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May 31, 2012

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Mr. Paul Cho
California Regional Water Quality Control Board,
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, California 90013

Subject: Groundwater Evaluation Report
SFPP Norwalk Pump Station
15306 Norwalk Boulevard, Norwalk, California

Dear Mr. Cho:

This groundwater evaluation report was prepared by CH2M HILL on behalf of SFPP, L.P. (SFPP), a subsidiary of Kinder Morgan Energy Partners, L.P. (KMEP), to evaluate the current groundwater monitoring network and monitoring program at the SFPP Norwalk Pump Station, located at 15306 Norwalk Boulevard, Norwalk, California (Figure 1).

This evaluation was conducted in response to a letter from the California Regional Water Quality Control Board, Los Angeles Region (RWQCB), dated April 5, 2012. In that letter, the RWQCB requested the following from SFPP:

- Item 1: Enhance the current groundwater monitoring network and program to evaluate the dissolved plume behavior over time.
- Item 2: Construct a groundwater conceptual site model (CSM) for the RWQCB's determination of necessary cleanup.

This evaluation report addresses Item 1. Regarding Item 2, SFPP submitted a Preliminary CSM on February 13, 2009, in response to a request from the RWQCB on November 25, 2008. The Preliminary CSM (AMEC Geomatrix, Inc. [AMEC], 2009) will be updated by SFPP after collection of the following data:

- **Soil Vapor Data.** Soil vapor samples will be collected and analyzed during 2012 in accordance with the work plan submitted by AMEC on May 27, 2010, and approved by the RWQCB in a letter dated August 11, 2010.
- **Soil Data.** Soil samples will be collected and analyzed according to a soil investigation work plan that is anticipated to be submitted to the RWQCB in early June 2012. SFPP anticipates that the investigation will be implemented shortly after the RWQCB's review and approval.

- **Groundwater Data.** Groundwater samples will be collected and analyzed over two semiannual monitoring events in accordance with the recommendations proposed in this evaluation report. The recommendations include the installation and monitoring of a new groundwater monitoring well in Holifield Park downgradient of the hydrocarbon plume in the southeastern area. This is a key data gap that has been identified by SFPP and the RWQCB in assessing the dissolved plume extent and behavior over time in this area.

This report was prepared by evaluating the adequacy of the current groundwater monitoring network and program, identifying data gaps in evaluating the dissolved plume behavior over time, identifying redundancies or unnecessary data being collected with the current program, and identifying data gaps to updating the Preliminary CSM to provide the items requested in the RWQCB April 5, 2012, letter.

Groundwater monitoring at the site is conducted in accordance with the revised Monitoring and Reporting Program (MRP), approved by the RWQCB in May 2002, and additional requests received thereafter from the RWQCB or Restoration Advisory Board (RAB). SFPP and Defense Logistics Agency Energy (DLA Energy; formerly DESC) jointly conduct groundwater sampling and analysis events at the site and perform sampling in accordance with the Sampling and Analysis Plan (SAP) entitled, *Groundwater Sampling and Analysis Plan, DFSP Norwalk/SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California* (Geomatrix, 1995). Blaine Tech Services, Inc. (Blaine Tech) has been retained by SFPP and DLA Energy to perform groundwater monitoring.

Site Description and Background

The Defense Fuel Support Point (DFSP) facility is located at 15306 Norwalk Boulevard in Norwalk, California. The DFSP facility is located in the central portion of the Los Angeles Basin at an elevation of approximately 75 feet above mean sea level (msl). The ground surface at the site generally slopes to the southwest. The DFSP facility is bounded to the west by Norwalk Boulevard, to the north by Excelsior Street, to the east by Holifield Park, and to the south by a residential area.

SFPP has equipment within 2 acres at the DFSP facility and has easements for its pipelines along the southern and eastern boundaries of the facility. Previously, SFPP operated a pump station near the south-central area of the site. The pump station was used to transfer fuel to and from the DFSP facility, and as an in-line pumping station for portions of the SFPP pipeline network. The pump station was decommissioned in 2001, but three pipelines heading eastward along the southern boundary of the DFSP facility (one of which bends at the southeastern corner of the facility and continues northward within the eastern easement) remain in service and continue to convey refined petroleum fuels including gasoline, diesel, and jet fuel. The pipelines are fitted with block valves, two of which are located along a 24-inch-diameter pipeline and within areas currently undergoing remediation. One block valve is located in the south-central portion of the site and is referred to as the "intermediate 24-inch block valve." The other block valve is located offsite near the southeastern area of the site and is referred to as the "southeastern 24-inch block valve" or "offsite 24-inch block valve."

Subsurface assessments have been performed at the DFSP facility since 1986. Groundwater monitoring and remediation wells have been installed at the site for monitoring and as components of groundwater remediation systems. The investigations have evaluated and defined the distribution of the light nonaqueous phase liquid (LNAPL), sorbed-phase, and dissolved-phase fuel hydrocarbons in soil and groundwater beneath the DFSP facility and at offsite properties to the south, west, and east.

Site assessments indicated that the chemicals of potential concern (COPCs) at the site are total petroleum hydrocarbons (TPH), including TPH quantified as gasoline, diesel fuel, jet propellant 4 (JP-4), jet propellant 5 (JP-5), and jet propellant 8 (JP-8); benzene, toluene, ethylbenzene, and total xylenes (BTEX); 1,2-dichloroethane (1,2-DCA); and methyl tertiary butyl ether (MTBE). In addition, tertiary butyl alcohol (TBA) has been detected in samples collected in recent investigations and, along with other fuel oxygenates, has been added to the MRP pursuant to a request made by the RWQCB in March 2009.

Preliminary CSM

The Preliminary CSM provides SFPP's understanding of site conditions based on the information reviewed as of the date the CSM was prepared (in 2009). The Preliminary CSM focuses on groundwater impacts beneath the site and adjacent offsite areas. The objectives of the Preliminary CSM were to:

- Present an approach for developing a joint CSM with DESC (now DLA Energy).
- Summarize the distribution of COPCs in groundwater.
- Summarize potential exposure pathways and receptors related to impacted media.
- Summarize remedial measures currently in progress.
- Describe the anticipated activities for updating the Preliminary CSM.

The Preliminary CSM provides a description of the following:

- Historical facilities and operations
- Geologic and hydrogeologic setting
- History of site investigations and remediation
- Impacted areas and COPCs
- Preliminary 3D graphical conceptual models
- Exposure evaluation
- Current remedial measures

More than 3 years of groundwater remediation and monitoring, and several site-specific investigations, have been performed since developing the Preliminary CSM. The additional site investigations performed by SFPP include the following:

- *Supplemental Vertical Delineation in Off-Site 24-Inch Block Valve Area* (AMEC, 2010a)
- *Results of Step-Out Investigation at the Southeastern Area of the SFPP Norwalk Station* (CH2M HILL, 2011b)

- *Results of LNAPL Characterization in the Uppermost Groundwater Zone and Top of Bellflower Aquitard (CH2M HILL, 2012)*

The hydrogeologic setting, impacted media, and distribution of COPCs as well as current remediation activities are briefly described below based on the information provided in the Preliminary CSM and the additional work that has been performed since the Preliminary CSM was developed.

Hydrogeologic Setting

The uppermost groundwater zone in the site vicinity is a semiperched unit between depths of approximately 25 and 50 feet below ground surface (bgs). Groundwater flow within this uppermost unconfined zone, as interpreted during previous assessments and monitoring at DFSP, is generally northwestward under a horizontal gradient of approximately 0.001 foot per foot (ft/ft). The uppermost groundwater zone overlies the Bellflower aquitard of the Lakewood Formation. Based on lithologic logs from previous assessments at and near DFSP, the Bellflower aquitard lies between depths of approximately 50 and 80 feet bgs beneath the site and consists of predominantly clay, silty clay, and sandy clay with some interbedded sand with silt.

The Exposition aquifer underlies the Bellflower aquitard between depths of approximately 80 and 220 feet bgs. The potentiometric surface in the Exposition aquifer is approximately 20 feet lower than that in the semiperched uppermost groundwater zone. This relatively consistent difference in hydraulic heads between the semiperched upper groundwater zone and the Exposition aquifer indicates that the Bellflower aquitard inhibits the vertical movement of groundwater in the site area. The horizontal hydraulic gradient in the Exposition aquifer beneath the site area has had a magnitude of approximately 0.001 ft/ft and a generally southeastward direction. The generally southeastward direction of the horizontal hydraulic gradient (and interpreted direction of horizontal groundwater flow) in the Exposition aquifer is roughly opposite the general direction of interpreted groundwater flow in the uppermost groundwater zone. These distinctly different hydraulic conditions consistently interpreted over time above and below the Bellflower aquitard support the interpretation that the Bellflower aquitard in this area comprises a unit that is laterally continuous and has a relatively low bulk vertical hydraulic conductivity.

Impacted Media and Distribution of COPCs

As stated above, the COPCs detected in soil and/or groundwater include TPH, BTEX, MTBE, 1,2-DCA, and TBA. Previous site assessments have shown soil impacts of COPCs at various locations within the DFSP facility and offsite portions immediately adjacent to the south-central and southeastern areas. In general, offsite soil impacts were not observed within approximately 10 feet of ground surface and appeared to be limited to the "smear zone" near the groundwater surface, which is approximately 25 feet bgs.

Soil gas investigations have been conducted in Holifield Park by Parsons in 2006 and 2007, and in the southern offsite residential areas by Geomatrix in 2006. COPCs were detected in soil gas samples collected from these areas; however, human health risk assessments

performed by Parsons and Geomatrix indicated no adverse effects to human health from exposure to air through potential vapor intrusion (Geomatrix, 2006; Parsons, 2008).

The vertical extent of groundwater impacts from COPCs is limited to the uppermost zone and does not extend to the underlying Exposition aquifer.

The general distribution of COPCs in the uppermost groundwater zone is as follows:

- The south-central and southeastern areas contain benzene, MTBE, and TBA.
- The West Side Barrier (WSB) area contains MTBE and 1,2-DCA concentrations that are below the lower, more conservative risk-based corrective action (RBCA) goals, which are 40 micrograms per liter ($\mu\text{g}/\text{L}$) for MTBE and 70 $\mu\text{g}/\text{L}$ for 1,2-DCA; the area also contains relatively low concentrations of TBA.
- The truck rack area contains benzene and relatively low concentrations of MTBE.
- The north-central and northeastern areas contain primarily benzene and low concentrations of MTBE and TBA.

In general, free product historically has been detected in the south-central area including the intermediate block valve area, the southeastern 24-inch block valve area, the north-central tank farm area, the northeastern area, and the truck rack area. The interpreted distribution of free product at the site was recently shown in Figure 2 of the second semiannual 2011 groundwater monitoring report, prepared by Parsons in January 2011. During the October 2011 monitoring event, free product was reported in five wells ranging in thickness from 0.02 to 0.94 foot. Free product was not detected in the south-central area during this monitoring event.

Current Remediation Activities

SFPP currently operates remediation systems consisting of soil vapor extraction (SVE), total fluids extraction (TFE), groundwater extraction (GWE), and treatment of extracted soil vapor and groundwater to address two specific areas at and near the site: the south-central area and the southeastern area. SFPP also previously operated a GWE system for remediation of the western offsite area (or WSB area).

The TFE and GWE systems are designed to:

- Contain and reduce the extent of LNAPL (or free product).
- Provide hydraulic capture of dissolved COPCs.
- Lower the LNAPL surface (where present) and groundwater table, thus exposing more hydrocarbon-impacted soil for SVE.

SVE System

SVE is performed using a blower to remove soil vapors at a rate of up to 2,500 standard cubic feet per minute (scfm) from up to 33 SVE wells. The extracted vapors are conveyed to a knockout tank that separates entrained moisture from the soil vapors. Soil vapors are then treated in a catalytic oxidizer prior to emission to the atmosphere. Operation of the SVE

treatment system is conducted in accordance with Permit to Operate No. F13759 issued by the South Coast Air Quality Management District.

Approximately 458,000 gallons of equivalent fuel have been removed by SVE and destroyed using thermal or catalytic oxidation since 1995, when the remediation system was started. Additional hydrocarbon mass has been destroyed by natural biodegradation.

TFE/GWE System

Free product and groundwater recovered by pneumatically operated top-loading total fluids pumps in the south-central and southeastern parts of the site along with the liquid condensate from the knockout tank are piped to an oil-water separator (OWS). Free product, if any, from the OWS is collected in a storage tank and recycled at an offsite location. Water from the OWS is treated using liquid-phase granular activated carbon (LGAC). Treated water is routed through an onsite 3,000-gallon equalization tank. Two fluidized bed bioreactors (FBBRs) installed downstream of the equalization tank treat fuel oxygenates such as TBA and MTBE. The treated groundwater then passes through polishing LGAC units prior to discharge in accordance with the National Pollutant Discharge Elimination System (NPDES) permit (No. CA0063509, CI No. 7497).

Since September 1995, approximately 51 million gallons of groundwater have been extracted from the south-central area; 16 million gallons of groundwater extracted from the southeastern area; and 8,900 gallons of free product recovered from the south-central and southeastern areas. System operations data indicate that free product recovery rates have decreased to low levels and become asymptotic. The decrease in free product extraction rate appears to correspond to the significant decreases in the extent and thickness of LNAPL in the south-central and southeastern areas.

Since 1996, more than 26 million gallons of groundwater have been extracted from the WSB wells. Groundwater extraction was discontinued in the WSB region on August 5, 2008, based on the reduced lateral extent and low concentrations of MTBE and 1,2-DCA west of the site. Detected concentrations of MTBE and 1,2-DCA in wells west of the site have been below the conservative, site-specific RBCA goals (Geomatrix, 1999) since August 2005.

Current Monitoring and Reporting Program

Specific monitoring wells and remediation wells are monitored by SFPP on a semiannual or annual basis in accordance with the revised MRP in effect for the site to evaluate groundwater elevation and groundwater quality conditions. Certain wells are also monitored by SFPP during calendar quarters when the semiannual monitoring event is not performed. Initially, wells monitored during these quarterly monitoring events consisted of 11 "sentry wells" selected by the RAB for the site in 1998. These sentry wells are located at and around the site near the edge(s) of one or more plumes associated with the site, and/or have exhibited variable chemical concentrations over time. These wells are monitored to provide data on seasonal variations in concentrations of chemicals in groundwater and to provide "early warning" of significant changes in the plumes. Thus, the quarterly monitoring events are referred to as the "sentry monitoring events" or "sentry events."

Since 1998, wells have been added to or removed from the sentry event in accordance with requests made by the RWQCB. In addition, certain wells are voluntarily monitored by SFPP based on requests made by the RAB.

In addition to sentry and semiannual monitoring events, certain wells are monitored on a monthly basis by SFPP, pursuant to a request from the RWQCB in February 2010. The RWQCB requested SFPP increase the monitoring frequency from quarterly to monthly for wells GMW-36, GMW-O-15, GMW-O-16, GMW-O-18, GMW-O-19, and PZ-5 in the southeastern offsite area. SFPP began the monthly monitoring in March 2010 and monthly monitoring has continued to date.

Table 1 presents a list of wells currently monitored by SFPP and the frequency of monitoring, according to the RWQCB's approved MRP. Additional monitoring of remediation wells, not shown in Table 1, may be monitored by SFPP to assist with the effectiveness of its groundwater remediation system. Well construction details are provided in Table 1 of the semiannual groundwater monitoring reports prepared by Parsons and CH2M HILL.

Proposed Revisions to Monitoring and Reporting Program

As described above, this evaluation report was prepared by evaluating the adequacy of the current groundwater monitoring network and program, identifying data gaps in evaluating the dissolved plume behavior over time, identifying redundancies or unnecessary data being collected with the current program, and identifying data gaps to updating the Preliminary CSM to provide the items requested in the RWQCB April 5, 2012, letter. The evaluation of the current groundwater monitoring network and program included preparing time series concentration charts for wells monitored by SFPP. These charts are provided in Attachment A. TPH, benzene, 1,2-DCA, MTBE, and TBA concentrations are plotted against time. LNAPL thickness is also displayed in the charts for wells with a historical presence of free product. Tabulated analytical data are presented in the semiannual groundwater monitoring reports prepared by Parsons and CH2M HILL. Figure 2 presents a location map showing SFPP wells highlighted according to current frequency of monitoring. The figure also provides notations next to each well for which changes to the current monitoring program are proposed.

The proposed revisions to the current monitoring and reporting program are included in Table 1 (highlighted in red font). Provided below is the rationale for the proposed changes.

SFPP proposes to continue monitoring the wells that are in the current groundwater monitoring program. One new well, GMW-O-24, is proposed to be installed and monitored at Holifield Park; it will serve as a downgradient sentinel for the southeastern area. The monitoring frequency is proposed to be reduced for several wells because long-term and seasonal trends have been established or the current sampling frequency does not provide data that are useful for interpreting groundwater flow and contaminant concentrations over time.

For the uppermost groundwater zone, wells proposed for monitoring were selected so that each area has monitoring upgradient of the plume, within the plume, and downgradient

of the plume. In addition, wells were selected to be cross-gradient of the plume, where available. For the Exposition aquifer, the existing five wells were selected, which are located upgradient and downgradient of the site. The wells selected for monitoring are summarized in Table 2 relative to their position for each area.

The sampling frequency proposed for most wells is semiannual, which is sufficient to assess seasonal and long-term concentration trends, based on the evaluation of the time-series concentration charts in Attachment A. The wells located in the southeastern area are proposed to be monitored quarterly instead of the current monthly frequency. The quarterly frequency in this area is considered to be warranted because the southeastern plume is underneath Holifield Park. Quarterly monitoring is not proposed for the southern offsite area because the groundwater flow direction is toward the onsite remediation wells. Quarterly monitoring is not proposed for the western offsite area because the concentrations are low (below risk-based standards) and continue to decrease.

Exposition Aquifer Wells

No changes are proposed for the Exposition aquifer groundwater monitoring program.

South-Central Area (Southern Offsite Wells)

SFPP recommends the following changes to the groundwater monitoring program for the southern offsite area:

- Decrease the sampling frequency from quarterly to semiannually at monitoring wells GMW-O-1, GMW-O-2, and GMW-O-3. These wells are located upgradient or cross-gradient of the south-central area plume. Hydrocarbon concentrations have been consistently nondetect in wells GMW-O-1 and GMW-O-2 since approximately 2005, with the exception of two low detections of TPH as free product (TPH-fp) in well GMW-O-2 since that time. Hydrocarbon concentrations in well GMW-O-3 have been consistently nondetect since approximately 2008 with the exception that TPH-fp was detected in 2012 at a concentration just above the reporting limit of 100 µg/L.
- Decrease the sampling frequency from semiannually to annually at monitoring well GMW-O-4 (MID). This well is completed in the deeper portion of the uppermost groundwater zone and all hydrocarbons have been consistently nondetect since the late 1990s, with the exception that TPH-fp was detected just above the reporting limit once in 2005. The uppermost groundwater zone near this well is currently monitored by co-located monitoring well GMW-O-4, which is sampled on a semiannual basis.
- Decrease the sampling frequency from quarterly to semiannually at monitoring well GMW-O-14. Hydrocarbon concentrations have been relatively steady since approximately 2007. Increases in concentrations are likely a result of seasonal fluctuations in groundwater elevation as this phenomenon has been observed throughout its sampling history.

South-Central Area (Onsite Wells)

SFPP recommends the following changes to the groundwater monitoring program for the south-central area:

- Change the monitoring at well GMW-10 from semiannual gauging to semiannual sampling. This extraction well is located approximately 150 feet northwest of the truck rack area, and the closest downgradient well that is monitored routinely is MW-12, which is located approximately 180 feet northwest. GMW-10 has been monitored voluntarily by SFPP during the last several sampling events and hydrocarbons have been reported consistently in this well.
- Change the monitoring at well GMW-13, located approximately 120 feet northeast of the truck rack area, from semiannual sampling to semiannual gauging. With the exception of low concentrations of TBA and 1,2-DCA reported during 2009, hydrocarbon concentrations have been consistently nondetect in this well since 2004. Furthermore, wells GMW-14 and GMW-3 near the truck rack area will continue to be monitored on a semiannual basis.

Southeastern Area Wells

SFPP recommends the following changes to the groundwater monitoring program for the southeastern area:

- Decrease the sampling frequency from quarterly to semiannually at onsite well GMW-38. MTBE and TBA have not been reported in well GMW-38 since late 2009, and the other monitored hydrocarbons have been consistently nondetect.
- Decrease the sampling frequency at wells GWM-37 and GMW-SF-8 from semiannually to annually. These wells are proposed to be gauged on a semiannual basis. Hydrocarbon concentrations have been consistently nondetect in these wells since approximately 2004.
- Decrease the sampling frequency of wells GMW-36, GMW-O-15, GMW-O-16, GMW-O-18, GMW-O-19, and PZ-5 from monthly to quarterly. There is no clear trend in concentrations of fuel constituents in these wells since monthly monitoring began in March 2010. Therefore, a reduction in sampling frequency to quarterly would still provide sufficient data to determine increasing or decreasing trends in the southeastern area of the site. Provided below is a more detailed discussion of the time series charts for these particular wells.
 1. Hydrocarbon concentrations in monitoring wells GMW-O-19 and GMW-O-16 have been consistently low or nondetect since approximately 2006. The only consistently detected contaminant is MTBE, which has consistently been detected at GMW-O-16 at a concentration of less than 5 µg/L for the past several years.
 2. Hydrocarbon concentrations in extraction wells GMW-36 and GMW-O-15 do not show a clear trend since the monthly sampling began in March 2010, in part because of the historical presence of free product in these wells. Fluctuation in concentrations of fuel constituents in wells with a historical presence of free product is expected due to such factors as water level fluctuation, groundwater extraction (i.e., pump

- operation), potential emulsification of free product in the groundwater samples, and different sampling methods. The extraction wells in the southeastern area have, for the most part, been in operation during monthly groundwater sampling; therefore, samples have been collected through the wellhead sampling ports. It is suspected that small quantities of emulsified free product may have been present in the water samples, which could cause significant increases in contaminant concentrations.
3. Hydrocarbon concentrations in downgradient extraction well GMW-O-18 were relatively low until extraction began in April 2010 as shown in the time series chart. MTBE was generally less than 10 µg/L, and the other hydrocarbons were not detected through 2009. Elevated detections of MTBE and other hydrocarbons in October 2009 led to the initiation of extraction, although concentrations temporarily decreased during the April 2010 event. After beginning extraction in April 2010, the concentrations of MTBE, TBA, and other hydrocarbons increased, which was expected, because the new extraction pulled these constituents from the higher-concentration areas to GMW-O-18 where the plume was now “anchored” by the new hydraulic containment further downgradient. Variability in concentrations in this extraction well is expected.
 4. Hydrocarbon concentrations in PZ-5, located between the extraction wells in the product area (GMW-36 and GMW-O-15) and the new downgradient extraction well (GMW-O-18) were generally steady prior to 2010; the variability in concentrations can be explained by seasonal effects. This well appears to have been within the capture zone induced by extraction at wells GMW-36 and GMW-O-15. Except for MTBE, concentrations in PZ-5 increased in 2010 after expanding extraction to GMW-O-18 as extraction in this well pulled constituents from the higher-concentration areas downgradient to the GMW-O-18/PZ-5 area. MTBE has been decreasing since 2008. Variability in concentrations began after extraction began in GMW-O-18. These trends would be expected and are likely the result of well GMW-O-18 containing the plume in this area.

As part of the data evaluation for wells in the southeastern area, SFPP determined the need to fill a data gap in the uppermost groundwater zone, downgradient of the northernmost extraction well (GMW-O-18) in Holifield Park. Therefore, SFPP is planning to install a new monitoring well, GMW-O-24, in Holifield Park to monitor groundwater quality downgradient of monitoring well PZ-5 and extraction well GMW-O-18. It is anticipated that well GMW-O-24 will be installed by the third quarter 2012, and will be monitored routinely on a quarterly basis thereafter.

In order to provide further hydrocarbon containment in the southeastern area, SFPP has initiated extraction from onsite extraction well GMW-SF-9. Well GMW-SF-10, located approximately 240 feet downgradient of GMW-SF-9, can also be turned on if additional containment is needed in this area. The TFE pumps in wells GMW-36, GMW-O-15, and GMW-O-18 are currently on and will continue to extract groundwater in the southeastern area for treatment.

Western Area Wells

SFPP recommends the following changes to the groundwater monitoring program for the western area:

- Change the monitoring from semiannual sampling to semiannual gauging in monitoring wells PW-1 and PW-2. PW-1 was dry during April 2012 for the first time since monitoring of this well began. Hydrocarbon concentrations in this well have been consistently nondetect with the exception of isolated detections of 1,2-DCA in 2005 and TPH-fp in 2008. Downgradient well WCW-6, located approximately 180 feet northwest of PW-1, will continue to be monitored on a semiannual basis. PW-2 has been dry since April 2009; therefore, this well should no longer serve as a groundwater sampling point. Well WCW-5, located approximately 120 feet west of PW-2 will continue to be monitored on a semiannual basis.
- Decrease the sampling frequency from semiannually to annually at monitoring well PW-3. With the exception of 1,2-DCA, all other hydrocarbons have been consistently nondetect for the last decade or more. The 1,2-DCA concentrations in this well have decreased significantly since monitoring began in the late 1990s; concentrations have been nondetect or less than 2 µg/L since approximately 2004.
- Decrease the sampling frequency from semiannually to annually in monitoring wells MW-19 (MID) and MW-20 (MID). Hydrocarbon concentrations have been relatively stable in both wells since 2003. Co-located monitoring wells MW-7 and MW-6 will continue to be sampled on a semiannual basis.

Western Offsite Wells

SFPP recommends the following change to the groundwater monitoring program for the western offsite area:

- Decrease the sampling frequency from quarterly to semiannually at monitoring wells WCW-3, WCW-7, and WCW-13. Concentrations of 1,2-DCA and MTBE have been nondetect or declining since 2007 in wells WCW-3 and WCW-7, and have been consistently nondetect in well WCW-13. Other monitored hydrocarbons in these wells have been consistently nondetect with the exception of TPH-fp, which was occasionally detected just above the reporting limit in well WCW-7.

Mr. Paul Cho, RWQCB

Page 12

May 31, 2012

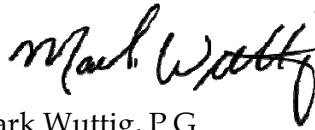
If you have any additional questions regarding this evaluation, please contact Dan Jablonski at (213) 228-8271, or Mr. Stephen Defibaugh, KMEP's Remediation Project Manager, at (714) 560-4802.

Sincerely,

CH2M HILL, Inc.



Dan Jablonski, R.E.A.
Project Manager



Mark Wuttig, P.G.
Senior Hydrogeologist

Attachments:

References

Tables: Table 1: SFPP Monitoring and Reporting Program
Table 2: Well Location Summary

Figures: Figure 1: Site Location Map
Figure 2: Well Location Map

Attachment A: Time Series Charts

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Mr. Charles Emig, City of Cerritos
Mr. Gary Lynch, Park Water Company
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Mr. Tim Whyte, URS

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Tables

TABLE 1
SFPP Monitoring and Reporting Program
SFPP Norwalk Pump Station, Norwalk, California

Grouping	Well Position ¹	Well ID	Location	Well Position ¹	Zone Monitored	Well Use	May 2002 Approved MRP Gauge Sample		Additional Monitoring Requests	Current Monitoring Plan ² Gauge Sample		Proposed Changes to Monitoring Plan ³	Monitor By
Exposition Aquifer	Upgradient	EXP-2	Western	Upgradient	Exposition	Monitoring	Quarterly	Quarterly	Gauge and sample simultaneously with DLA	Quarterly	Quarterly	---	SFPP/DLA
		EXP-4	Western offsite	Upgradient	Exposition	Monitoring	Annual	Annual	---	Semiannual	Annual	---	SFPP
	Downgradient	EXP-1	North-central	Downgradient	Exposition	Monitoring	Quarterly	Quarterly	Gauge and sample simultaneously with DLA	Quarterly	Quarterly	---	SFPP/DLA
		EXP-3	Southeastern	Downgradient	Exposition	Monitoring	Quarterly	Quarterly	Gauge and sample simultaneously with DLA	Quarterly	Quarterly	---	SFPP/DLA
		EXP-5	Southeastern offsite	Downgradient	Exposition	Monitoring	Quarterly	Quarterly	---	Quarterly	Quarterly	---	SFPP
South-Central Area (Southern Offsite)	Upgradient	GMW-O-2	Southern offsite	Upgradient	Uppermost	Monitoring	Quarterly	Quarterly	---	Quarterly	Quarterly	Change from quarterly sampling to semiannual sampling	SFPP
		GMW-O-3	Southern offsite	Upgradient	Uppermost	Monitoring	Quarterly	Quarterly	Monitor closely (RWQCB 9/13/02)	Quarterly	Quarterly	Change from quarterly sampling to semiannual sampling	SFPP
		GMW-O-4	Southern offsite	Upgradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP
		GMW-O-4 (MID)	Southern offsite	Upgradient	Uppermost (deep)	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	Change from semiannual sampling to annual sampling	SFPP
		GMW-O-5	Southern offsite	Upgradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP
		GMW-O-6	Southern offsite	Upgradient	Uppermost	Monitoring	Annual	Annual	---	Annual	Annual	---	SFPP
		GMW-O-7	Southern offsite	Upgradient	Uppermost	Monitoring	Semiannual	---	---	Semiannual	---	---	SFPP
		GMW-O-8	Southern offsite	Upgradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP
	Plume Center	GMW-O-9	Southern offsite	Upgradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP
		GMW-O-12	Southern offsite	Plume Center	Uppermost	Remediation	Semiannual	---	---	Semiannual	---	---	SFPP
		GMW-O-14	Southern offsite	Plume Center	Uppermost	Monitoring	Semiannual	Semiannual	Monitor closely (RWQCB 9/13/02)	Quarterly	Quarterly	Change from quarterly sampling to semiannual sampling	SFPP
		MW-O-2	Southern offsite	Plume Center	Uppermost	Remediation	Semiannual	---	---	Semiannual	---	---	SFPP
		Plume Edge	GMW-O-10	Southern offsite	Plume Edge	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---
Cross-gradient	GMW-O-1	Southern offsite	Cross-gradient	Uppermost	Monitoring	Quarterly	Quarterly	---	Quarterly	Quarterly	Change from quarterly sampling to semiannual sampling	SFPP	
South-Central Area (Onsite)	Plume Center	GMW-22	South-central	Plume Center	Uppermost	Remediation	Semiannual	---	---	Semiannual	---	---	SFPP
		GMW-25	South-central	Plume Center	Uppermost	Remediation	Semiannual	---	---	Semiannual	---	---	SFPP
		GWR-1	South-central	Plume Center	Uppermost	Monitoring	Annual	Annual	---	Annual	Annual	---	SFPP
		GWR-3	South-central	Plume Center	Uppermost	Remediation	Semiannual	---	---	Semiannual	---	---	SFPP
		MW-18 (MID)	South-central	Plume Center	Uppermost (deep)	Remediation	Semiannual	---	---	Semiannual	---	---	SFPP
		MW-SF-2	South-central	Plume Center	Uppermost	Remediation	Semiannual	---	---	Semiannual	---	---	SFPP
		MW-SF-6	South-central	Plume Center	Uppermost	Remediation	Semiannual	---	---	Semiannual	---	---	SFPP
	Plume Edge	MW-SF-9	South-central	Plume Center	Uppermost	Remediation	Semiannual	---	---	Semiannual	Semiannual	---	SFPP
		GMW-2	South-central	Plume Edge	Uppermost	Monitoring	Annual	Annual	---	Annual	Annual	---	SFPP
		GMW-10	South-central	Plume Edge	Uppermost	Remediation	Semiannual	---	---	Semiannual	---	Change semiannual gauging to semiannual sampling	SFPP
		GMW-23	South-central	Plume Edge	Uppermost	Monitoring	Semiannual	---	---	Semiannual	---	---	SFPP
		GMW-26	South-central	Plume Edge	Uppermost	Monitoring	Semiannual	---	---	Semiannual	---	---	SFPP
		GMW-27	South-central	Plume Edge	Uppermost	Monitoring	Semiannual	Semiannual	Monitor quarterly until concentrations stabilize per Mary Jane	Semiannual	Semiannual	---	SFPP
		GMW-28	South-central	Plume Edge	Uppermost	Monitoring	Semiannual	---	---	Semiannual	---	---	SFPP
		GMW-29	South-central	Plume Edge	Uppermost	Monitoring	Semiannual	---	---	Semiannual	---	---	SFPP
		GMW-30	South-central	Plume Edge	Uppermost	Monitoring	Semiannual	---	---	Semiannual	---	---	SFPP
		HL-3	South-central	Plume Edge	Uppermost	Monitoring	Annual	Annual	---	Annual	Annual	---	SFPP
	Cross-gradient	PZ-2	South-central	Plume Edge	Uppermost	Monitoring	Semiannual	---	---	Semiannual	---	---	SFPP
HL-2		South-central	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP	
Downgradient		GMW-12	South-central	Downgradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	DLA
	MW-12	South-central	Downgradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP	
South-Central Area (Truck Rack)	Plume Center	GMW-41	South-central	Downgradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	DLA
		GMW-1	South-central (truck rack)	Plume Center	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP
		GMW-4	South-central (truck rack)	Plume Center	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP
		MW-9	South-central (truck rack)	Plume Center	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP
	Plume Edge	MW-15	South-central (truck rack)	Plume Center	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP
		GMW-3	South-central (truck rack)	Plume Edge	Uppermost	Monitoring	Semiannual	Semiannual	Monitor quarterly until concentrations stabilize (RWQCB 11/18/02)	Semiannual	Semiannual	---	SFPP
	Cross-gradient	GMW-14	South-central (truck rack)	Plume Edge	Uppermost	Monitoring	Semiannual	---	Monitor semiannually (RWQCB 9/10/03)	Semiannual	Semiannual	---	SFPP
Downgradient	GMW-13	South-central (truck rack)	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	Change semiannual sampling to semiannual gauging	SFPP	

TABLE 1
SFPP Monitoring and Reporting Program
SFPP Norwalk Pump Station, Norwalk, California

Grouping	Well Position ¹	Well ID	Location	Well Position ¹	Zone Monitored	Well Use	May 2002 Approved MRP Gauge Sample		Additional Monitoring Requests	Current Monitoring Plan ² Gauge Sample		Proposed Changes to Monitoring Plan ³	Monitor By	
Southeastern Area	Upgradient	GMW-O-17	Southeastern offsite	Upgradient	Uppermost	Monitoring	Annual	Annual	---	Annual	Annual	---	SFPP	
	Plume Center	GMW-36	Southeastern	Plume Center	Uppermost	Remediation	Semiannual	Semiannual	Sample Monthly (RWQCB 2/26/10)	Monthly	Monthly	Change from monthly sampling to quarterly sampling	SFPP	
		GMW-O-15	Southeastern	Plume Center	Uppermost	Remediation	Semiannual	---	Sample Monthly (RWQCB 2/26/10)	Monthly	Monthly	Change from monthly sampling to quarterly sampling	SFPP	
	Plume Edge	GMW-O-16	Southeastern	Plume Edge	Uppermost	Monitoring	Semiannual	Semiannual	Sample Monthly (RWQCB 2/26/10)	Monthly	Monthly	Change from monthly sampling to quarterly sampling	SFPP	
		MW-8	Southeastern	Plume Edge	Uppermost	Monitoring	Semiannual	Semiannual	Monitor quarterly until concentrations stabilize (RWQCB 11/18/02)	Semiannual	Semiannual	---	SFPP	
	Cross-gradient	GMW-37	Southeastern	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	Monitor quarterly until concentrations stabilize (RWQCB 11/18/02)	Semiannual	Semiannual	Change from semiannual sampling to annual sampling	SFPP	
		GMW-O-19	Southeastern	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	Sample Monthly (RWQCB 2/26/10)	Monthly	Monthly	Change from monthly sampling to quarterly sampling	SFPP	
	Downgradient	GMW-SF-8	Southeastern	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	Monitor quarterly until concentrations stabilize (RWQCB 11/18/02)	Semiannual	Semiannual	Change from semiannual sampling to annual sampling	SFPP	
		GMW-38	Southeastern	Downgradient	Uppermost	Monitoring	Semiannual	---	Monitor quarterly until concentrations stabilize (RWQCB 11/18/02)	Quarterly	Quarterly	Change from quarterly sampling to semiannual sampling	SFPP	
Southeastern Area (Holifield Park)	Plume Center	GMW-39	Southeastern	Downgradient	Uppermost	Monitoring	Semiannual	Semiannual	Monitor quarterly until concentrations stabilize (RWQCB 11/18/02)	Quarterly	Quarterly	---	SFPP	
		GMW-SF-7	Southeastern	Downgradient	Uppermost	Monitoring	Semiannual	Semiannual	Monitor quarterly until concentrations stabilize (RWQCB 11/18/02)	Semiannual	Semiannual	---	SFPP	
	Plume Edge	PZ-5	Southeastern (Holifield Park)	Plume Center	Uppermost	Monitoring	No comment	No comment	Sample Monthly (RWQCB 2/26/10)	Monthly	Monthly	Change from monthly sampling to quarterly sampling	SFPP	
Western Area (Onsite)	Plume Edge	GMW-O-18	Southeastern (Holifield Park)	Plume Edge	Uppermost	Remediation	Semiannual	---	Sample Monthly (RWQCB 2/26/10)	Monthly	Monthly	Change from monthly sampling to quarterly sampling	SFPP	
		Downgradient	GMW-O-24	Southeastern (Holifield Park)	Downgradient	Uppermost	Monitoring	Semiannual	Semiannual	---	---	---	Proposed new downgradient monitoring well in park; proposed to be sampled quarterly	SFPP
		MW-7	GMW-19 (MID)	Western	Plume Edge	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP
	MW-21 (MID)		Western	Plume Edge	Uppermost (deep)	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	Change from semiannual sampling to annual sampling	SFPP	
	Cross-gradient	PW-1	Western	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Annual	Annual	---	SFPP	
		PW-2	Western	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	Change from semiannual sampling to semiannual gauging	SFPP	
		PW-3	Western	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	Change from semiannual sampling to annual sampling	SFPP	
Downgradient	GMW-8	Western	Downgradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP		
	MW-6	Western	Downgradient	Uppermost	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	---	SFPP		
MW-20 (MID)	Western	Downgradient	Uppermost (deep)	Monitoring	Semiannual	Semiannual	---	Semiannual	Semiannual	Change from semiannual sampling to annual sampling	SFPP			
Western Area (Offsite)	Cross-gradient	WCW-1	Western offsite	Cross-gradient	Uppermost	Monitoring	Annual	Annual	---	Annual	Annual	---	SFPP	
		WCW-2	Western offsite	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	Monitored by DLA during second semiannual events (4th quarter)	Semiannual	Semiannual	---	SFPP	
		WCW-5	Western offsite	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	Monitored by DLA during second semiannual events (4th quarter)	Semiannual	Semiannual	---	SFPP	
		WCW-6	Western offsite	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	Monitored by DLA during second semiannual events (4th quarter)	Semiannual	Semiannual	---	SFPP	
		WCW-10	Western offsite	Cross-gradient	Uppermost	Monitoring	Semiannual	---	Monitored by DLA during second semiannual events (4th quarter)	Semiannual	---	---	SFPP	
		WCW-11	Western offsite	Cross-gradient	Uppermost	Monitoring	Semiannual	---	Monitored by DLA during second semiannual events (4th quarter)	Semiannual	---	---	SFPP	
	Downgradient	WCW-12	Western offsite	Cross-gradient	Uppermost	Monitoring	Semiannual	Semiannual	Monitored by DLA during second semiannual events (4th quarter)	Semiannual	Semiannual	---	SFPP	
		WCW-3	Western offsite	Downgradient	Uppermost	Monitoring	Quarterly	Quarterly	Monitored by DLA during second semiannual events (4th quarter)	Quarterly	Quarterly	Change from quarterly sampling to semiannual sampling	SFPP	
		WCW-4	Western offsite	Plume Edge	Uppermost	Monitoring	Semiannual	Semiannual	Monitored by DLA during second semiannual events (4th quarter)	Semiannual	Semiannual	---	SFPP	
		WCW-7	Western offsite	Plume Edge	Uppermost	Monitoring	Quarterly	Quarterly	Monitored by DLA during second semiannual events (4th quarter)	Quarterly	Quarterly	Change from quarterly sampling to semiannual sampling	SFPP	
		WCW-8	Western offsite	Plume Edge	Uppermost	Monitoring	Semiannual	Semiannual	Monitored by DLA during second semiannual events (4th quarter)	Semiannual	Semiannual	---	SFPP	
		WCW-9	Western offsite	Downgradient	Uppermost	Monitoring	Semiannual	---	Monitored by DLA during second semiannual events (4th quarter)	Semiannual	---	---	SFPP	
		WCW-13	Western offsite	Cross-gradient	Uppermost	Monitoring	Quarterly	Quarterly	Monitored by DLA during second semiannual events (4th quarter)	Quarterly	Quarterly	Change from quarterly sampling to semiannual sampling	SFPP	
		WCW-14	Western offsite	Downgradient	Uppermost	Monitoring	Semiannual	Semiannual	Monitored by DLA during second semiannual events (4th quarter)	Semiannual	Semiannual	---	SFPP	

Notes
¹ Well position in relation to the interpreted TPH plume
² Monitoring plan after additional requests made by the RAB and RWQCB
³ Red font indicates proposed changes; --- indicates no change proposed or does not apply

Abbreviations
DLA - Defense Logistics Agency Energy
MRP - Monitoring and Reporting Program (RWQCB, 2002)
RAB - Restoration Advisory Board
RWQCB - Regional Water Quality Control Board, Los Angeles Region
SFPP - SFPP, L.P.
TPH - Total Petroleum Hydrocarbons

TABLE 2

Well Location Summary

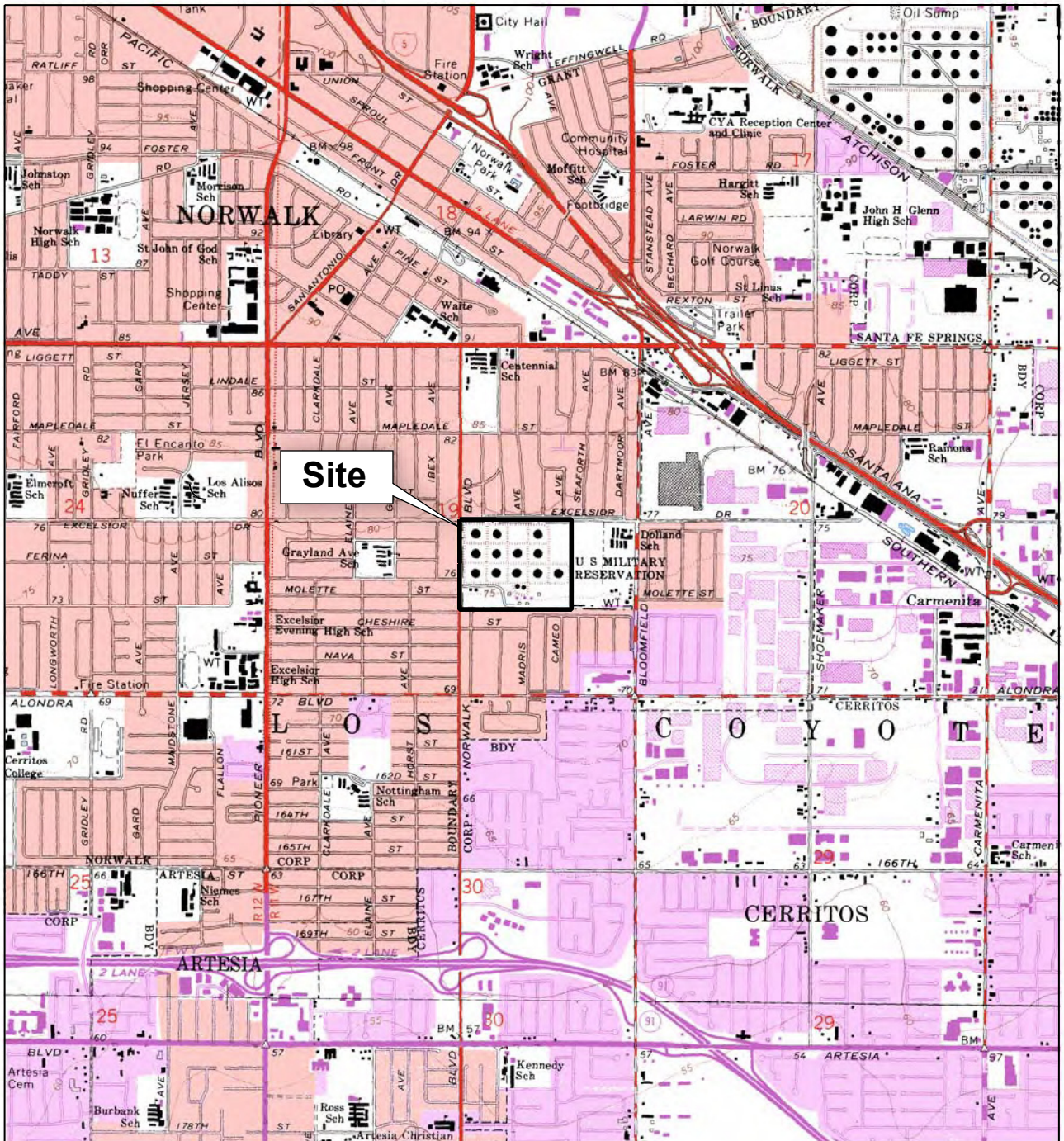
SFPP Norwalk Pump Station, Norwalk, California

Area	Upgradient	Plume	Plume Edge	Cross Gradient	Downgradient
Exposition Aquifer	EXP-2, EXP-4	---	---	---	EXP-1, EXP-3, EXP-5
South-Central Area (Southern Offsite)	GMW-O-2, GMW-O-3, GMW-O-4, GMW-O-4 (MID), GMW-O-5, GMW-O-6, GMW-O-7, GMW-O-8, GMW-O-9	GMW-O-12, GMW-O-14, MW-O-2	GMW-O-10	GMW-O-1	Onsite Wells
South-Central Area (Onsite)	Offsite Wells (to South)	GMW-22, GMW-25, GWR-1, GWR-3, MW-18 (MID), MW-SF-2, MW-SF-6, MW-SF-9	GMW-2, GMW-10, GMW-23, GMW-26, GMW-27, GMW-28, GMW-29, GMW-30, HL-3, PZ-2	HL-2	GMW-12, MW-12, GMW-41
South-Central Area (Truck Rack)	Offsite Wells (to South)	GMW-1, GMW-4, MW-9, MW-15	GMW-3, GMW-14	GMW-13	GMW-12
Southeastern Area	GMW-O-17	GMW-36, GMW-O-15	GMW-O-16, MW-8	GMW-37, GMW-O-19, GMW-SF-8	GMW-38, GMW-39, GMW-SF-7
Southeastern Area (Holifield Park)	GMW-O-17	PZ-5	GMW-O-18	Onsite Wells	GMW-O-24 (Proposed)
Western Onsite Area	Offsite Wells (to South)	Onsite Wells	MW-7, MW-19 (MID), MW-21 (MID)	PW-1, PW-2, PW-3	GMW-8, MW-6, MW-20 (MID)
Western Offsite Area	Onsite Wells	Onsite Wells	Onsite Wells	WCW-1, WCW-2, WCW-5, WCW-6, WCW-10, WCW-11, WCW-12	WCW-3, WCW-4, WCW-7, WCW-8, WCW-9, WCW-13, WCW-14

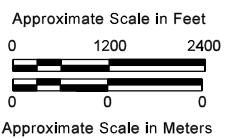
Note

--- = does not apply

Figures



Site



SITE LOCATION MAP

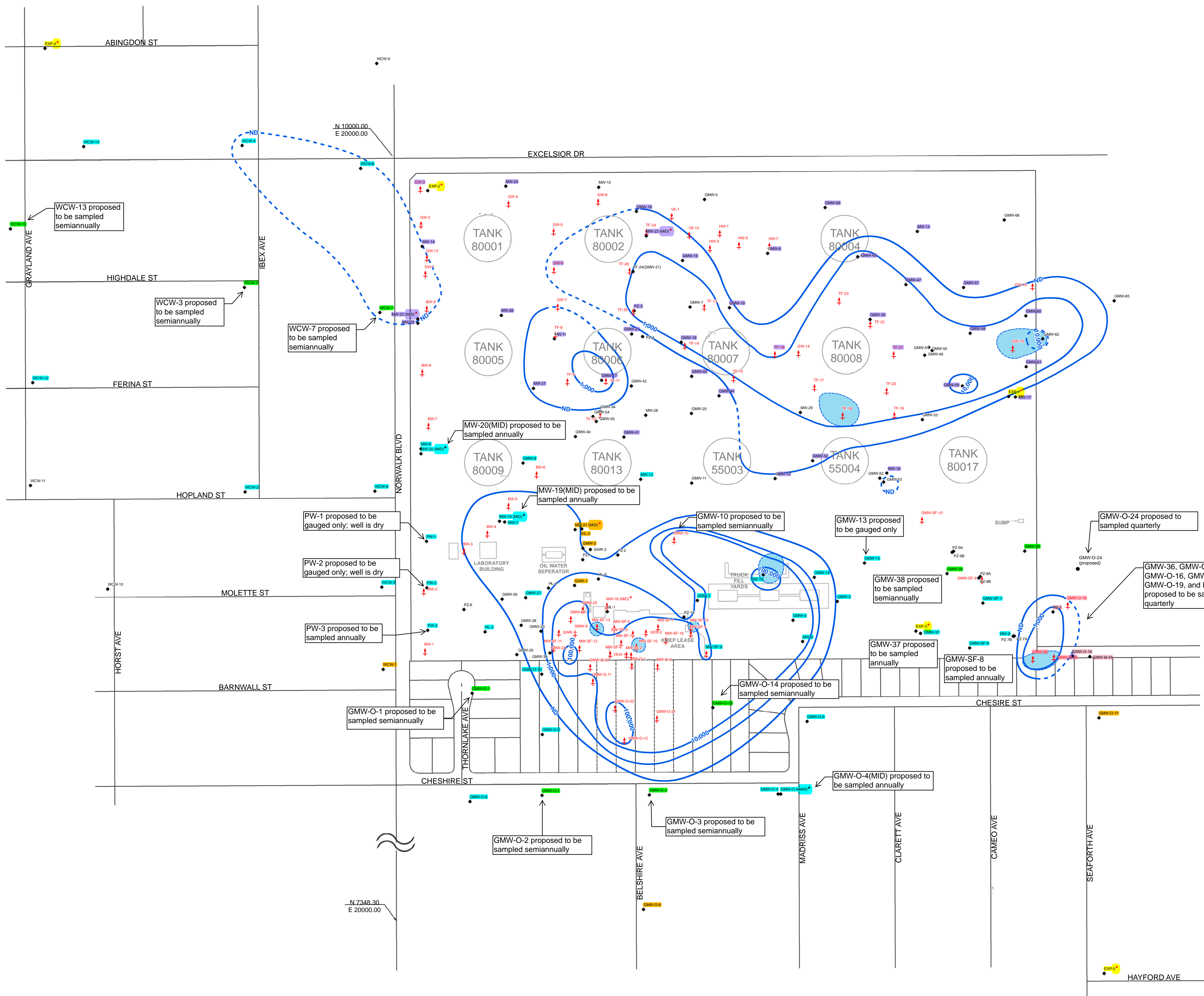
SFPP Norwalk Pump Station
Norwalk, California

By: Andy Vollmar Date: July 21, 2010 Project No: 407609



Figure 1

BASEMAP MODIFIED FROM U.S.G.S. 7.5 MINUTE QUADRANGLE MAP
LOS ALAMITOS 1964, CALIFORNIA. PHOTO-REVISED 1981.
WHITTIER 1965, CALIFORNIA. PHOTO-REVISED 1981.



Explanation

- GMW-5 ● Monitoring well and designation
- VE-1 ↓ Vapor extraction, groundwater extraction, total fluids, or free product extraction well used for site remediation
- MW-22(MID)* Wells screened in the Exposition aquifer or near the bottom of the uppermost aquifer
- ND --- Estimated extent of detected dissolved TPH in groundwater (concentration dependent on laboratory reporting limit); dashed where inferred (April 2011)
- 1,000 --- Lines of equal TPH concentration (µg/L) in groundwater; dashed where inferred (April 2011)
- Estimated extent of measurable light nonaqueous phase hydrocarbons (LNAPL, free product) on groundwater; dashed where inferred (April 2011)

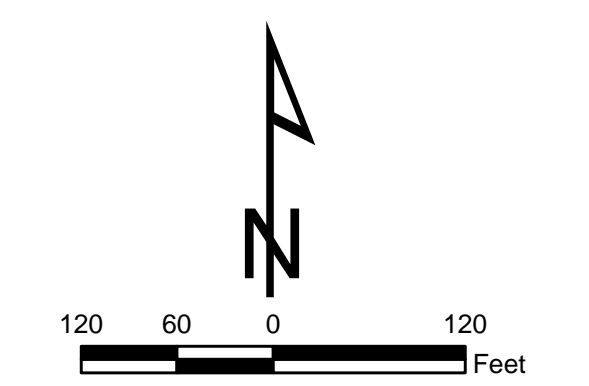
SFPP Monitoring

- HL-3 Uppermost monitoring well sampled annually by SFPP
- MW-8 Uppermost monitoring well sampled semiannually by SFPP
- GMW-36 Uppermost monitoring well sampled quarterly by SFPP
- PZ-5 Uppermost monitoring or extraction well sampled monthly by SFPP
- SFPP wells proposed for change in sampling frequency

SFPP/DLA Energy Joint Monitoring (sampled by SFPP and/or DLA Energy)

- EXP-1 Exposition aquifer monitoring well
- DLA Energy Monitoring
- MW-17 Uppermost monitoring well sampled by DLA Energy

1. Base map prepared from data provided by Fluor Daniel GTI, Dulin & Boynton, Geomatrix, and Parsons.
2. Except as noted below, well locations surveyed by Dulin & Boynton.
3. Locations of wells HL-1, HL-3, and HL-4 based on field measurements by Fluor Daniel GTE and Woodward-Clyde.
4. Locations of wells BW-1 through BW-9 surveyed by Geomatrix based on reference to other wells surveyed by Dulin & Boynton.
5. Split groundwater samples are collected from Exposition aquifer wells EXP-1, EXP-2, and EXP-3 on a quarterly basis.
6. Western onsite wells WCW-1 through WCW-8, WCW-12, WCW-13, and WCW-14 are sampled by DLA Energy during the second semiannual events (fourth quarter of each year).



Well Location Map

SFPP Norwalk Pump Station
Norwalk, California

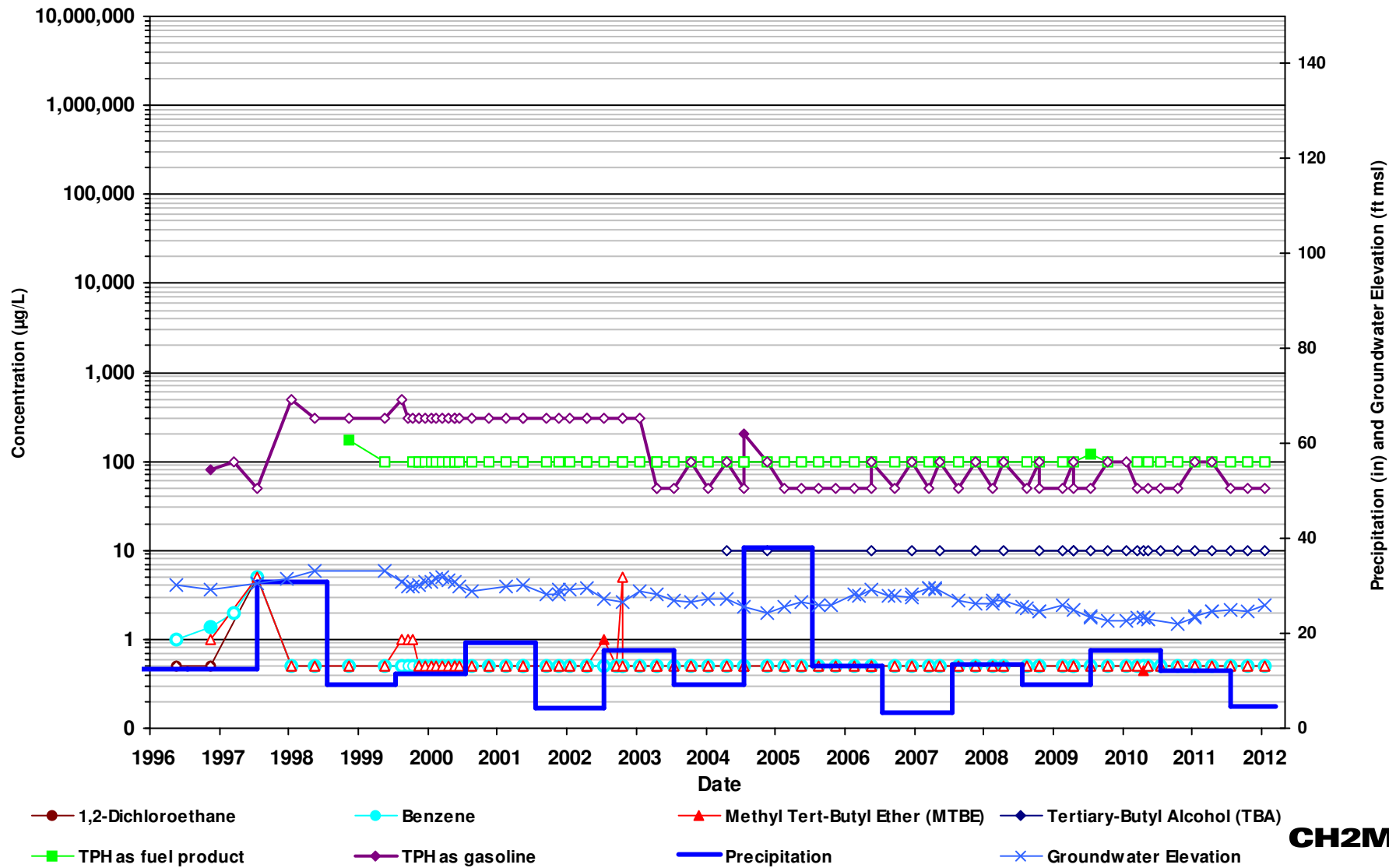
By: Michael Brown Date: 6/2011 Project No: 406972

SCD 10ALT PROJ 406972_SFPP_NORWALK MAP FILES 20111117.MXD SWOLF80 5/3/2012 10:54:28 AM

Attachment A

Time Series Charts

EXP-1

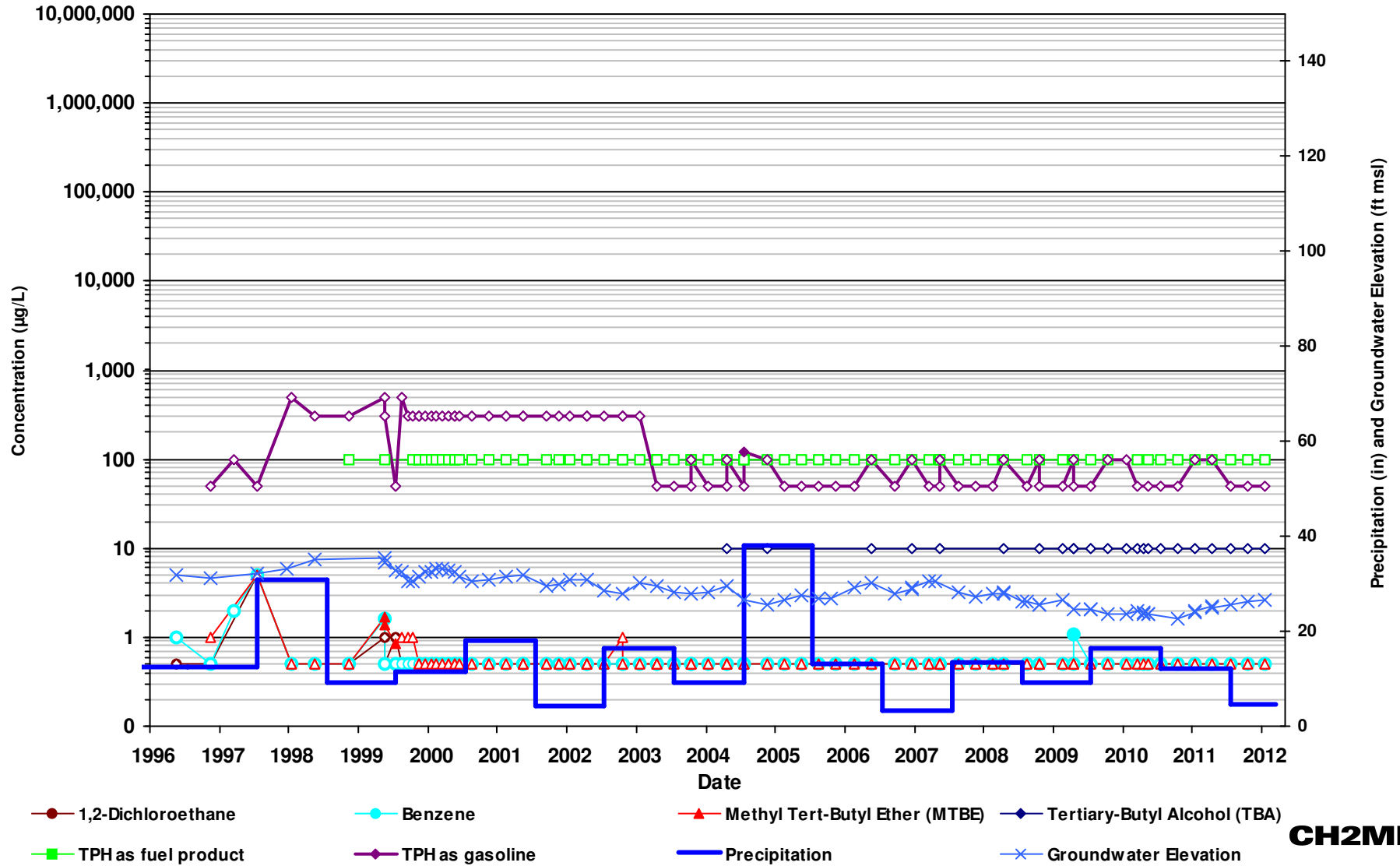


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

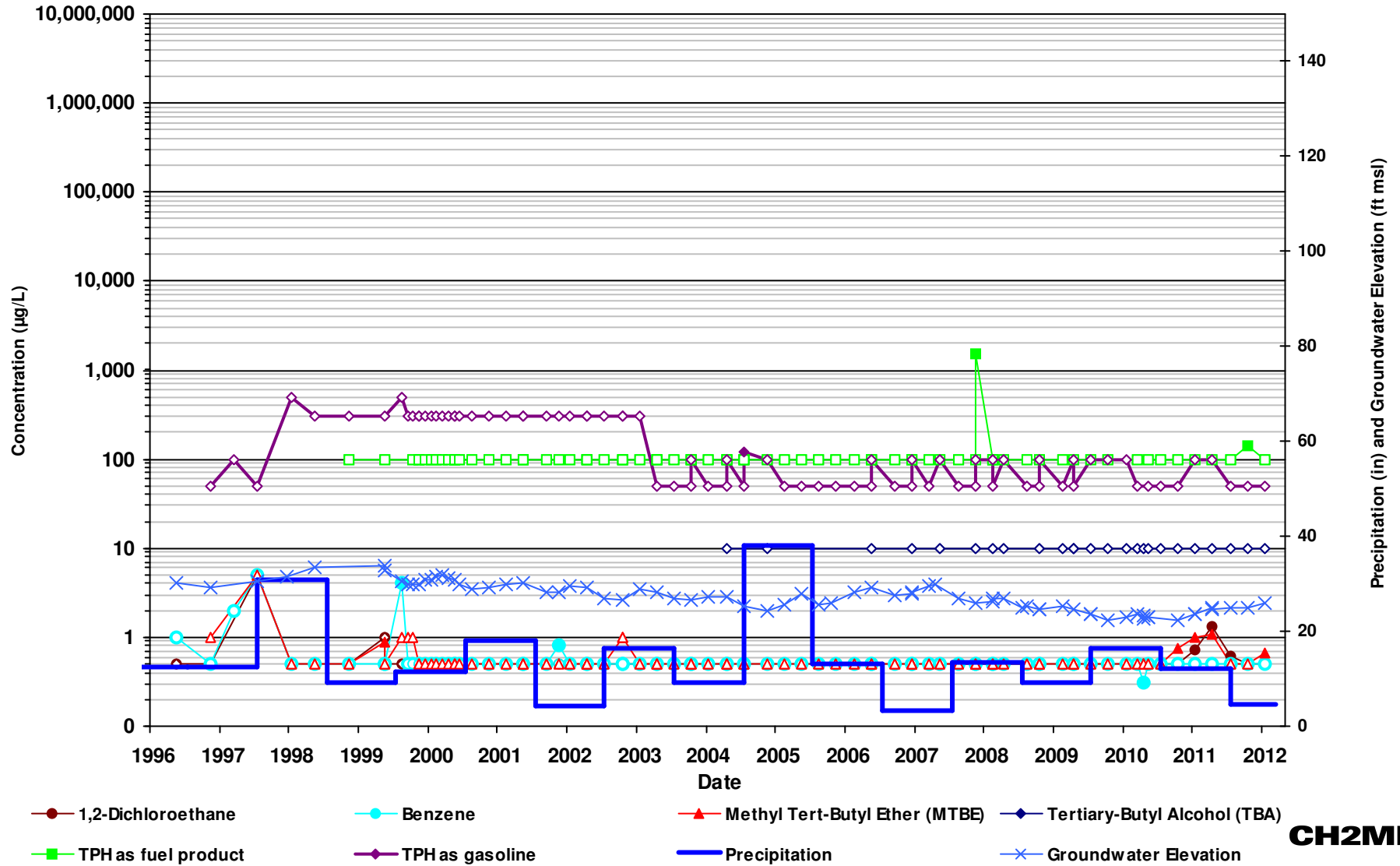
EXP-2



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

EXP-3

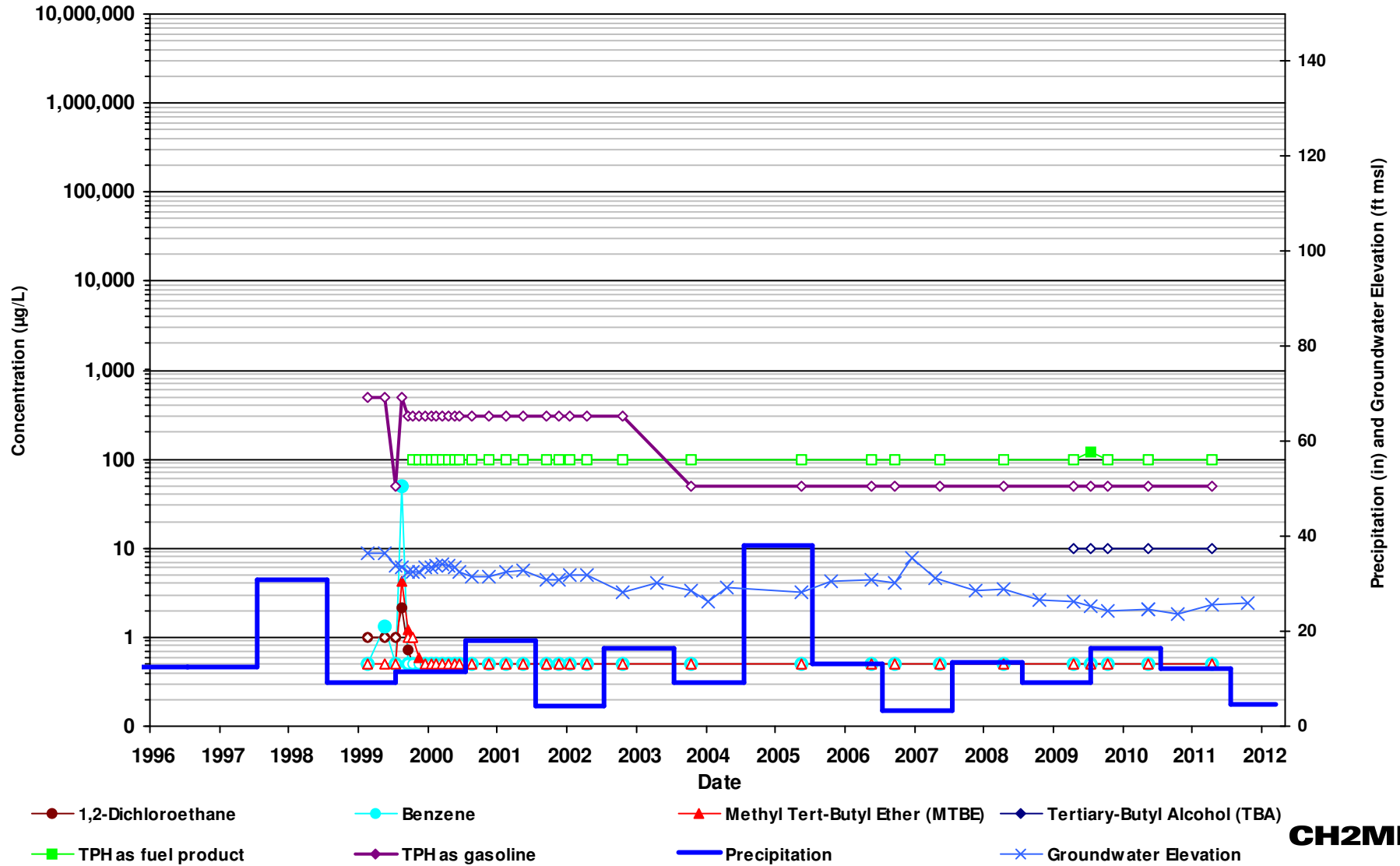


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

EXP-4

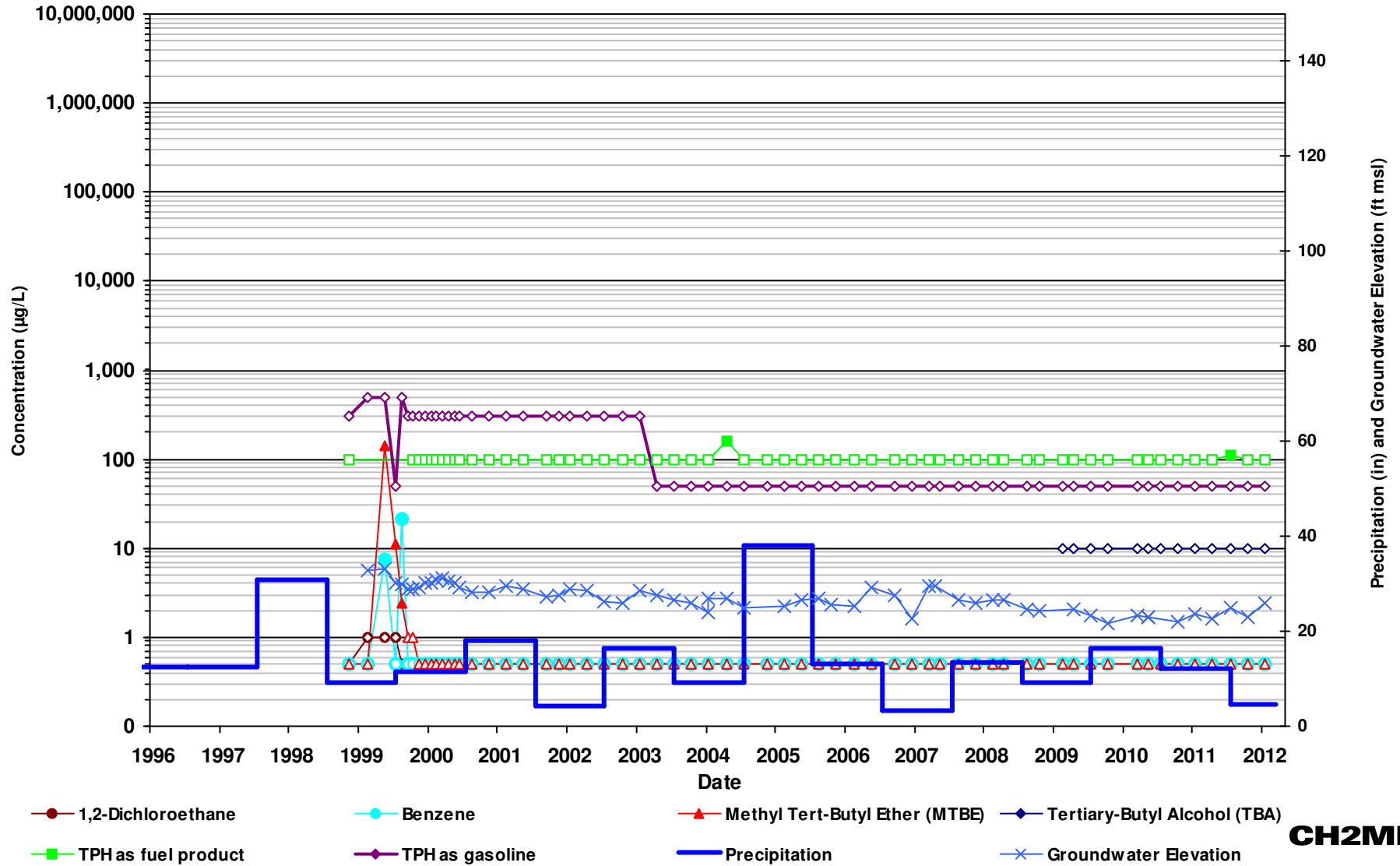


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

EXP-5

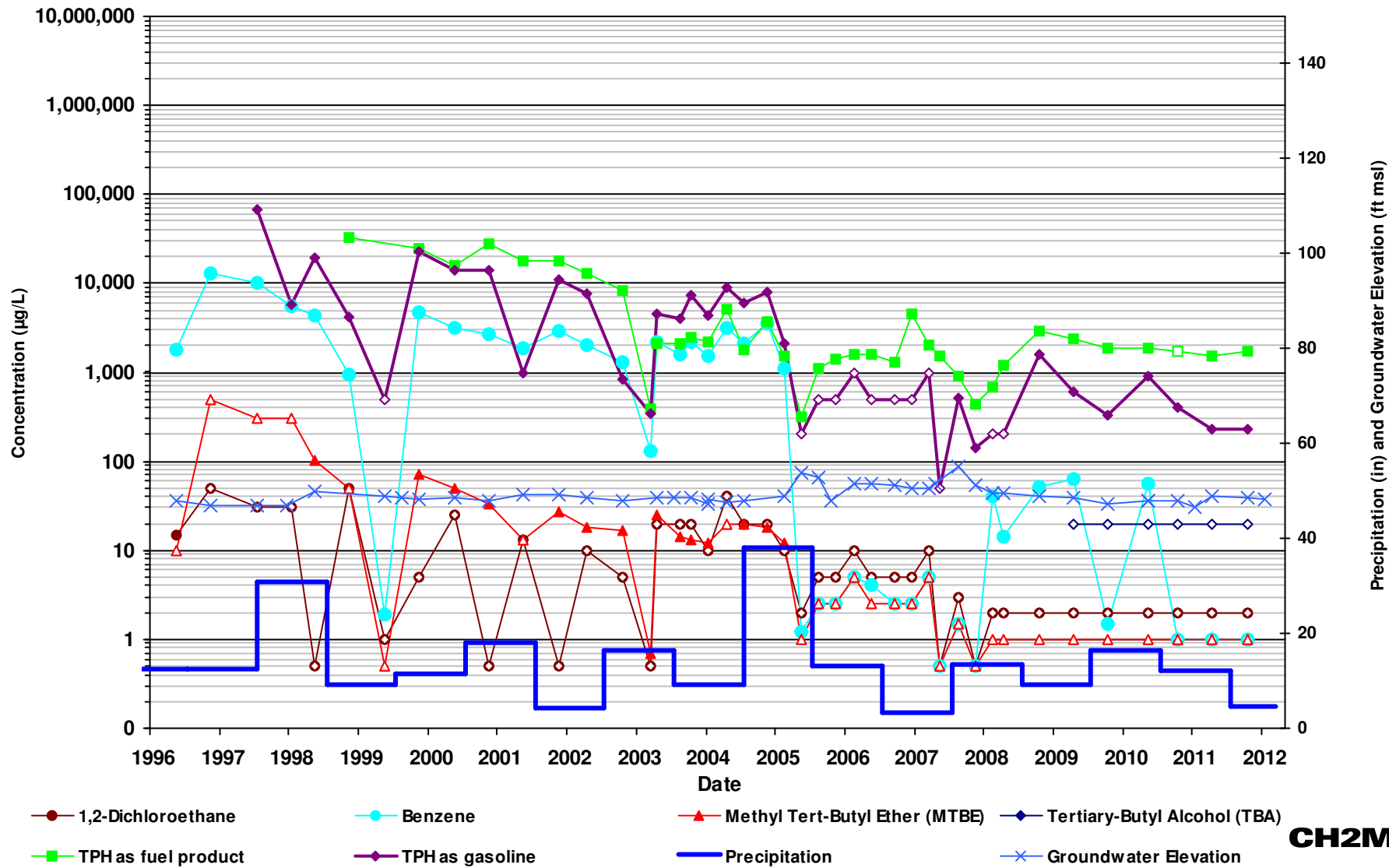


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-1

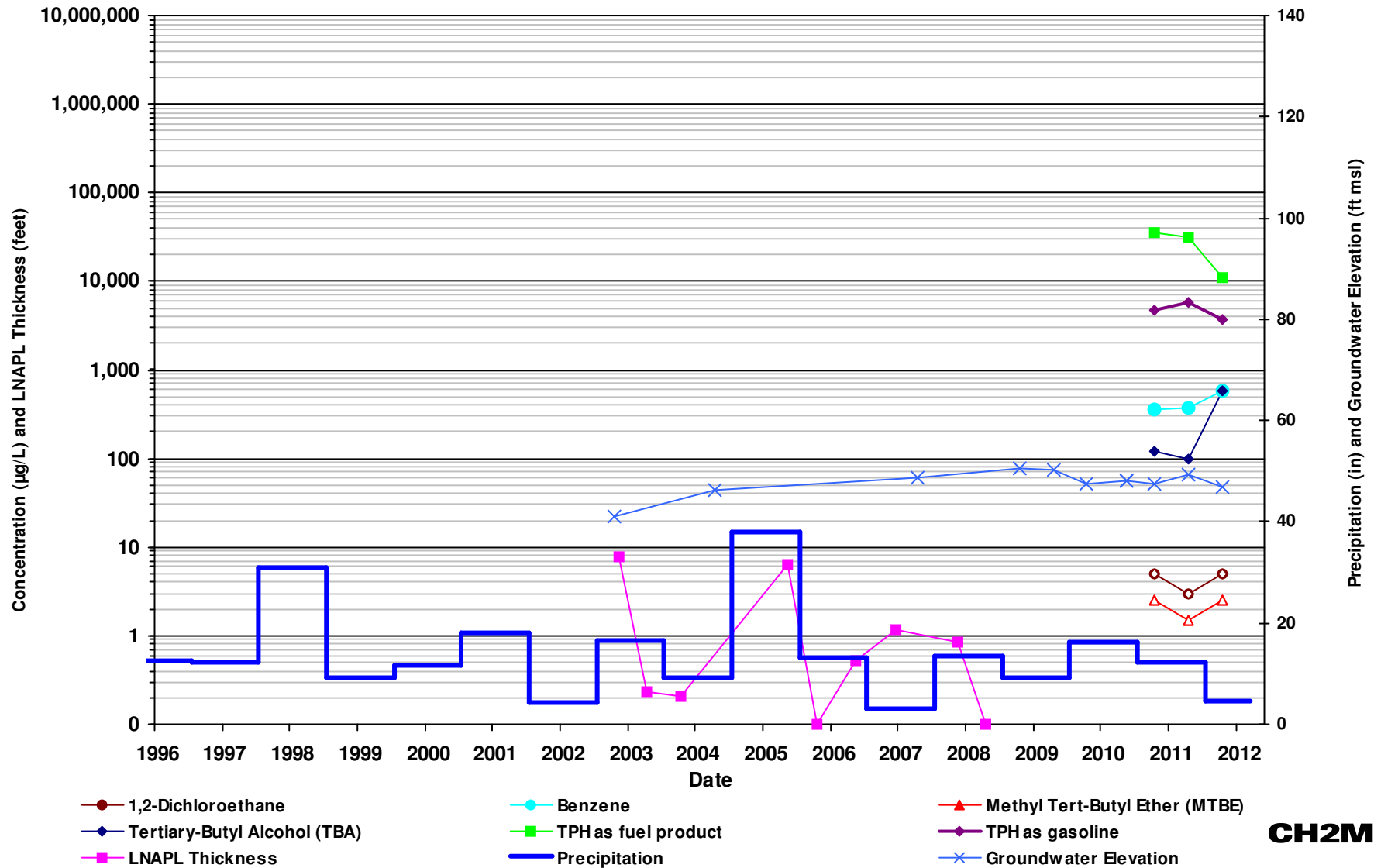


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

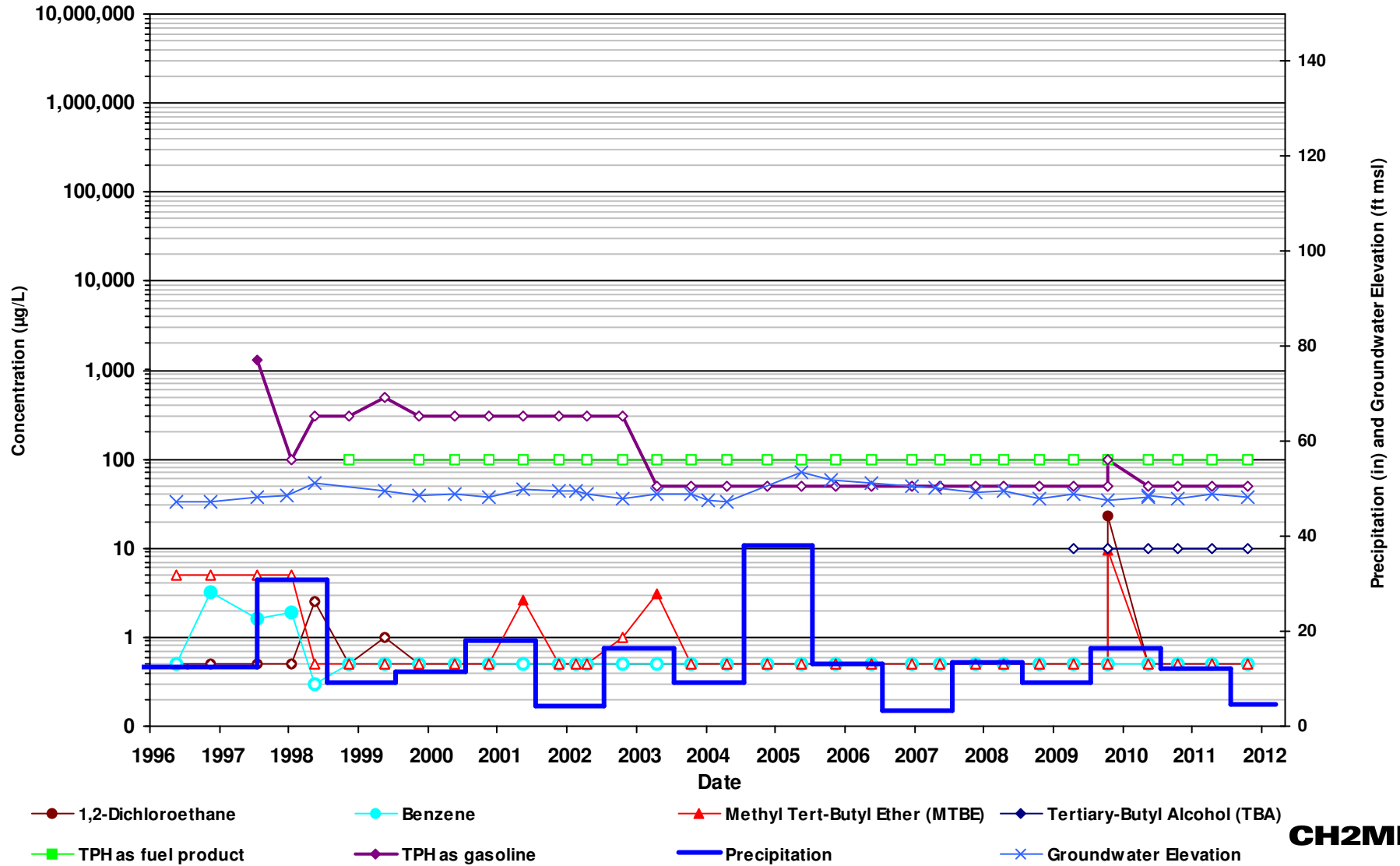
GMW-10



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-13

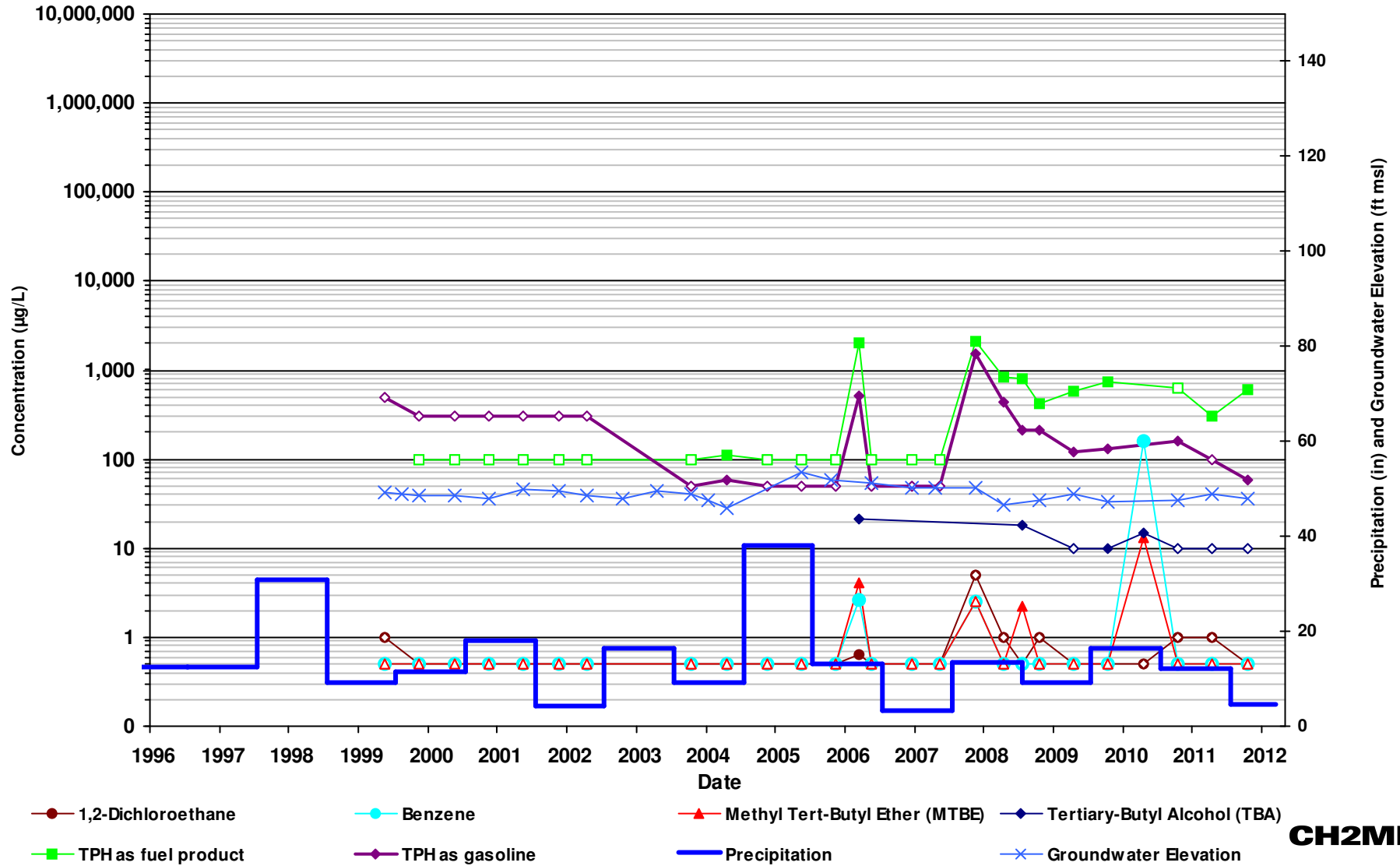


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-14

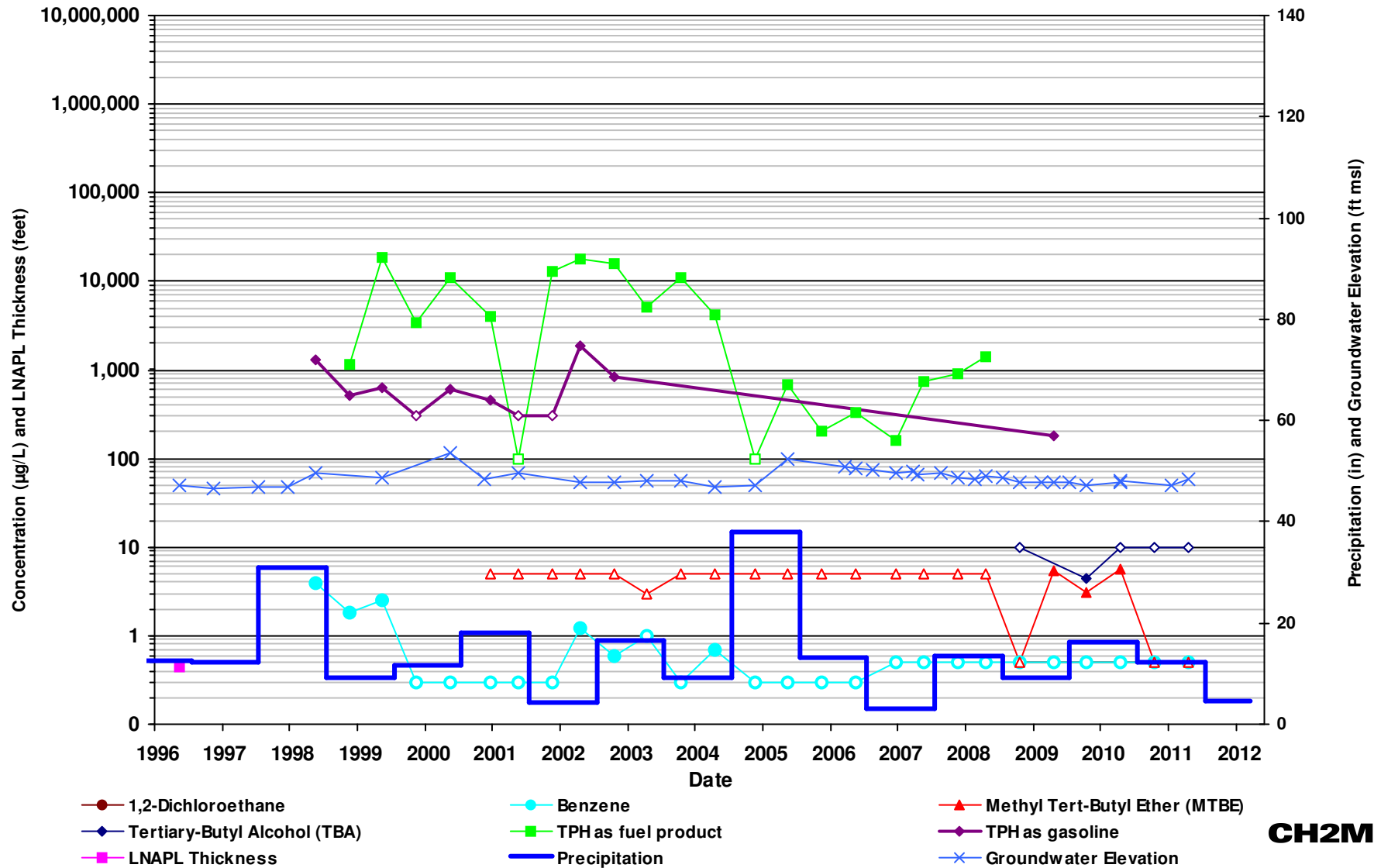


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

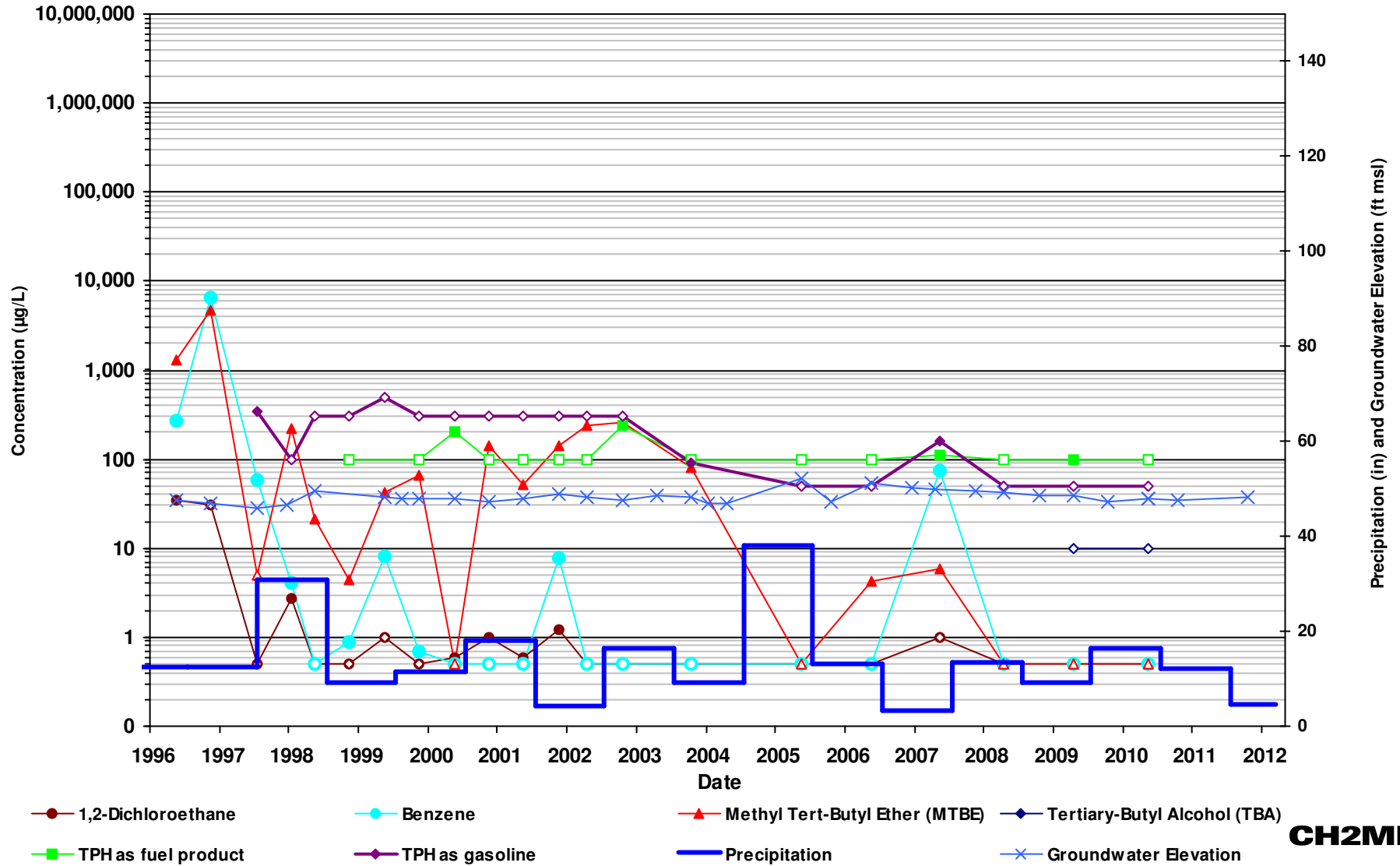
GMW-15



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

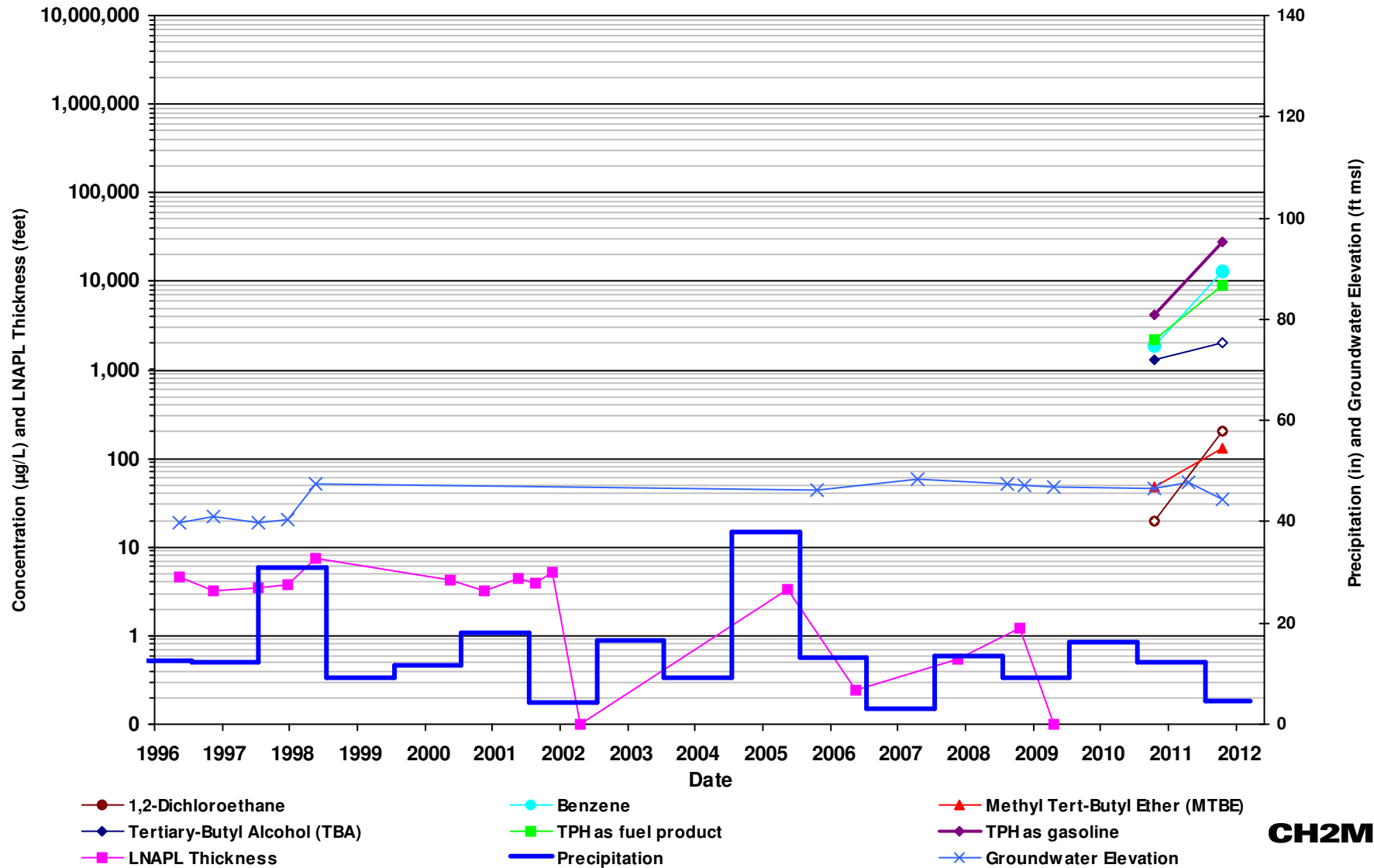
GMW-2



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

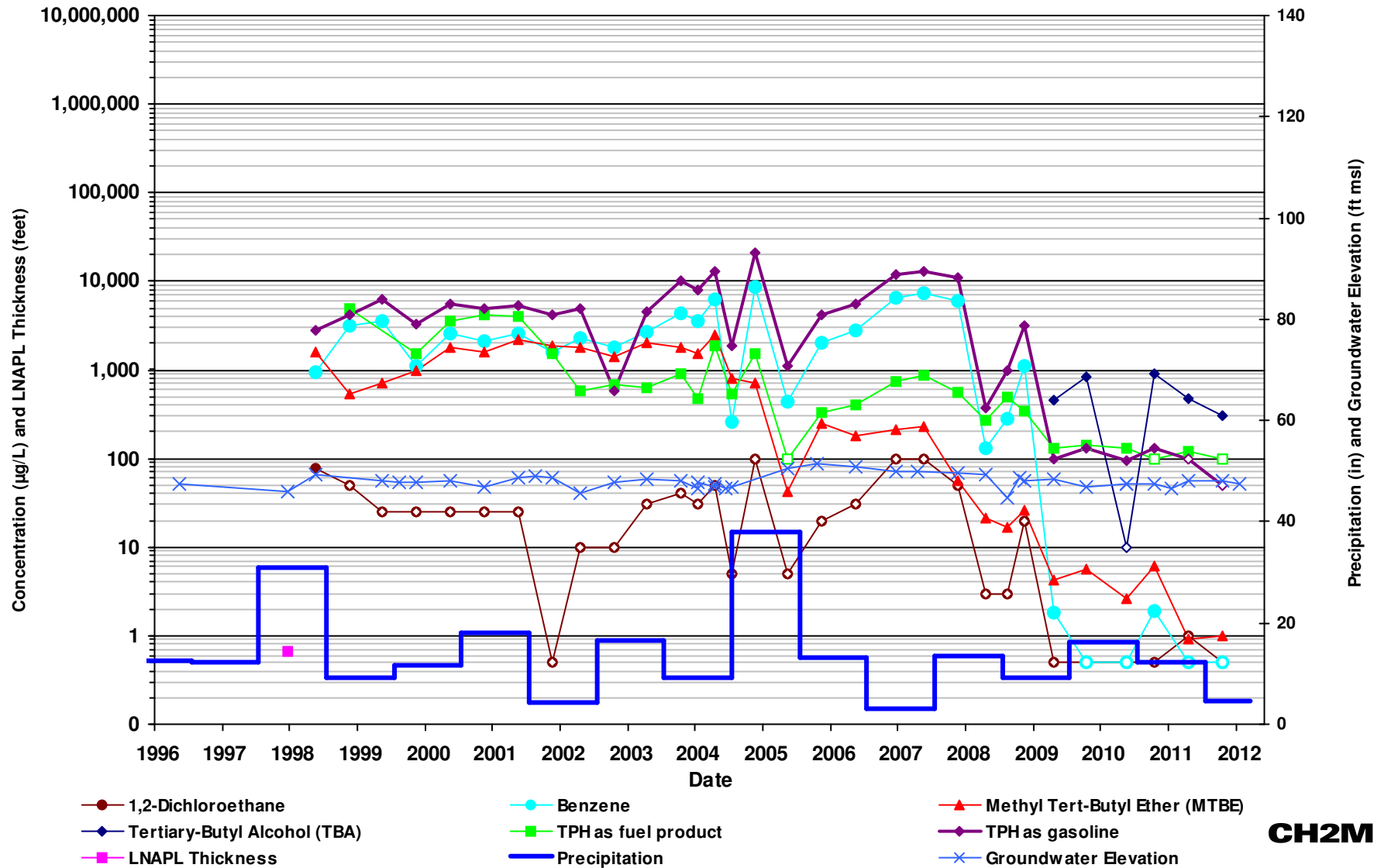
GMW-22



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

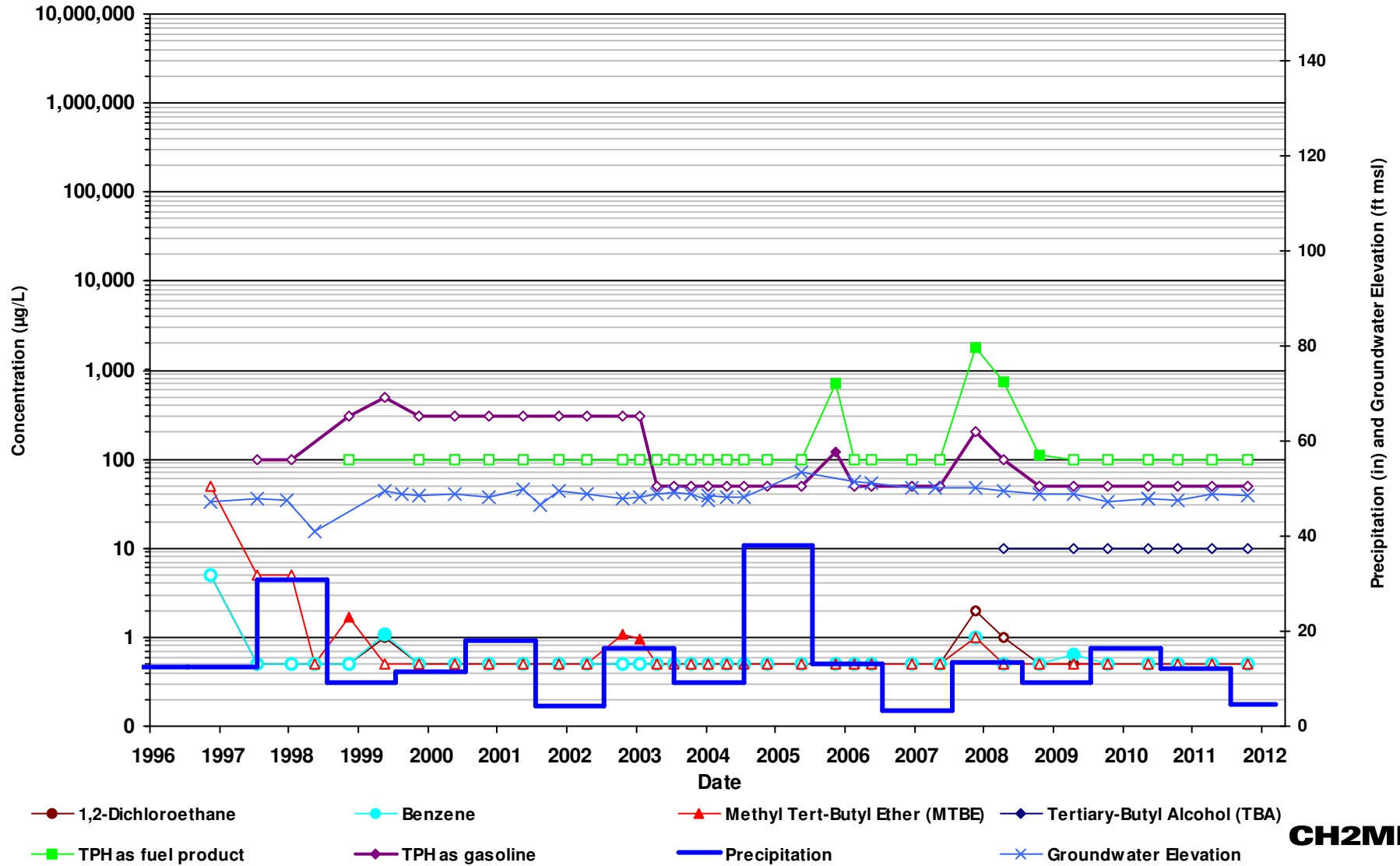
GMW-27



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

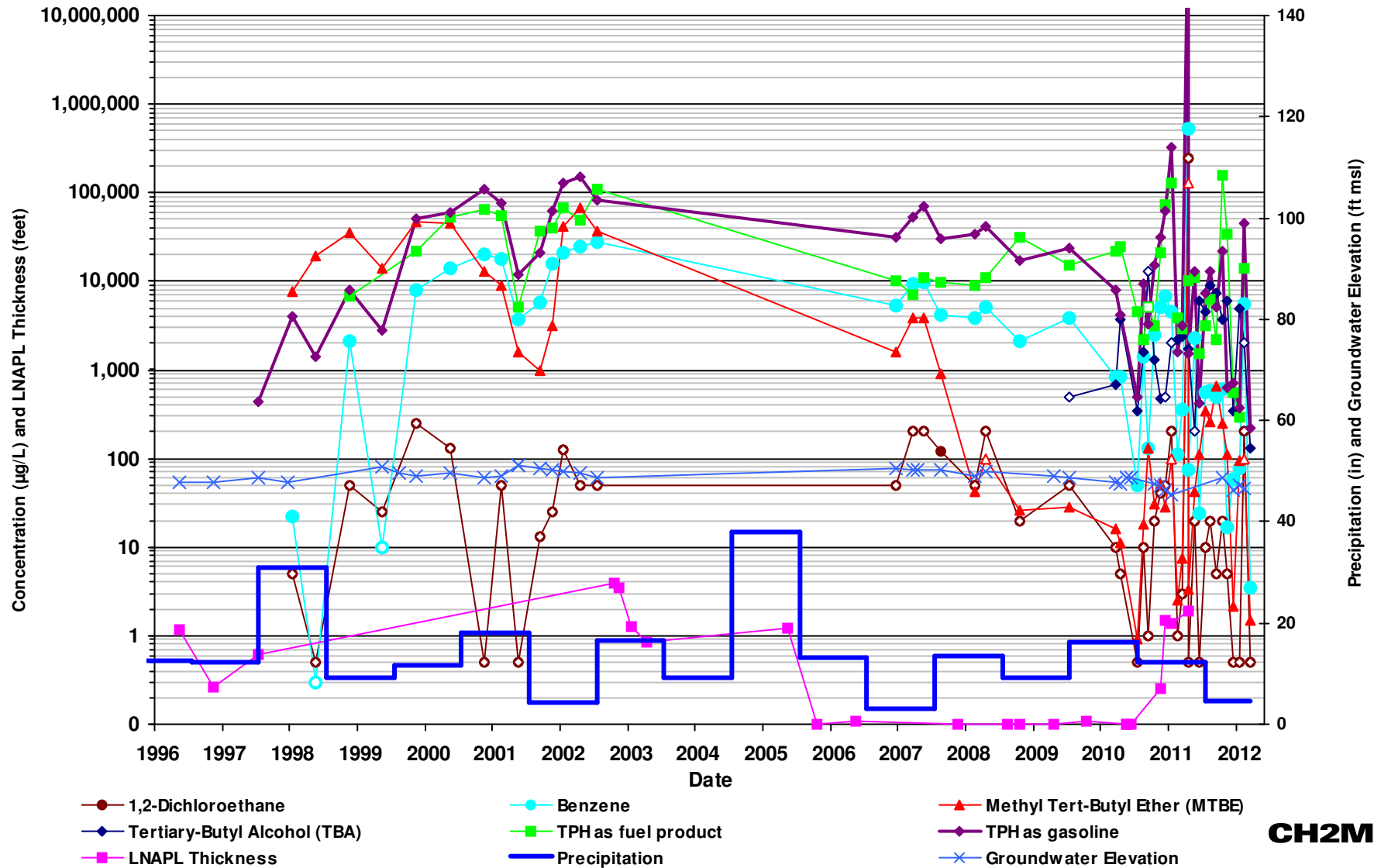
GMW-3



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

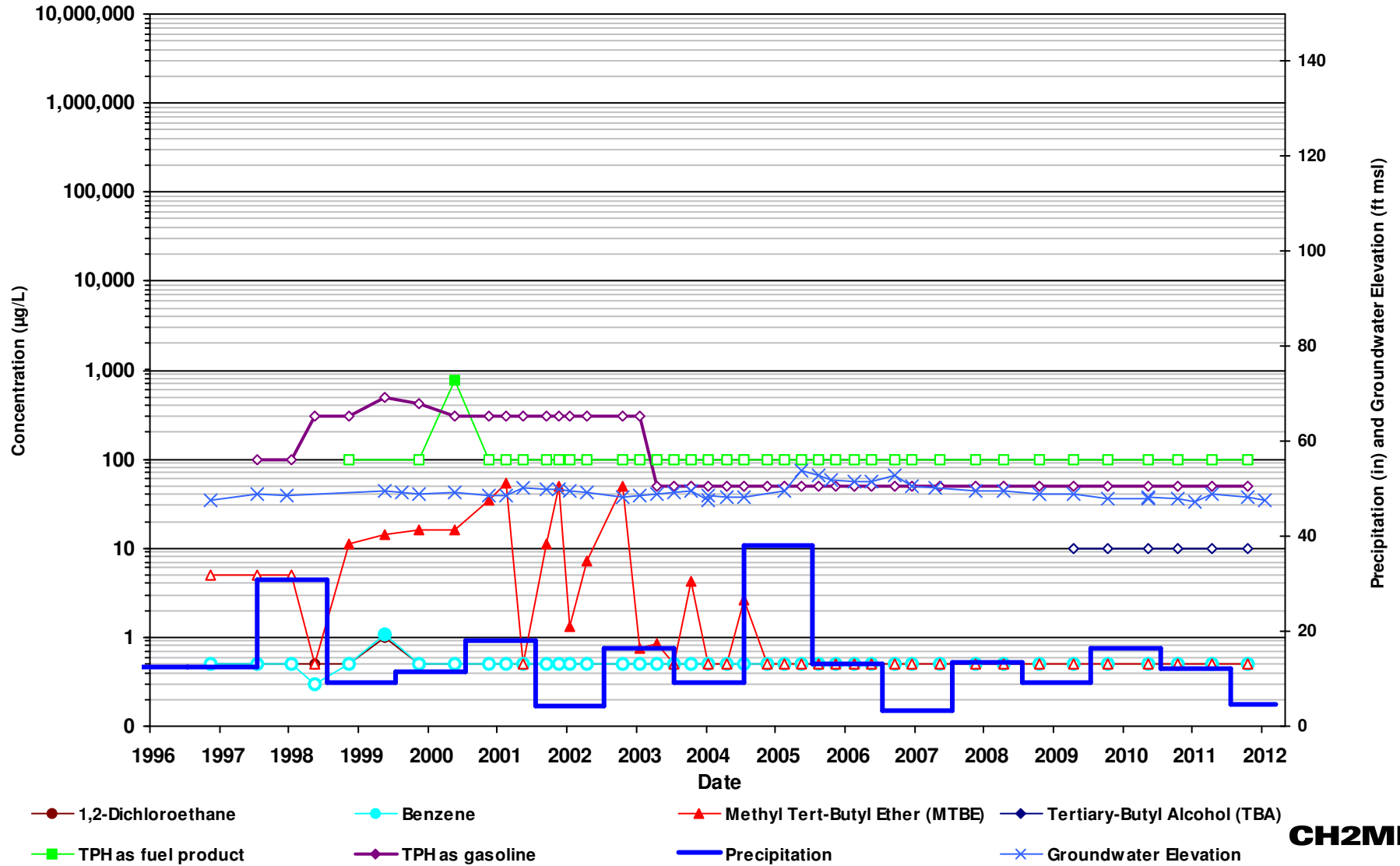
GMW-36



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

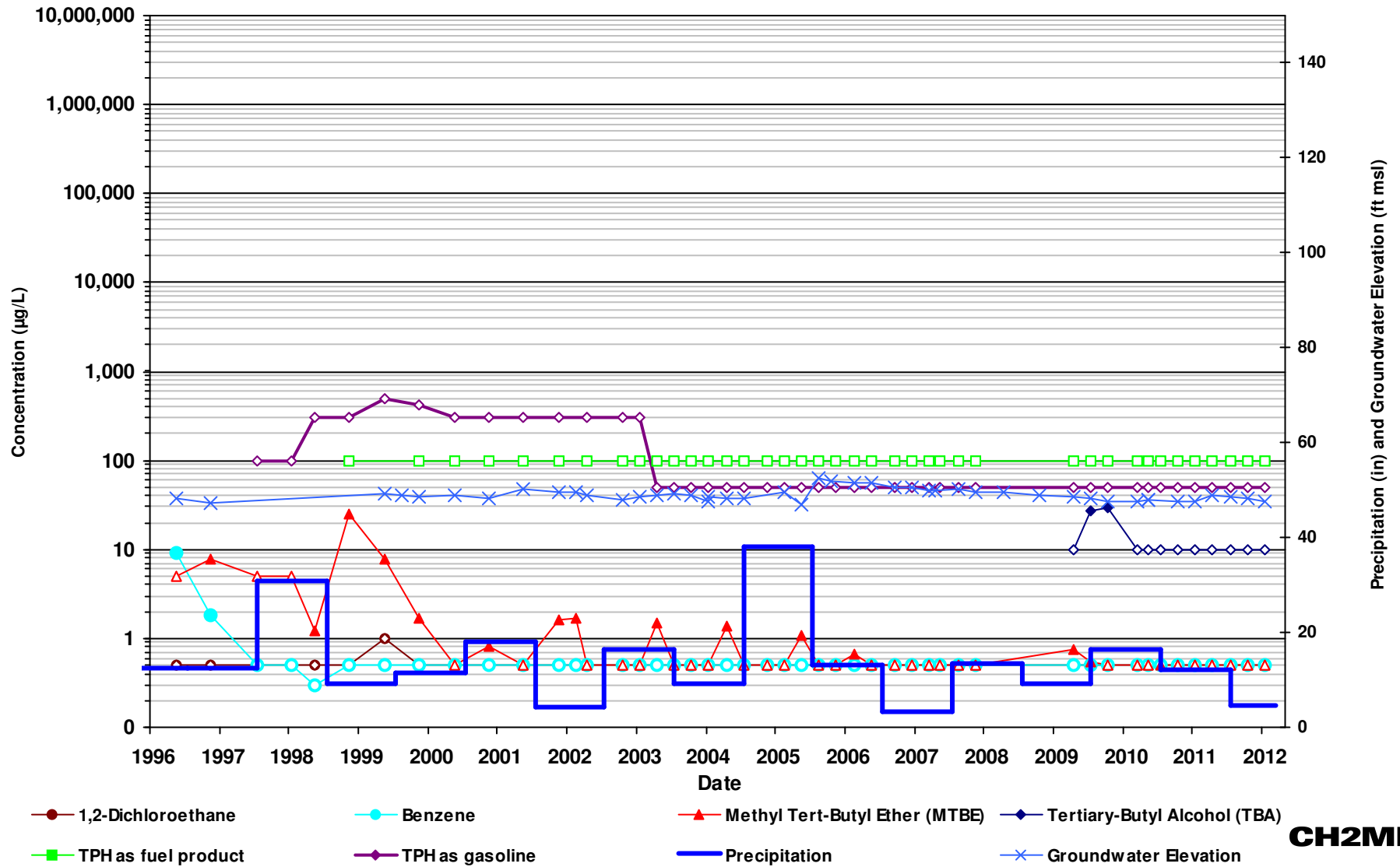
GMW-37



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

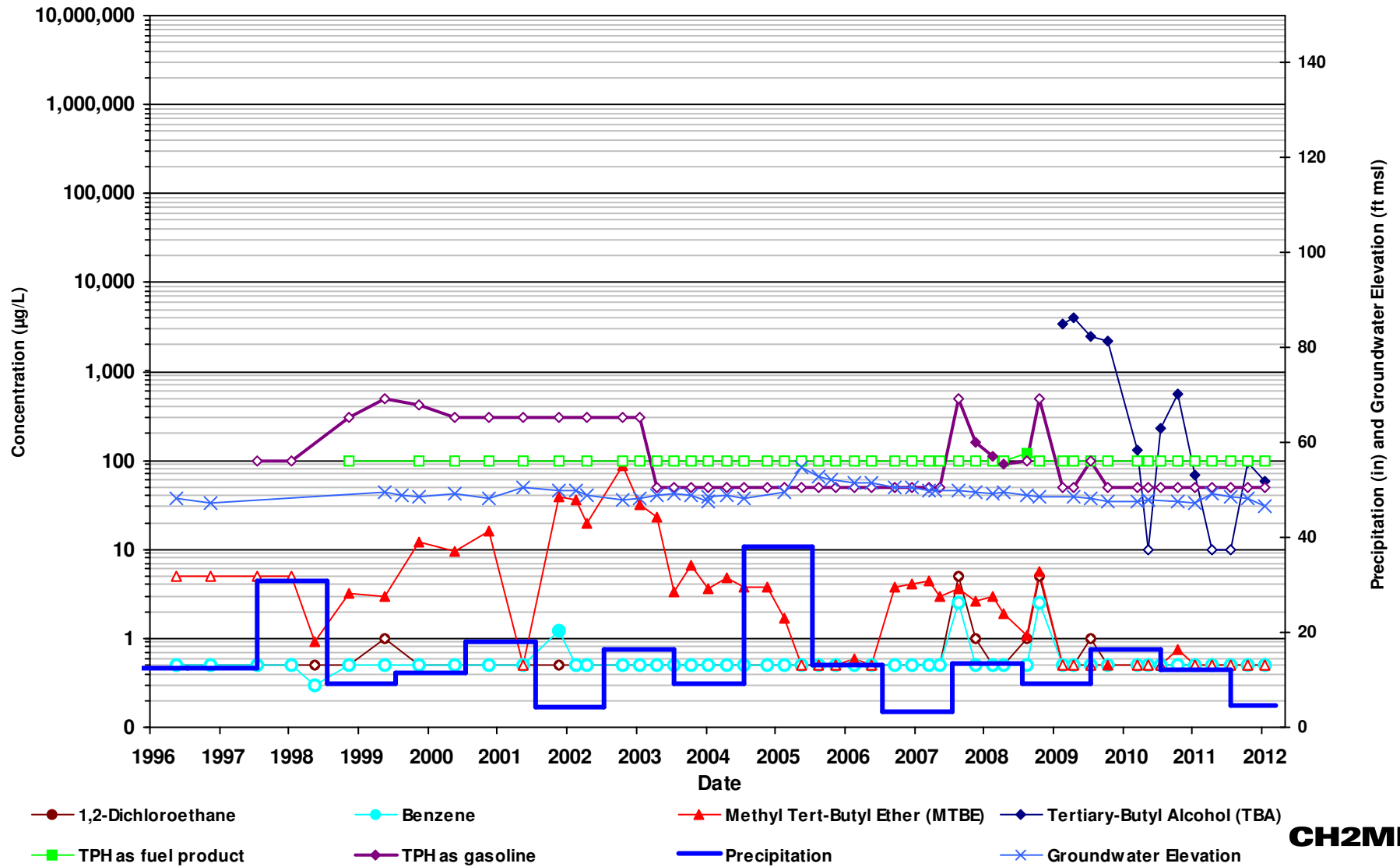
GMW-38



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-39

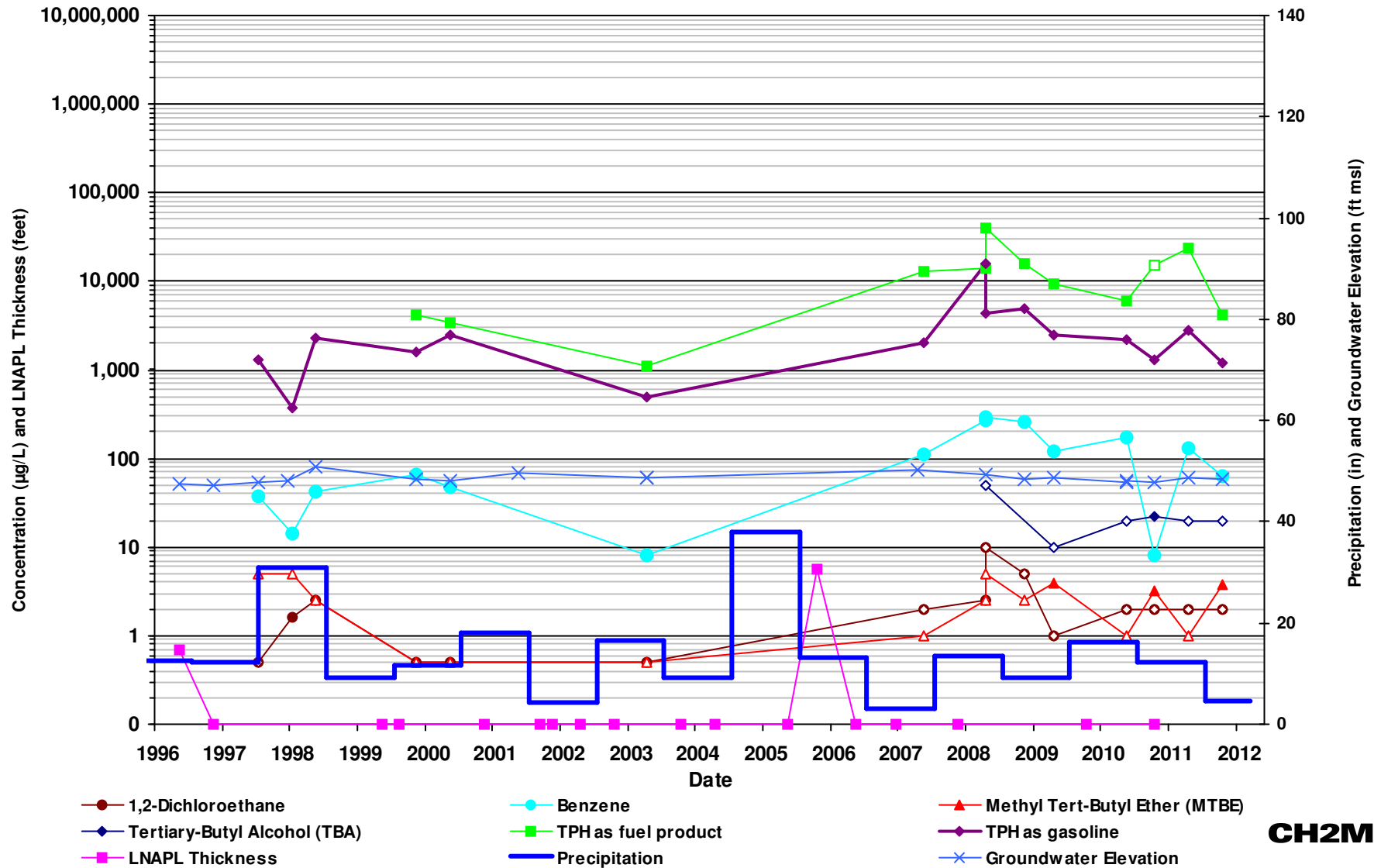


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

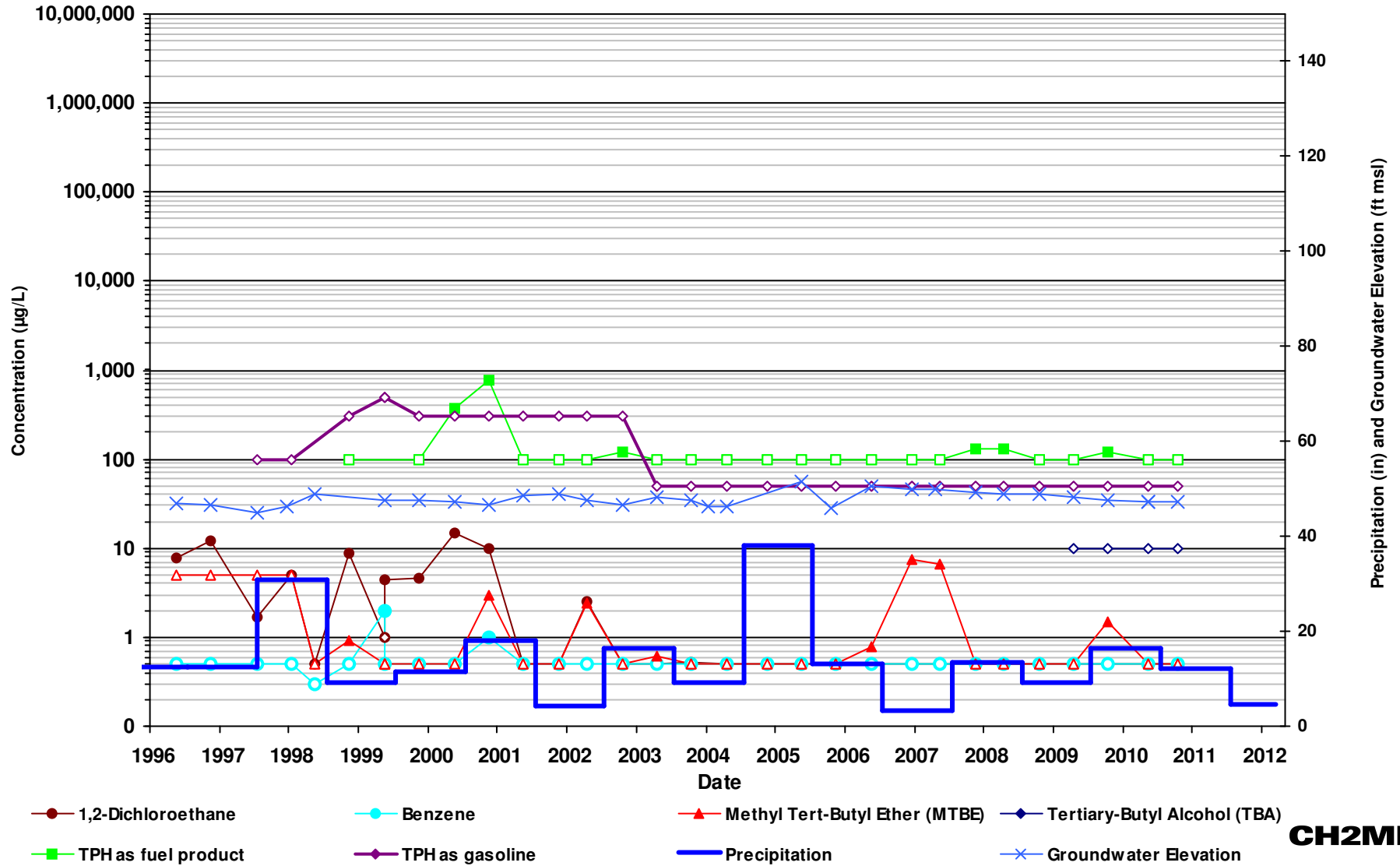
GMW-4



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

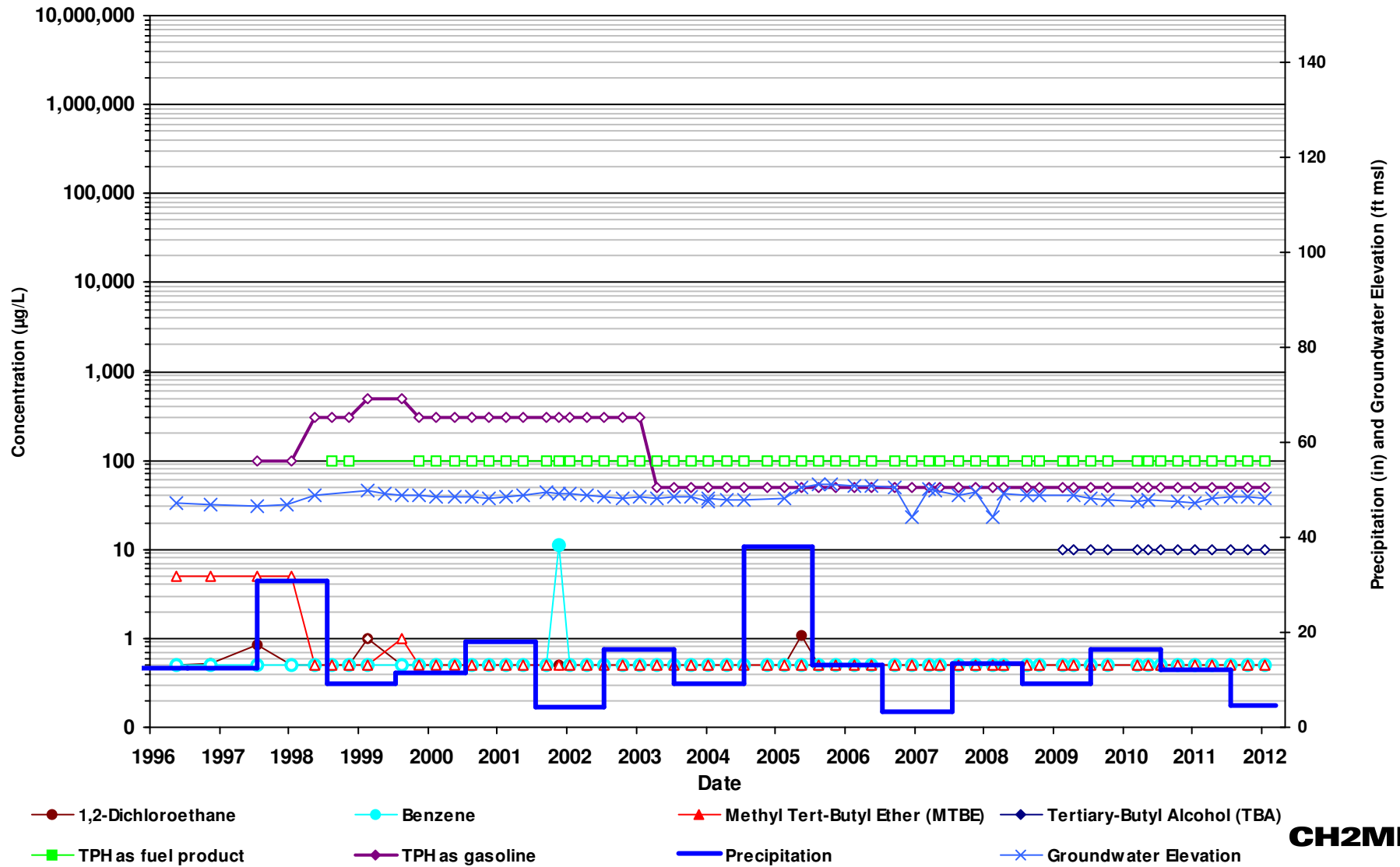
GMW-8



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

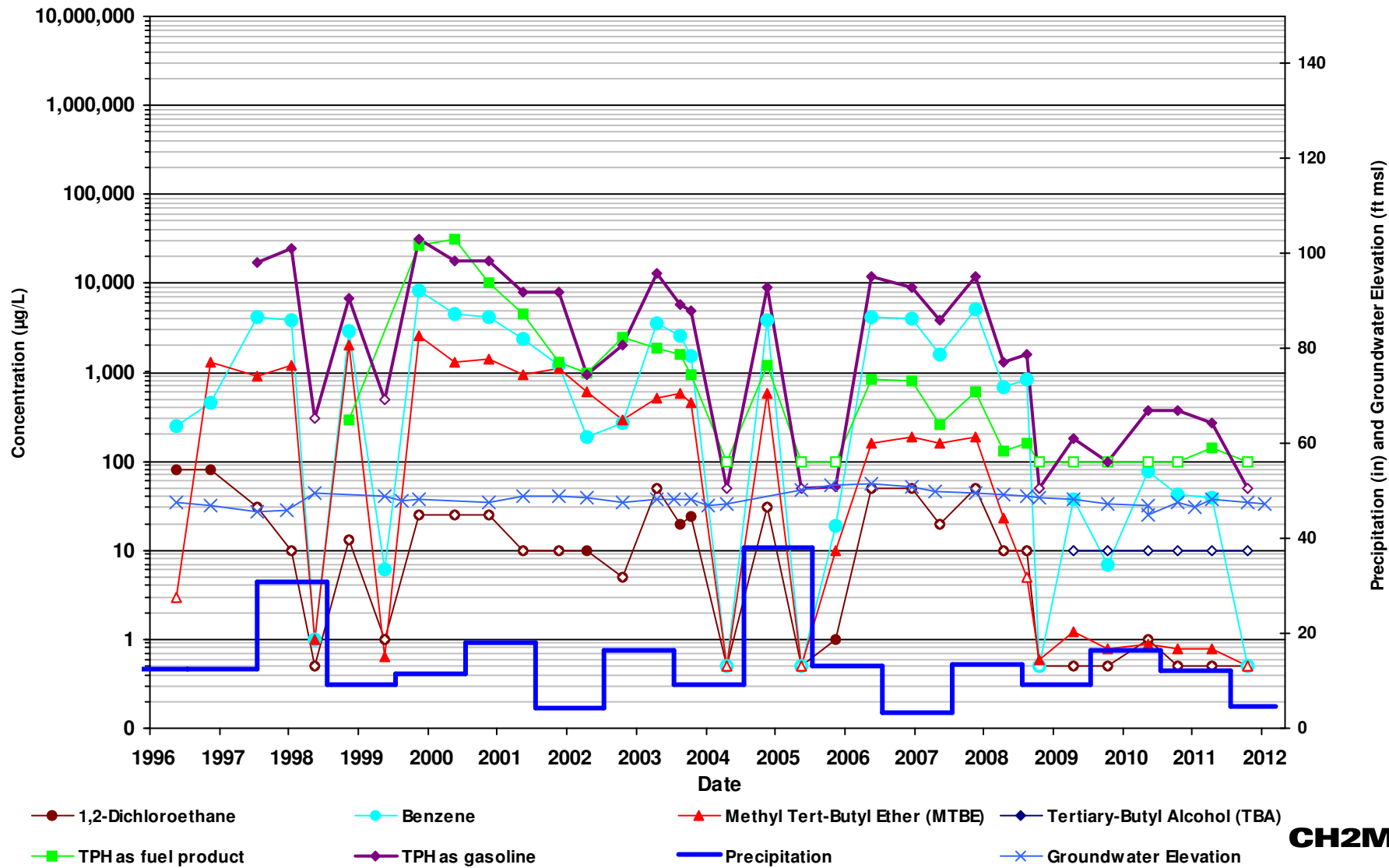
GMW-O-1



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

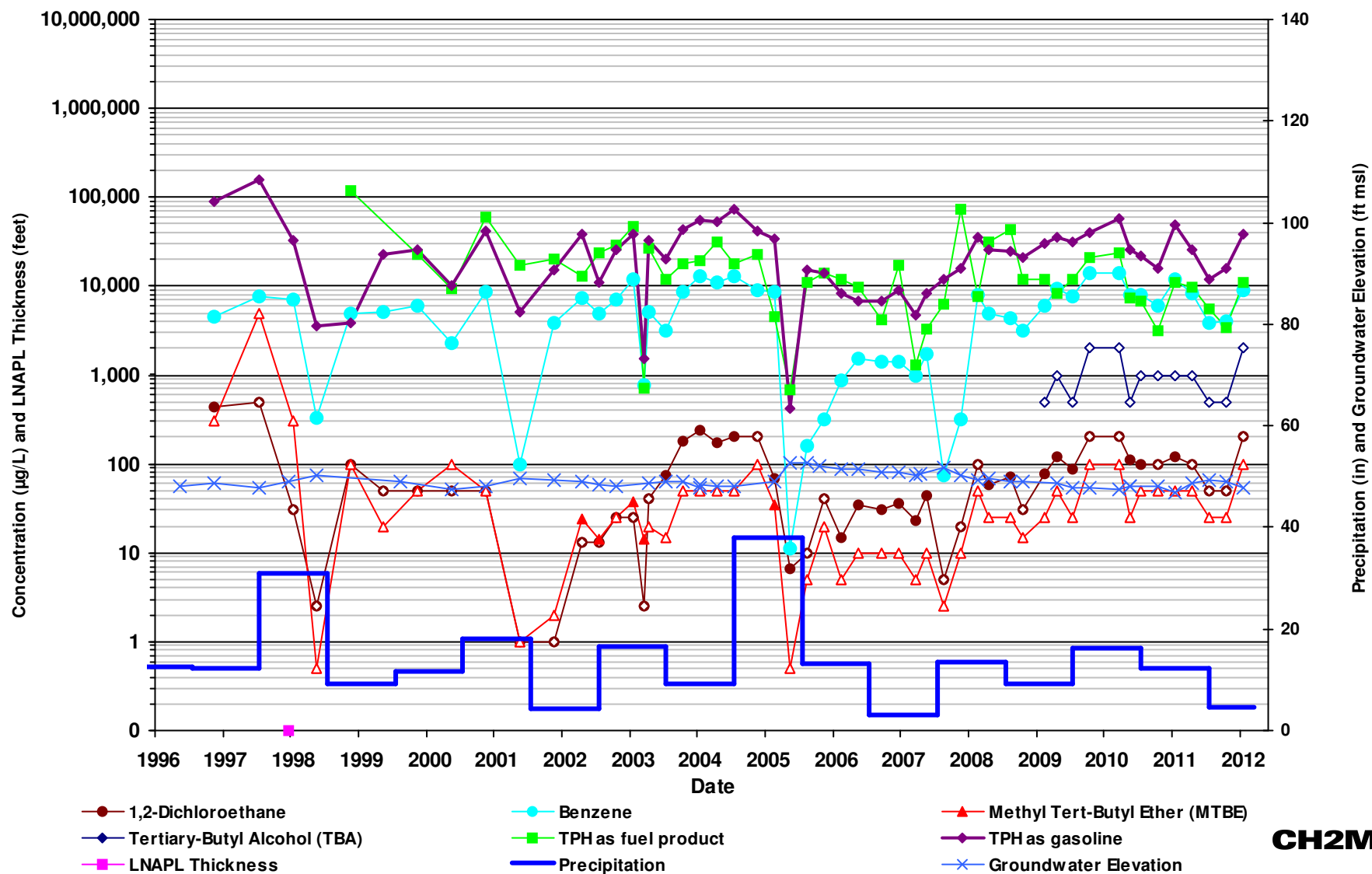
GMW-O-10



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-O-14

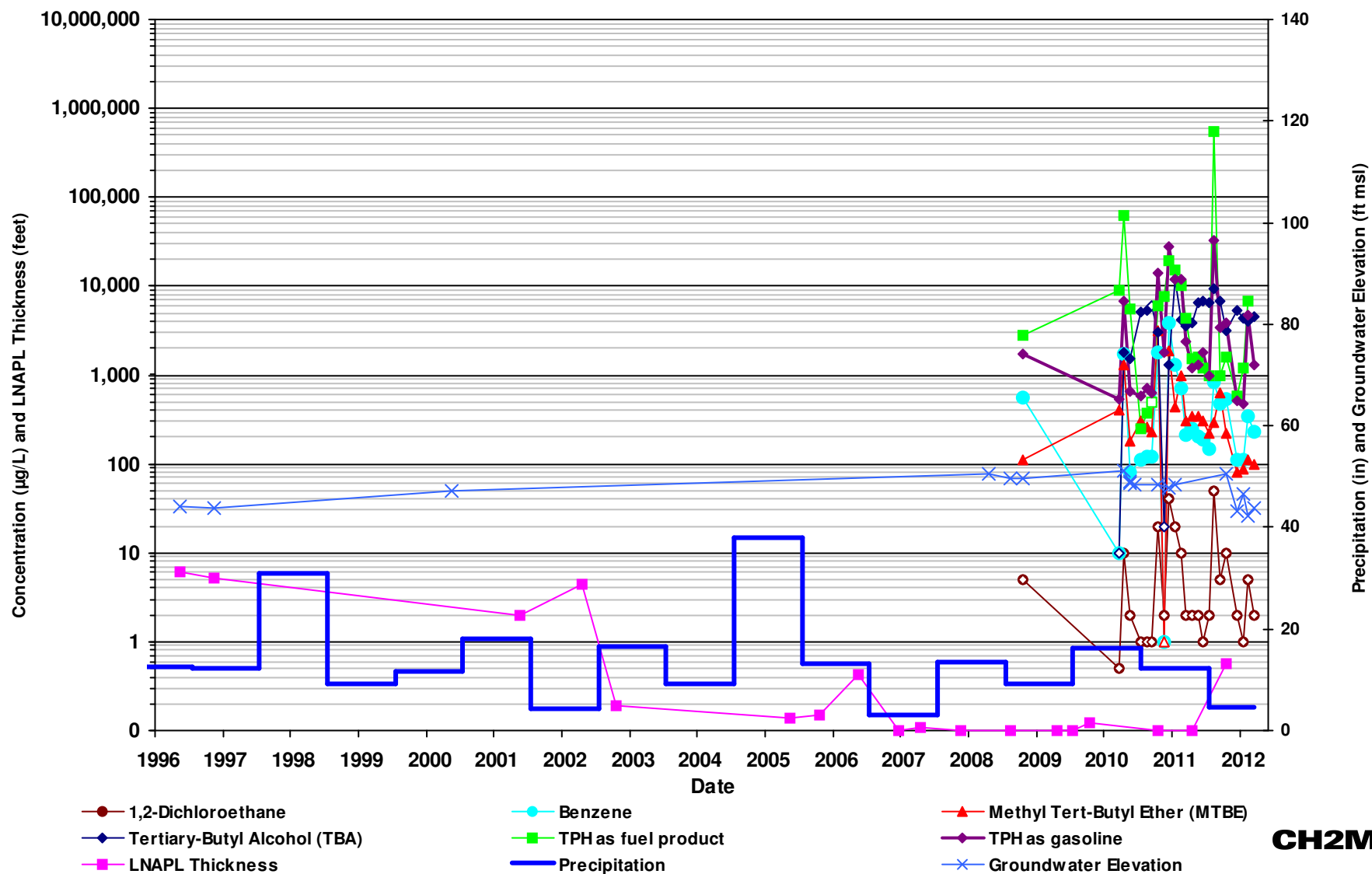


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-O-15

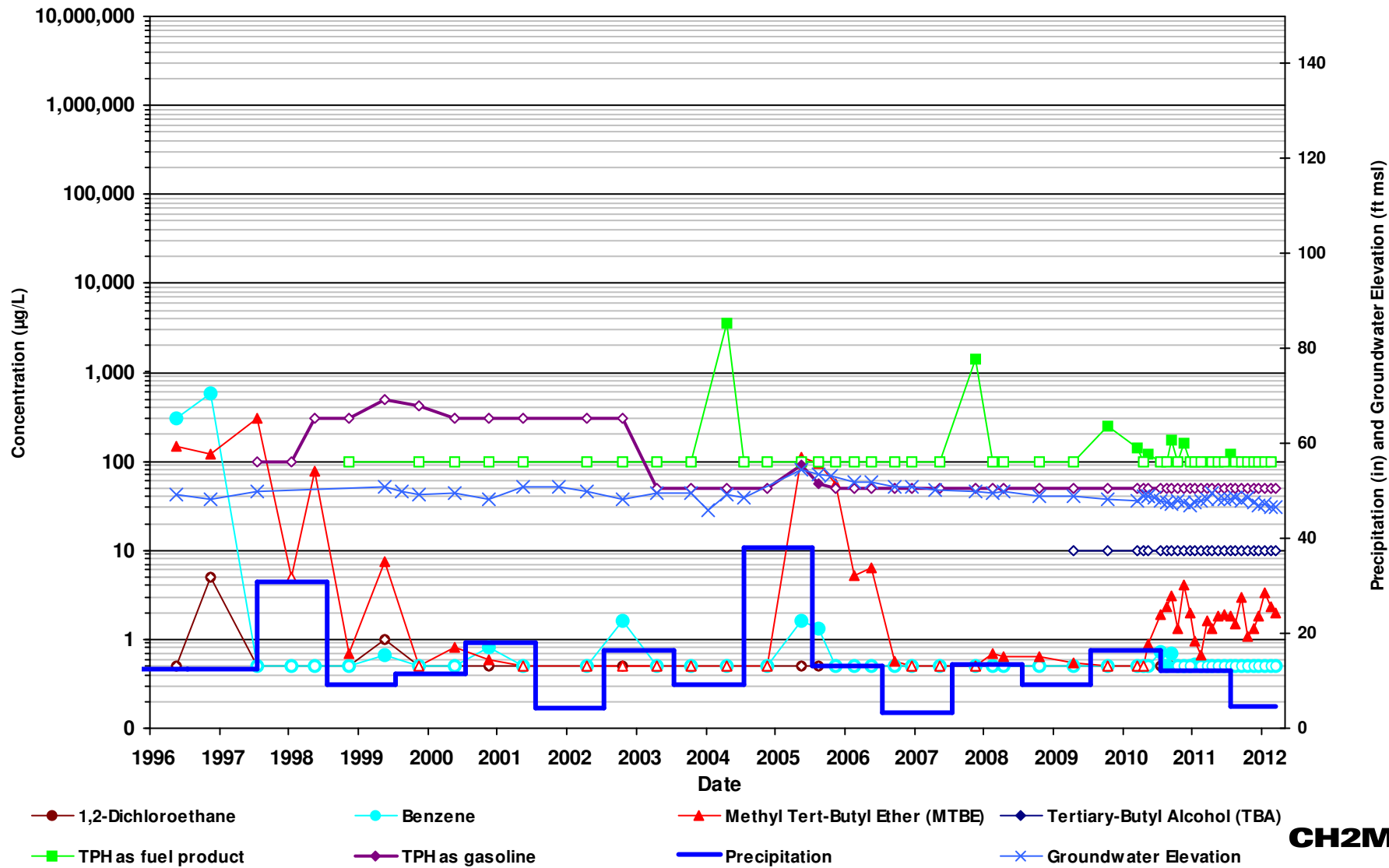


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-O-16

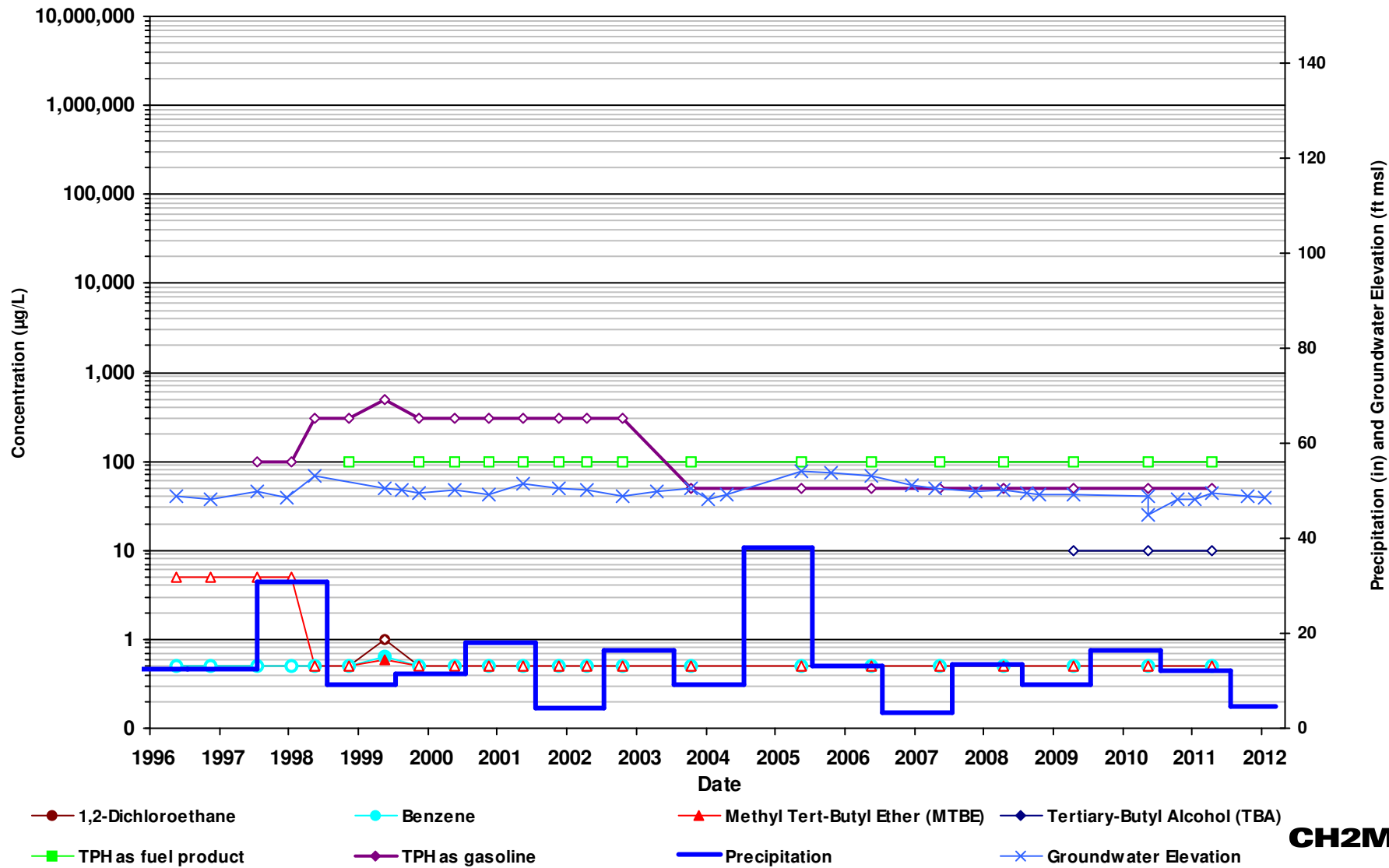


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-O-17

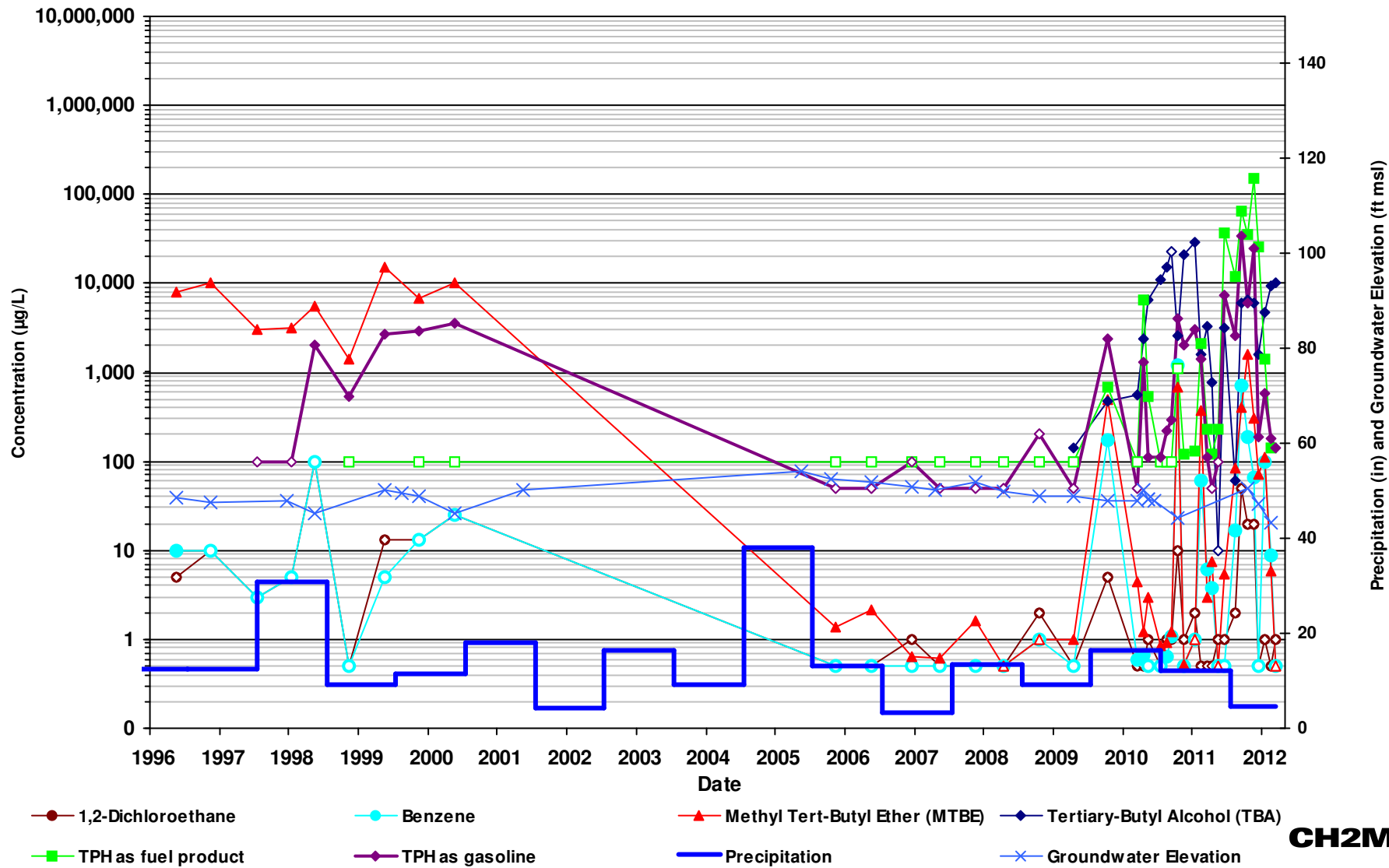


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-O-18

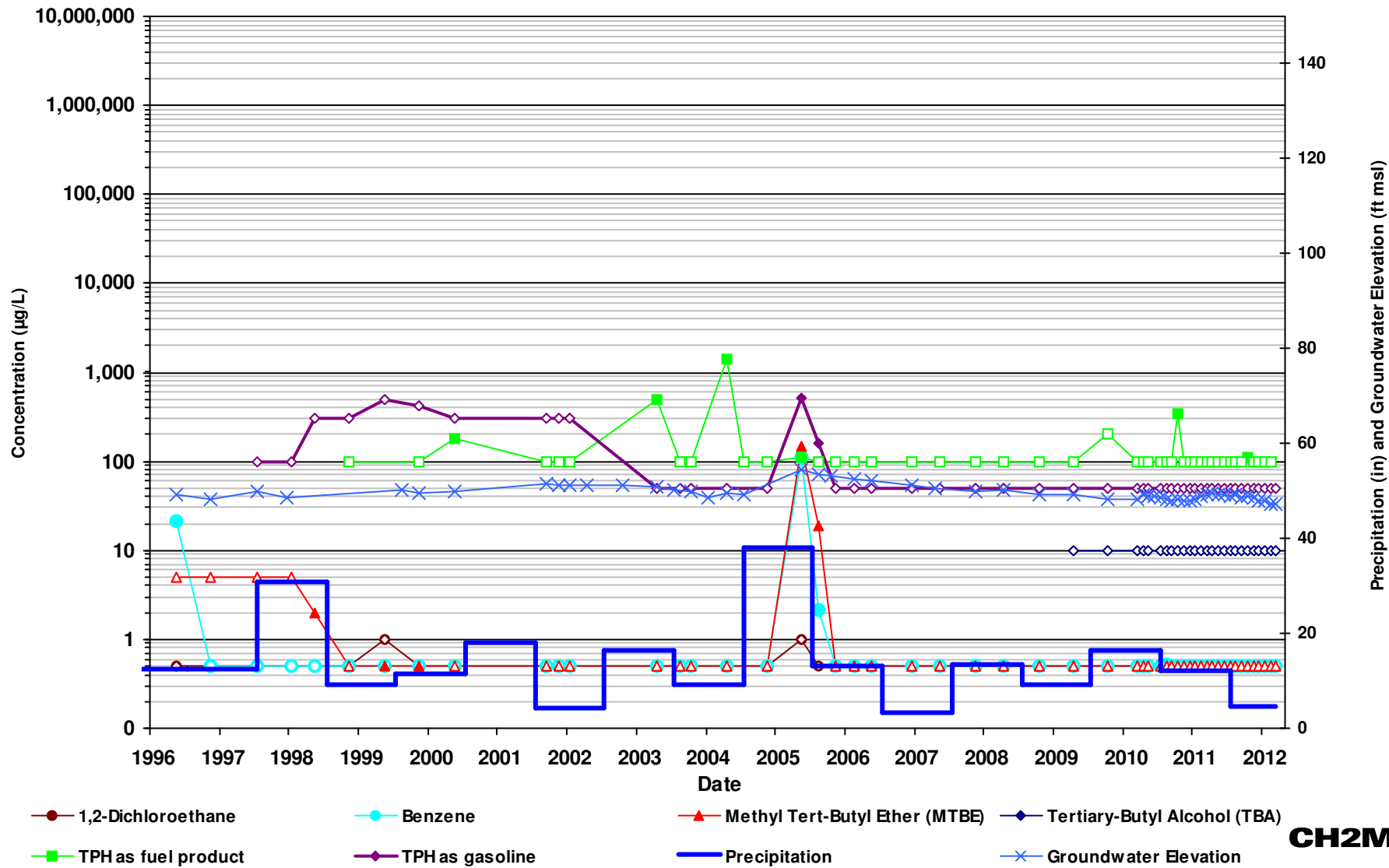


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-O-19

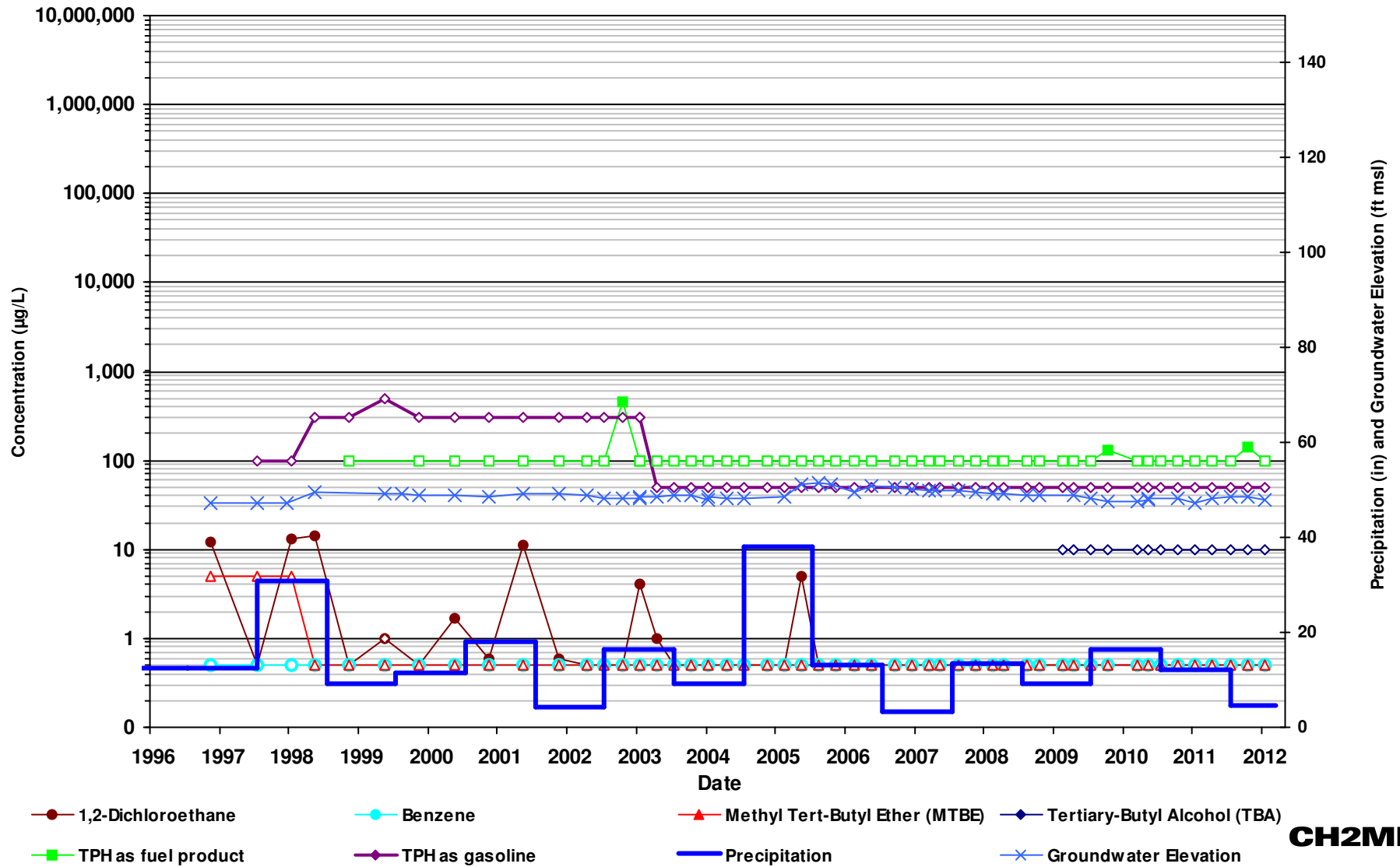


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

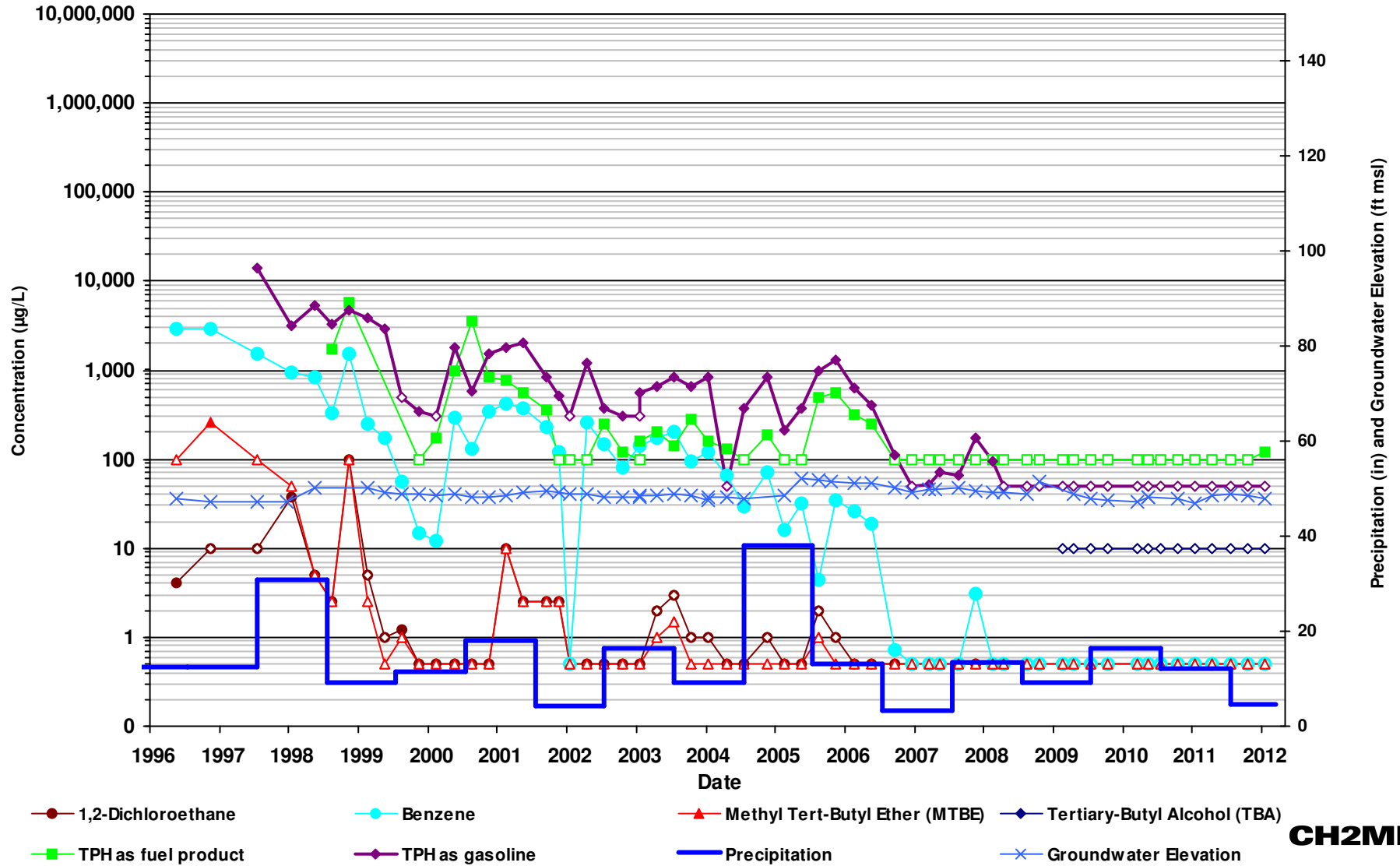
GMW-O-2



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

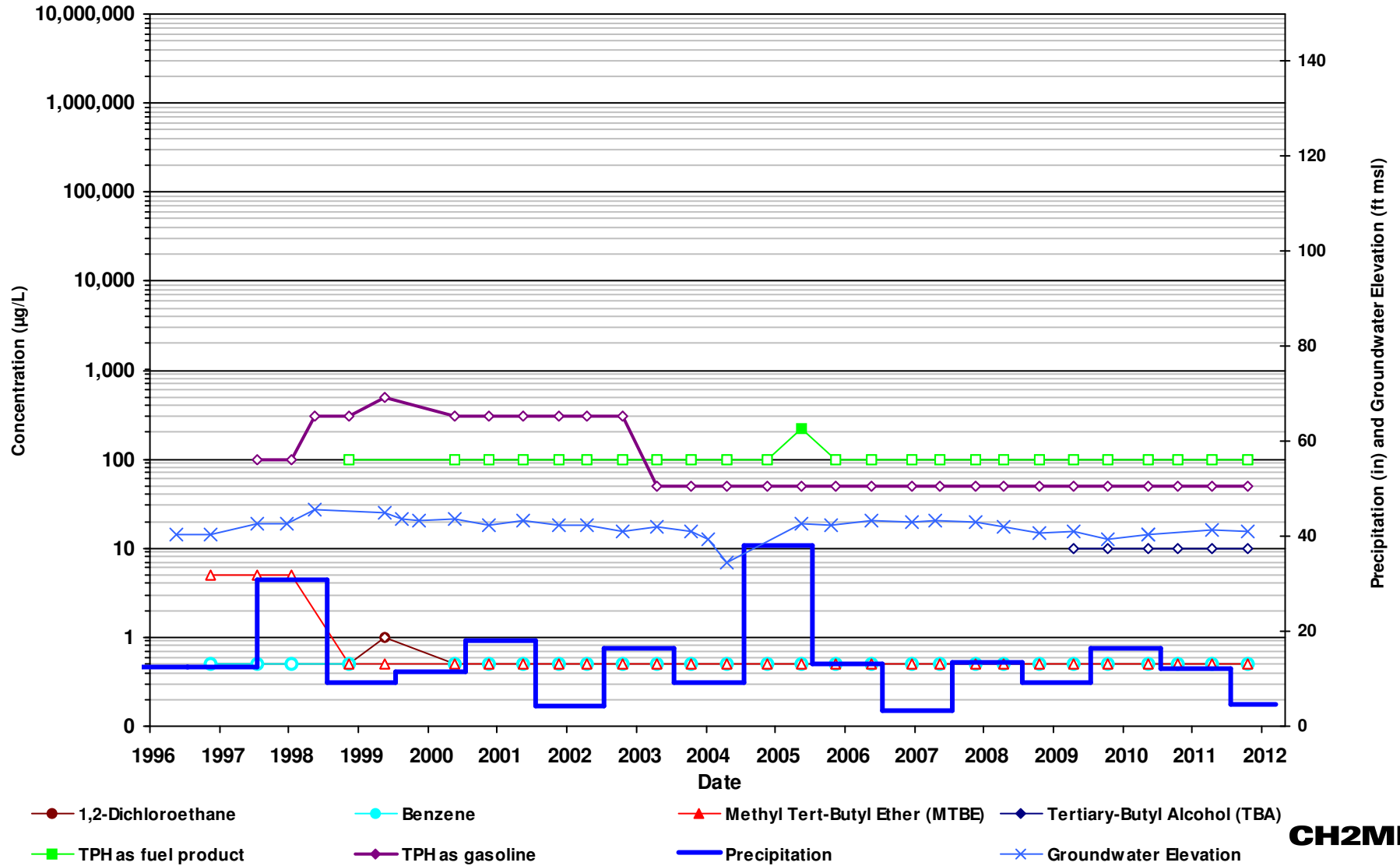
GMW-O-3



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

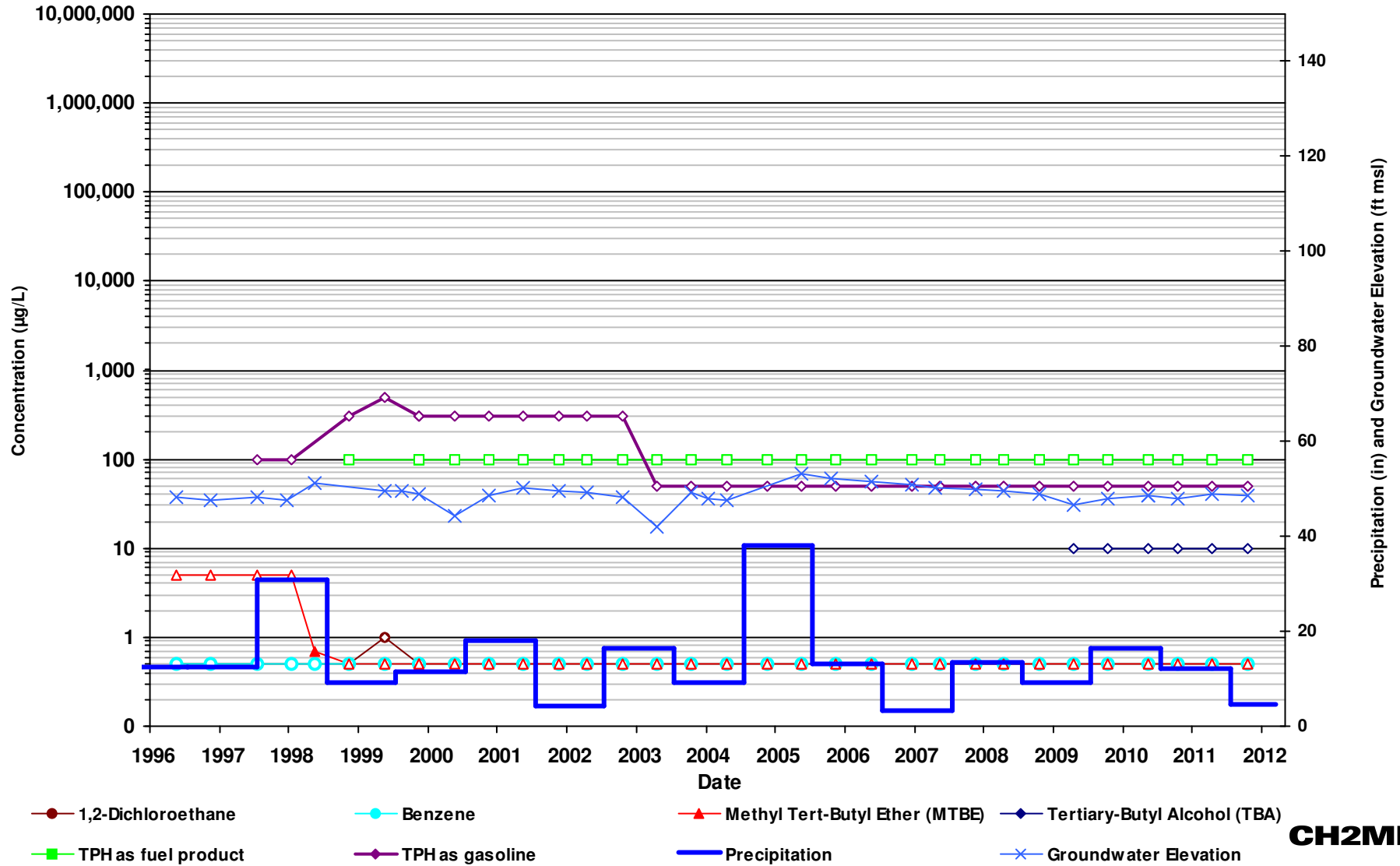
GMW-O-4 (MID)



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

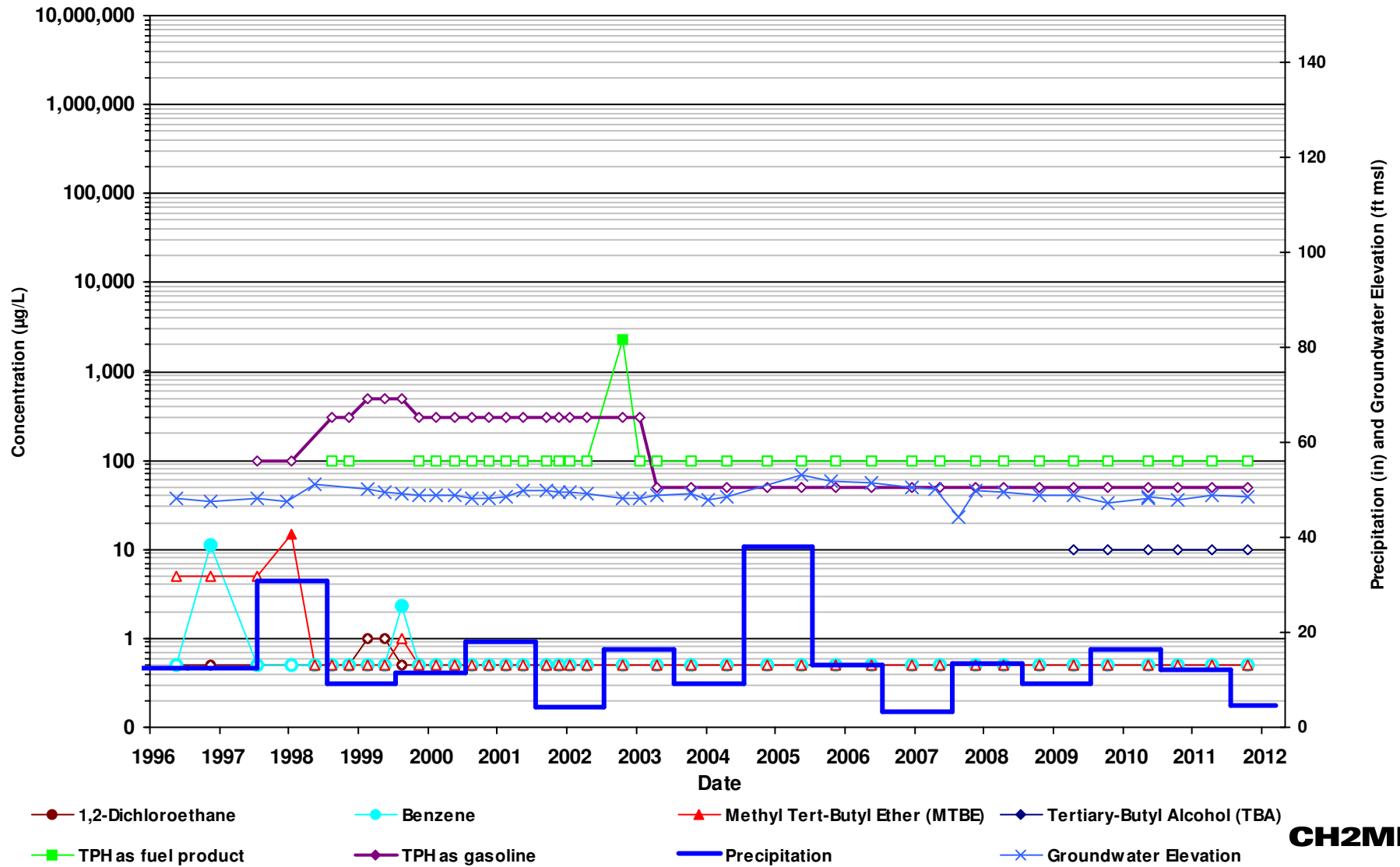
GMW-O-4



CH2MHILL

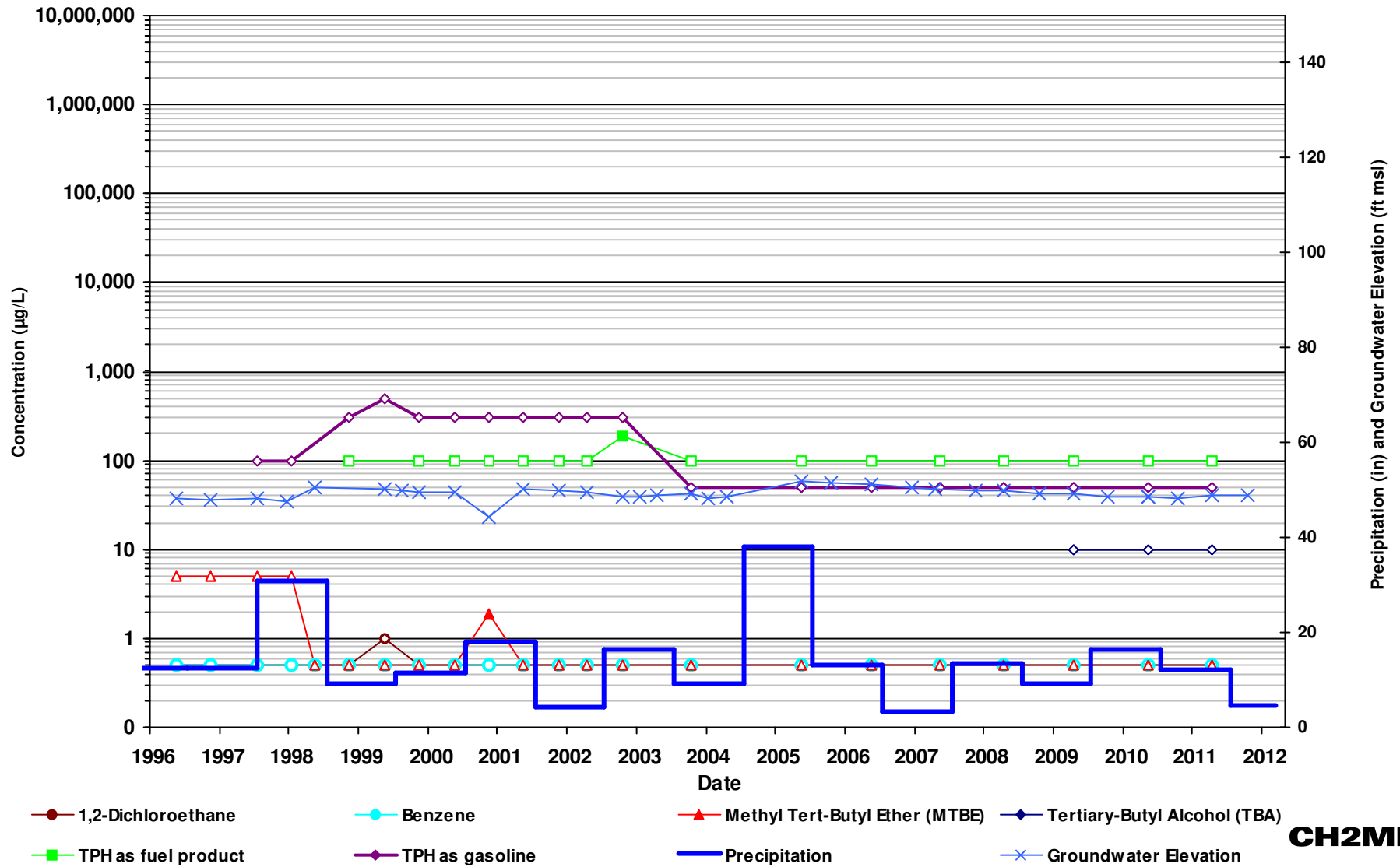
Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GMW-O-5



Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

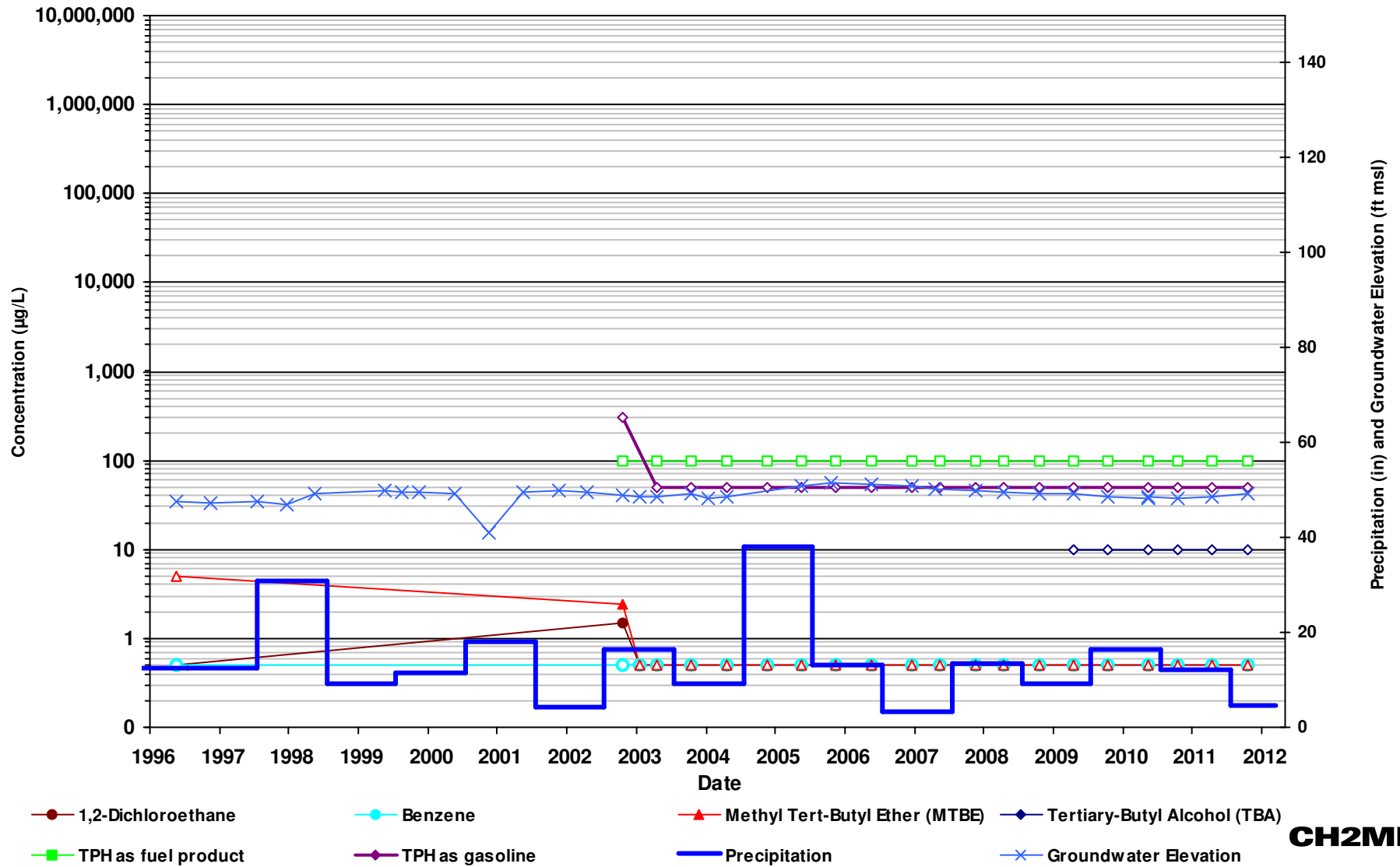
GMW-O-6



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

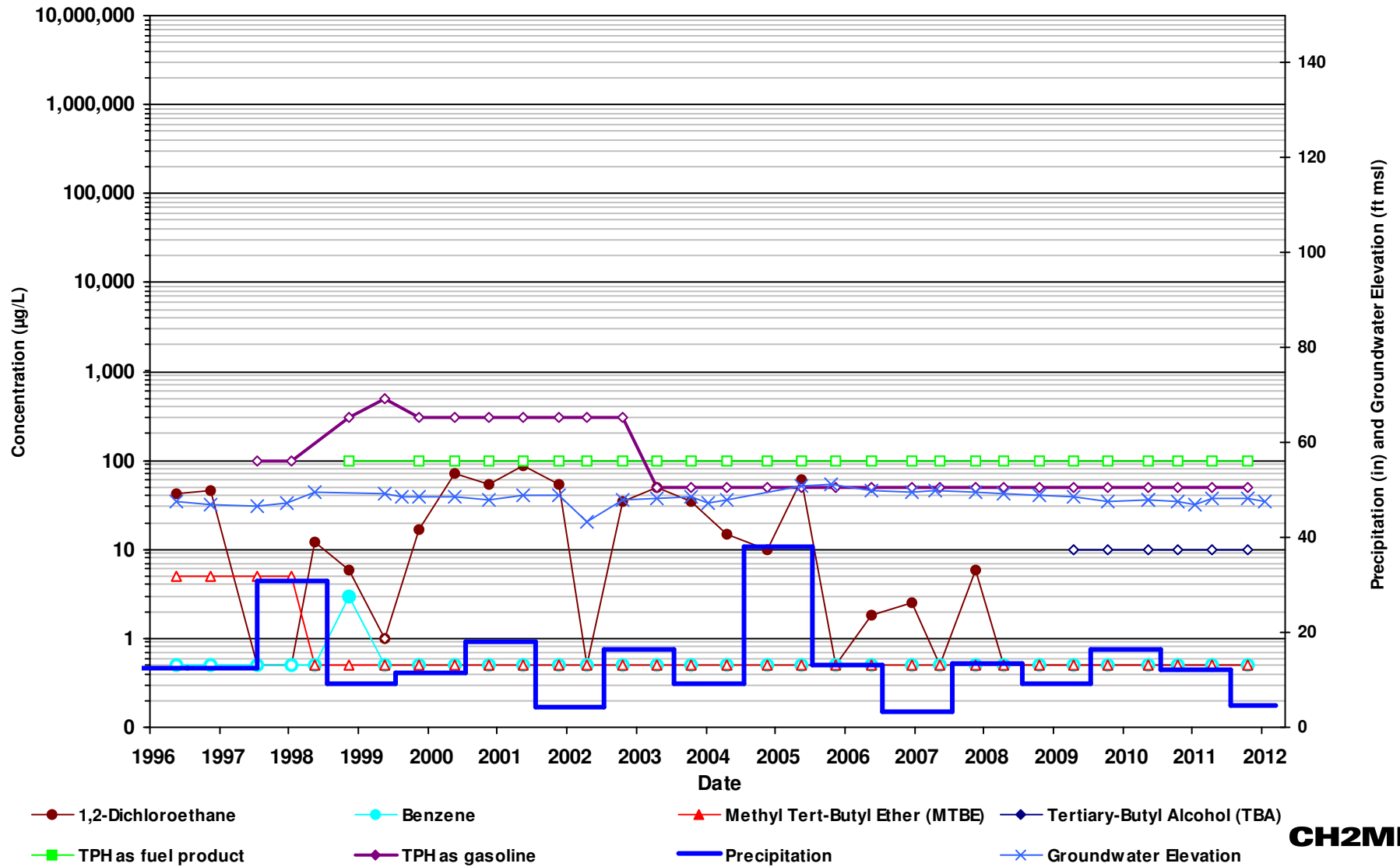
GMW-O-8



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

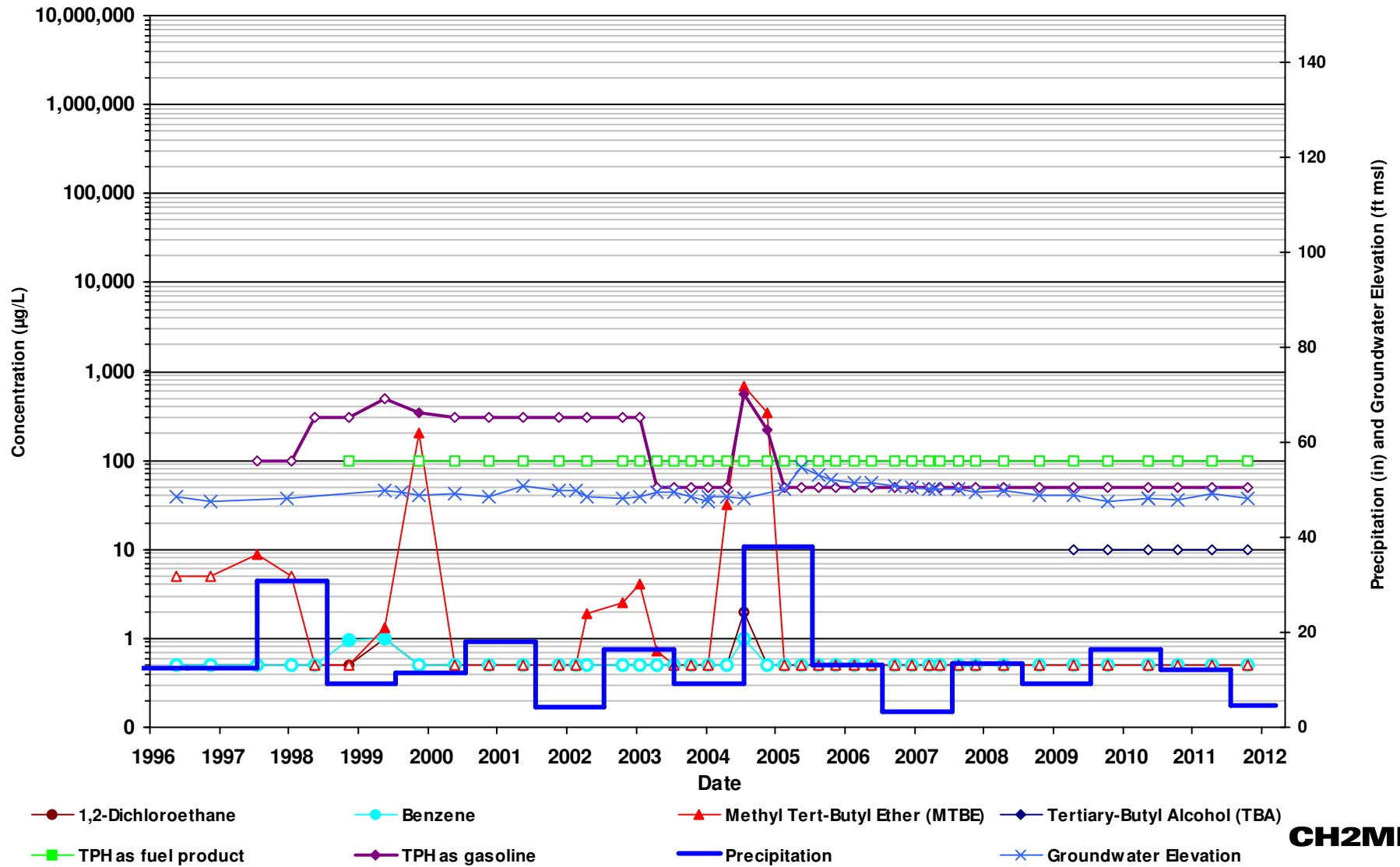
GMW-O-9



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

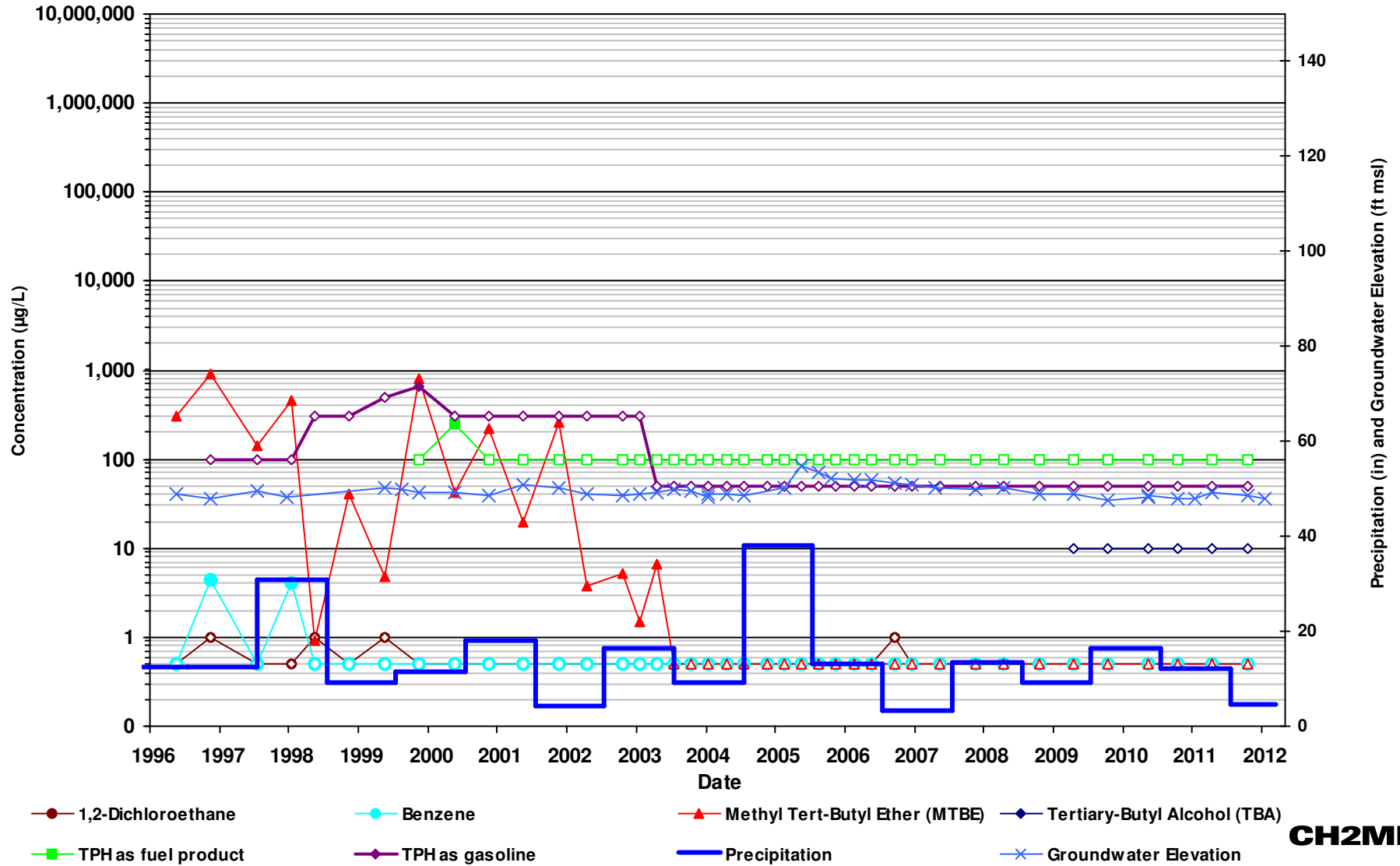
GMW-SF-7



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

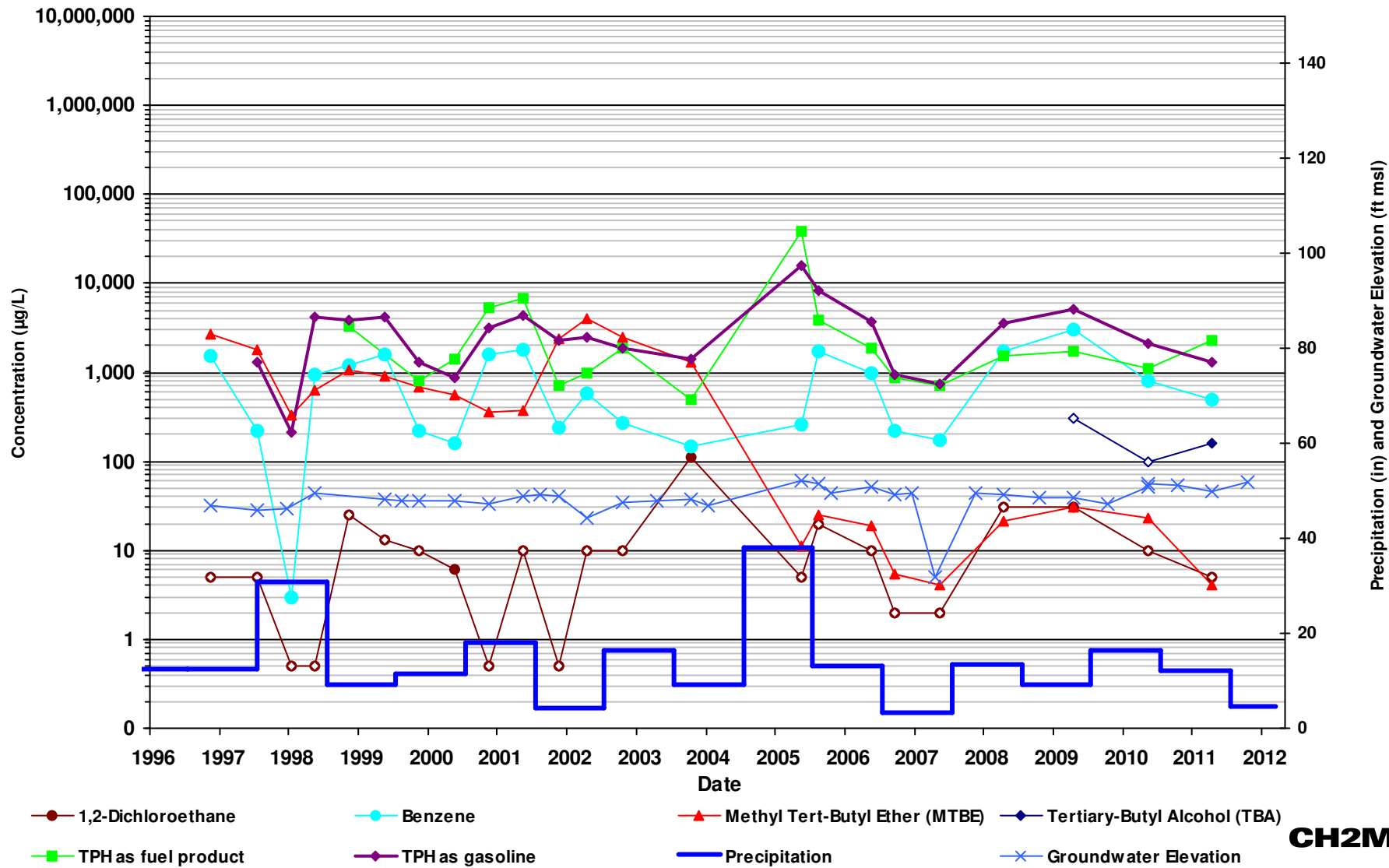
GMW-SF-8



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

GWR-1

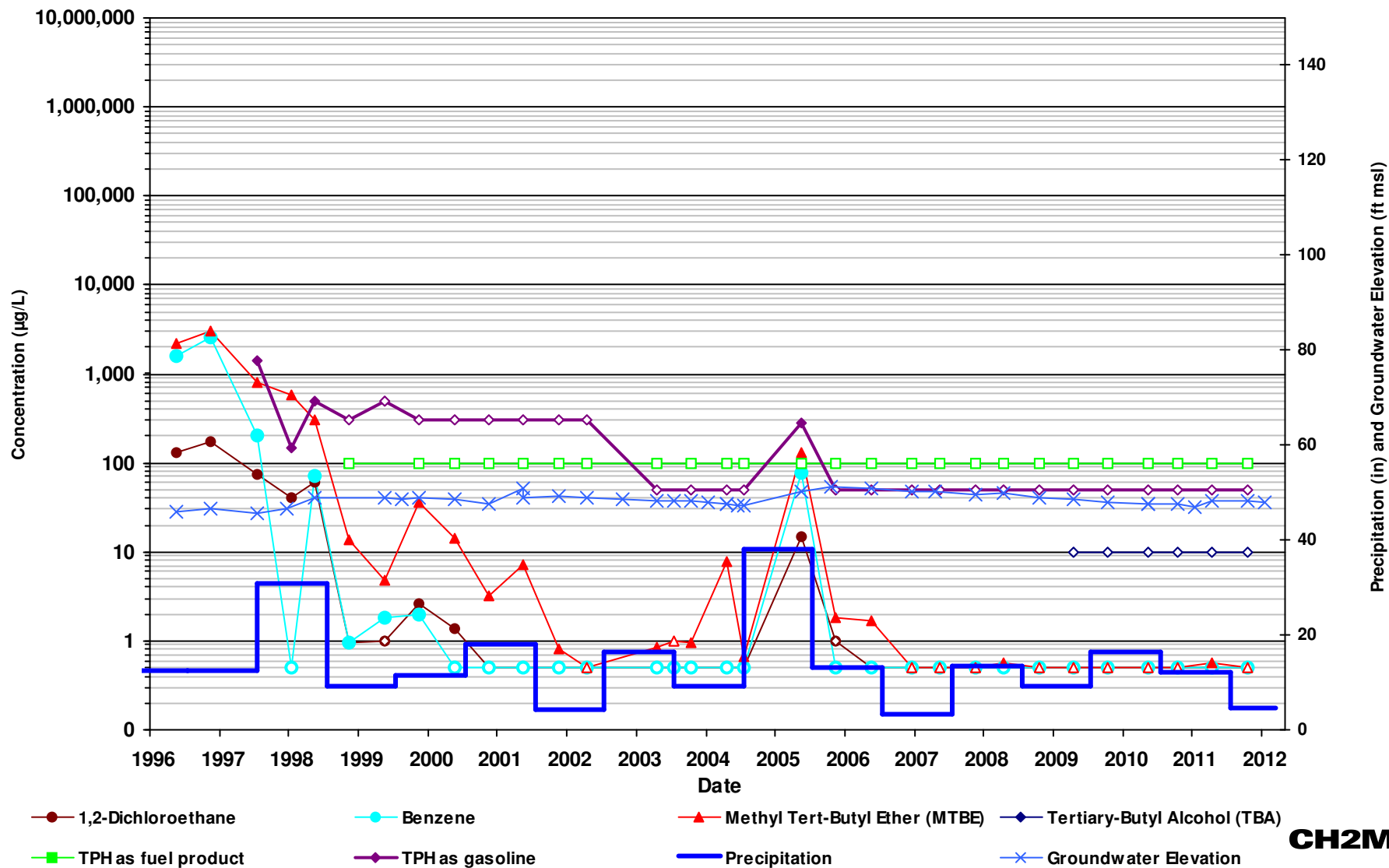


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

HL-2

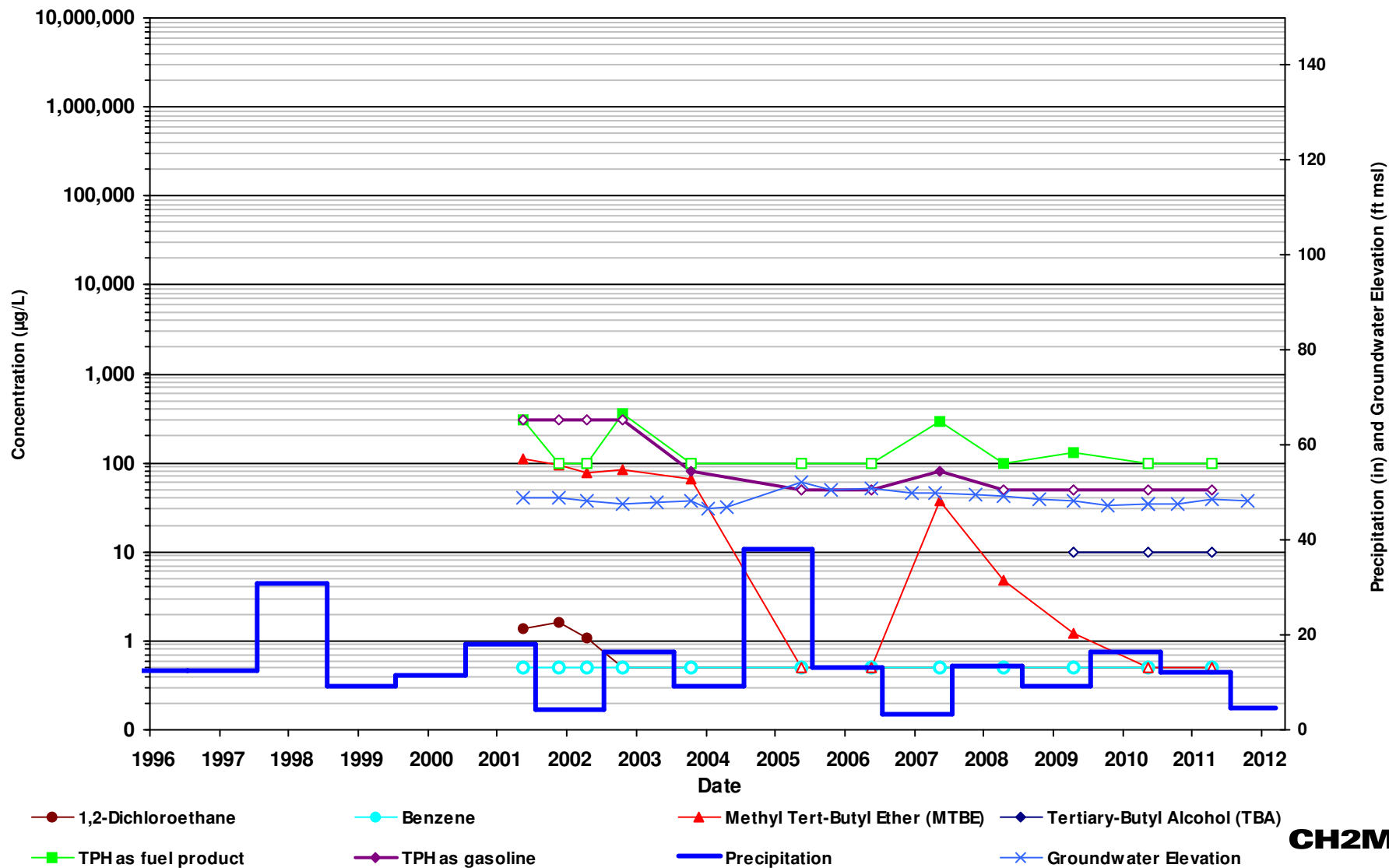


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

HL-3

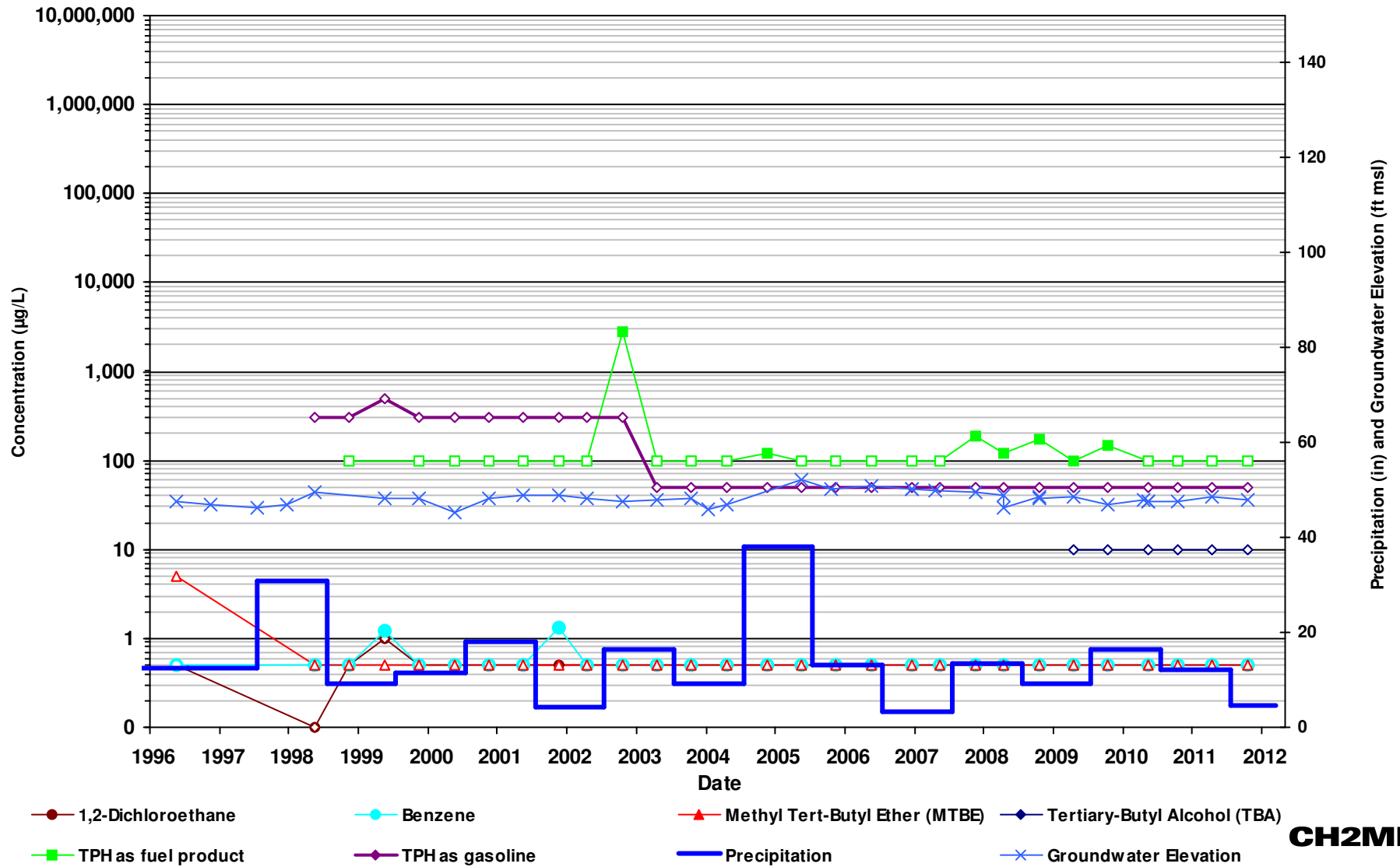


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

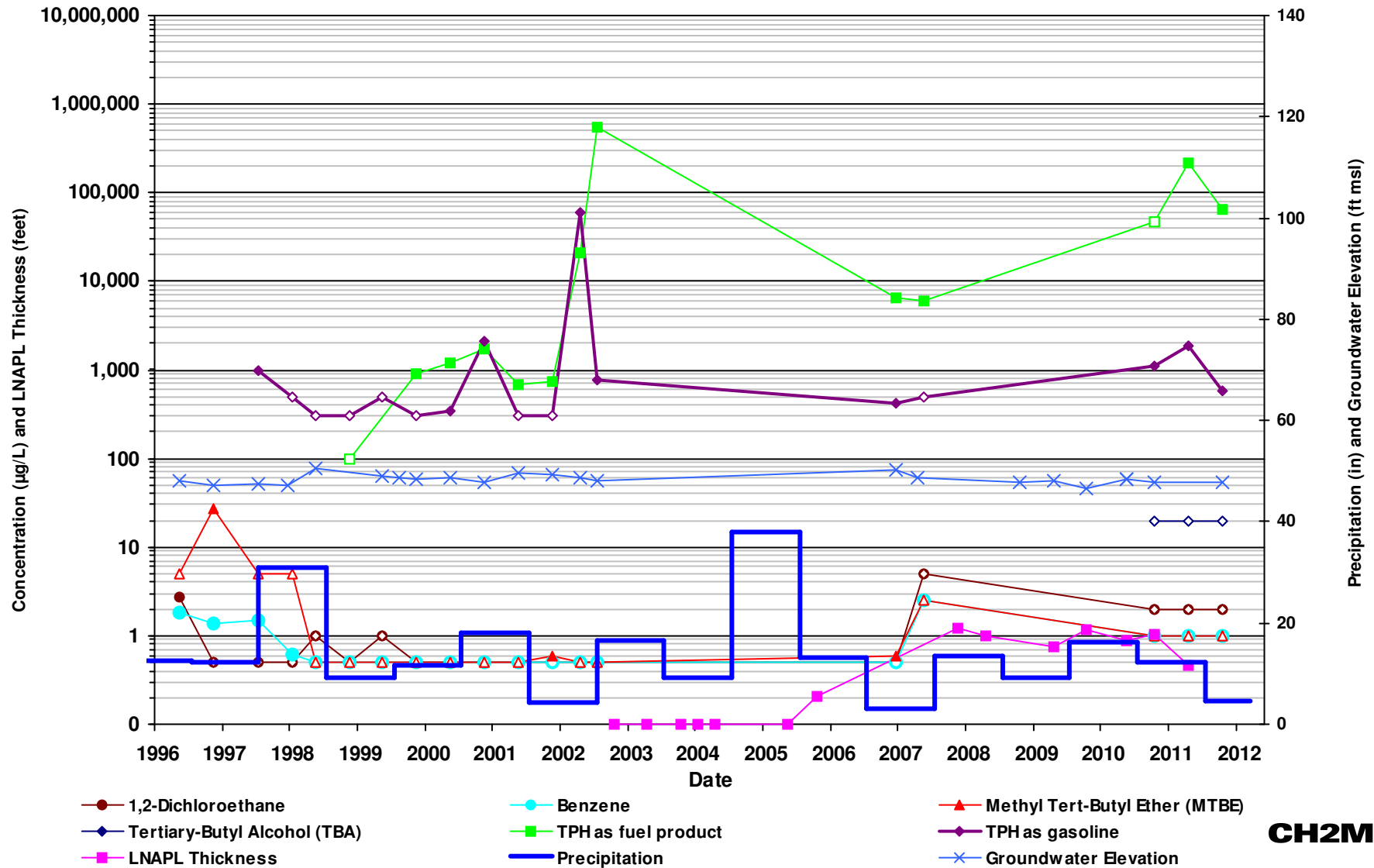
MW-12



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

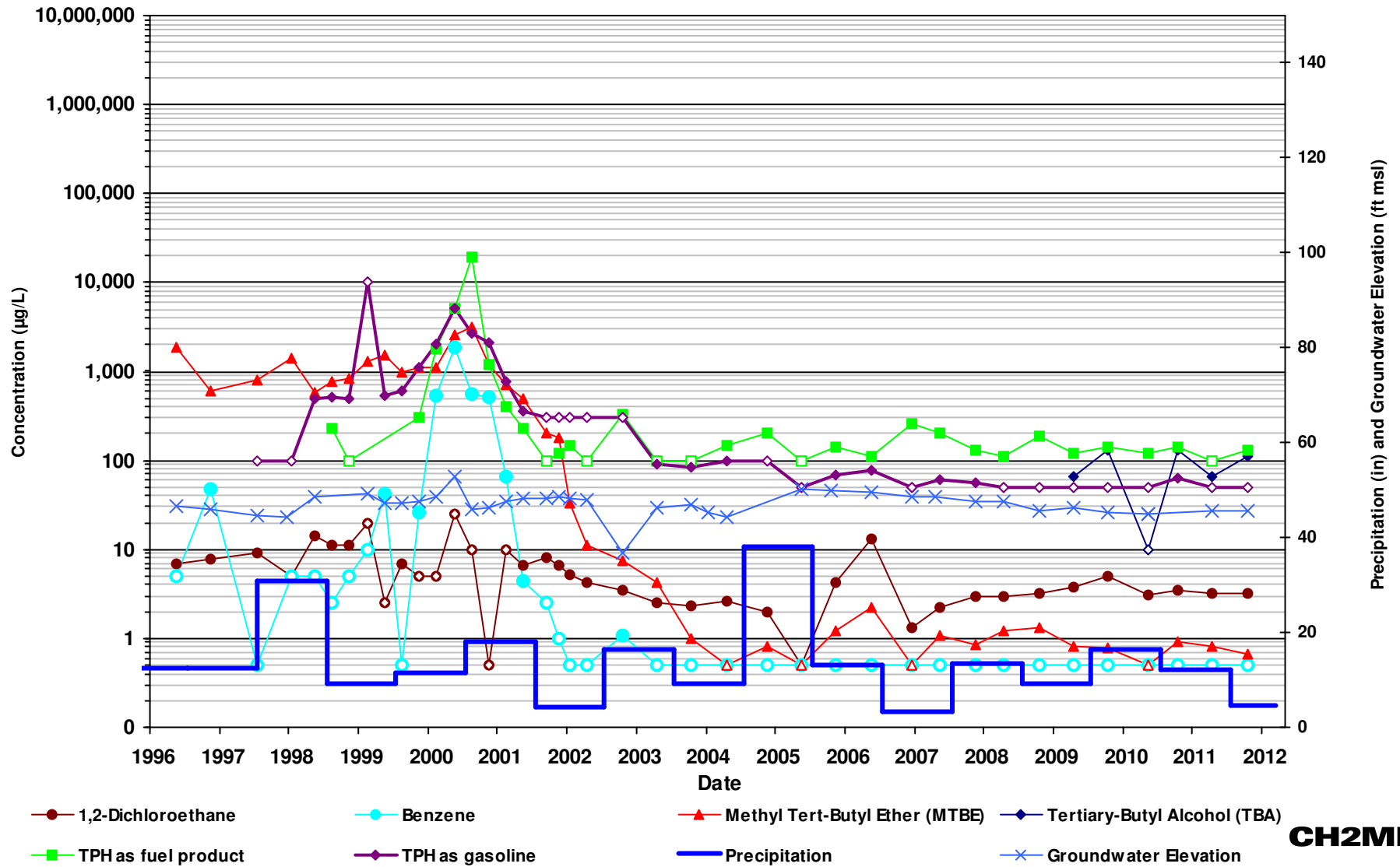
MW-15



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

MW-19 (MID)

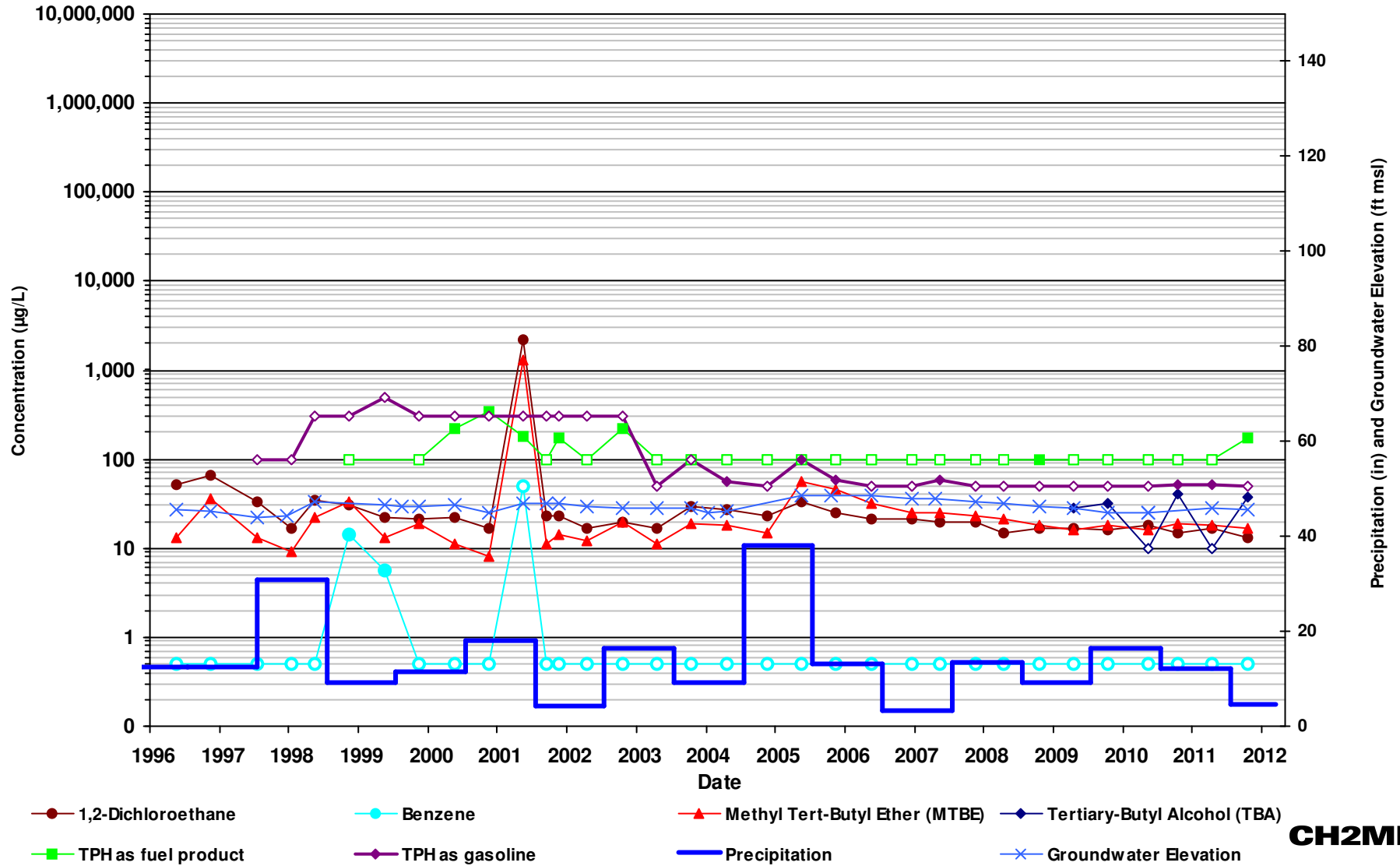


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

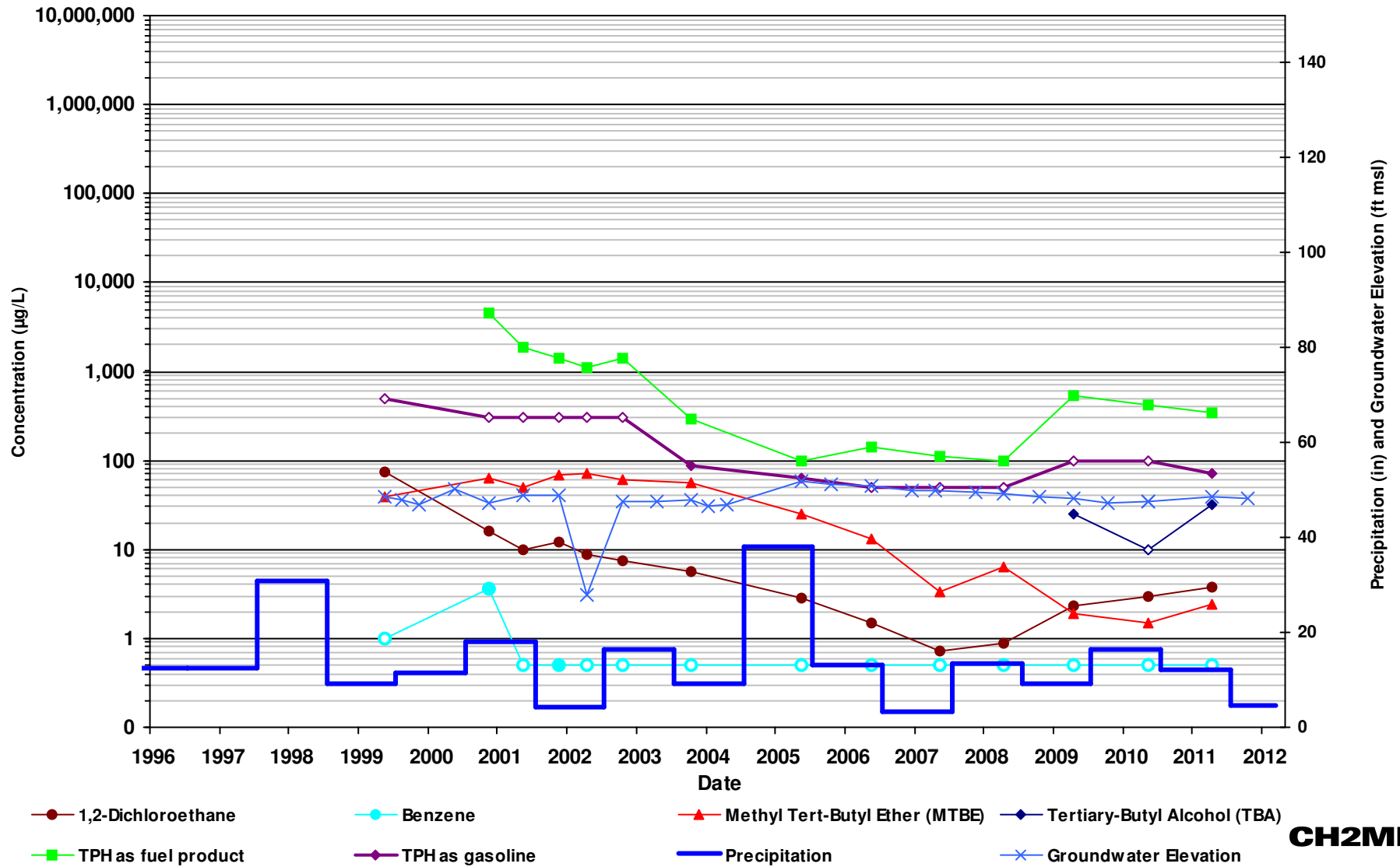
MW-20 (MID)



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

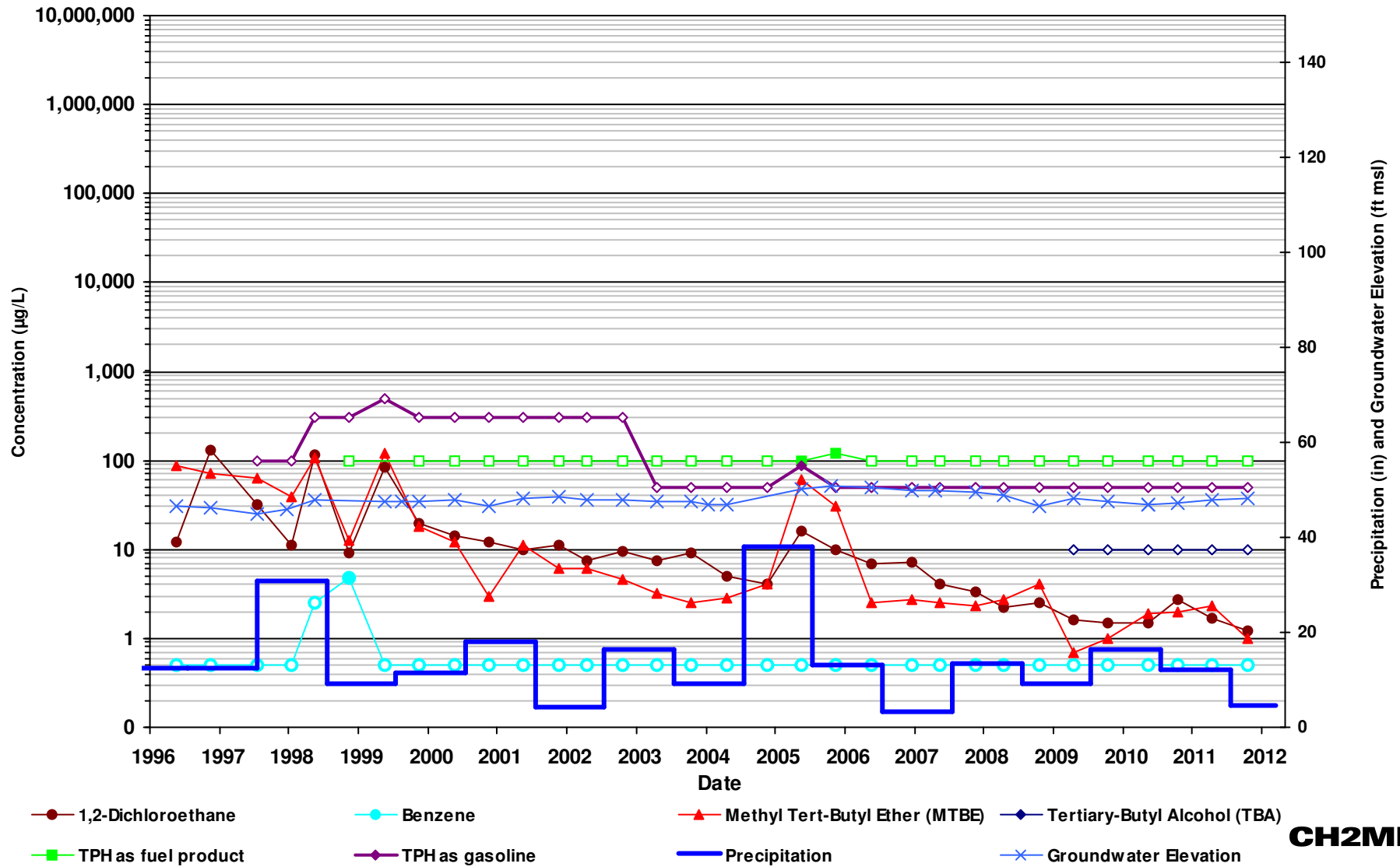
MW-21 (MID)



CH2MHILL

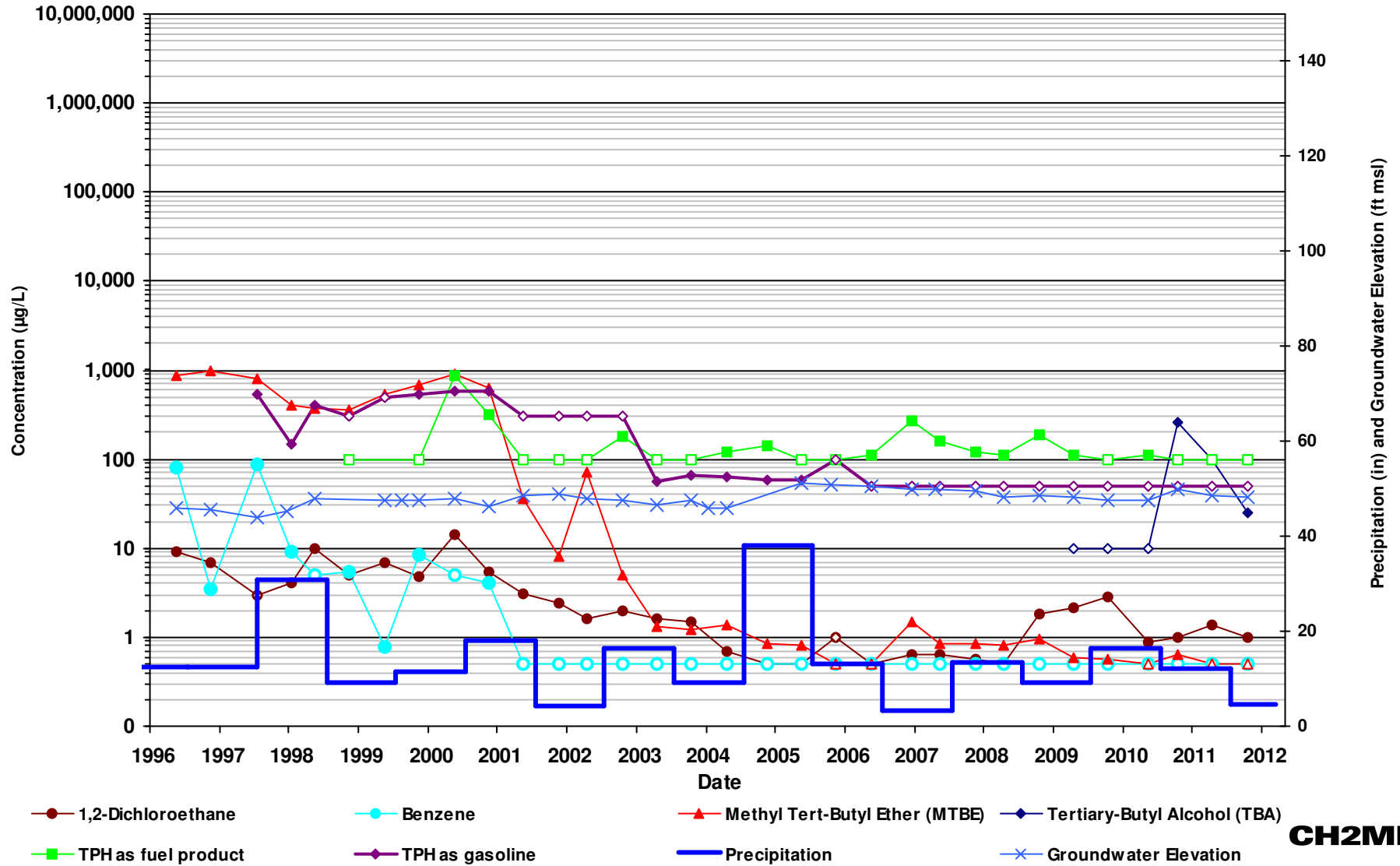
Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

MW-6



Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

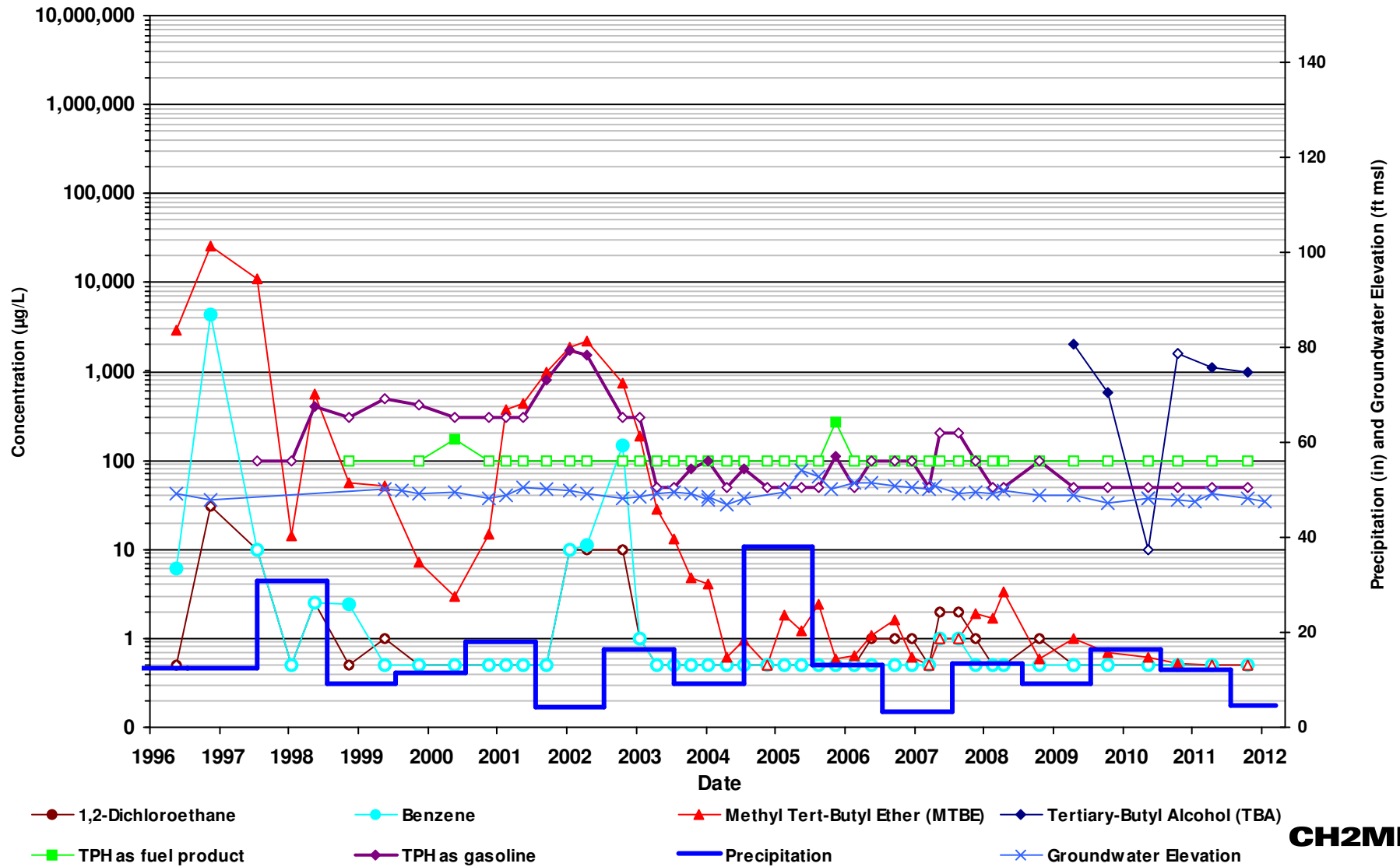
MW-7



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

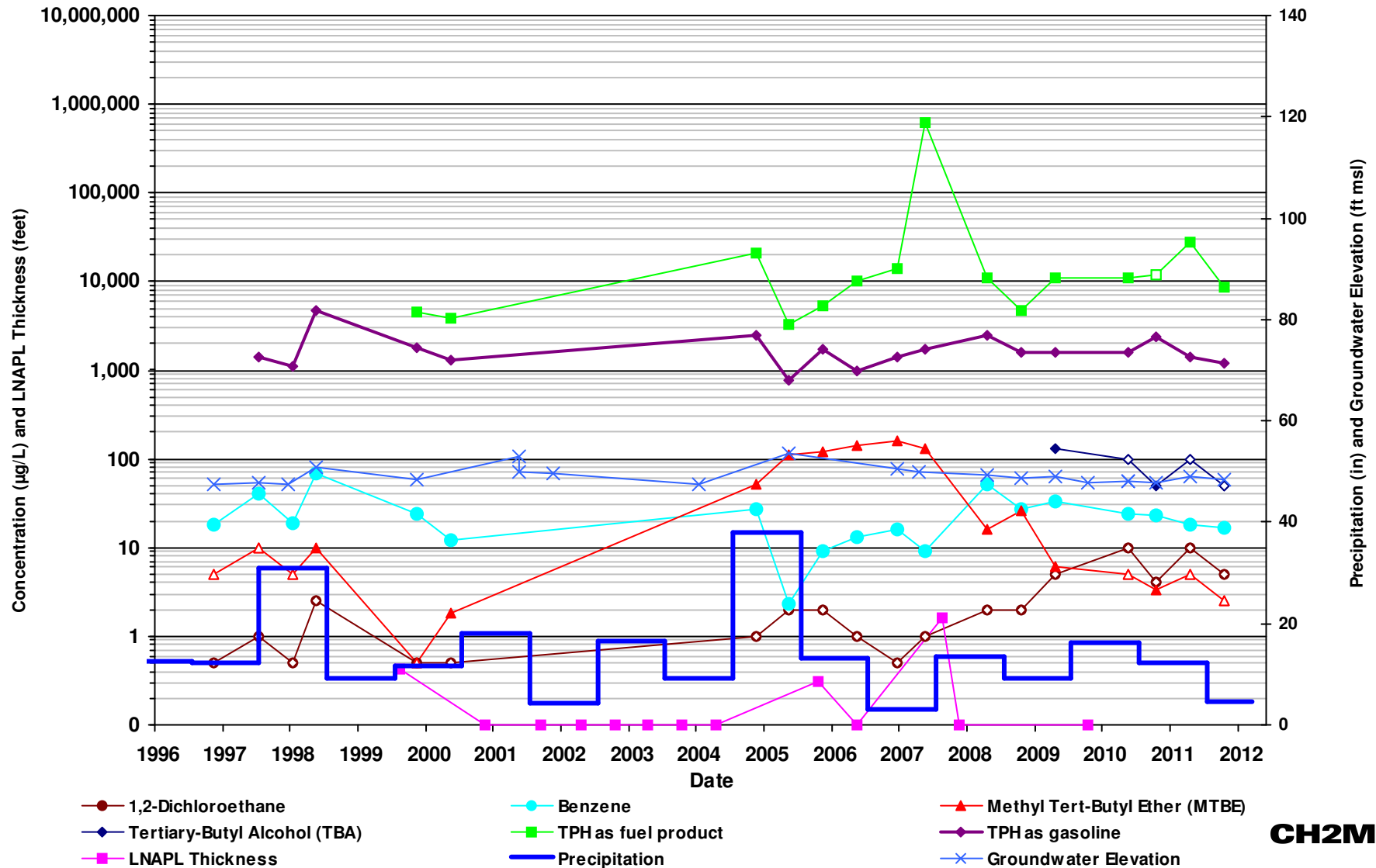
MW-8



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

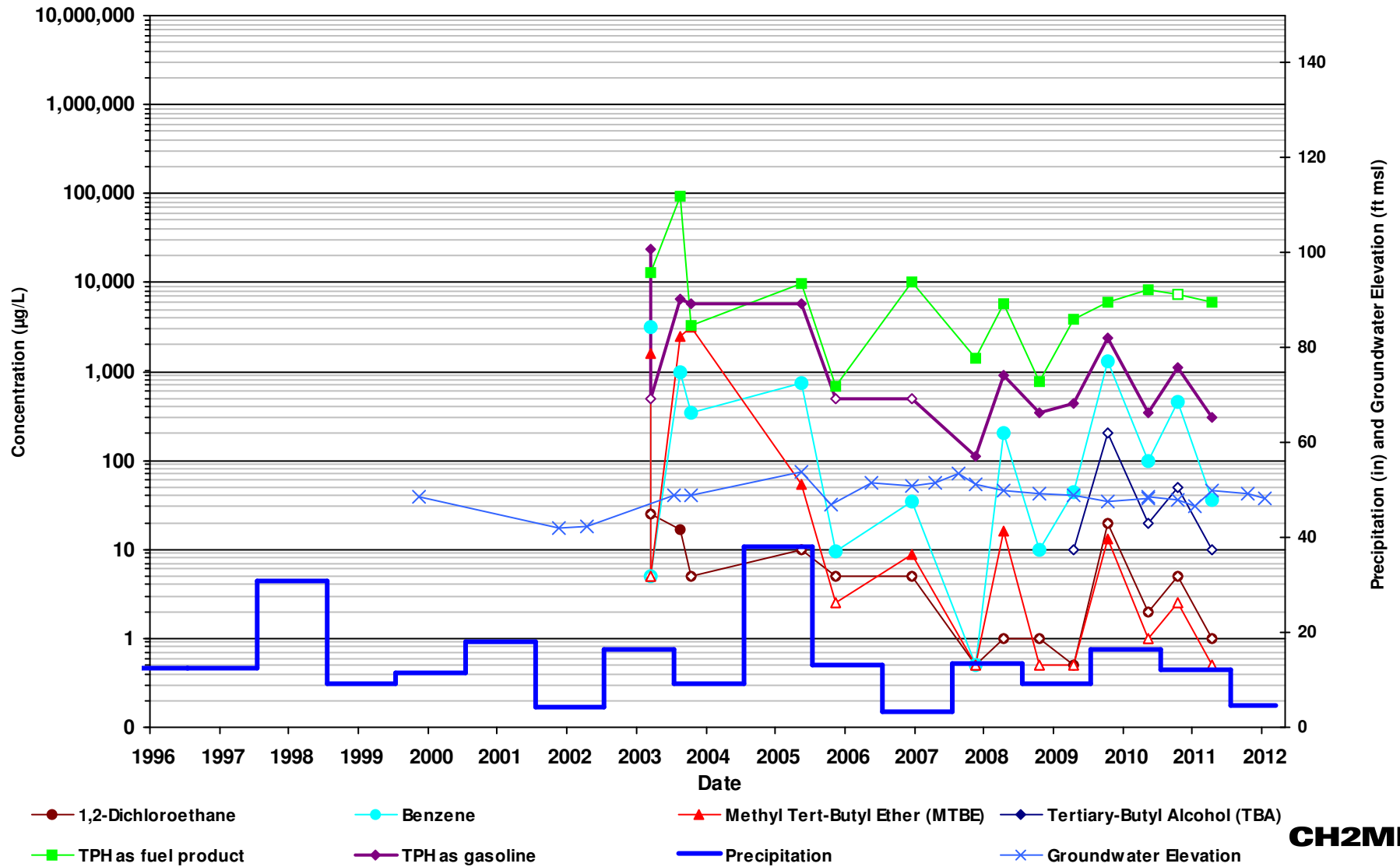
MW-9



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

MW-SF-9

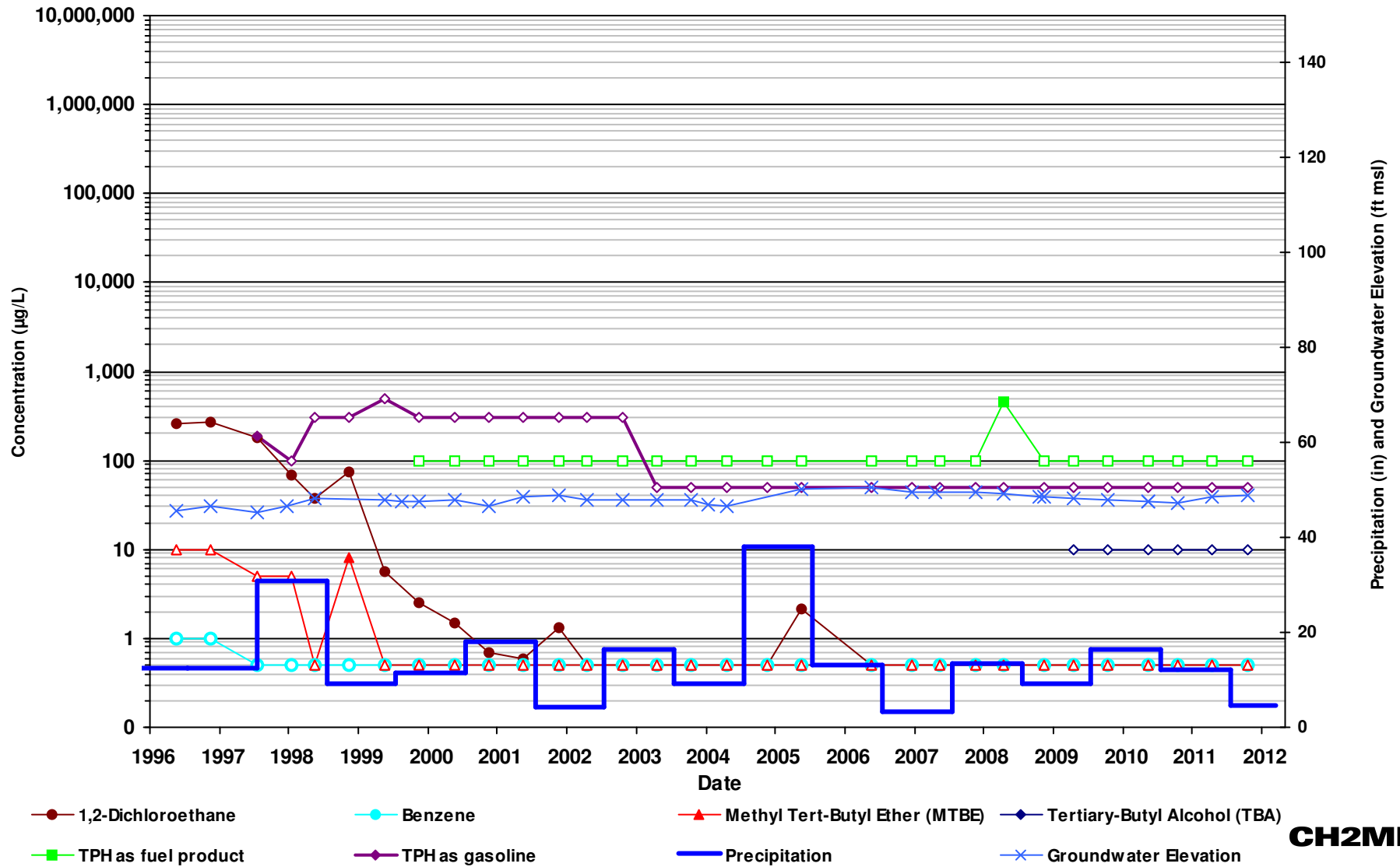


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

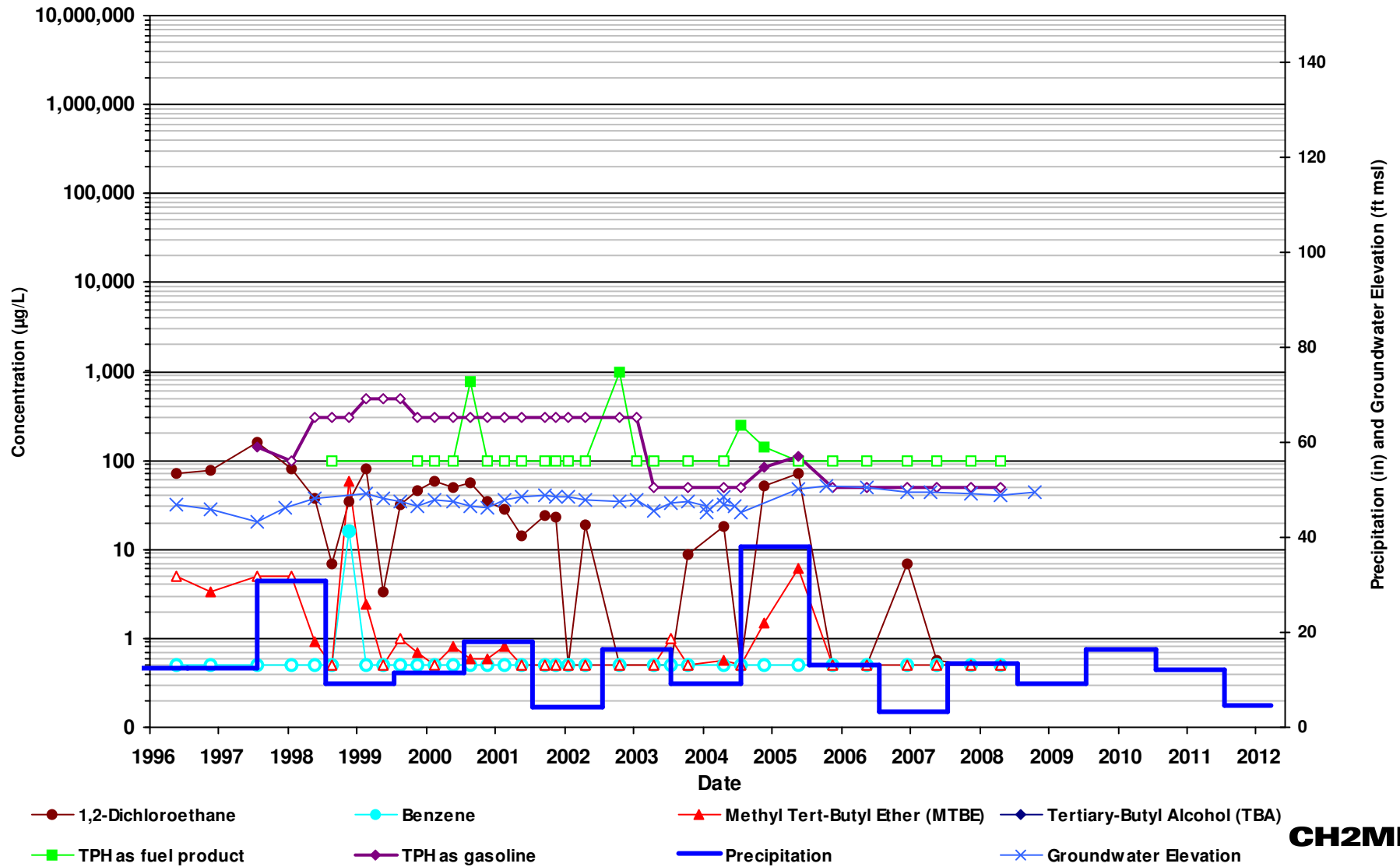
PW-1



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

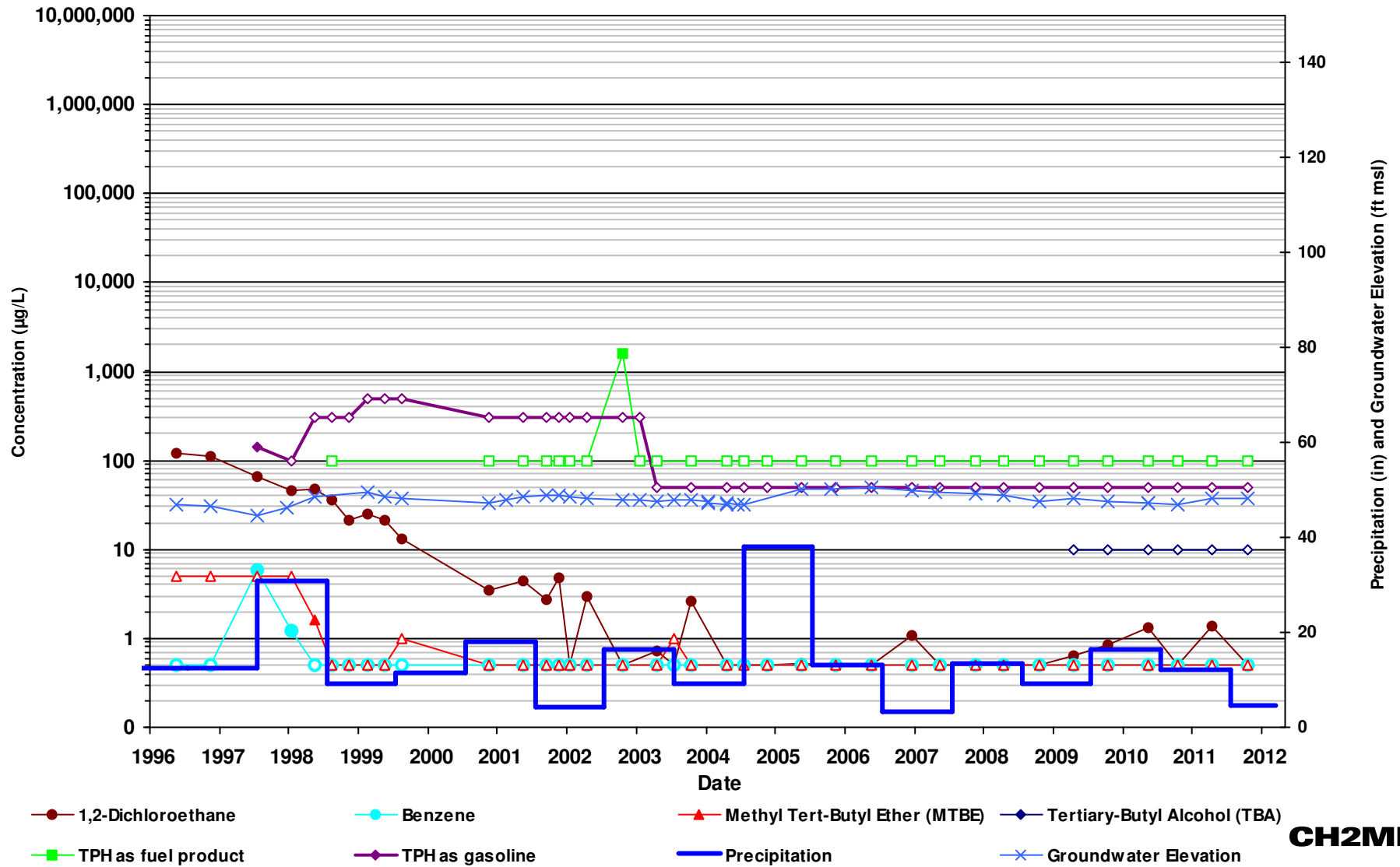
PW-2



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

PW-3

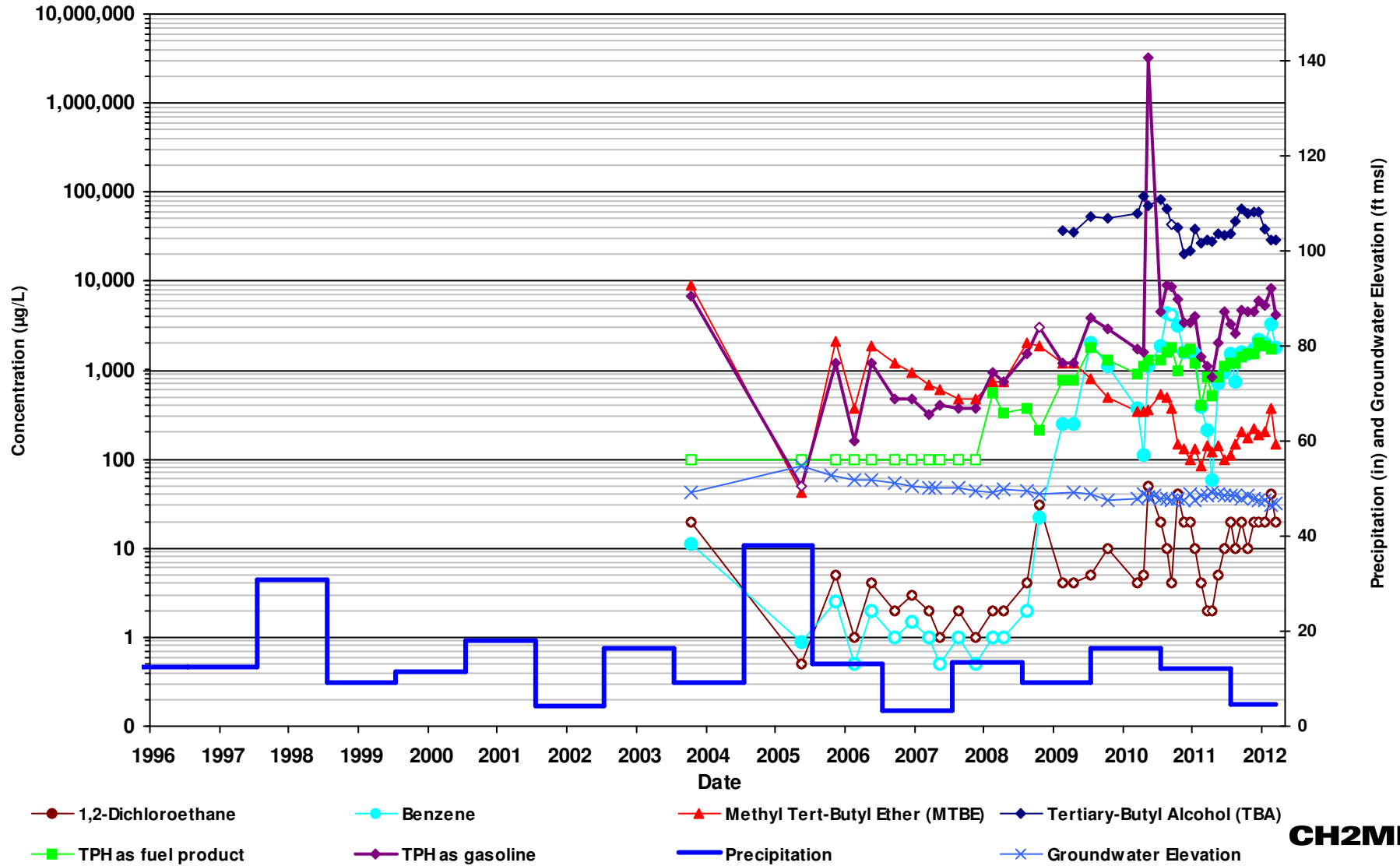


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

PZ-5

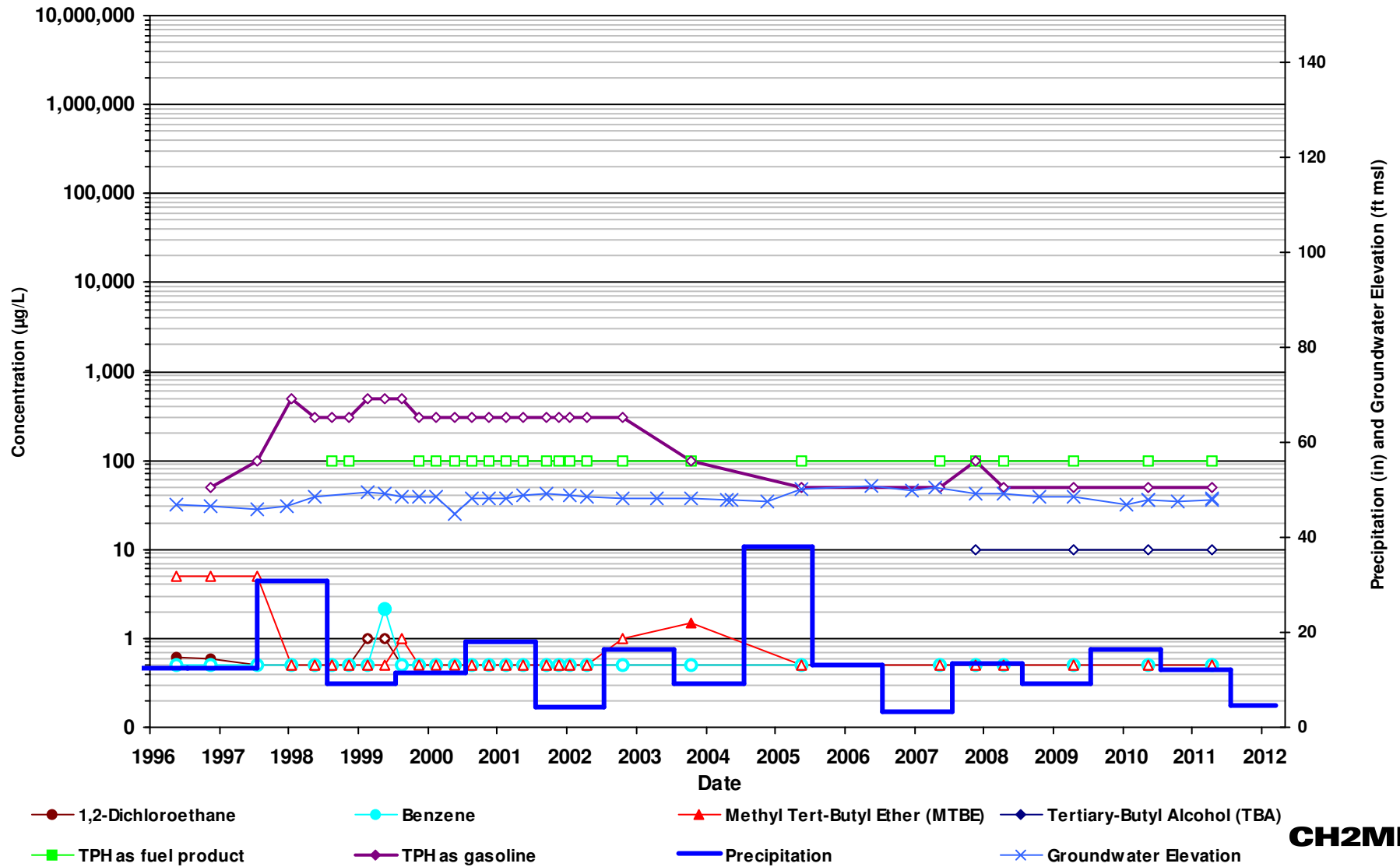


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

WCW-1

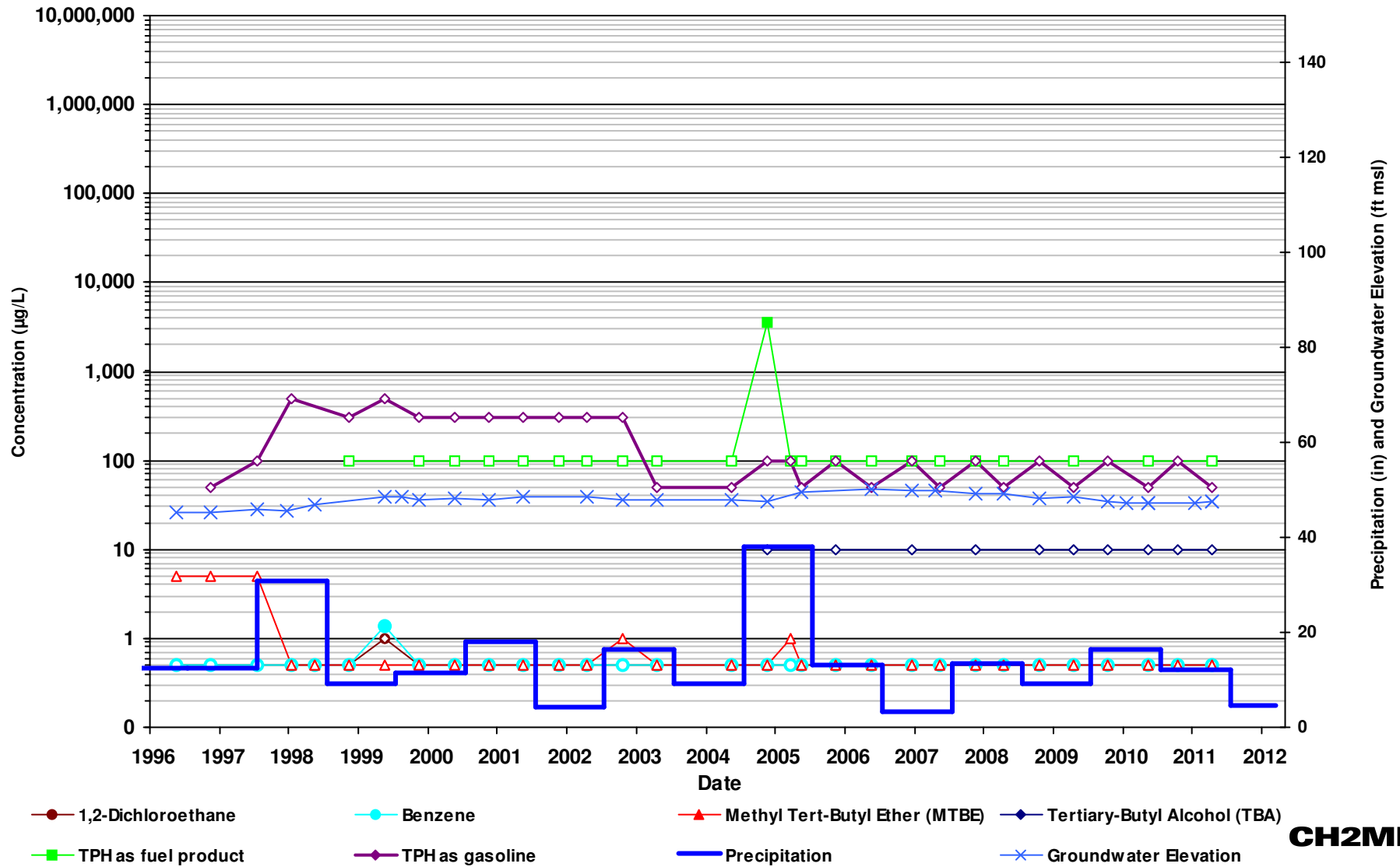


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

WCW-12

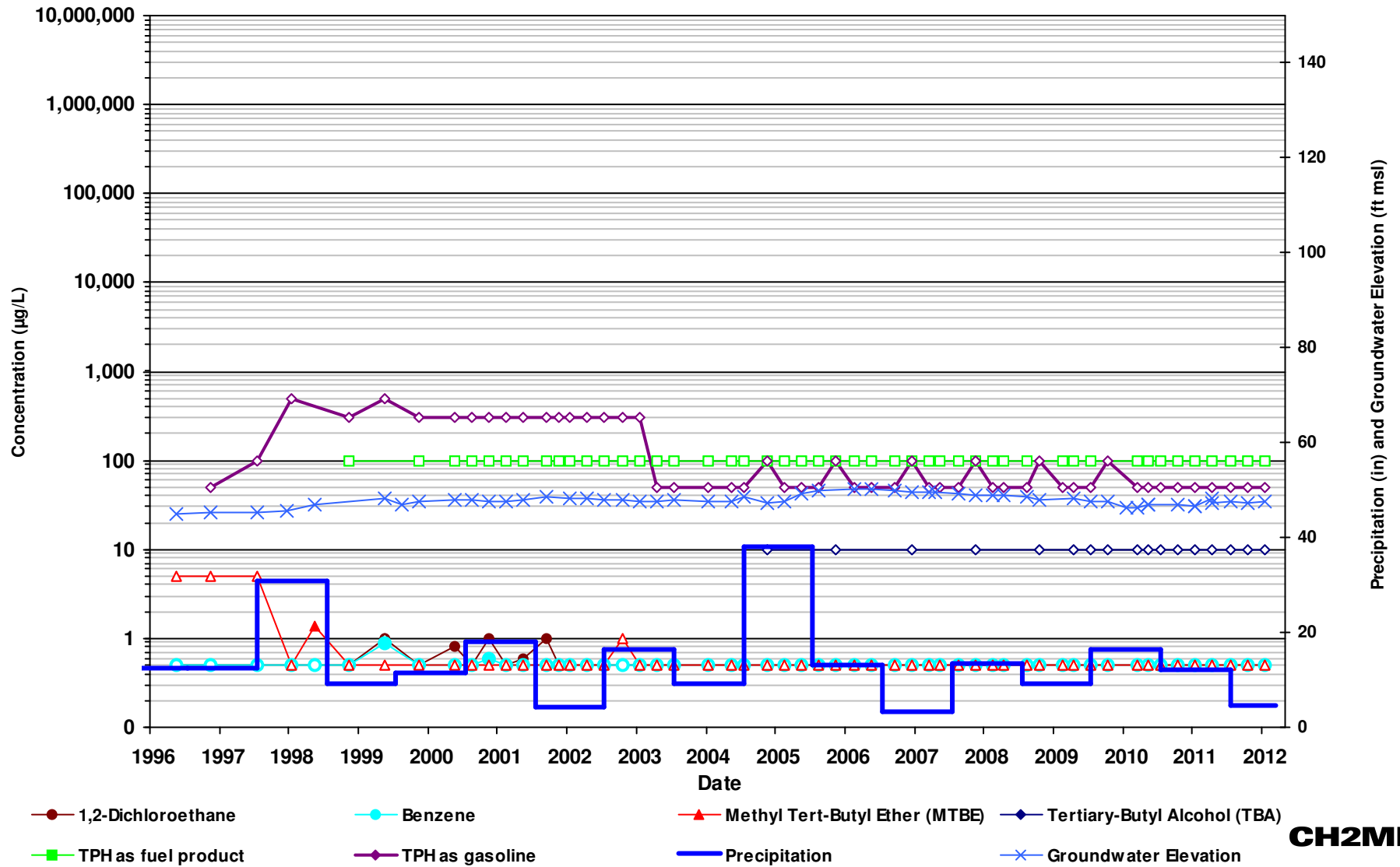


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

WCW-13

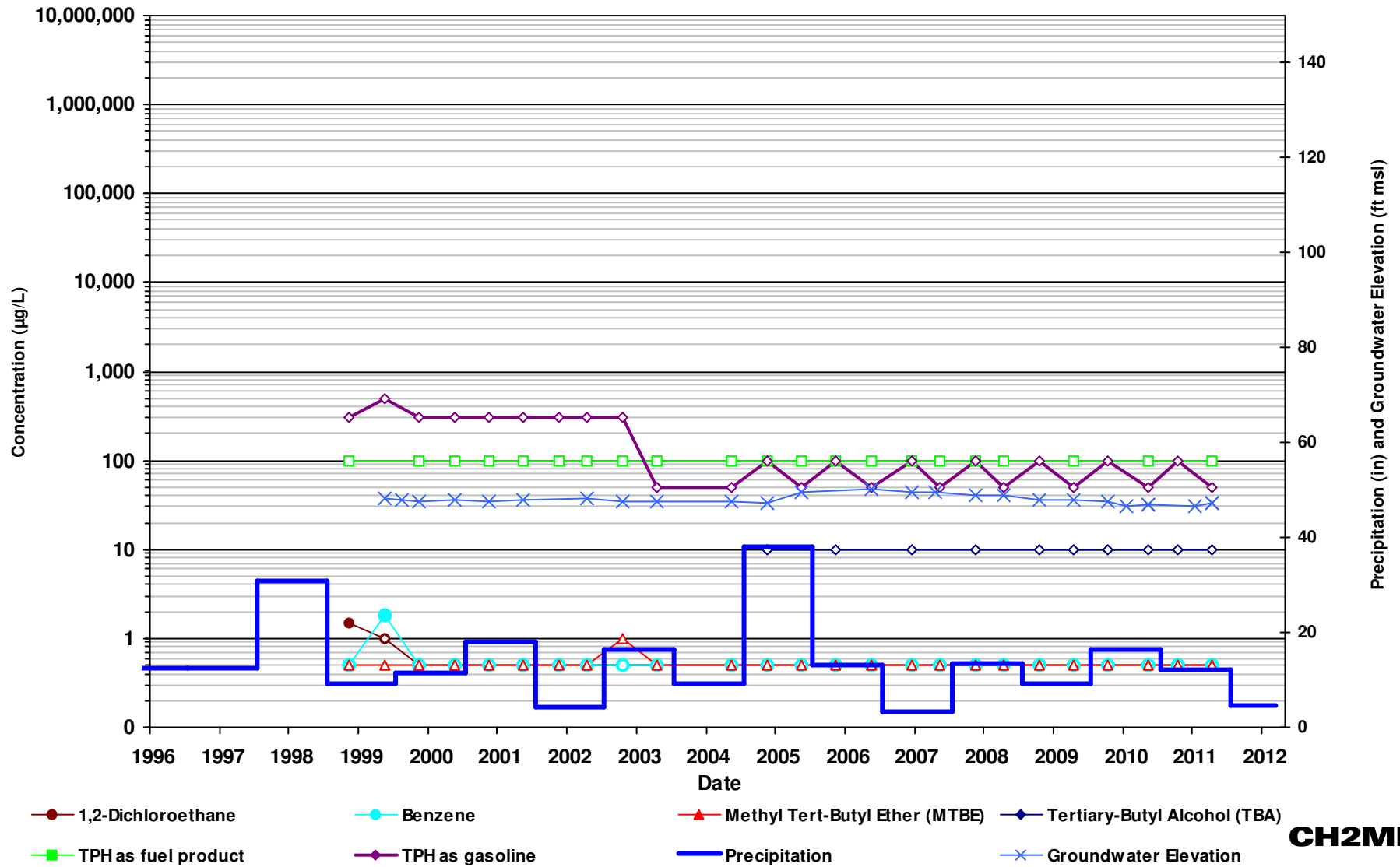


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

WCW-14

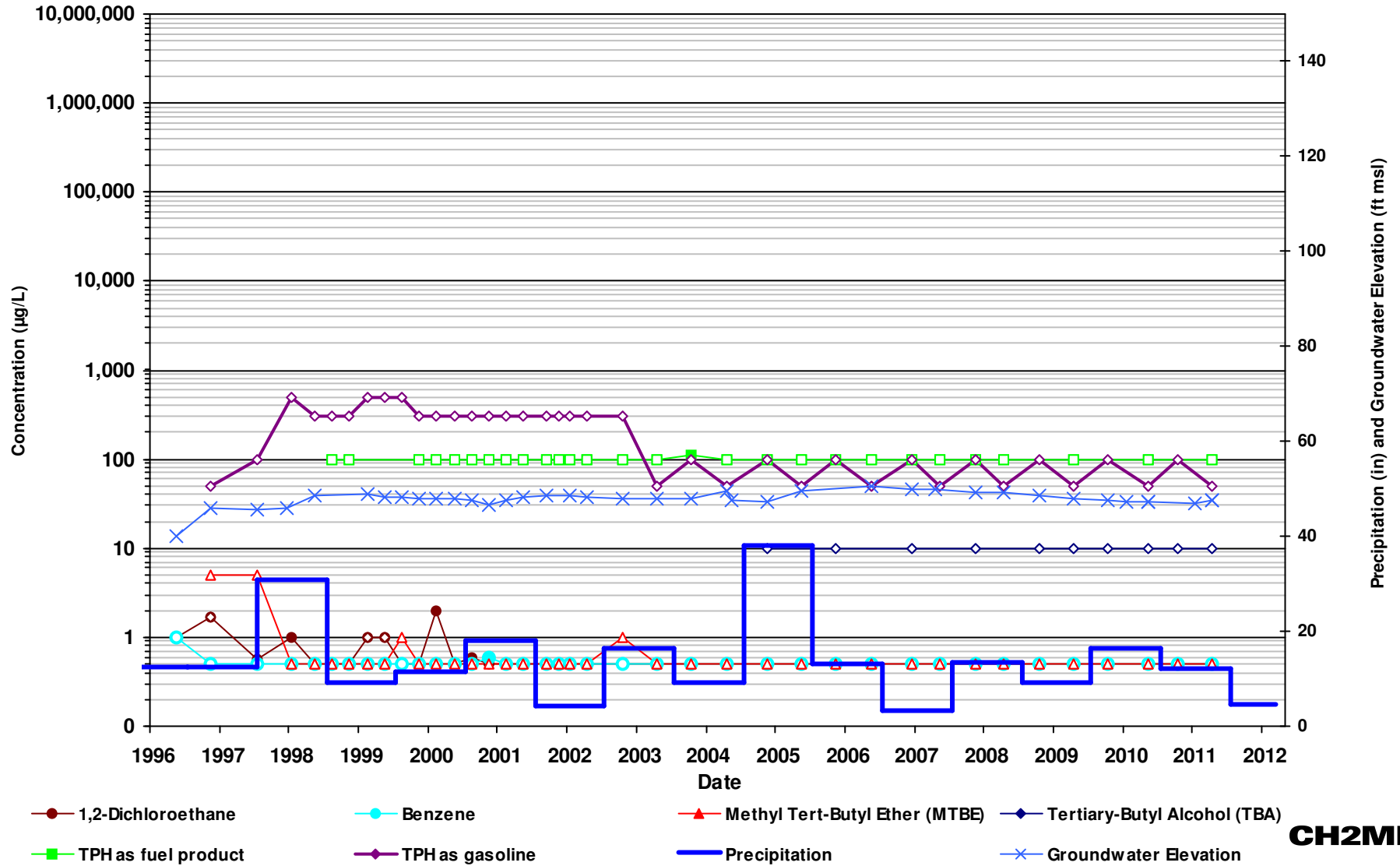


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

WCW-2

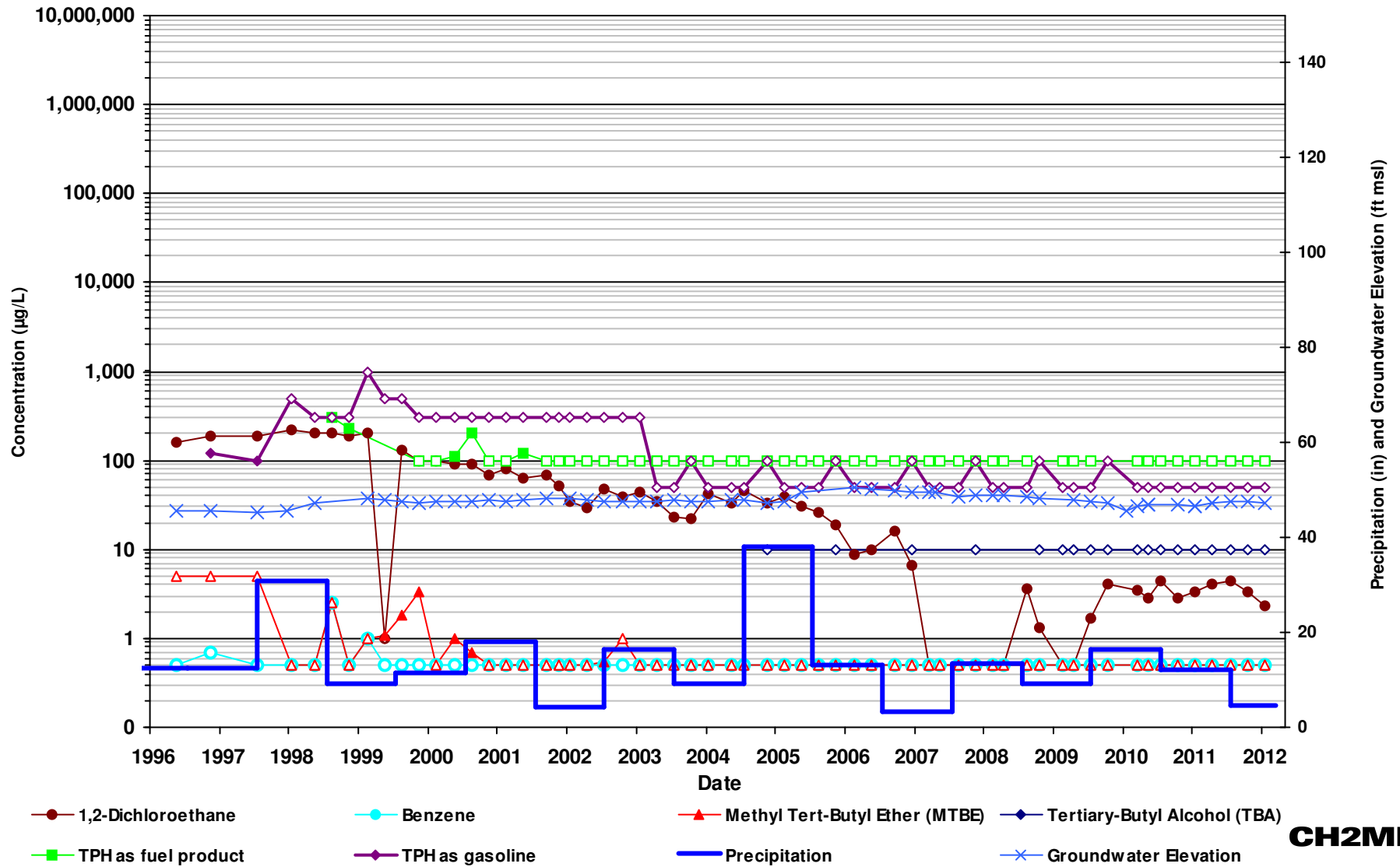


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

WCW-3

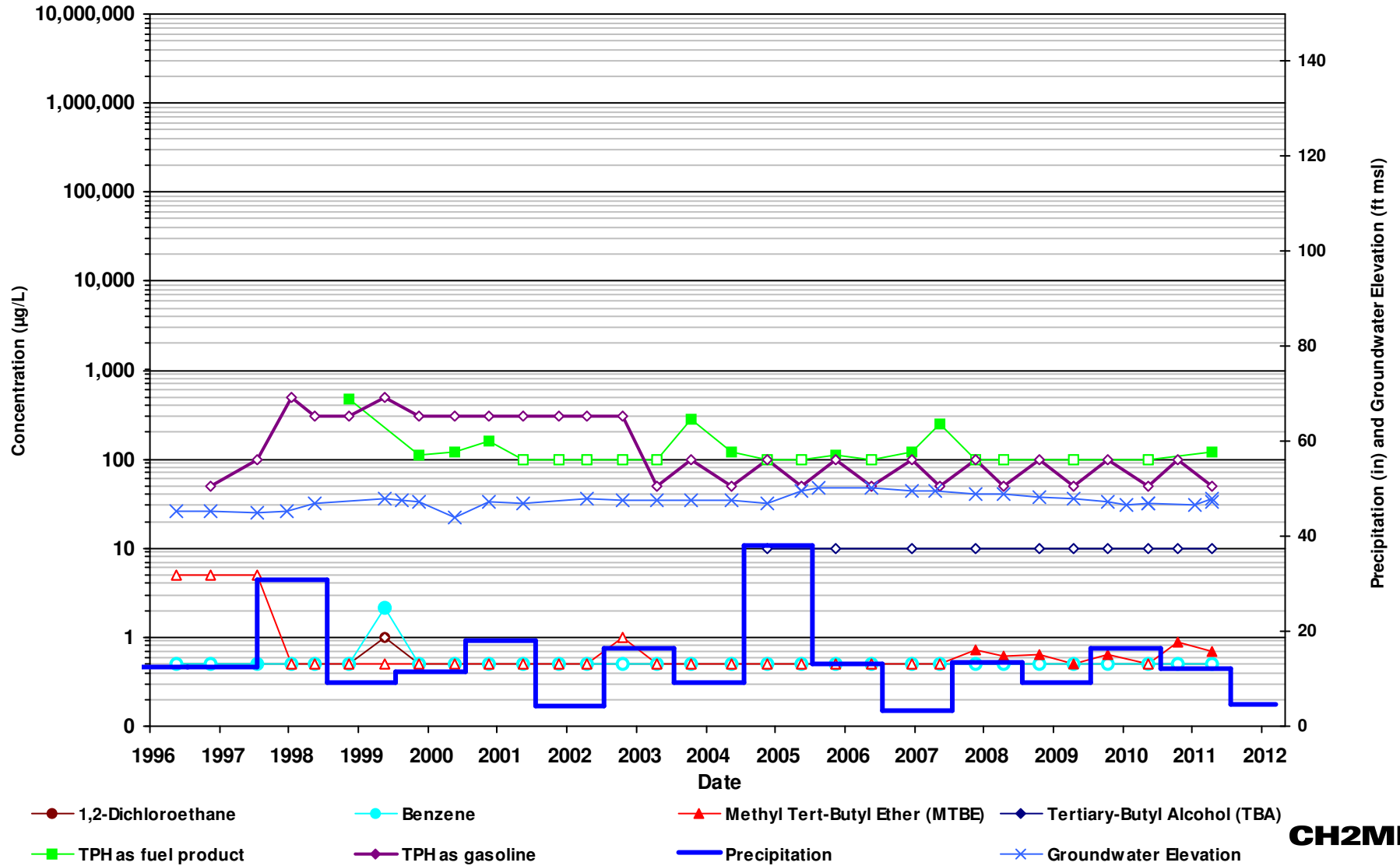


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

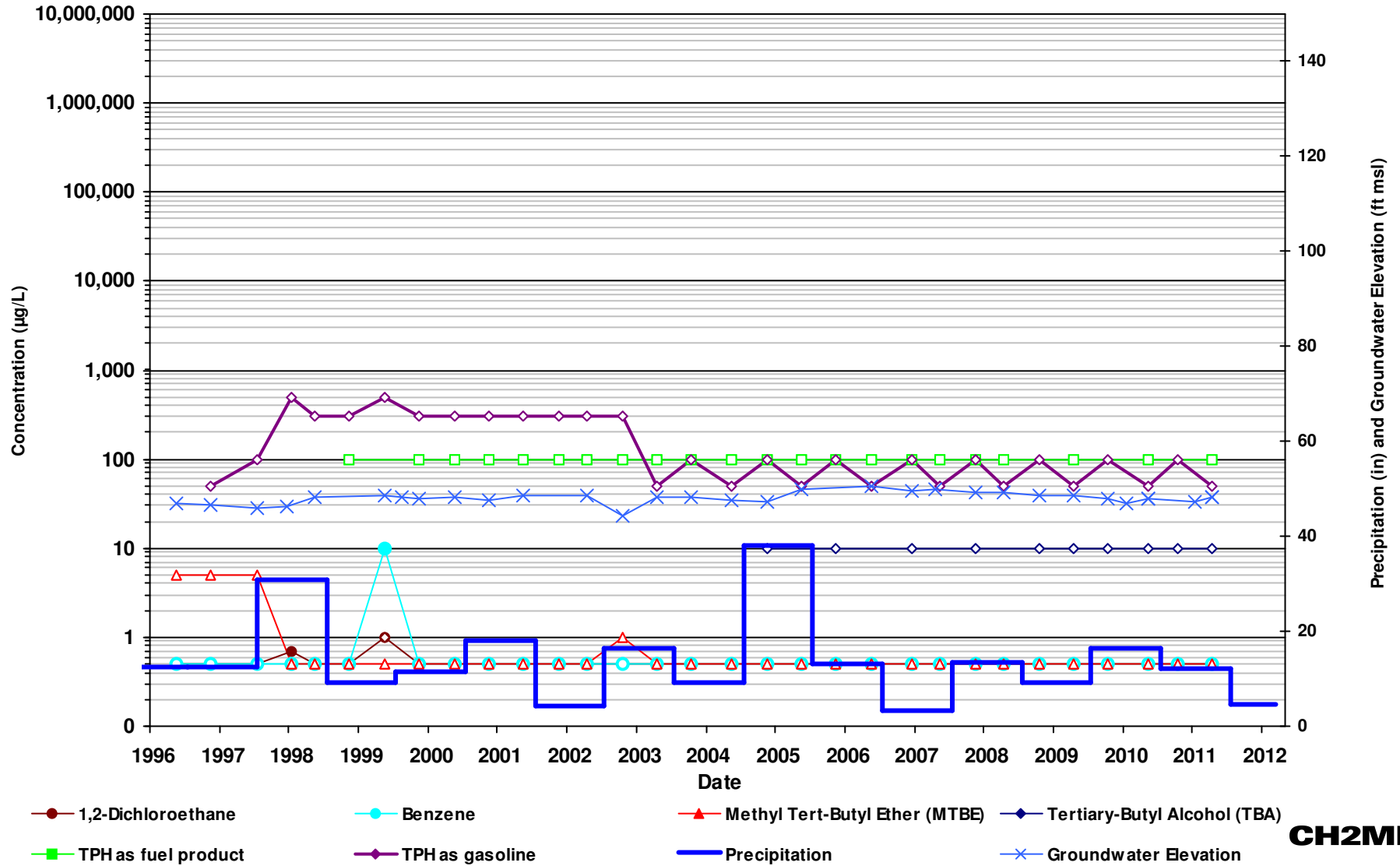
WCW-4



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

WCW-5

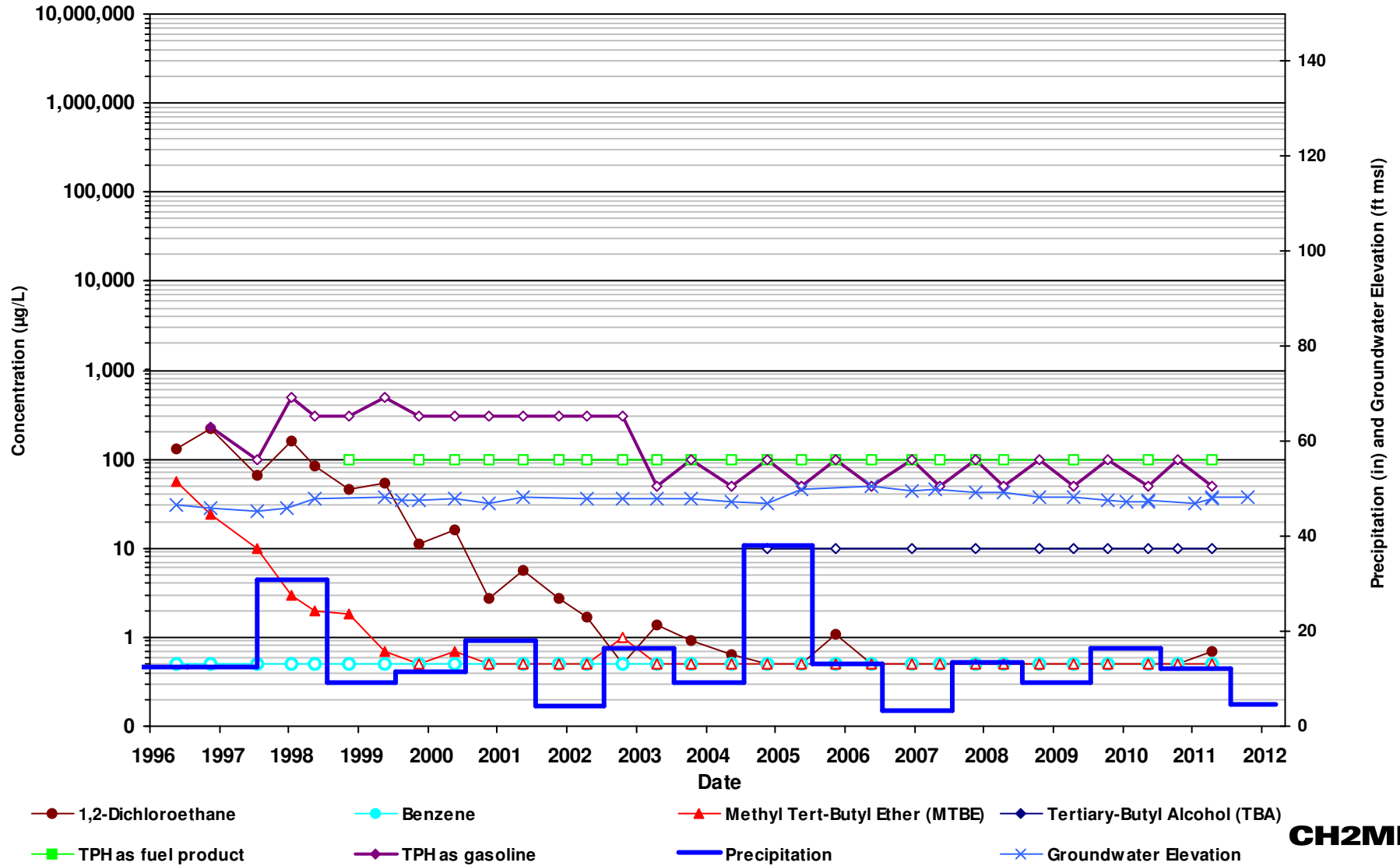


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

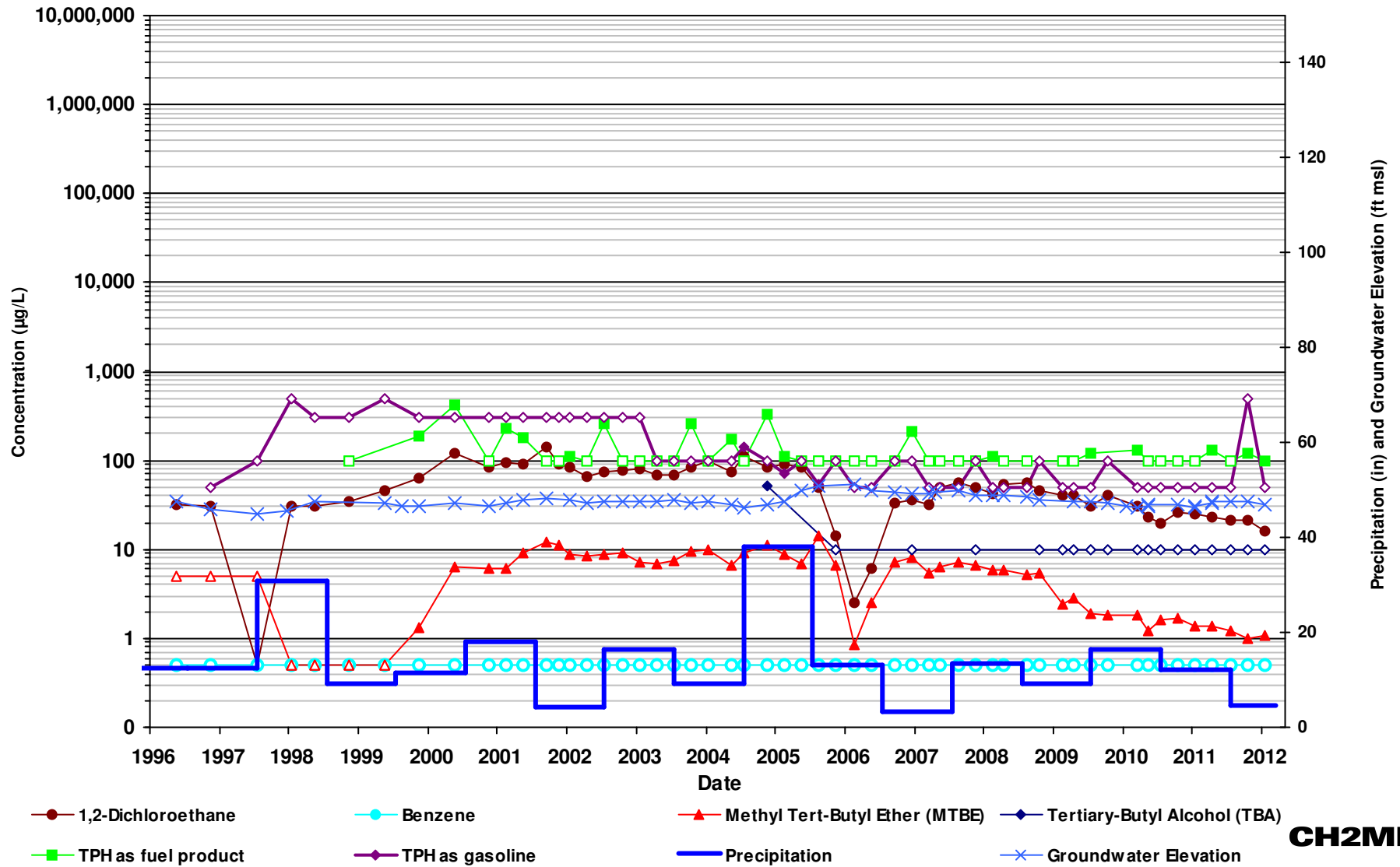
WCW-6



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source:
<http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

WCW-7

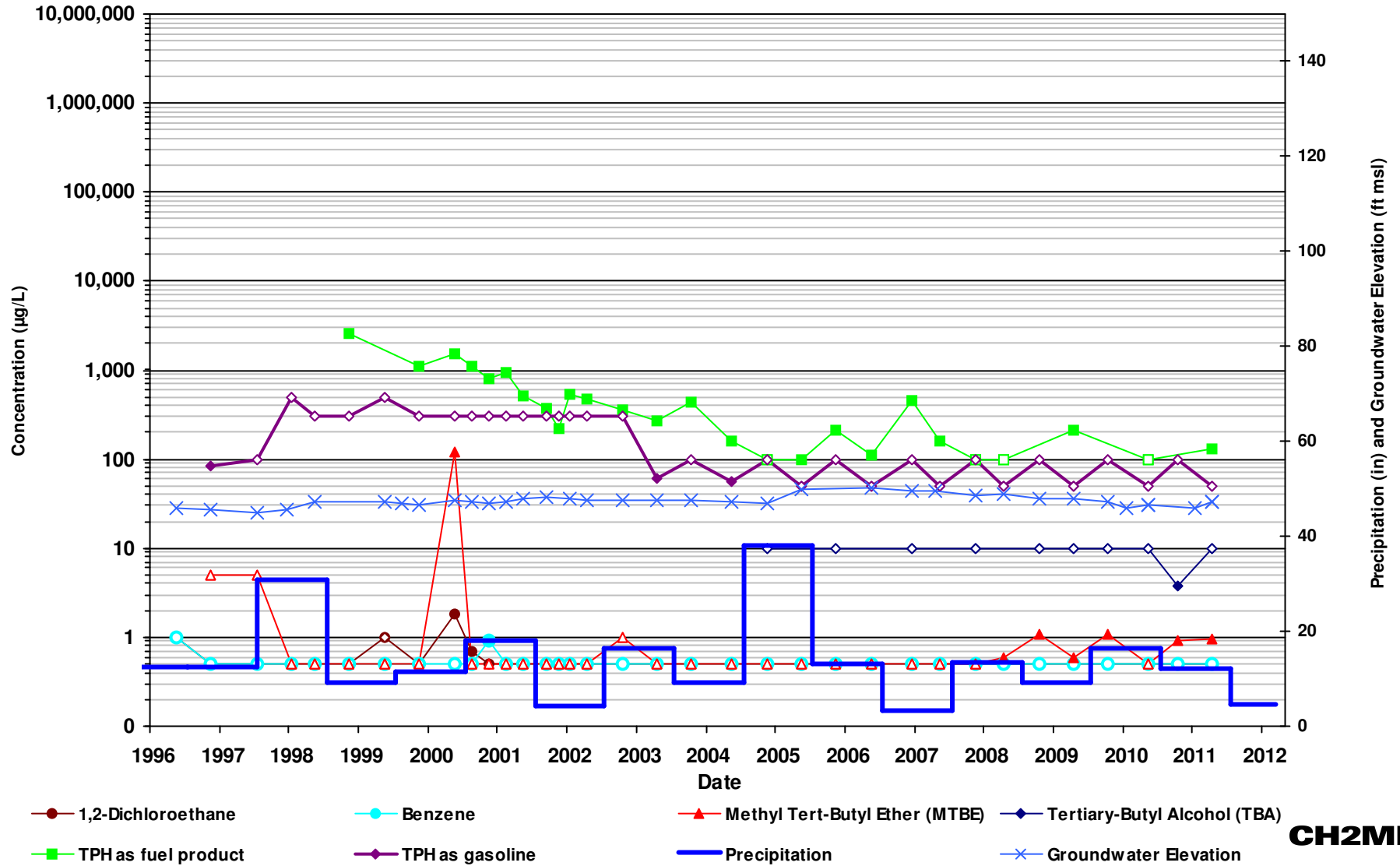


CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.

Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>

WCW-8



CH2MHILL

Non detect results (ND) are plotted with an open symbol using the laboratory reporting limit.
 Precipitation data reported as annual rainfall which is calculated from Long Beach CIMIS #174 weather station. source: <http://www.ipm.ucdavis.edu/weather/sites/losangeles.html>