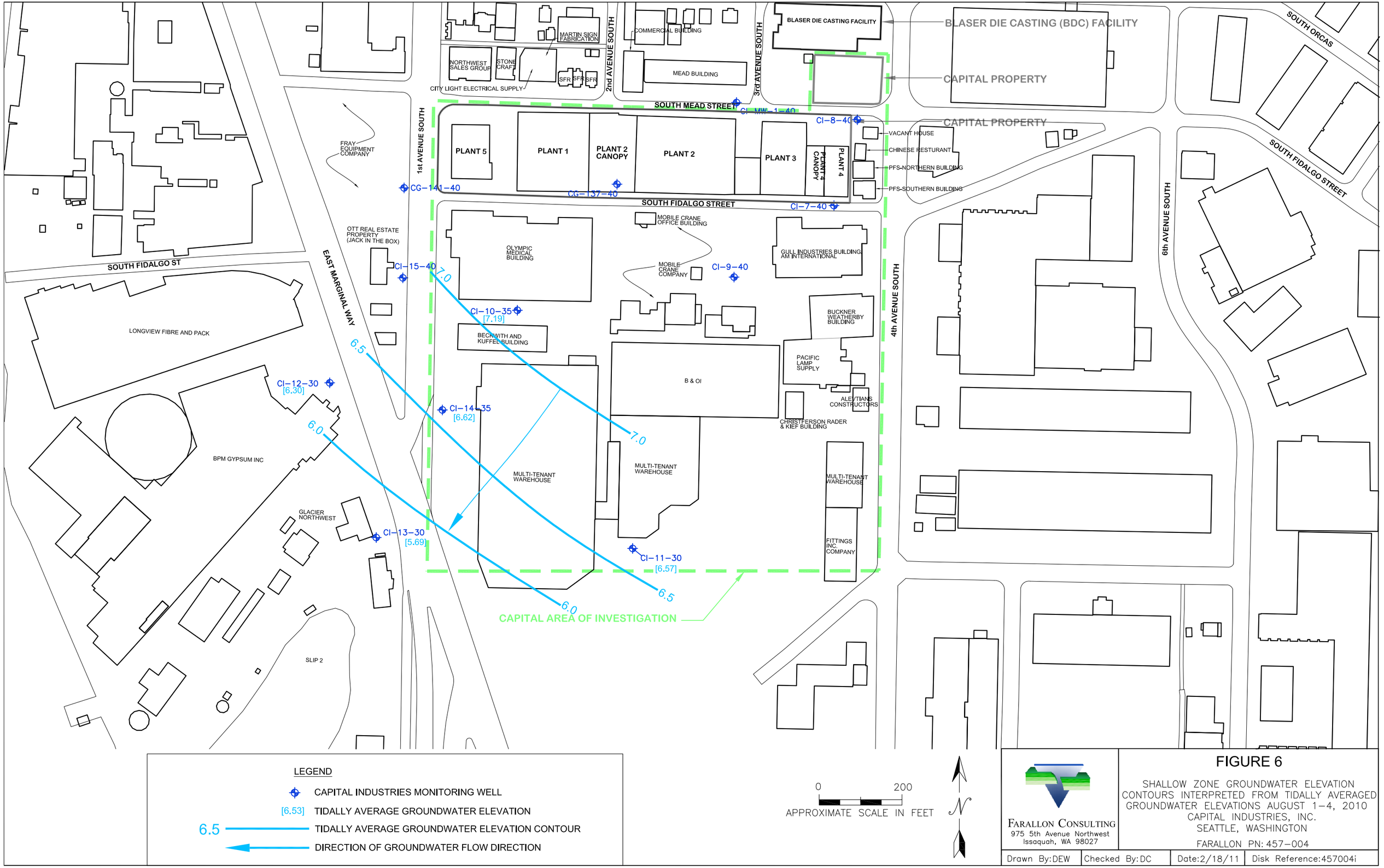

LEGEND

- CAPITAL INDUSTRIES MONITORING WELL
- [6.53] TIDALLY AVERAGE GROUNDWATER ELEVATION
- 6.5 TIDALLY AVERAGE GROUNDWATER ELEVATION CONTOUR
- DIRECTION OF GROUNDWATER FLOW DIRECTION

0 200

APPROXIMATE SCALE IN FEET

N

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Issaquah, WA 98027

FIGURE 6

SHALLOW ZONE GROUNDWATER ELEVATION CONTOURS INTERPRETED FROM TIDALLY AVERAGED GROUNDWATER ELEVATIONS AUGUST 1–4, 2010
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

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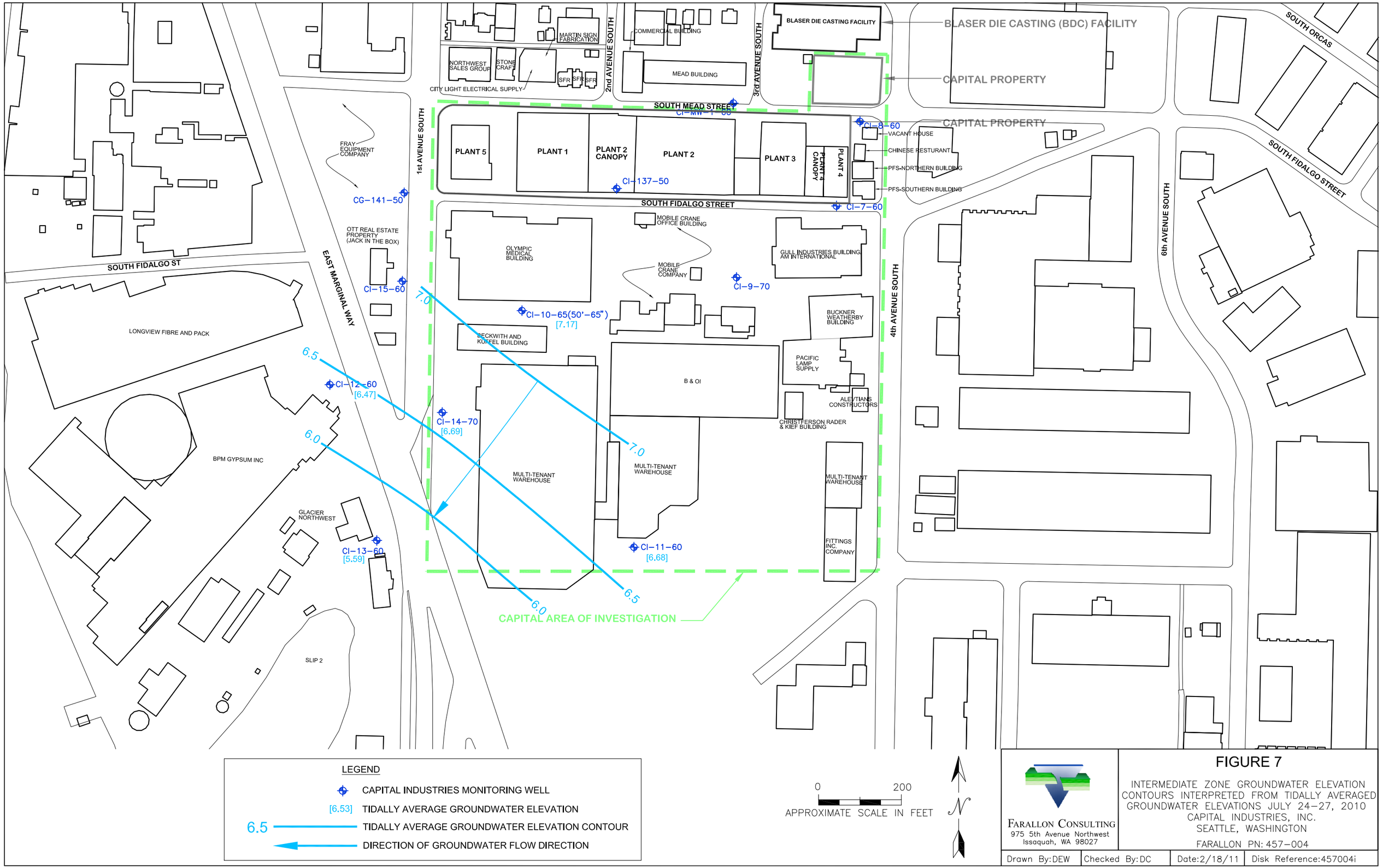

FIGURE 7

INTERMEDIATE ZONE GROUNDWATER ELEVATION CONTOURS INTERPRETED FROM TIDALLY AVERAGED GROUNDWATER ELEVATIONS JULY 24–27, 2010
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

FARALLON PN: 457-004

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975 5th Avenue Northwest
Issaquah, WA 98027

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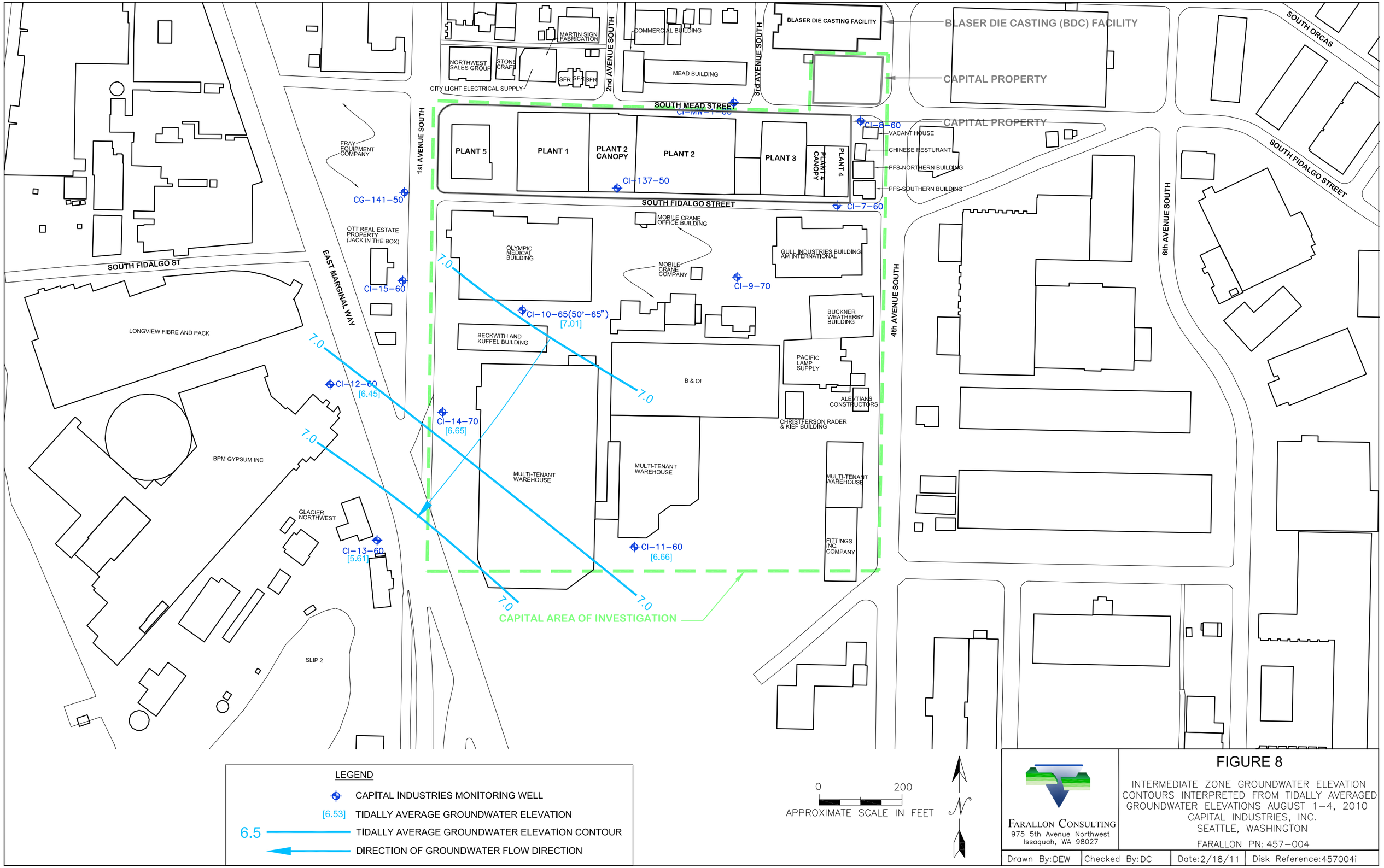


FIGURE 8

INTERMEDIATE ZONE GROUNDWATER ELEVATION CONTOURS INTERPRETED FROM TIDALLY AVERAGED GROUNDWATER ELEVATIONS AUGUST 1–4, 2010
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

FARALLON PN: 457-004

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

Drawn By: DEW	Checked By: DC	Date: 2/18/11	Disk Reference: 457004i

TABLES

TIDAL STUDY AND
AQUIFER CHARACTERIZATION RESULTS
Capital Industries
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-004

Table 1
Tidally Averaged Groundwater Elevations
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Well Identification	Tidal Study Investigation Period and Average Elevations	
	July 24 to 27, 2010	August 1 to 4, 2010
CI-10-WT	7.27	7.17
CI-10-35	7.24	7.19
CI-10-65	7.17	7.01
CI-11-WT	6.53	6.55
CI-11-30	6.59	6.57
CI-11-60	6.68	6.66
CI-12-WT	6.36	6.33
CI-12-30	6.32	6.30
CI-12-60	6.47	6.45
CI-13-WT	5.75	5.73
CI-13-30	5.68	5.69
CI-13-60	5.59	5.61
CI-14-WT	6.63	6.65
CI-14-35	6.75	6.62
CI-14-70	6.69	6.65

NOTES:

Groundwater elevations reported in feet above mean sea level.

Groundwater elevations calculated using Serfes (1991) method for 72-hour tidal cycle

Table 2
Average Hydraulic Gradient and Flow Direction
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Aquifer Zone	Average Gradient/Flow Direction	
	July 24 to 27, 2010	August 1 to 4, 2010
Water Table Zone	0.0035/219.2°	0.0036/217.1°
Shallow Zone	0.0043/215.9°	0.0037/220.2°
Intermediate Zone	0.0044/222.0°	0.0042/223.4°

NOTES:
Average flow direction reported as azimuth measured clockwise from north (0°)
Flow direction and gradient calculated using tidally averaged groundwater elevations in well clusters CI-11, CI-13 and CI-14

Table 3
Vertical Gradients Calculated from Paired Monitoring Wells
Capital Industries, Inc.
Seattle, Washington
Farallon PN 457-004

Monitoring Well Pair	July 24 to 27, 2010			August 1 to 4, 2010		
	Average Vertical Gradient	Maximum Vertical Gradient	Minimum Vertical Gradient	Average Vertical Gradient	Maximum Vertical Gradient	Minimum Vertical Gradient
CI-10-WT CI-10-35	-0.0020	-0.0008	-0.0029	0.0013	0.0025	-0.0024
CI-10-35 CI-10-65	-0.0025	0.0003	-0.0047	-0.0065	-0.0014	-0.0085
CI-11-WT CI-11-30	0.0059	0.0202	-0.0205	0.0020	0.0193	-0.0179
CI-11-30 CI-11-60	0.0030	0.0052	0.0015	0.0030	0.0072	0.0017
CI-12-WT CI-12-30	-0.0040	0.0015	-0.0108	-0.0030	0.0334	-0.0255
CI-12-30 CI-12-60	0.0050	0.0074	0.0024	0.0050	0.0072	-0.0077
CI-13-WT CI-13-30	-0.0072	0.0013	-0.0149	-0.0041	0.0039	-0.0171
CI-13-30 CI-13-60	-0.0029	0.0105	-0.0254	-0.0026	0.0103	-0.0206
CI-14-WT CI-14-35	0.0080	0.0225	-0.0079	-0.0020	0.0124	-0.0116
CI-14-35 CI-14-70	-0.0017	0.0024	-0.0084	0.0009	0.0059	-0.0060

NOTES:

A positive value indicates an upward vertical gradient; a negative value indicates a downward vertical gradient

Only the saturated portions of water table zone monitoring well screens that were fully submerged were used to calculate the midpoint elevations.

Vertical hydraulic gradients were calculated by dividing the difference in groundwater elevations by the difference in well screen midpoint elevations for each well pair.

Table 4
Summary of Hydraulic Conductivity Estimates Using Stage-Ratio Method
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

	Water Table Zone		Shallow Zone		Intermediate Zone	
	July 24 to 27 2010	August 1 to 4 2010	July 24 to 27 2010	August 1 to 4 2010	July 24 to 27 2010	August 1 to 4 2010
Tidal Period (hours)	12.4	12.4	12.4	12.4	12.4	12.4
Tidal Period (days)	0.5	0.5	0.5	0.5	0.5	0.5
Delta X (feet)	390	490	370	440	430	370
Aquifer Thickness (feet)	150	150	150	150	150	150
Storage Coefficient	0.1	0.1	0.1	0.1	0.1	0.1
Transmissivity (gpd/foot)	133,848	211,288	120,472	170,368	162,712	120,472
Transmissivity ($feet^2$/day)	17,894	28,247	16,106	22,776	21,753	16,106
Hydraulic Conductivity (cm/sec)	4.21E-02	6.64E-02	3.79E-02	5.36E-02	5.12E-02	3.79E-02
Hydraulic Conductivity (feet/day)	**119**	**188**	**107**	**152**	**145**	**107**

NOTES:

Delta X is defined as the ratio of groundwater stage to surface water stage plotted against distance of observation wells from Duwamish over one log cycle for monitoring well clusters CI-11, CI-13 and CI-14

Aquifer thickness based on information in Duwamish Basin Groundwater Pathways Conceptual Model Report (Booth and Herman, 1989)

Storage coefficient is estimated based on literature values for unconfined aquifer (typical range is 0.1 to 0.3)

cm/sec = centimeters per second

gpd = gallons per day

Table 5
Average Time Lag Values in Monitoring Wells
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Well Identification	Distance to Duwamish (feet)	Average Lag Time vs. Duwamish (hours:minutes:seconds)	
		July 24 to 27, 2010	August 1 to 4, 2010
CI-11-WT	680	1:51:19	1:44:58
CI-11-30	680	1:52:08	1:52:03
CI-11-60	680	2:10:30	2:08:25
CI-12-WT	530	2:26:58	2:05:36
CI-12-30	530	2:11:41	2:23:03
CI-12-60	530	2:21:25	2:24:08
CI-13-WT	190	1:16:19	1:10:25
CI-13-30	190	1:16:47	1:12:14
CI-13-60	190	1:15:25	1:11:30
CI-14-WT	550	3:06:56	2:11:14
CI-14-35	550	2:18:14	1:58:41
CI-14-70	550	2:12:19	2:16:52

NOTE:
Average time lag calculated using maximum and minimum tidal levels over 72-hour periods

Table 6
Summary of Hydraulic Conductivity Estimates Using Time Lag Method
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

	Water Table Zone		Shallow Zone		Intermediate Zone	
	July 24 to 27 2010	August 1 to 4 2010	July 24 to 27 2010	August 1 to 4 2010	July 24 to 27 2010	August 1 to 4 2010
Tidal Period (hours)	12.4	12.4	12.4	12.4	12.4	12.4
Tidal Period (days)	0.5	0.5	0.5	0.5	0.5	0.5
Delta X (feet)	570	720	770	570	620	850
Delta t_1 (hours)	3	2	2	2	2	3
Delta t_1 (days)	0.13	0.08	0.08	0.08	0.08	0.13
Aquifer Thickness (feet)	150	150	150	150	150	150
Storage Coefficient = 0.1						
Hydraulic Conductivity (cm/sec)	1.96E-01	7.04E-01	8.05E-01	4.41E-01	5.22E-01	4.36E-01
Hydraulic Conductivity (feet/day)	**556**	**1,996**	**2,283**	**1,251**	**1,480**	**1,236**
Storage Coefficient = 0.01						
Hydraulic Conductivity (cm/sec)	1.96E-02	7.04E-02	8.05E-02	4.41E-02	5.22E-02	4.36E-02
Hydraulic Conductivity (feet/day)	**56**	**200**	**228**	**125**	**148**	**124**
Storage Coefficient = 0.001						
Hydraulic Conductivity (cm/sec)	1.96E-03	7.04E-03	8.05E-03	4.41E-03	5.22E-03	4.36E-03
Hydraulic Conductivity (feet/day)	**5.6**	**20**	**23**	**13**	**15**	**12**

NOTES:

Delta X and t_1 obtained by plotting average time lag vs. distance of observation wells from Duwamish for monitoring well clusters CI-12, CI-13 & CI-14

Aquifer thickness based on information in Duwamish Basin Groundwater Pathways Conceptual Model Report (Booth and Herman, 1989)

Storage coefficient is based on literature values for unconfined aquifer to semi-confined aquifer

cm/sec = centimeters per second

Table 7
Hydraulic Conductivity Estimates From Slug Testing
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Well Name	Aquifer Zone	Total Depth (feet bgs)	Screen Interval (feet bgs)	Screen Length (feet)	Depth to Filter Pack (feet)	Radius of Casing (feet)	Effective Porosity of Filter Pack	Static Depth to Water (feet)	Static Water Column Height (feet)	Saturated Aquifer Thickness (feet)	Initial Slug Test Displacement (H_0) (feet)	Rising/Falling Head Test	Partially Submerged Sandpack	Test Solution Method	Estimated K (cm/sec)	Estimated K (feet/day)
MW-8	Water Table	20	10 to 20	10	8	0.083	0.3	7.93	12.07	62.07	3.15	rising	yes	Bouwer-Rice	3.52E-02	99.8
CI-8-40	Shallow	40	30 to 40	10	28	0.083	0.3	7.68	32.32	62.32	1.77	falling	no	Springer-Gelhar	7.51E-02	213
CI-8-60	Intermediate	60	50 to 60	10	48	0.083	0.3	7.77	52.23	62.23	2.05	rising	no	Bouwer-Rice	3.56E-03	10.1
CI-9-WT	Water Table	20	10 to 20	10	8	0.083	0.3	7.89	12.11	62.11	1.53	rising	no	Springer-Gelhar	4.76E-02	135
	Water Table	20	10 to 20	10	8	0.083	0.3	7.89	12.11	62.11	3.12	falling	no	Springer-Gelhar	1.26E-01	357
CI-9-40	Shallow	40	30 to 40	10	28	0.083	0.3	7.86	32.14	62.14	1.76	rising	no	Bouwer-Rice	9.00E-03	25.5
CI-9-70	Intermediate	70	60 to 70	10	58	0.083	0.3	7.90	62.1	62.1	4.36	rising	no	Bouwer-Rice	3.60E-03	10.2
CI-10-WT	Water Table	20	10 to 20	10	8	0.083	0.3	8.50	11.5	61.5	4.34	rising	yes	Bouwer-Rice	3.40E-02	96.5
	Water Table	20	10 to 20	10	8	0.083	0.3	8.50	11.5	61.5	4.32	falling	no	Springer-Gelhar	3.27E-02	92.8
CI-10-35	Shallow	35	25 to 35	10	23	0.083	0.3	8.54	26.46	61.46	2.78	rising	no	Bouwer-Rice	1.38E-02	39.1
	Shallow	35	25 to 35	10	23	0.083	0.3	8.54	26.46	61.46	3.92	falling	no	Bouwer-Rice	2.54E-02	71.9
CI-10-65	Intermediate	65	50 to 65	15	48	0.083	0.3	8.60	56.4	61.4	9.82	rising	no	Bouwer-Rice	3.74E-03	10.6
	Intermediate	65	50 to 65	15	48	0.083	0.3	8.60	56.4	61.4	2.30	falling	no	Bouwer-Rice	3.32E-03	9.4
CI-14-WT	Water Table	20	10 to 20	10	8	0.083	0.3	8.46	11.54	61.54	3.54	rising	yes	Bouwer-Rice	1.44E-02	40.9
	Water Table	20	10 to 20	10	8	0.083	0.3	8.46	11.54	61.54	3.97	falling	no	Bouwer-Rice	1.88E-02	53.4
CI-14-35	Shallow	35	25 to 35	10	23	0.083	0.3	8.56	26.44	61.44	3.70	rising	no	Bouwer-Rice	4.04E-02	114.4
	Shallow	35	25 to 35	10	23	0.083	0.3	8.56	26.44	61.44	2.29	falling	no	Bouwer-Rice	2.77E-02	78.4
CI-14-70	Intermediate	70	60 to 70	10	58	0.083	0.3	8.70	61.3	61.3	6.55	rising	no	Bouwer-Rice	1.16E-03	3.3
	Intermediate	70	60 to 70	10	58	0.083	0.3	8.70	61.3	61.3	3.01	falling	no	Bouwer-Rice	1.02E-03	2.9
														Mean Hydraulic Conductivity in Water Table Zone:	3.5E-02	99.1
														Mean Hydraulic Conductivity in Shallow Zone:	2.5E-02	71.8
														Mean Hydraulic Conductivity in Intermediate Zone:	2.4E-03	6.8

NOTES:

Saturated aquifer thickness based on assumed aquifer thickness of 70 feet

Mean hydraulic conductivity calculated using geometric mean

bgs = below ground surface (bgs)

cm/sec = centimeters per second

Intermediate Aquifer Zone = 40 to 70 feet bgs

K = hydraulic connectivity

Shallow Aquifer Zone = 20 to 40 feet bgs

Water Table Aquifer Zone = approximately 10 to 20 feet bgs

ATTACHMENT A
MANUFACTURER SPECIFICATIONS FOR DATA LOGGING INSTRUMENTS

TIDAL STUDY AND
AQUIFER CHARACTERIZATION RESULTS
Capital Industries
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-004

In-Situ Inc.

Innovations in Water Monitoring

Level TROLL® Instruments

Water Level Instruments for Every Application & Budget

Level TROLL® 700 Instrument

- Designed for aquifer characterization
- Vented (gauged) and non-vented (absolute) instruments
- Linear, fast linear, linear average, event, step linear, and true logarithmic logging modes
- Titanium construction for all applications (0.72” OD)

Level TROLL® 500 Instrument

- Designed for groundwater and surface-water monitoring
- Vented or non-vented instrument
- Linear, fast linear, and event logging modes
- Titanium body ideal for harsh environments (0.72” OD)

Level TROLL® 300 Instrument

- Designed for fresh water and industrial monitoring
- Non-vented instrument
- Linear, fast linear, and event logging modes
- Stainless steel construction (0.82” OD)

Powerful, Accurate, Reliable Performance

- **Low-power consumption** – Extend deployments and get the only industry guarantee for battery life — minimum of 5 years or 2 million readings. External power or battery packs can be used.
- **Telemetry and SCADA integration** – Access data when you need it. No adapters or confusing proprietary protocols required — fully compliant Modbus/RS485, SDI-12, and 4-20 mA.
- **Superior accuracy** – Get guaranteed accuracy under all operating conditions — instruments undergo extensive calibration procedures for pressure and temperature. Each instrument includes a serialized calibration report.
- **Intuitive interface** – Simplify data collection and management with Win-Situ® 5 and Win-Situ® Mobile software. Software features setup wizards, fast data download rates, multiple water level reference options, and more.

Applications

- Aquifer characterization
- Coastal deployments — tide/harbor levels, storm surge systems, and wetlands research
- Construction and mine dewatering
- River, lake, and reservoir monitoring
- Stormwater management

Level TROLL® 300, 500 & 700 Instruments

General	Level TROLL 300	Level TROLL 500	Level TROLL 700	BaroTROLL
Temperature ranges	Operational: -4-176° F (-20-80° C) Storage: -40-176° F (-40-80° C) Calibrated: 23-122° F (-5-50° C)	Operational: -4-176° F (-20-80° C) Storage: -40-176° F (-40-80° C) Calibrated: 23-122° F (-5-50° C)	Operational: -4-176° F (-20-80° C) Storage: -40-176° F (-40-80° C) Calibrated: 23-122° F (-5-50° C)	Operational: -4-176° F (-20-80° C) Storage: -40-176° F (-40-80° C) Calibrated: 23-122° F (-5-50° C)
Diameter	0.82 in (2.08 cm)	0.72 in (1.83 cm)	0.72 in (1.83 cm)	0.72 in (1.83 cm)
Length	9.0 in (22.9 cm)	8.5 in (21.6 cm)	8.5 in (21.6 cm)	8.5 in (21.6 cm)
Weight	0.54 lb (245 g)	0.43 lb (197 g)	0.43 lb (197 g)	0.43 lb (197 g)
Materials	Stainless steel body; Delrin® nose cone	Titanium body; Delrin nose cone	Titanium body; Delrin nose cone	Titanium body; Delrin nose cone
Output options	Modbus/RS485, SDI-12, 4-20 mA	Modbus/RS485, SDI-12, 4-20 mA	Modbus/RS485, SDI-12, 4-20 mA	Modbus/RS485, SDI-12, 4-20 mA
Battery type & life	3.6V lithium; 5 years or 2M readings[1]	3.6V lithium; 5 years or 2M readings[1]	3.6V lithium; 5 years or 2M readings[1]	3.6V lithium; 5 years or 2M readings[1]
External power	8-36 VDC	8-36 VDC	8-36 VDC	8-36 VDC
Measurement current	4 mA	4 mA	4 mA	4 mA
Sleep current	180 µA	180 µA	180 µA	180 µA
Memory Data records[2] Data logs	1.0 MB 65,000 2	2.0 MB 130,000 50	4.0 MB 260,000 50	1.0 MB 65,000 2
Fastest logging rate & Modbus rate	2 per second	2 per second	4 per second	1 per minute
Fastest SDI-12 & 4-20 mA output rate	1 per second	1 per second	1 per second	1 per second
Log types	Linear, Fast Linear, and Event	Linear, Fast Linear, and Event	Linear, Fast Linear, Linear Average, Event, Step Linear, True Logarithmic	Linear
Real-time clock	Accurate to 1 second/24-hr period	Accurate to 1 second/24-hr period	Accurate to 1 second/24-hr period	Accurate to 1 second/24-hr period
Sensor Type/Material	Piezoresistive; stainless steel	Piezoresistive; titanium	Piezoresistive; titanium	Piezoresistive; titanium
Range	*Non-vented* 30 psia: 35.8 ft (10.9 m) 100 psia: 197.3 ft (60.1 m) 300 psia: 658.7 ft (200.7 m)	*Non-vented* 30 psia: 35.8 ft (10.9 m) 100 psia: 197.3 ft (60.1 m) 300 psia: 658.7 ft (200.7 m) 500 psia: 1120 ft (341.3 m) *Vented* 5 psig: 11.5 ft (3.5 m) 15 psig: 35 ft (11 m) 30 psig: 69 ft (21 m) 100 psig: 231 ft (70 m) 300 psig: 692 ft (211 m) 500 psig: 1153 ft (351 m)	*Non-vented* 30 psia: 35.8 ft (10.9 m) 100 psia: 197.3 ft (60.1 m) 300 psia: 658.7 ft (200.7 m) 500 psia: 1120 ft (341.3 m) 1000 psia: 2306.4 ft (703 m) *Vented* 5 psig: 11.5 ft (3.5 m) 15 psig: 35 ft (11 m) 30 psig: 69 ft (21 m) 100 psig: 231 ft (70 m) 300 psig: 692 ft (211 m) 500 psig: 1153 ft (351 m)	0 to 16.5 psi; 0 to 1.14 bar
Burst pressure	Maximum 2x range; burst 3x range	Maximum 2x range; burst 3x range	Maximum 2x range; burst 3x range	Vaccum/over-pressure above 16.5 psi damages sensor
Accuracy @ 15° C	±0.1% full scale (FS)	±0.05% FS	±0.05% FS	±0.1% FS
Accuracy (FS)	±0.2% FS[3]	±0.1% FS[3]	±0.1% FS[3]	±0.2% FS[3]
Resolution	±0.01% FS or better	±0.005% FS or better	±0.005% FS or better	±0.005% FS or better
Units of measure	Pressure: psi, kPa, bar, mbar, mmHg, inHg, cmH_2O, inH_2O Level: in, ft, mm, cm, m	Pressure: psi, kPa, bar, mbar, mmHg, inHg, cmH_2O, inH_2O Level: in, ft, mm, cm, m	Pressure: psi, kPa, bar, mbar, mmHg, inHg, cmH_2O, inH_2O Level: in, ft, mm, cm, m	Pressure: psi, kPa, bar, mbar, mmHg, inHg, cmH_2O, inH_2O
Temperature Sensor	Silicon	Silicon	Silicon	Silicon
Range	Calibrated: 23-122° F (-5-50° C)	Calibrated: 23-122° F (-5-50° C)	Calibrated: 23-122° F (-5-50° C)	Calibrated: 23-122° F (-5-50° C)
Accuracy & resolution	±0.1° C; 0.01° C or better	±0.1° C; 0.01° C or better	±0.1° C; 0.01° C or better	±0.1° C; 0.01° C or better
Units of measure	Fahrenheit, Celsius	Fahrenheit, Celsius	Fahrenheit, Celsius	Fahrenheit, Celsius
Warranty	Level TROLL and BaroTROLL instruments come with a 1-year warranty. Up to 5-year extended warranties are available.			

BaroTROLL® Instrument

The titanium BaroTROLL instrument measures and logs barometric pressure and temperature. Use the BaroTROLL in conjunction with Level TROLL instruments.

Win-Situ Baro Merge™ software simplifies post-correction of water level data. Barometric readings are automatically subtracted from data collected by a Level TROLL to compensate for changes in water level due to barometric fluctuations.

24/7 Support

In-Situ technical experts assist with instrument setup, application support, and troubleshooting. Fast, friendly, and always free, technical answers are a phone call away.

[1] Battery life guaranteed when used within the factory-calibrated temperature range.
[2] 1 record = date/time plus 2 parameters logged (no wrapping) from device within the factory-calibrated temperature range.
[3] Across factory-calibrated temperature range.

Specifications are subject to change without notice. Delrin is a registered trademark of E.I. du Pont de Nemours and Company.

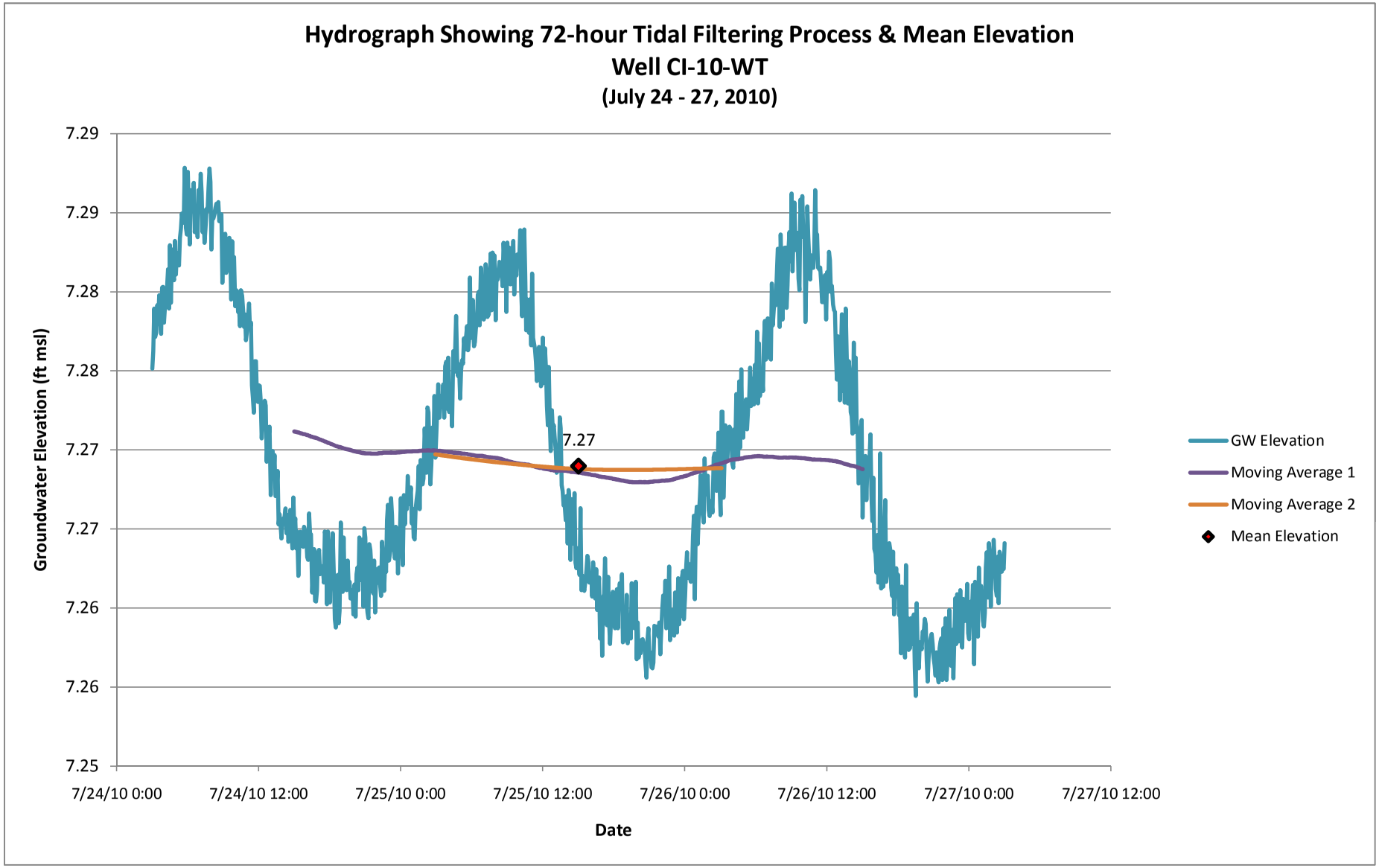
In-Situ Inc.

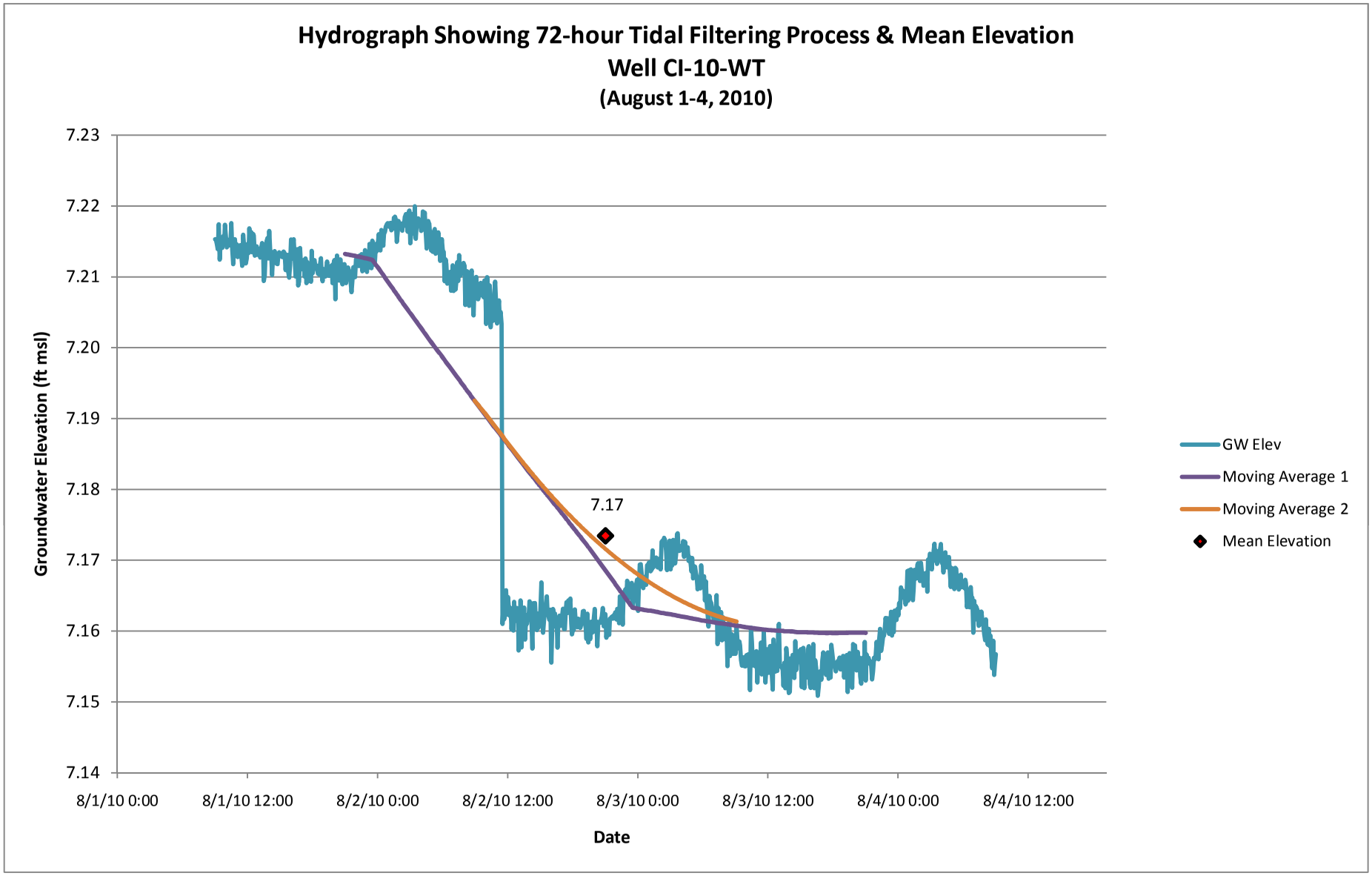
Call to purchase or rent — www.in-situ.com
221 East Lincoln Avenue, Fort Collins, CO 80524
1-800-446-7488 (toll-free in US & Canada)
1-970-498-1500 (international & domestic)

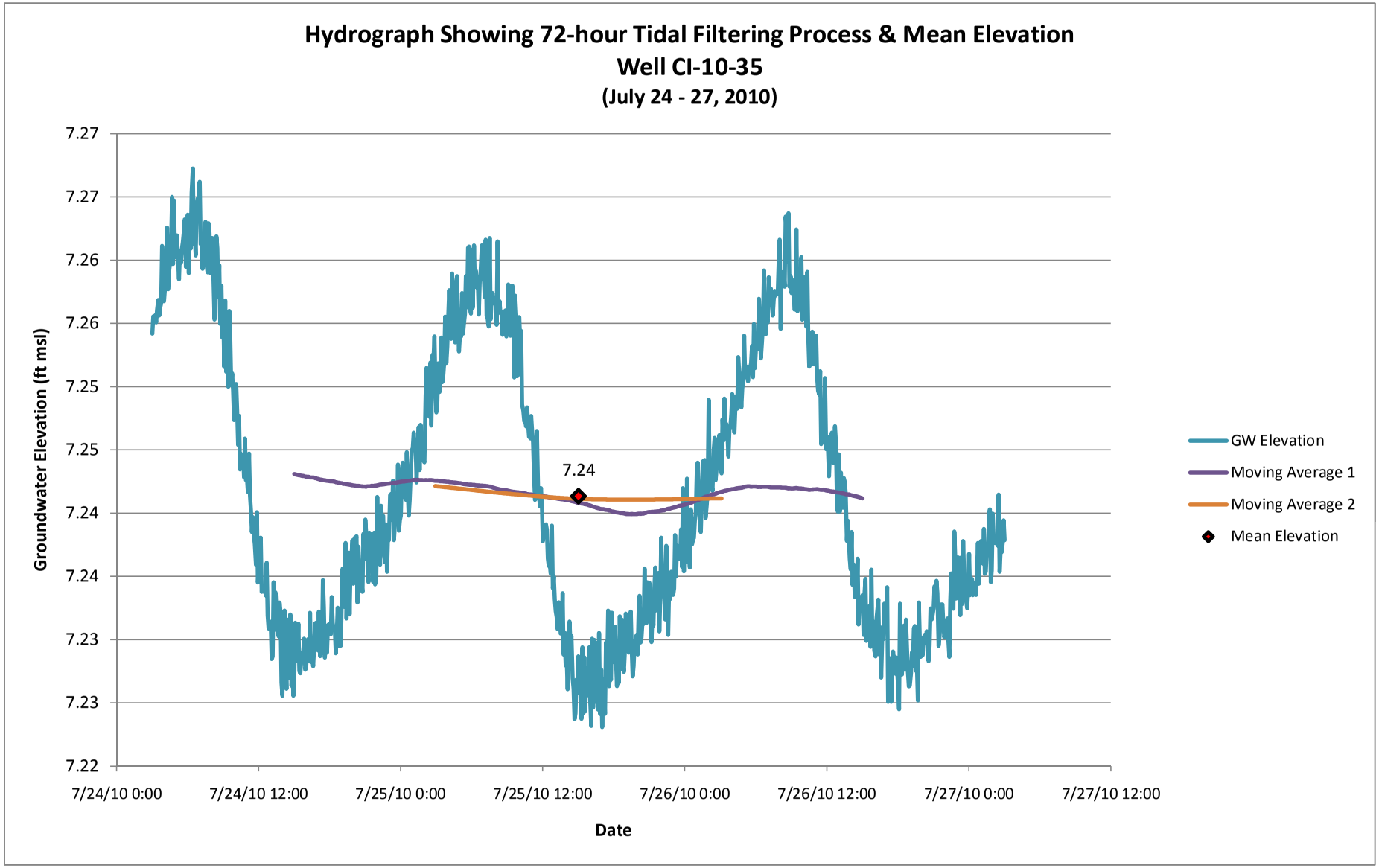
ATTACHMENT B
GRAPHS SHOWING GROUNDWATER ELEVATION FLUCTUATIONS AND TIDAL FILTERING PROCESS

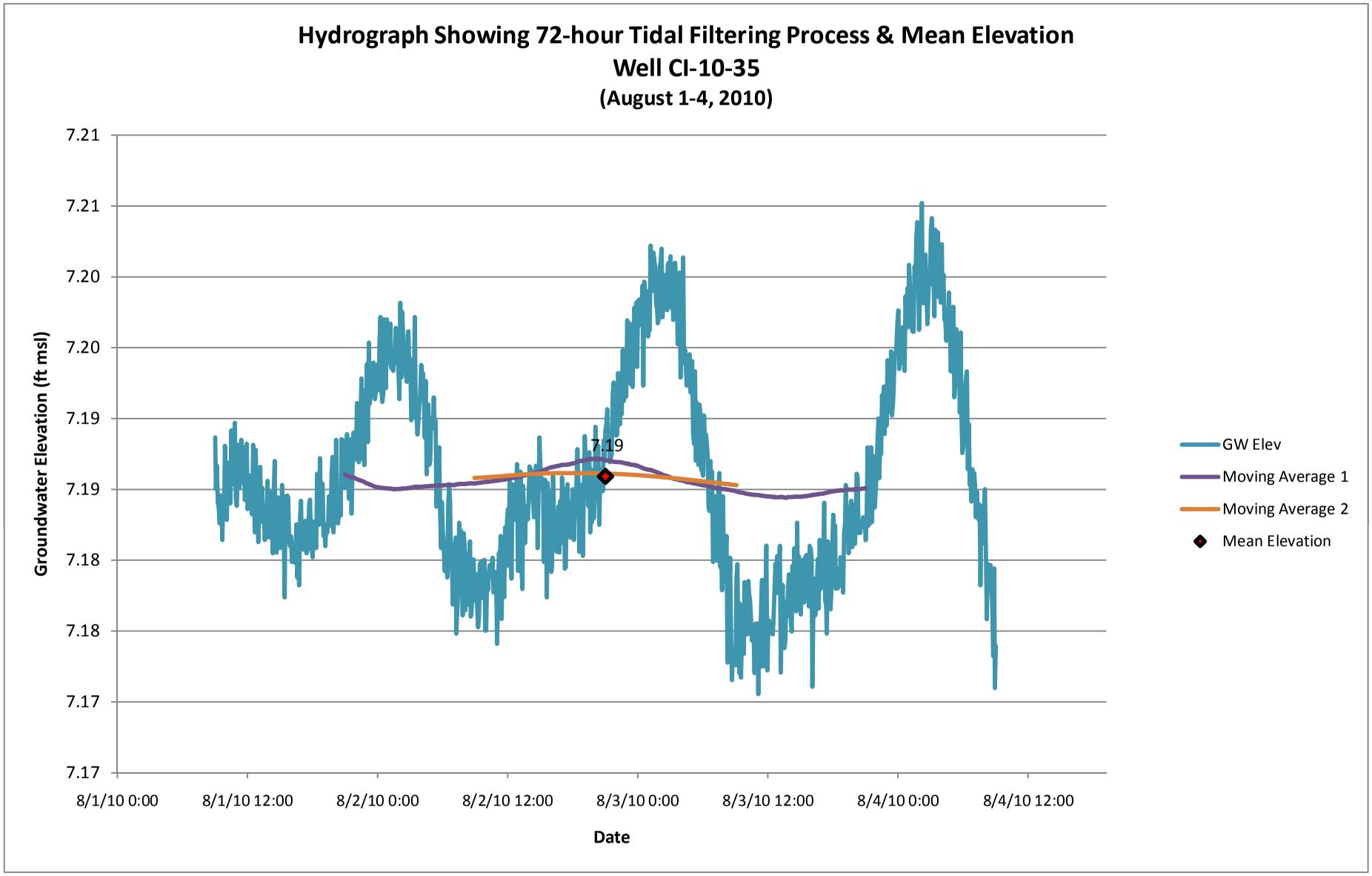
TIDAL STUDY AND
AQUIFER CHARACTERIZATION RESULTS
Capital Industries
5801 Third Avenue South
Seattle, Washington

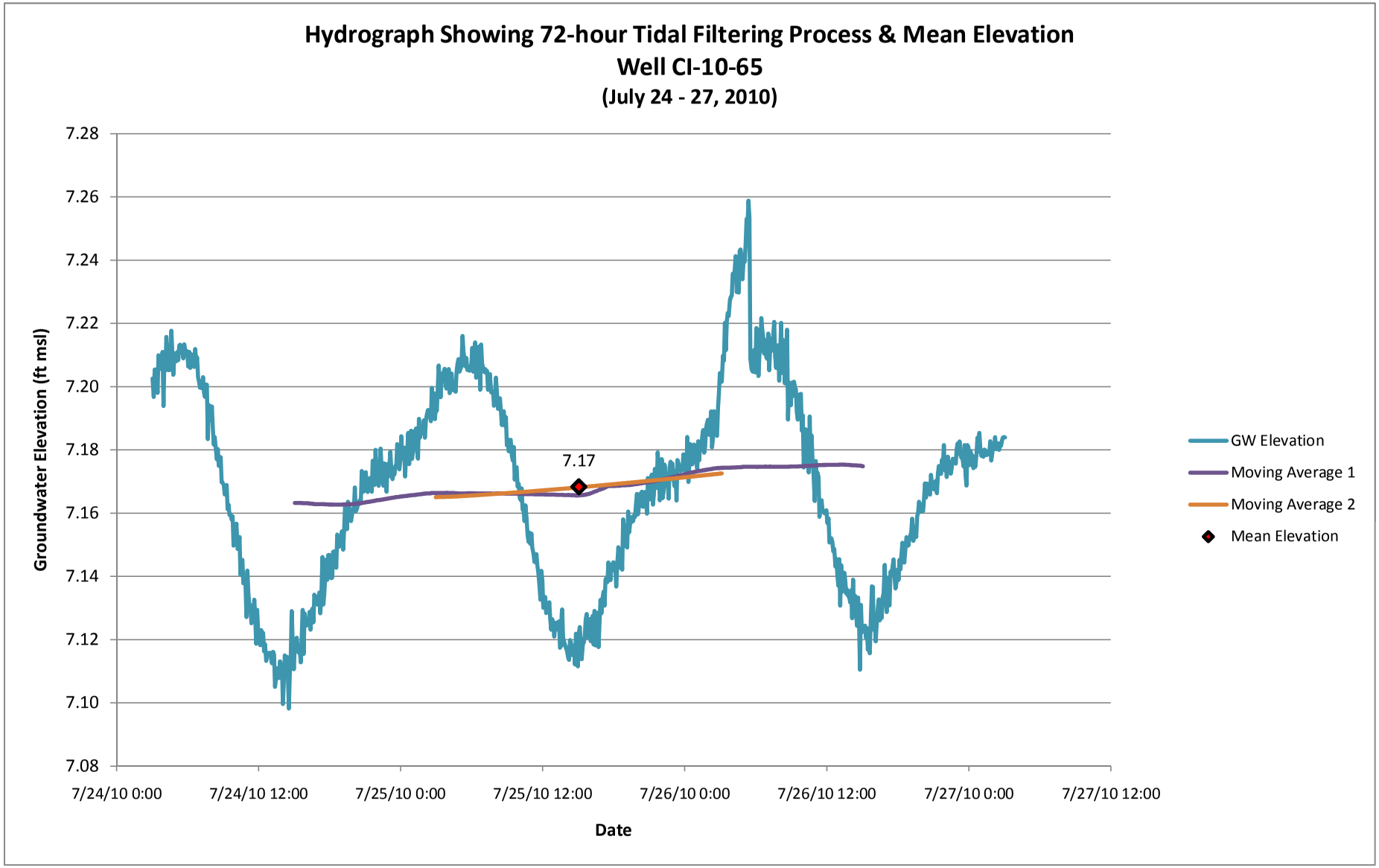
Farallon PN: 457-004

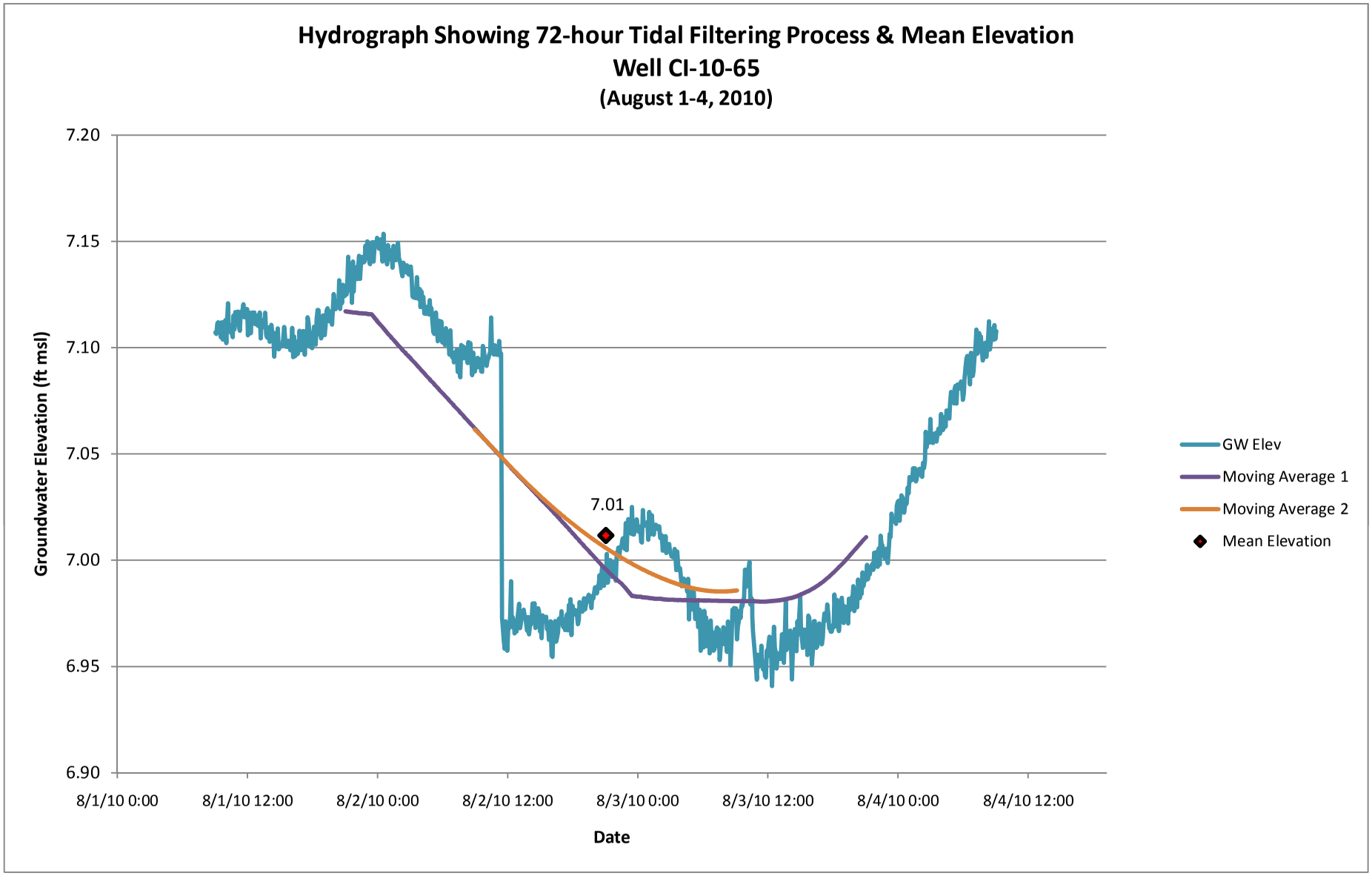

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-WT
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
7.29
7.29
7.28
7.28
7.27
7.27
7.26
7.26
7.25
7.27
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

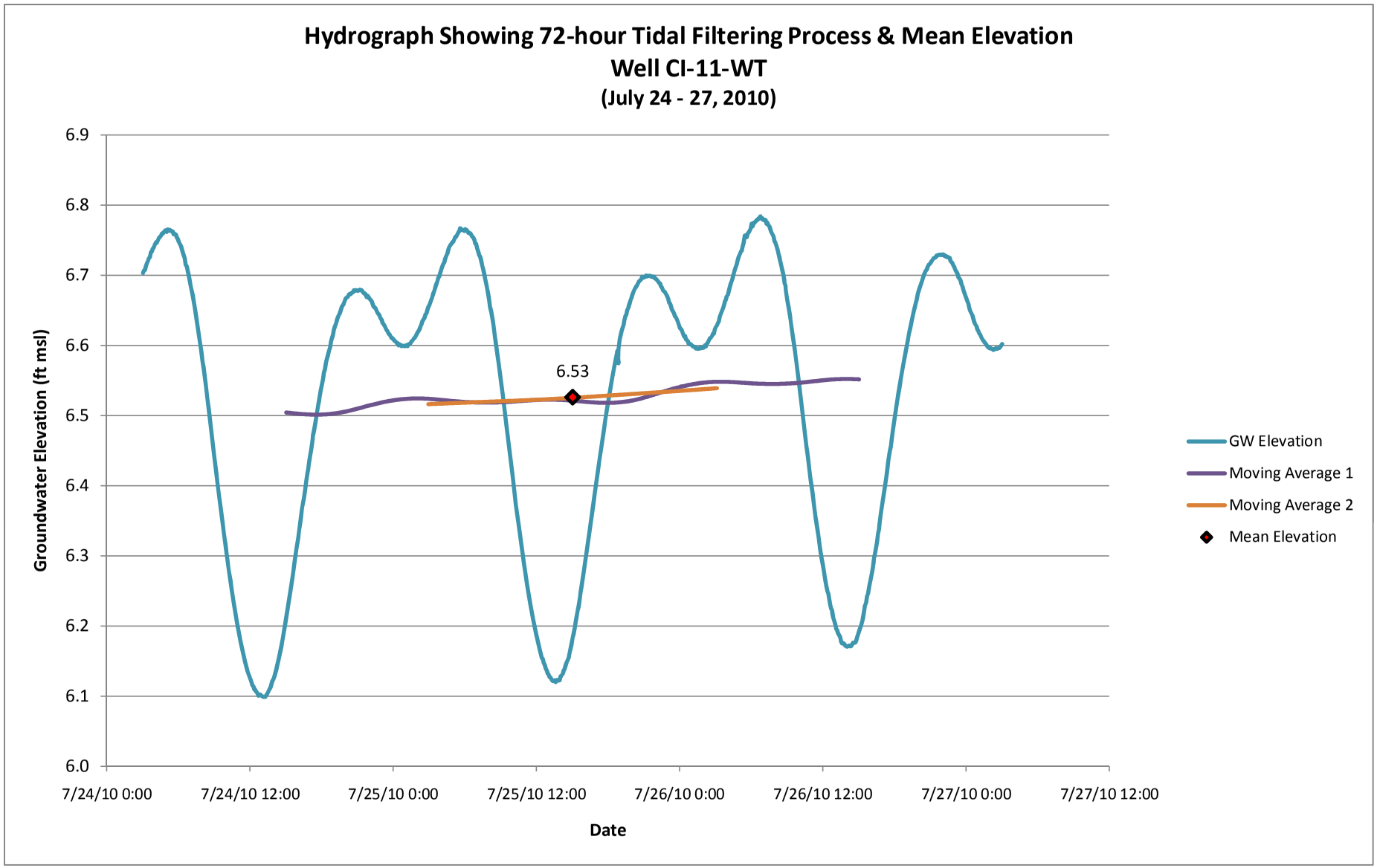

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-WT
(August 1-4, 2010)
Groundwater Elevation (ft msl)
7.23
7.22
7.21
7.20
7.19
7.18
7.17
7.16
7.15
7.14
7.17
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-35
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
7.27
7.27
7.26
7.26
7.25
7.25
7.24
7.24
7.23
7.23
7.22
7.24
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-35
(August 1-4, 2010)
Groundwater Elevation (ft msl)
7.21
7.21
7.20
7.20
7.19
7.19
7.18
7.18
7.17
7.17
7.19
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-65
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
7.28
7.26
7.24
7.22
7.20
7.18
7.16
7.14
7.12
7.10
7.08
7.17
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-65
(August 1-4, 2010)
Groundwater Elevation (ft msl)
7.20
7.15
7.10
7.05
7.00
6.95
6.90
7.01
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-WT
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6.0
6.53
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
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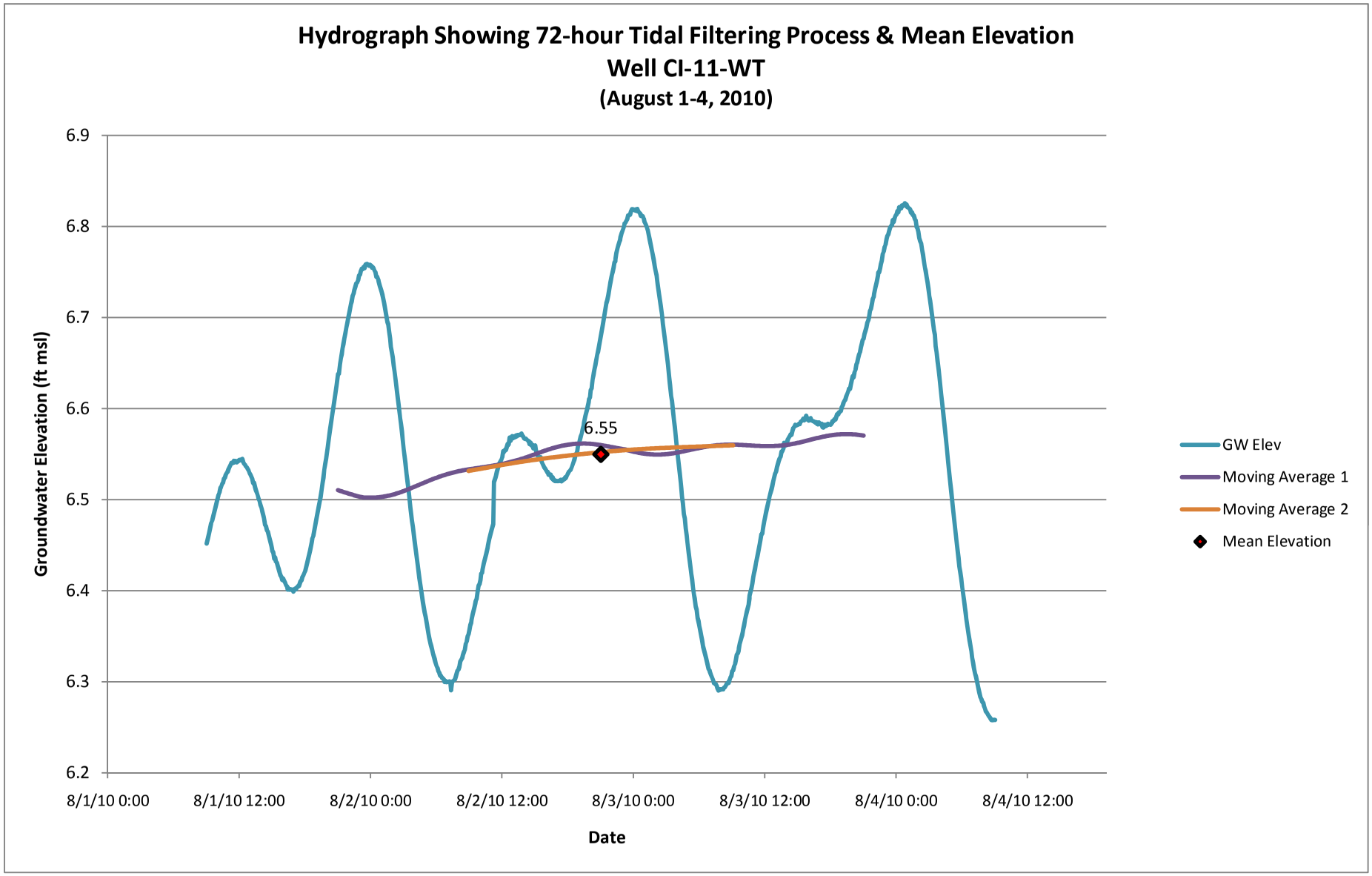
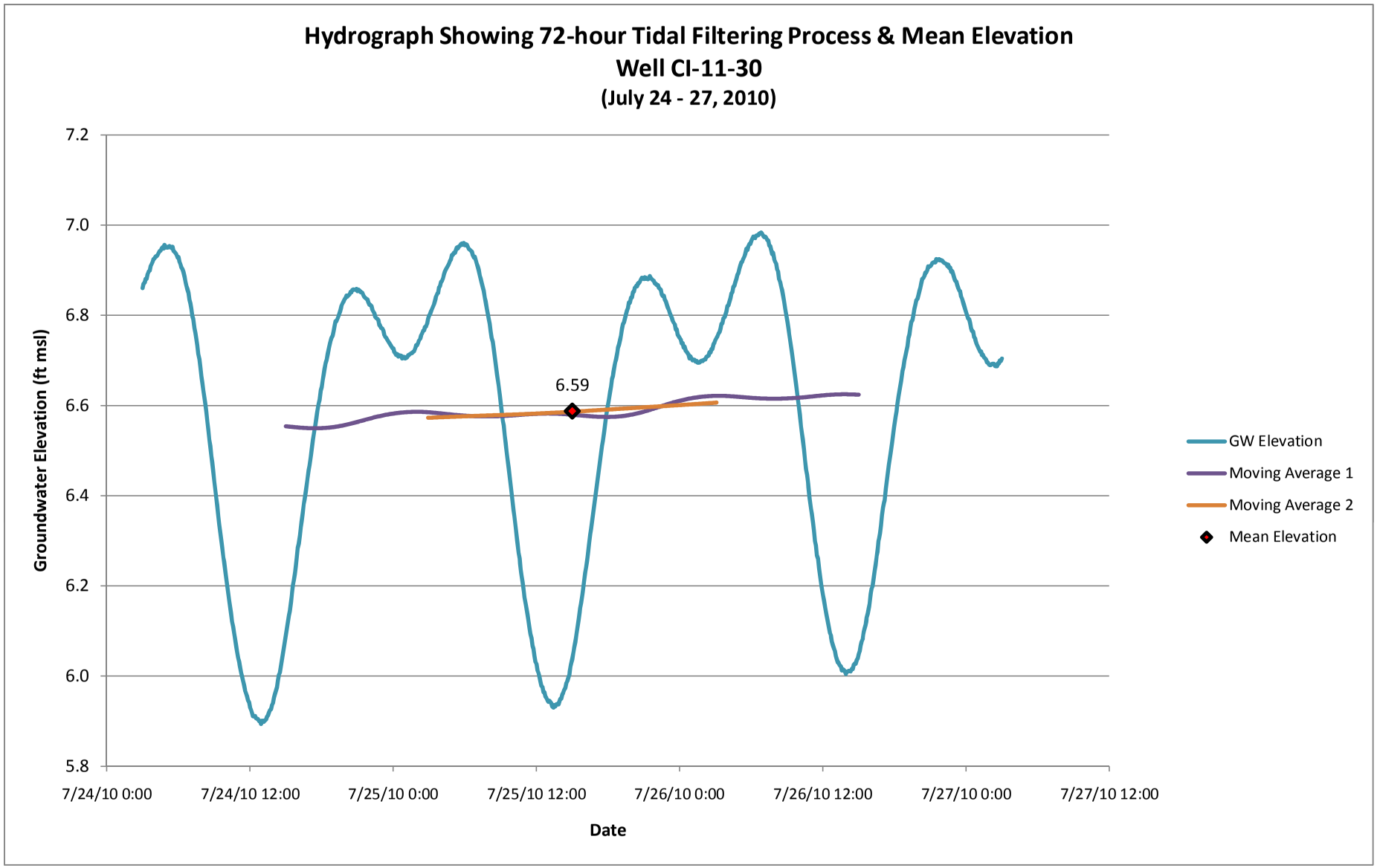
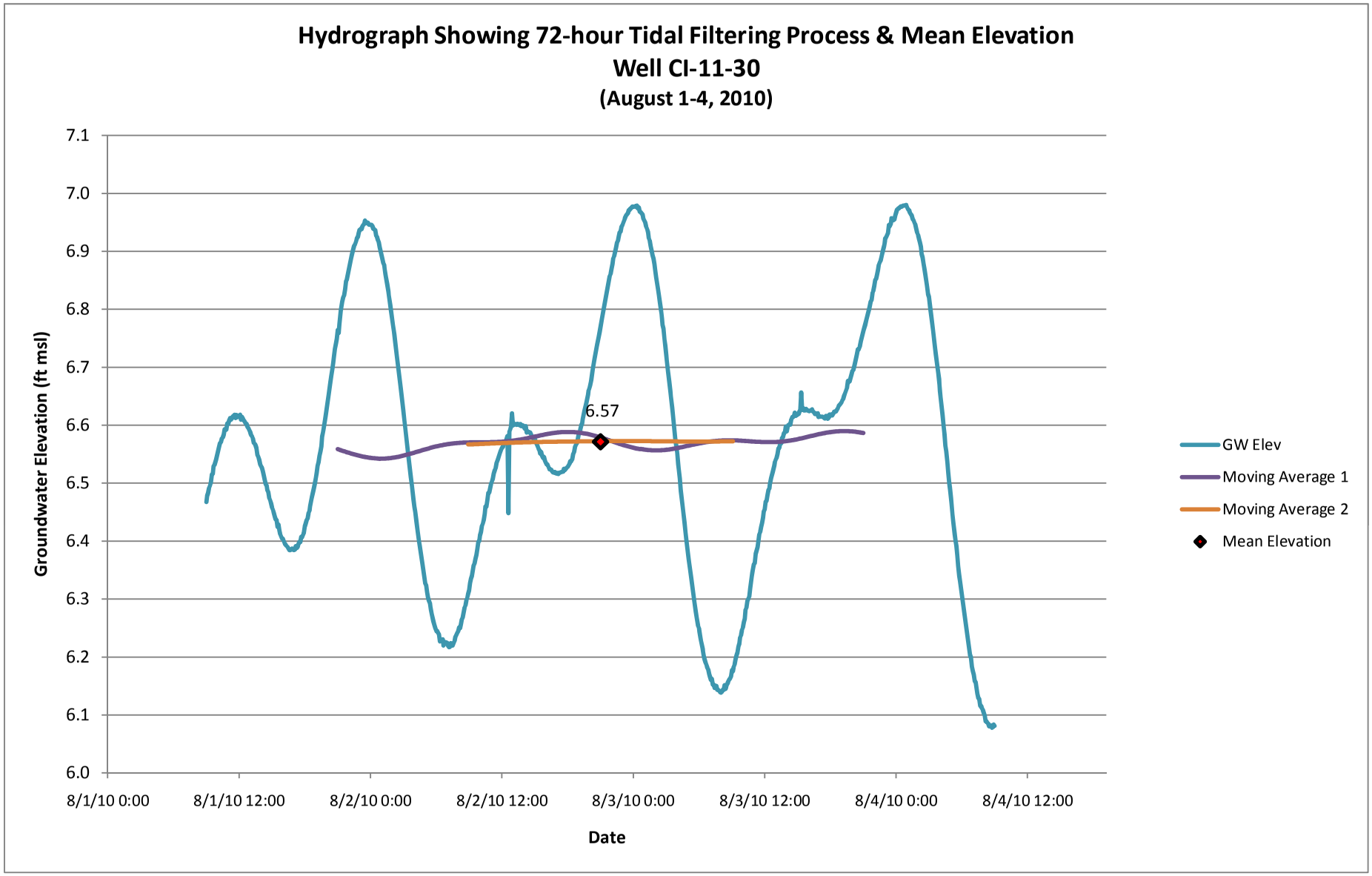
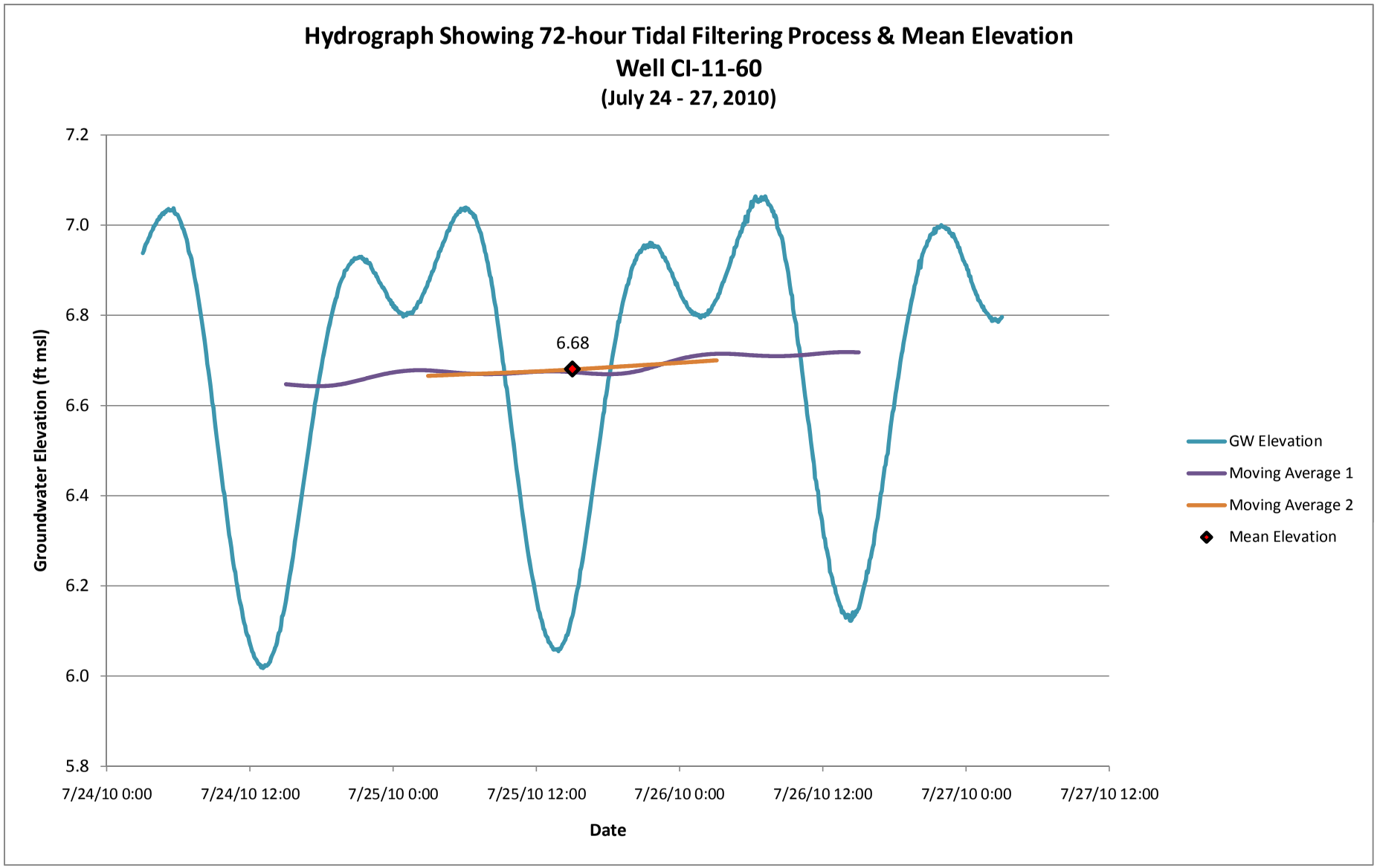
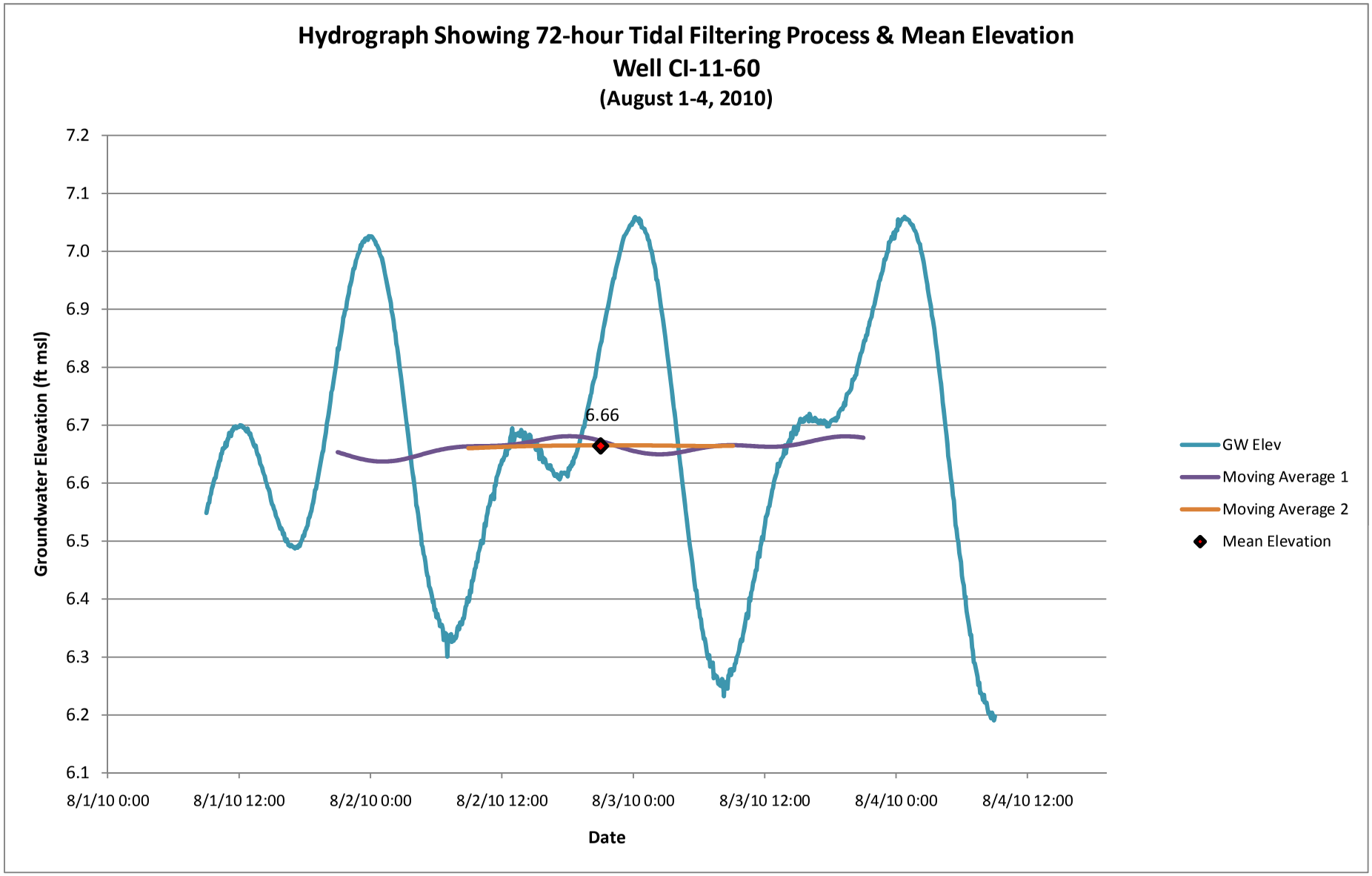
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

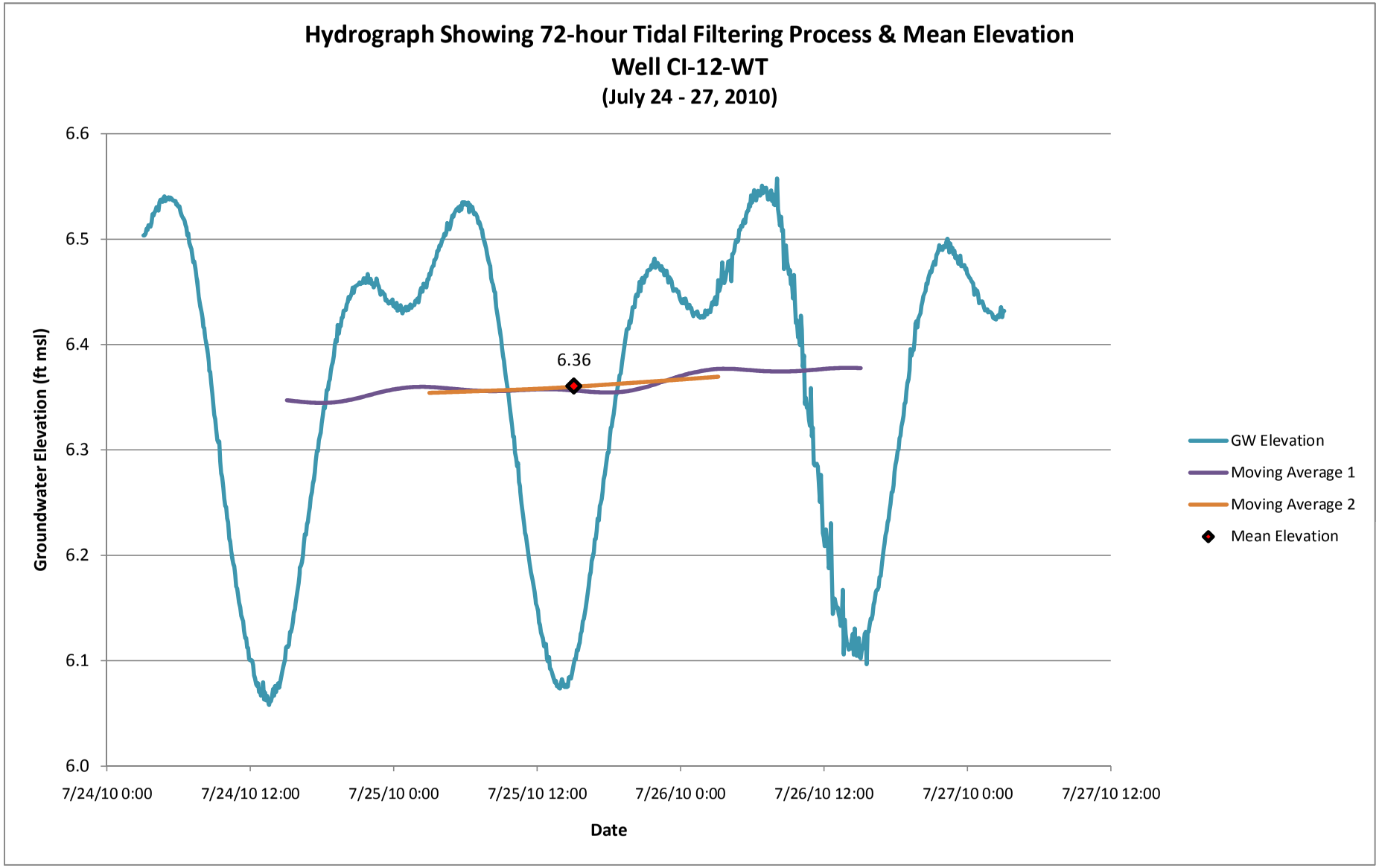

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-WT
(August 1-4, 2010)
Groundwater Elevation (ft msl)
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.2
6.55
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation

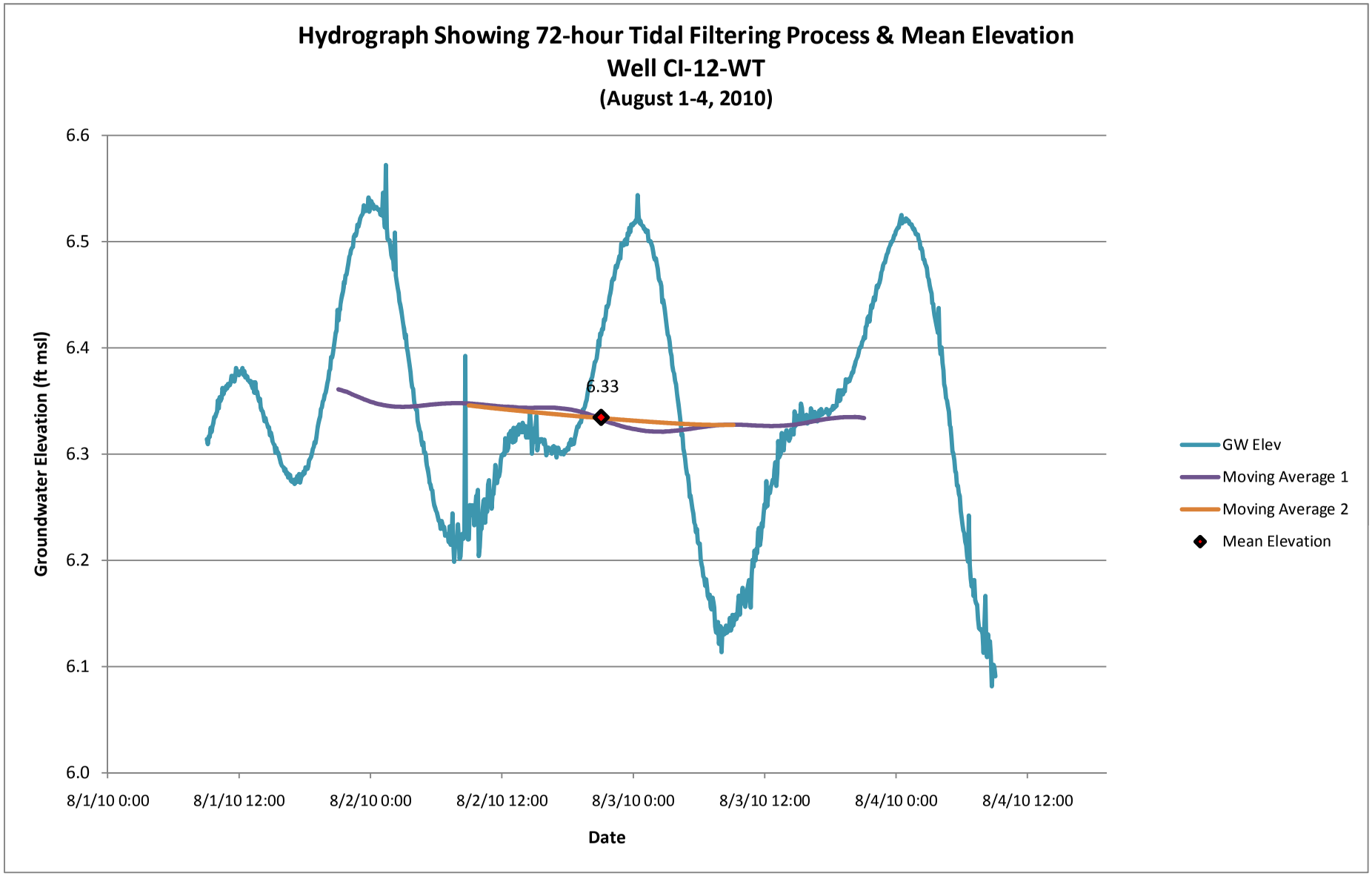

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-30
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
7.2
7.0
6.8
6.6
6.4
6.2
6.0
5.8
6.59
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

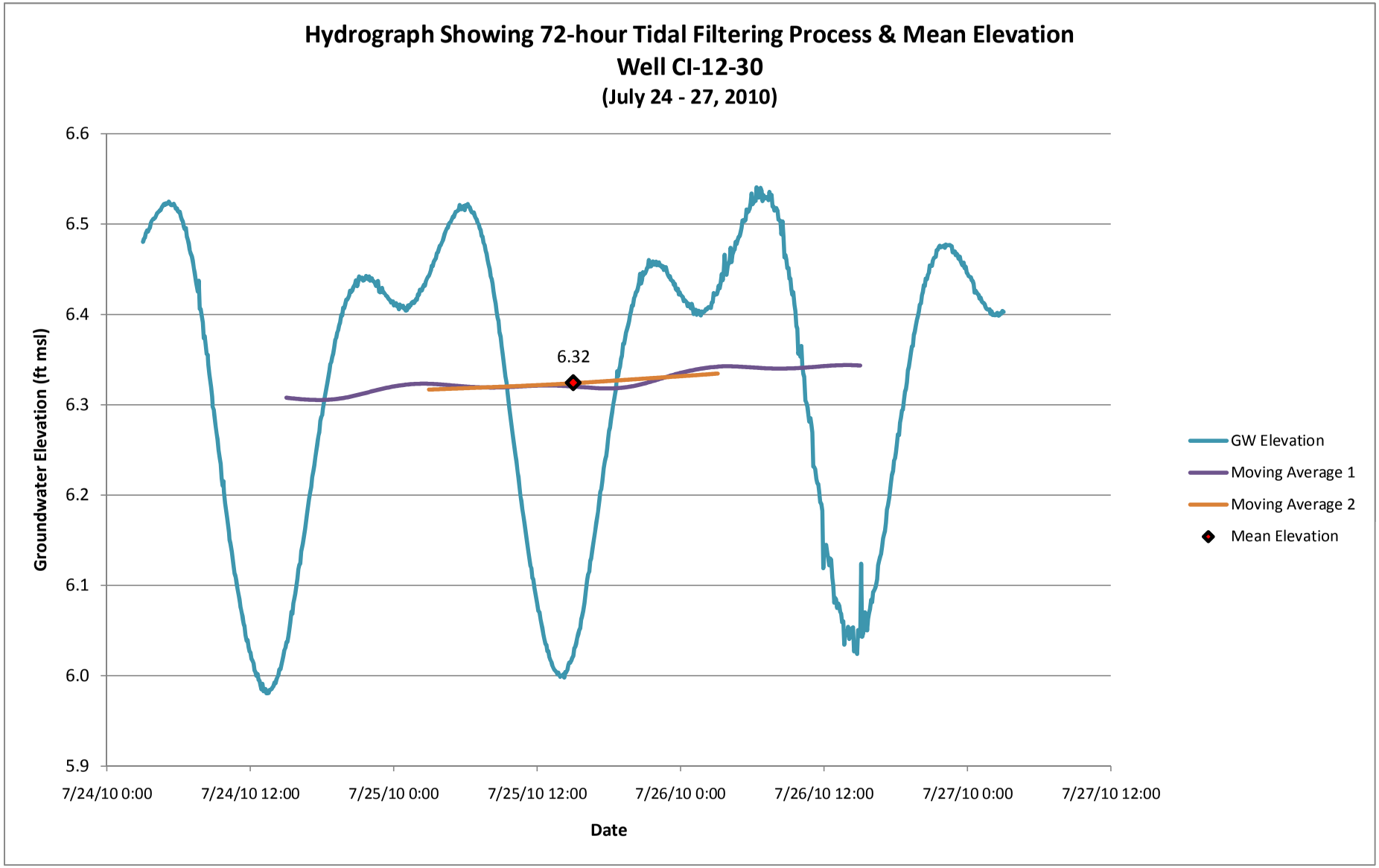

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-30
(August 1-4, 2010)
Groundwater Elevation (ft msl)
7.1
7.0
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6.0
6.57
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation

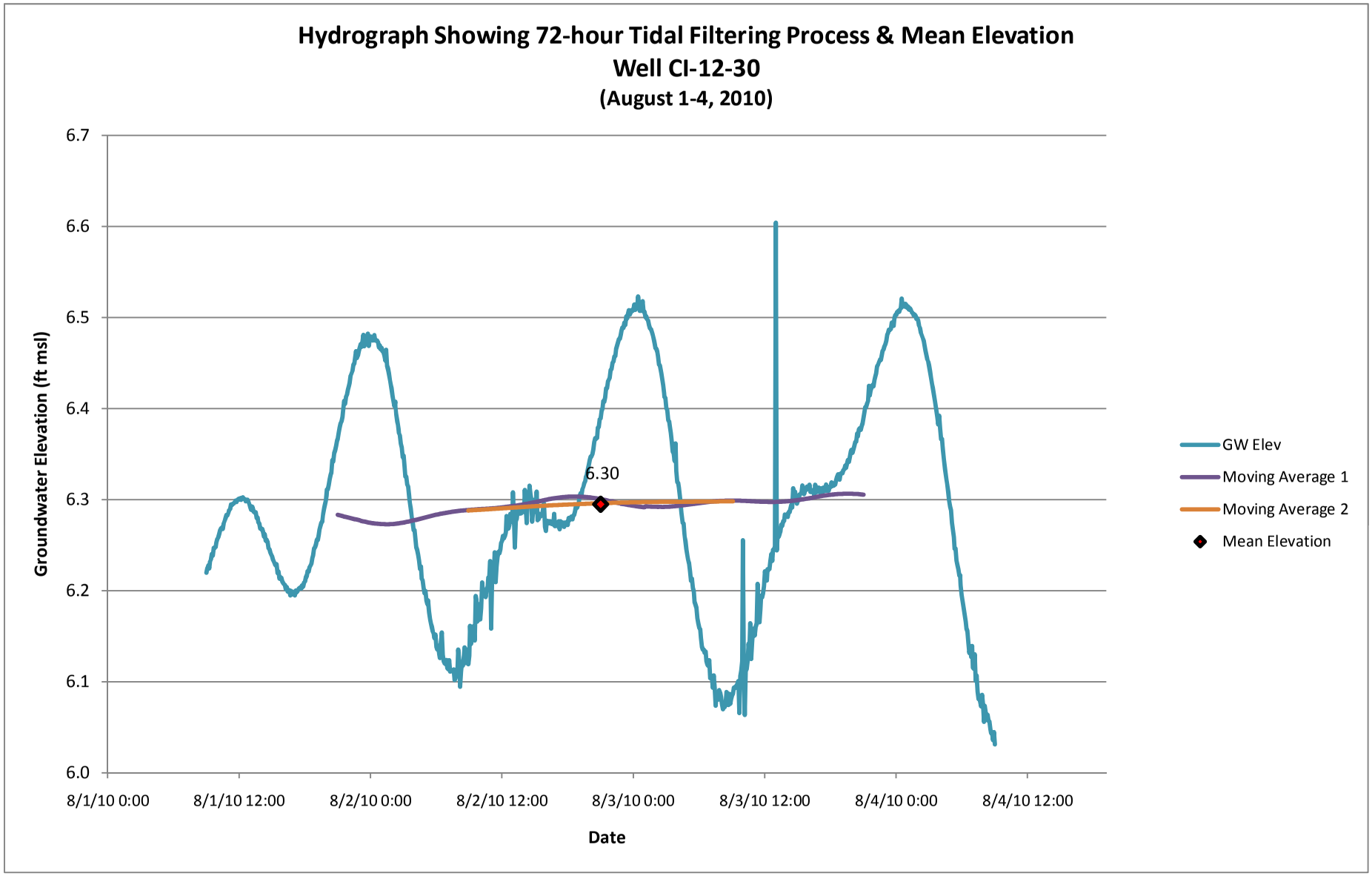

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-60
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
7.2
7.0
6.8
6.6
6.4
6.2
6.0
5.8
6.68
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

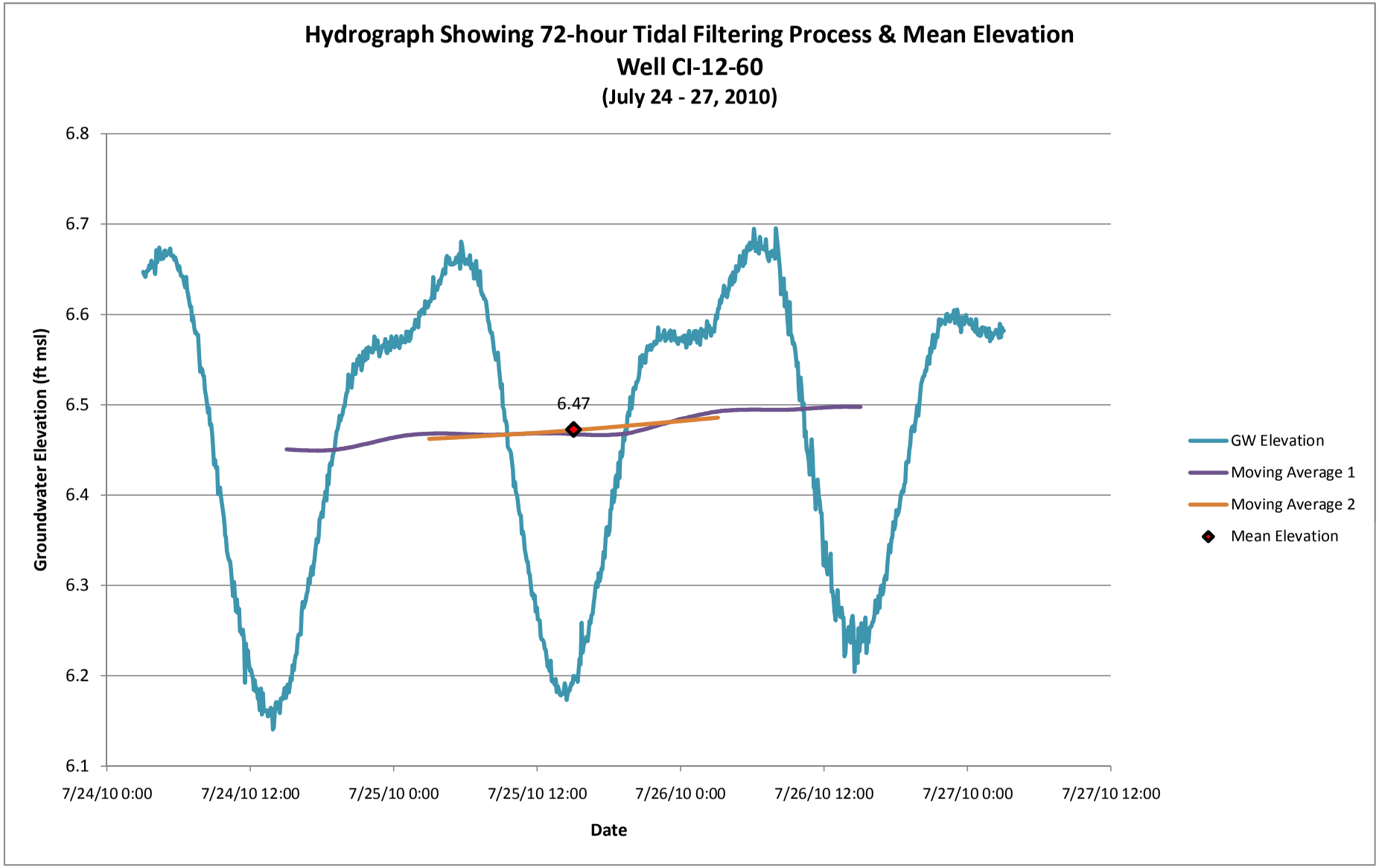

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-60
(August 1-4, 2010)
Groundwater Elevation (ft msl)
7.2
7.1
7.0
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6.66
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation

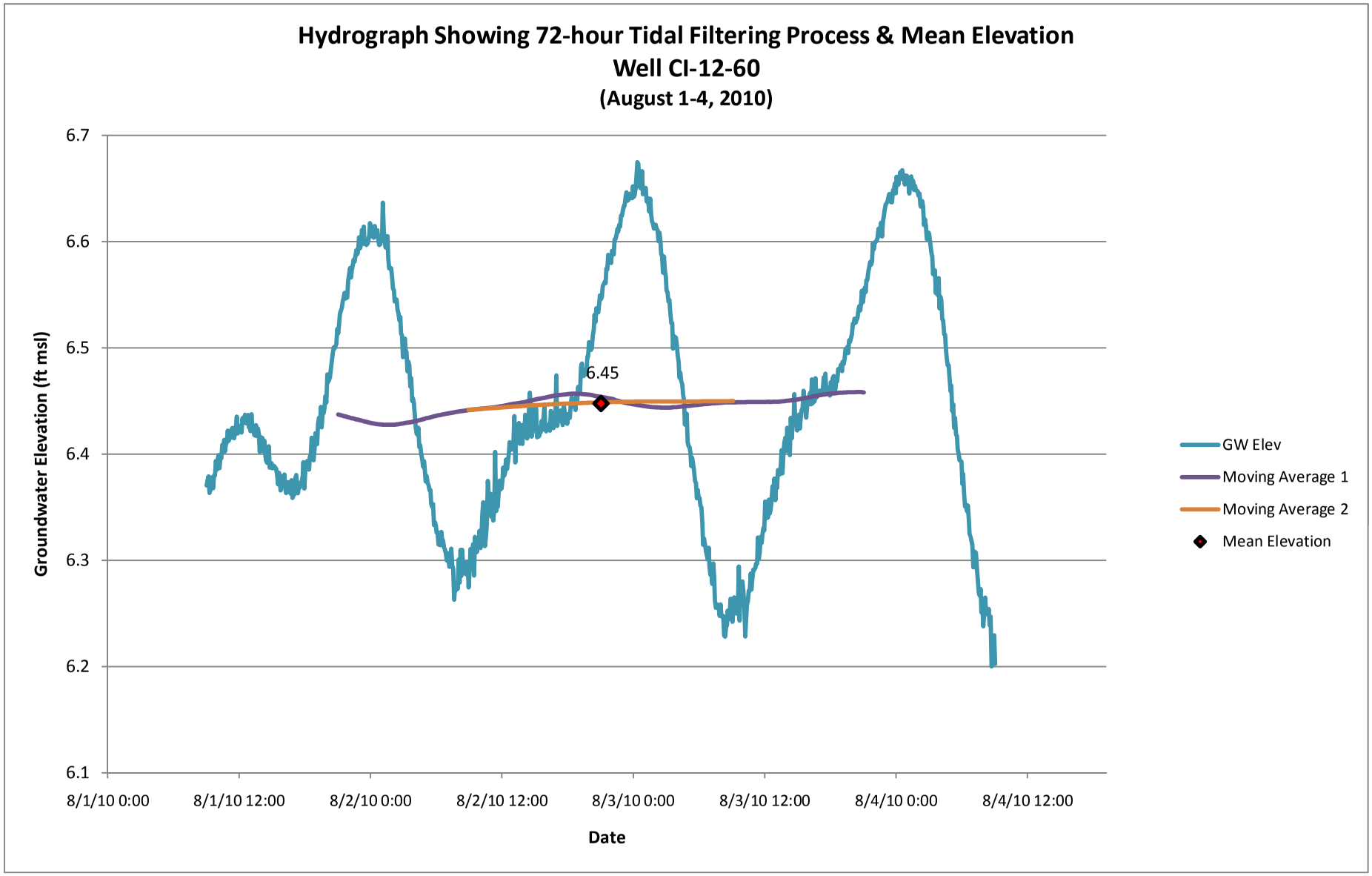

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-12-WT
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
6.6
6.5
6.4
6.3
6.2
6.1
6.0
6.36
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

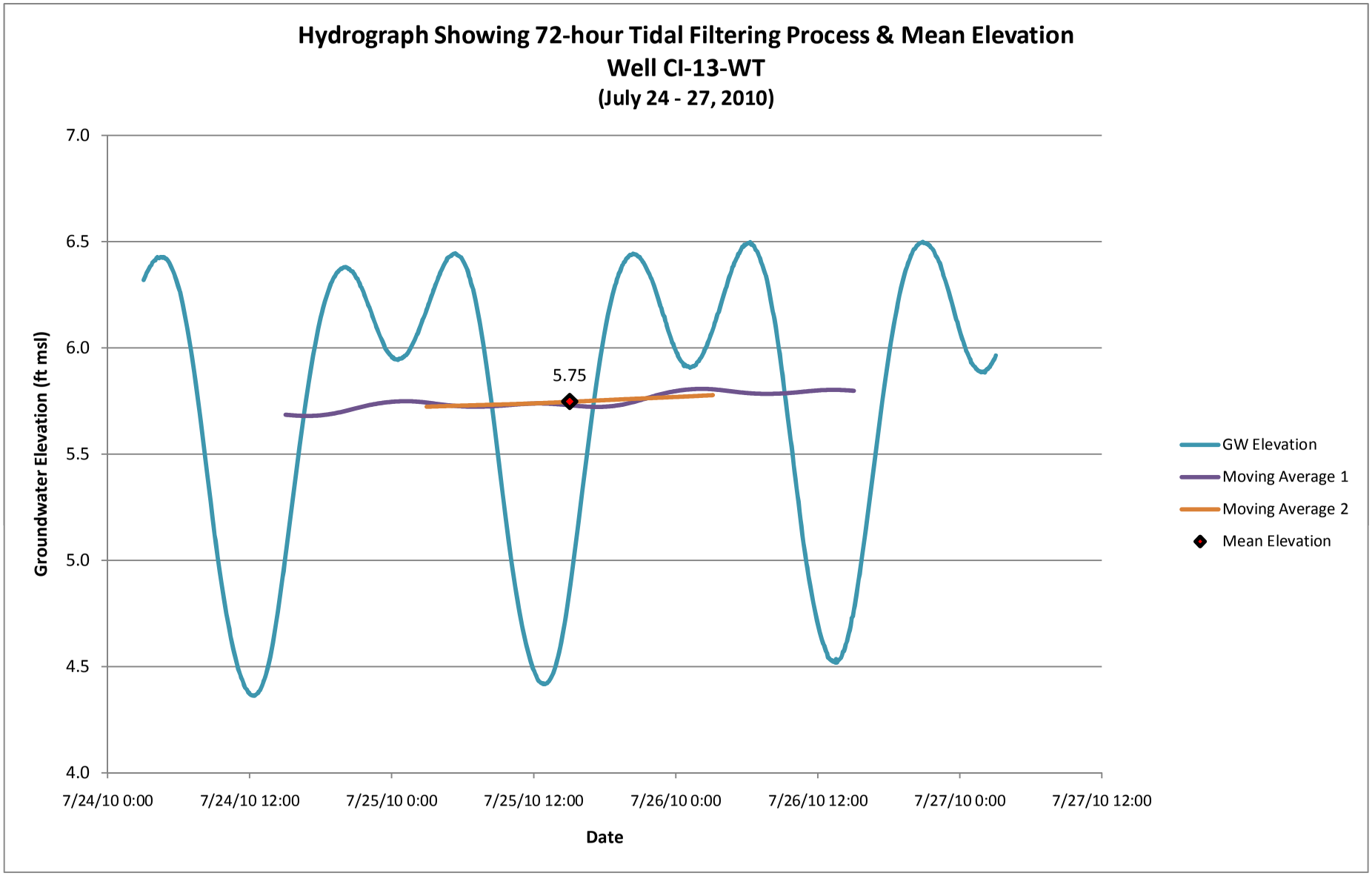

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-12-WT
(August 1-4, 2010)
Groundwater Elevation (ft msl)
6.6
6.5
6.4
6.3
6.2
6.1
6.0
6.33
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation

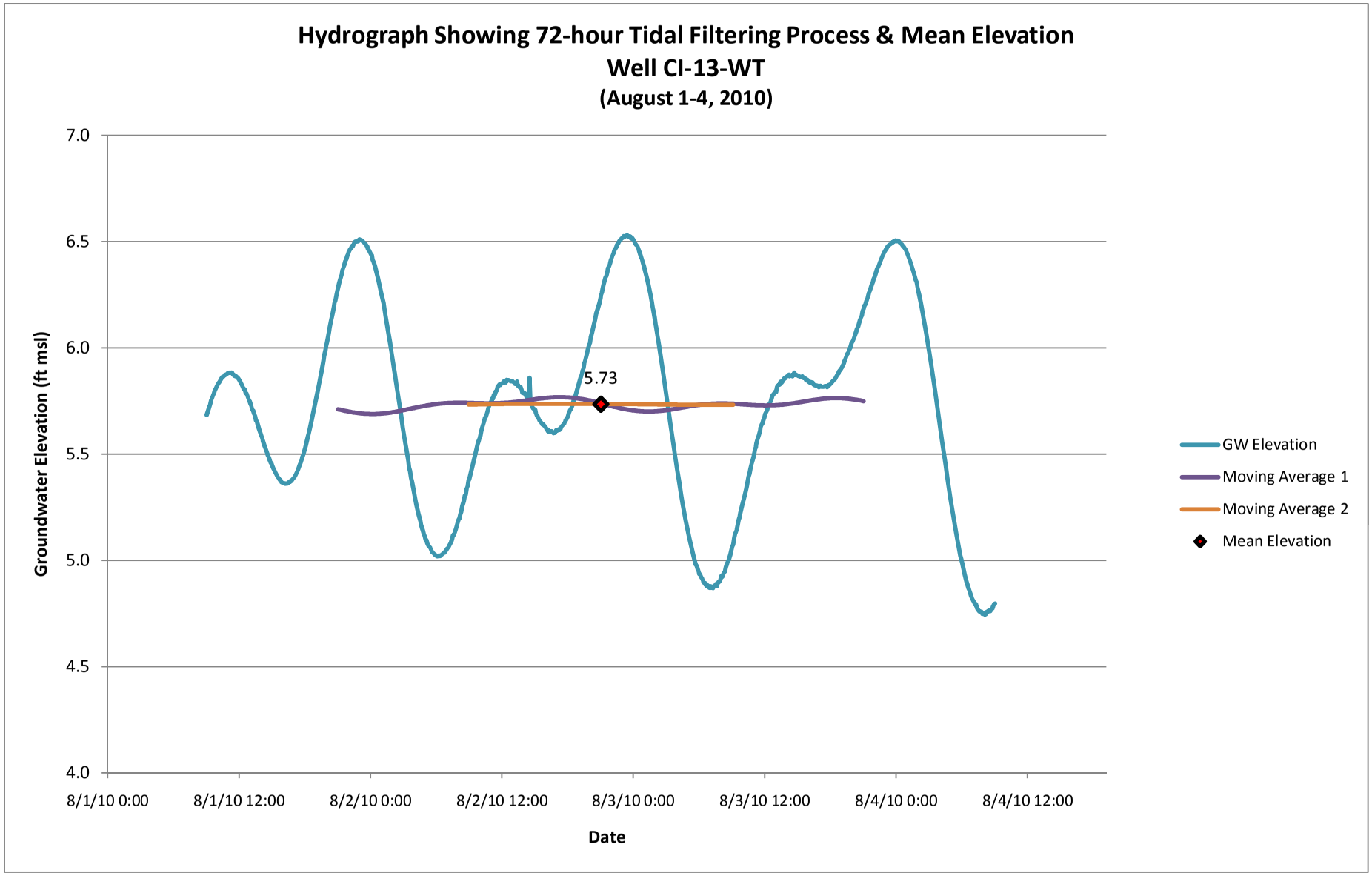

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-12-30
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
6.6
6.5
6.4
6.3
6.2
6.1
6.0
5.9
6.32
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

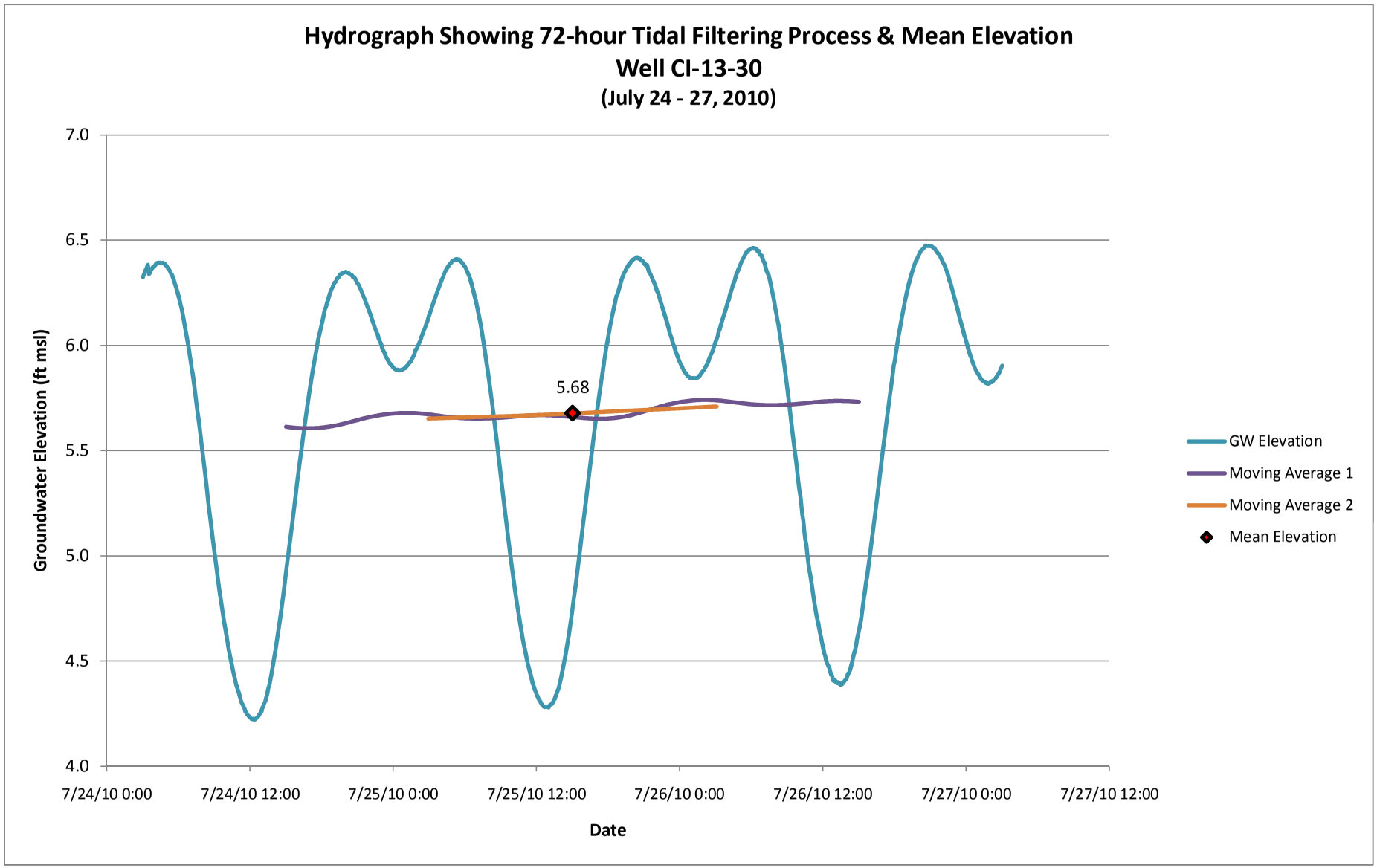

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-12-30
(August 1-4, 2010)
Groundwater Elevation (ft msl)
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6.0
6.30
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation

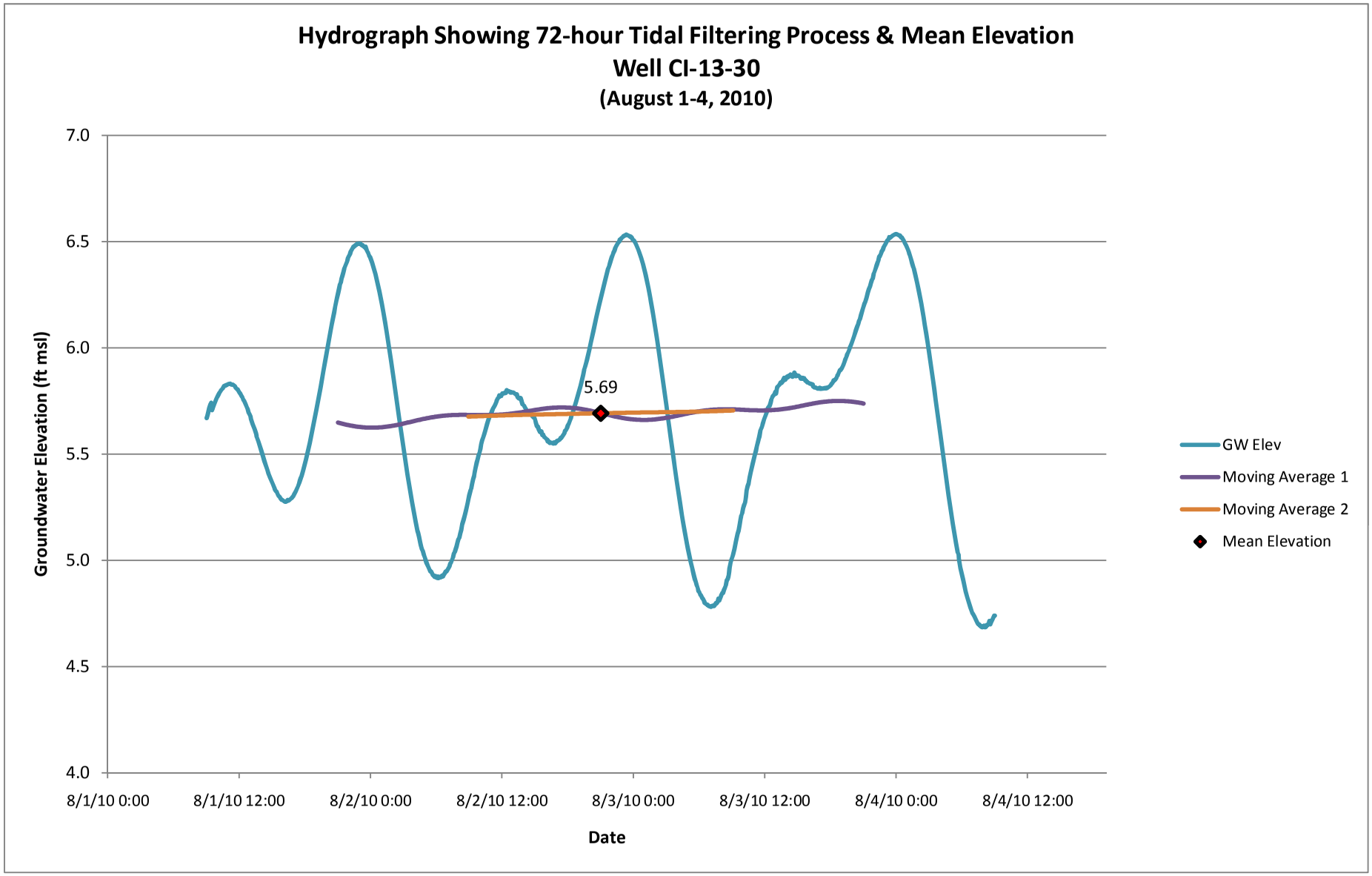

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-12-60
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
6.8
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6.47
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

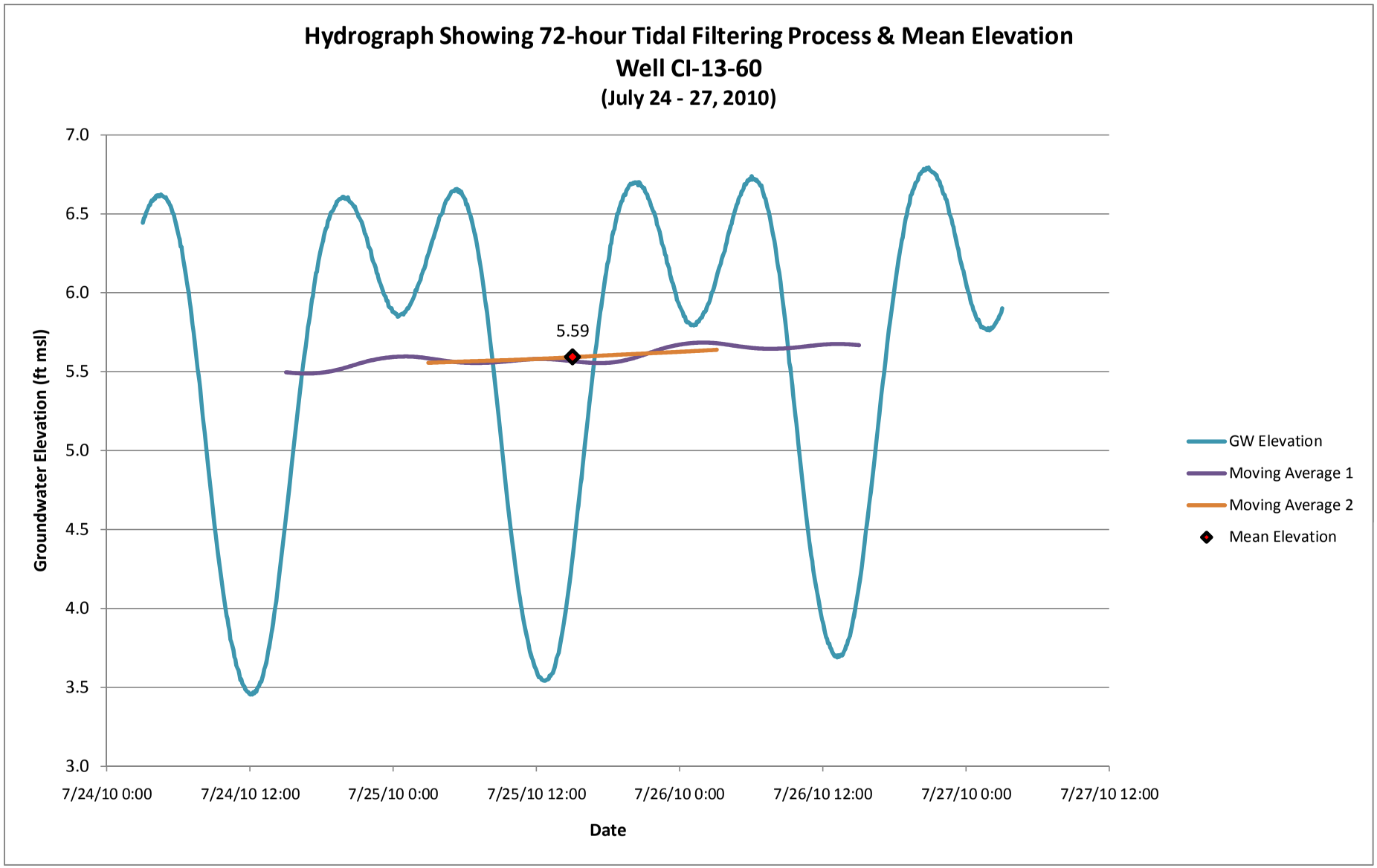

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-12-60
(August 1-4, 2010)
Groundwater Elevation (ft msl)
6.7
6.6
6.5
6.4
6.3
6.2
6.1
6.45
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation

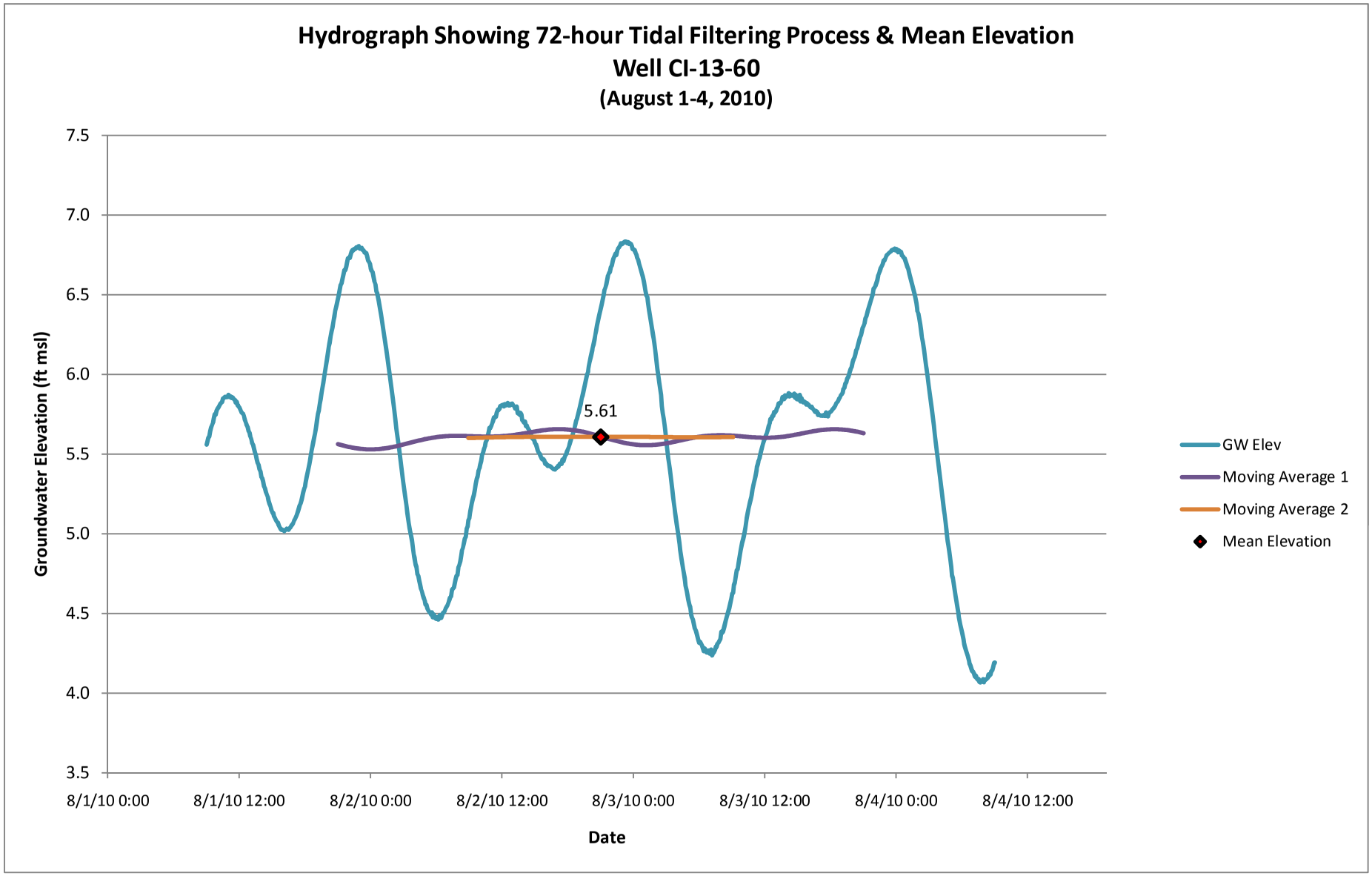

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-WT
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
7.0
6.5
6.0
5.5
5.0
4.5
4.0
5.75
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

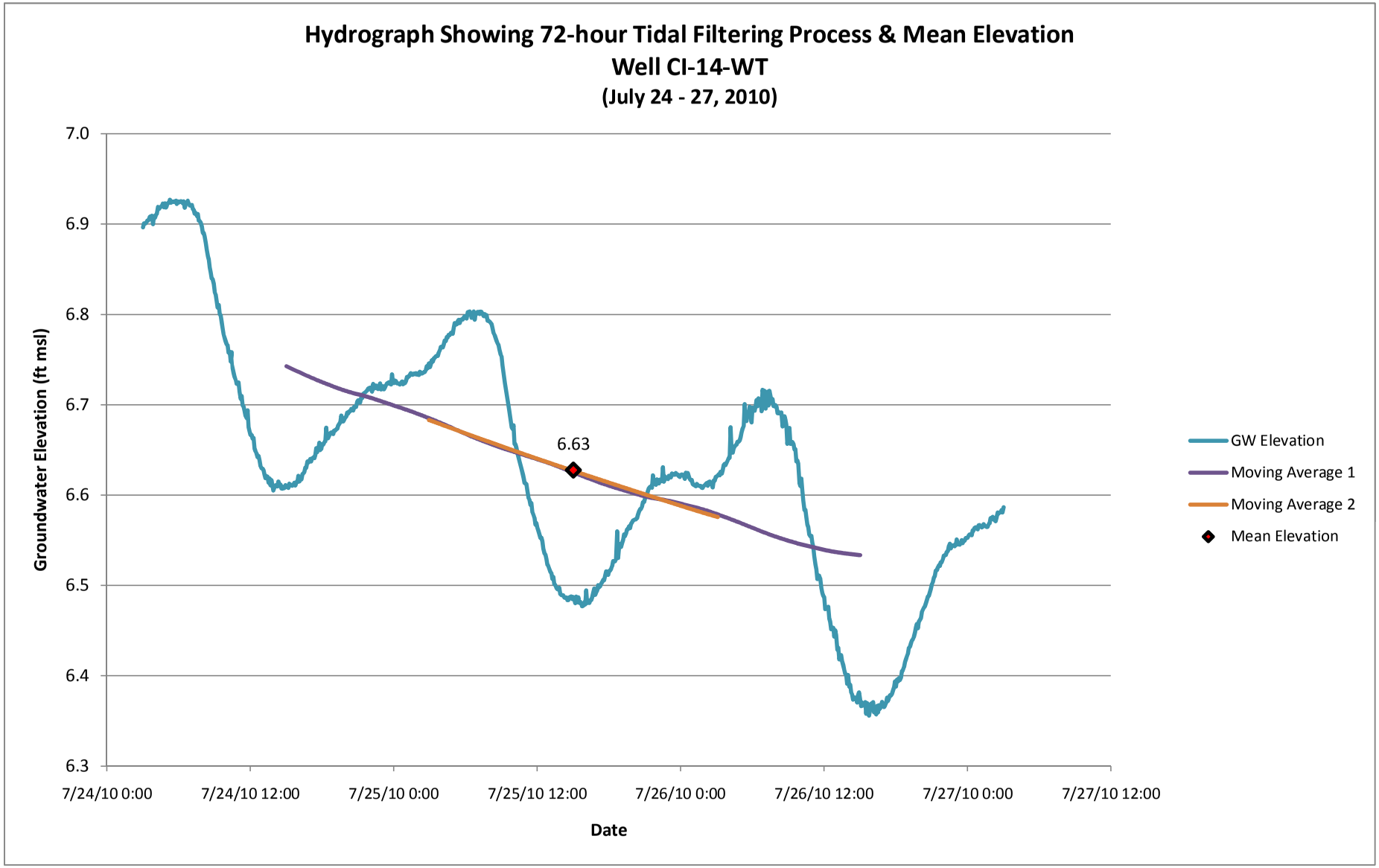

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-WT
(August 1-4, 2010)
Groundwater Elevation (ft msl)
7.0
6.5
6.0
5.5
5.0
4.5
4.0
5.73
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

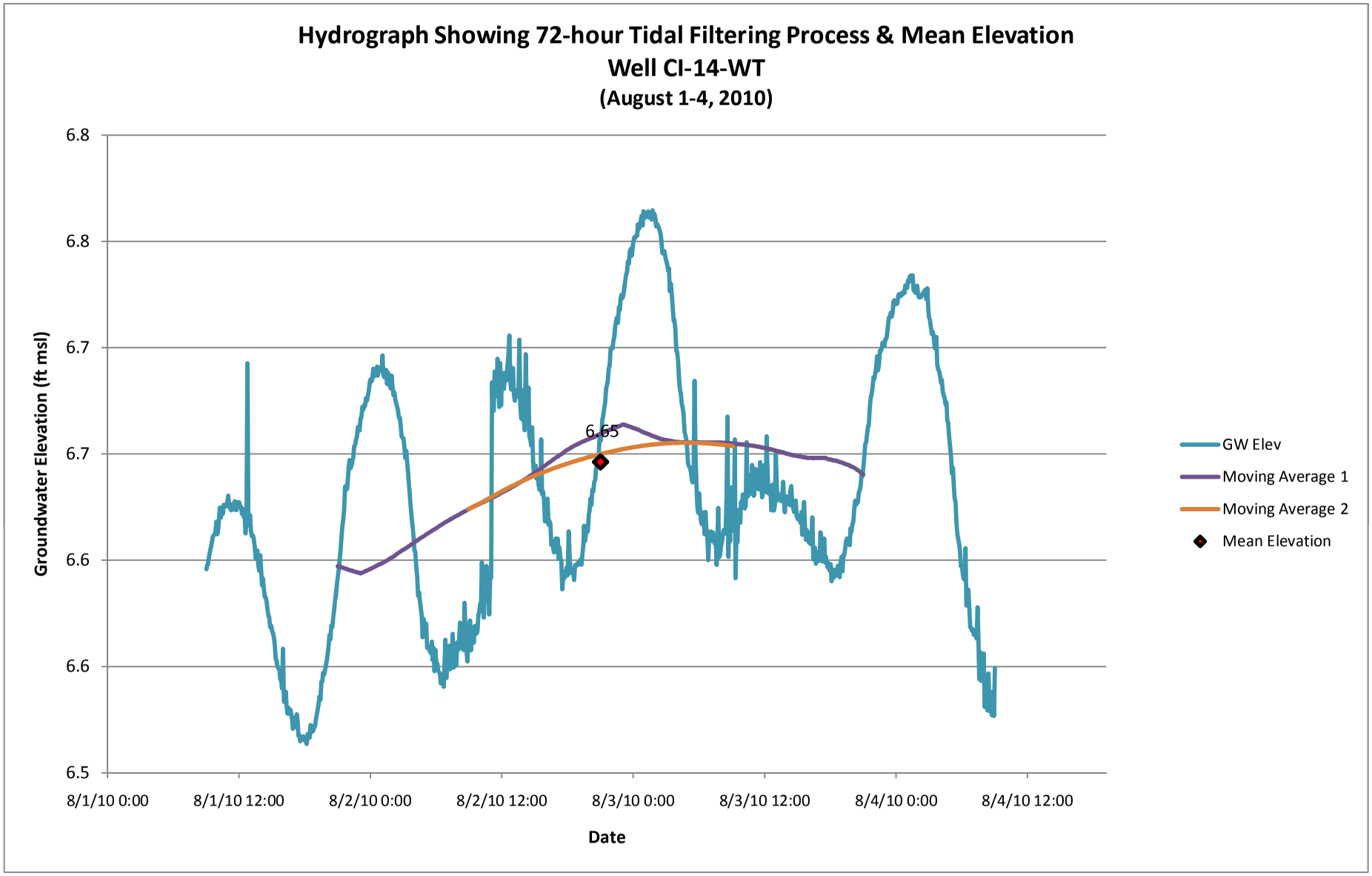

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-30
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
7.0
6.5
6.0
5.5
5.0
4.5
4.0
5.68
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

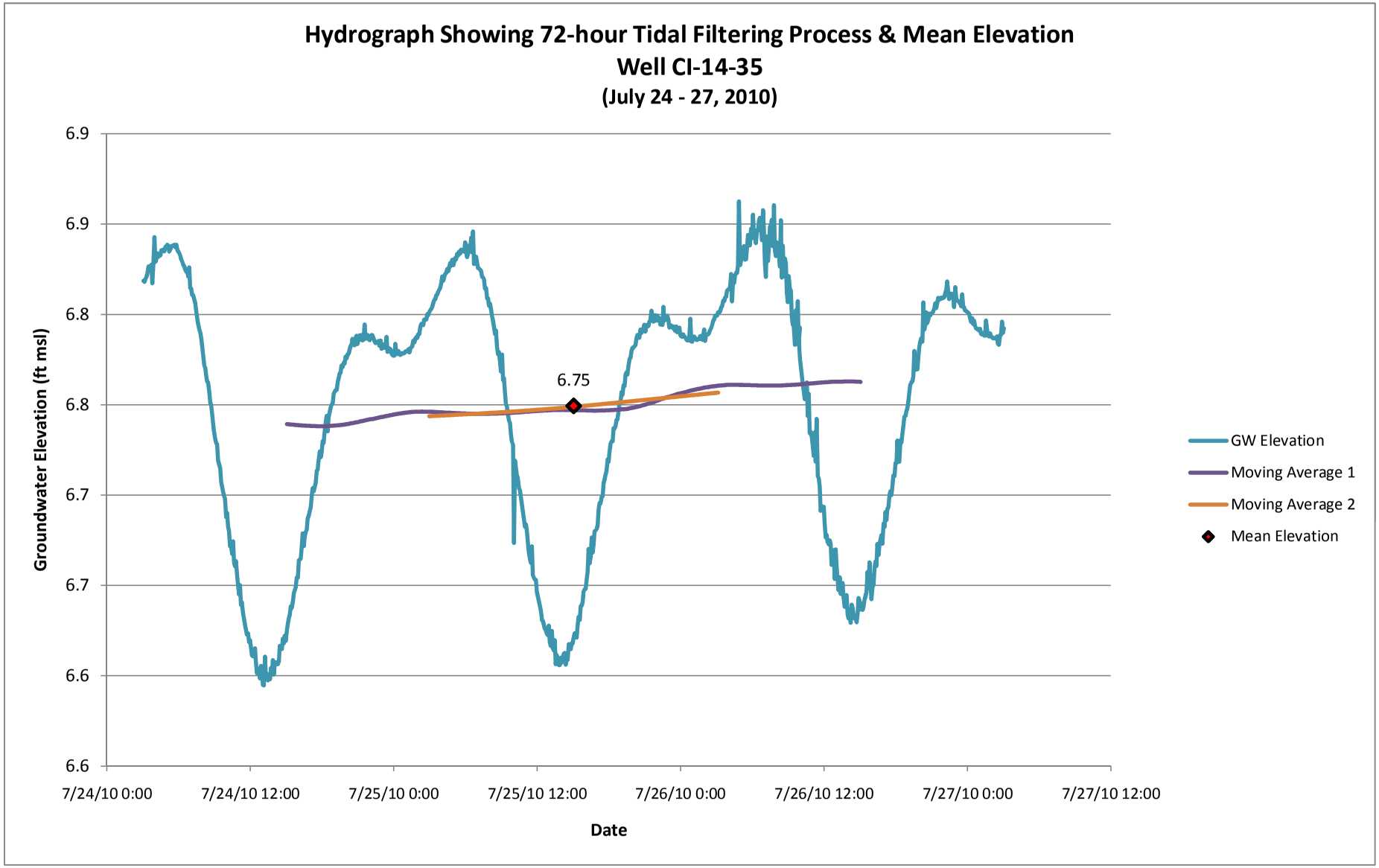

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-30
(August 1-4, 2010)
Groundwater Elevation (ft msl)
7.0
6.5
6.0
5.5
5.0
4.5
4.0
5.69
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation

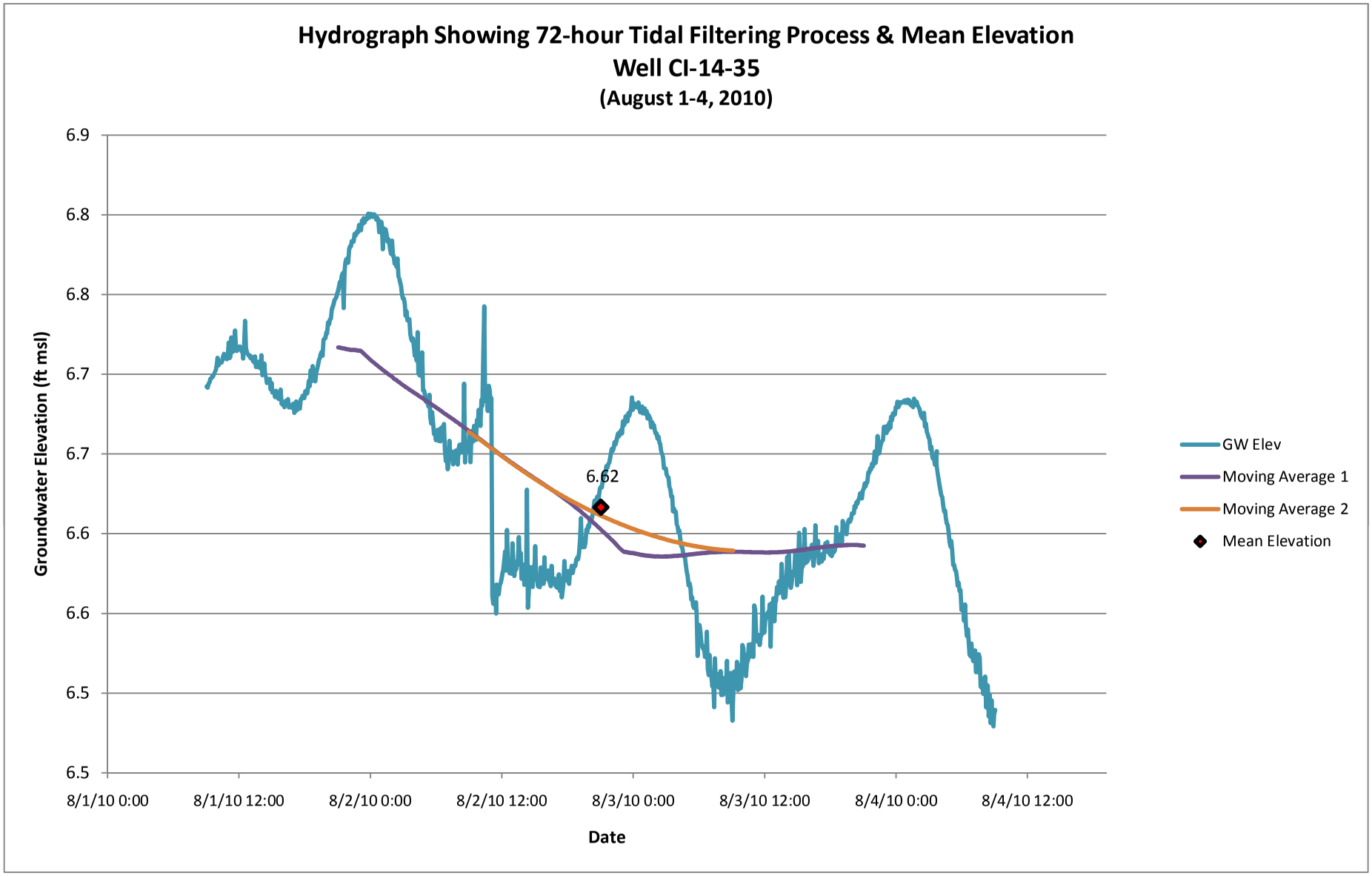

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-60
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
5.59
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

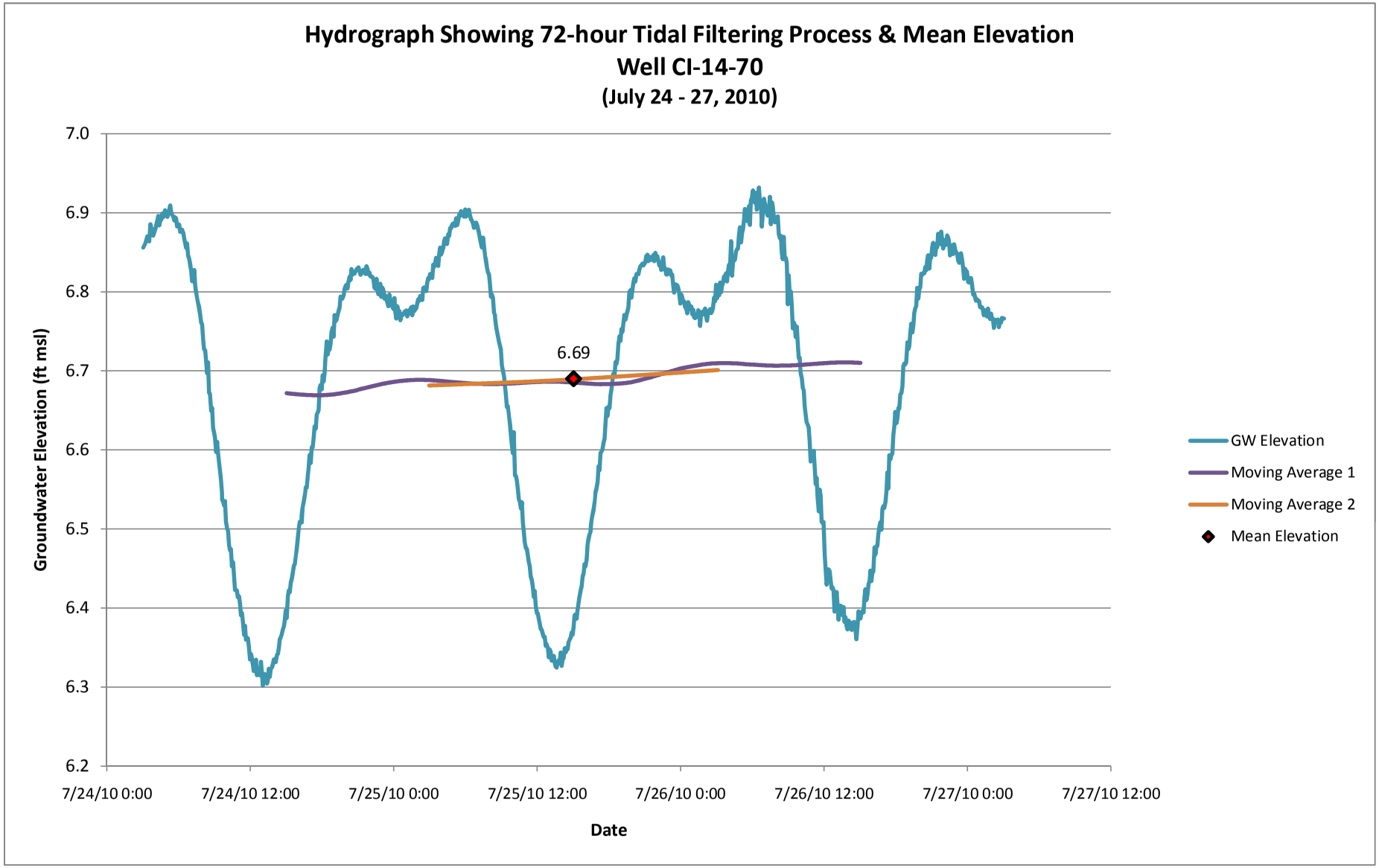

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-60
(August 1-4, 2010)
Groundwater Elevation (ft msl)
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
5.61
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation

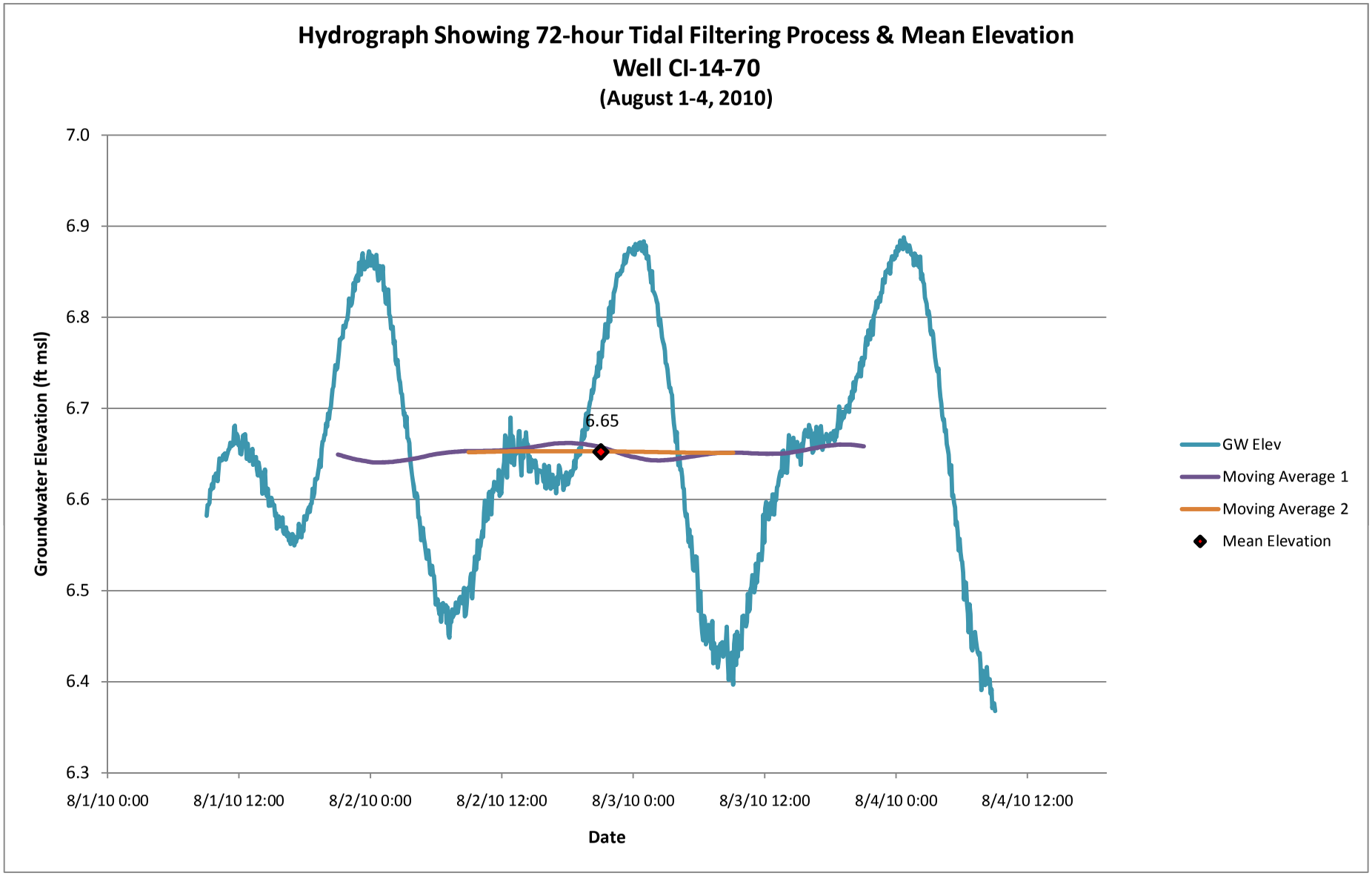

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-WT
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
7.0
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.63
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-WT
(August 1-4, 2010)
Groundwater Elevation (ft msl)
6.8
6.8
6.7
6.7
6.6
6.6
6.5
6.65
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-35
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
6.9
6.9
6.8
6.8
6.7
6.7
6.6
6.6
6.75
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-35
(August 1-4, 2010)
Groundwater Elevation (ft msl)
6.9
6.8
6.8
6.7
6.7
6.6
6.6
6.5
6.5
6.62
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-70
(July 24 - 27, 2010)
Groundwater Elevation (ft msl)
7.0
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.2
6.69
7/24/10 0:00
7/24/10 12:00
7/25/10 0:00
7/25/10 12:00
7/26/10 0:00
7/26/10 12:00
7/27/10 0:00
7/27/10 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

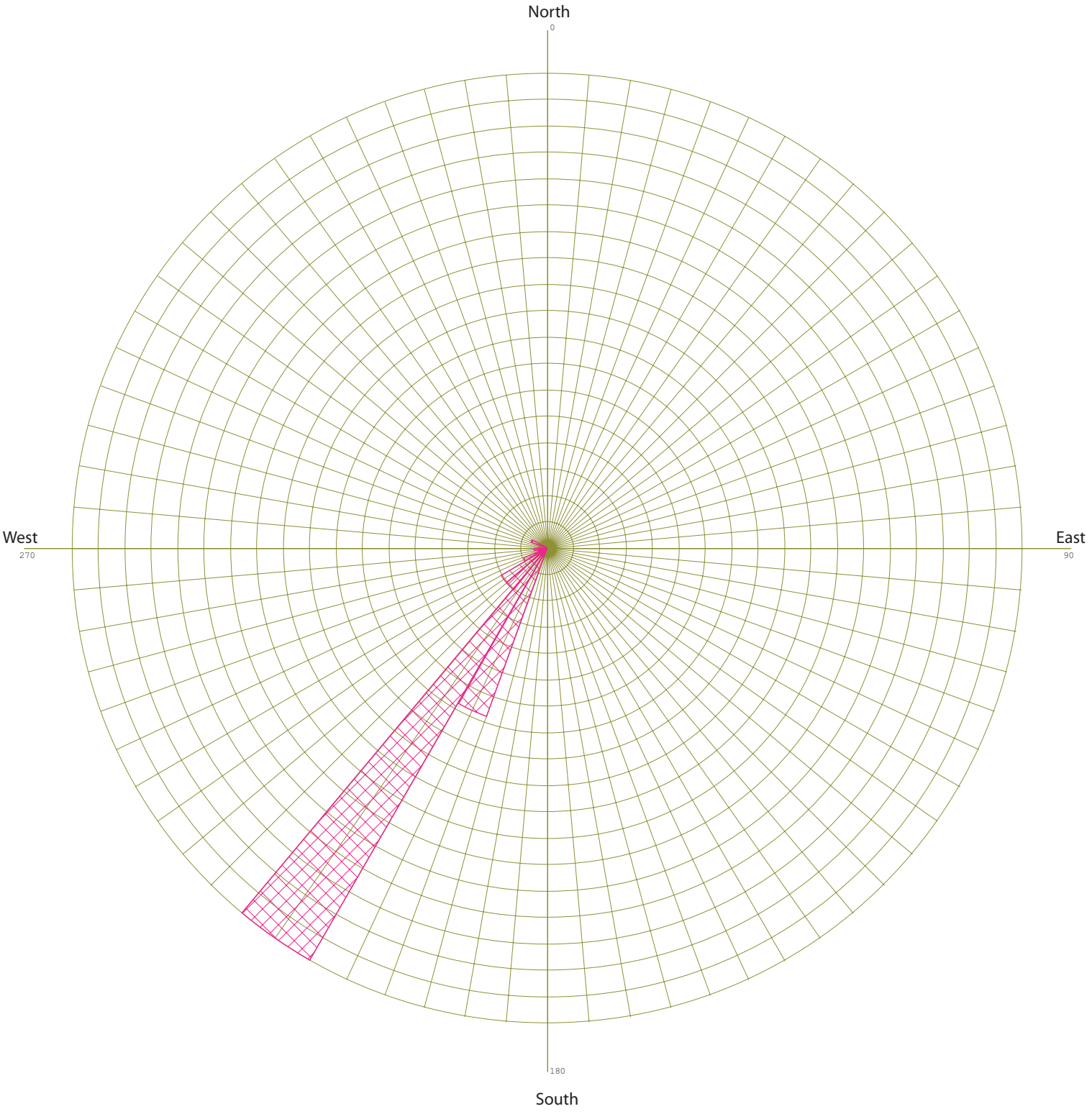

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-70
(August 1-4, 2010)
Groundwater Elevation (ft msl)
7.0
6.9
6.8
6.7
6.6
6.5
6.4
6.3
6.65
8/1/10 0:00
8/1/10 12:00
8/2/10 0:00
8/2/10 12:00
8/3/10 0:00
8/3/10 12:00
8/4/10 0:00
8/4/10 12:00
Date
GW Elev
Moving Average 1
Moving Average 2
Mean Elevation

ATTACHMENT C
ROSE DIAGRAMS SHOWING GROUNDWATER FLOW DIRECTION AND RELATIVE FREQUENCY OF FLOW

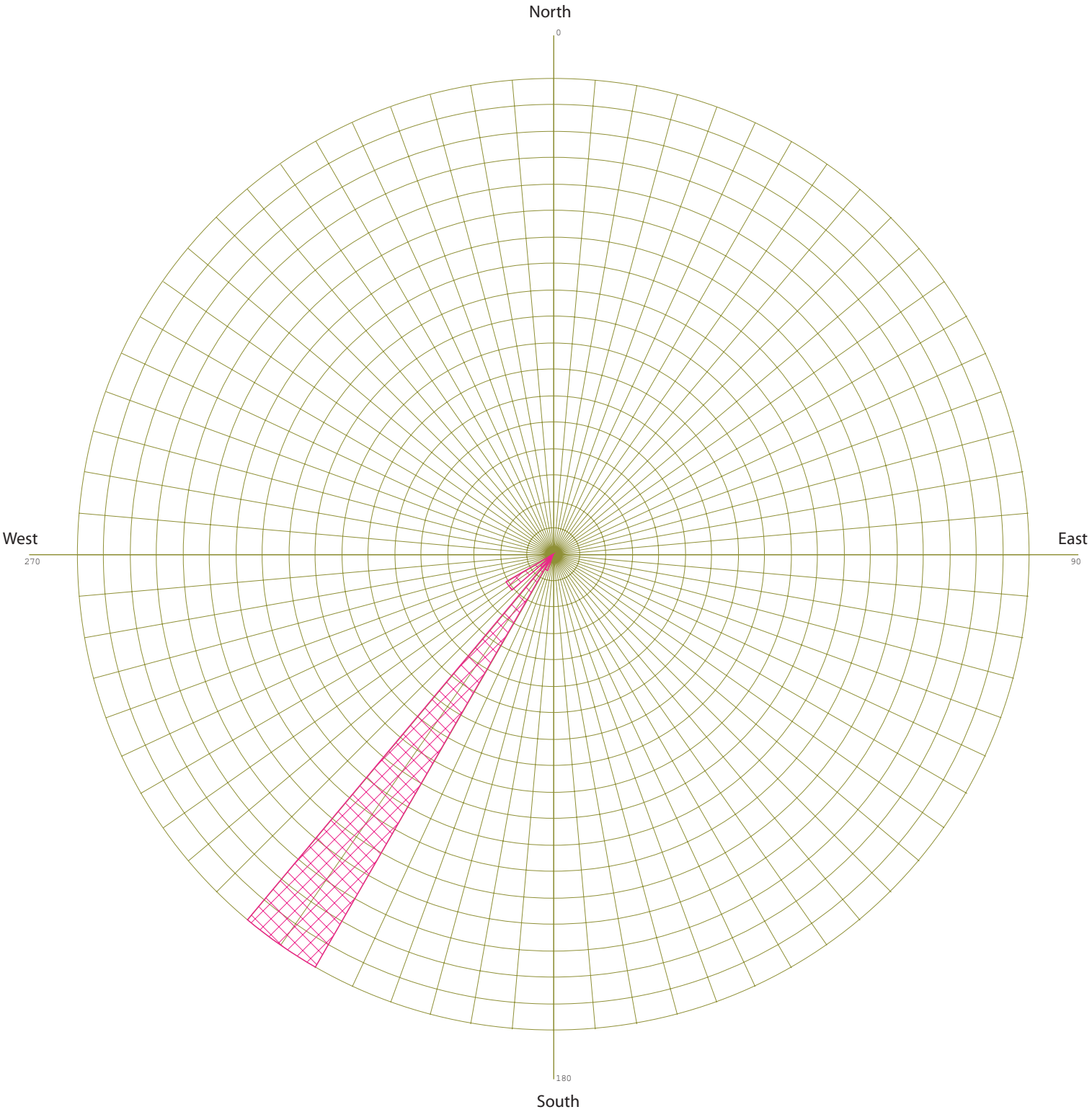
TIDAL STUDY AND
AQUIFER CHARACTERIZATION RESULTS
Capital Industries
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-004

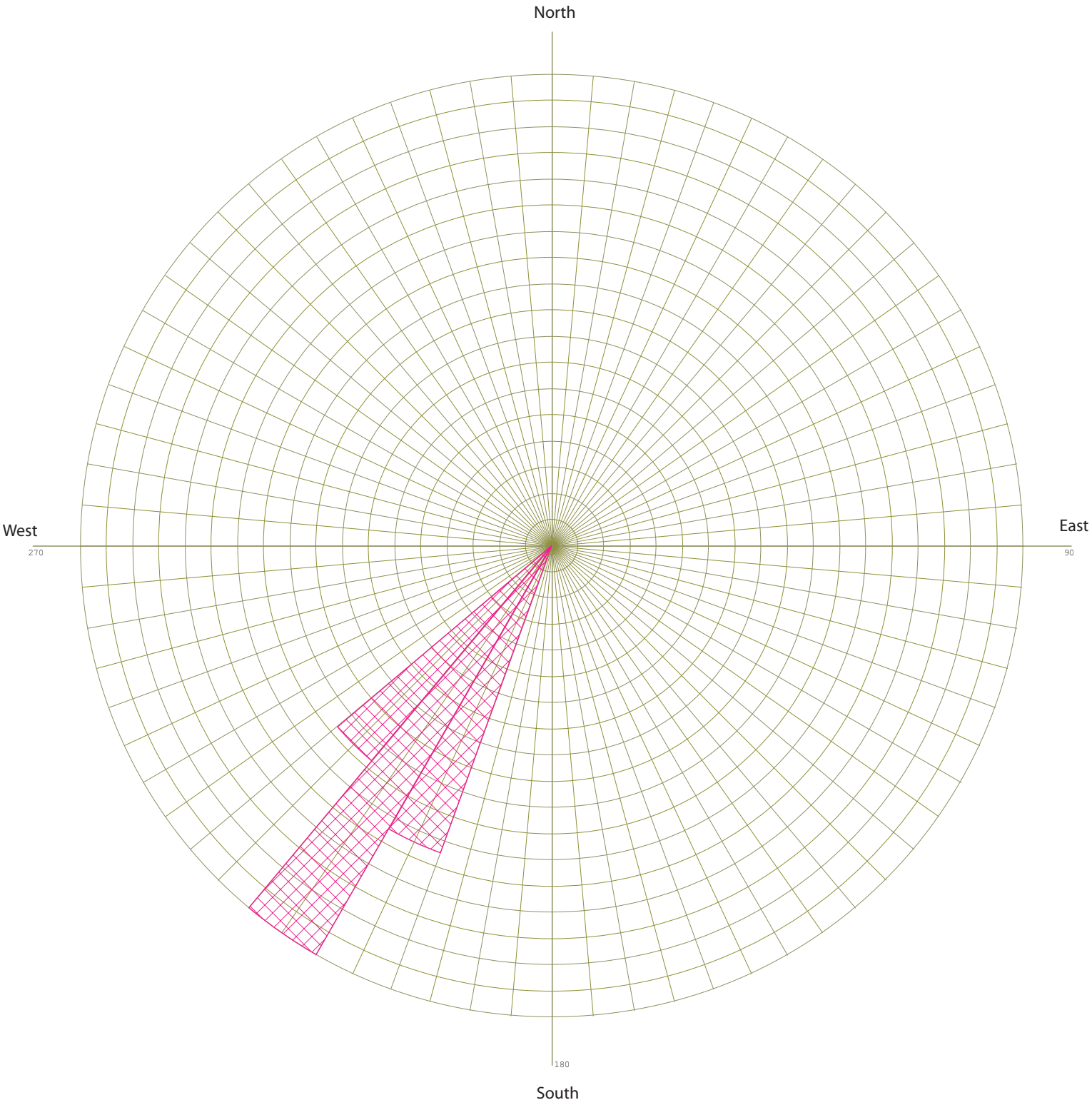
Rose Diagram Showing Frequency of Groundwater Flow Direction in Water Table Zone
July 24 -27, 2010
Wells CI-11-WT, CI-13-WT & CI-14-WT
Capital Tidal Investigation



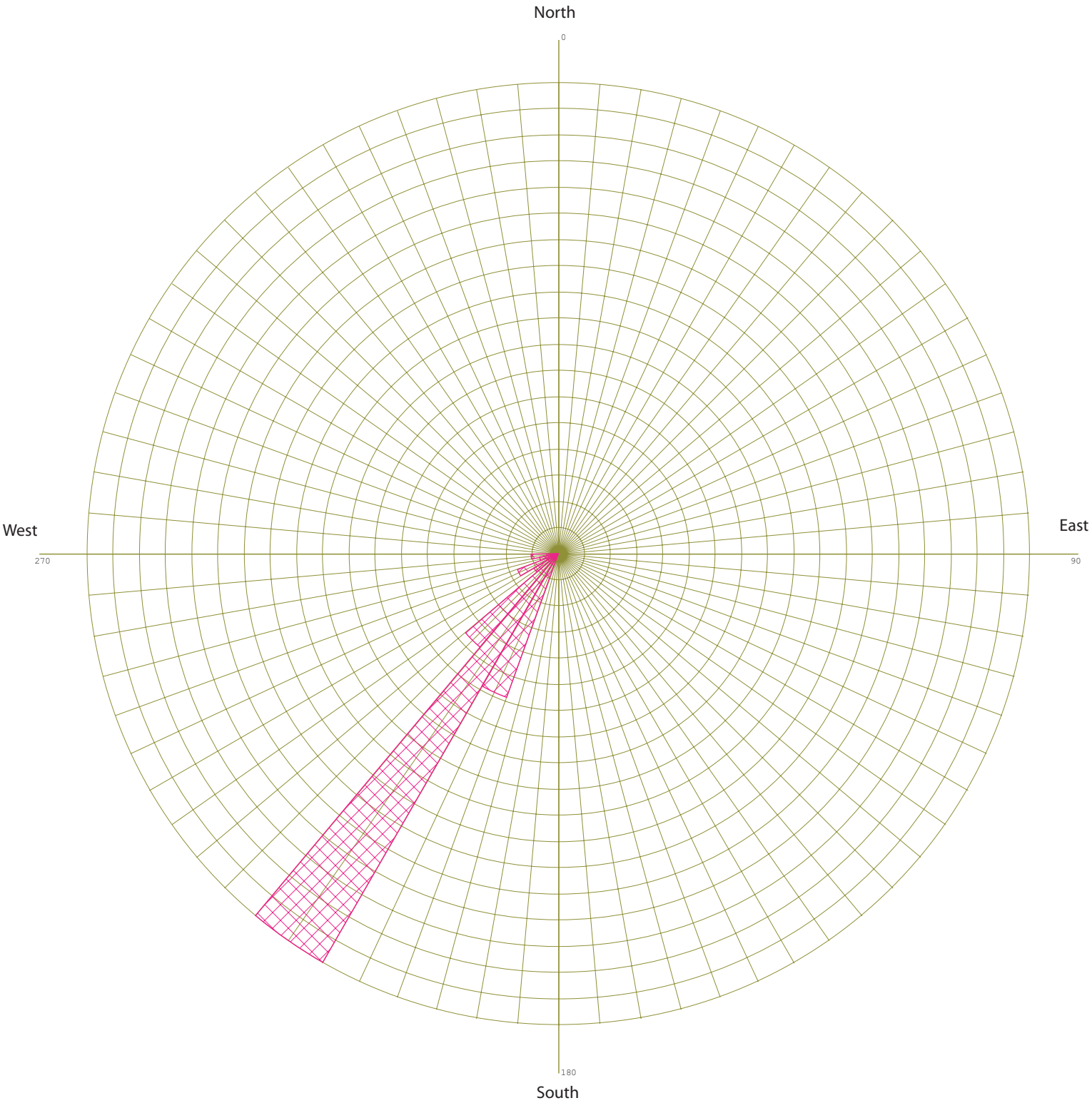
Rose Diagram Showing Frequency of Groundwater Flow Direction in Water Table Zone
August 1-4, 2010
Wells CI-11-WT, CI-13-WT & CI-14-WT
Capital Tidal Investigation



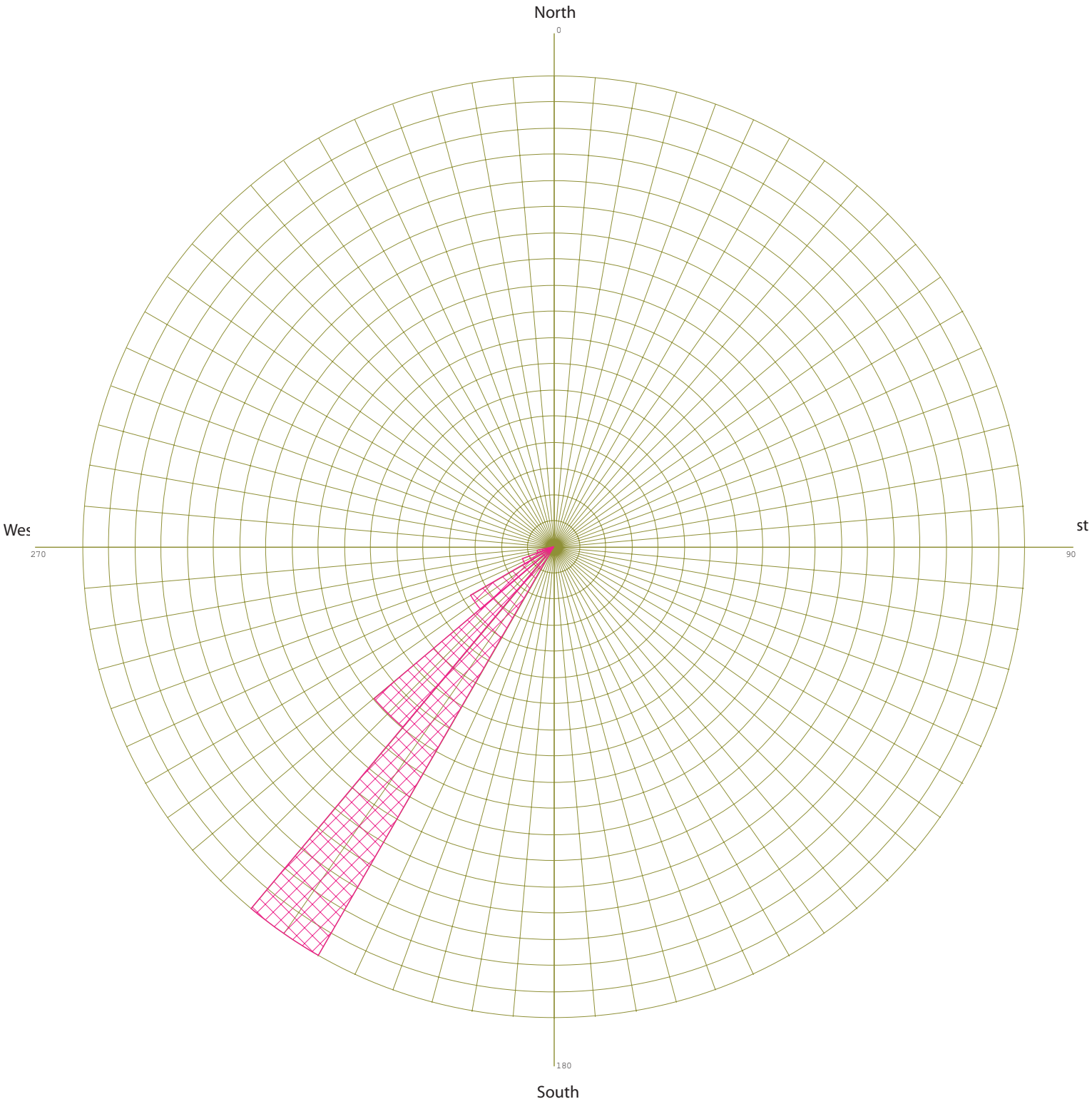
Rose Diagram Showing Frequency of Groundwater Flow Direction in Shallow Zone
July 24 -27, 2010
Wells CI-11-30, CI-13-30 & CI-14-35
Capital Tidal Investigation



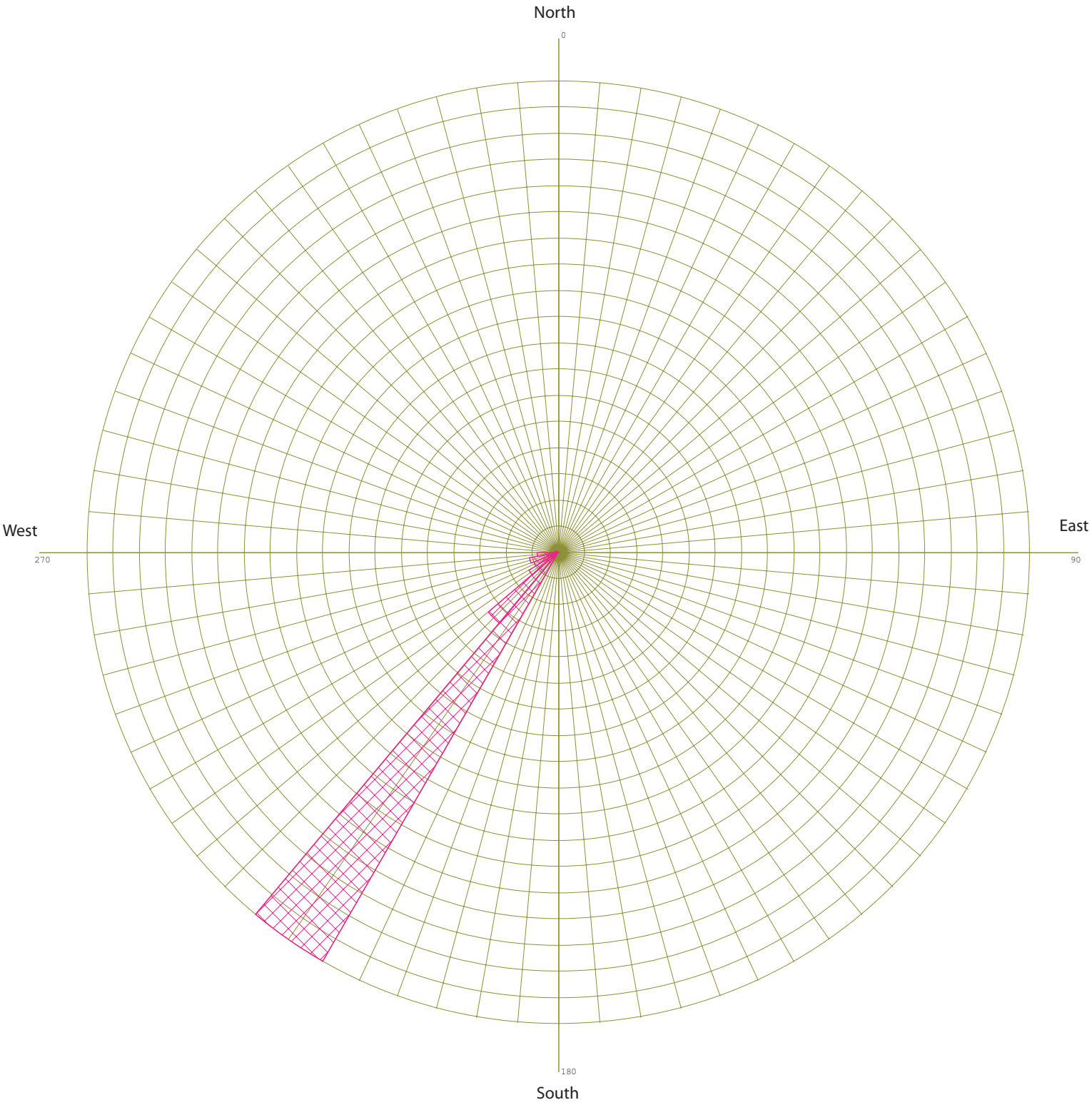
Rose Diagram Showing Frequency of Groundwater Flow Direction in Shallow Zone
August 1-4, 2010
Wells CI-11-30, CI-13-30 & CI-14-35
Capital Tidal Investigation



Rose Diagram Showing Frequency of Groundwater Flow Direction in Intermediate Zone
July 24 -27, 2010
Wells CI-11-60, CI-13-60 & CI-14-70
Capital Tidal Investigation



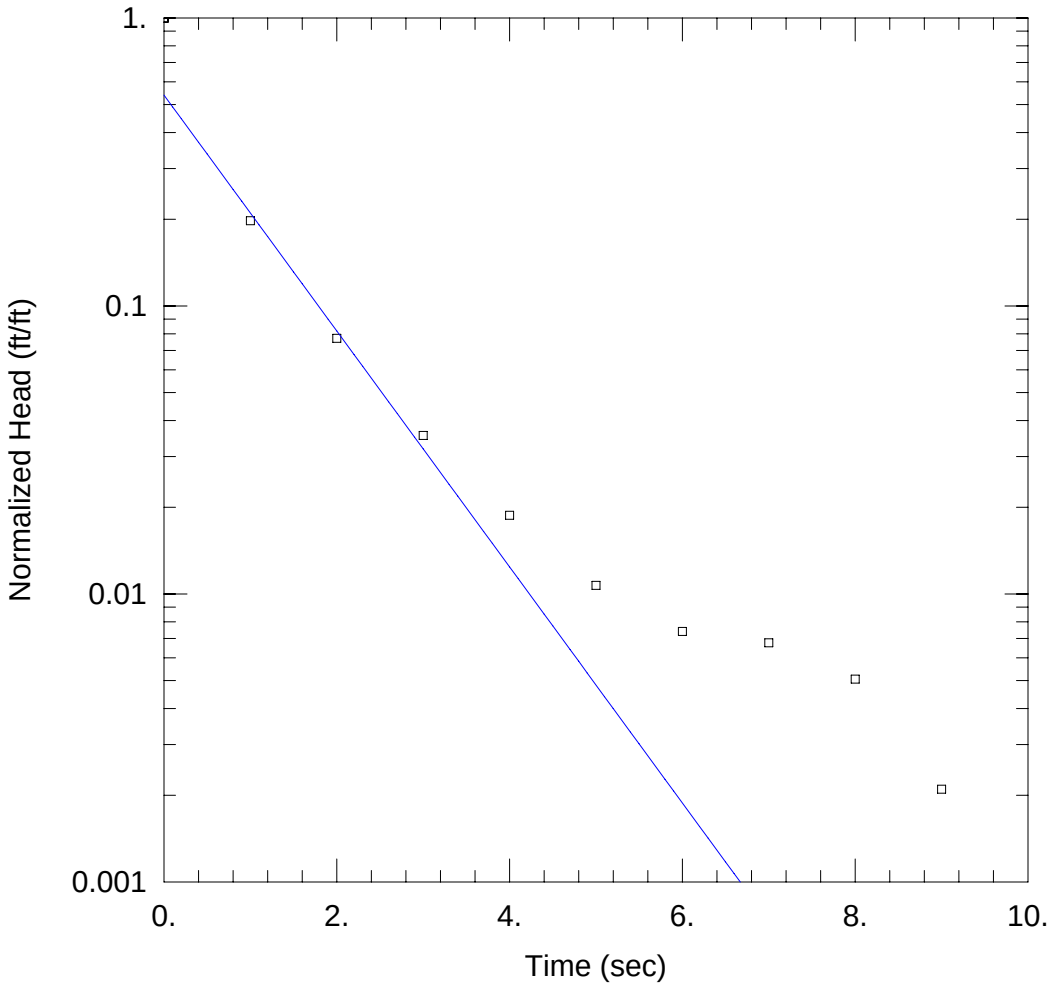
Rose Diagram Showing Frequency of Groundwater Flow Direction in Intermediate Zone
August 1-4, 2010
Wells CI-11-60, CI-13-60 & CI-14-70
Capital Tidal Investigation



ATTACHMENT D
SLUG TEST ANALYSIS PLOTS

TIDAL STUDY AND
AQUIFER CHARACTERIZATION RESULTS
Capital Industries
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-004



SLUG TEST RESULTS FOR MW-8 (RISING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\MW-8.aqt
Date: 01/21/11 Time: 15:28:05

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Well: MW-8
Test Date: 8-6-10

AQUIFER DATA

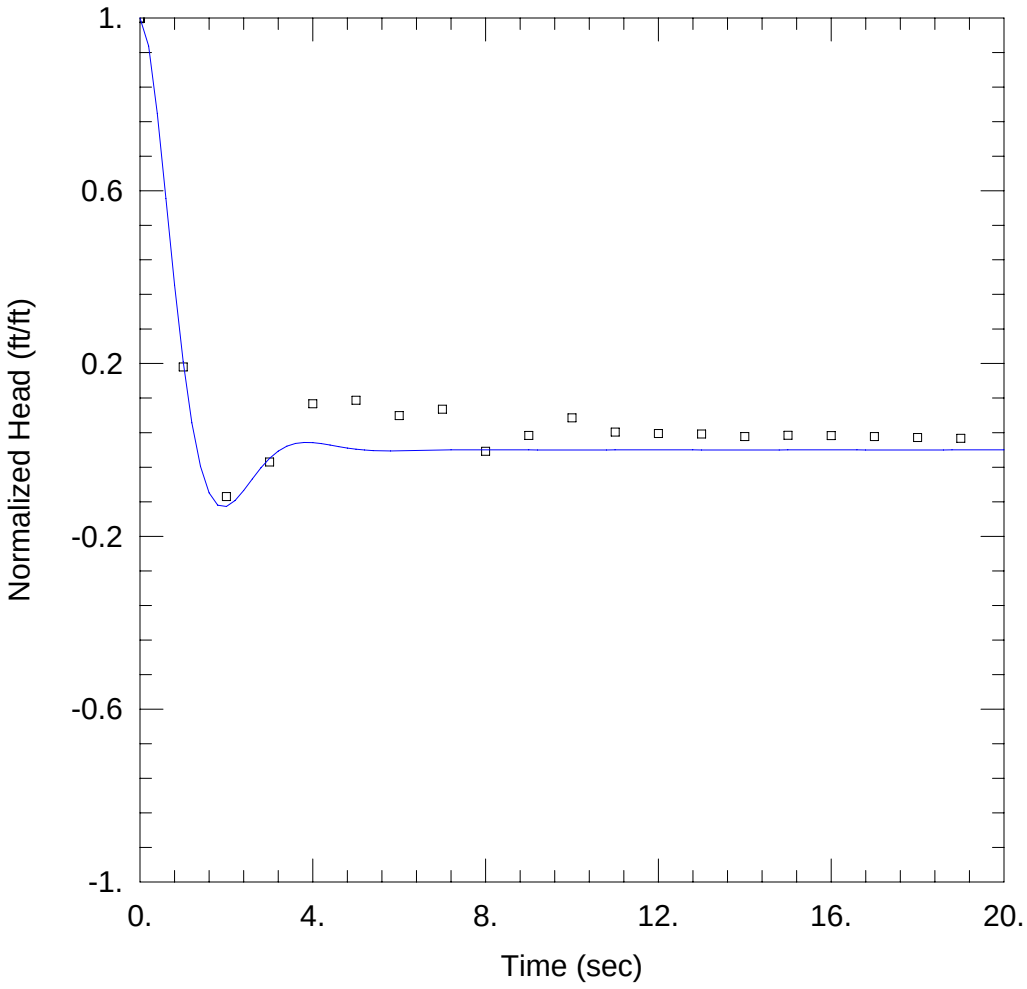
Saturated Thickness: 62.07 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-8)

Initial Displacement: 3.15 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 12.07 ft
Screen Length: 10. ft
Well Radius: 0.083 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 99.79 ft/day
y0 = 1.7 ft



SLUG TEST RESULTS FOR CI-8-40 (FALLING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-8-40.aqt
Date: 01/21/11 Time: 15:28:27

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Well: CI-8-40
Test Date: 8-6-10

AQUIFER DATA

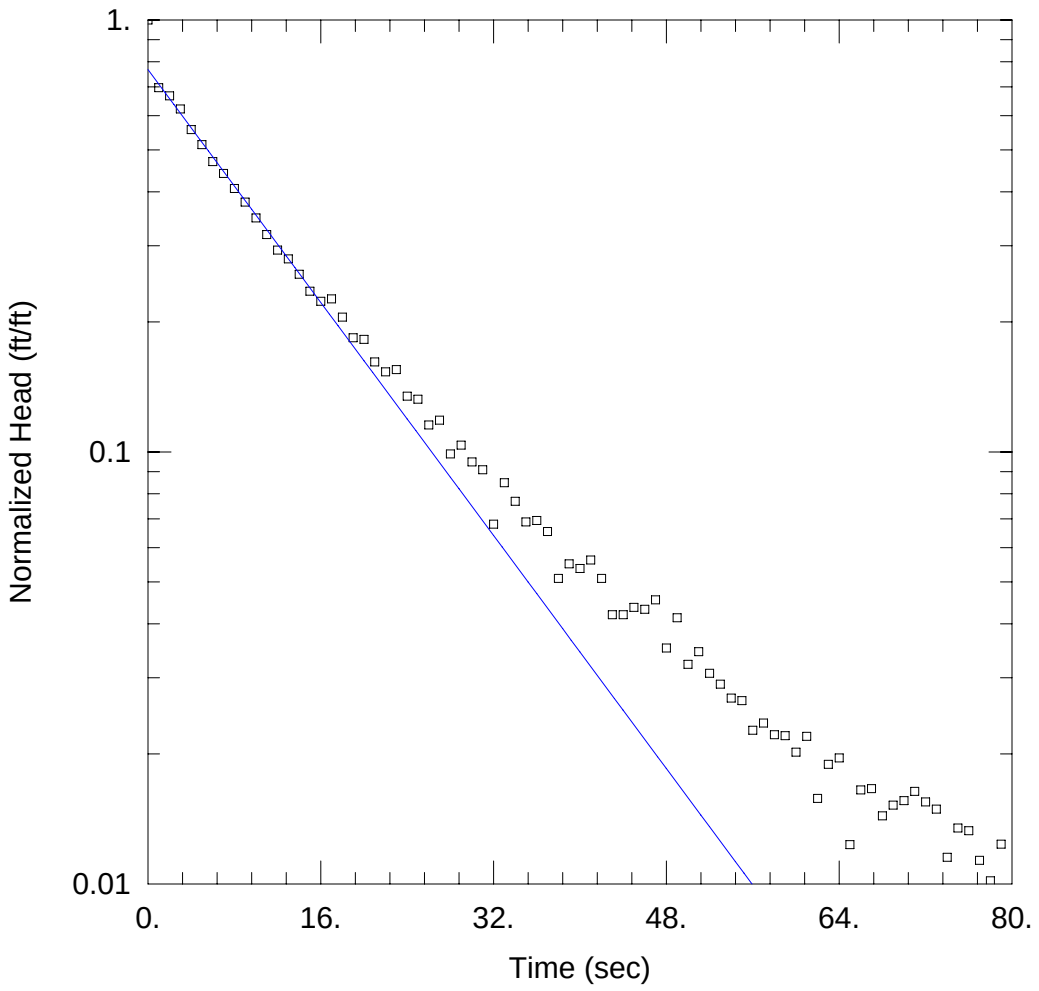
Saturated Thickness: 62.32 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (CI-8-40)

Initial Displacement: 1.77 ft
Total Well Penetration Depth: 40. ft
Casing Radius: 0.083 ft
Static Water Column Height: 32.32 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 213. ft/day
Le = 8.556 ft



SLUG TEST RESULTS FOR CI-8-60 (RISING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-8-60.aqt
Date: 01/21/11 Time: 15:28:42

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Well: CI-8-40
Test Date: 8-6-10

AQUIFER DATA

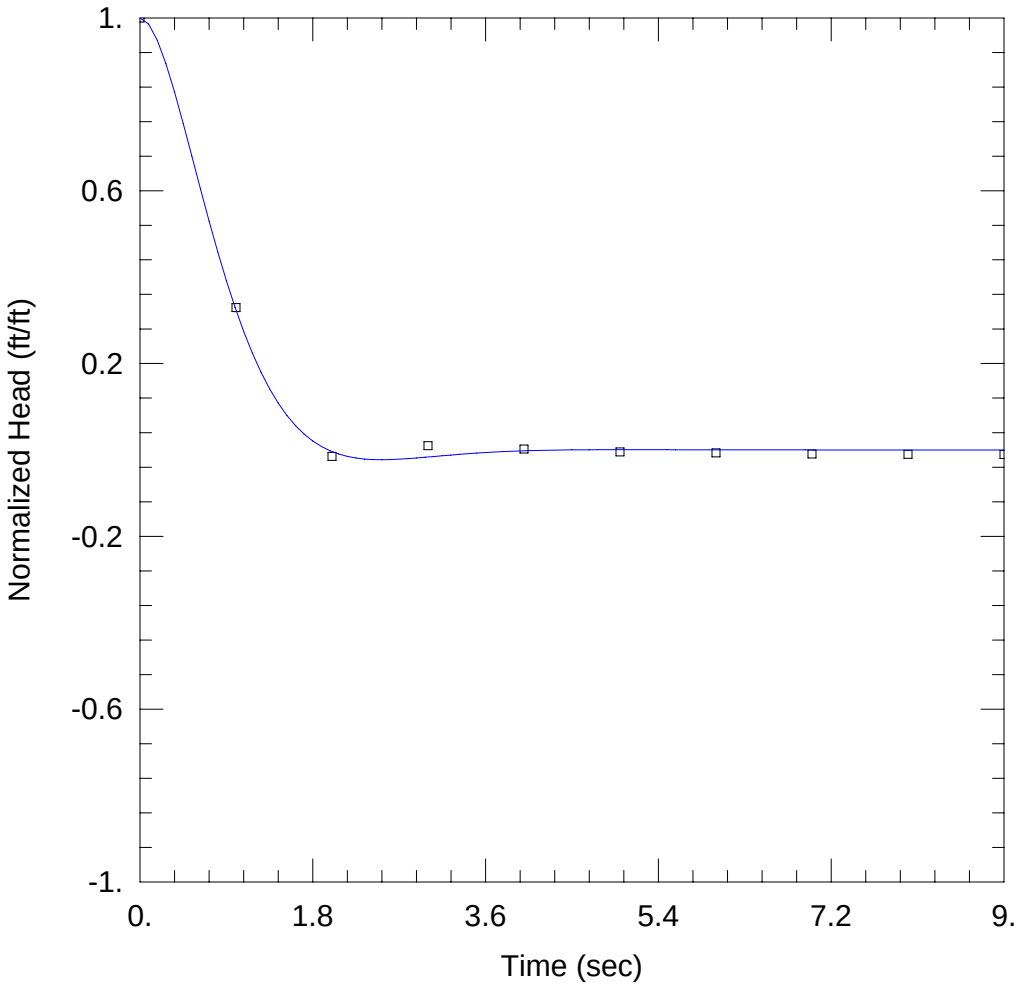
Saturated Thickness: 62.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (CI-8-60)

Initial Displacement: 2.05 ft
Total Well Penetration Depth: 60. ft
Casing Radius: 0.083 ft
Static Water Column Height: 52.23 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 10.06 ft/day
y0 = 1.573 ft



SLUG TEST RESULTS FOR CI-9-WT (RISING HEAD)

Data Set: N:\...\CI-9-WT RisingHead-Short.aqt
Date: 01/21/11 Time: 15:29:20

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 62.11 ft Anisotropy Ratio (Kz/Kr): 1.

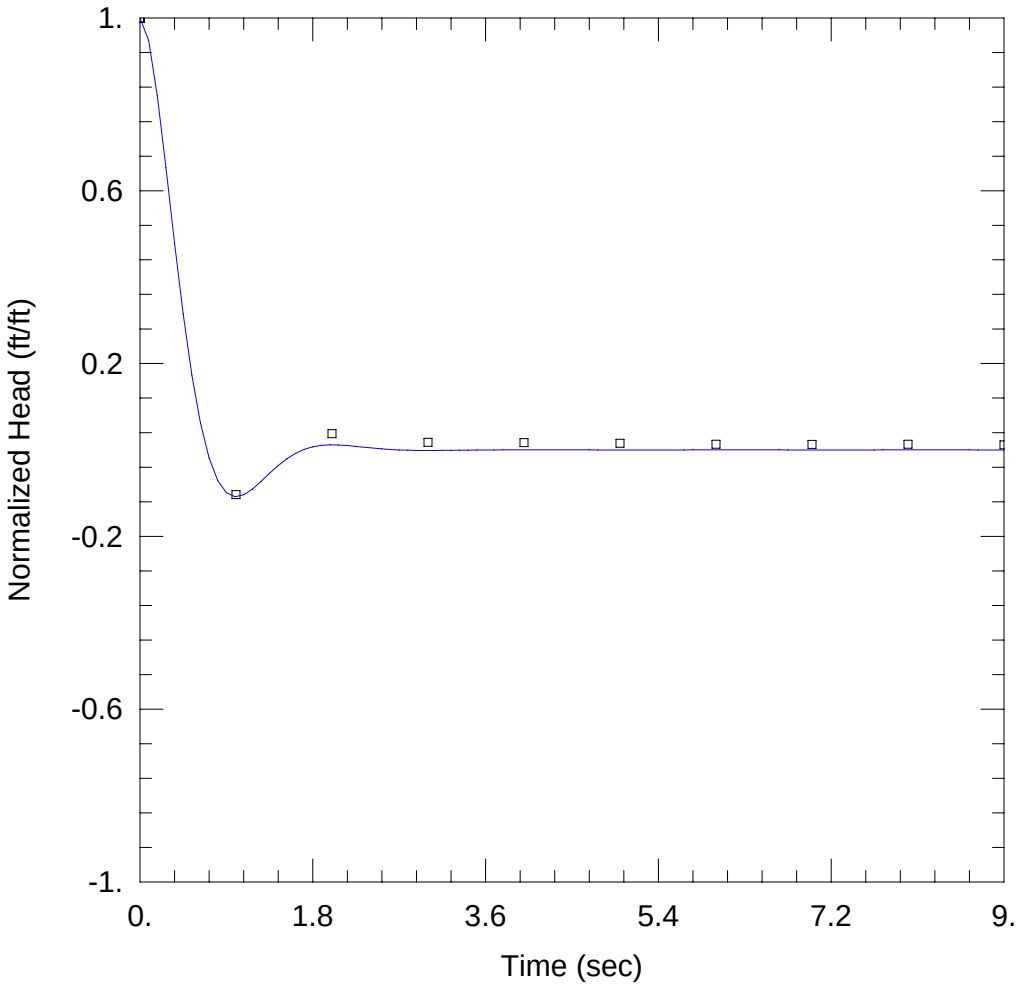
WELL DATA (CI-9-WT)

Initial Displacement: 1.53 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 12.11 ft
Screen Length: 10. ft
Well Radius: 0.083 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 135.1 ft/day Le = 8.4 ft



SLUG TEST RESULTS FOR CI-9-WT (FALLING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-9-WT FallingHead.aqt
Date: 01/21/11 Time: 15:29:40

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

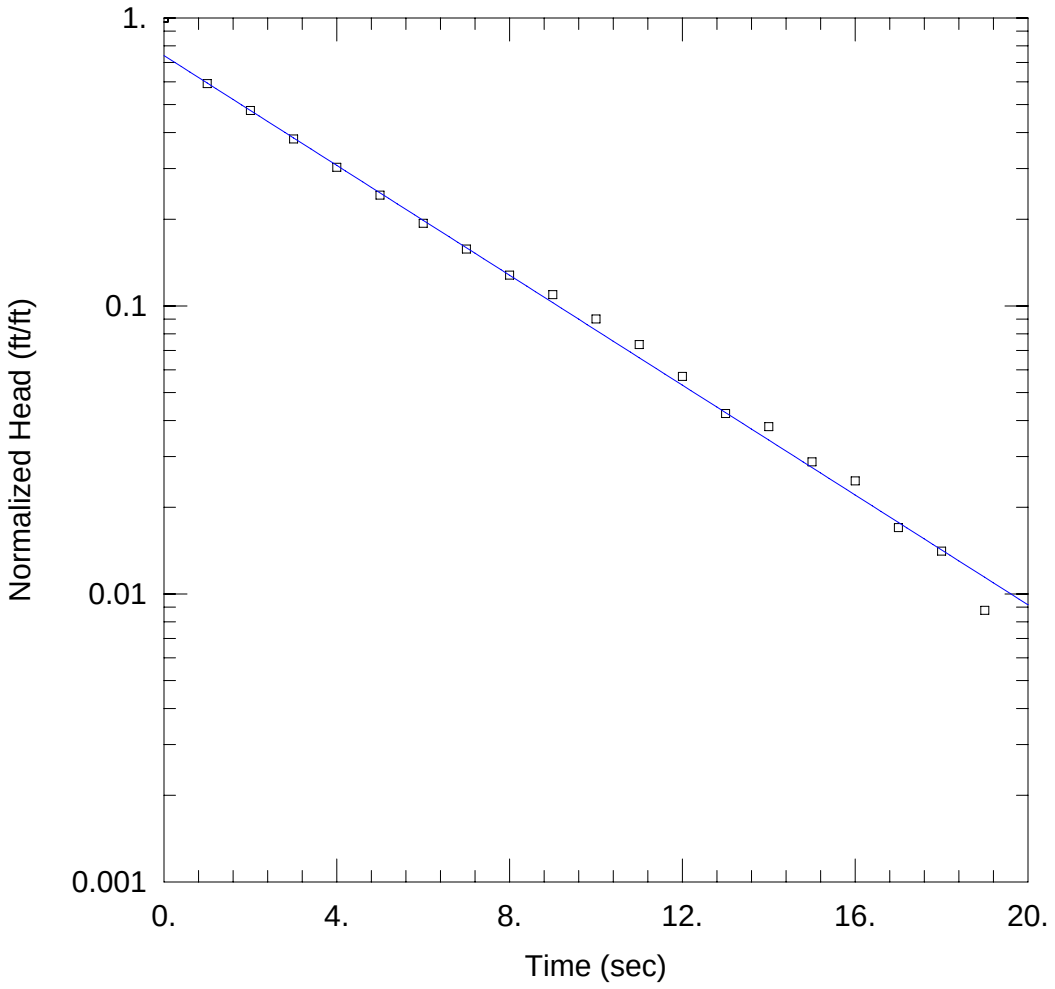
Saturated Thickness: 62.11 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (CI-9-WT)

Initial Displacement: 3.12 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 12.11 ft
Screen Length: 10. ft
Well Radius: 0.083 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 356.5 ft/day
Le = 2.173 ft



SLUG TEST RESULTS FOR CI-9-40 (RISING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-9-40 RisingHead.aqt
Date: 01/21/11 Time: 15:30:09

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 62.14 ft Anisotropy Ratio (Kz/Kr): 1.

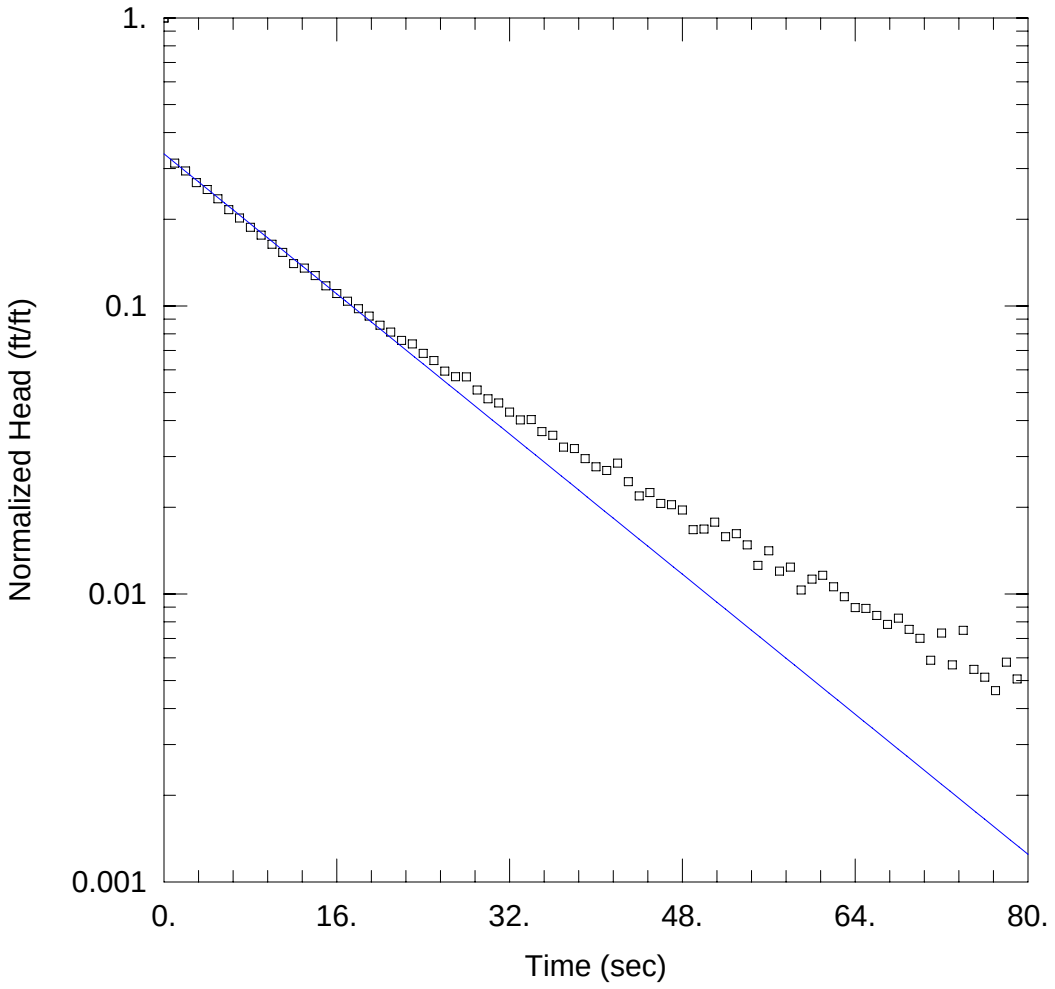
WELL DATA (CI-9-40)

Initial Displacement: 1.76 ft Static Water Column Height: 32.14 ft
Total Well Penetration Depth: 40. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 25.52 ft/day y0 = 1.302 ft



SLUG TEST RESULTS FOR CI-9-70 (RISING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-9-70 RisingHead.aqt
Date: 01/21/11 Time: 15:30:32

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 62.1 ft Anisotropy Ratio (Kz/Kr): 1.

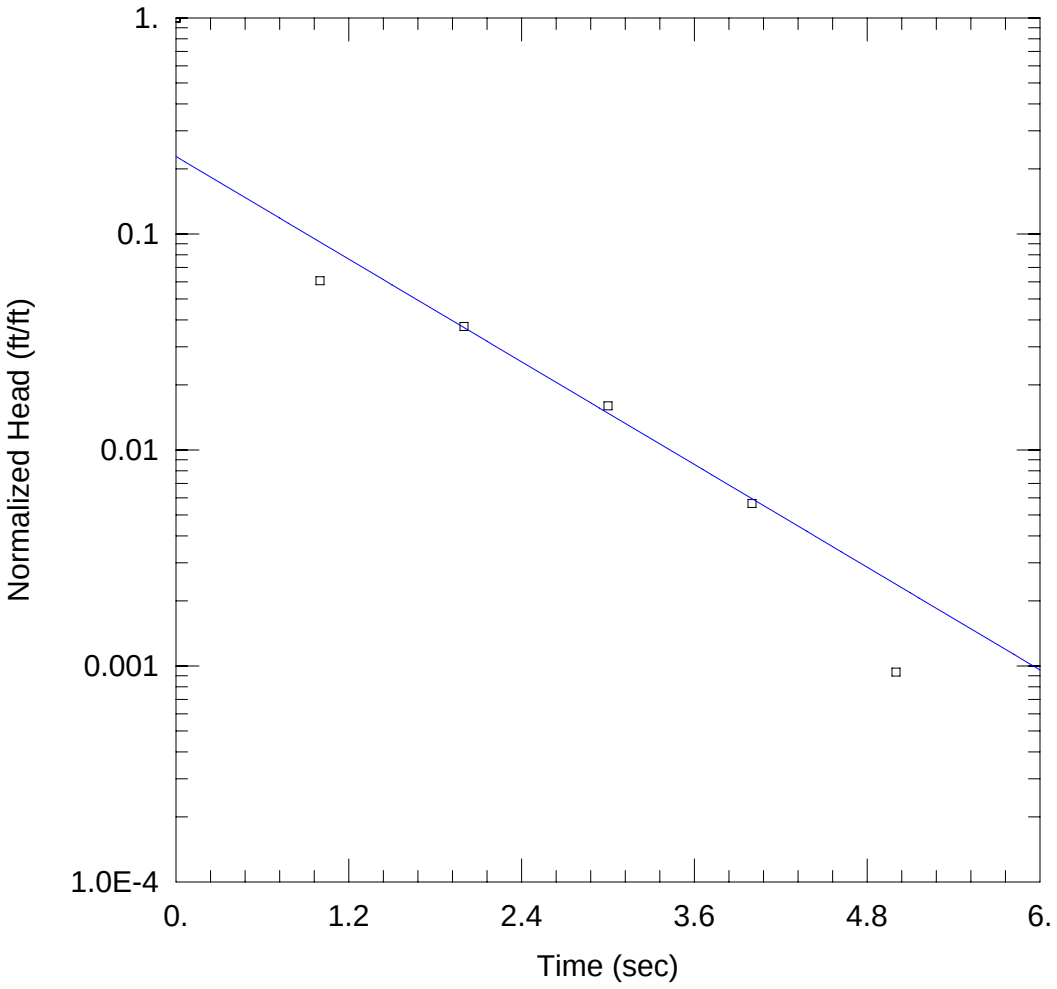
WELL DATA (CI-9-70)

Initial Displacement: 4.36 ft Static Water Column Height: 62.1 ft
Total Well Penetration Depth: 70. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 10.19 ft/day y0 = 1.47 ft



SLUG TEST RESULTS FOR CI-10-WT (RISING HEAD)

Data Set: N:\...\CI-10-WT RisingHead.aqt
Date: 01/21/11 Time: 15:30:54

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 61.5 ft Anisotropy Ratio (Kz/Kr): 1.

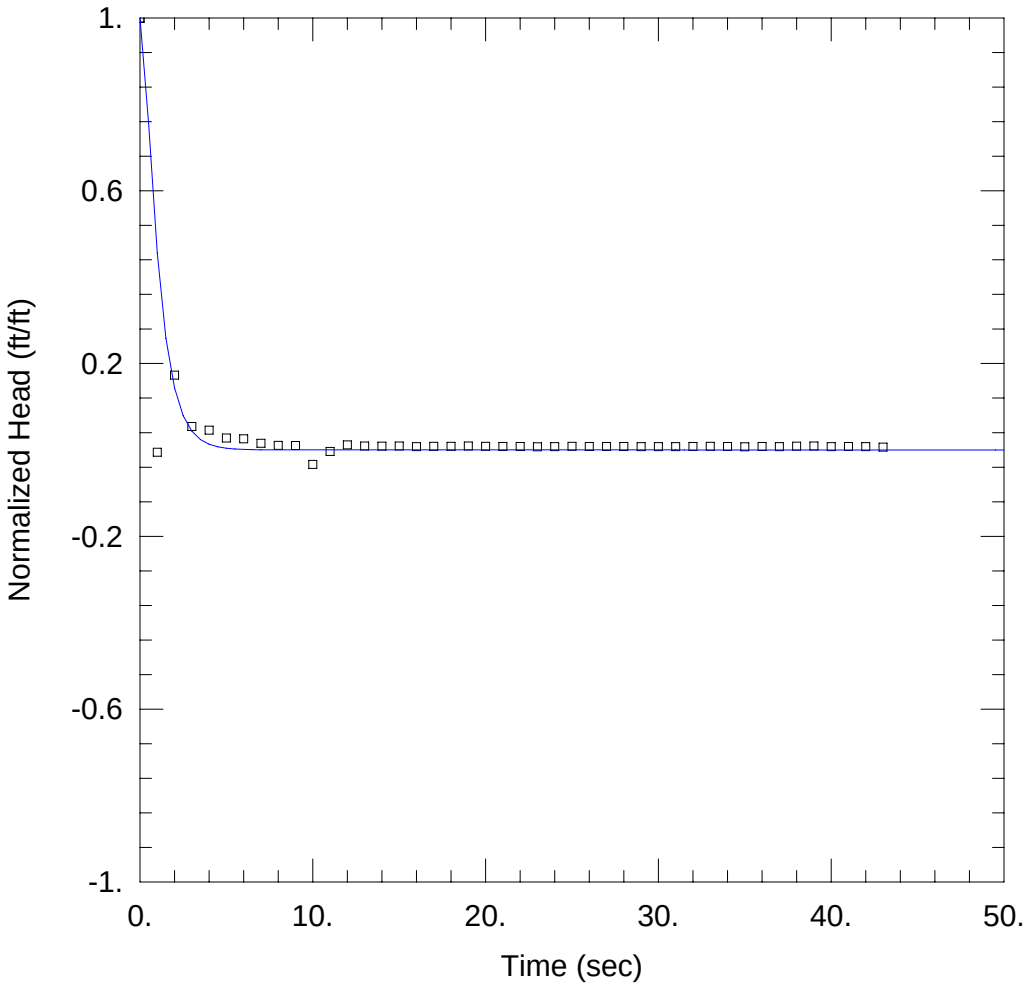
WELL DATA (CI-10-WT)

Initial Displacement: 4.34 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.5 ft
Screen Length: 10. ft
Well Radius: 0.083 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 96.5 ft/day y0 = 0.9909 ft



SLUG TEST RESULTS FOR CI-10-WT (FALLING HEAD)

Data Set: N:\...\CI-10-WT FallingHead.aqt
Date: 01/21/11 Time: 15:34:56

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 61.5 ft Anisotropy Ratio (Kz/Kr): 1.

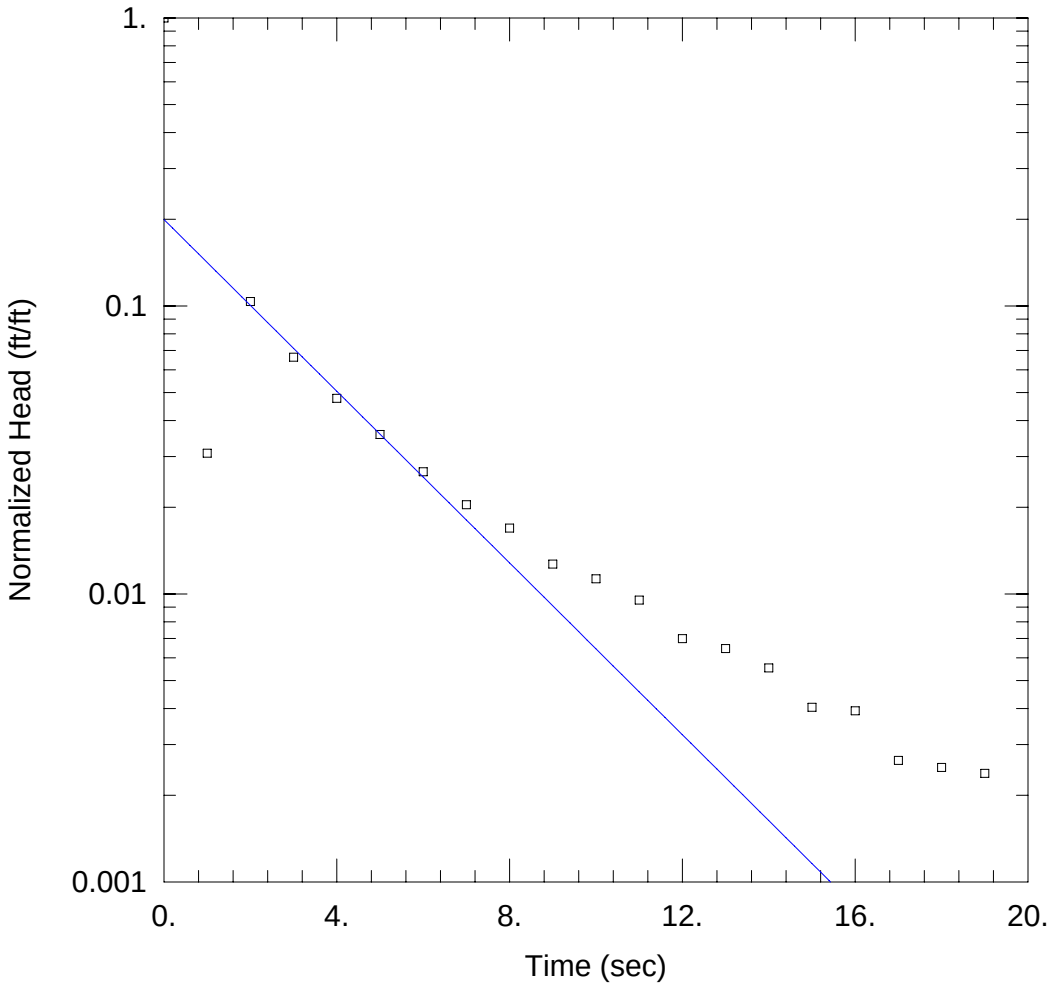
WELL DATA (CI-10-WT)

Initial Displacement: 4.32 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.5 ft
Screen Length: 10. ft
Well Radius: 0.083 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 92.8 ft/day Le = 8.282 ft



SLUG TEST RESULTS FOR CI-10-35 (RISING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-10-35 RisingHead.aqt
Date: 01/21/11 Time: 15:35:21

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 61.46 ft Anisotropy Ratio (Kz/Kr): 1.

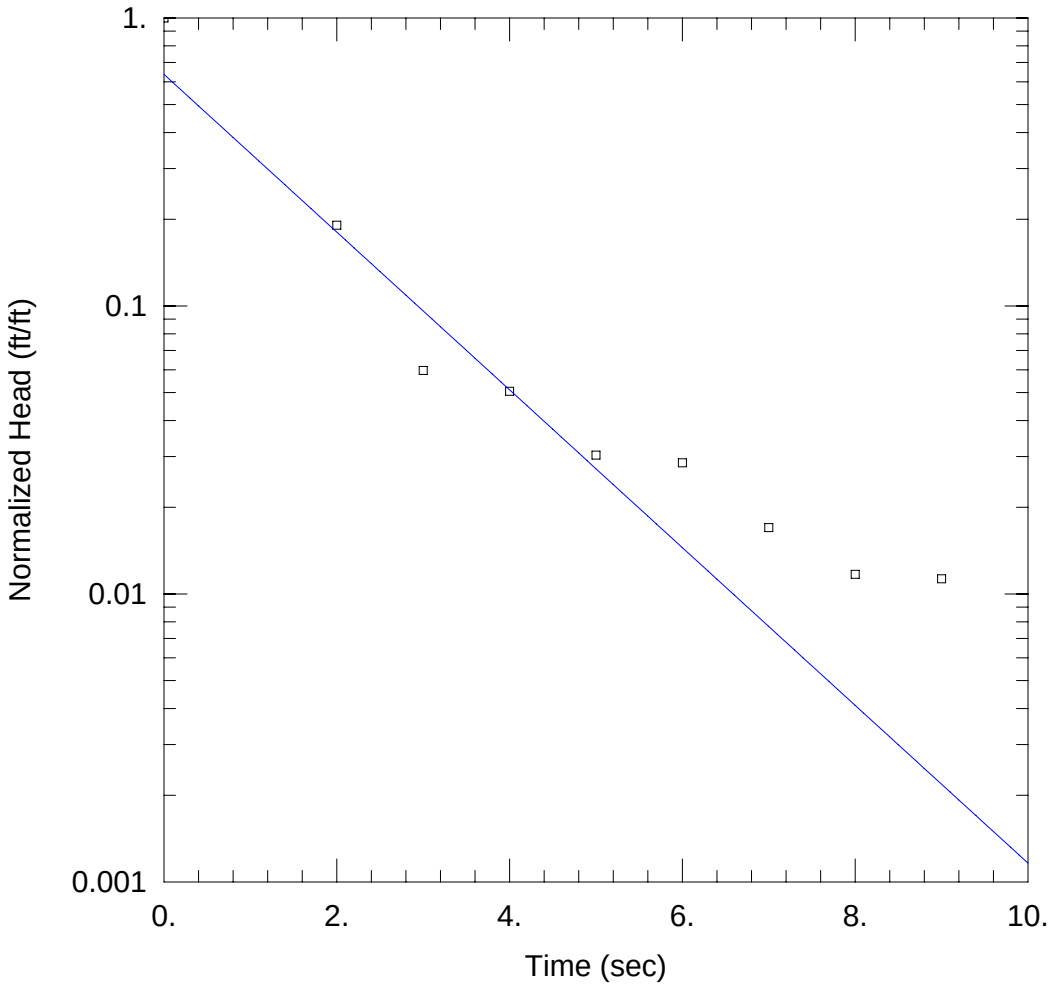
WELL DATA (CI-10-35)

Initial Displacement: 2.78 ft Static Water Column Height: 26.46 ft
Total Well Penetration Depth: 35. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 39.11 ft/day y0 = 0.5545 ft



SLUG TEST RESULTS FOR CI-10-35 (FALLING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-10-35 FallingHead.aqt
Date: 01/21/11 Time: 15:35:49

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

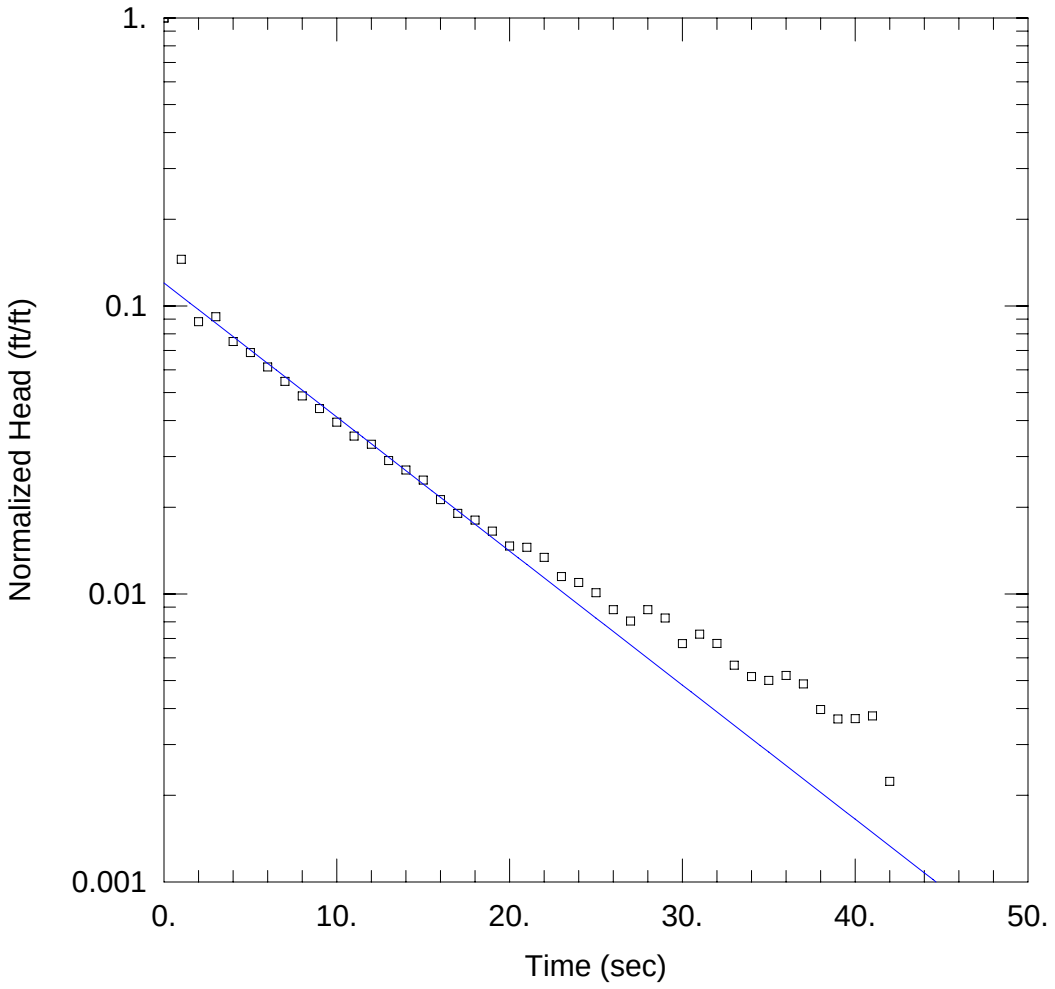
Saturated Thickness: 61.46 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (CI-10-35)

Initial Displacement: 3.92 ft
Total Well Penetration Depth: 35. ft
Casing Radius: 0.083 ft
Static Water Column Height: 26.46 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 71.86 ft/day
y0 = 2.496 ft



SLUG TEST RESULTS FOR CI-10-65 (RISING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-10-65 RisingHead.aqt
Date: 01/21/11 Time: 15:36:10

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 61.4 ft Anisotropy Ratio (Kz/Kr): 1.

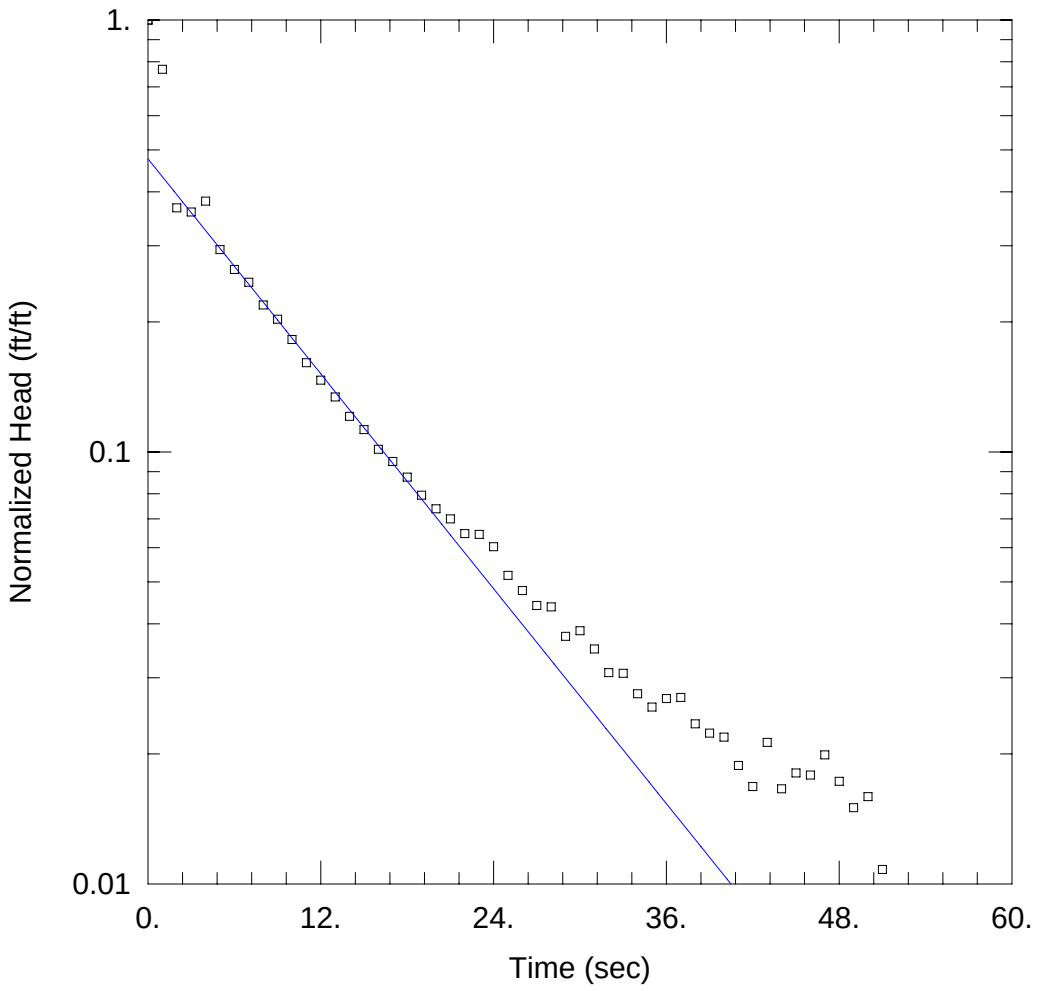
WELL DATA (CI-10-65)

Initial Displacement: 9.82 ft Static Water Column Height: 56.4 ft
Total Well Penetration Depth: 65. ft Screen Length: 15. ft
Casing Radius: 0.083 ft Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 10.58 ft/day y0 = 1.18 ft



SLUG TEST RESULTS FOR CI-10-65 (FALLING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-10-65 FallingHead.aqt
Date: 01/21/11 Time: 15:36:30

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

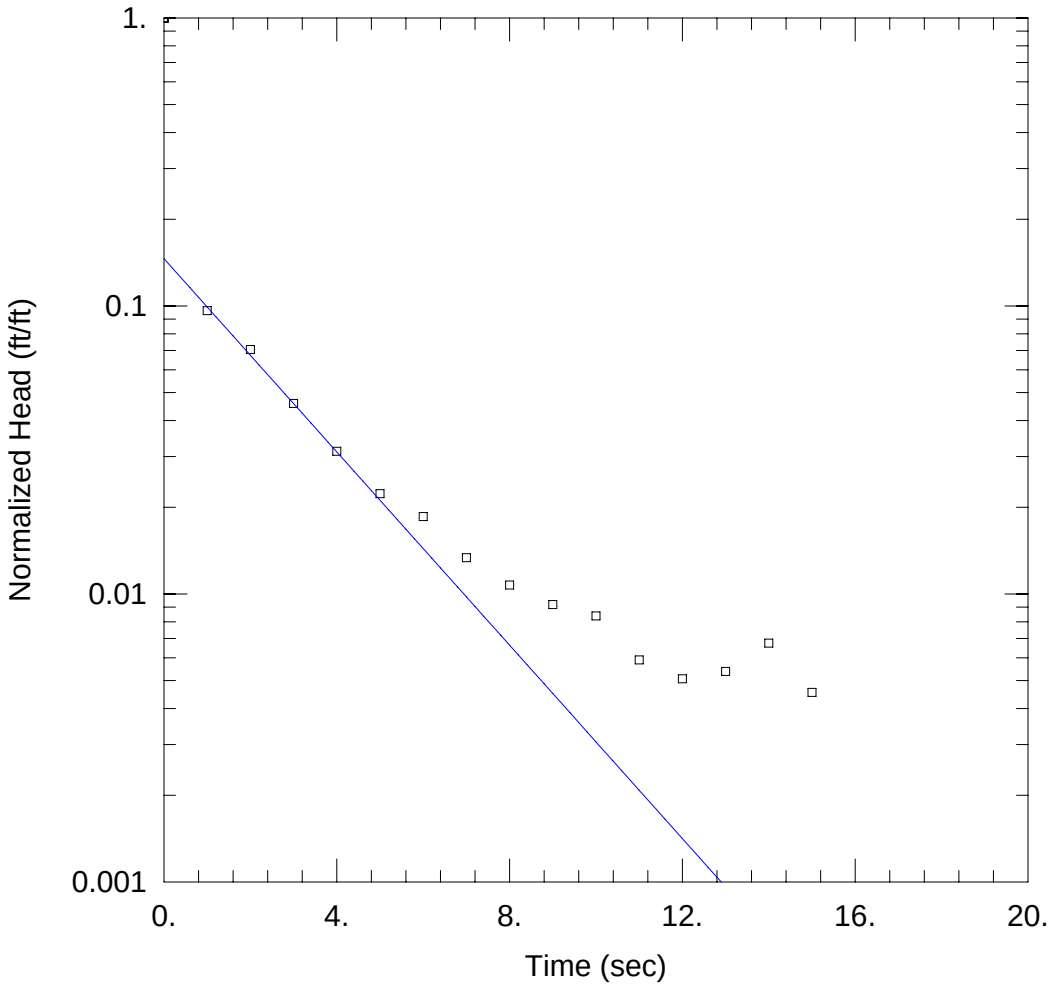
Saturated Thickness: 61.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (CI-10-65)

Initial Displacement: 2.3 ft
Total Well Penetration Depth: 65. ft
Casing Radius: 0.083 ft
Static Water Column Height: 56.4 ft
Screen Length: 15. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 9.423 ft/day
y0 = 1.097 ft



SLUG TEST RESULTS FOR CI-14-WT (RISING HEAD)

Data Set: N:\...\CI-14-WT RisingHead.aqt
Date: 01/21/11 Time: 15:36:52

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 61.54 ft Anisotropy Ratio (Kz/Kr): 1.

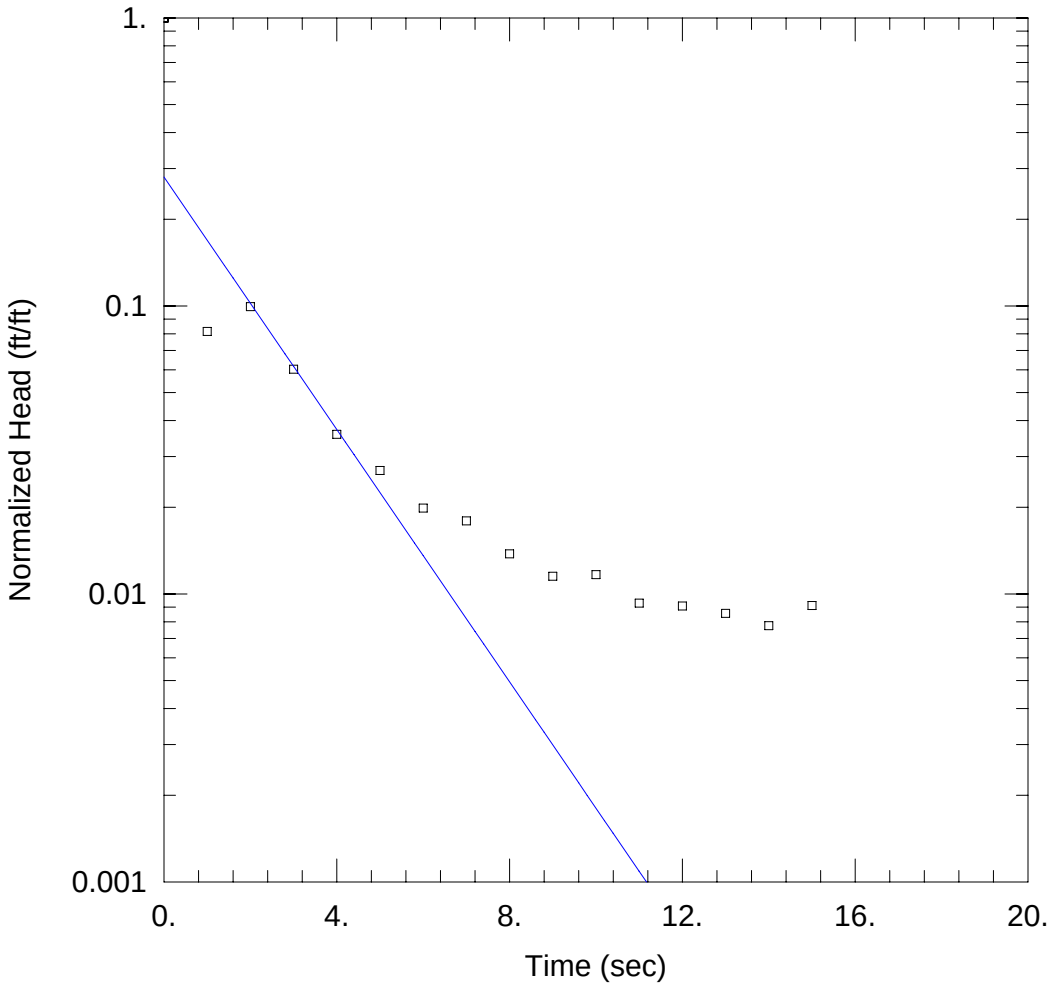
WELL DATA (CI-14-WT)

Initial Displacement: 3.54 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.54 ft
Screen Length: 10. ft
Well Radius: 0.083 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 40.87 ft/day y0 = 0.5165 ft



SLUG TEST RESULTS FOR CI-14-WT (FALLING HEAD)

Data Set: N:\...\CI-14-WT FallingHead.aqt
Date: 01/21/11 Time: 15:37:11

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 61.54 ft Anisotropy Ratio (Kz/Kr): 1.

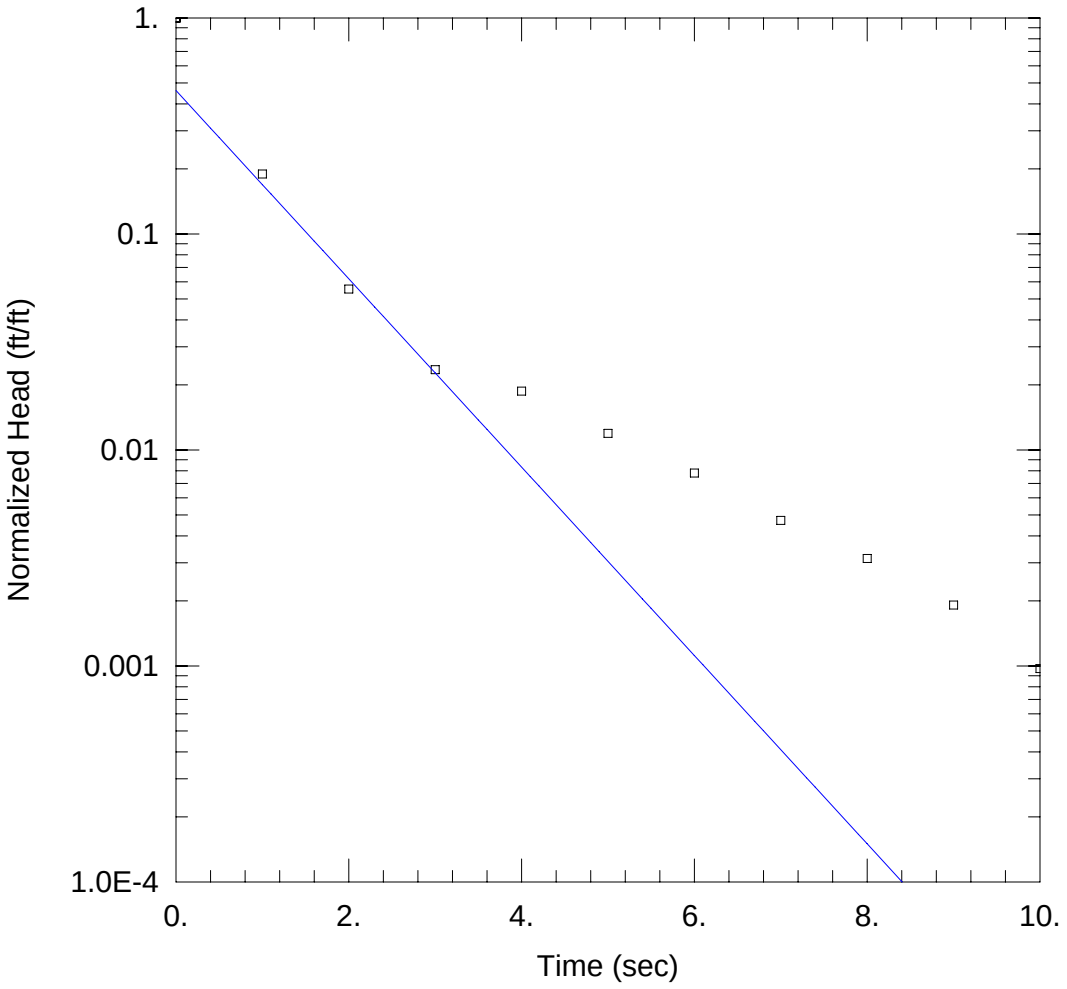
WELL DATA (CI-14-WT)

Initial Displacement: 3.97 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.54 ft
Screen Length: 10. ft
Well Radius: 0.083 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 53.37 ft/day y0 = 1.112 ft



SLUG TEST RESULTS FOR CI-14-35 (RISING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-14-35 RisingHead.aqt
Date: 01/21/11 Time: 15:37:29

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 61.44 ft Anisotropy Ratio (Kz/Kr): 1.

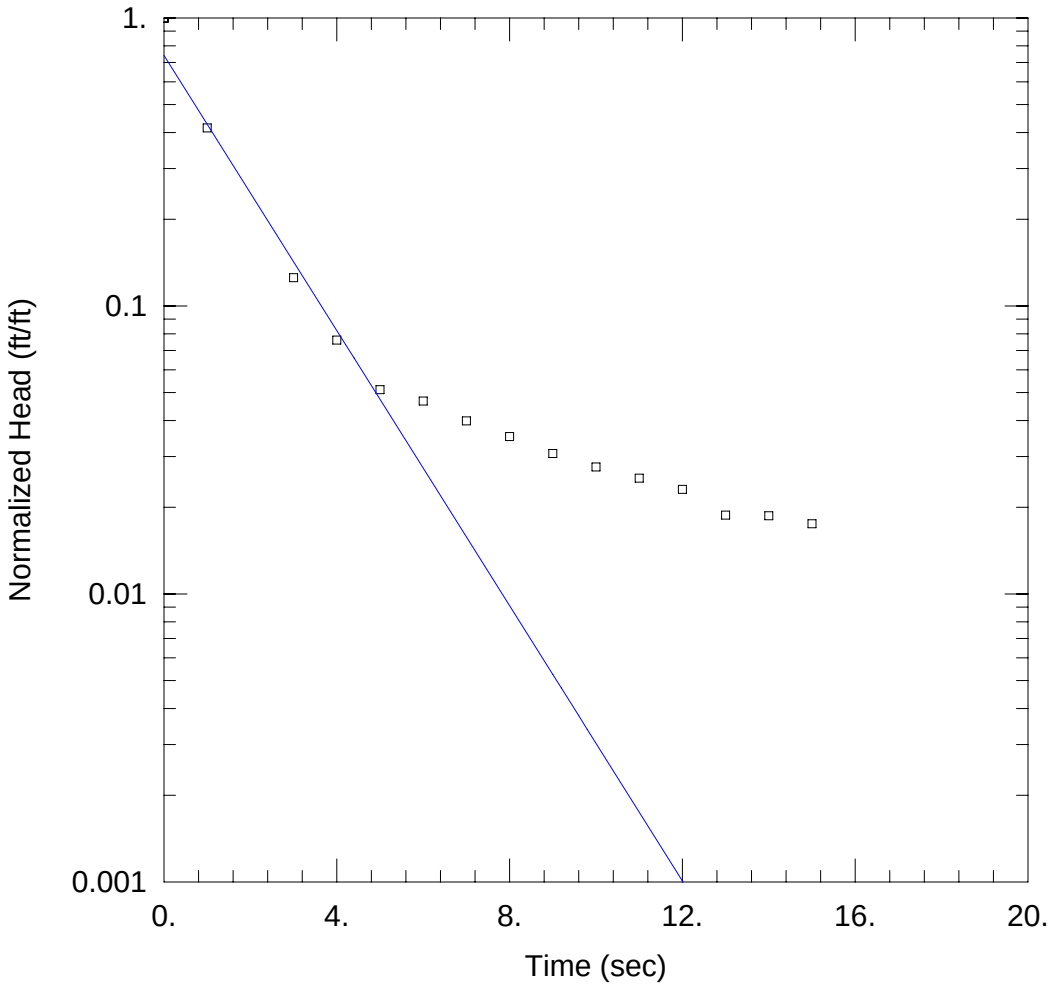
WELL DATA (CI-14-35)

Initial Displacement: 3.7 ft Static Water Column Height: 26.44 ft
Total Well Penetration Depth: 35. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 114.4 ft/day y0 = 1.707 ft



SLUG TEST RESULTS FOR CI-14-35 (FALLING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-14-35 FallingHead.aqt
Date: 01/21/11 Time: 15:37:52

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 61.44 ft Anisotropy Ratio (Kz/Kr): 1.

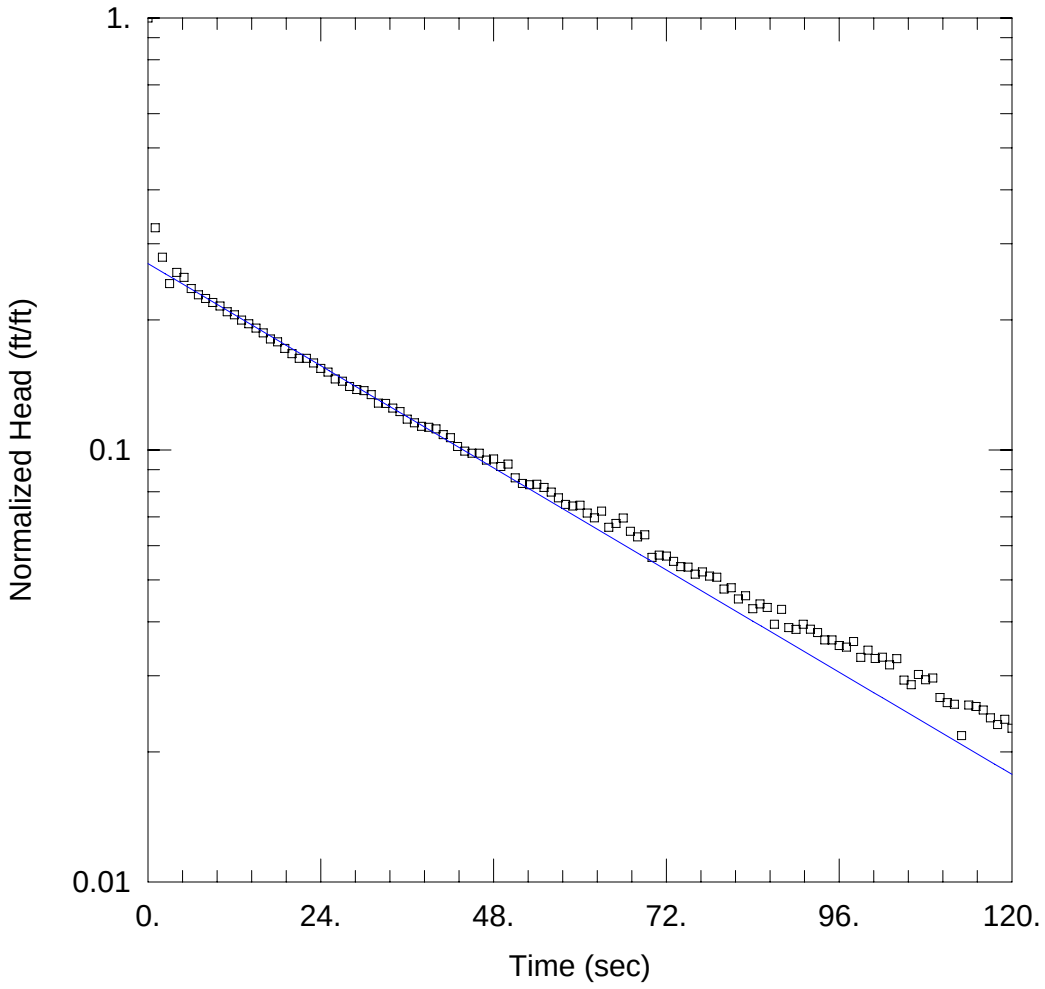
WELL DATA (CI-14-35)

Initial Displacement: 2.29 ft Static Water Column Height: 26.44 ft
Total Well Penetration Depth: 35. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 78.4 ft/day y0 = 1.696 ft



SLUG TEST RESULTS FOR CI-14-70 (RISING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-14-70 RisingHead.aqt
Date: 01/21/11 Time: 15:38:26

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

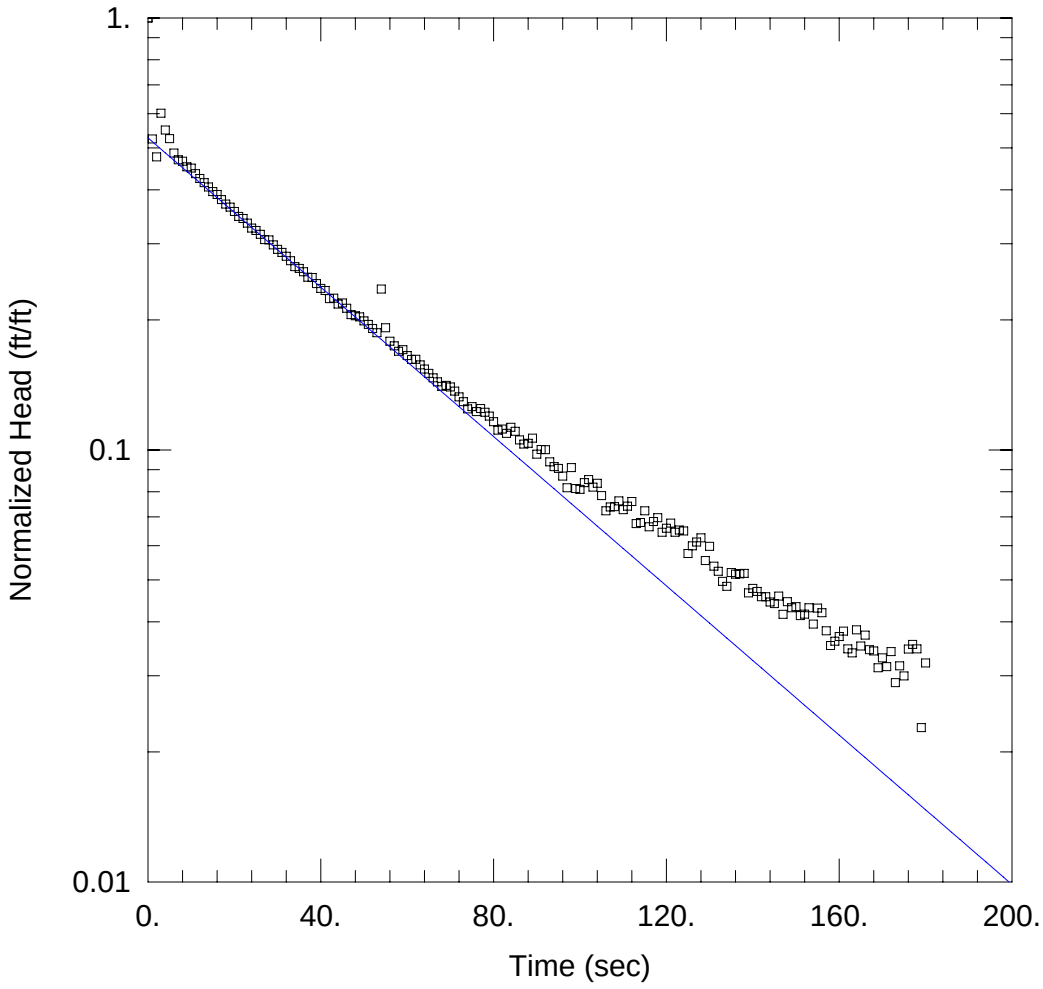
Saturated Thickness: 61.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (CI-14-70)

Initial Displacement: 6.55 ft
Total Well Penetration Depth: 70. ft
Casing Radius: 0.083 ft
Static Water Column Height: 61.3 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.305 ft/day
y0 = 1.769 ft



SLUG TEST RESULTS FOR CI-14-70 (FALLING HEAD)

Data Set: N:\Farallon\Capital Industries\Slug Testing Aug 2010\Aqtesolv Files\CI-14-70 FallingHead.aqt
Date: 01/21/11 Time: 15:38:52

PROJECT INFORMATION

Company: Farallon Consulting
Client: Capital
Test Date: 8-6-10

AQUIFER DATA

Saturated Thickness: 61.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (CI-14-70)

Initial Displacement: 3.01 ft
Total Well Penetration Depth: 70. ft
Casing Radius: 0.083 ft
Static Water Column Height: 61.3 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.898 ft/day
y0 = 1.588 ft

ATTACHMENT E
REFERENCES

TIDAL STUDY AND
AQUIFER CHARACTERIZATION RESULTS
Capital Industries
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-004

ATTACHMENT E
REFERENCES

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Serfes, M.E. 1991. "Determining the Mean Hydraulic Gradient of Ground Water Affected by Tidal Fluctuations." *Ground Water* 29 (no. 4): 549 – 555.

Springer, R.K. and L.W. Gelhar. 1991. *Characterization of Large-Scale Aquifer Heterogeneity in Glacial Outwash by Analysis of Slug Tests with Oscillatory Response, Cape Cod, Massachusetts.* U.S. Geological Survey Water Resources Investigation Report 91-4034. pp. 36-40.

Table 1
Tidally Averaged Groundwater Elevations
Capital Industries
July 30 - August 2, 2011

Well ID	Tidally Averaged Groundwater Elevation
CI-10-WT	7.53
CI-10-35	7.48
CI-10-65	7.38
CI-11-WT	6.73
CI-11-30	6.53
CI-11-60	7.32
CI-12-WT	6.51
CI-12-30	6.51
CI-12-60	6.75
CI-13-WT	5.93
CI-13-30	5.90
CI-13-60	4.65
CI-14-WT	6.97
CI-14-35	6.94
CI-14-70	7.22
CI-15-40	7.33
CI-15-60	7.30

Notes:

Groundwater elevations reported in feet above mean sea level (msl)

Groundwater elevations calculated using Serfes (1991) method for 72-hour tidal cycle

Table 2
Tidally Averaged Groundwater Elevations
Capital Industries
April 21 - 23, 2012

Well ID	Tidally Averaged Groundwater Elevation
CI-10-WT	7.83
CI-10-35	7.94
CI-10-65	7.89
CI-11-WT	7.16
CI-11-30	7.28
CI-11-60	7.32
CI-12-WT	--
CI-12-30	--
CI-12-60	--
CI-13-WT	6.25
CI-13-30	6.36
CI-13-60	6.26
CI-14-WT	7.41
CI-14-35	7.42
CI-14-70	7.33
CI-15-40	7.73
CI-15-60	7.69
CI-16-WT	6.61
CI-16-30	6.57
CI-16-60	6.56
CI-17-WT	6.01
CI-17-30	5.97
CI-18-WT	6.38
CI-18-30	6.35
CI-19-WT	10.33
CI-19-30	4.76

Notes:

Groundwater elevations reported in feet above mean sea level (msl)

Groundwater elevations calculated using Serfes (1991) method for 72-hour tidal cycle

-- = wells were flooded at time of tidal study; data not available during tidal study period

Table 3

Average Horizontal Gradient and Flow Direction
Capital Industries Tidal Investigation
2011 and 2012 Tidal Studies

Well ID	Average Gradient/Flow Direction	
	July 30-August 2, 2011	April 21-23, 2012
Water Table Zone	0.0025/SW	0.0025/SW
Shallow Zone	0.0025/SW	0.0029/SW
Intermediate Zone	0.005/SW	0.0028/SW

Notes:
Flow direction and gradient calculated using tidally averaged groundwater elevations and contour maps

Table 4
Vertical Gradients Calculated from Paired Monitoring Wells
Capital Industries Tidal Investigation
April 21 - 23, 2012

Monitoring Well Pair	Well Screen Midpoint Elevation[1] (feet msl)	April 21 - 23, 2012 Avg. Groundwater Elevation (feet msl)	Average Vertical Hydraulic Gradient[2] (feet/foot)	Direction of Vertical Gradient[3]
CI-10-WT	0.68	7.83	0.0073	Upward
CI-10-35	-14.32	7.94		
CI-10-35	-14.32	7.94	-0.0018	Downward
CI-10-65	-41.87	7.89		
CI-11-WT	-1.58	7.16	0.0119	Upward
CI-11-30	-11.68	7.28		
CI-11-30	-11.68	7.28	0.0013	Upward
CI-11-60	-41.49	7.32		
CI-13-WT	0.58	6.25	0.0113	Upward
CI-13-30	-9.17	6.36		
CI-13-30	-9.17	6.36	-0.0033	Downward
CI-13-60	-39.70	6.26		
CI-14-WT	0.08	7.41	0.0007	Upward
CI-14-35	-14.88	7.42		
CI-14-35	-14.88	7.42	-0.0026	Downward
CI-14-70	-49.87	7.33		
CI-15-40	-18.40	7.73	-0.0020	Downward
CI-15-60	-38.42	7.69		
CI-16-WT	-0.60	6.61	-0.0040	Downward
CI-16-30	-10.52	6.57		
CI-16-30	-10.52	6.57	-0.0003	Downward
CI-16-60	-40.43	6.56		
CI-17-WT	-0.28	6.01	-0.0039	Downward
CI-17-30	-10.42	5.97		
CI-18-WT	1.56	6.38	-0.0031	Downward
CI-18-30	-8.26	6.35		
CI-19-WT[4]	0.79	10.33	-0.5450	Downward
CI-19-30	-9.43	4.76		

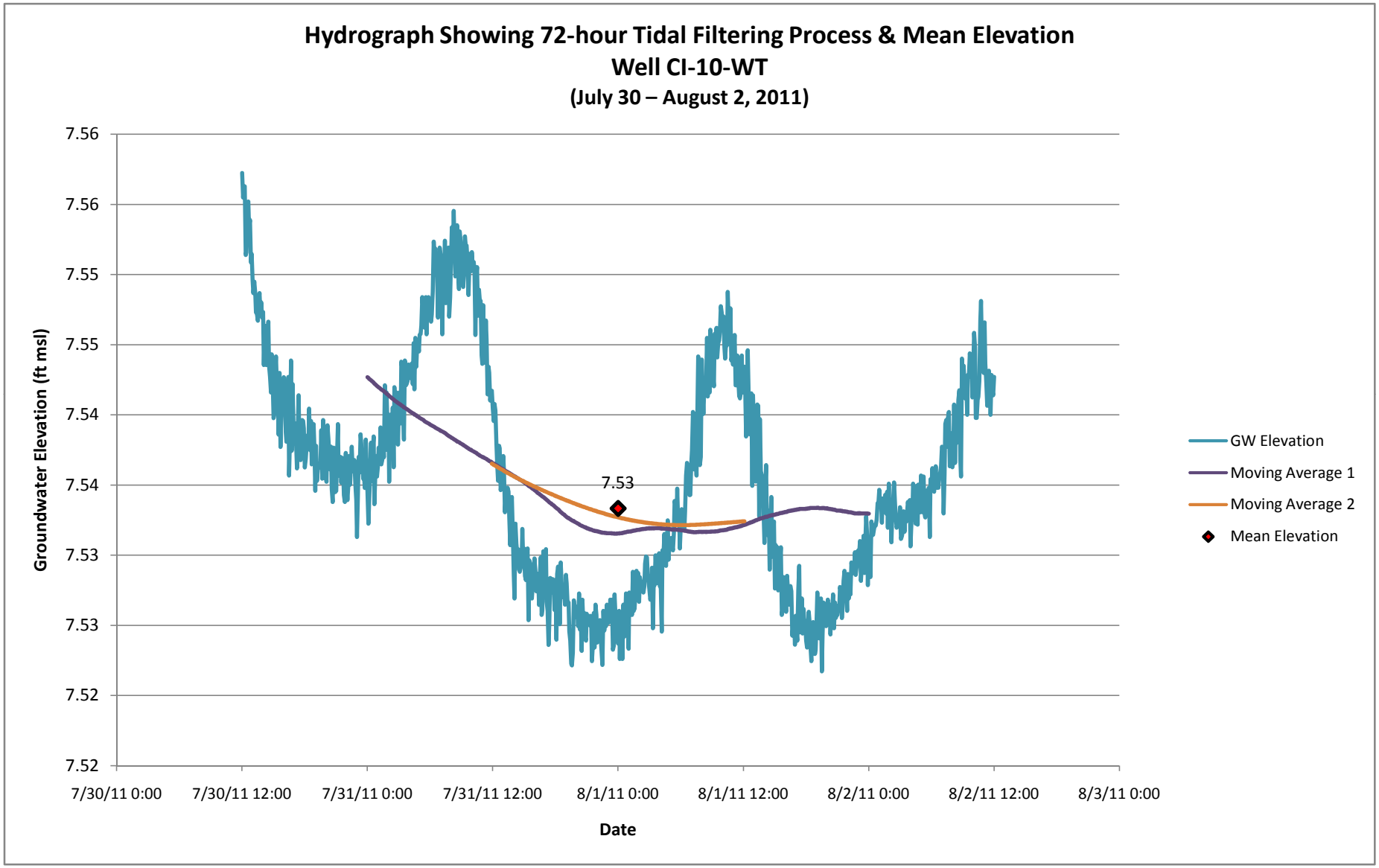
Notes:

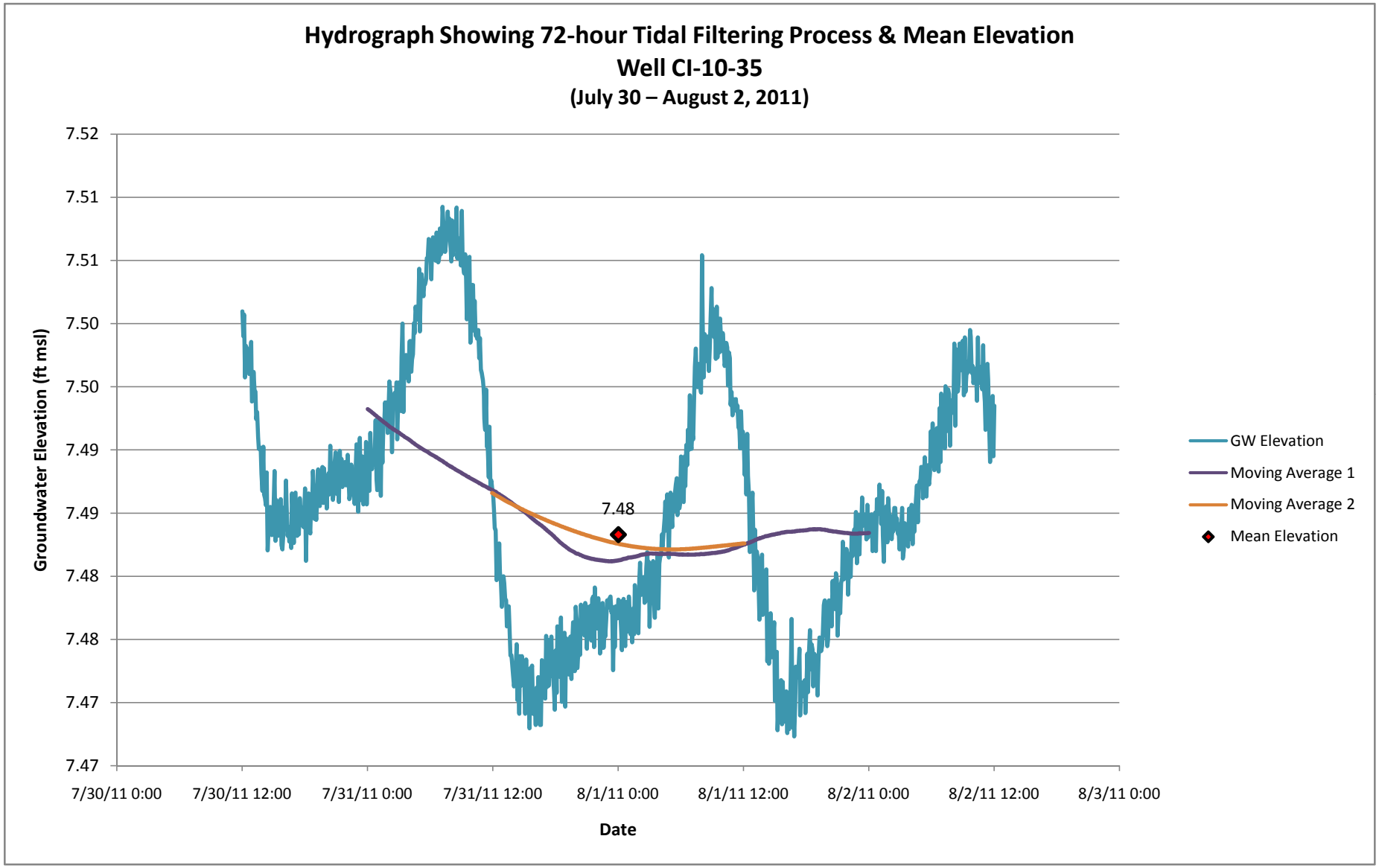
[1] Only the saturated portions of water table zone monitoring well screens that were fully submerged were used to calculate the midpoint elevations.

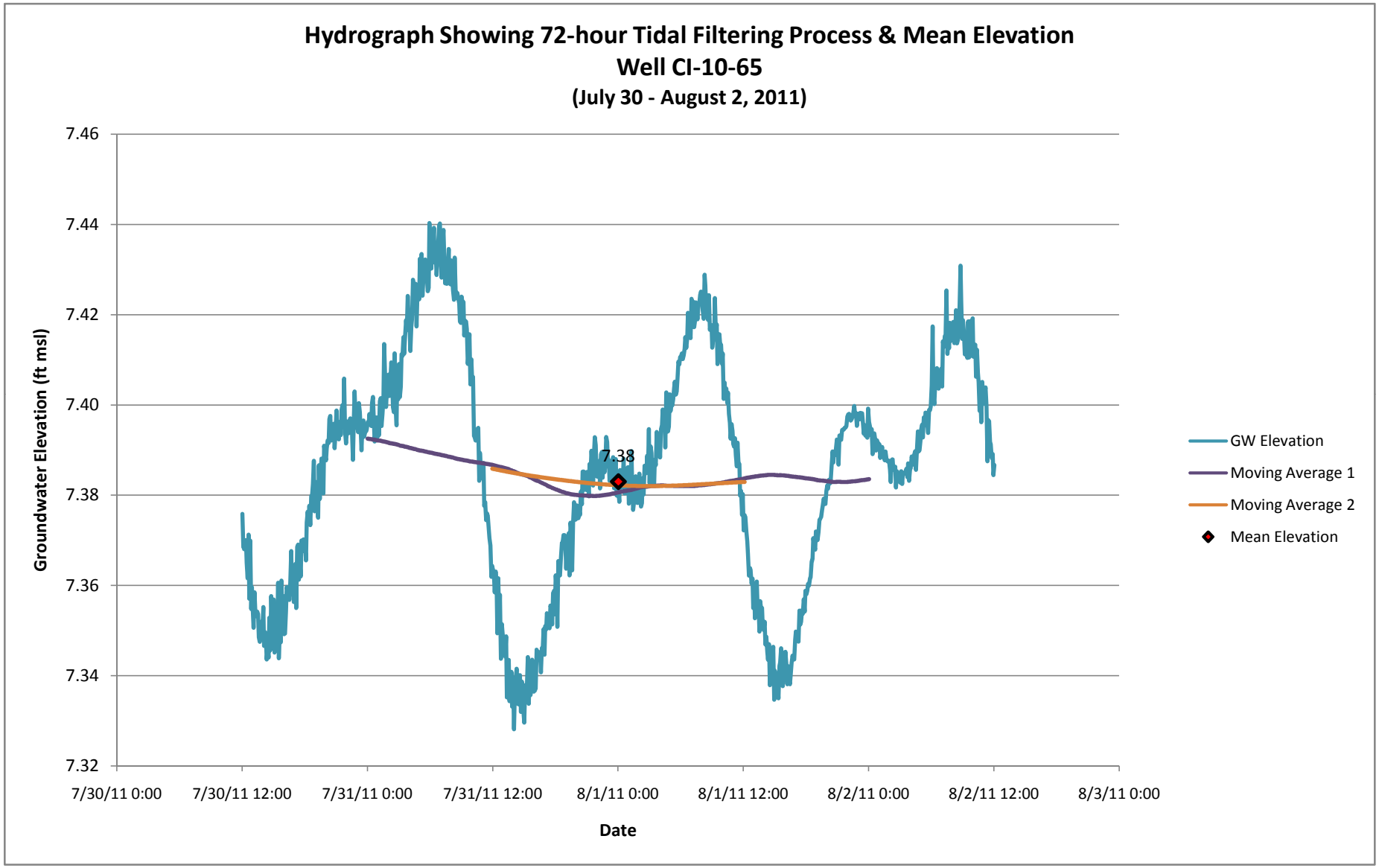
[2] Vertical hydraulic gradients were calculated by dividing the difference in groundwater elevations by the difference in well screen midpoint elevations for each well pair.

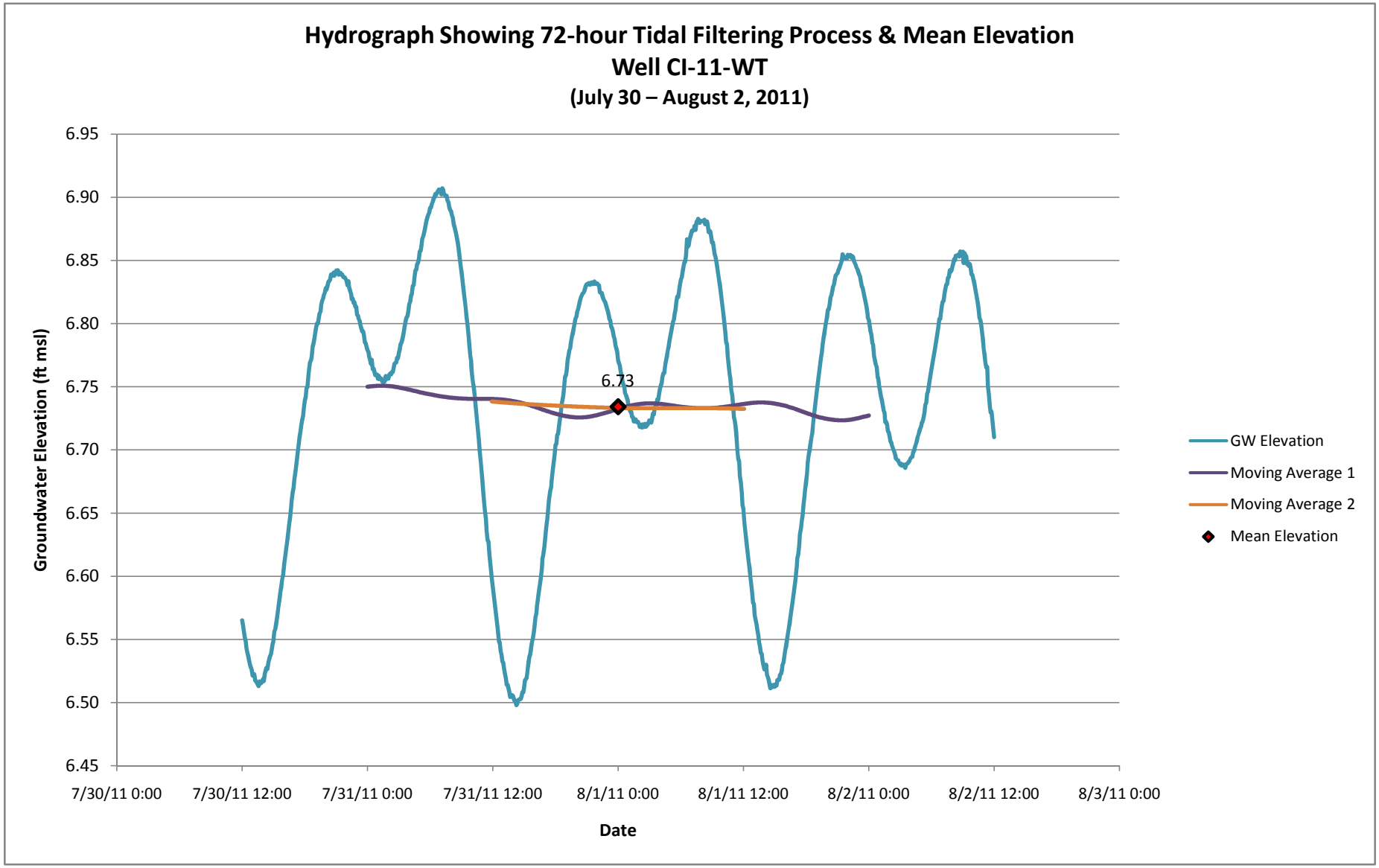
[3] An upward vertical gradient is indicated when the groundwater elevation of the lower water bearing zone is higher than the ground-water elevation of the upper water bearing zone. A downward vertical gradient is indicated when the groundwater elevation of the lower water bearing zone is less than the groundwater elevation of the upper water bearing zone.

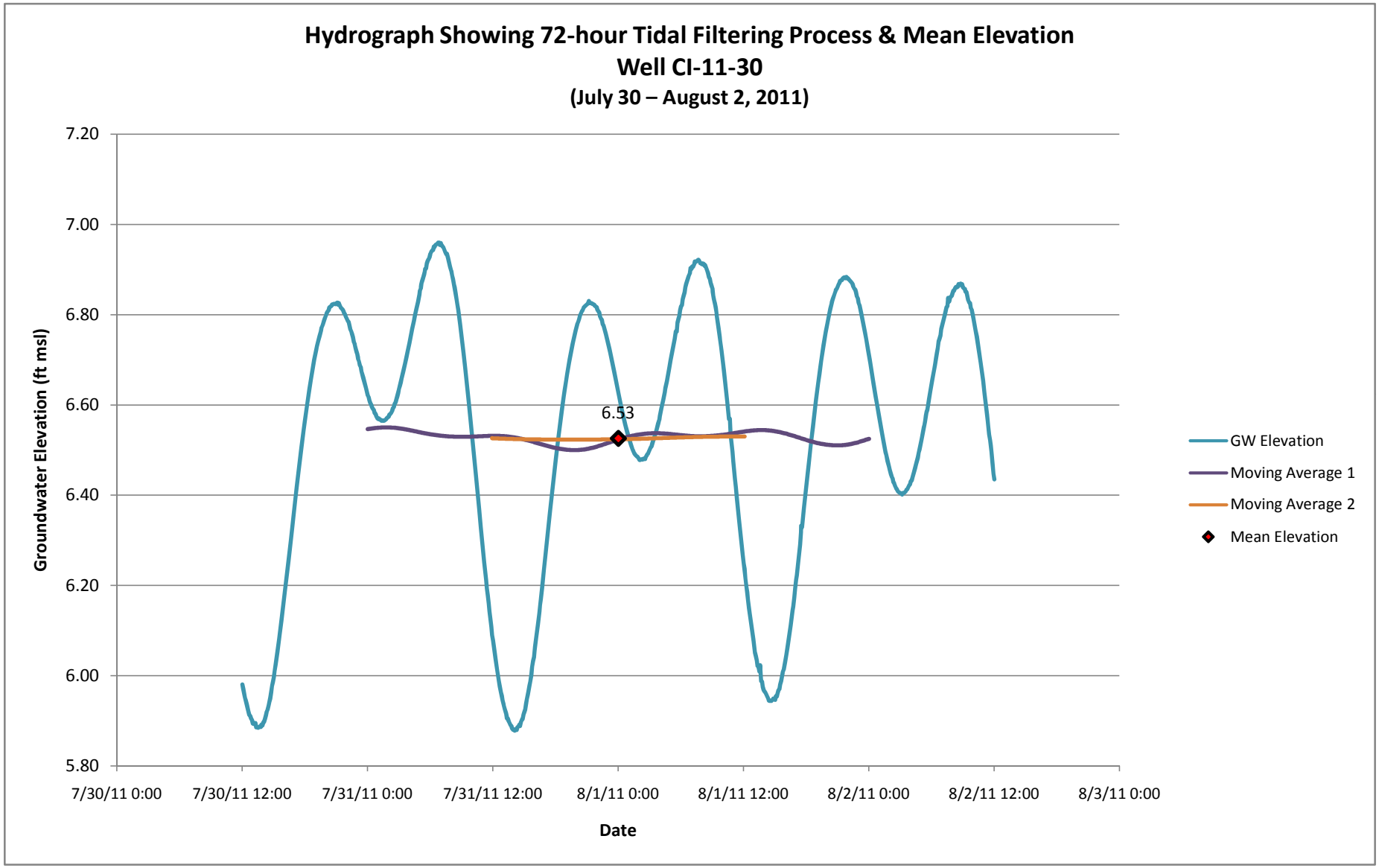
[4] Anomalous elevation in CI-19-WT

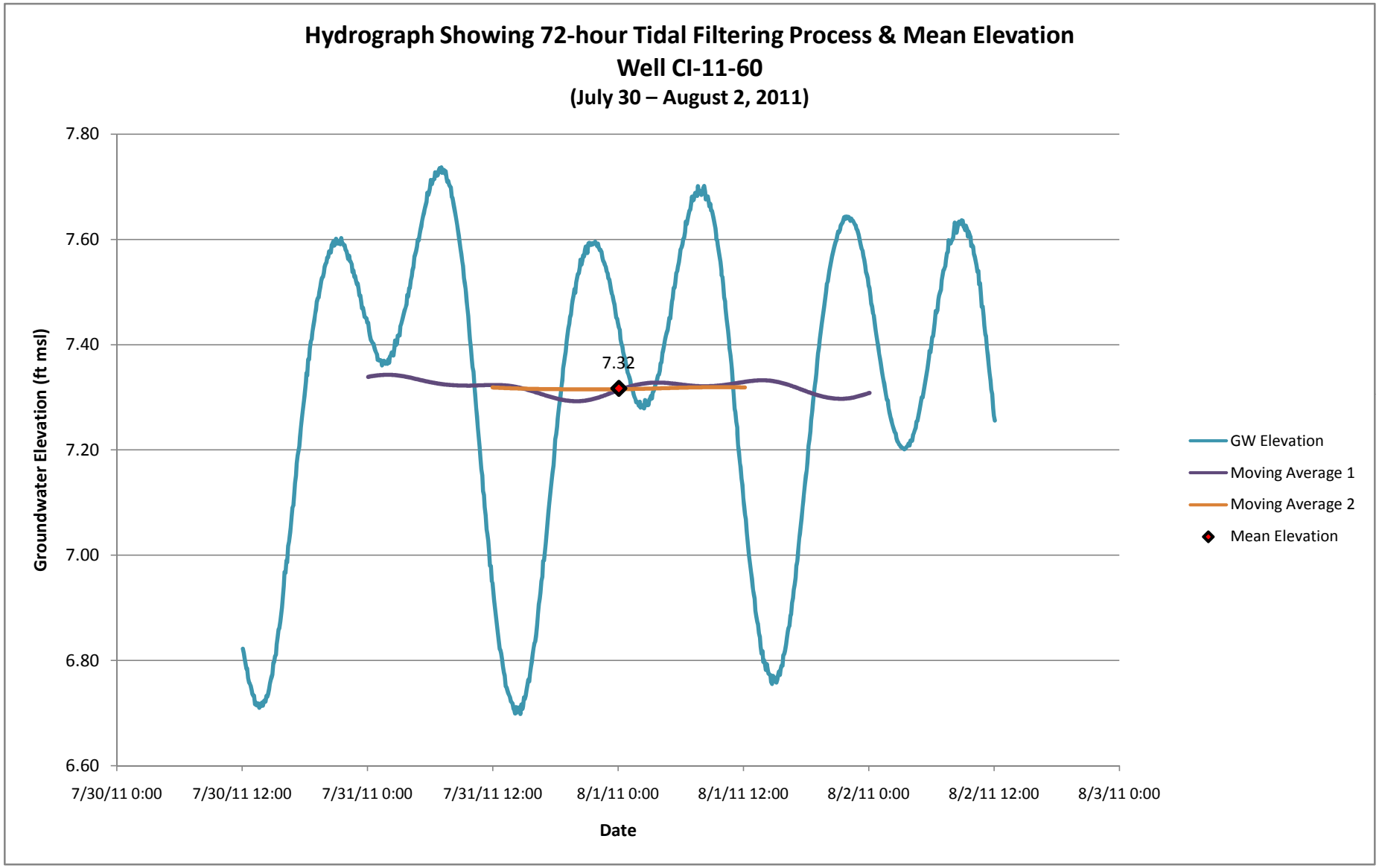

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-WT
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.56
7.56
7.55
7.55
7.54
7.54
7.53
7.53
7.52
7.52
7.53
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

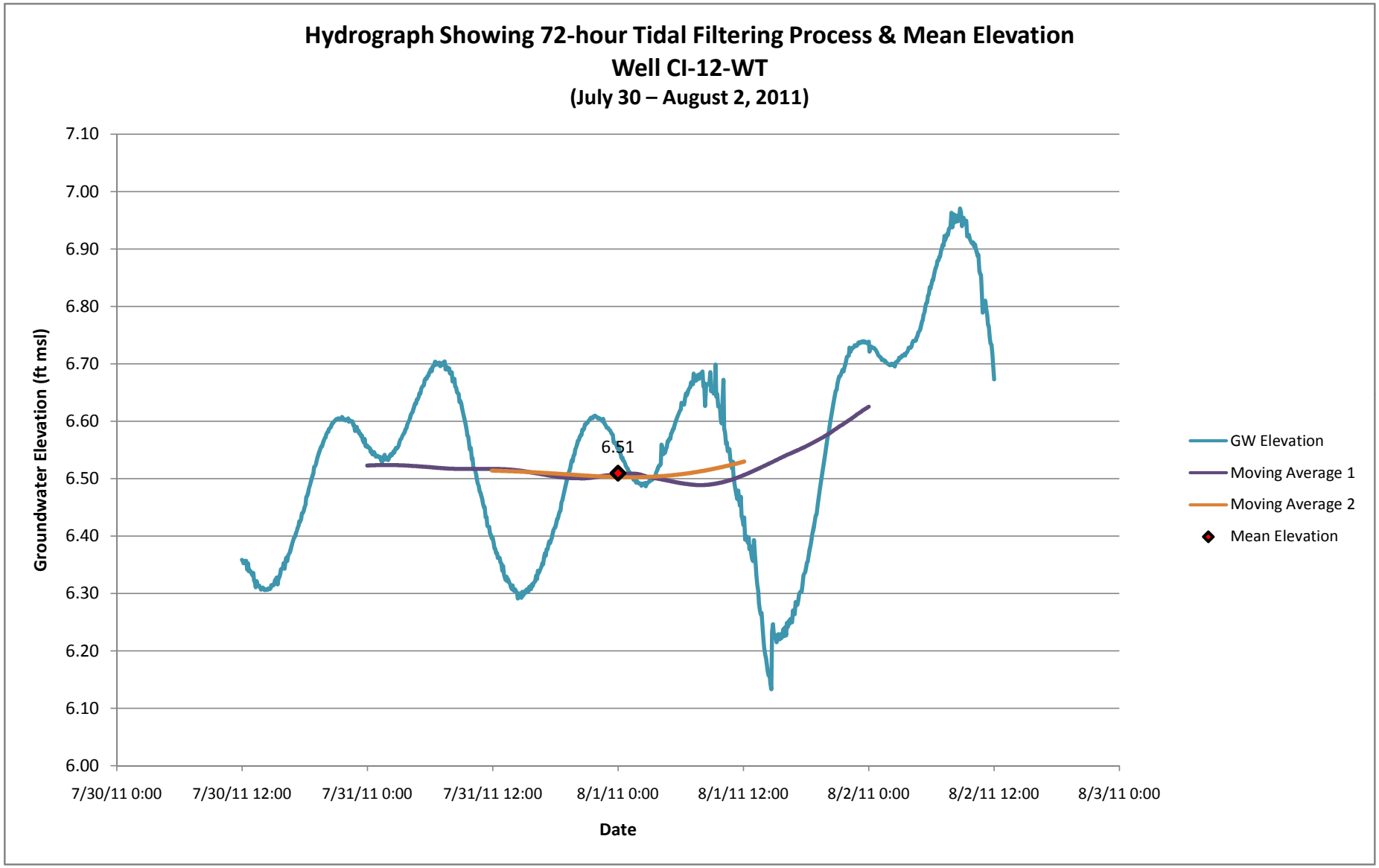

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-35
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.52
7.51
7.51
7.50
7.50
7.49
7.49
7.48
7.48
7.47
7.47
7.48
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

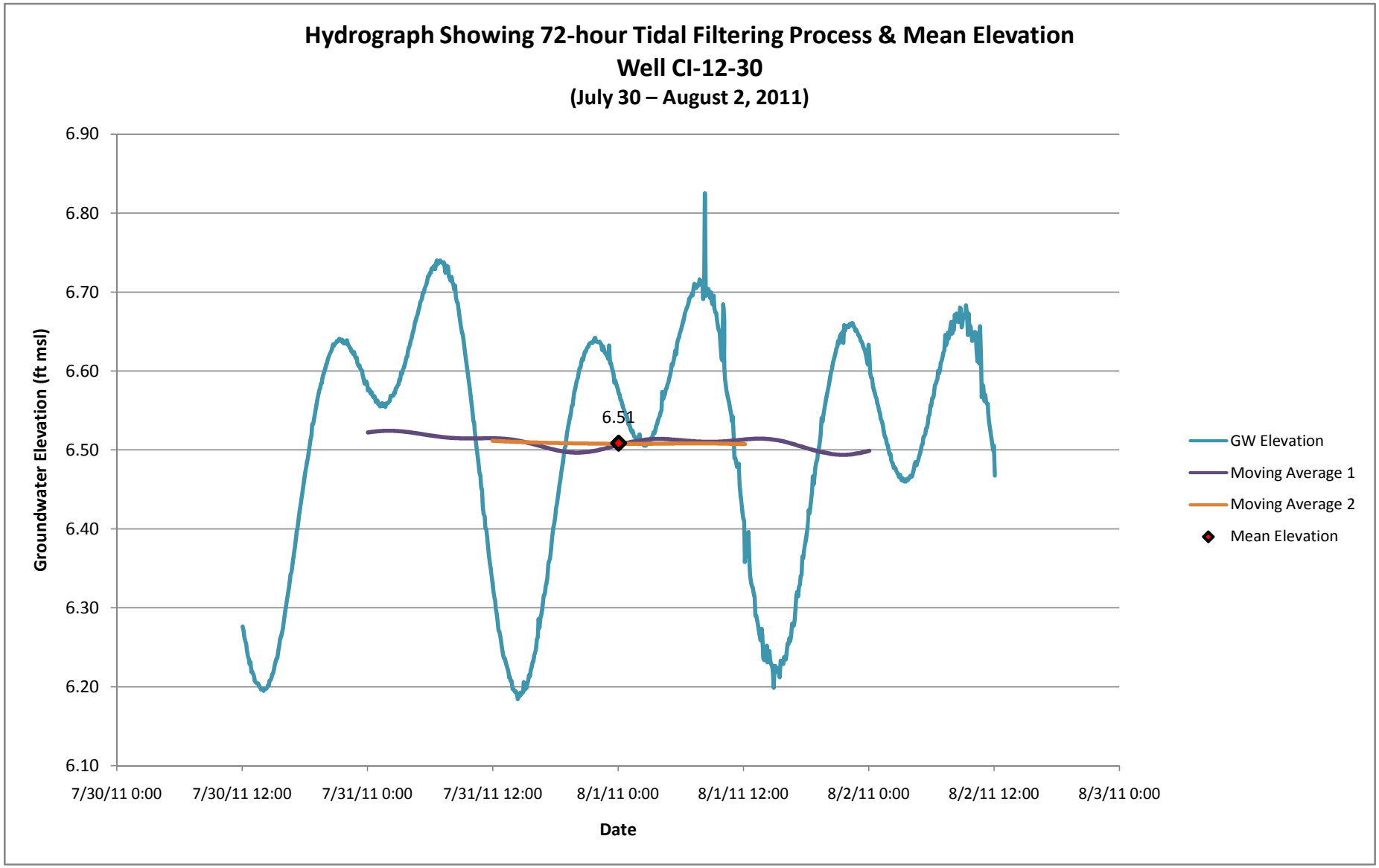

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-65
(July 30 - August 2, 2011)
Groundwater Elevation (ft msl)
7.46
7.44
7.42
7.40
7.38
7.36
7.34
7.32
7.38
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

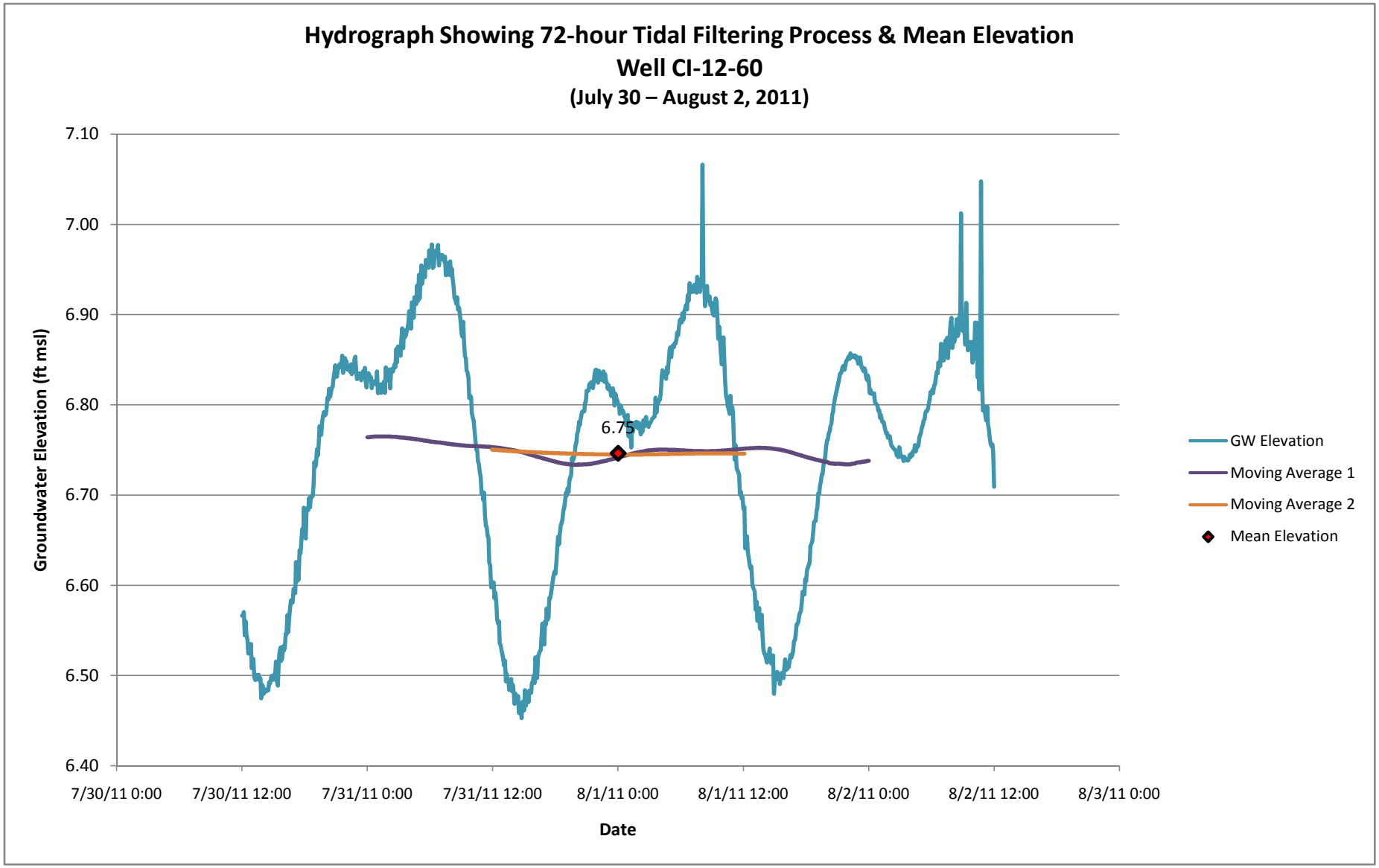

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-WT
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
6.95
6.90
6.85
6.80
6.75
6.70
6.65
6.60
6.55
6.50
6.45
6.73
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

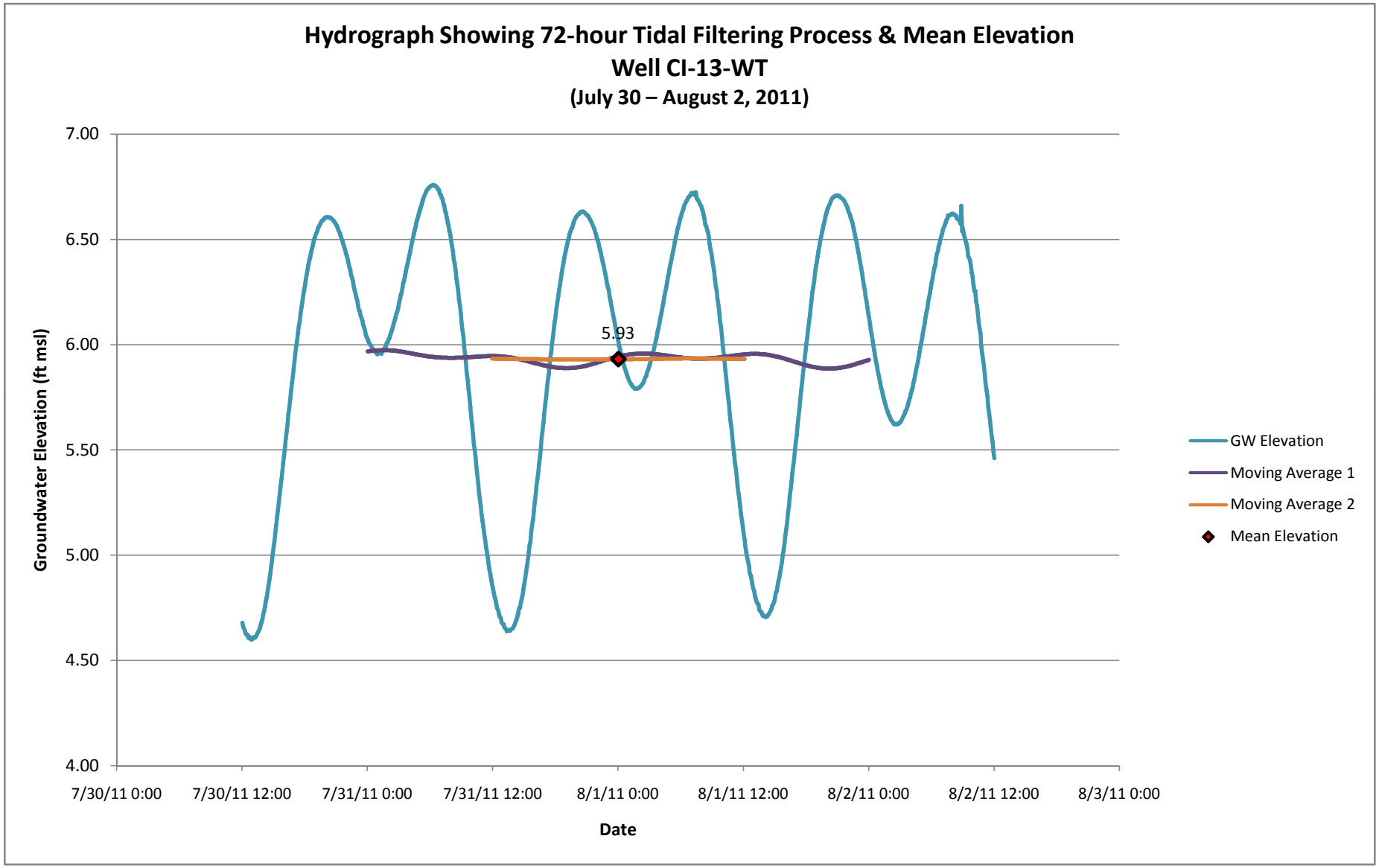

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-30
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.20
7.00
6.80
6.60
6.40
6.20
6.00
5.80
6.53
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

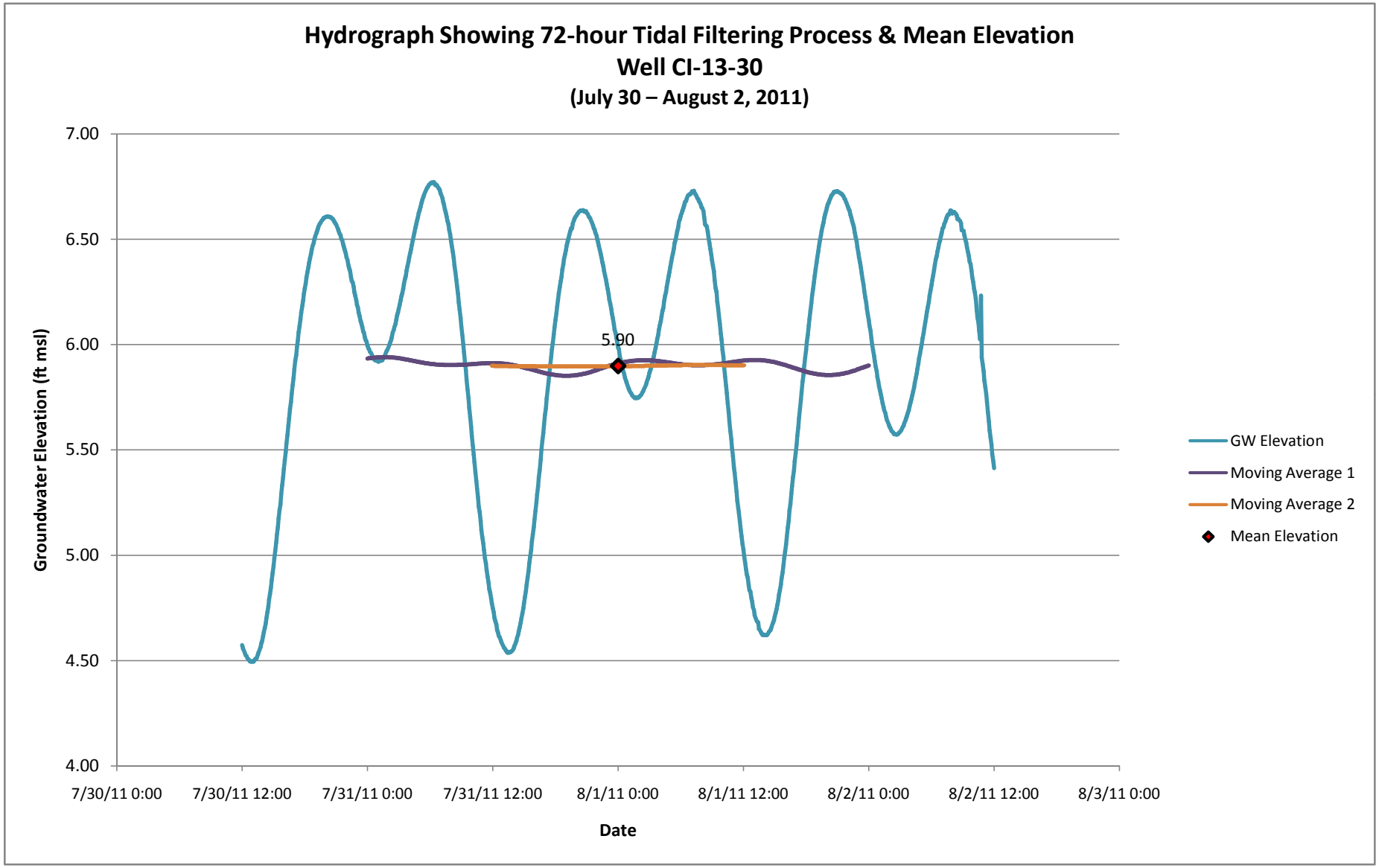

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-60
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.80
7.60
7.40
7.20
7.00
6.80
6.60
7.32
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

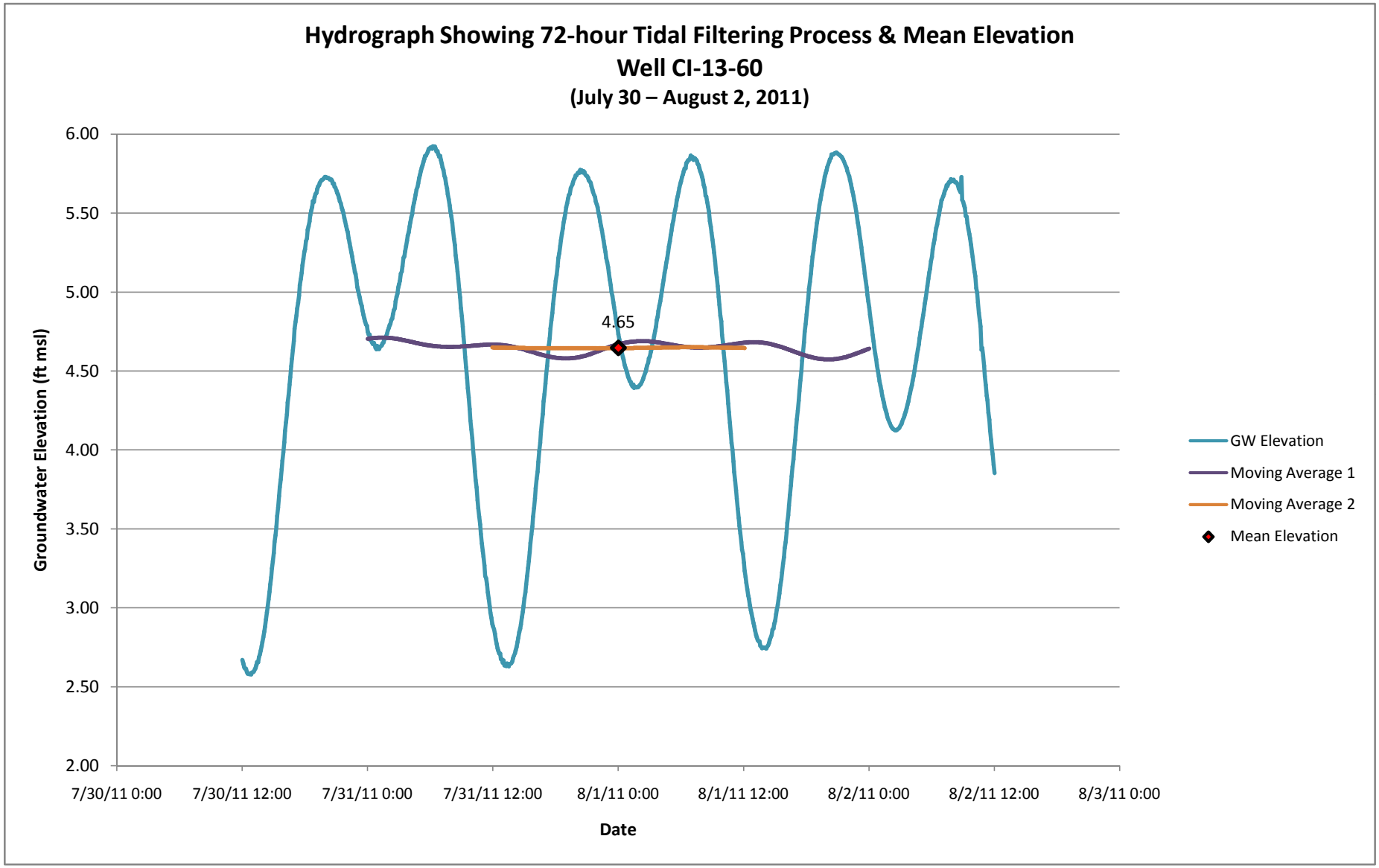

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-12-WT
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.10
7.00
6.90
6.80
6.70
6.60
6.50
6.40
6.30
6.20
6.10
6.00
6.51
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

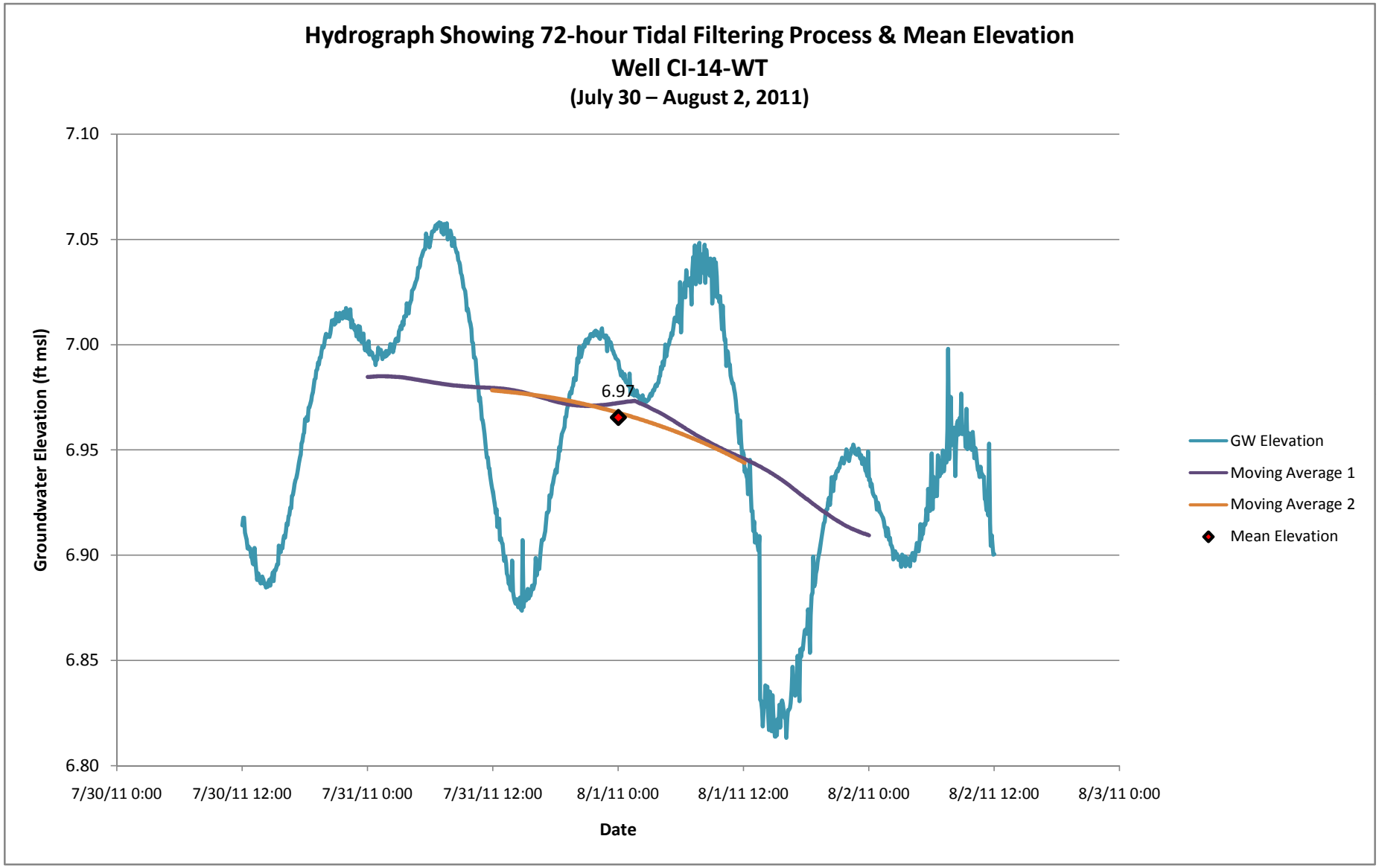

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-12-30
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
6.90
6.80
6.70
6.60
6.50
6.40
6.30
6.20
6.10
6.51
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

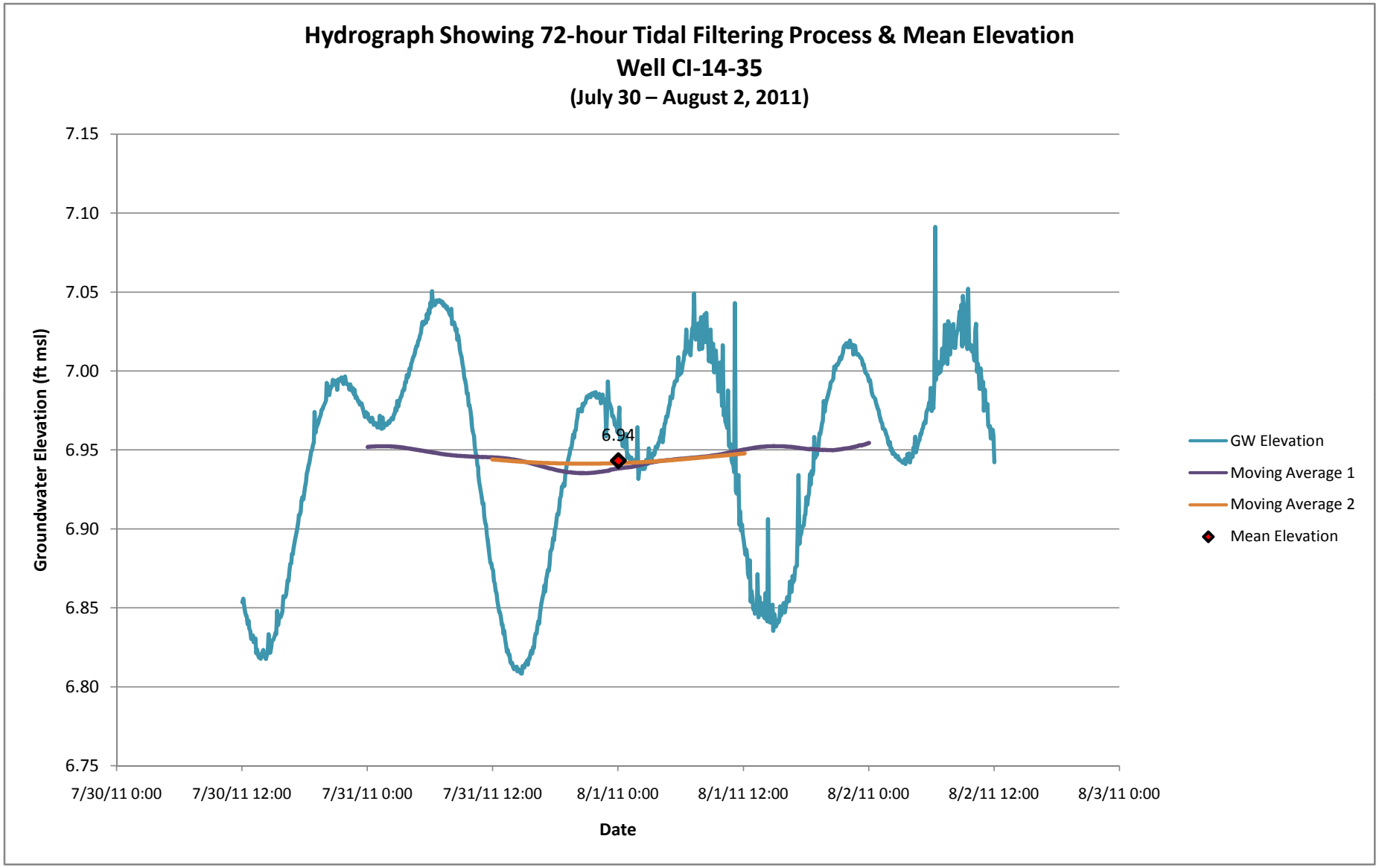

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-12-60
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.10
7.00
6.90
6.80
6.70
6.60
6.50
6.40
6.75
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

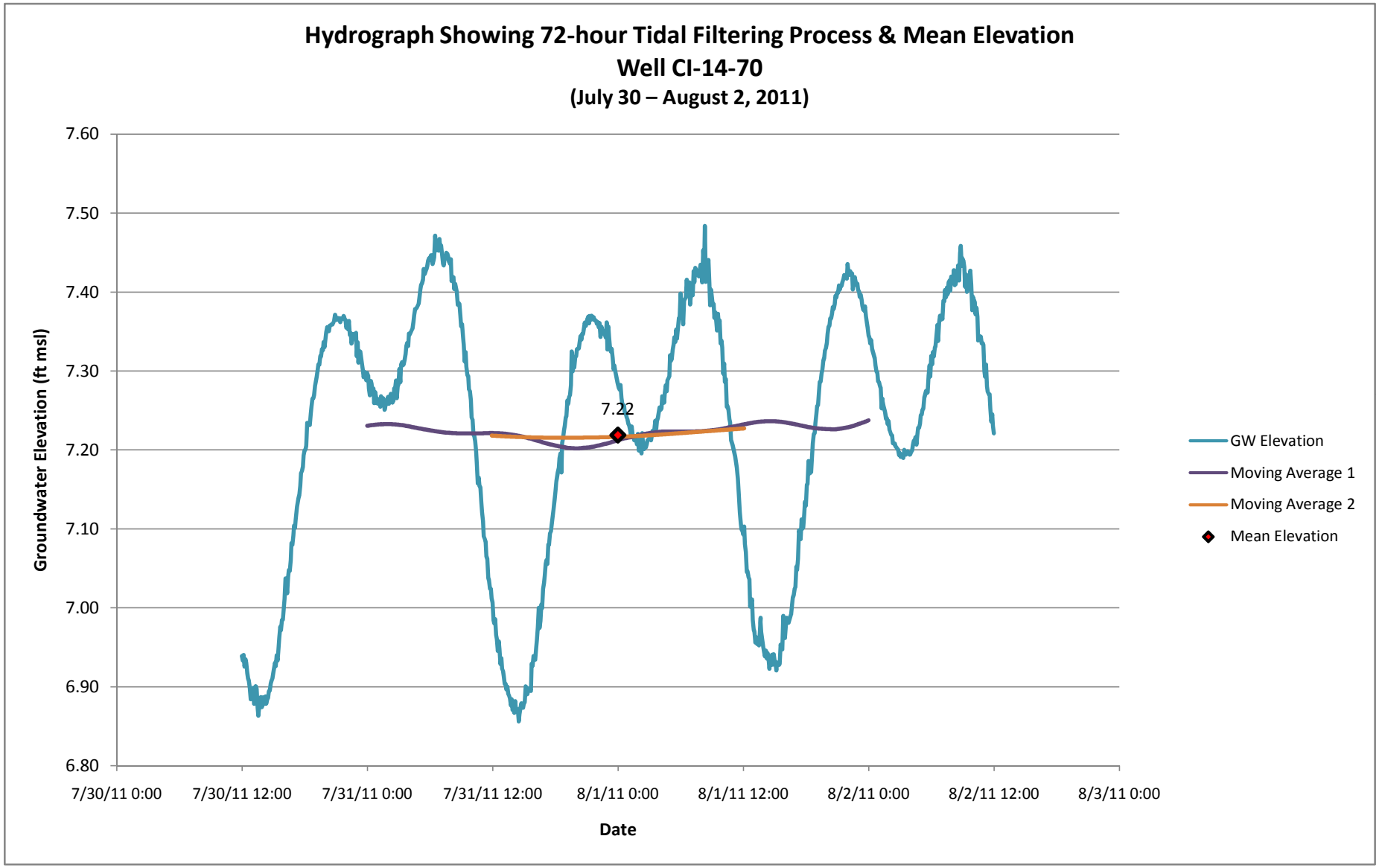

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-WT
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.00
6.50
6.00
5.50
5.00
4.50
4.00
5.93
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

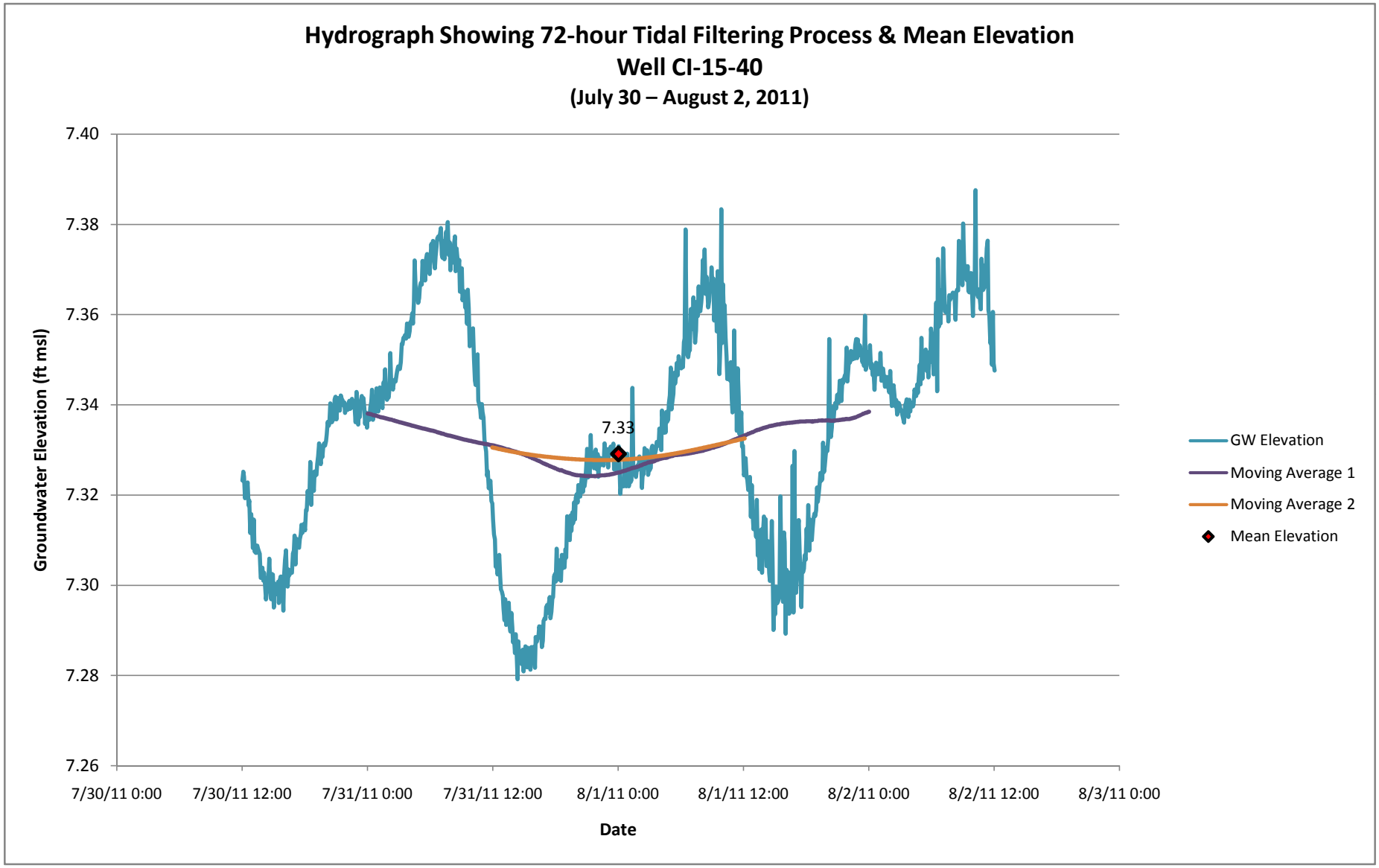

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-30
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.00
6.50
6.00
5.50
5.00
4.50
4.00
5.90
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

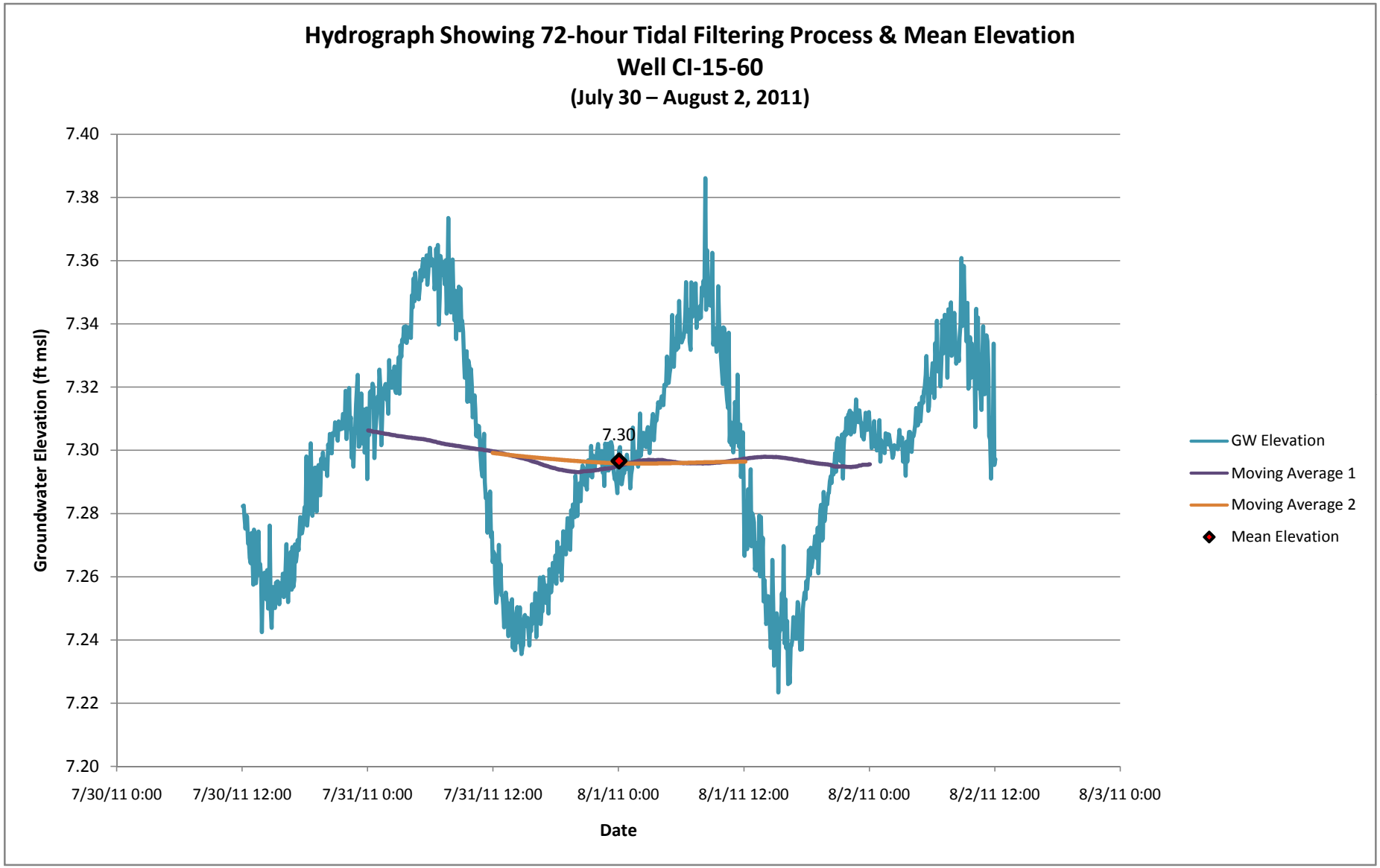

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-60
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
4.65
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

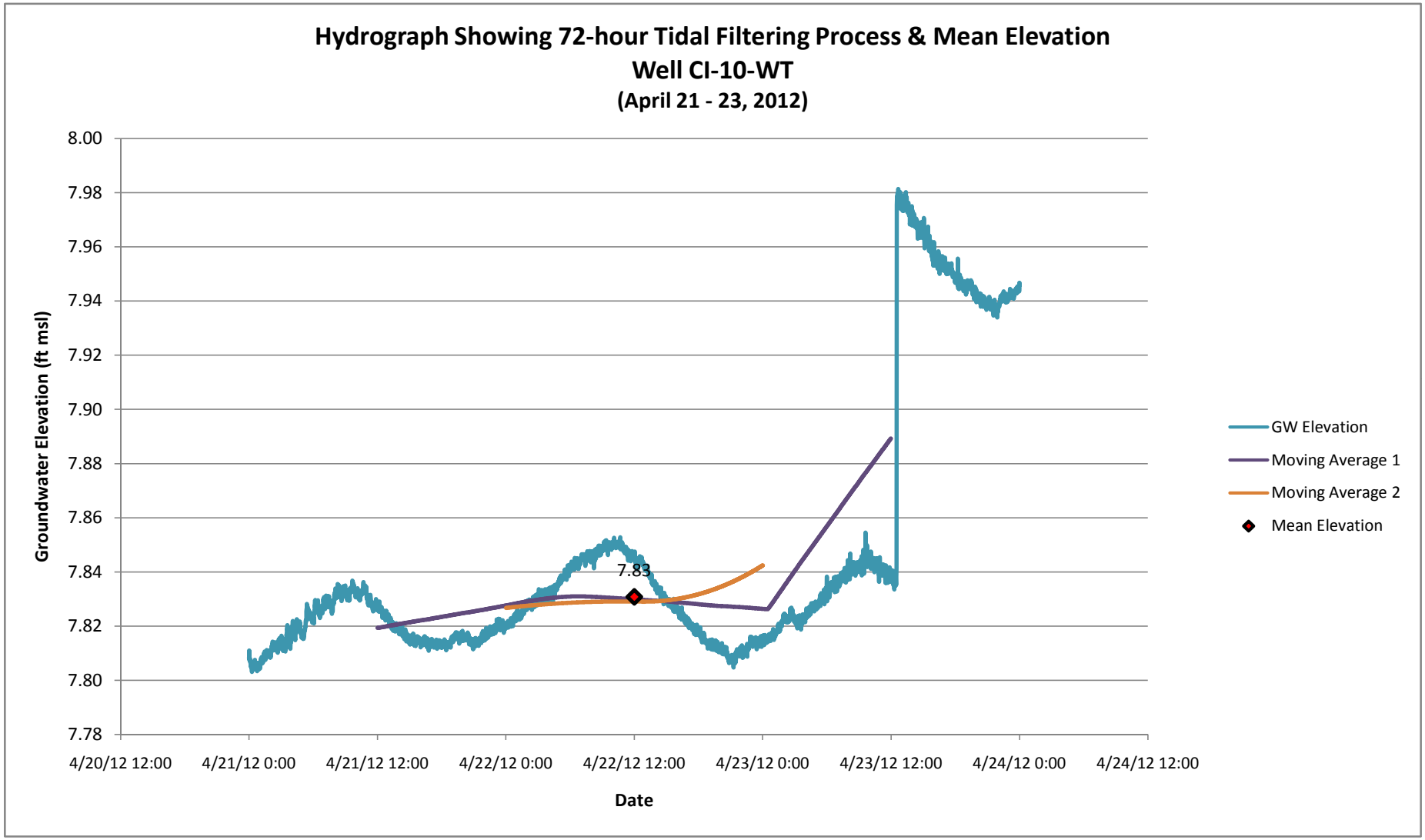

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-WT
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.10
7.05
7.00
6.95
6.90
6.85
6.80
6.97
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

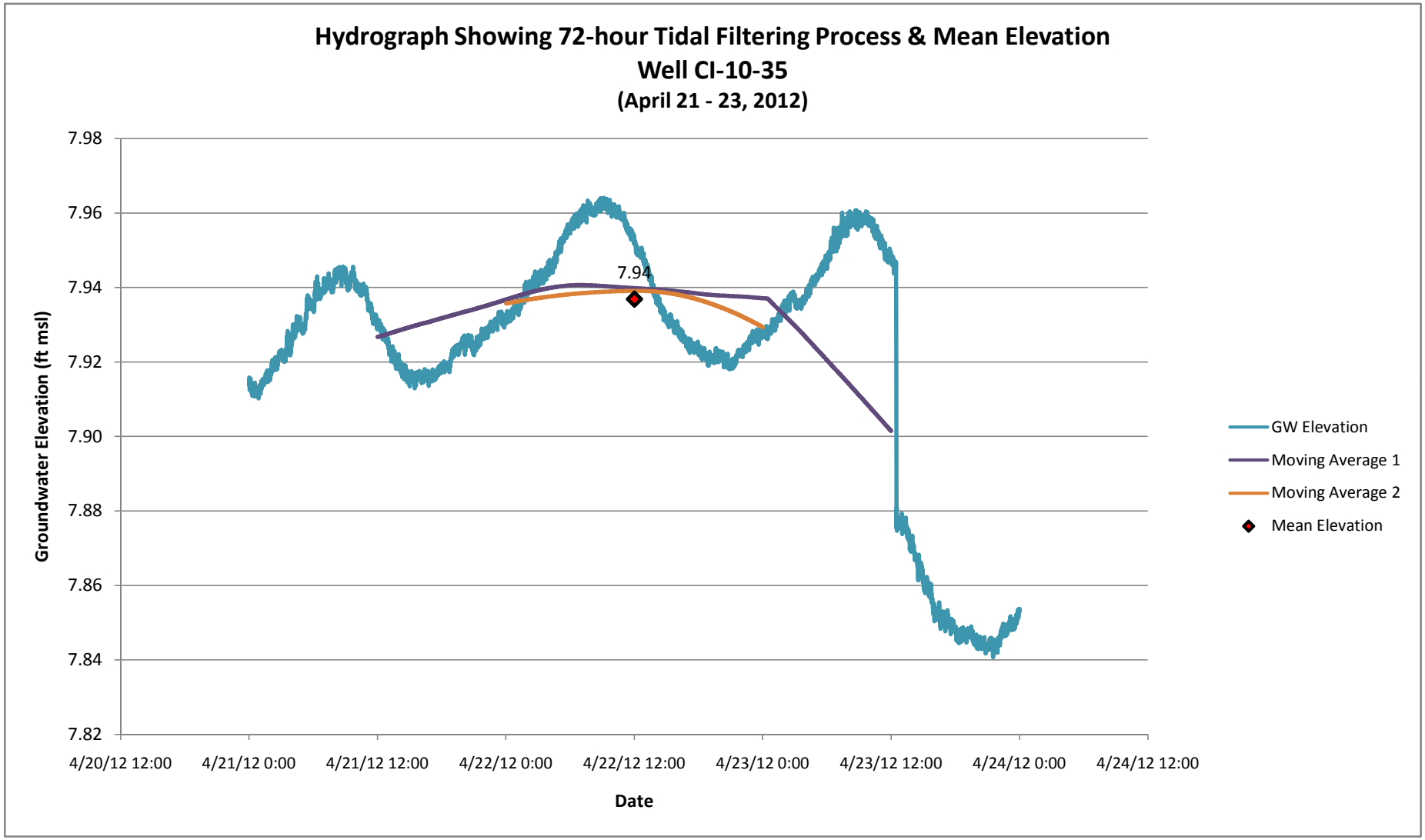

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-35
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.15
7.10
7.05
7.00
6.95
6.90
6.85
6.80
6.75
6.94
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

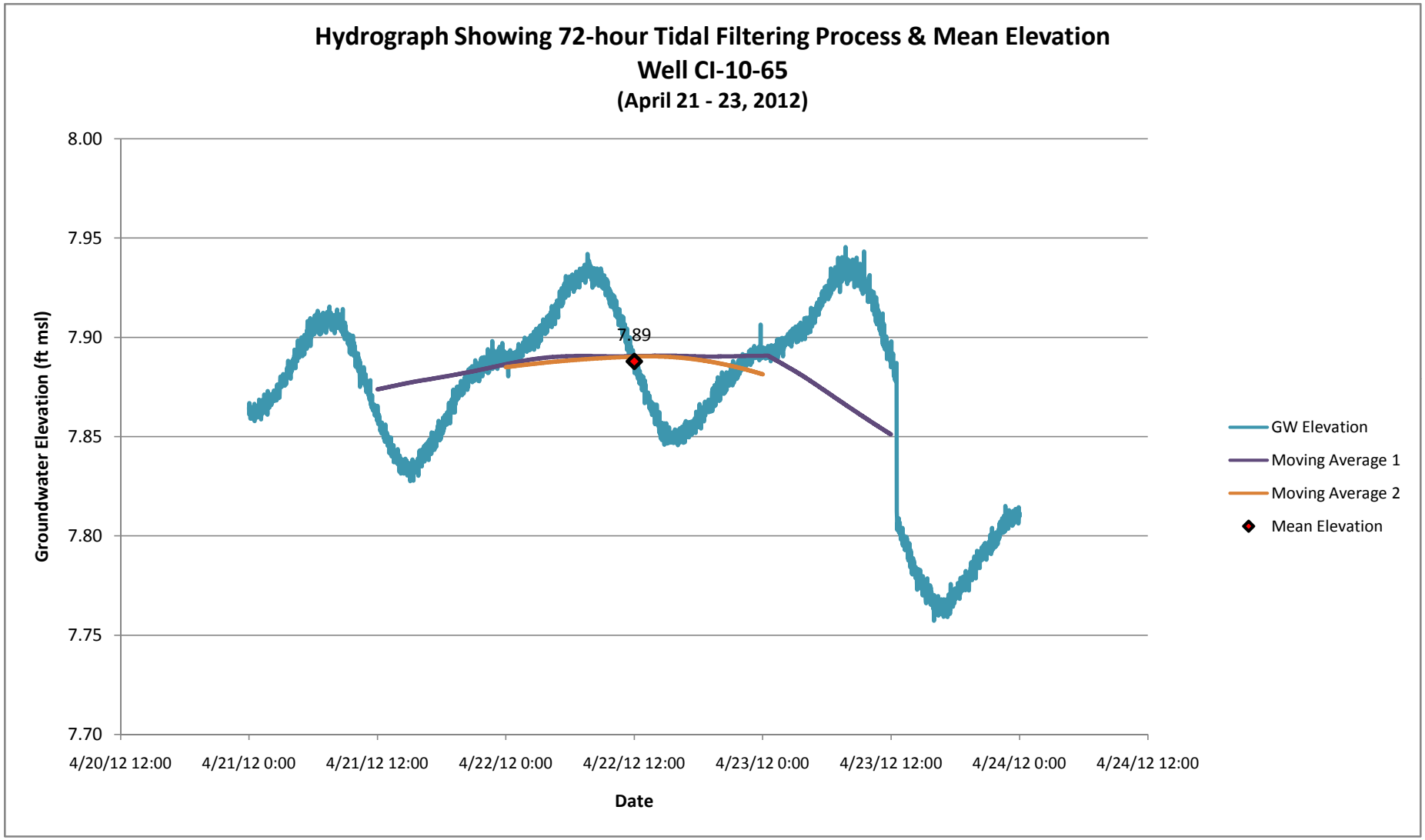

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-70
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.60
7.50
7.40
7.30
7.20
7.10
7.00
6.90
6.80
7.22
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

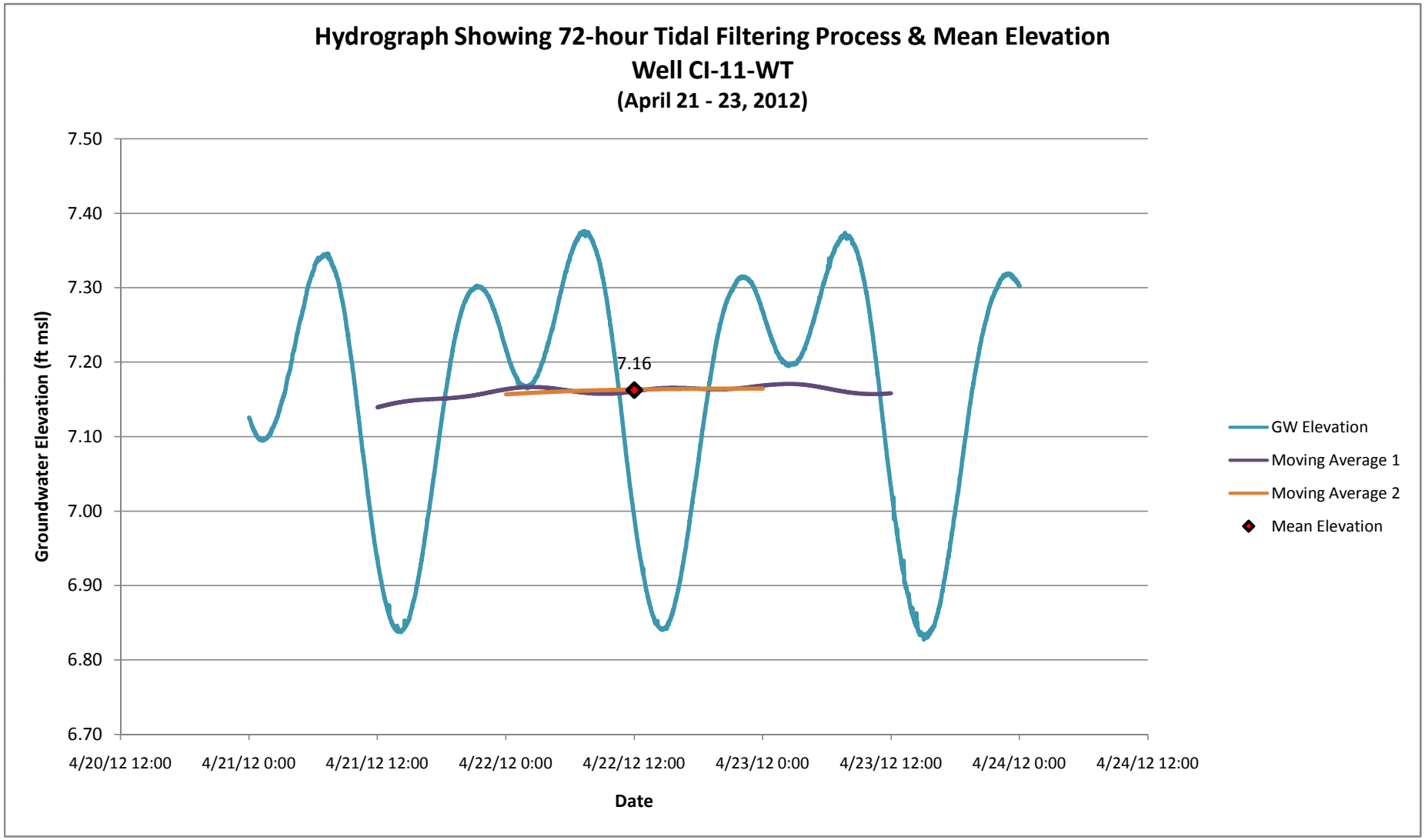

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-15-40
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.40
7.38
7.36
7.34
7.32
7.30
7.28
7.26
7.33
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

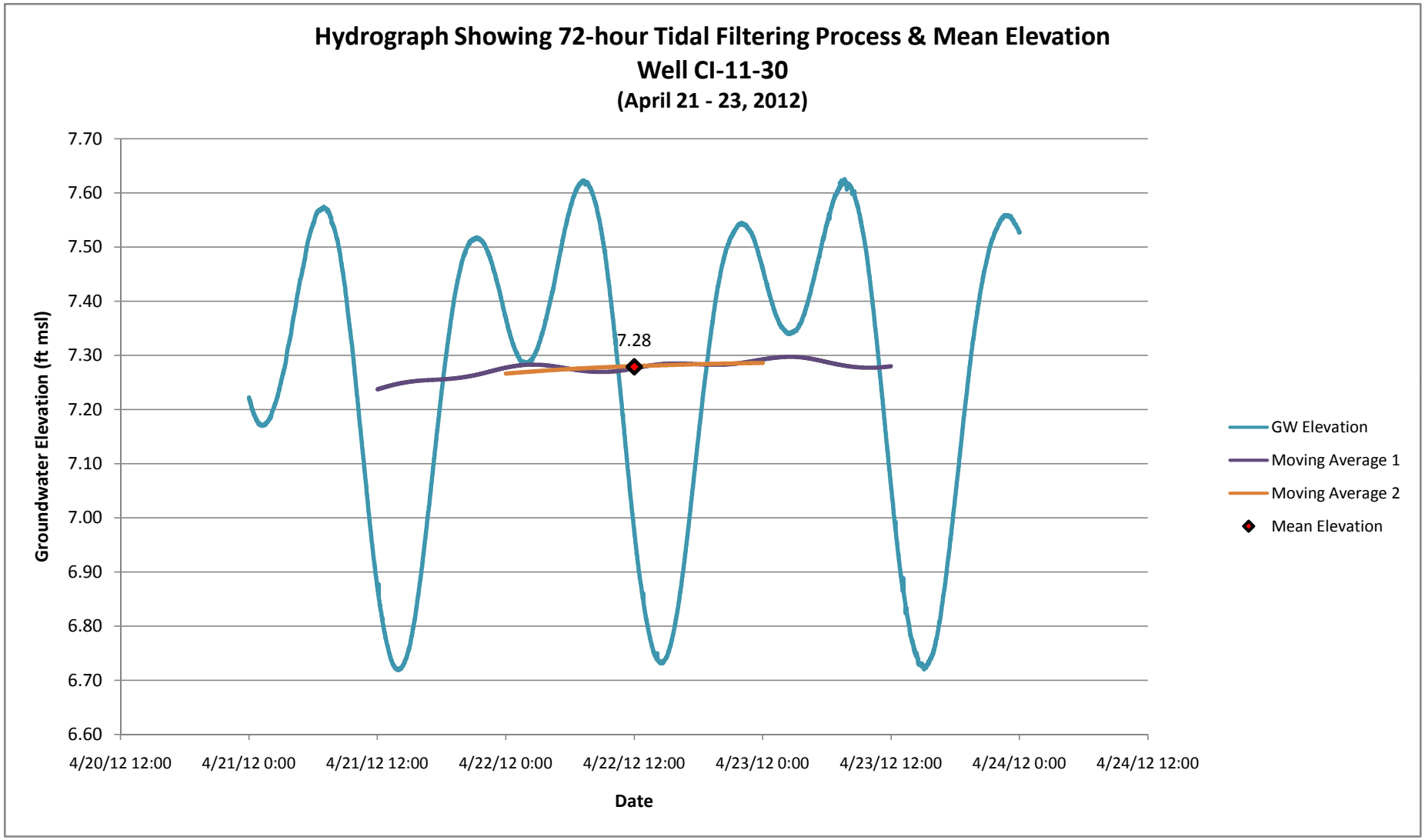

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-15-60
(July 30 – August 2, 2011)
Groundwater Elevation (ft msl)
7.40
7.38
7.36
7.34
7.32
7.30
7.28
7.26
7.24
7.22
7.20
7.30
7/30/11 0:00
7/30/11 12:00
7/31/11 0:00
7/31/11 12:00
8/1/11 0:00
8/1/11 12:00
8/2/11 0:00
8/2/11 12:00
8/3/11 0:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

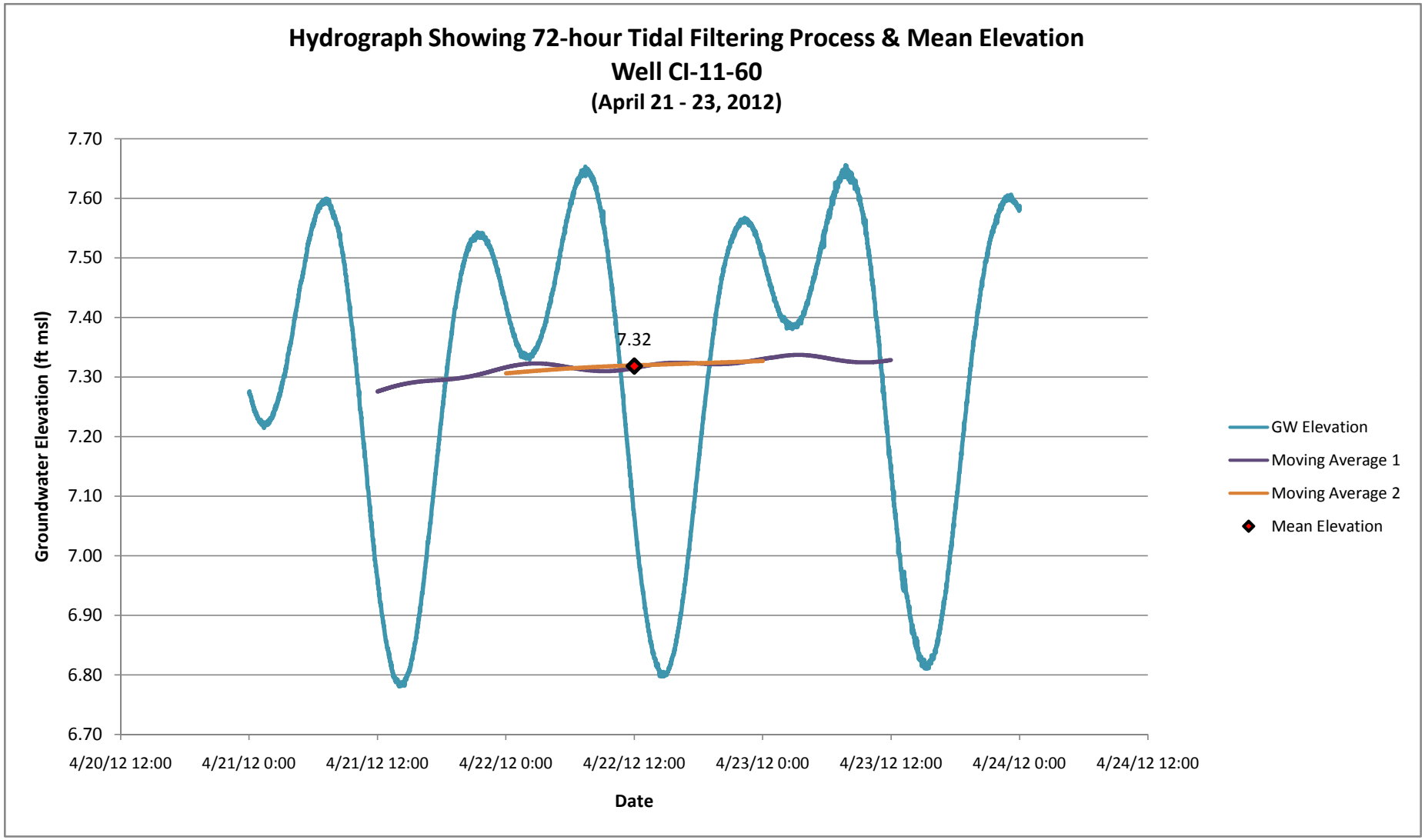

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-WT
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
8.00
7.98
7.96
7.94
7.92
7.90
7.88
7.86
7.84
7.82
7.80
7.78
7.83
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

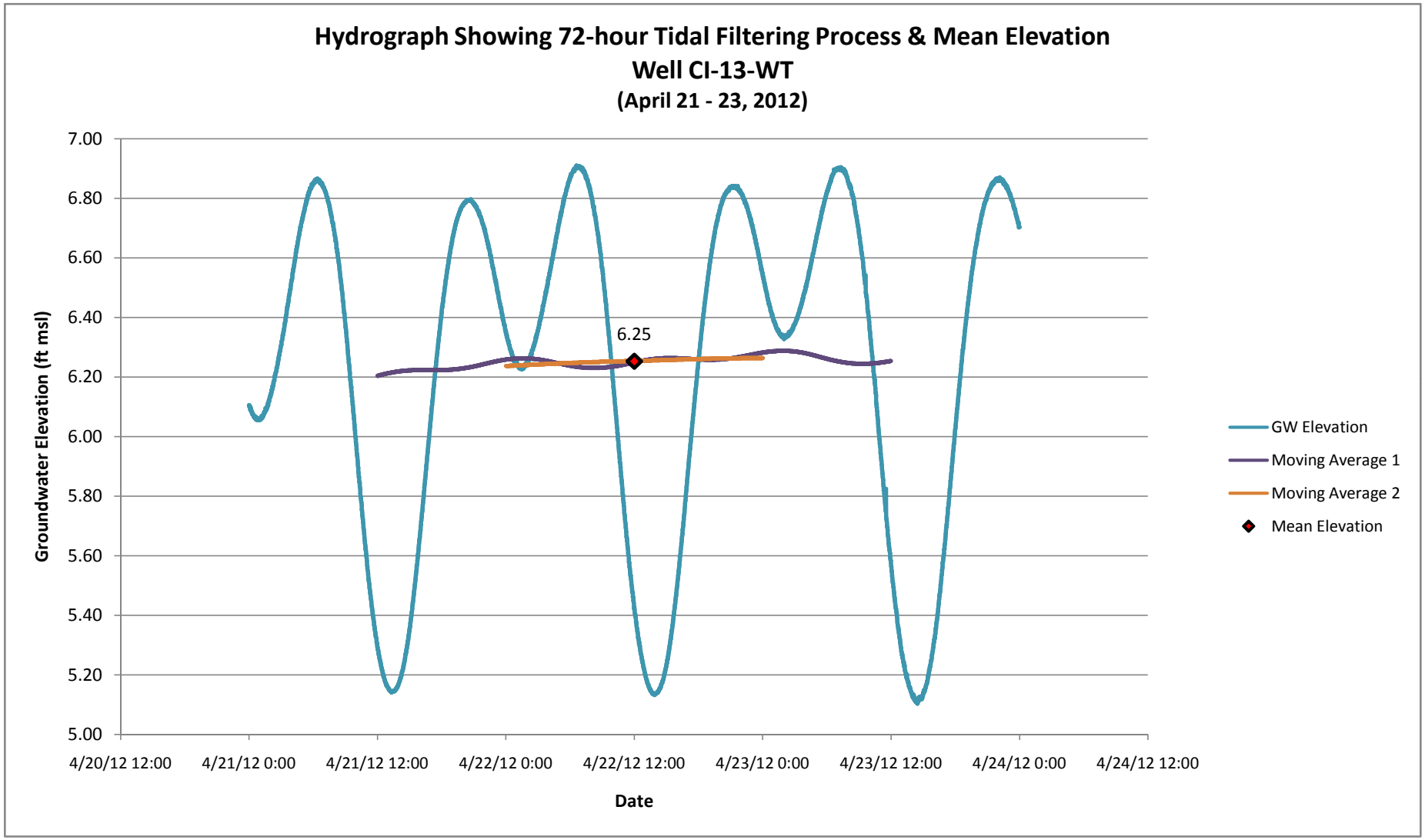

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-35
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.98
7.96
7.94
7.92
7.90
7.88
7.86
7.84
7.82
7.94
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

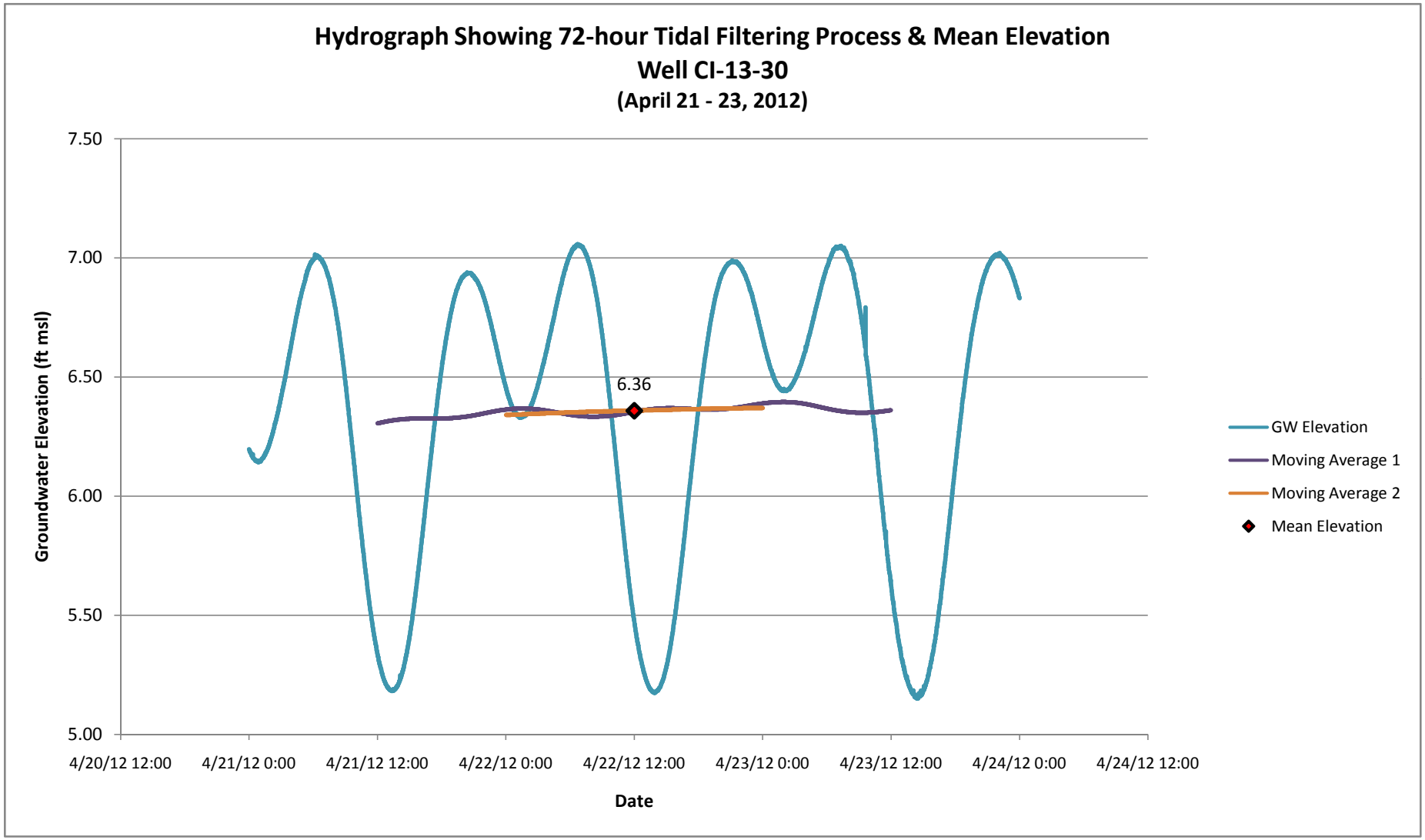

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-10-65
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
8.00
7.95
7.90
7.85
7.80
7.75
7.70
7.89
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

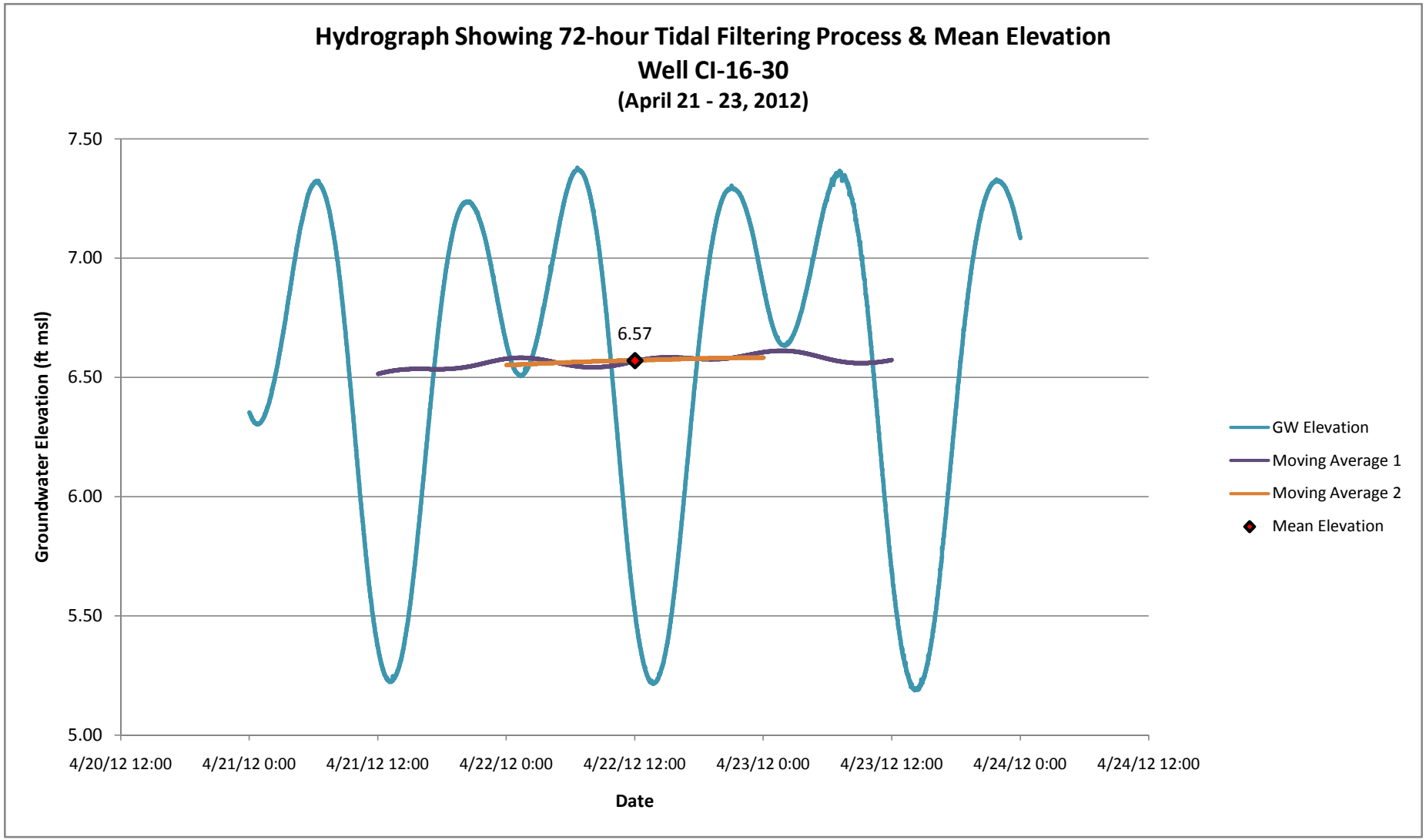

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-WT
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.50
7.40
7.30
7.20
7.10
7.00
6.90
6.80
6.70
7.16
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

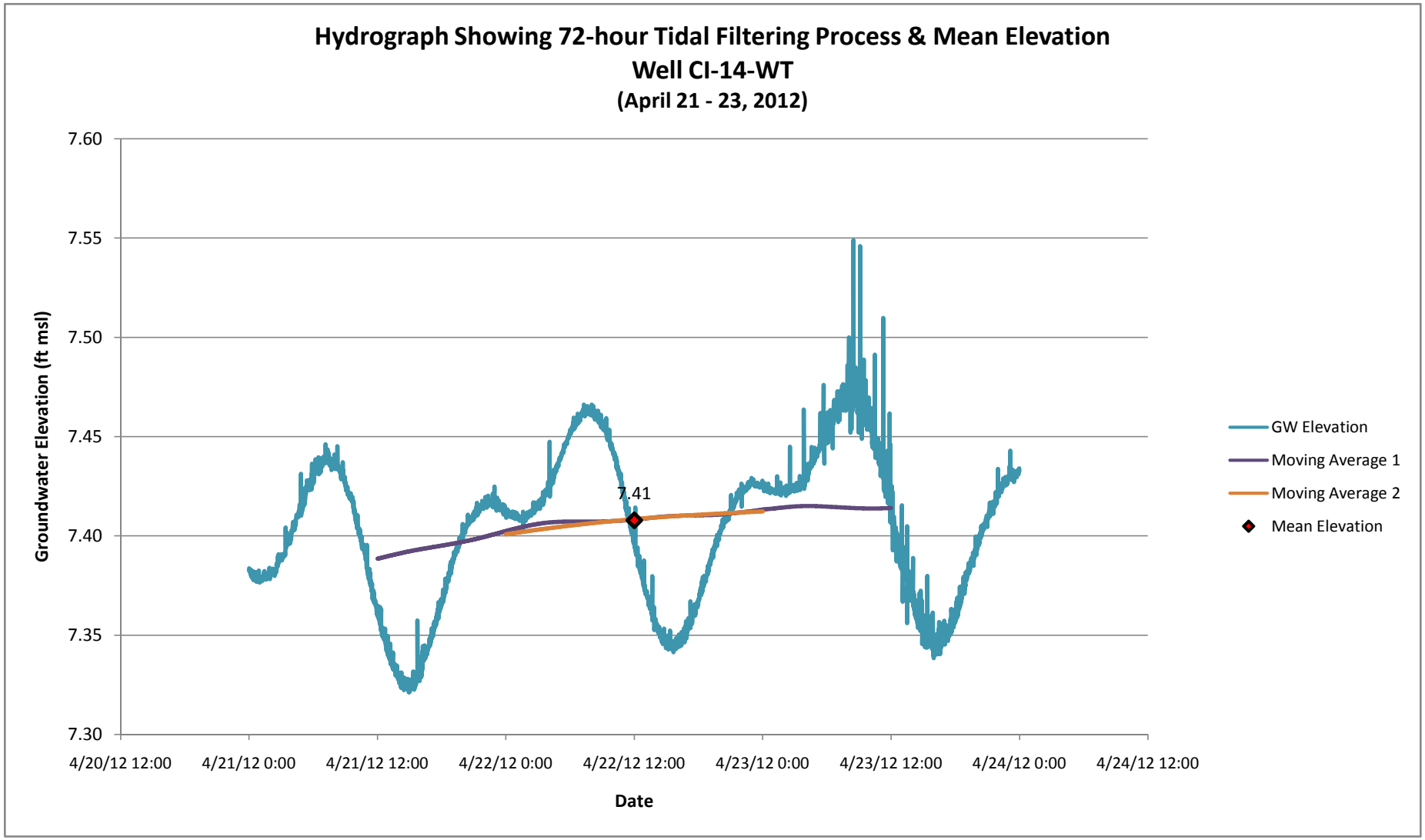

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-30
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.70
7.60
7.50
7.40
7.30
7.20
7.10
7.00
6.90
6.80
6.70
6.60
7.28
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

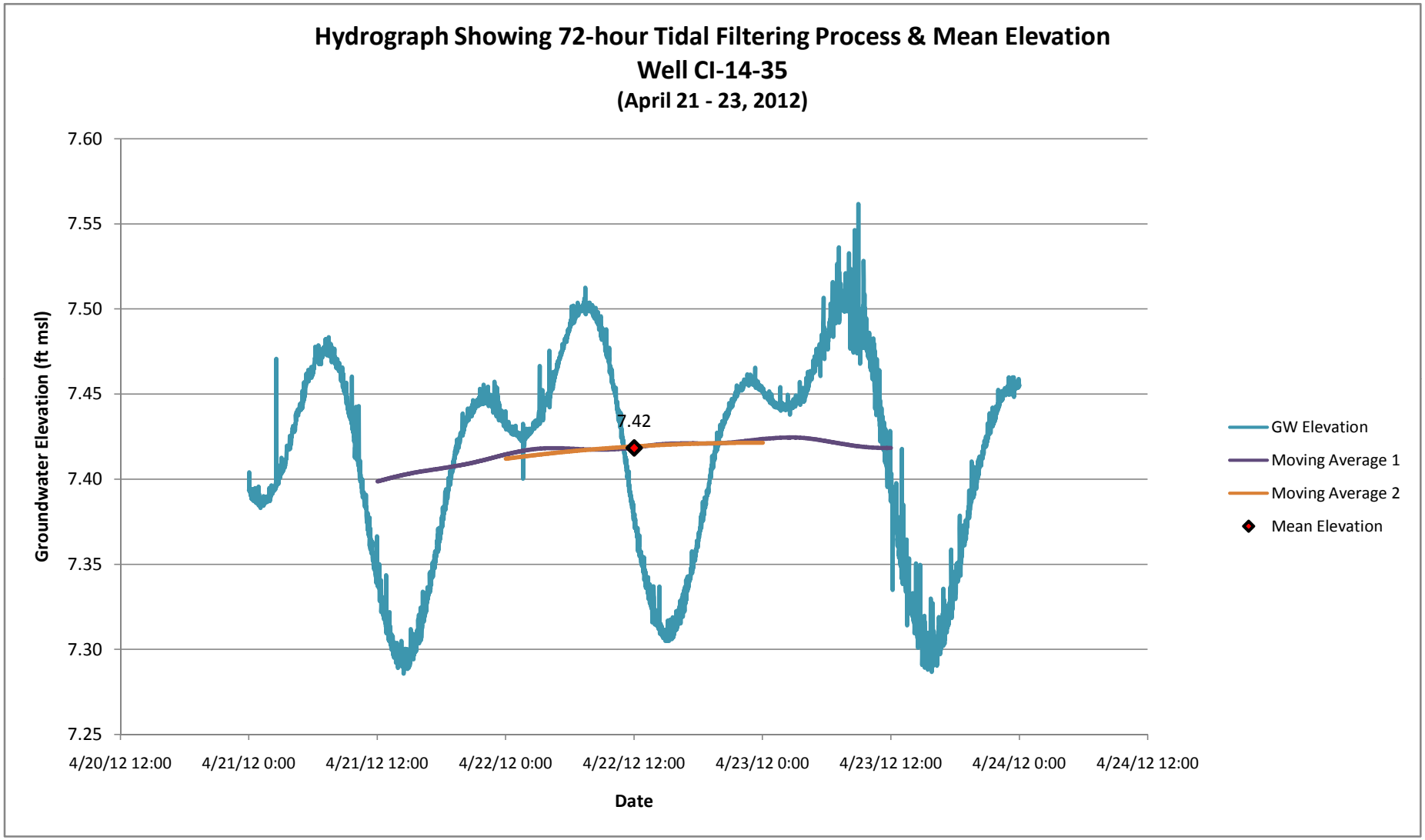

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-11-60
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.70
7.60
7.50
7.40
7.30
7.20
7.10
7.00
6.90
6.80
6.70
7.32
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

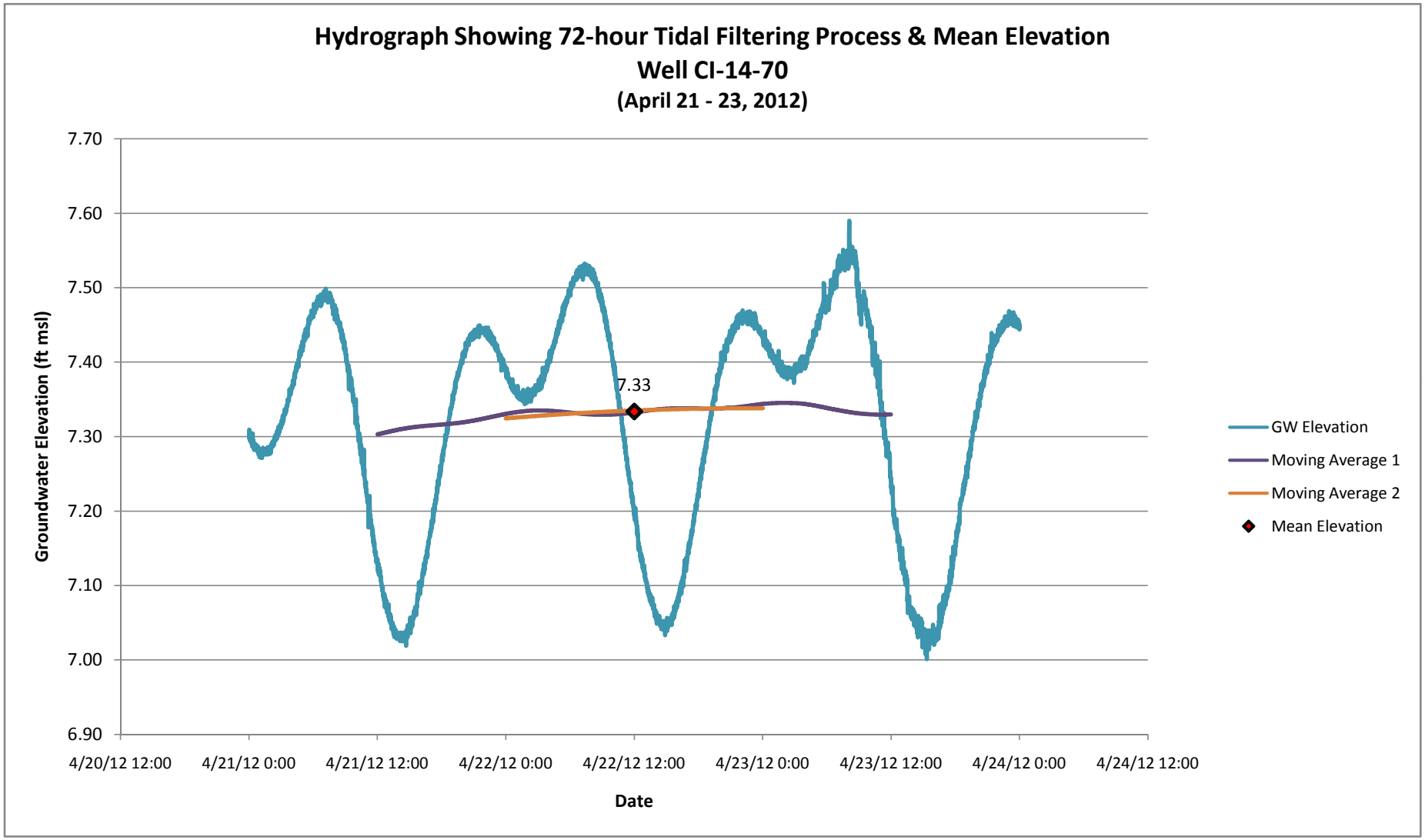

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-WT
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.00
6.80
6.60
6.40
6.20
6.00
5.80
5.60
5.40
5.20
5.00
6.25
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

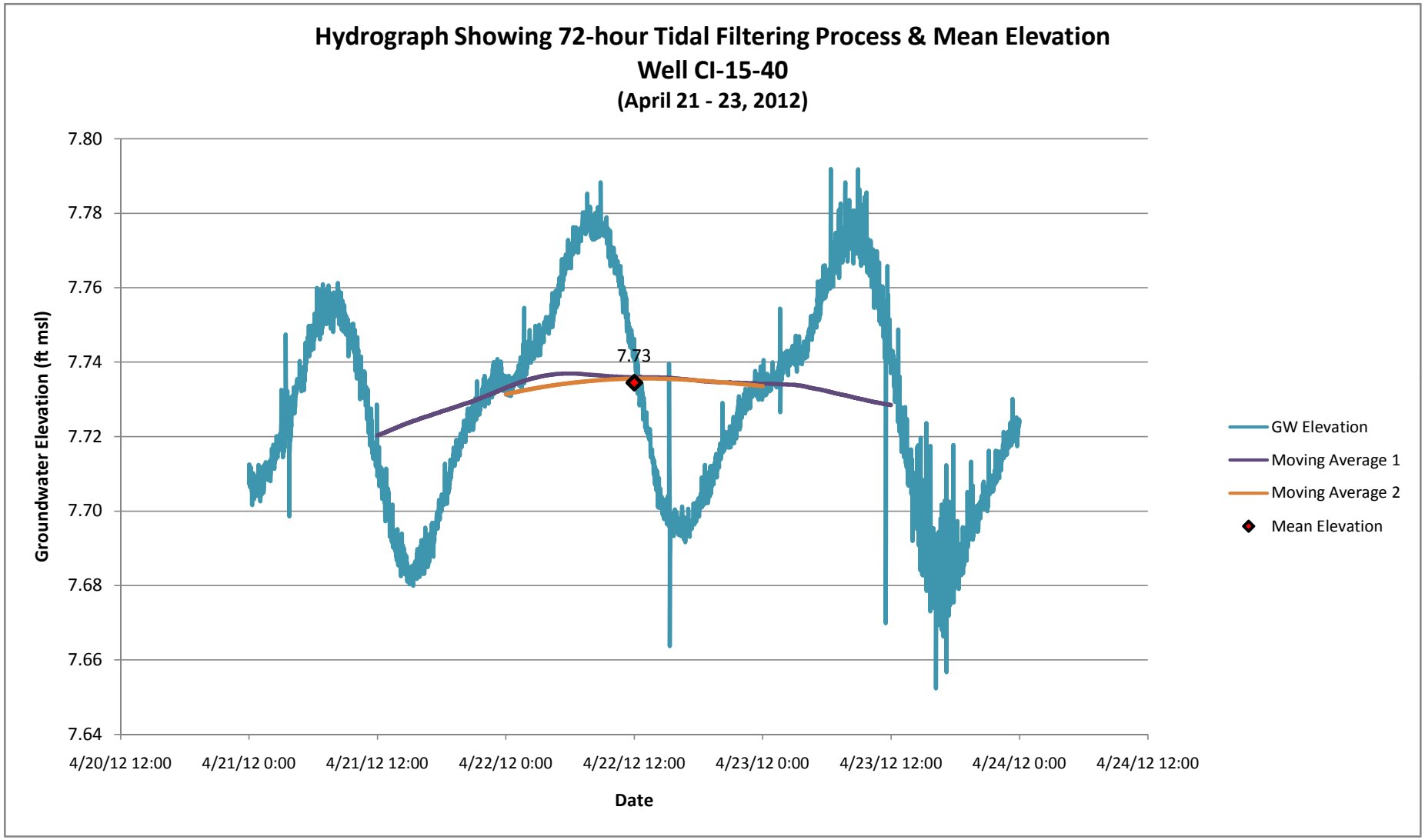

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-13-30
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.50
7.00
6.50
6.00
5.50
5.00
6.36
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

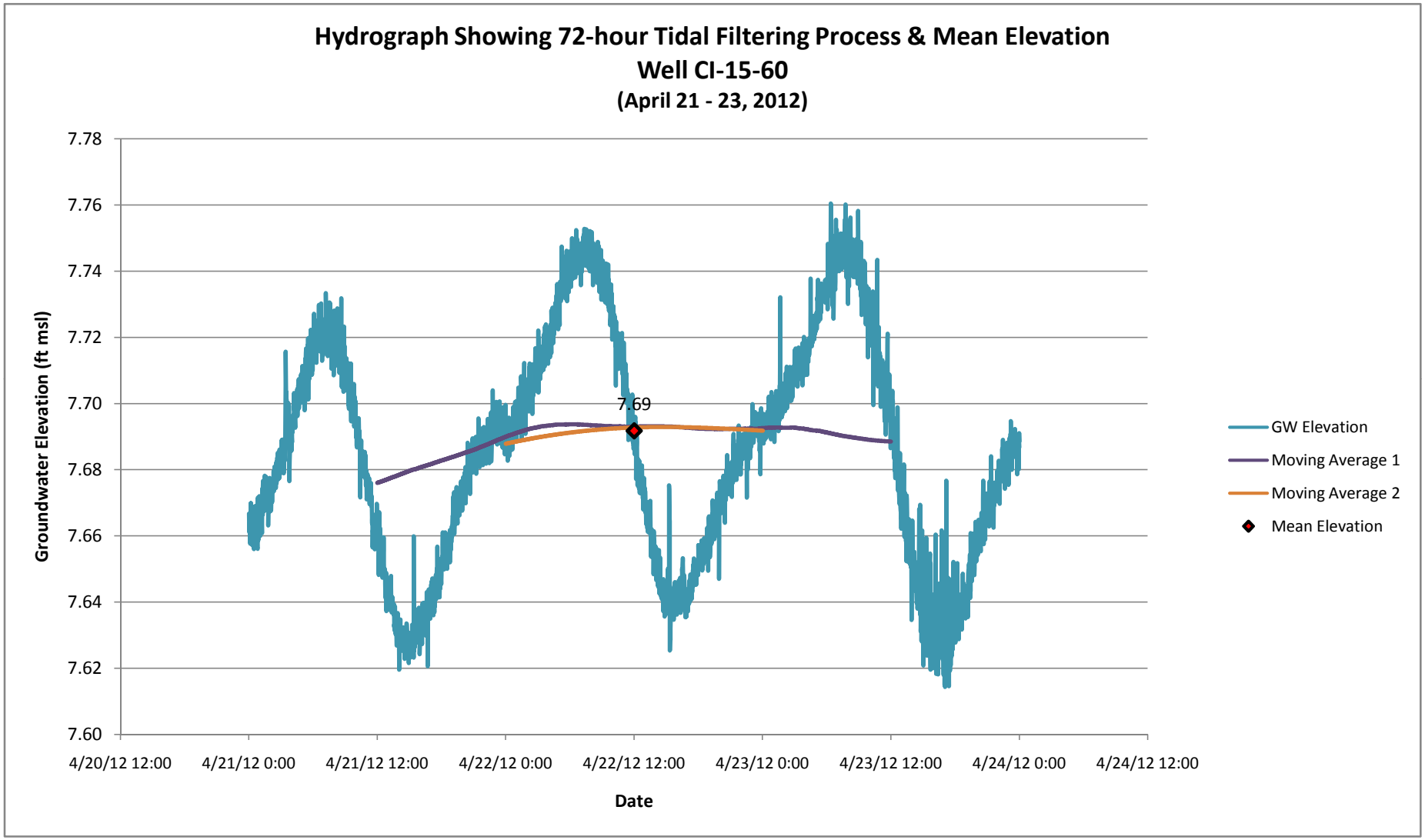

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-16-30
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.50
7.00
6.50
6.00
5.50
5.00
6.57
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

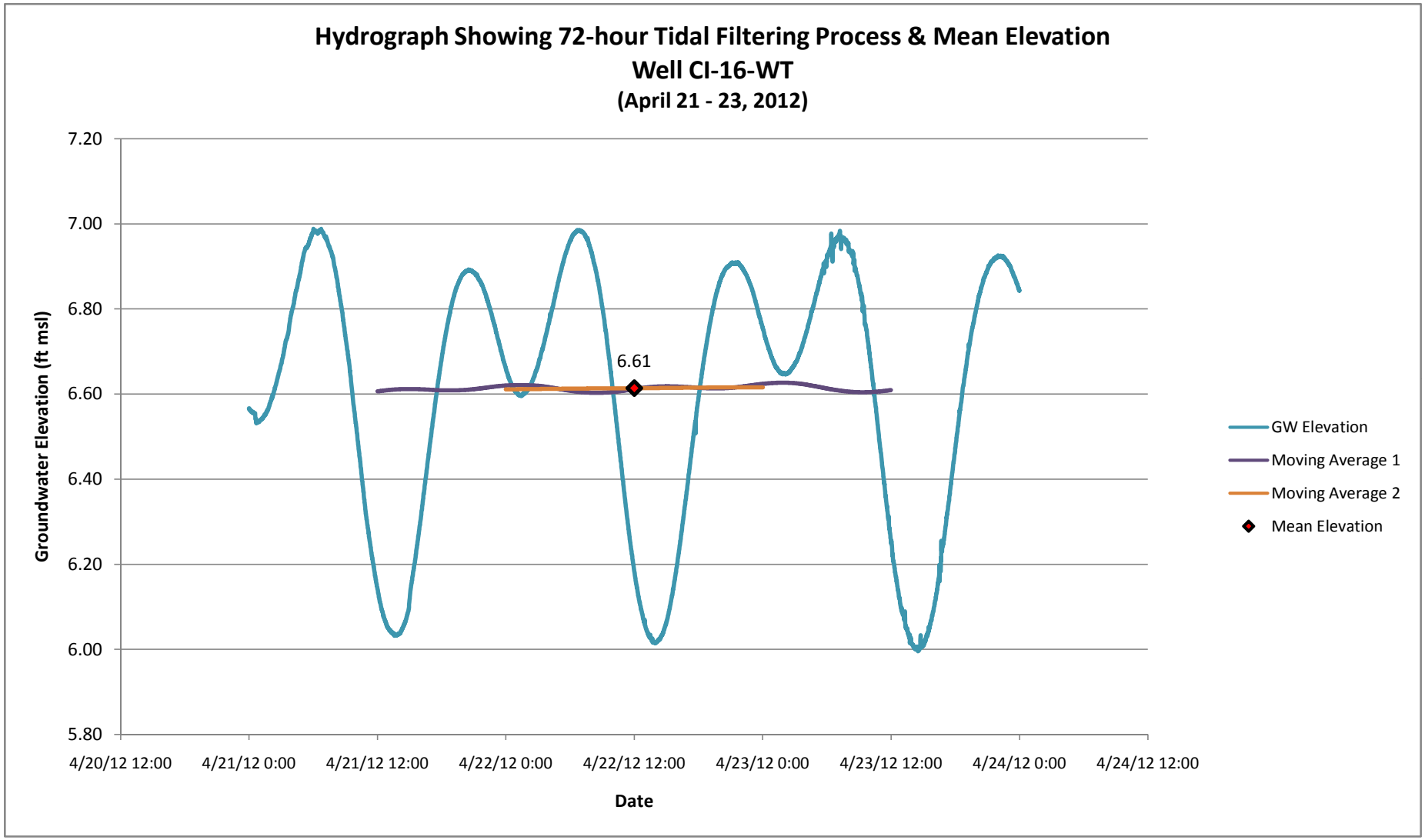

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-WT
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.60
7.55
7.50
7.45
7.40
7.35
7.30
7.41
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

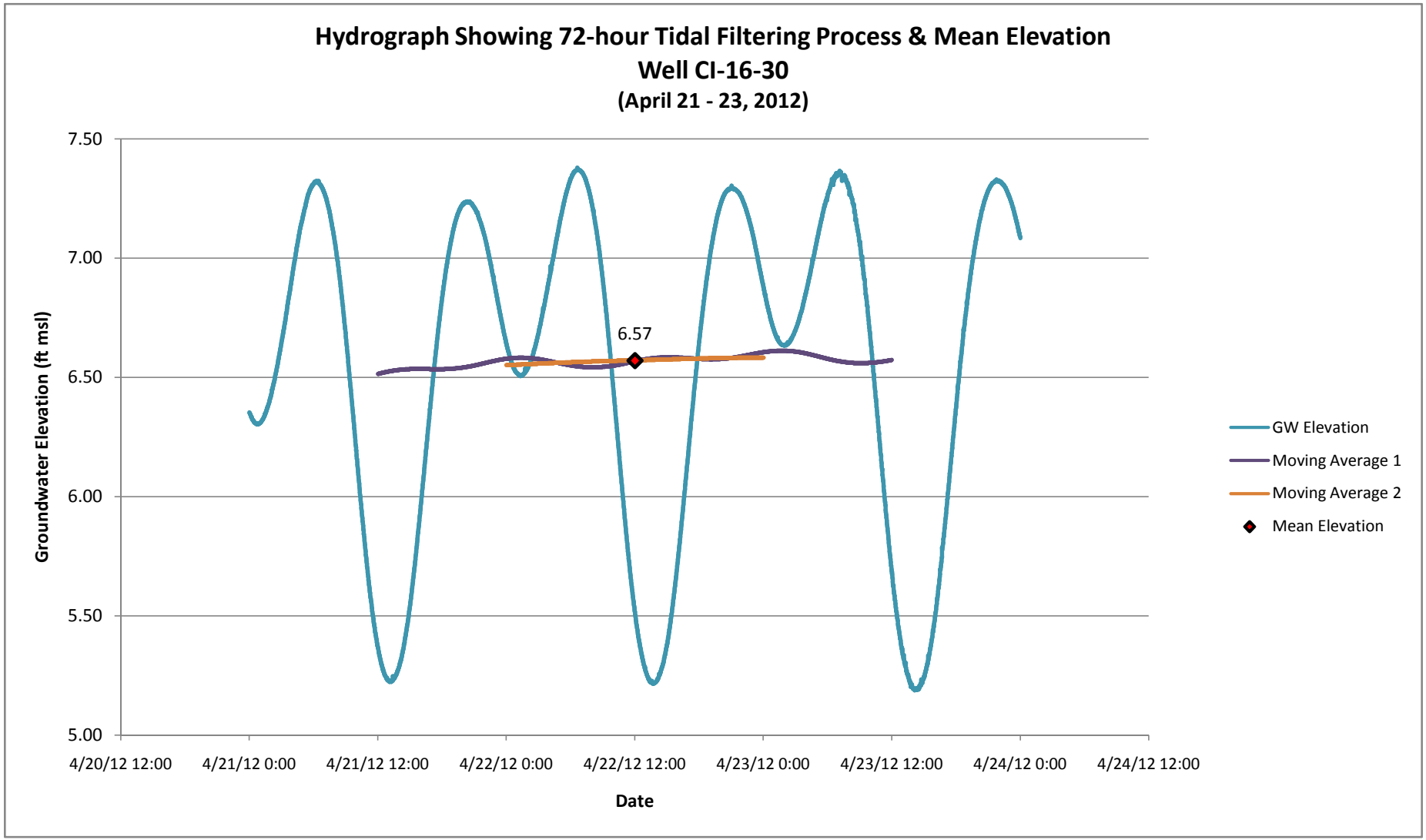

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-35
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.60
7.55
7.50
7.45
7.40
7.35
7.30
7.25
7.42
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

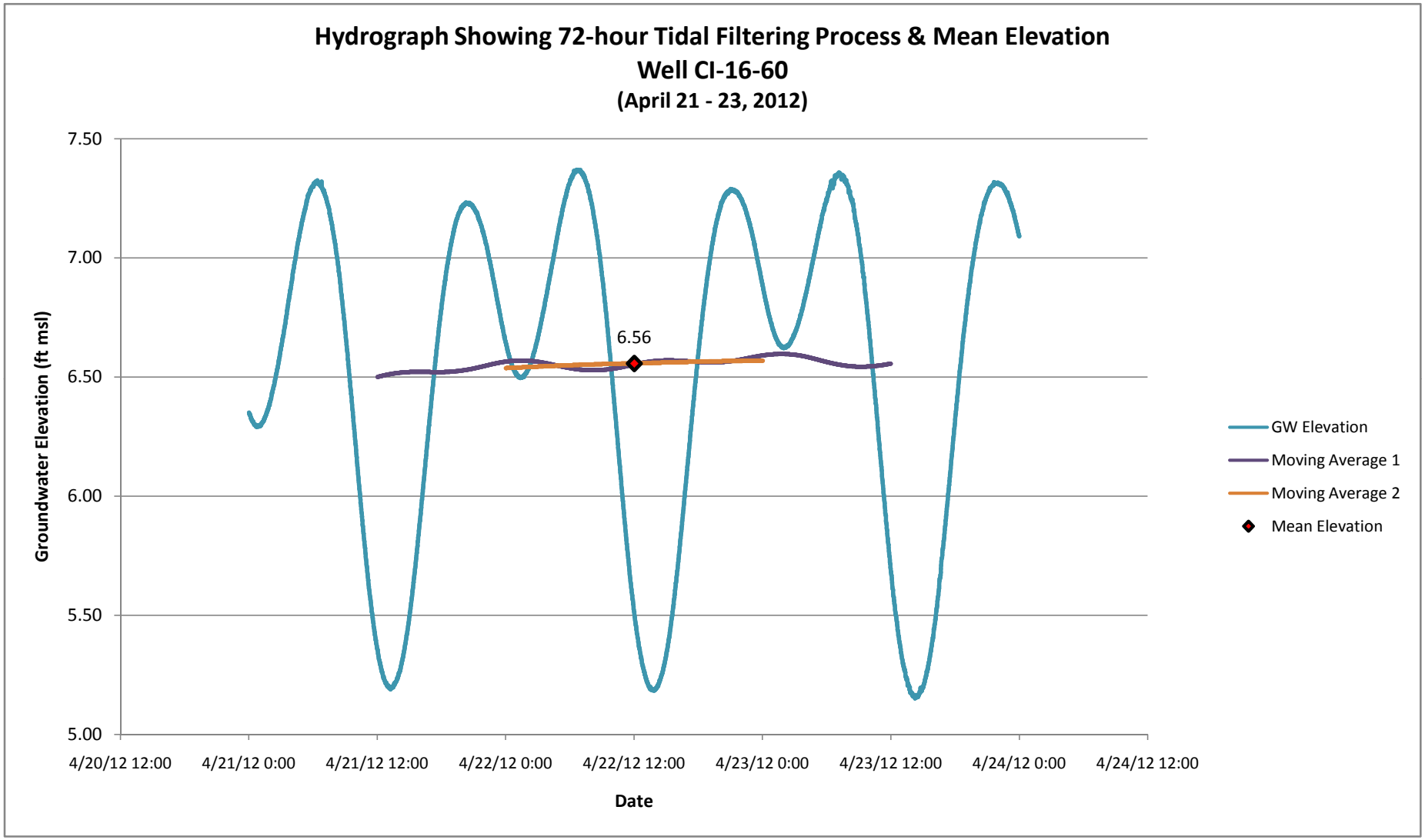

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-14-70
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.70
7.60
7.50
7.40
7.30
7.20
7.10
7.00
6.90
7.33
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

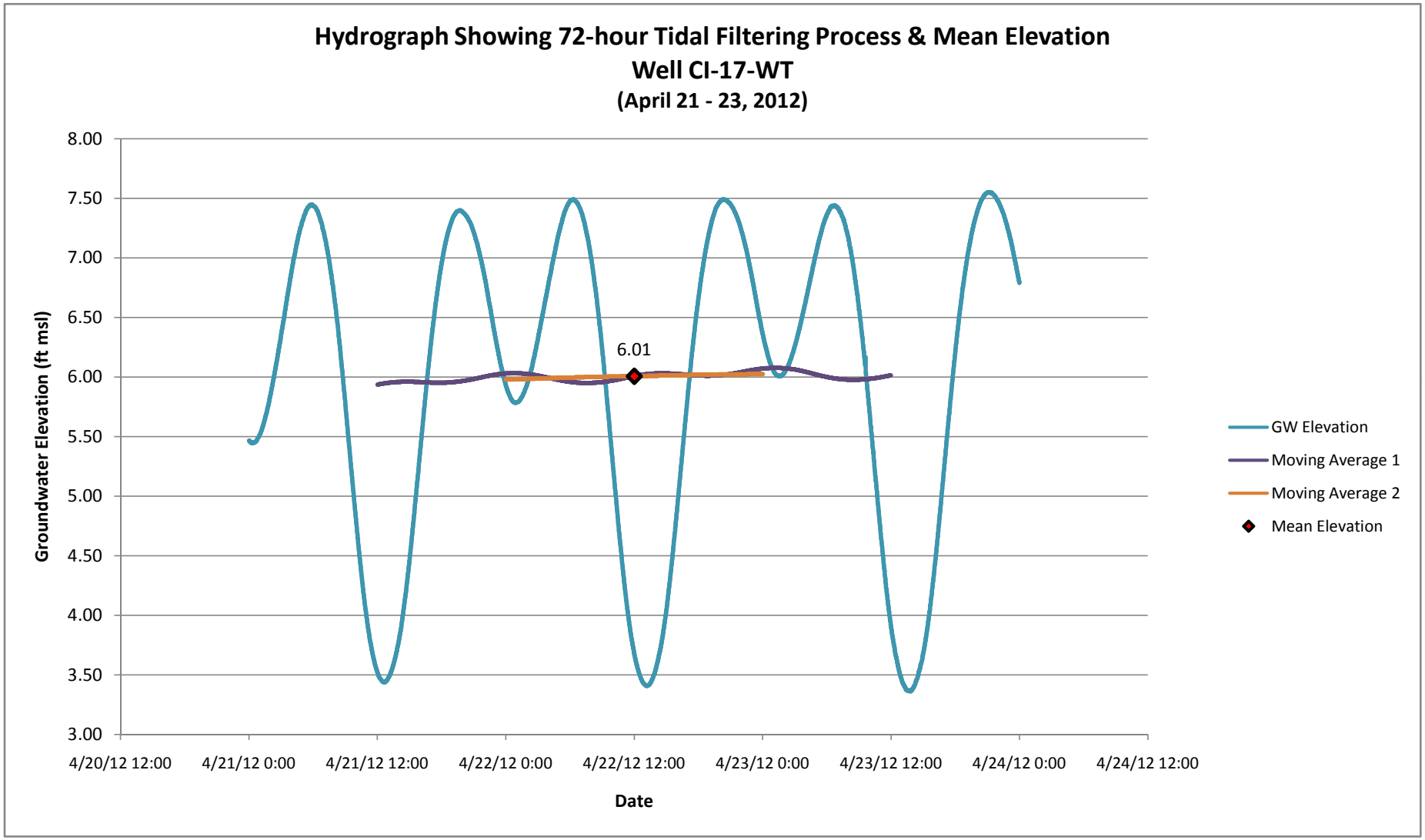

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-15-40
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.80
7.78
7.76
7.74
7.72
7.70
7.68
7.66
7.64
7.73
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

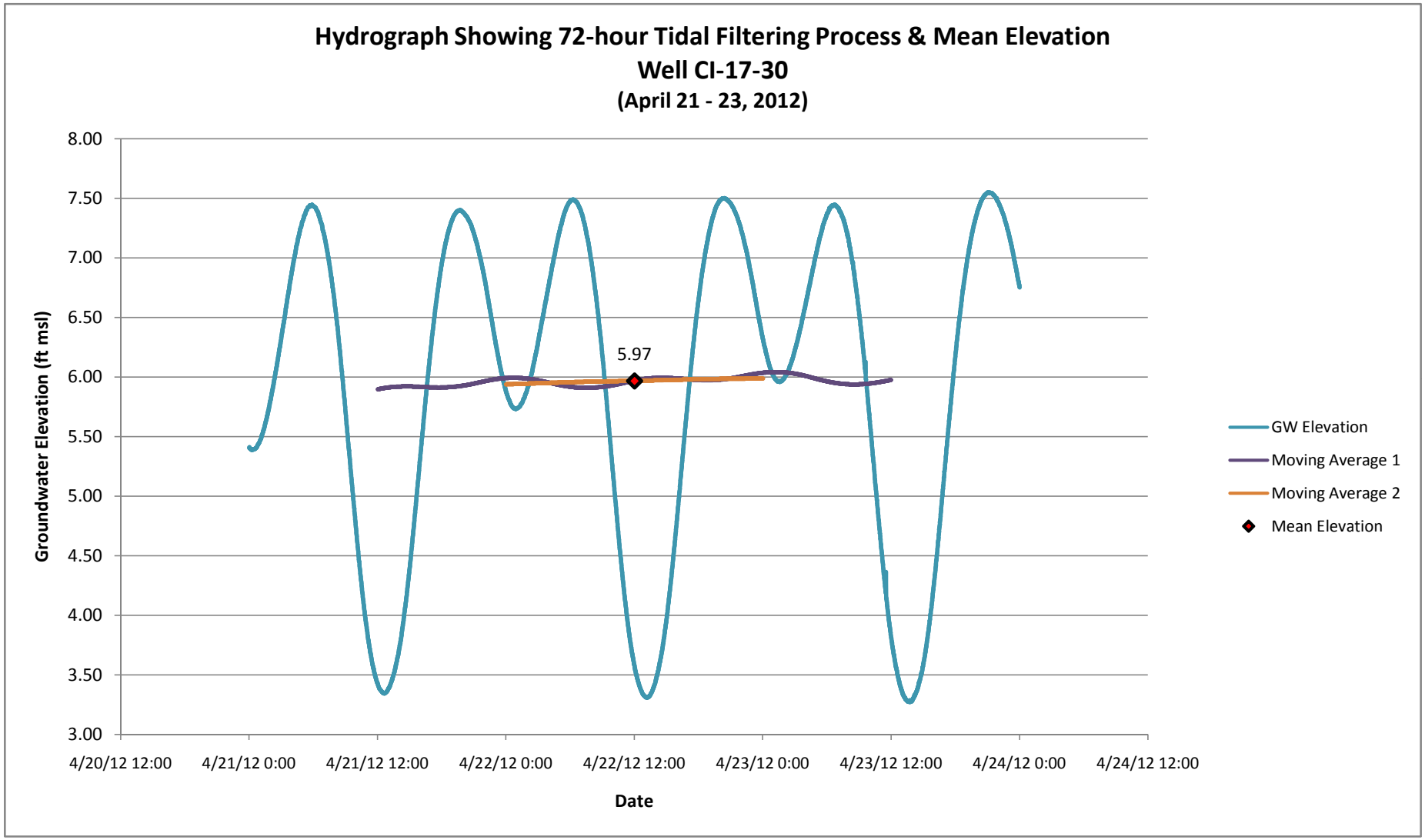

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-15-60
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.78
7.76
7.74
7.72
7.70
7.68
7.66
7.64
7.62
7.60
7.69
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

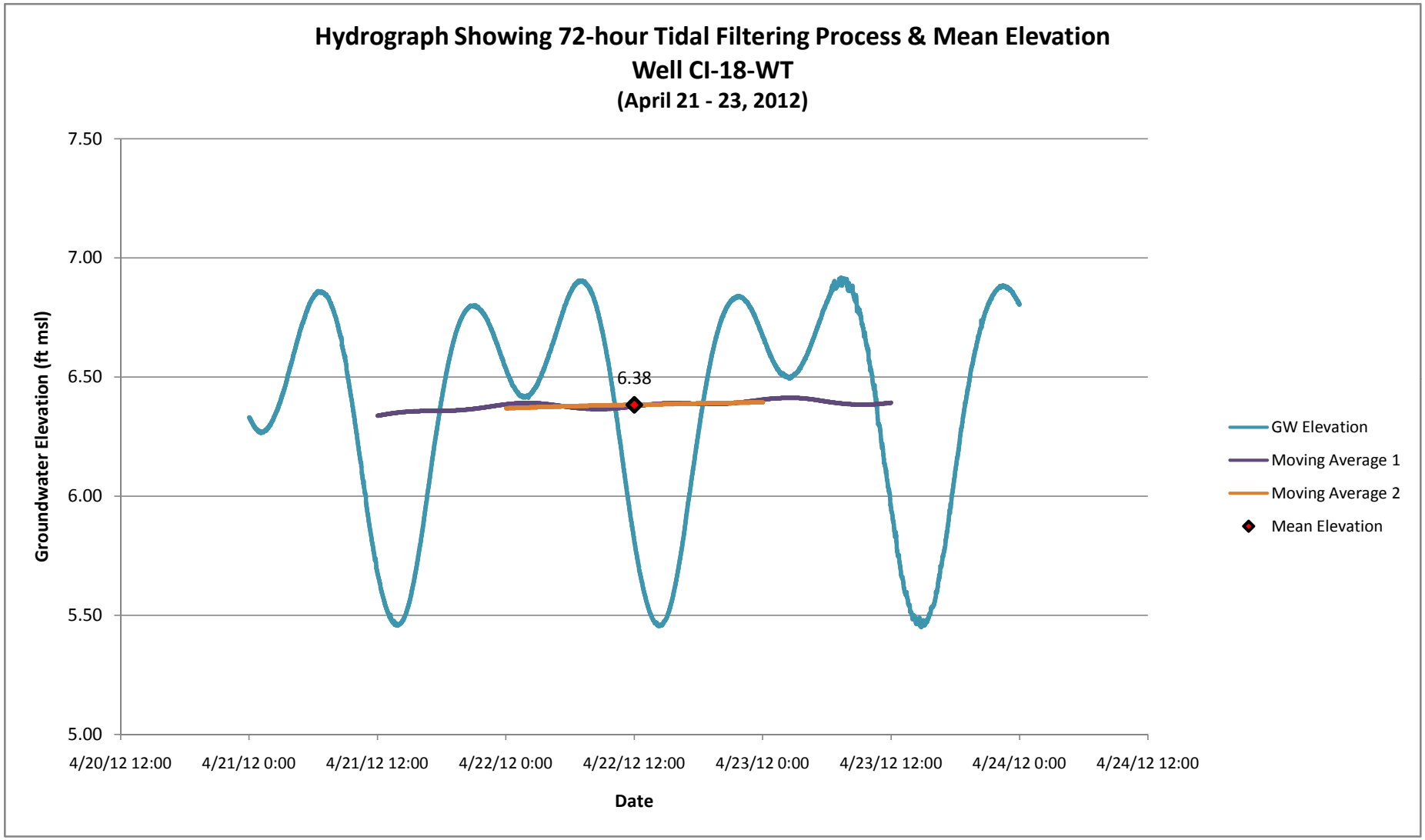

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-16-WT
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.20
7.00
6.80
6.60
6.40
6.20
6.00
5.80
6.61
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

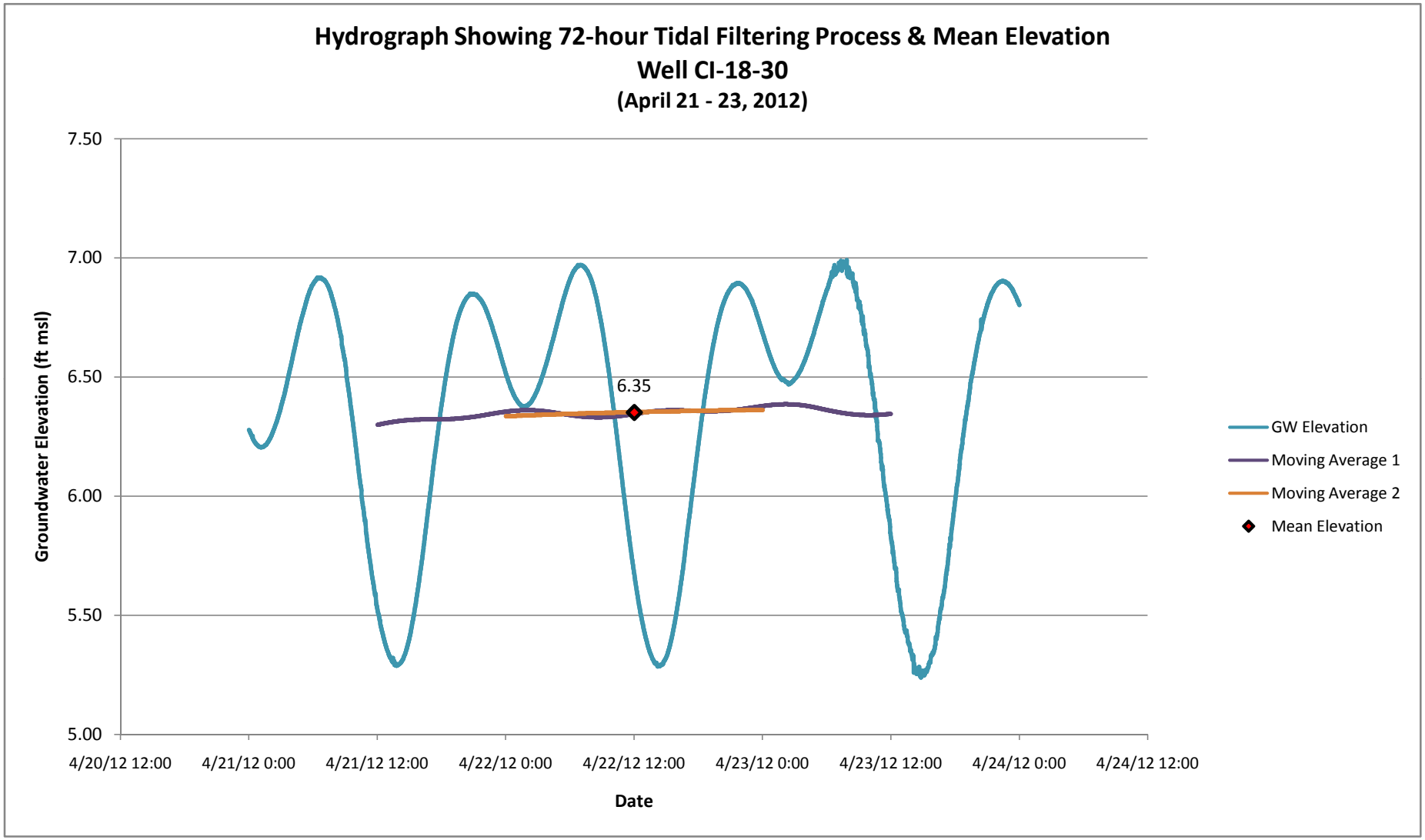

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-16-30
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.50
7.00
6.50
6.00
5.50
5.00
6.57
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

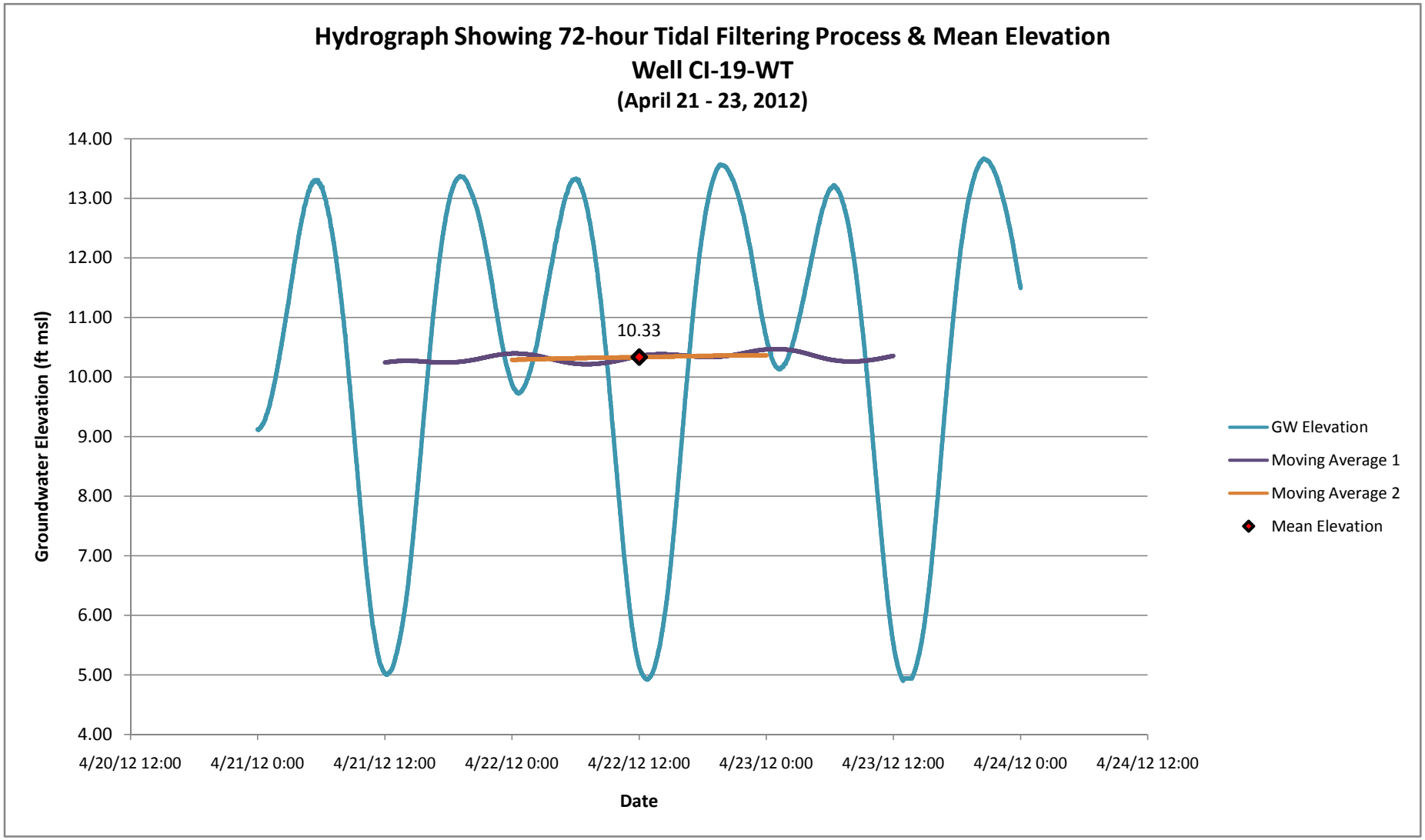

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-16-60
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.50
7.00
6.50
6.00
5.50
5.00
6.56
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

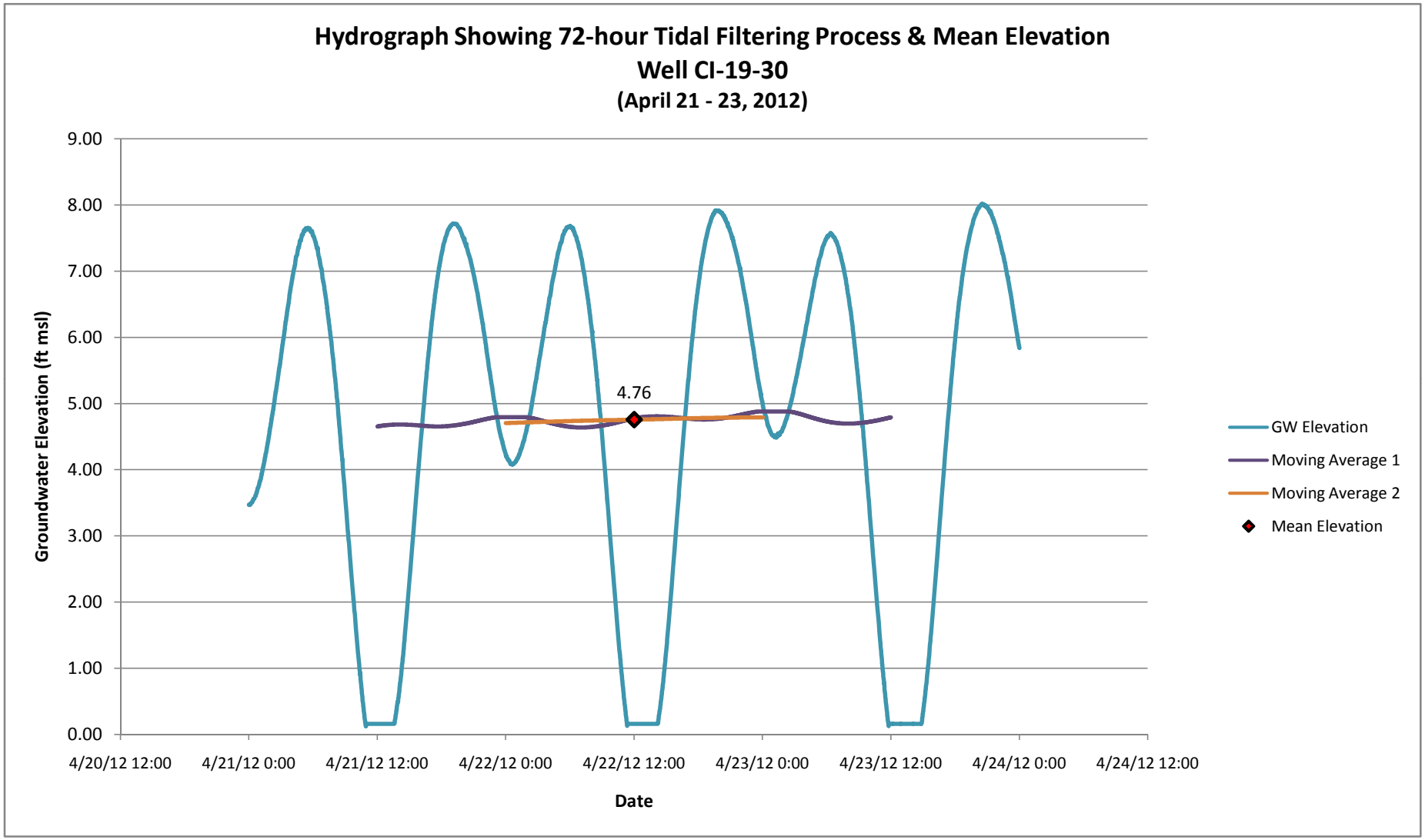

Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-17-WT
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
8.00
7.50
7.00
6.50
6.00
5.50
5.00
4.50
4.00
3.50
3.00
6.01
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-17-30
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
8.00
7.50
7.00
6.50
6.00
5.50
5.00
4.50
4.00
3.50
3.00
5.97
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-18-WT
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.50
7.00
6.50
6.00
5.50
5.00
6.38
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-18-30
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
7.50
7.00
6.50
6.00
5.50
5.00
6.35
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-19-WT
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
10.33
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation


Hydrograph Showing 72-hour Tidal Filtering Process & Mean Elevation
Well CI-19-30
(April 21 - 23, 2012)
Groundwater Elevation (ft msl)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
4.76
4/20/12 12:00
4/21/12 0:00
4/21/12 12:00
4/22/12 0:00
4/22/12 12:00
4/23/12 0:00
4/23/12 12:00
4/24/12 0:00
4/24/12 12:00
Date
GW Elevation
Moving Average 1
Moving Average 2
Mean Elevation

INTERMEDIATE ZONE TIDALLY AVERAGED GROUNDWATER ELEVATIONS AUGUST 2011

DRAFT

ORCAS
5th AVENUE
BDC-1-WT
BDC-4-WT
BDC-10-60
BDC-10-40
BLASER DIE CASTING FACILITY
BLASER DIE CASTING (BDC) FACILITY
CAPITAL PROPERTY
BDC-3-60
BDC-3-40
BDC-3-WT
BDC-2-WT
BDC-7-WT
BDC-7-60
BDC-7-40
CG-136-40
CG-136-WT
MW-17-40
MW-19-40
MARTIN SIGN FABRICATION
MW-17-60
MW-19-60
NORTHWEST SALES GROUP
STONE CRAFT
COMMERCIAL BUILDING
2nd AVENUE SOUTH
3rd AVENUE SOUTH
SFR SFR SFR
CITY LIGHT ELECTRICAL SUPPLY
MEAD BUILDING
BDC-6-WT
BDC-6-30
BDC-6-60
BDC-11-WT
BDC-11-60
BDC-11-40
MW-5
SOUTH MEAD STREET
CI-MW-1-WT
CI-MW-1-40
CI-MW-1-60
MW-8
ND
CI-8-40
CI-8-60
VACANT HOUSE
CHINESE RESTURANT
PFS-NORTHERN BUILDING
PFS-SOUTHERN BUILDING
FRAY EQUIPMENT COMPANY
1st AVENUE SOUTH
PLANT 5
PLANT 1
PLANT 2 CANOPY
PLANT 2
PLANT 3
PLANT 4 CANOPY
PLANT 4
MW-2
CG-137-WT
CI-137-50
MW-3
CG-137-40
MW-4
MW-6
SOUTH FIDALGO STREET
CI-7-40
CI-7-60
MW-7
CG-141-WT
CG-141-40
CG-141-50
SP0-42
CG-140-WT
ABP-CG-140-70
CG-140-30
CG-140-40
OTT REAL ESTATE PROPERTY (JACK IN THE BOX)
SOUTH FIDALGO ST
EAST MARGINAL
MOBILE CRANE OFFICE BUILDING
OLYMPIC MEDICAL BUILDING
MOBILE CRANE COMPANY
GULL INDUSTRIES BUILDING/ AM INTERNATIONAL
CI-15-40
CI-15-60
7.30
7.38
CI-9-40
CI-9-WT
CI-9-70
CI-10-WT
CI-10-35
CI-10-65(50'-65")
BUCKNER WEATHERBY BUILDING
4th AVENUE SOUTH
6th AVENUE SOUTH
BECKWITH AND KUFFEL BUILDING
PACIFIC LAMP SUPPLY
B & OI
ALEYTIANS CONSTRUCTORS
CHRISTPERSON RADER & KIEF BUILDING
6.75
CI-12-WT
CI-12-30
CI-12-60
7.22
CI-14-WT
CI-14-35
CI-14-70
LONGVIEW FIBRE AND PACK
DUWAMISH RIVER
CERTAIN TEED GYPSUM
MULTI-TENANT WAREHOUSE
MULTI-TENANT WAREHOUSE
MULTI-TENANT WAREHOUSE
FITTINGS INC. COMPANY
CI-19-WT
CI-19-30
CAL PORTLAND
CI-18-WT
CI-18-30
4.65
CI-13-30
CI-13-WT
CI-13-60
7.32
CI-11-60
CI-11-WT
CI-11-30
7.0
5.0
5.5
6.0
6.5
CI-16-WT
CI-16-30
CI-16-60
CI-17-WT
CI-17-30
CAPITAL AREA OF INVESTIGATION

0 200
APPROXIMATE SCALE IN FEET

N

LEGEND

- CAPITAL INDUSTRIES MONITORING WELL
- BLASER DIE CASTING BORING MONITORING WELL
- 2012 GROUNDWATER MONITORING WELL
- NEW MONITORING WELLS
- PSC MONITORING WELL
- ART BRASS PLATING BORING MONITORING WELL

ALL LOCATIONS ARE APPROXIMATE

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 2

CAPITAL AREA OF INVESTIGATION SHOWING MONITORING WELL LOCATIONS
2012 GROUNDWATER MONITORING PLAN
CAPITAL INDUSTRIES, INC., SEATTLE, WA

FARALLON PN: 457-004

Drawn By: DEW	Checked By: AF	Date: 4/4/12	Disk Reference: 457004i

ORCAS

5th AVENUE

BDC-1-WT

BDC-4-WT

BDC-10-60

BDC-10-40

BLASER DIE CASTING FACILITY

BLASER DIE CASTING (BDC) FACILITY

BDC-3-60

BDC-3-40

BDC-3-WT

BDC-2-WT

BDC-7-WT

BDC-7-60

BDC-7-40

CAPITAL PROPERTY

MW-17-40

MW-19-40

MARTIN SIGN FABRICATION

MW-17-60

MW-19-60

NORTHWEST SALES GROUP

STONE CRAFT

SFR SFR SFR

CITY LIGHT ELECTRICAL SUPPLY

COMMERCIAL BUILDING

2nd AVENUE SOUTH

3rd AVENUE SOUTH

MEAD BUILDING

BDC-6-WT

BDC-6-30

BDC-6-60

CG-136-40

CG-136-WT

BDC-11-WT

BDC-11-60

BDC-11-40

MW-5

SOUTH MEAD STREET

CI-MW-1-WT

CI-MW-1-40

CI-MW-1-60

MW-8 ND

CI-8-40

CI-8-60

CAPITAL PROPERTY

VACANT HOUSE

CHINESE RESTURANT

PFS-NORTHERN BUILDING

PFS-SOUTHERN BUILDING

1st AVENUE SOUTH

FRAY EQUIPMENT COMPANY

PLANT 5

PLANT 1

PLANT 2 CANOPY

PLANT 2

PLANT 3

PLANT 4 CANOPY

PLANT 4

MW-2

CG-137-WT

CI-137-50

MW-3

CG-137-40

MW-4

MW-6

SOUTH FIDALGO STREET

CI-7-40

CI-7-60

MW-7

CG-141-WT

CG-141-40

CG-141-50

SP0-42

CG-140-WT

ABP-CG-140-70

CG-140-30

CG-140-40

OTT REAL ESTATE PROPERTY (JACK IN THE BOX)

SOUTH FIDALGO ST

EAST MARGINAL

MOBILE CRANE OFFICE BUILDING

OLYMPIC MEDICAL BUILDING

MOBILE CRANE COMPANY

GULL INDUSTRIES BUILDING/ AM INTERNATIONAL

CI-15-40

CI-15-60

CI-9-40

CI-9-WT

CI-9-70

7.69

7.89

CI-10-WT

CI-10-35

CI-10-65(50'-65")

BUCKNER WEATHERBY BUILDING

4th AVENUE SOUTH

6th AVENUE SOUTH

BECKWITH AND KUFFEL BUILDING

PACIFIC LAMP SUPPLY

B & O

ALEYTIANS CONSTRUCTORS

CHRISTFERSON RADER & KIEF BUILDING

CI-14-WT

CI-14-35

CI-14-70

7.33

CI-12-WT

CI-12-30

CI-12-60

LONGVIEW FIBRE AND PACK

DUWAMISH RIVER

CERTAIN TEED GYPSUM

MULTI-TENANT WAREHOUSE

MULTI-TENANT WAREHOUSE

MULTI-TENANT WAREHOUSE

7.5

CI-19-WT

CI-19-30

CAL PORTLAND

CI-18-WT

CI-18-30

6.26

CI-13-30

CI-13-WT

CI-13-60

7.32

CI-11-60

CI-11-WT

CI-11-30

FITTINGS INC. COMPANY

6.56

CI-16-WT

CI-16-30

CI-16-60

7.0

CI-17-WT

CI-17-30

6.5

CAPITAL AREA OF INVESTIGATION

INTERMEDIATE ZONE
TIDALLY AVERAGED
GROUNDWATER ELEVATIONS
APRIL 2012

DRAFT

0 200

APPROXIMATE SCALE IN FEET

N

LEGEND

- CAPITAL INDUSTRIES MONITORING WELL
- BLASER DIE CASTING BORING MONITORING WELL
- 2012 GROUNDWATER MONITORING WELL
- NEW MONITORING WELLS
- PSC MONITORING WELL
- ART BRASS PLATING BORING MONITORING WELL

ALL LOCATIONS ARE APPROXIMATE

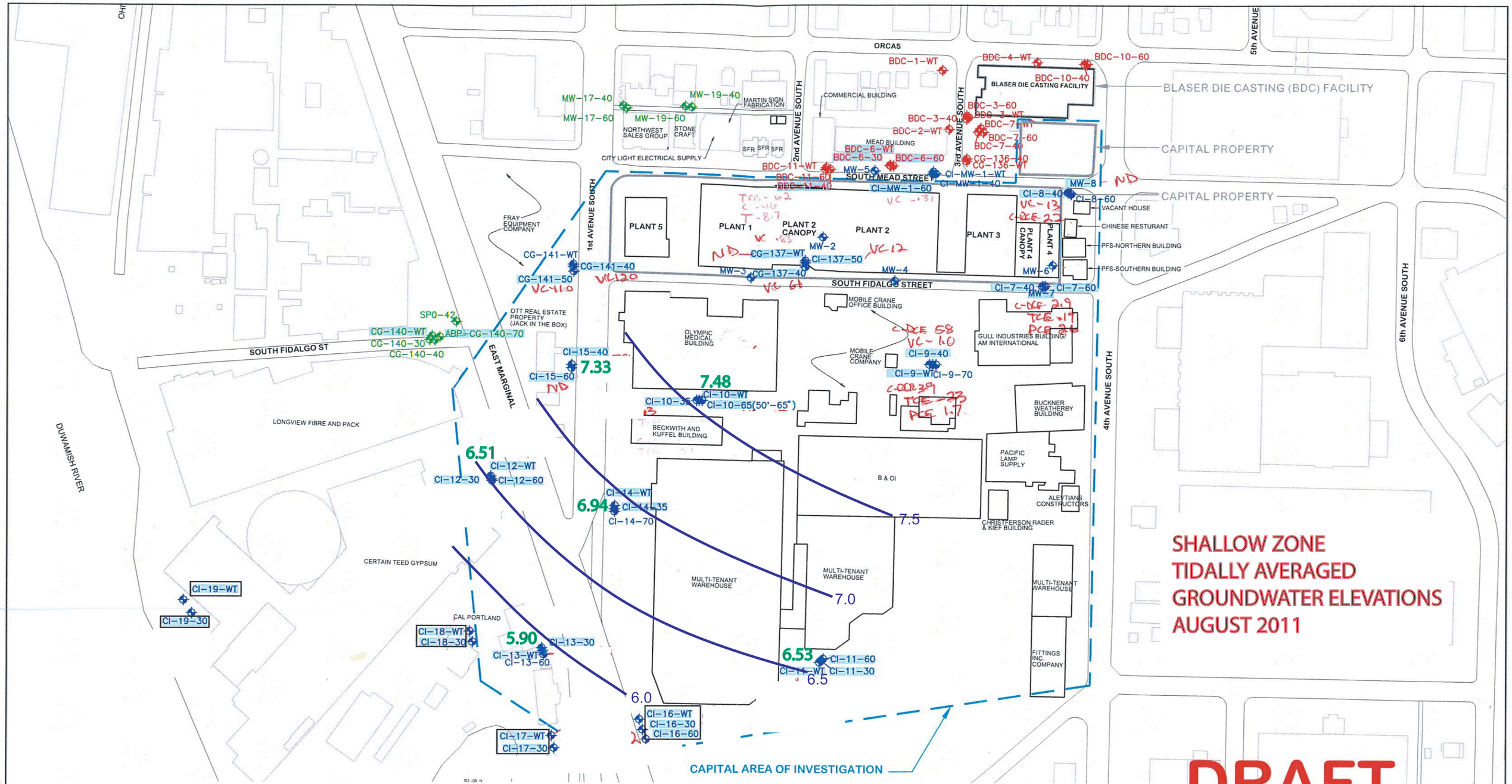
FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 2

CAPITAL AREA OF INVESTIGATION SHOWING MONITORING WELL LOCATIONS
2012 GROUNDWATER MONITORING PLAN
CAPITAL INDUSTRIES, INC., SEATTLE, WA

FARALLON PN: 457-004

Drawn By: DEW	Checked By: AF	Date: 4/4/12	Disk Reference: 457004i



FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 2

CAPITAL AREA OF INVESTIGATION SHOWING MONITORING WELL LOCATIONS
2012 GROUNDWATER MONITORING PLAN
CAPITAL INDUSTRIES, INC., SEATTLE, WA

FARALLON PN: 457-004

Drawn By: DEW	Checked By: AF	Date: 4/4/12	Disk Reference: 457004i

ORCAS

5th AVENUE

BDC-1-WT

BDC-4-WT

BDC-10-60

BDC-10-40

BLASER DIE CASTING FACILITY

BLASER DIE CASTING (BDC) FACILITY

CAPITAL PROPERTY

BDC-3-60

BDC-3-40

BDC-3-WT

BDC-2-WT

BDC-7-WT

BDC-7-60

BDC-7-40

CG-136-40

CG-136-WT

MW-17-40

MW-19-40

MARTIN SIGN FABRICATION

MW-17-60

MW-19-60

NORTHWEST SALES GROUP

STONE CRAFT

SFR SFR SFR

CITY LIGHT ELECTRICAL SUPPLY

COMMERCIAL BUILDING

2nd AVENUE SOUTH

3rd AVENUE SOUTH

MEAD BUILDING

BDC-6-WT

BDC-6-30

BDC-6-60

BDC-11-WT

BDC-11-60

BDC-11-40

MW-5

SOUTH MEAD STREET

CI-MW-1-WT

CI-MW-1-40

CI-MW-1-60

MW-8 ND

CI-8-40

CI-8-60

VACANT HOUSE

CHINESE RESTURANT

PFS-NORTHERN BUILDING

PFS-SOUTHERN BUILDING

TCE-62
C-116
T-8.7

VC-131

VC-13
C-DCE 22

1st AVENUE SOUTH

PLANT 5

PLANT 1

PLANT 2 CANOPY

PLANT 2

PLANT 3

PLANT 4 CANOPY

PLANT 4

MW-2

VC-12

ND

CG-137-WT

CI-137-50

MW-3

CG-137-40

MW-4

MW-6

SOUTH FIDALGO STREET

CI-7-40

CI-7-60

MW-7

C-DCE 2.9
TCE 1.7
PCE 2.8

FRAY EQUIPMENT COMPANY

CG-141-WT

CG-141-40

CG-141-50

VC-4.10

VC120

OTT REAL ESTATE PROPERTY (JACK IN THE BOX)

SP0-42

CG-140-WT

ABP-CG-140-70

CG-140-30

CG-140-40

SOUTH FIDALGO ST

EAST MARGINAL

7.73

CI-15-40

VC-.78

CI-15-60

C-DCE 1.2

ND

MOBILE CRANE OFFICE BUILDING

OLYMPIC MEDICAL BUILDING

MOBILE CRANE COMPANY

GULL INDUSTRIES BUILDING/ AM INTERNATIONAL

C-DCE 58
VC-1.0

CI-9-40

CI-9-WT

CI-9-70

C-DCE 39
TCE-23
PCE 1.7

7.94

CI-10-WT

CI-10-35

CI-10-65(50'-65")

BUCKNER WEATHERBY BUILDING

4th AVENUE SOUTH

6th AVENUE SOUTH

BECKWITH AND KUFFEL BUILDING

PACIFIC LAMP SUPPLY

B & OI

ALEYTIANS CONSTRUCTORS

CHRISTPERSON RADER & KIEF BUILDING

CI-14-WT

CI-14-35

CI-14-70

7.42

CI-12-WT

CI-12-30

CI-12-60

LONGVIEW FIBRE AND PACK

DUWAMISH RIVER

CERTAIN TEED GYPSUM

MULTI-TENANT WAREHOUSE

MULTI-TENANT WAREHOUSE

MULTI-TENANT WAREHOUSE

7.5

7.28

CI-11-60

CI-11-WT

CI-11-30

FITTINGS INC. COMPANY

4.76

CI-19-WT

CI-19-30

6.35

CAL PORTLAND

CI-18-WT

CI-18-30

6.36

CI-13-30

CI-13-WT

CI-13-60

6.57

CI-16-WT

CI-16-30

CI-16-60

7.0

CI-17-WT

CI-17-30

5.97

5.0

5.5

6.0

6.5

CAPITAL AREA OF INVESTIGATION

SHALLOW ZONE
TIDALLY AVERAGED
GROUNDWATER ELEVATIONS
APRIL 2012

DRAFT

0 200
APPROXIMATE SCALE IN FEET

N

LEGEND

- CAPITAL INDUSTRIES MONITORING WELL
- BLASER DIE CASTING BORING MONITORING WELL
- 2012 GROUNDWATER MONITORING WELL
- NEW MONITORING WELLS
- PSC MONITORING WELL
- ART BRASS PLATING BORING MONITORING WELL

ALL LOCATIONS ARE APPROXIMATE

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 2

CAPITAL AREA OF INVESTIGATION SHOWING MONITORING WELL LOCATIONS
2012 GROUNDWATER MONITORING PLAN
CAPITAL INDUSTRIES, INC., SEATTLE, WA

FARALLON PN: 457-004

Drawn By: DEW	Checked By: AF	Date: 4/4/12	Disk Reference: 457004i

ORCAS

5th AVENUE

BDC-1-WT

BDC-4-WT

BDC-10-60

BDC-10-40

BLASER DIE CASTING FACILITY

BLASER DIE CASTING (BDC) FACILITY

BDC-3-60

BDC-3-WT

BDC-3-40

BDC-2-WT

BDC-7-WT

BDC-7-60

BDC-7-40

CAPITAL PROPERTY

CG-136-40

CG-136-WT

MW-17-40

MW-19-40

MARTIN SIGN FABRICATION

MW-17-60

MW-19-60

NORTHWEST SALES GROUP

STONE CRAFT

SFR SFR SFR

CITY LIGHT ELECTRICAL SUPPLY

COMMERCIAL BUILDING

2nd AVENUE SOUTH

3rd AVENUE SOUTH

MEAD BUILDING

BDC-6-WT

BDC-6-30

BDC-6-60

BDC-11-WT

BDC-11-60

BDC-11-40

MW-5

SOUTH MEAD STREET

CI-MW-1-WT

CI-MW-1-40

CI-MW-1-60

MW-8 ND

CI-8-40

CI-8-60

CAPITAL PROPERTY

VACANT HOUSE

CHINESE RESTURANT

PFS-NORTHERN BUILDING

PFS-SOUTHERN BUILDING

1st AVENUE SOUTH

FRAY EQUIPMENT COMPANY

PLANT 5

PLANT 1

PLANT 2 CANOPY

PLANT 2

PLANT 3

PLANT 4 CANOPY

PLANT 4

MW-2

CG-137-WT

CI-137-50

MW-3

CG-137-40

MW-4

MW-6

SOUTH FIDALGO STREET

CI-7-40

CI-7-60

MW-7

CG-141-WT

CG-141-40

CG-141-50

SP0-42

CG-140-WT

ABP-CG-140-70

CG-140-30

CG-140-40

OTT REAL ESTATE PROPERTY (JACK IN THE BOX)

SOUTH FIDALGO ST

EAST MARGINAL

MOBILE CRANE OFFICE BUILDING

OLYMPIC MEDICAL BUILDING

MOBILE CRANE COMPANY

GULL INDUSTRIES BUILDING/ AM INTERNATIONAL

CI-15-40

CI-15-60

CI-9-40

CI-9-WT

CI-9-70

7.53

CI-10-WT

CI-10-65(50'-65")

BUCKNER WEATHERBY BUILDING

4th AVENUE SOUTH

6th AVENUE SOUTH

DUWAMISH RIVER

LONGVIEW FIBRE AND PACK

BECKWITH AND KUFFEL BUILDING

6.51

CI-12-WT

CI-12-30

CI-12-60

PACIFIC LAMP SUPPLY

B & OI

ALEYTIANS CONSTRUCTORS

CI-14-WT

6.97

CI-14-35

CI-14-70

7.5

CHRISTPERSON RADER & KIEF BUILDING

CERTAIN TEED GYPSUM

MULTI-TENANT WAREHOUSE

MULTI-TENANT WAREHOUSE

MULTI-TENANT WAREHOUSE

7.0

CI-19-WT

CI-19-30

CAL PORTLAND

CI-18-WT

CI-18-30

5.93

CI-13-30

CI-13-WT

CI-13-60

6.73

CI-11-60

CI-11-WT

CI-11-30

FITTINGS INC. COMPANY

6.5

6.0

CI-16-WT

CI-16-30

CI-16-60

CI-17-WT

CI-17-30

CAPITAL AREA OF INVESTIGATION

WATER TABLE ZONE
TIDALLY AVERAGED
GROUNDWATER ELEVATIONS
AUGUST 2011

DRAFT

0 200
APPROXIMATE SCALE IN FEET

N

LEGEND

- CAPITAL INDUSTRIES MONITORING WELL
- BLASER DIE CASTING BORING MONITORING WELL
- 2012 GROUNDWATER MONITORING WELL
- NEW MONITORING WELLS
- PSC MONITORING WELL
- ART BRASS PLATING BORING MONITORING WELL

ALL LOCATIONS ARE APPROXIMATE

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 2

CAPITAL AREA OF INVESTIGATION SHOWING MONITORING WELL LOCATIONS
2012 GROUNDWATER MONITORING PLAN
CAPITAL INDUSTRIES, INC., SEATTLE, WA

FARALLON PN: 457-004

Drawn By: DEW	Checked By: AF	Date: 4/4/12	Disk Reference: 457004i

WATER TABLE ZONE
TIDALLY AVERAGED GROUNDWATER ELEVATIONS
APRIL 2012

DRAFT

ORCAS

5th AVENUE

BLASER DIE CASTING (BDC) FACILITY

BLASER DIE CASTING FACILITY

CAPITAL PROPERTY

CAPITAL PROPERTY

VACANT HOUSE

CHINESE RESTURANT

PFS-NORTHERN BUILDING

PFS-SOUTHERN BUILDING

2nd AVENUE SOUTH

3rd AVENUE SOUTH

1st AVENUE SOUTH

4th AVENUE SOUTH

6th AVENUE SOUTH

SOUTH MEAD STREET

SOUTH FIDALGO STREET

SOUTH FIDALGO ST

EAST MARGINAL

DUWAMISH RIVER

OHIO

MW-17-40
MW-17-60
MW-19-40
MW-19-60
NORTHWEST SALES GROUP
STONE CRAFT
MARTIN SIGN FABRICATION
CITY LIGHT ELECTRICAL SUPPLY
SFR SFR SFR
COMMERCIAL BUILDING
MEAD BUILDING

BDC-1-WT
BDC-4-WT
BDC-10-60
BDC-10-40
BDC-3-60
BDC-3-WT
BDC-3-40
BDC-2-WT
BDC-7-WT
BDC-7-60
BDC-7-40
BDC-6-WT
BDC-6-30
BDC-6-60
CG-136-40
CG-136-WT
BDC-11-WT
BDC-11-60
BDC-11-40
MW-5
CI-MW-1-WT
CI-MW-1-40
CI-MW-1-60
MW-8 ND
CI-8-40
CI-8-60

PLANT 5
PLANT 1
PLANT 2 CANOPY
PLANT 2
PLANT 3
PLANT 4 CANOPY
PLANT 4

CG-137-WT
CG-137-40
CI-137-50
MW-2
MW-3
MW-4
MW-6
CI-7-40
CI-7-60
MW-7

CG-141-WT
CG-141-40
CG-141-50

SP0-42
CG-140-WT
ABP-CG-140-70
CG-140-30
CG-140-40
OTT REAL ESTATE PROPERTY (JACK IN THE BOX)

FRAY EQUIPMENT COMPANY

MOBILE CRANE OFFICE BUILDING
MOBILE CRANE COMPANY
OLYMPIC MEDICAL BUILDING
GULL INDUSTRIES BUILDING/ AM INTERNATIONAL
BUCKNER WEATHERBY BUILDING
PACIFIC LAMP SUPPLY
B & OI
ALEYTIANS CONSTRUCTORS
CHRISTFERSON RADER & KIEF BUILDING
BECKWITH AND KUFFEL BUILDING
LONGVIEW FIBRE AND PACK
CERTAIN TEED GYPSUM
CAL PORTLAND
MULTI-TENANT WAREHOUSE
FITTINGS INC. COMPANY

CI-15-40
CI-15-60
CI-9-40
CI-9-WT
CI-9-70
CI-10-WT
CI-10-35
CI-10-65(50'-65")
CI-12-WT
CI-12-30
CI-12-60
CI-14-WT
CI-14-35
CI-14-70
CI-19-WT
CI-19-30
CI-18-WT
CI-18-30
CI-13-30
CI-13-WT
CI-13-60
CI-11-60
CI-11-WT
CI-11-30
CI-16-WT
CI-16-30
CI-16-60
CI-17-WT
CI-17-30

7.83
7.41
10.33*
6.38
6.25
7.16
7.5
7.0
6.61
6.01
6.5

CAPITAL AREA OF INVESTIGATION

* Anomalous elevation - not included in contouring

0 200
APPROXIMATE SCALE IN FEET

N

LEGEND

- CAPITAL INDUSTRIES MONITORING WELL
- BLASER DIE CASTING BORING MONITORING WELL
- 2012 GROUNDWATER MONITORING WELL
- NEW MONITORING WELLS
- PSC MONITORING WELL
- ART BRASS PLATING BORING MONITORING WELL

ALL LOCATIONS ARE APPROXIMATE

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 2

CAPITAL AREA OF INVESTIGATION SHOWING MONITORING WELL LOCATIONS
2012 GROUNDWATER MONITORING PLAN
CAPITAL INDUSTRIES, INC., SEATTLE, WA

FARALLON PN: 457-004

Drawn By: DEW	Checked By: AF	Date: 4/4/12	Disk Reference: 457004i

APPENDIX C
DATA GAP ANALYSIS

REVISED DRAFT
REMEDIAL INVESTIGATION REPORT
Capital Industries, Inc.
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-004

FARALLON consulting

975 5th Avenue Northwest, Issaquah, Washington 98027
Tel: (425) 295-0800 Fax: (425) 295-0850
www.farallonconsulting.com

November 11, 2011

Mr. Ed Jones
Washington State Department of Ecology
3190 160th Avenue Southeast
Bellevue, Washington 98008

RE: DATA GAP ANALYSIS, DRAFT REMEDIAL INVESTIGATION REPORT
CAPITAL INDUSTRIES, INC.
5801 THIRD AVENUE SOUTH, SEATTLE, WASHINGTON
FARALLON PN: 457-004
AGREED ORDER NO. DE 5348

Dear Mr. Jones:

Farallon Consulting, L.L.C. (Farallon) has prepared this letter on behalf of Capital Industries, Inc. (Capital) to transmit the data gap analysis as required in the Washington State Department of Ecology (Ecology) *Revised Remedial Investigation Report Due Date Extension Letter* dated November 4, 2011. The data gap analysis consists of the attached Plant 2 Soil Data Gap Analysis and Data Gap Summary Table.

Following Ecology's review of the data gap analysis documents, a meeting with Ecology may be necessary to reach concurrence on the actions required to address the Remedial Investigation data gaps. The meeting will be discussed after Ecology completes its review.

If you have questions regarding this data gap analysis, please contact the undersigned at (425) 295-0800.

Sincerely,

Farallon Consulting, L.L.C.

Peter Jewett, L.G., L.E.G.
Principal Engineering Geologist

Attachments: Attachment A, *Plant 2 Soil Data Gap Analysis*
Attachment B, Table 1, *Significant Data Gaps—Summary and Response*

cc: Mr. Ronald Taylor; Capital Industries, Inc.
Mr. Donald Verfurth; Gordon and Rees L.L.P.

PJ:bjj

ATTACHMENT A
PLANT 2 SOIL DATA GAP ANALYSIS

OPERATIONAL HISTORY

- A waterfall paint station was located in the southwest corner of Plant 2 (Figure 4-4, Appendix A).
- A chemical/paint storage area was located at the central portion of the Plant 2 Canopy along the east wall. Plant 2 was destroyed by fire on January 18, 2004. (Figure 4-4, Appendix A).

INVESTIGATION HISTORY

- Soil vapor samples were collected by Floyd Snider McCarthy, Inc. (FSM) (2004) in April of 2004 during the rebuilding of Plant 2.
- Soil monitoring using a photoionization detector (PID) was performed by FSM during the rebuilding of Plant 2. Suspect soils were excavated, screened, and sampled. A total of 328 yards of soil was removed from the site during construction.
- A Gore Sorber soil gas investigation was performed by Environmental Consulting Services, Inc. (ECS) (2005) in February of 2005 to identify soil above the water table that was potentially impacted with chlorinated solvents. Soil in identified areas subsequently was sampled via Geoprobe.
- Soil sampling was conducted by Farallon Consulting, L.L.C. (Farallon) (2008) as part of the Second Avenue Redevelopment project, west-adjacent to the Plant 2 Canopy.
- Farallon (2008) collected soil samples from boring B2 and the boring for monitoring well MW-2 in the Plant 2 Canopy during a subsurface investigation in 2006.

SUBSURFACE INVESTIGATION SUMMARY

FSM (2004) collected soil gas samples in summa canisters from below the cement pad at Plant 2 in April of 2004. The sampling locations are shown on Figure 3.1 and analytical results are presented in Table 4-1 in Appendix B. Trichloroethene (TCE) was detected in samples collected from locations VP-7 and VP-11, located in the southwest and northwest corners of the building, respectively. High levels of toluene, ethylbenzene, and xylenes were detected in two samples collected from the southeast corner of Plant 2. Tetrachloroethene (PCE) was detected in 10 of the 12 soil gas samples collected throughout the building.

FSM also monitored the removal of the concrete pad and soil from Plant 2 during the reconstruction of the building in April and May of 2004.

- Four samples were collected from soil associated with the pad rubble from the northeast, northwest, central, and southeast sections of the Plant 2 footprint. None of the samples analyzed contained detectable amounts of PCE, TCE, dichloroethene (DCE), vinyl chloride, or benzene, toluene, ethylbenzene, and xylenes (BTEX).
- During soil excavation, soil was screened using a PID. The Soil Vapor and Construction Monitoring Report prepared by FSM (2004) states “nearly all of the soil excavated

resulted in a background reading on the PID." Two soil samples were collected to confirm the PID readings: one from the northwestern area, and one from the southern portion of Plant 2 at a depth of 1 foot below ground surface (bgs). The samples did not contain detectable concentrations of PCE, TCE, DCE, vinyl chloride, or BTEX.

- Two cubic yards of suspect soil (i.e., soil exhibiting a PID reading over 5) was excavated from the stormwater vault in the northwest corner of Plant 2 and stockpiled.
- Ten cubic yards of suspect soil was excavated from two footings along the south wall of Plant 2 and stockpiled.
- Seven cubic yards of suspect soil was excavated from an internal footing in the southwest corner of Plant 2 and stockpiled.
- Six soil samples from the total of 19 cubic yards of suspect soil stockpiles were analyzed. The samples did not contain detectable concentrations of PCE, TCE, DCE, vinyl chloride, or BTEX. The soil was judged to be clean and was either used as backfill at the site or disposed of off the site.
- Extensive PID monitoring was conducted during the excavation of footings and utility trenches. Figure 1 in Appendix B is a schematic showing the approximate distribution of footing and utility trench excavations. Where PID readings exceeded 5, the suspect soil was removed as noted above. Otherwise the PID readings were at or near background and did not indicate the presence of soil contaminated with volatile compounds. Sixteen approximately 10- by 10- by 4-foot-deep footings were excavated and screened using a PID. Utility trenches of unknown linear footage also were excavated across the site and screened. No additional suspect soil was detected.
- The distribution of the footings, utility vaults, and trenches covers the entire site and, along with the soil sampling conducted, indicates with reasonable certainty that there is no ongoing source of TCE in the soil above the groundwater table at Plant 2.

ECS (2005) conducted a Gore Sorber soil gas survey and soil sampling at Plant 2 and the Plant 2 Canopy in February of 2005.

- Eleven Gore Sorbers were placed throughout the western portion of Plant 2, and nine were distributed throughout the Plant 2 Canopy (Figures 5-6a, 5-6b, and 5-8, Appendix A). No TCE was detected in the soil vapor adsorbed by the Gore Sorbers installed in soil beneath Plant 2 or the Plant 2 Canopy. PCE and 1,1,1-trichloroethane (1,1,1-TCA) were detected in relatively low amounts.
- Soil boring ECS33 was installed in the southwest corner of Plant 2 where previous soil gas and Gore Sorber data indicated a possible source (Figure 5-8, Appendix A). No PCE, TCE, or vinyl chloride was detected in soil at 3.2- or 6.9-foot depths. No chlorinated ethenes were detected in borings ECS6 or ECS7 located south and down-gradient of ECS33 (Figure 5-8, Appendix A).
- No PCE, TCE, or vinyl chloride was detected in soil samples collected from six of seven locations in and surrounding the Plant 2 Canopy. PCE was detected in one sample collected from ECS35 at a depth of 3.8 feet. PCE was not detected in the sample

collected from ECS35 at a depth of 6.5 feet, nor is PCE present in groundwater near Plant 2.

Farallon (2008) collected 17 soil samples from test pits in the Second Avenue South area adjacent to the Plant 2 Canopy to the west, for volatile organic compound (VOC) analysis. The samples were collected at depths ranging from 0.5 foot to 9.5 feet bgs. No PCE, TCE, DCE or vinyl chloride was detected in any of the samples. Figure 13 in Appendix C shows the sampling locations and Table 8 provides the analytical results.

Farallon collected soil samples from boring B2 and during installation of MW-2 in the Plant 2 canopy. No TCE was detected in the samples collected from boring B2 from 2.5 to 34 feet bgs (Table 4, Appendix C). Vinyl chloride was detected in samples collected below 32.5 feet bgs. During installation of MW-2, TCE was detected in a soil sample collected from 8.5 to 9 feet bgs, at the water table interface. TCE was not detected in shallow soil samples collected at 3.5 or 6 feet bgs at this location.

SUMMARY

There has been considerable investigation of soil conditions in and around both Plant 2 and the Plant 2 Canopy. There is no evidence of a source of TCE in shallow soil at Plant 2 based on the soil gas and soil screening and the soil sampling activities conducted at these buildings. Therefore, there is no data gap or need for additional remedial soil investigation at Plant 2 or the Plant 2 Canopy.

REFERENCES

Environmental Consulting Services, Inc. (ECS). 2005. *Draft Remedial Investigation Report, Capital Industries Site, Seattle, Washington.* Prepared for Capital Industries, Inc., Seattle, Washington. June.

Farallon Consulting, L.L.C. (Farallon). 2008. *Remedial Investigation Work Plan, Capital Industries, Inc., 5801 Third Avenue South, Seattle, Washington*. Prepared for Capital Industries, Inc., Seattle, Washington. September 16.

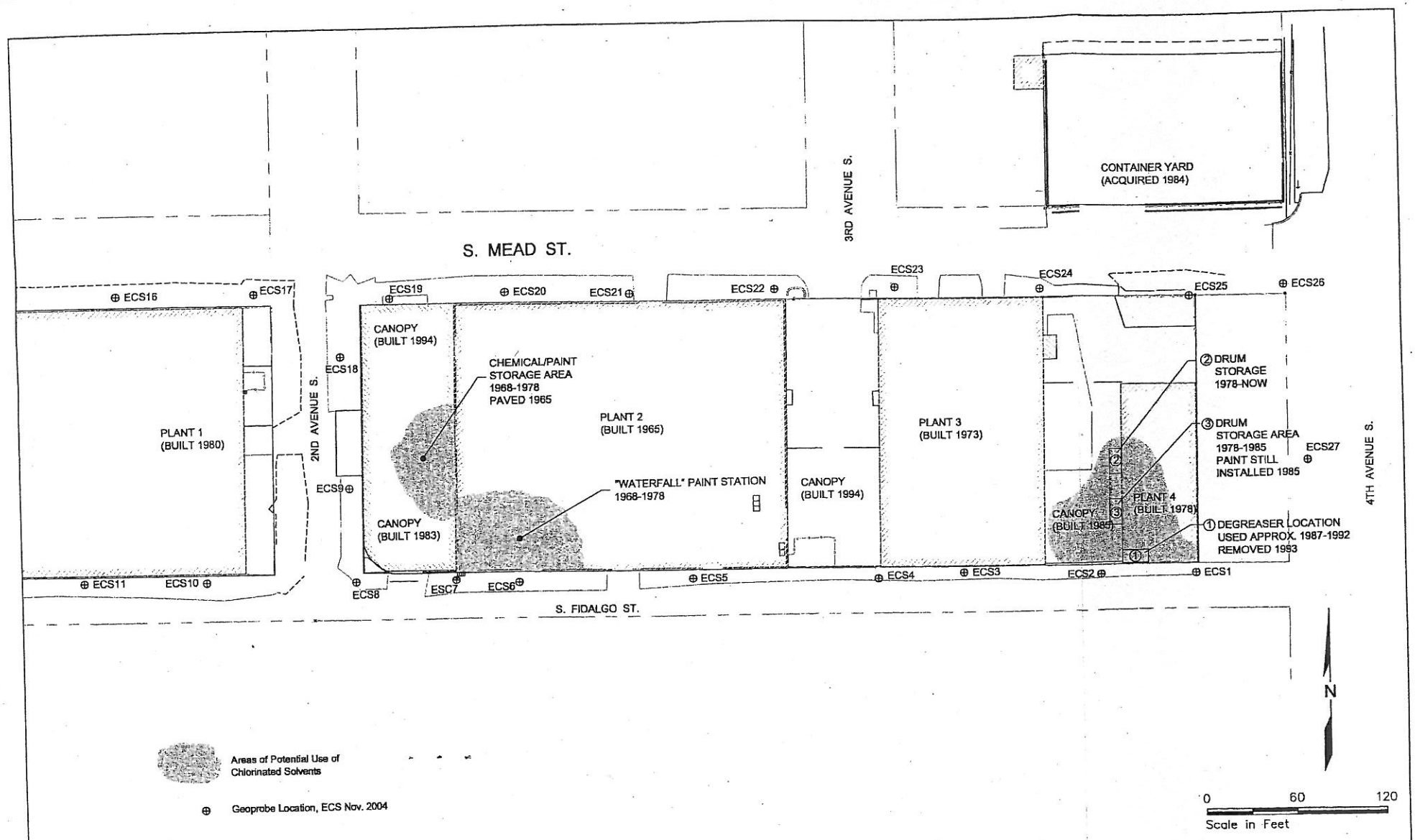
Farallon Consulting L.L.C., Aspect Consulting, Arrow Environmental, and Pacific Groundwater Group (Farallon et al.). 2008. *Data Summary Report, West Groundwater Investigation Area, Seattle, Washington.* January 22.

Floyd Snider McCarthy, Inc. (FSM). 2004. *Capital Industries, Inc. Soil Vapor and Construction Monitoring Report.* Prepared for Capital Industries, Inc., Seattle, Washington. July 6.

APPENDICES

Appendix A, Environmental Consulting Services, Inc. Figures 4-4, 5-6a, 5-6b, and 5-8
Appendix B, Floyd Snider McCarthy, Inc. Figure 3.1, Table 4-1, and Figure 1
Appendix C, Farallon Consulting, L.L.C. Figure 13 and Tables 4 and 8

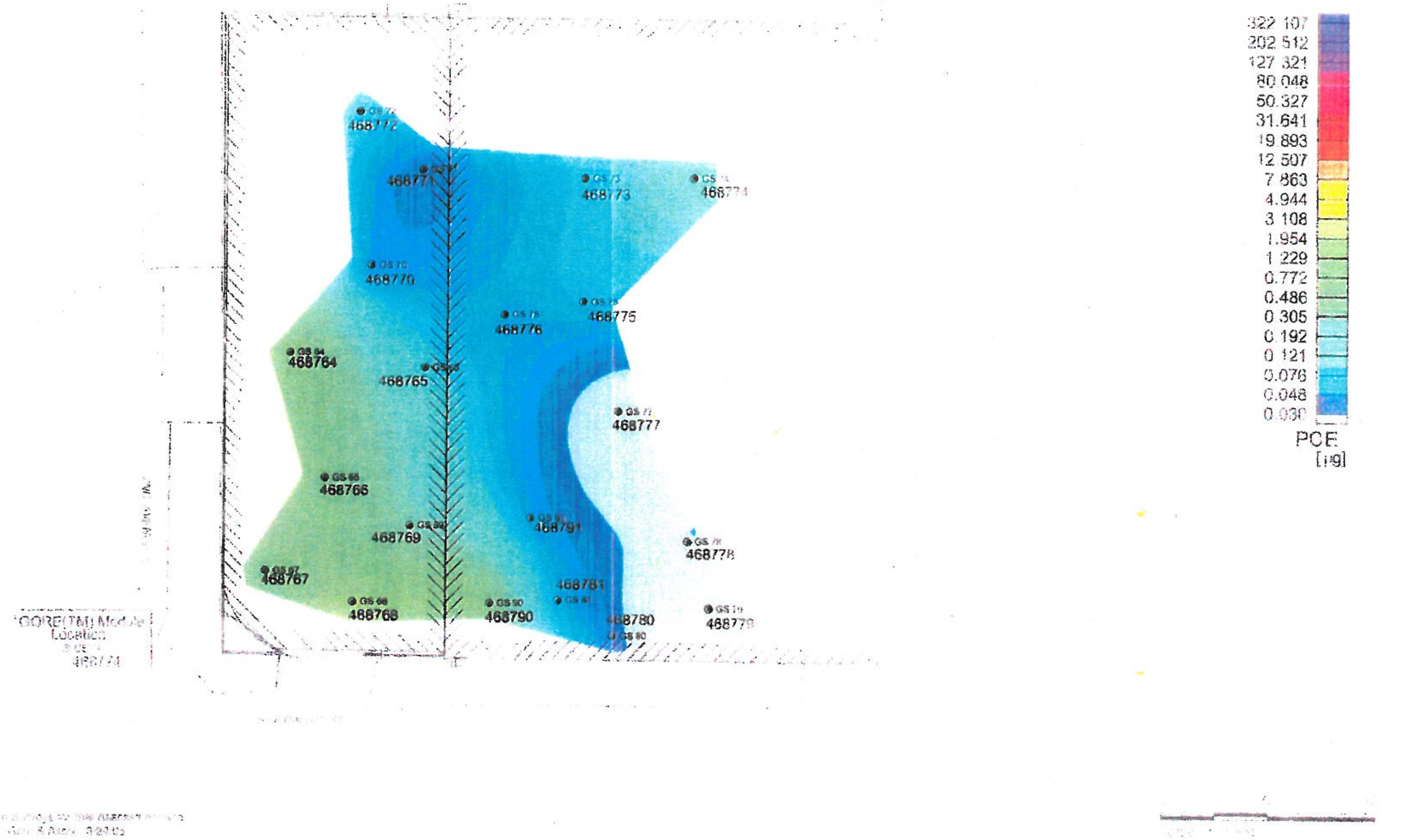
APPENDIX A



Environmental Consulting Services, Inc.

Capital Industries
Seattle, Washington

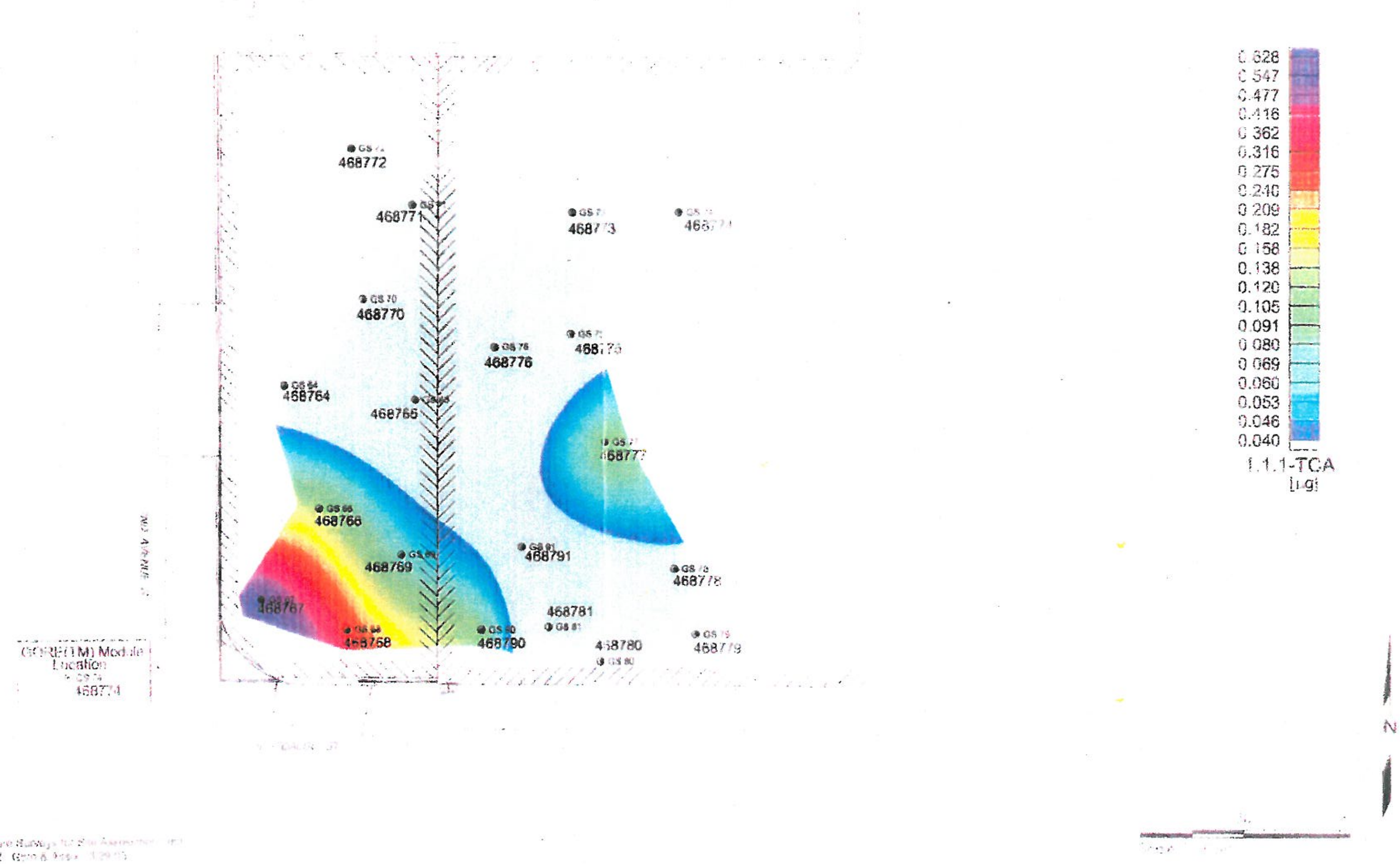
Figure 4-4
Locations of Potential Historical Uses of Chlorinated Solvents at Capital



Environmental Consulting Services, Inc.

Capital Industries
Seattle, Washington

Figure 5-6a
PCE in Gore Sorbers, Plant 2 and Plant 2 Canopy



Environmental Consulting Services, Inc.

Capital Industries
Seattle, Washington

Figure 5-6b
TCA in Gore Sorbers, Plant 2 and Plant 2 Canopy

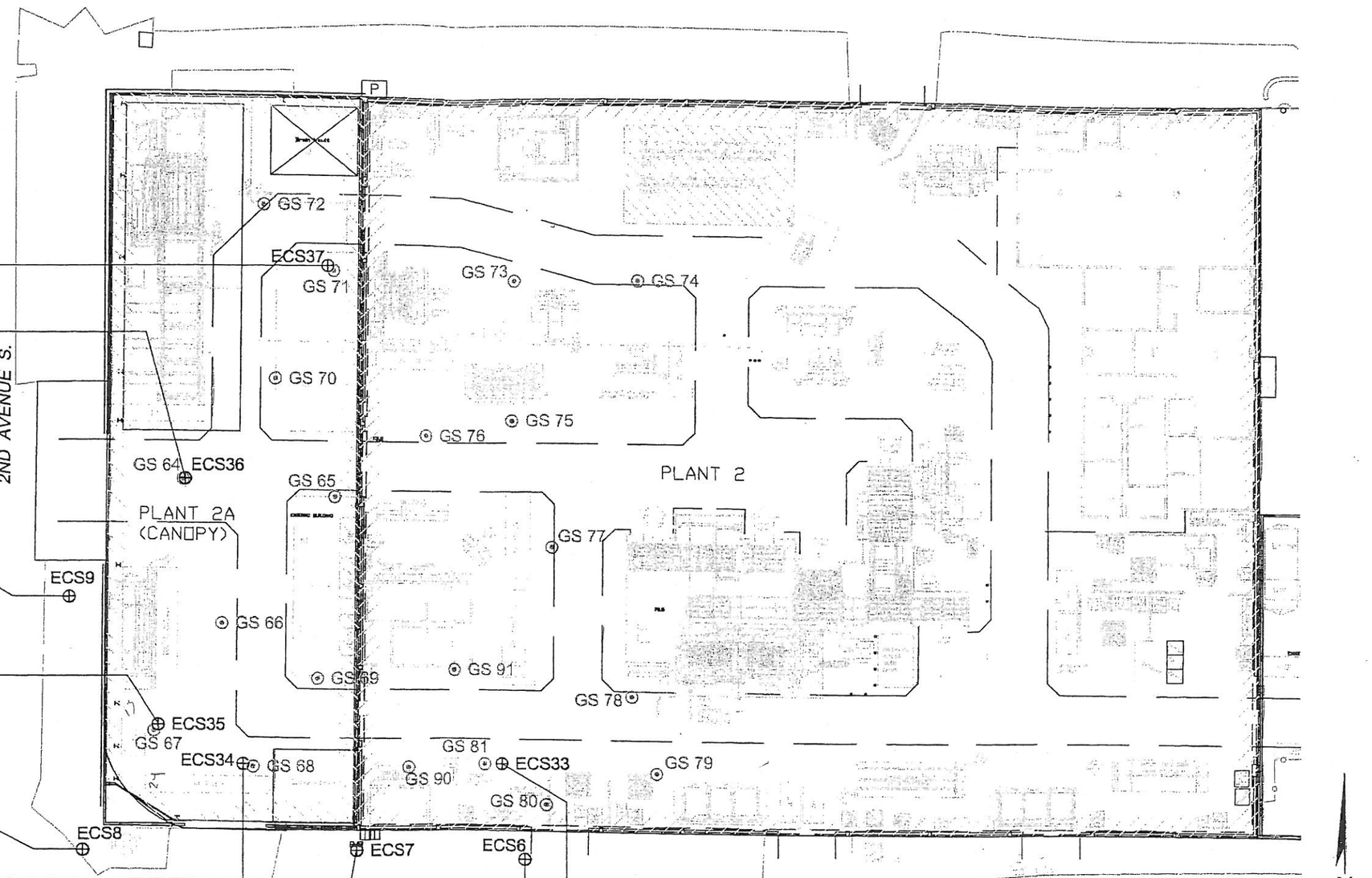
ECS37	Soil Depth in Feet	
Compound	1.5	4.2
Vinyl Chloride (ug/kg)	<0.4UJ	<0.6UJ
TCE (ug/kg)	<0.4UJ	<0.6UJ
PCE (ug/kg)	<0.4UJ	<0.6UJ
Other Volatiles (ug/kg)	ND(<0.8U)	ND(<1.2U)

ECS36	Soil Depth in Feet	
Compound	3.8	6.7
Vinyl Chloride (ug/kg)	<0.5UJ	<0.4UJ
TCE (ug/kg)	<0.5UJ	<0.4UJ
PCE (ug/kg)	<0.5UJ	<0.4UJ
Other Volatiles (ug/kg)	ND(<1.0U)	ND(<0.9U)

ECS9	Soil Depth in Feet		
Compound	0.0	2.0	6.0
Vinyl Chloride (ug/kg)	<10U	<10U	<10U
TCE (ug/kg)	<10U	<10U	<10U
PCE (ug/kg)	<10U	<10U	<10U
Other Volatiles (ug/kg)	<10U	<10U	<10U

ECS35	Soil Depth in Feet	
Compound	3.8	6.5
Vinyl Chloride (ug/kg)	<0.4UJ	<0.4UJ
TCE (ug/kg)	<0.4UJ	<0.4UJ
PCE (ug/kg)	**2.5**	<0.4UJ
Other Volatiles (ug/kg)	ND(<0.9U)	ND(<0.9U)

ECS8	Soil Depth in Feet	
Compound	4.5	6.7
Vinyl Chloride (ug/kg)	<10U	<10U
TCE (ug/kg)	<10U	<10U
PCE (ug/kg)	<10U	<10U
Other Volatiles (ug/kg)	<10U	<10U



ECS34	Soil Depth in Feet	
Compound	3.4	6.9
Vinyl Chloride (ug/kg)	<0.5UJ	<0.4UJ
TCE (ug/kg)	<0.5UJ	<0.9U
PCE (ug/kg)	<0.5UJ	0.5J
Other Volatiles (ug/kg)	ND(<1.1U)	ND(<0.9U)

ECS33	Soil Depth in Feet	
Compound	3.2	6.9
Vinyl Chloride (ug/kg)	<0.6UJ	<0.6UJ
TCE (ug/kg)	<0.6UJ	<0.6UJ
PCE (ug/kg)	<0.6UJ	<0.6UJ
Other Volatiles (ug/kg)	ND(<1.3U)	ND(<1.2U)

ECS7	Soil Depth in Feet	
Compound	3.0	7.0
Vinyl Chloride (ug/kg)	<10U	<10U
TCE (ug/kg)	<10U	<10U
PCE (ug/kg)	<10U	<10U
Other Volatiles (ug/kg)	<10U	<10U

ECS6	Soil Depth in Feet	
Compound	3.0	6.0
Vinyl Chloride (ug/kg)	<10U	<10U
TCE (ug/kg)	<10U	<10U
PCE (ug/kg)	<10U	<10U
Other Volatiles (ug/kg)	<10U	<10U

⊙ Gore Sorber Location, March 2005

⊕ Geoprobe Location, November 2004 (ECS6,7,8, and 9) and April 2005.

U = Indicates that the compound was not detected at the reported concentration

J = Estimated concentration when the value is less than the reporting limit established by the laboratory

Soil Target Value for cis 1,2 Dichloroethene = 9.93 ug/kg
Soil Target Value for TCE = 0.624 ug/kg
Soil Target Value for PCE = 1.87 ug/kg
Soil Target Value for vinyl chloride = 1.2 ug/kg

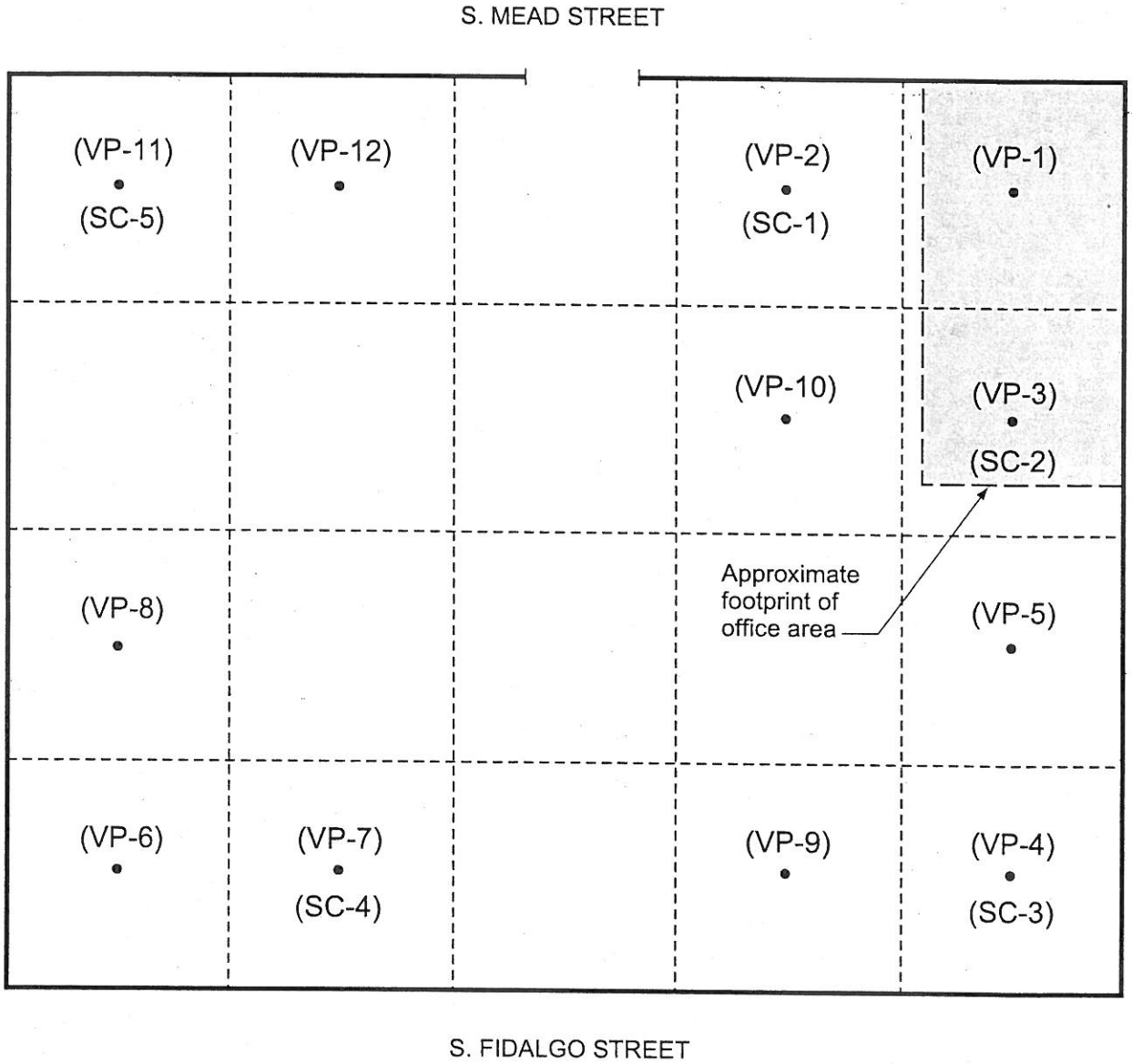
Environmental Consulting Services, Inc.

Capital Industries
Seattle, Washington

Figure 5-8
Summary of Soil Test Results
Plant 2 and Plant 2 Canopy Areas

DWG NAME: G:\project\Clients\mccarthy\capital\c_indu020 (Apr2005 Geoprobe).dwg
DATE: 05/25/05 12:05pm

APPENDIX B



LEGEND

- • Sample Location
- (VP) On-Site Lab Soil Vapor Sample
- (SC) Off-Site Lab Summa Canister Sample

NOT TO SCALE

N

Floyd Snider McCarthy, Inc.
Strategic and Technical Solutions for Contaminated Properties

Capital Industries, Inc.
Plant 2
Seattle, Washington

Figure 3.1
Location of Soil Vapor Samples

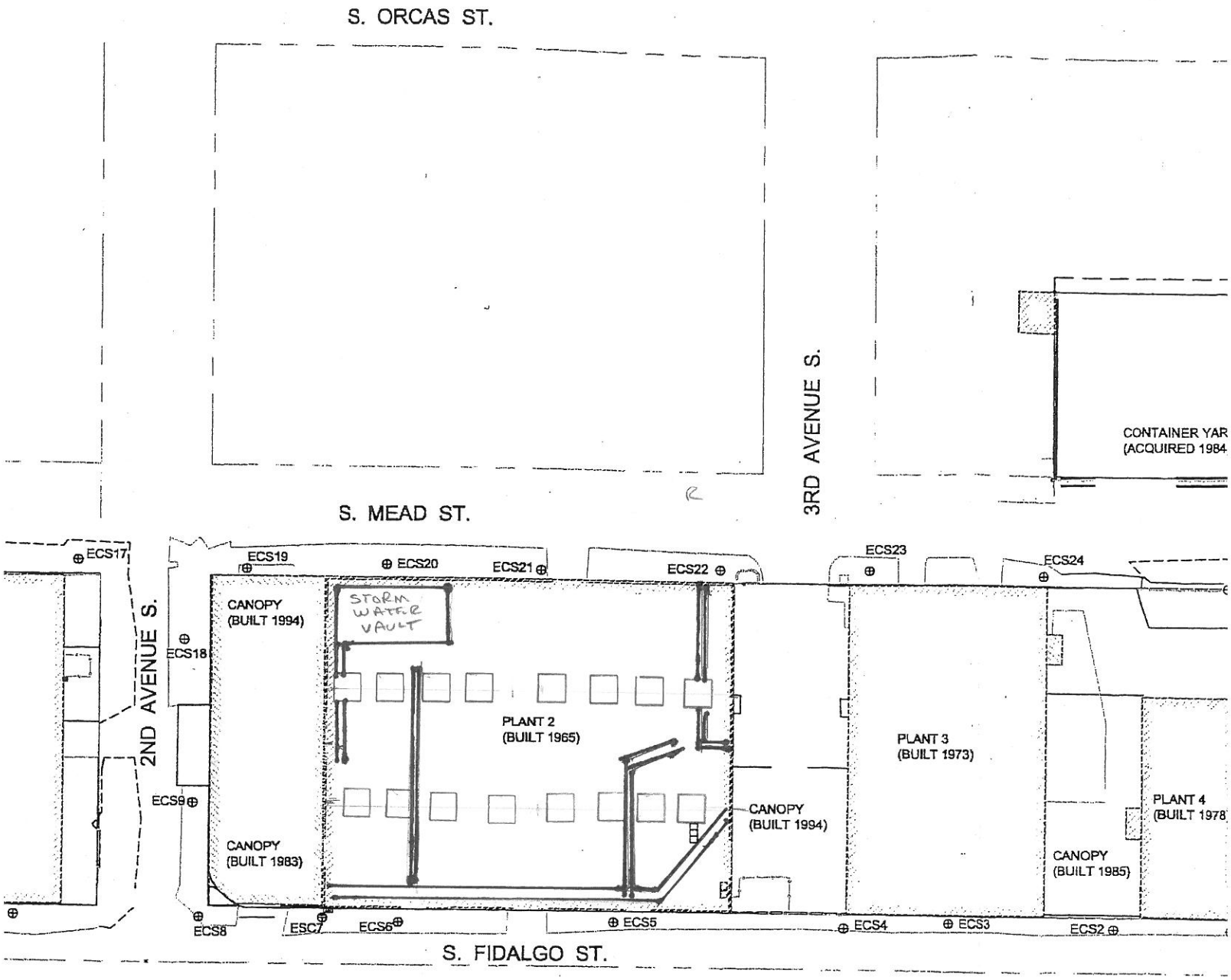
Table 4-1
Soil Vapor Results Below Plant 2

Sample Number	VP-1	VP-2	VP-3	VP-4	VP-5	VP-6	VP-7	VP-8	VP-9	VP-10	VP-11	VP-12	Average
Compound													
Benzene	4.9	5	5	5	5	5	5	5	5	5	5	5	5
Toluene	5.7	6	6	**180**	**498**	6	6	6	6	6	**38**	6	64
Ethyl Benzene	6.6	7	7	**530**	**1236**	**146**	7	7	7	7	7	7	164
Total Xylenes	6.6	7	7	**1059**	**5739**	7	7	7	**181**	7	**119**	7	596
Cis-12DCE	6.0	6	6	**76**	6	6	6	6	6	6	6	6	12
Trans-12DE	6.03	6	6	**442**	6	6	6	6	6	6	6	6	42
TCE	8.19	8	8	8	8	8	**60**	8	8	8	**36**	8	15
PCE	10.3	10	**83**	**614**	**35**	**248**	**145**	**117**	**214**	**179**	**172**	**165**	166
VC	52.0	52	52	52	52	52	52	52	52	52	52	52	52

Notes:

Units in µg/m3.

Bold numbers = results above MDL.



Legend. - ALL Locations approximate; Derived from field notes.

═══ - utility trenches

□ - footing excavations

NOT TO SCALE

FIGURE 1

PLANT 2 FOOTING AND UTILITY EXCAVATIONS

CAPITAL INDUSTRIES

APPENDIX C

SINGLE FAMILY RESIDENCE

2nd AVE

COMME
BUILDIN

TH MEAD STREET

PLANT 1

SSR-7-0.5-071608/
SSR-7-1.0-071608

SSR-8-0.5-071608/
SSR-8-1.0-071608

SSR-1A-9.5-063008

SSR-5-0.5-071608/
SSR-5-1.0-071608

SSR-6-0.5-071608/
SSR-6-1.0-071608

PLANT 2
CANOPY

PLANT 2

SSR-3-0.5-071608/
SSR-3-1.0-071608

SSR-4-0.5-071608/
SSR-4-1.0-071608

SSR-1-0.5-071608/
SSR-1-1.0-071608

SSR-2-0.5-071608/
SSR-2-1.0-071608

SOUTH FIDALGO STREET

0 40

APPROXIMATE SCALE IN FEET

OLYMPIC MEDICAL

LEGEND

CAPITAL PROPERTY

2nd AVENUE VACATED BY CITY OF SEATTLE
REDEVELOPED BY CAPITAL

ELECTRICAL VAULT EXCAVATION AREA

SSR-8-0.5-071608/ SOIL SAMPLING LOCATION
FARALLON (JUNE, JULY 2008)

ALL LOCATIONS ARE APPROXIMATE

N

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 13

2nd AVENUE SOUTH REDEVELOPMENT
SOIL SAMPLING LOCATIONS
RI WORK PLAN
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

FARALLON PN: 457-004

Drawn By: DEW	Checked By: DC	Date: 9/8/08	Disk Reference: 457004cm

Table 4
Analytical Results for HVOCs in Soil Samples
Remedial Investigation Report
Capital Industries, Inc.
Seattle, Washington
Farallon PN:457-004

Area of Investigation[1]	Sample Location	Sample Date	Sample Identification	Depth (feet)[2]	Soil Analytical Results (mg/kg)[3]				
					cis-1,2-DCE	trans-1,2-DCE	PCE	TCE	Vinyl chloride
Previous Investigation (Farallon 2006)									
Capital Industries, Inc.	B1	1/16/2006	B1-011606-9.5-10	9.5-10	0.00061 U	0.00061 U	0.00061 U	0.0019	0.00061 U
		1/16/2006	B1-011606-29.5-30	29.5-30	0.00073 U	0.00073 U	0.00073 U	0.00073 U	**0.019**
		1/16/2006	B1-011606-33.5-34	33.5-34	0.00079 U	0.00079 U	0.00079 U	0.00079 U	0.00079 U
Capital Industries, Inc.	B2	1/17/2006	B2-011706-2.5-3	2.5-3	0.00057 U	0.00057 U	0.00057 U	0.00057 U	0.00057 U
		1/17/2006	B2-011706-5.5-6	5.5-6	0.00063 U	0.00063 U	0.00063 U	0.00063 U	0.00063 U
		1/17/2006	B2-011706-32.5-33	32.5-33	0.0022	0.00078 U	0.00078 U	0.00078 U	**0.0074**
		1/17/2006	B2-011706-33.5-34	33.5-34	0.00081 U	0.00081 U	0.00081 U	0.00081 U	**0.068**
Capital Industries, Inc.	B3	1/17/2006	B3-011706-8.5-9	8.5-9	0.00076 U	0.00076 U	0.00076 U	0.00076 U	0.00076 U
		1/17/2006	B3-011706-13.5-14	13.5-14	**0.039**	0.00069 U	0.00069 U	0.0024	0.0023
		1/17/2006	B3-011706-25.5-26	25.5-26	0.0036	0.00083 U	0.00083 U	0.00083 U	0.0019
Capital Industries, Inc.	B4	1/16/2006	B4-011606-9.5-10	9.5-10	0.00065 U	0.00065 U	0.00065 U	0.00065 U	0.00065 U
		1/16/2006	B4-011606-13.5-14	13.5-14	0.0007 U	0.0007 U	0.0007 U	0.0007 U	0.0007 U
		1/16/2006	B4-011606-17.5-18	17.5-18	0.0095	0.00073 U	0.00073 U	0.00073 U	0.0021
Capital Industries, Inc.	B5	1/16/2006	B5-011606-7.5-8	7.5-8	0.00083 U	0.00083 U	0.00083 U	0.00083 U	0.00083 U
		1/16/2006	B5-011606-13.5-14	13.5-14	0.0056	0.00065 U	0.00065 U	0.0013	0.00065 U
		1/16/2006	B5-011606-17.5-18	17.5-18	0.00092	0.00072 U	0.00072 U	0.00072 U	0.00072 U
		1/16/2006	B5-011606-33.5-34	33.5-34	0.0035	0.00063 U	0.00063 U	0.00063 U	**0.031**
Capital Industries, Inc.	MW-1	2/7/2006	MW1-020706-5-6.5	5-6.5	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U
		2/7/2006	MW1-020706-15-16.5	15-16.5	0.0064	0.00062 U	0.00062 U	**0.0034**	0.00062 U
Capital Industries, Inc.	MW-2	2/7/2006	MW2-020706-3.5-4	3.5-4	0.00069 U	0.00069 U	0.00069 U	0.00069 U	0.00069 U
		2/7/2006	MW2-020706-6-6.5	6-6.5	0.00059 U	0.00059 U	0.00059 U	0.00059 U	0.00059 U
		2/7/2006	MW2-020706-8.5-9	8.5-9	**0.011**	0.00059 U	0.00059 U	**0.13**	0.00064 U
		2/7/2006	MW2-020706-11-11.5	11-11.5	**0.034**	0.0031	0.00064 U	0.00059 U	0.00059 U
Capital Industries, Inc.	MW-3	2/6/2006	MW3-020606-4-5.5	4-5.5	0.00057 U	0.00057 U	0.00057 U	0.00057 U	0.00057 U
		2/6/2006	MW3-020606-15-16.5	15-16.5	**0.012**	0.00068 U	0.00068 U	0.0019	0.0024
Capital Industries, Inc.	MW-4	2/6/2006	MW4-020606-5-6.5	5-6.5	0.00062 U	0.00062 U	0.00062 U	0.00062 U	0.00062 U
		2/6/2006	MW4-020606-17-18.5	17-18.5	0.00058 U	0.00058 U	0.00058 U	0.00071	0.00058 U
Capital Industries, Inc.	MW-5	2/7/2006	MW5-020706-5-6.5	5-6.5	0.00061 U	0.00061 U	0.00061 U	0.00061 U	0.00061 U
		2/7/2006	MW5-020706-10-11.5	10-11.5	0.0052	0.0006 U	0.0006 U	0.0022	0.0006 U
Capital Industries, Inc.	MW-6	2/7/2006	MW6-020706-2.5-3	2.5-3	**0.011**	0.0006 U	**0.016**	**0.032**	0.0006 U
		2/7/2006	MW6-020706-5-6.5	5-6.5	**0.12**	0.0035	**0.21**	**0.28**	0.00063 U
		2/7/2006	MW6-020706-7.5-8.5	7.5-8.5	**0.11**	0.003	**0.2**	**0.2**	0.0006 U
Capital Industries, Inc.	MW-7	2/6/2006	MW7-020606-5-6.5	5-6.5	0.00091	0.00065 U	**0.056**	**0.065**	0.00065 U
		2/6/2006	MW7-020606-10-11.5	10-11.5	0.00066 U	0.00066 U	**0.0053**	**0.0031**	0.00066 U
Capital Industries, Inc.	MW-8	2/6/2006	MW8-020606-5-6.5	5-6.5	0.00062 U	0.00062 U	0.00062 U	0.00062 U	0.00062 U
		2/6/2006	MW8-020606-16.5-18	16.5-18	0.0037	0.00063 U	0.00063 U	0.00063 U	0.00063 U

Table 4
Analytical Results for HVOCs in Soil Samples
Remedial Investigation Report
Capital Industries, Inc.
Seattle, Washington
Farallon PN:457-004

Remedial Investigation									
Capital Industries, Inc.	B14	12/04/2008	B14-120408-2	2	0.0013 U	0.0013 U	**0.091**	**0.024**	*0.0064 U*
		12/04/2008	B14-120408-5	5	0.0012 U	0.0012 U	**0.0055**	0.0018	*0.0059 U*
		12/04/2008	B14-120408-7	7	0.0012 U	0.0012 U	**0.0097**	**0.0035**	*0.0058 U*
Capital Industries, Inc.	B15	12/02/2008	B15-120208-2	2	0.0012 U	0.0012 U	**0.0039**	0.0012 U	*0.0061 U*
		12/02/2008	B15-120208-5	5	0.0012 U	0.0012 U	0.0012 U	0.0012 U	*0.0059 U*
		12/02/2008	B15-120208-7	7	0.0011 U	0.0011 U	0.0012	0.0011 U	*0.0056 U*
Capital Industries, Inc.	B18	12/09/2008	B18-120908-2	2	0.0011 U	0.0011 U	0.0011 U	0.0017	*0.0055 U*
		12/09/2008	B18-120908-5	5	0.0012 U	0.0012 U	**0.008**	**0.006**	*0.0061 U*
		12/09/2008	B18-120908-7	7	0.0011 U	0.0011 U	**0.021**	**0.012**	*0.0053 U*
		12/09/2008	Dup-B18-120908-7	7	0.0011 U	0.0011 U	**0.026**	**0.015**	*0.0056 U*
Capital Industries, Inc.	B25	07/30/2009	B25-073009-2	2	0.0011 U	0.0011 U	**0.021**	**0.0076**	0.0011 U
		07/30/2009	B25-073009-5	5	0.0011 U	0.0011 U	**0.012**	**0.015**	0.0011 U
		07/30/2009	B25-073009-7	7	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U
Capital Industries, Inc.	B26	07/30/2009	B26-073009-2	2	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U
		07/30/2009	B26-073009-5	5	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
		07/30/2009	B26-073009-7	7	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
MTCA Method C Screening Levels					**0.00993** [4]	**0.00969** [4]	**0.0031** [4]	**0.0028** [4]	**0.005** [4]

NOTES:

Results in **bold** denote concentrations above applicable screening levels (Table 1).

Results in *italics* denote concentrations are non-detect but above applicable screening levels (Table 1).

[1]Areas where the potentially liable parties have conducted their respective remedial investigations in accordance with their respective Agreed/Enforcement orders.

[2]Depth in feet below ground surface.

[3]Analyzed by U.S. Environmental Protection Agency Method 8260B.

[4]Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method C Soil Cleanup Levels for Industrial Land Uses, Section 706 of Chapter 173-340 of the Washington Administrative Code.

DCE = dichloroethene

HVOCs = halogenated volatile organic compounds

J = Value reported was below the practical quantitation limit, and is an estimate

mg/kg = milligrams per kilogram

PCE = tetrachloroethene

TCE = trichloroethene

U = Result is less than the laboratory practical quantitation limit or was not detected at or above the reporting limit listed.

Table 8
Second Avenue South Soil Analytical Data
Remedial Investigation Work Plan
Capital Industries
5801 Third Avenue South
Seattle, Washington
Farallon PN: 457-004

Sample Identification	Depth (feet)[1]	Date Sampled[2]	Soil Analytical Results (milligrams per kilogram)				
			PCE[3]	TCE[3]	cis 1,2-DCE[3]	trans-1,2-DCE[3]	Vinyl Chloride[3]
SSR-1A-9.5-063008[4]	9.5	6/30/2008	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013
SSR-1-0.5-071608	0.5	07/16/08	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013
SSR-1-1.0-071608	1	07/16/08	<0.00091	<0.00091	<0.00091	<0.00091	<0.00091
SSR-2-0.5-071608	0.5	07/16/08	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
SSR-2-1.0-071608	1	07/16/08	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
SSR-3-0.5-071608	0.5	07/16/08	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
SSR-3-1.0-071608	1	07/16/08	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012
SSR-4-0.5-071608	0.5	07/16/08	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013
SSR-4-1.0-071608	1	07/16/08	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012
SSR-5-0.5-071608	0.5	07/16/08	0.00087	0.00087	0.00087	0.00087	0.00087
SSR-5-1.0-071608	1	07/16/08	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012
SSR-6-0.5-071608	0.5	07/16/08	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013
SSR-6-1.0-071608	1	07/16/08	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013
SSR-7-0.5-071608	0.5	07/16/08	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089
SSR-7-1.0-071608	1	07/16/08	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
SSR-8-0.5-071608	0.5	07/16/08	<0.0012	<0.0012	<0.0012	<0.0012	<0.0012
SSR-8-1.0-071608	1	07/16/08	<0.00093	<0.00093	<0.00093	<0.00093	<0.00093
Soil Screening Levels			**0.0031**	**0.0028**	**0.00993**	**0.00969**	**0.005**

NOTES:

Results in **BOLD** denote concentrations are at or above Washington State Model Toxics Control Act Cleanup Regulation Method A cleanup levels.

< denotes result is less than laboratory practical quantitation limit or analyte not detected at or above the reporting limit.

[1]Depth in feet below ground level.

[2]Samples collected by Farallon Consulting, L.L.C.

[3]Analyzed by U.S. Environmental Protection Agency Method 8260B.

[4]During the soil sampling activities conducted by Farallon on July 16, 2008, boring identification SSR-1 was repeated from the sampling activities conducted on June 30, 2008. The identifier for the sample collected from the electrical vault at 9.5 feet bgs on June 30, 2008 has been modified to SSR-1A.

DCE = dichloroethene
PCE = tetrachloroethene
TCE = trichloroethene

Attachment B
Table 1
Significant Data Gaps—Summary and Responses
Draft Remedial Investigation
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Significant Data Gap	Ecology Comment Number	Ecology Comment	Category	Capital Response
Data gaps associated with adequate characterization of site soil contamination	15(f)	It appears from Figure 5 that there has been only one vadose zone soil sampling location inside and beneath Plant 2 (additional sampling was performed in the canopy area and immediately outside the perimeter of Plant 2).	Data Gap No Additional Sampling Necessary	Significant investigations of soil conditions in and around both Plant 2 and Plant 2 Canopy have been summarized in prior documents that were not detailed in the Draft RI Report. These include: • Soil vapor samples collected in April 2004 during rebuilding of Plant 2 by Floyd, Snider McCarthy. • Soil monitoring by PID was performed by Floyd Snyder McCarty during rebuilding of Plant 2. Suspect soils were excavated, screened, and sampled. 328 yards of soil were removed from the site during construction. • A Gore Sorber soil gas investigation was performed by Environmental Consulting Services in February 2005 to identify soil above the water table that is potentially contaminated with chlorinated solvents. Soil in identified areas was subsequently sampled via Geoprobe. • Soil sampling was conducted by Farallon as part of the Second Avenue Redevelopment project west-adjacent to the Plant 2 Canopy. • Farallon collected soil samples from boring B2 and monitoring well MW-2 in the Plant 2 Canopy during a subsurface investigation in 2006. There is no evidence of concentrations of VOCs in the shallow soil in Plant 2 based on the soil gas and soil screening, and soil sampling activities conducted at these buildings. Therefore there is no Data Gap or a need for additional remedial soil investigation at Plant 2 or the Plant 2 Canopy. (See attached documents)
		It appears that contamination in the Plant 4 area has not been bounded to the southeast (unless ECS-1 was sampled and results were low; ECS-1data do not appear to be included in the Report).	Data Gap No Additional Sampling Necessary	The nature and extent of concentrations of VOCs in shallow soil are bounded to the: • Southeast by B26, approximately 100 feet southeast of Plant 4, • West B-4, 175 feet west/southwest of Plant 4, • Northeast by ECS41, on the northeastern side of Plant 4. • South/southwest, below 2 feet bgs by B15. • South, below 5 feet bgs by B25. The nature and extent of VOCs in soil is not bounded to the east or northwest. Additional data collected for the VI south of Plant 4 in the Gull Industries Building and east of Plant 4 in the Commercial Buildings will support the evaluation of pathways and the nature and extent of VOCs in shallow soil The nature and extent of VOCs in soil is characterized sufficiently to proceed with the FS. Additional analytical data for shallow soil to the east or north will not affect the evaluation of technically feasible cleanup alternatives

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Table 1
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Significant Data Gap	Ecology Comment Number	Ecology Comment	Category	Capital Response
Data gaps associated with adequate characterization of site soil contamination (continued)	15(f) (continued)	Soil contamination east of Plant 4 has not been defined	Data Gap No Additional Sampling Necessary	See Response above
		Little sampling has been performed on the north or west side of Plant 4	Data Gap No Additional Sampling Necessary	See Response above
		Sampling location west of Plant 4 detected TCE. No sampling north west or south of this location.	Data Gap No Additional Sampling Necessary	See Response above
		Soil samples from MW-7 detected PCE and TCE. No samples collected east or west of this location.	Data Gap No Additional Sampling Necessary	See Response above
		Soil samples collected south of MW-7, across the street, contained PCE and TCE. There are no sampling locations to bound the east, south, or west. (B15, -14 and -25 detected PCE).	Data Gap No Additional Sampling Necessary	See Response above

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Data gaps associated with adequate characterization of site groundwater contamination	18			
TCE		Concentrations in the WT-zone are unknown for a considerable distance south of CI-9WT.	Data Gap No Additional Sampling Necessary	Monitoring well locations were selected based on the analytical results of reconnaissance groundwater samples and were reviewed and approved by Ecology in the RI Work Plan. Monitoring well CI-14-WT is immediately down-gradient and approximately 700 feet southwest of CI-9-WT; monitoring well CI-11-WT is south and slightly cross-gradient; and monitoring well CI-10-WT is southeast and slightly cross-gradient of CI-9-WT. Concentrations of VOCs have been detected above the screening levels in the Water Table Zone in CI-10-WT, and in CI-11-WT. There is limited access from existing buildings in the area south and southeast of CI-9-WT. The distance between the monitoring wells is not excessive given the scale of the study area. There is sufficient information from the monitoring wells east, southeast, and south of CI-9-WT to proceed with the FS.
		Contamination was detected at point B12, but no well has been installed at this location ("between" WT-well MW4 and the CI-10 cluster. The CI-10 cluster is about 300 feet southwest of B12).	Data Gap No Additional Sampling Necessary	The analytical results or reconnaissance groundwater samples collected from borings from the Phase I work were used to select monitoring well locations that were reviewed and approved of by Ecology. The purpose of the discrete-depth data was to design the monitoring well network. It was never intended that monitoring wells would be installed at each reconnaissance boring location, as documented in the Work Plans. The existing monitoring well network provides adequate coverage of the aquifer system near B12 and does not represent a Data Need.
		Contamination was detected at point B7, but no well has been installed at this location ("between" the 137 cluster and the CI-10/15 clusters. The CI-10/15 clusters are approximately 275 to 450 feet south-southwest/west-southwest of B7).	Data Gap No Additional Sampling Necessary	There is limited access south of B-7 due to presence of building. As noted above, the existing monitoring well network provides adequate coverage near B7.
		Concentrations were elevated at older sampling locations ECS06 and 122 ("between" MW4 and the 137 cluster) in both the WT and shallow zones. The contamination was not bounded at depth (no samples were collected deeper than about 37' bgs here), and no samples have been collected at this location for a number of years.	Data Gap No Additional Sampling Necessary	Nearby well cluster CI-137 and down-gradient monitoring well cluster CI-10 screen all three aquifer zones and provide lateral and vertical delineation of VOCs in the water-bearing zones. There are sufficient groundwater data from the existing monitoring well network to proceed with the FS.
cis-1,2-DCE	18	Contamination was detected in the shallow zone at point B23, but no well has been installed at this location (about 200 feet up-gradient of the CI-13 cluster). No shallow well is up-gradient of point B23 for over 800 feet.	Data Gap No Additional Sampling Necessary	See Response above. There is limited access from existing buildings up-gradient of B23. Well clusters CI-14 and CI-13 provide sufficient data to complete the RI

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Vinyl chloride	18	Concentrations appear to be unknown west of wells CI-12WT and 12-30. In addition, a) no wells are close to (less than 350 feet from) 12WT or 12-30 to the south or southwest (up-gradient); and b) no shallow or intermediate wells are north of well cluster 12 on the west side of East Marginal Way South (until reaching Fidalgo).	Data Need Additional Sampling Necessary	Concentrations of VOCs above the screening levels have been detected in Art Brass Plating wells MW-22 and MW-23-30, located due west of CI-12 near the Lower Duwamish Waterway (LDW). Concentrations of VC have been detected above the screening levels in groundwater samples collected from the CI-12 in the Water Table and Shallow zones. Although the results of the BIOCHLOR model show that concentrations of VC will not exceed the screening levels at the LDW, installation and sampling of monitoring wells along the LDW shoreline has been identified as a Data Need for completion of the RI. Capital proposes installation of a monitoring well cluster downgradient of well cluster CI-12 near the bank of the LDW (see Figure 1 attached). The monitoring well cluster will include monitoring wells screened in the Water Table and Shallow zones. The exact location of the monitoring wells will depend on securing access from the current landowner. Preliminary monitoring well proposed locations are shown on the attached figure.
		Concentrations in the intermediate zone do not appear to be vertically bounded at clusters 137 or 141.	Data Gap No Additional Sampling Necessary	Concentrations of vinyl chloride were detected in the Intermediate Zone above the screening levels at these. This is a Data Gap; however, there is sufficient information to proceed with the FS. Vertical bounding of the concentrations of VC is not needed to evaluate technically feasible cleanup alternatives.
		Concentrations in the vicinity of well cluster 141 appear to be unknown. Although the Water Table Interval at 141 seems to be relatively clean, concentrations of VC have reportedly ranged from 150 to 170 ug/l at 141-40, and 72 to 100 ug/l at 141-50. Well 140-30 appears to be down-gradient of 141-40, but also contains elevated (though lower) levels of VC. No well appears to be directly down-gradient of 141-50 (or at deeper depths at 141). Well clusters 12 and 140 seem to be far enough cross-gradient to possibly miss elevated VC levels traveling from the intermediate zone at location 141. In addition, there are no shallow or intermediate zone wells east of the 141 cluster until the 137 cluster near 2nd Avenue.	Data Gap No Additional Sampling Necessary	CG-141-WT is not “relatively” clean – concentrations of COPCs have been below the laboratory detection limits for 5 consecutive quarters. There are sufficient groundwater data from the existing monitoring well network to proceed with the FS. Well clusters CG-140 and CI-15 appear to be slightly cross-gradient of CI-141 but provide reasonable coverage of the contaminant plume down-gradient of CI-141. Well placement accounted for cost and logistical factors. The well locations were selected based on the analytical results of reconnaissance groundwater samples and Ecology agreed that the well locations were sufficient for purposes of the RI. The Art Brass wells MW-22 And MW-23 are located down-gradient of well cluster CI-141. Well cluster CI-137 provides adequate coverage east of CI-141, and a lack of wells in this area does not represent a data need.

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Vinyl chloride (continued)	18 (continued)	Concentrations appear to be unknown southwest, west, or northwest of B20. No wells or DP points are located in these areas.	Data Need Additional Sampling Necessary	Well cluster CI-13 was located to collect groundwater samples in this area. Capital was not able to obtain access to areas farther west toward the LDW; therefore, well cluster CI-13 was agreed upon, in consultation with Ecology, to provide data as close to the LDW as possible. Concentrations of VOCs above the screening levels have been detected in Art Brass Plating wells MW-22 and MW-23 located due west of CI-12 near the LDW. Concentrations of VC have been detected above the screening levels in groundwater samples collected from the CI-12 in the Water Table and Shallow zones. Although the results of the BIOCHLOR model show that concentrations of VC will not exceed the screening levels at the LDW, installation and sampling of monitoring wells along the LDW shoreline has been identified as a Data Need for completion of the RI. As discussed above, Capital proposes installation of a well cluster downgradient of B20, near the bank of the LDW. The well cluster will consist of monitoring wells screened in the Water Table and Shallow Zones. The exact location of the well cluster will depend on securing access from the current property owner.
		Concentrations appear to be unknown down-gradient of well 13-30. No wells or DP points are located in this area.	Data Need Additional Sampling Necessary	Concentrations of VC have exceeded the screening levels have been detected groundwater samples collected from the Water Table and Shallow Zone in CI-13. The results of BIOCHLOR modeling indicate that the concentrations of VC will not exceed the screening levels at the LDW; however, installation and sampling of monitoring wells along the LDW shoreline is a Data Need. As discussed above, Capital proposes installation of a well cluster downgradient of well cluster CI-13 near the eastern end of Slip 2. The cluster will consist of monitoring wells screened in the Shallow and Intermediate zones. The exact location of the well cluster will depend on securing access from Cal-Portland, the current landowner.
		Concentrations appear to be unknown north of DP-point B24. No wells or DP points are located between well clusters 13 and 11.	Data Need Additional Sampling Necessary	Concentrations of VC have been detected in the Water Table, Shallow and Intermediate zones at well cluster CI-11. Installation and sampling of monitoring wells downgradient of CI-11 is a Data Need. Capital proposes installation of a well cluster downgradient of well cluster CI-11. The cluster will consist of wells screened in the Water Table, Shallow and Intermediate zones. The exact location of the wells will depend on securing access from Cal-Portland, the current landowner.
		Concentrations in the intermediate zone appear to be unknown west and west-southwest of 15-60/B11	Data Gap No Additional Sampling Necessary	The area west of CI-15/B11 is outside of the Capital Area of Investigation as defined in the RI Work Plan and approved by Ecology. Weill cluster CG-140-70 is west of CI-15-60 as are ABP wells MW-22-50, 23-50, and 24-50 located west-southwest of CI-15-60 near the LDW. There are sufficient groundwater data from the existing monitoring well network to proceed with the FS.
		Concentrations in the intermediate zone do not appear to be vertically bounded at 15-60.	Data Gap No Additional Sampling Necessary	Concentrations of VC have been detected in the Intermediate Zone above the screening levels at this location. This is a Data Gap; however, there is sufficient information to proceed with the FS. Vertical bounding of the VC concentrations is not needed to evaluate technically feasible cleanup alternatives.
		Concentrations in the intermediate zone do not appear to be vertically bounded at B28, northeast of Plant 5. No well has been installed at/near the B28 location.	Data Gap No Additional Sampling Necessary	Concentrations of COPCs detected in the reconnaissance groundwater sample collected from B28 are likely from an off-site source because Capital has no record of sources in this area. Well cluster CG-140 is directly down-gradient of B28 (about 200 feet) and ABP wells MW-17-60 and MW-19-60 are situated up-gradient. As noted with other borings, wells were not intended to be installed at every boring location. Vertical bounding of the VC concentrations is not needed to evaluate technically feasible cleanup alternatives.

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Significant Data Gap	Ecology Comment Number	Ecology Comment	Category	Capital Response
		Capital has not installed wells deeper than the water table zone west of the Plant 2 canopy along Mead or Fidalgo Streets. However, in various parts of the draft RI Report, Capital has asserted that deeper VC concentrations in portions of the company's RI study are due, or primarily due, to an up-gradient source. Are there no data gaps associated with this assertion, or with attempts to better locate these sources?	Data Gap No Additional Sampling Necessary	The weight of evidence that includes groundwater flow direction, known and documented sources up-gradient of Capital, operational history of chemical use by Capital, and the analytical results of groundwater samples collected from up-gradient wells (e.g. BDC-6-60, BDC-11-60) and borings confirm an up-gradient source of VC. Capital well CG-137-50 is near the southern end of the Plant 2 canopy, directly down-gradient of off-site and on-site source areas. Monitoring wells situated west of the Plant 2 canopy would be cross-gradient and would not provide useful information.
Vinyl chloride (continued)	18 (continued)	Concentrations in the intermediate zone do not appear to be vertically bounded at MW3. MW3 is located only 50 feet from B7, where VC was bounded, but VC levels at 33 feet bgs were twice as high at B3 (MW3) as at B7.	Data Gap No Additional Sampling Necessary	This is a Data Gap; however, there is sufficient information to proceed with the FS. Vertical bounding of VC concentrations is not needed to evaluate technically feasible cleanup alternatives.
		Concentrations do not appear to be vertically bounded at B2 or B4, nor are there nearby wells that are screened below the WT-zone. In addition, no shallow or intermediate zone wells are down-gradient of point B4 for some distance.	Data Gap No Additional Sampling Necessary	Well clusters CI-9 and CI-10 provide sufficient information to proceed with the FS. Vertical bounding of VC concentrations is not needed to evaluate technically feasible cleanup alternatives.
		Concentrations do not appear to be vertically bounded at points I22/ECS6	Data Gap No Additional Sampling Necessary	Well clusters CI-9 and CI-10 provide sufficient information to proceed with the FS. Vertical bounding of the VC concentrations is not needed to evaluate technically feasible cleanup alternatives.
		Concentrations are unknown at the river's eastern edge between Art Brass well M3 and Slip 2, a distance of over 800 feet	Data Need Additional Sampling Necessary	Assume reference is to M-23, not M-3. Concentrations of VOCs above the screening levels have been detected in Art Brass Plating wells MW-22 and MW-23 located due west of CI-12 near the Lower Duwamish Waterway (LDW). Installation and sampling of monitoring wells along the LDW shoreline south of these monitoring wells has been identified as a Data Need. See comments above regarding installation of a well cluster along the eastern bank of the LDW.
1,4-dioxane	18	Concentrations do not appear to be vertically bounded at well clusters 7 or 1.	Data Gap No Additional Sampling Necessary	Dioxane is likely not vertically bounded in those areas. Vertical bounding of VC concentrations is not needed to evaluate technically feasible cleanup alternatives.
		Concentrations do not appear to be known down-gradient of well cluster 8 for some distance.	Data Gap No Additional Sampling Necessary	The existing monitoring well network provides adequate coverage of the aquifer system and does not represent a Data Need. Well Clusters CI7, CI-9, CI137-50/CG-137, MW-2, MW-3, and MW-4 provide sufficient information for the nature and extent of COPCs in groundwater to proceed with FS.

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For the vadose and WT zones:	18	It appears to be unknown if there are preferential man-made subsurface pathways for groundwater movement in Capital's site area. The report does not contain figures showing the locations and depths of utility lines/corridors (sewers) between Mead Street and the intersection of 1st Avenue and East Marginal Way South (from 4th Avenue to the Waterway).	Data Gap No Additional Sampling Necessary	Farallon has reviewed underground utility maps and will provide copies in the revised Report. The conceptual site model for the nature and extent of COPCs in groundwater and indoor vapor is based on the analytical results of soil, groundwater, soil vapor, and indoor air samples. There is sufficient data to delineate the nature and extent of COPCs.
For all groundwater zones	18	Flow direction and/or gradient data gaps should be evaluated. For example, is enough information known about seasonal changes in groundwater flow directions, particularly in the vicinity of the intersection of 1st Ave South and East Marginal Way South? Before evaluating potential cleanup alternatives it is important to confidently: a) understand which "portion" of contaminated site area groundwater discharges to the west-southwest, toward the Duwamish Waterway, or more southerly (toward Slip 2); b) determine whether the areas of discharge change with season (or other factors), and if so, c) be able to predict when this will occur and which areas of contamination may be affected (i.e., which contaminated areas up-gradient of the river may have seasonally dependent discharge locations).	Data Gap No Additional Sampling Necessary	Sufficient information has been collected to evaluate seasonal changes in groundwater flow direction. The results of the RI are sufficient to: a) Define which “portion’ of the site discharges to the shoreline of the LDW to the west and to Slip2 b) Determine the seasonal variations in discharge (flow direction) c) Assess seasonal variation on discharge location/flow directions. The tidally averaged groundwater elevations and seasonal variations will be used to assess tidal and seasonal variations in groundwater flow patterns near the LDW and will help establish if seasonal variations in flow patterns are present
		Ethene and ethane were analyzed only at a subset of monitoring wells. In many cases, the Reporting Levels were too high to be useful. Do ethane and ethene groundwater concentrations need to be better quantified during the RI or FS?	Data Gap No Additional Sampling Necessary	

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Vapor Intrusion	19(d)	Discuss VI-related data gaps. For example, the section does not appear to discuss preferential pathways. There are at least two general types of preferential pathways that VI assessments must consider: (l) preferential lateral pathways in the subsurface that can route contaminated soil gas to areas where, based on shallow groundwater and soil VOC levels, a VI threat would not be expected; and (2) preferential pathways linking shallow subsurface areas to building interiors. Ecology asked Capital to investigate both types (utility corridors and indoor sumps) as part of the company's Tier 2 assessment work. The information must be contained in the revised Report	Data Gap No Additional Sampling Necessary	This is unnecessary and unwarranted based on the groundwater data collected for the RI and the results of VI sampling. The only buildings located in the Area of Investigation where TCE was detected in groundwater beneath the building not included for Tier 3 assessment at concentrations above the screening level of 0.404 parts per billion are the Multi-Tenant Warehouse south of the Beckwith and Kuffel Building and the B&O Building south of the Mobil Crane facility. Both of these building are greater than 100 feet from monitoring wells where the cancer cumulative exceedance factor (CCEF) and/or non-cancer cumulative exceedance factor (NCCEF) exceed 10, and do not require Tier 3 assessment under the IPIM. Both of these buildings are on the edge of the extent of VOCs detected in groundwater above the laboratory detection limits. Further evaluation of these buildings is an unnecessary expense. This was addressed by Farallon to Ecology in the letter regarding *Response to Ecology Letter Dated November 3, 2010, Vapor Intrusion Assessment* dated December 2, 2010.
Soil Contamination East of Plant 4	21	Page 6-2, Section 6.1.1.1. Capital hypothesizes here that soil contamination may be partially due to a release from "a location east of Capital Plant 4 at the former ABP facility." Ecology agrees that it is possible that soil contamination detected at B18 is not due, or is only partially due, to releases at Plant 4. However, the revised Report must go further. What types of data and other information are needed to support this hypothesis? How will these data and information be collected and when (during the Rl period? Following the Rl period?).	Data Gap No Additional Sampling Necessary	Analysis of soil samples from 5 to 7 feet bgs detected both PCE and TCE above screening levels at B18. The Commercial Building east of Plant 4 was occupied by Art Brass, with a known history of use of chlorinated solvents. Collection of soil samples from beneath the floor slab, soil vapor data, or soil samples collected from east of B18 would address this issue. The investigation to identify a source in this area should be the responsibility of Art Brass. Additional soil data are not necessary for Capital to proceed with the FS.

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Fate and Transport	35	Pages 6-17 through 6-25, Section 6.2.5. In general, Ecology agrees with the modeling approach using the analytical model BIOCHLOR to conduct fate and transport evaluations. That is, the approach is generally consistent with previous modeling discussions we have had with Capital and what we expected the Report to contain. However, in the revised Report fate and transport modeling results need to be further discussed and certain input parameters further justified, as discussed in the following comments. Source concentrations were based on March 2011 data. Ecology does not disagree with using the most recent (at that time) data for this modeling. However, these input concentrations should be further justified so that it is clear that seasonal variations in observed concentrations were properly considered. If a decreasing trend in the data cannot be determined, the maximum concentrations during the RI monitoring period should be used. Unlike the Art Brass Plating area to the north, there are no groundwater monitoring wells (sentry wells) along the Waterway where Capital's contaminated groundwater is expected to discharge. We must therefore be confident that model predictions are reasonably conservative.	Data Gap No Additional Sampling Necessary	The revised RI will use the maximum concentration measured during the RI period in the modeling, as well as an average of the values. The RI will evaluate the source data and determine if downward trends are apparent.

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Fate and Transport (continued)	35 (continued)	It appears that Capital used a longitudinal dispersivity value of 31.2 feet for all modeling runs (Table 12 and Appendix E), which is likely based on the model area length of Source 1. Different dispersivity values should be used for different source areas	Data Gap No Additional Sampling Necessary	This statement is incorrect. The dispersivity is not based on length of Source 1. The 31.2-foot longitudinal dispersivity value is based on the assumption of a plume extending the entire distance from the Capital facility to the LDW (1,730 feet), which is a very conservative approach. This value was calculated using the Modified Xu and Eckstein method and the calculator provided in BIOCHLOR.
		Sensitivity analyses should also be performed for source concentration and dispersivity. These two parameters, and hydraulic gradient, can be increased and decreased by a factor of 2. Additional sensitivity analysis of degradation half-lives should be performed using a factor of 5. Hydraulic conductivity values range several orders of magnitude based on the slug tests and tidal study data; therefore, K values should be evaluated (increased) by a factor of lO in the sensitivity analysis. The results of all sensitivity modeling runs should be presented in a new table or in Table 13.	Data Gap No Additional Sampling Necessary	The revised RI will include a sensitivity analysis and a table documenting the results will be included
		Source decay should not be applied unless a clear trend can be determined for concentrations within the source areas.	Data Gap No Additional Sampling Necessary	There is likely insufficient data to show a clear trend in the data. However, the use of a constant source term is highly conservative given that there is no evidence of DNAPL or ongoing release of dissolved phase VOCs that would act as a continuing source. The revised RI will use a realistic source decay term to evaluate future COC concentrations, at least for sensitivity analysis to compare against a constant source option

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Fate and Transport (continued)	45	Page 6-27, Section 6.3.4. Ecology has not concluded that the "potential for contaminated groundwater to reach the LDW is low" as stated here, nor are we confident that all COPC concentrations reaching the Waterway will be below SLs. In addition, we do not agree - as a general statement - that the BIOCHLOR modeling input parameters used in the draft report are "extremely conservative". Capital does not have monitoring wells along the shoreline of Slip 2 or north along the Waterway. Modeling predictions, therefore, cannot be verified (as they can to some extent in the Art Brass Plating study area). Furthermore, Slip 2, as a groundwater discharge boundary, makes the groundwater flow pattern more complex and plume paths more uncertain than they would otherwise be. As noted in Comment 35 above, Capital must ensure that the modeling is reasonably conservative and to do this the associated sensitivity analyses should be significantly more robust. Capital may state in the revised Report that the company's opinion is that the "potential for contaminated groundwater to reach the LDW is low," but Ecology assumes that site groundwater contamination *will reach* the river. Of greater interest are the concentrations of COPCs in groundwater as it discharges to the Waterway today; conservative estimates of concentrations possible in the future; and, whether after acknowledging the uncertainty associated with these answers – the concentrations could or are likely to pose a health threat to humans or the environment.	Data Need Additional Sampling Necessary	The RI does not present Capitals "opinion", the RI presents an interpretation of the data based on best scientific methodologies. Ecology may not concur with the interpretation. The BIOCHLOR modeling using conservative inputs (especially the constant source term) show no impacts to the LDW for most "source" areas. The only exceptions are for VC in Source Area 2 in the Water Table zone, and Source Area 1 in the Shallow zone: • For Source Area 2 in WT zone, the model predicts VC at a peak of 1.5 ug/l compared to a screening level of 1.28 ug/l. • For Source Area 1 in Shallow zone, the model predicts VC at 2.93 ug/l compared to a screening level of 1.69 ug/l. Both of the above assume a constant source term. If a decaying source is modeled, then both drop below screening levels. The simulations also do not take into account tidal mixing , which is known to occur in aquifers near tidally influenced water bodies such as the LDW, as water is flushed into and out of the aquifer from the water body. The sensitivity analysis will produce some modeling results that may show COPCs above screening levels at the LDW (e.g. increasing hydraulic conductivity by a factor of 2, increasing gradient, etc.). This issue will be addressed by placement of well clusters along the bank of the LDW. See comments above.

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Fate and Transport (continued)	46	Pages 6-25 through 6-27, Section 6.3. (*excerpted only the groundwater portion of this comment*)
		<u>Groundwater</u>
		• Human exposure to contaminated groundwater between Capital and the Waterway. Possible receptors:
		  • Current workers (for the reasons cited above, Ecology assumes that workers located on Capital's property are not currently being unacceptably exposed to groundwater. However, for workers located down-gradient the assessment of the VI threat has not been completed).
		  • Current trenchers (in the area where groundwater quality has been impacted), via incidental direct contact and/or inhalation.
		  • Future workers (on Capital's property and down-gradient).
		  • Future trenchers (on Capital's property and down-gradient).
		  • Future residents (on Capital's property and down-gradient)
			Data Need
			
			Additional Sampling Necessary
				Ecology acknowledges that data from well cluster CI-12 support the contention that COPCs have not reached the LDW. The revised RI will provide a detailed discussion of receptors.
				
				This issue will be addressed by placement of well clusters along the bank of the LDW. See comments above regarding well cluster installation.

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Fate and Transport (continued)	46 (continued)	*Note: a possible future scenario is that land use at Capital's property and down-gradient will change. Another possible future scenario is that groundwater, at least in some areas, may become viewed as a drinking water resource.* • Exposure to surface water/sediments contaminated by discharging groundwater. Ecology realizes that Capital believes groundwater contamination due to releases at Plants 2 and 4 has not reached the Waterway. Monitoring results from wells south of cluster 12 provide support for such a contention. But it is also true that vinyl chloride concentrations are elevated at cluster 141 and well 15-60, and no monitoring wells currently exist along the east side of the river south of Art Brass's well MW23. So Ecology and the four PLPs do not know what levels of COPCs (and particularly vinyl chloride) are present in groundwater approaching the river between MW23 and Slip 2. This lack of information is due to the reluctance of property owners in the area to grant access for wells, and, in Ecology's view, to the independent nature of the three west-of-4th RIs.		Capital will update the exposure scenarios following evaluation of data from the well clusters to be located along the LDW.

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Significant Data Gap	Ecology Comment Number	Ecology Comment	Category	Capital Response
Fate and Transport (continued)	46 (continued)	In discussing the probability of elevated COPC levels at the river south of MW-23, Capital's RI Report may state that it is the company's opinion that groundwater contamination due to releases at Plants 2 and 4 has not reached the Waterway. However, this must be qualified as Capital's opinion (i.e., not a view Ecology is being asked to approve), supported, and properly qualified by acknowledging the uncertainty. Because of this uncertainty the Report should also identify the following possible receptors: • Current and future recreational exposure (to humans) to contaminated surface water/sediments at the river (via incidental direct contact) • Current and future ecological exposure, via direct contact with contaminated surface water/sediments • Current and future ecological exposure, due to ingestion of contaminated aquatic biota • Current and future human ingestion of contaminated fish, shellfish, etc. *Note: the pathways noted here refer to exposure to media or biota that have become contaminated due to the discharge of contaminated west-of-the site groundwater not contaminated via other sources.*		

Attachment B
Table 1
Significant Data Gaps—Summary and Responses
Draft Remedial Investigation
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Significant Data Gap	Ecology Comment Number	Ecology Comment	Category	Capital Response
Fate and Transport (continued)	57	Page 7-2, Section 7.1.2. The report states that "[t]here appears to be another source of COPCs north of Capital Plant 5 and possibly... adjacent to and east of Plant 4." Capital contends that contaminants have "migrated in groundwater to the Capital Area of Investigation from up-gradient sources at these facilities." Ecology agrees that groundwater in Capital's RI area has been impacted by sources other than Capital's releases, and based on the results of B-18 sampling it appears that there is contamination present east of Plant 4. However, the revised Report should focus on what specific (additional) information is needed - regarding these sources and potential sources - before initiating an evaluation of potential cleanup actions west of 4th.	Data Gap No Additional Sampling Necessary	There are sufficient data to confirm that there are confirmed off-site sources north of Plant 5 and north of Plant 4, although another data point east of Plant 4 might be useful (see Response to Comment 21 above). The delineation of existing or potential off-site sources may be a Data Gap; however, this does not represent a Data Need to complete the RI. There are sufficient data to proceed with the FS. Identification of up-gradient sources is not necessary to evaluating cleanup options.

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Significant Data Gaps—Summary and Responses
Draft Remedial Investigation
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Significant Data Gap	Ecology Comment Number	Ecology Comment	Category	Capital Response
Fate and Transport (continued)	59	59. Page 7-2, Section 7.1.3. Although the Report acknowledges that soil contamination at Plant 4 has not been bounded to the east, the section concludes by stating that soil contamination has been delineated "sufficiently" to begin an FS. Ecology agrees that there are scenarios where an FS may be started before knowing the full extent of contamination in an area. Generally, however, in these cases there is an estimate of the extent of contamination and a reasonable degree of confidence that even if the estimate is in error, the type of cleanup action selected to effectively address the contamination would not need to change. In the revised Report, if Capital believes that data gaps associated with Plant 4' s extent of soil contamination are not pre-FS *data needs,* the company's rationale must be provided.	Data Gap No Additional Sampling Necessary	The revised RI will provide sufficient rationale that the nature and extent of soil contamination proximate to Plant 4 is sufficiently characterized to proceed with the FS.
	61	Page 7-3, Section 7.1.4. If Capital believes that certain COPCs have not reached the part of the Waterway down-gradient of the company's property, this can be stated in the Report if the statement is properly qualified and supported by Capital's rationale. Please see Comments 45 and 46 above. However, it is not true that "[m]onitoring well data confirm ... " that COPCs have not reached the Waterway. As Capital knows, there are no monitoring wells along the eastern bank of the river between Art Brass's MW-23 and Slip 2. Capital may theorize that -- based on measured COPC concentrations in groundwater as much as 900 or more feet east of the river -- concentrations immediately approaching the Waterway are so low that, in effect, the substances do not currently "reach" surface water. But the revised Report should not assert that something has been "confirmed" when it remains, essentially, an untested hypothesis.	Data Need Additional Sampling Necessary	This issue will be addressed by placement of well clusters along the bank of the Duwamish Waterway. .

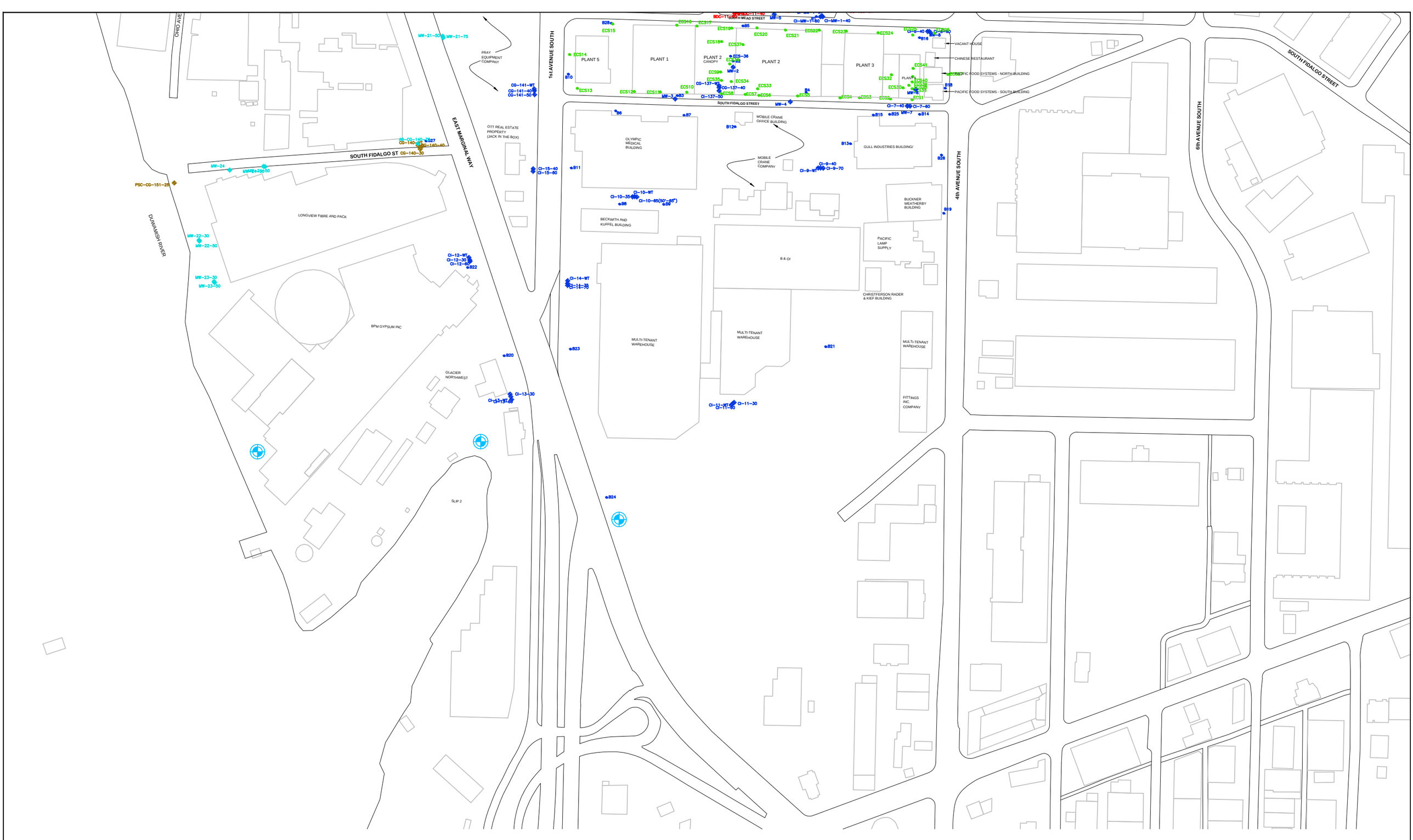
Attachment B
Table 1
Significant Data Gaps—Summary and Responses
Draft Remedial Investigation
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Significant Data Gap	Ecology Comment Number	Ecology Comment	Category	Capital Response
Fate and Transport (continued)	62	Page 7-3, Section 7.1.4. Capital could be correct: a "primary parent product of TCE at a source area up-gradient to the northeast" may be, in part, responsible for elevated VC levels in shallow zone groundwater. Ecology would not agree, however, that the observation of increasing concentrations of VC in the westerly direction necessarily supports such a theory. And it certainly is not enough by itself to conclude that the theory is likely to be valid. If, in Section 7.1.4 (and on page 6-9) of the revised Report, Capital wants to maintain the company's position regarding up-gradient sources, the Report should also: • Estimate where (which areas, specifically) in Capital's RI area VC (and any other COPC) levels are likely to be significantly impacted by contamination due to each potential non-Capital source, and provide support for the estimate. Support should include reference to groundwater flow directions west of 4th Avenue based on elevation data collected by all four PLPs; • Identify the possible location(s) and type(s) of source(s) Capital is referring to. Are any, for example, "continuing" and uncontrolled sources? • Explain the efforts Capital has made to verify its suspicions about these sources; and • Discuss whether additional efforts need to be made to obtain information in the future - either before the RI has been completed, or later during the cleanup process.	Data Gap No Additional Sampling Necessary	There are sufficient documentation and data to confirm sources of COPCs at Art Brass, Blaser, and PSC. The revised RI summarizes the existing data, including figures showing flow lines from up-gradient sources to Capital as well as up-gradient data, and provides a written description. Additional sampling is not necessary

Attachment B
Table 1
Significant Data Gaps—Summary and Responses
Draft Remedial Investigation
Capital Industries, Inc.
Seattle, Washington
Farallon PN: 457-004

Significant Data Gap	Ecology Comment Number	Ecology Comment	Category	Capital Response
Fate and Transport (continued)	67	Pages 7-5 and 7-6, Section 7.1.7. Ecology does not concur that TCE and cis-l,2-DCE contamination in groundwater is "unlikely to reach" the Waterway. The Department is hopeful that TCE and cis-I ,2-DCE concentrations in groundwater discharging to the river will be below surface water-based cleanup levels. However, we assume that detectable levels of these compounds and VC will "reach" the waterway in the future, and some may possibly have already traveled this far. Capital may state the company's opinion in the revised Report if the statement is properly qualified (so that it is clear the company is not asking for Ecology "approval"), supported by Capital's rationale, and accompanied by acknowledgment of the associated uncertainty.	Data Need Additional Sampling Necessary	The RI does not present Capital's "opinion", but presents an interpretation of the data based on best scientific methodologies. Ecology may not concur with the interpretation. The draft RI provides a detailed discussion and rationale for this conclusion. The sensitivity analysis will be augmented, but should not affect the conclusions. It is clear that Ecology disagrees with Capital's interpretation; however, Ecology also does not reference or provide data to refute this conclusion. This issue will be addressed by placement of well clusters along the bank of the LDW.

NOTES:
Capital = Capital Industries, Inc.
COPCs = constituents of potential concern
DCE = dichloroethene
DP = drilling point
Farallon = Farallon Consulting, L.L.C.
FS = Feasibility Study
IPIM = Inhalation Pathway Interim Measure
µg/l = micrograms per liter
PCE = tetrachloroethene
PID = photoionization detector
RI = Remedial Investigation
SL = screening level
TCE = trichloroethene
VC = vinyl chloride
VI = vapor intrusion
VOCs = volatile organic compounds
WT = Water Table



LEGEND

- POSSIBLE WELL CLUSTER
- CAPITAL INDUSTRIES MONITORING WELL
- BLASER DIE CASTING MONITORING WELL
- PSC MONITORING WELL
- ART BRASS PLATING MONITORING WELL
- CAPITAL INDUSTRIES BORING
- ECS32 DIRECT-PUSH BORING BY ENVIRONMENTAL CONSULTING SERVICES (ECS) (2004-2005)
- ART BRASS PLATING BORING

ALL LOCATIONS ARE APPROXIMATE

DRAFT

N

0 120

APPROXIMATE SCALE IN FEET

FARALLON CONSULTING
975 5th Avenue Northwest
Issaquah, WA 98027

FIGURE 1

POSSIBLE WELL CLUSTER LOCATIONS
REMDEDIAL INVESTIGATION
CAPITAL INDUSTRIES, INC.
SEATTLE, WASHINGTON

FARALLON PN: 457-004

Drawn By: DEW	Checked By: AF	Date: 11/8/11	Disk Reference: 457-004i

APPENDIX D
HISTORICAL DATA

REVISED DRAFT
REMEDIAL INVESTIGATION REPORT
Capital Industries, Inc.
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-004

Table 6
Groundwater Monitoring Well Analytical Results for Selected Halogenated Volatile Organic Compounds
Remedial Investigation Work Plan
Capital Industries
Seattle, Washington
Farallon PN: 457-004

Sample Identification	Source	Water-Bearing Zone	Sample Depth[1]	Sample Date	Analytical Resu		
					Tetra-chloroethene	Trichloro-ethene	(cis) 1,2-Dichloro ethene
MW-1	Farallon	Water Table Zone	12	02/10/06	0.52	16	78
			7	06/19/06	0.50	13	62
			10	06/19/06	0.50	14	66
			13	06/19/06	0.50	14	61
			16	06/19/06	0.34	12	49
MW-2	Farallon	Water Table Zone	14	02/10/06	<2	300	28
MW-3	Farallon	Water Table Zone	12	02/09/06	<0.2	5.6	49
MW-4	Farallon	Water Table Zone	12	02/09/06	<0.2	3.6	1.1
MW-4 FD	Farallon	Water Table Zone	12	02/09/06	<0.2	3.8	0.96
MW-5	Farallon	Water Table Zone	14	02/09/06	<2	300	230
			9	06/19/06	<2	240	200
			12	06/19/06	<2	250	170
			15	06/19/06	<2	250	210
			18	06/19/06	<2	250	210
MW-6	Farallon	Water Table Zone	13	02/10/06	16	19	22
MW-7	Farallon	Water Table Zone	12	02/09/06	46	38	6.7
MW-8	Farallon	Water Table Zone	12	02/09/06	<0.2	<0.2	0.41
CG-137-WT	PSC	Water Table Zone	15	11/06/06	<0.13	210	<0.12
CG-137-WT	PSC	Water Table Zone	15	01/31/07	<0.13	250	<0.12
CG-137-40	PSC	Shallow Zone	35	11/06/06	<0.13	0.21	54
CG-137-40	PSC	Shallow Zone	35	01/31/07	<0.13	0.35	65

NOTES:

— = not analyzed.

< denotes no detectable concentrations above the listed laboratory practical quantitation limit.

Farallon = Farallon Consulting, L.L.C.

PSC = Philip Services Corporation

[1]Depth in feet below ground surface.

[2]Analyzed using U.S. Environmental Protection Agency Method 8260.

[3]Washington State Model Toxics Control Act Cleanup Regulation Method A Groundwater Cleanup Level, Chapter 173-340 of the Washington Administrative Code, as amended November 2007.

[4] Cleanup Levels and Risk Calculations Database, Washington State Department of Ecology 2008.

Table 6
Groundwater Monitoring Well Analytical Results for Selected Halogenated Volatile Organic Compounds
Remedial Investigation Work Plan
Capital Industries
Seattle, Washington
Farallon PN: 457-004

Sample Identification	Source	Water-Bearing Zone	Sample Depth[1]	Sample Date	lts (micrograms per liter)[2] (trans) 1,2-Dichloro ethene	Vinyl Chloride	1,4-Dioxane	Manganese
MW-1	Farallon	Water Table Zone	12	02/10/06	1.1	<0.4	<0.943	<0.1
			7	06/19/06	0.98	<0.20	—	—
			10	06/19/06	0.93	<0.20	—	—
			13	06/19/06	0.98	<0.20	—	—
			16	06/19/06	0.95	<0.20	—	—
MW-2	Farallon	Water Table Zone	14	02/10/06	6.2	<2	<0.943	<0.1
MW-3	Farallon	Water Table Zone	12	02/09/06	0.23	4	—	<0.1
MW-4	Farallon	Water Table Zone	12	02/09/06	<0.2	<0.2	—	<0.1
MW-4 FD	Farallon	Water Table Zone	12	02/09/06	<0.2	<0.2	—	—
MW-5	Farallon	Water Table Zone	14	02/09/06	3.2	17	—	<0.1
			9	06/19/06	4.3	20	—	—
			12	06/19/06	3.5	21	—	—
			15	06/19/06	4.5	19	—	—
			18	06/19/06	4.7	19	—	—
MW-6	Farallon	Water Table Zone	13	02/10/06	<0.2	<0.2	—	<0.1
MW-7	Farallon	Water Table Zone	12	02/09/06	<0.2	<0.2	—	<0.1
MW-8	Farallon	Water Table Zone	12	02/09/06	<0.2	<0.2	—	<0.1
CG-137-WT	PSC	Water Table Zone	15	11/06/06	8.7	1.1	<0.27	
CG-137-WT	PSC	Water Table Zone	15	01/31/07	15	2.6	—	—
CG-137-40	PSC	Shallow Zone	35	11/06/06	<0.15	64	39	—
CG-137-40	PSC	Shallow Zone	35	01/31/07	<0.15	61	—	—

NOTES:

— = not analyzed.

< denotes no detectable concentrations above the listed laboratory practical quantitation limit.

Farallon = Farallon Consulting, L.L.C.

PSC = Philip Services Corporation

[1]Depth in feet below ground surface.

[2]Analyzed using U.S. Environmental Protection Agency Method 8260.

[3]Washington State Model Toxics Control Act Cleanup Regulation Method A Groundwater Cleanup Level, Chapter 173-340 of the Washington Administrative Code, as amended November 2007.

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