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September 26, 2018

Ms. Amy Butler
Illinois Environmental Protection Agency
Bureau of Land
1021 North Grand Avenue East
Springfield, Illinois 62794

Groundwater Management Zone – Additional Information
Roxana, Illinois
1191150002 – Madison County
Equilon Enterprises LLC d/b/a Shell Oil Products US
Log No. B-43R-M-32

Dear Ms. Butler:

On behalf of Shell Oil Products US (SOPUS), AECOM Technical Services, Inc. (AECOM) is submitting this additional information to the *Proposed Groundwater Management Zone* (GMZ) package, originally dated May 19, 2016 with updates in May 2017 and January 2018. This letter presents information with respect to the following:

- GMZ boundary
- Vertical extent of impact in Public Works Yard area
- Addition of Point of Vertical Groundwater Monitoring
- Groundwater trend information

These items were discussed with you in a meeting on April 5, 2018 and conference call on July 19, 2018. Your email dated September 5, 2018 requested submittal of the additional information.

GMZ Boundary

The GMZ boundary has been adjusted, as requested, to pass through groundwater monitoring wells that have not exceeded screening criteria for organic petroleum hydrocarbons. Refer to **Attachment 1**, which contains the revised **Figure 13 Proposed GMZ Boundary**, which is intended to replace Figure 13 included in the original Proposed GMZ submittal.

Vertical Extent of Impact in Public Works Yard Area

The vertical extent of impact in the vicinity of the Roxana Public Works Yard was discussed in the April 5, 2018 meeting and the July 19, 2018 conference call. The July 19th web-call included presentation of subsurface cross section figures from the *Response to Public Works Yard Soil Sampling Agency Comments Provided in July 9, 2013 Letter*, dated September 12, 2013. **Attachment 2** includes Figures 1 through 4 from the subject submittal. These figures depict the vertical extent of impact to practical limits based on a combination of soil analytical results and soil sample headspace measurements using a photoionization detector (PID).

Addition of Point of Vertical Groundwater Monitoring

As requested by IEPA, the P-93 nested wells (P-93A, P-93B, P-93C and P-93D) will be sampled as part of the Proposed GMZ program.

Groundwater Trend Information

In a meeting with IEPA on April 5, 2018, selected benzene concentration trend plots pertinent to GMZ discussions were presented. As requested by IEPA, these plots will be included in future groundwater monitoring reports and were initially included in the *2nd Quarter 2018 Report for the Roxana Interim Groundwater Monitoring Program*, dated July 3, 2018. **Attachment 3** includes these previously reported charts from Appendix D of the 2nd Quarter 2018 Report (Benzene Concentrations over Time for MW-7, MW-8, MW-22, MW-25, P-57, P-59, ROST-4-PZ(C), and T-12), which represent groundwater conditions in the 4th Street and Public Works Yard areas. Some of these wells are located along the western (upgradient) margins of the dissolved phase plume and their decreasing trends are indicative of plume migration toward the pumping centers in the refinery.

If you have any further questions during your review, please contact Kevin Dyer, SOPUS Senior Principal Program Manager, at kevin.dyer@shell.com (618/288-7237), or Bob Billman at bob.billman@aecom.com (314/802-1122).

Sincerely,

AECOM, on behalf of Shell Oil Products US

Wendy Pennington, PE
Project Engineer

Robert B. Billman, PG
Senior Project Manager

Enclosures:
Attachment 1 - Figure 13 Proposed GMZ Boundary
Attachment 2 - Figure 1 Public Works Yard Plan View and Cross Section Key Map
Figure 2 Cross Section A-A' Public Works Yard
Figure 3 Cross Section B-B' Public Works Yard
Figure 4 Cross Section C-C' Public Works Yard
Attachment 3 - Benzene Concentrations over Time for MW-7, MW-8, MW-22, MW-25, P-57, P-59, ROST-4-PZ(C), and T-12

cc: Kevin Dyer, SOPUS
Eric Petersen, Phillips 66
Gina Search, IEPA, Collinsville
Repositories –Roxana Public Library, website

LEGEND

- QUARTERLY GROUNDWATER GAUGING
- SEMI–ANNUAL GROUNDWATER SAMPLING AND QUARTERLY GAUGING
- ANNUAL GROUNDWATER SAMPLING AND QUARTERLY GAUGING
- WRR GROUNDWATER PRODUCTION WELL LOCATION
- WRR OIL RECOVERY WELL LOCATION
- PROPOSED GMZ BOUNDARY (REVISED 9/2018)
- APPROXIMATE EXTENT OF WELLS EXCEEDING CLASS I WATER QUALITY STANDARDS FOR ORGANIC PETROLEUM HYDROCARBON CONSTITUENTS FOR CURRENT (2Q18) GROUNDWATER CONDITIONS

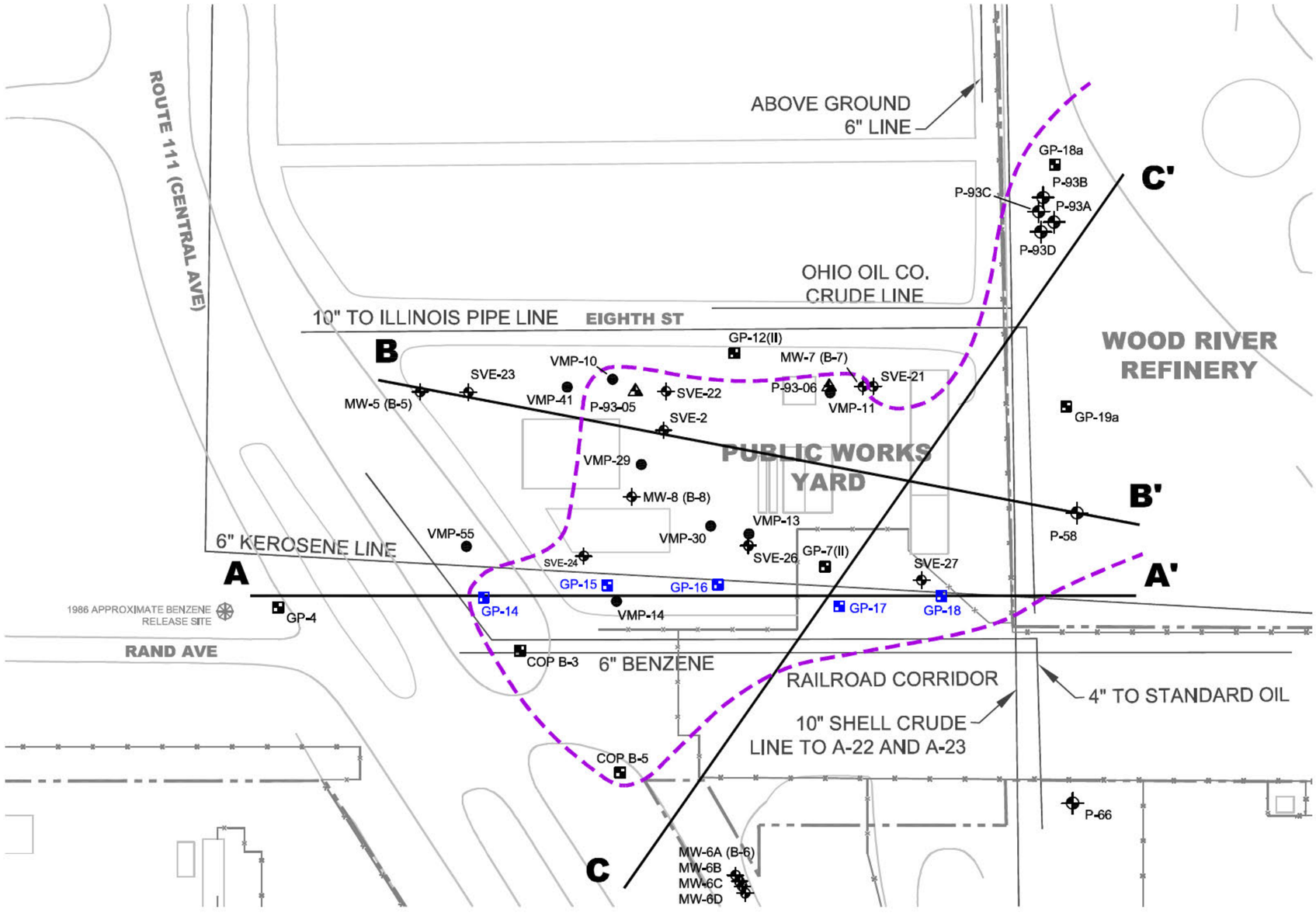
0 500 SCALE FEET

0 1000 SCALE FEET

DRAFT

SHELL OIL PRODUCTS US GROUNDWATER MANAGEMENT ZONE ROXANA, ILLINOIS	PROJECT NO. 60477387
AECOM	
DRN. BY: djd May 2018 DSGN. BY: bbb CHKD. BY: bbb	Proposed GMZ Boundary — FIG. NO. 13

File: G:\STLOUIS\JOBS\PROJECTS\EM\SHELL\60227988 WRR 2018\300 DELIVERABLES\(DELIV)\GMZ\FIGURES\FIGURE 13 PROPOSED GMZ (2018).DWG Last edited: SEP. 19, 18 @ 08:55 a.m. by: wendy.pennington



LEGEND

- SOIL BORING LOCATION (MOST RECENT PUBLIC WORKS YARD SAMPLING)
- APPROXIMATE HORIZONTAL EXTENT OF SOIL IMPACT (SEE NOTE)
- SOIL BORING LOCATION
- CPT/MIP LOCATION
- GROUNDWATER MONITORING WELL LOCATION SOIL VAPOR EXTRACTION (SVE) WELL LOCATION
- VAPOR MONITORING POINT LOCATION
- A——A' CROSS SECTION TRANSECT LINE

NOTES:

1. INFORMATION FROM BORING LOCATIONS SHOWN WERE REVIEWED FOR THE PURPOSES OF THIS RESPONSE SUBMITTAL. NOT ALL OF THE LOCATIONS SHOWN ARE INCLUDED ON THE ACCOMPANYING CROSS SECTIONS.
2. HORIZONTAL EXTENT OF IMPACT BASED ON: EXCEEDANCES OF TACO INDUSTRIAL/COMMERCIAL AND/OR CONSTRUCTION WORKER SCREENING CRITERIA FOR BENZENE; "RED" OR "PINK" SUDAN IV(R) SCREENING RESULTS; AND/OR PID HEADSPACE SCREENING RESULTS GREATER THAN 500 PPM.
3. PIPELINE INFORMATION IS A COMPILATION FROM SEVERAL DRAWINGS PROVIDED BY THE REFINERY IN 2009 AND IS NOT MEANT TO BE USED AS AN ACTUAL UTILITY PIPELINE LOCATION MAP.

0 100
SCALE FEET

N

SHELL OIL PRODUCTS US ROXANA, ILLINOIS	PROJECT NO. 21562850
URS	
DRN. BY: wmp 8/16/13 DSGN. BY: djd CHKD. BY: bj/rt	Public Works Yard Plan View and Cross Section Key Map
	FIG. NO. 1

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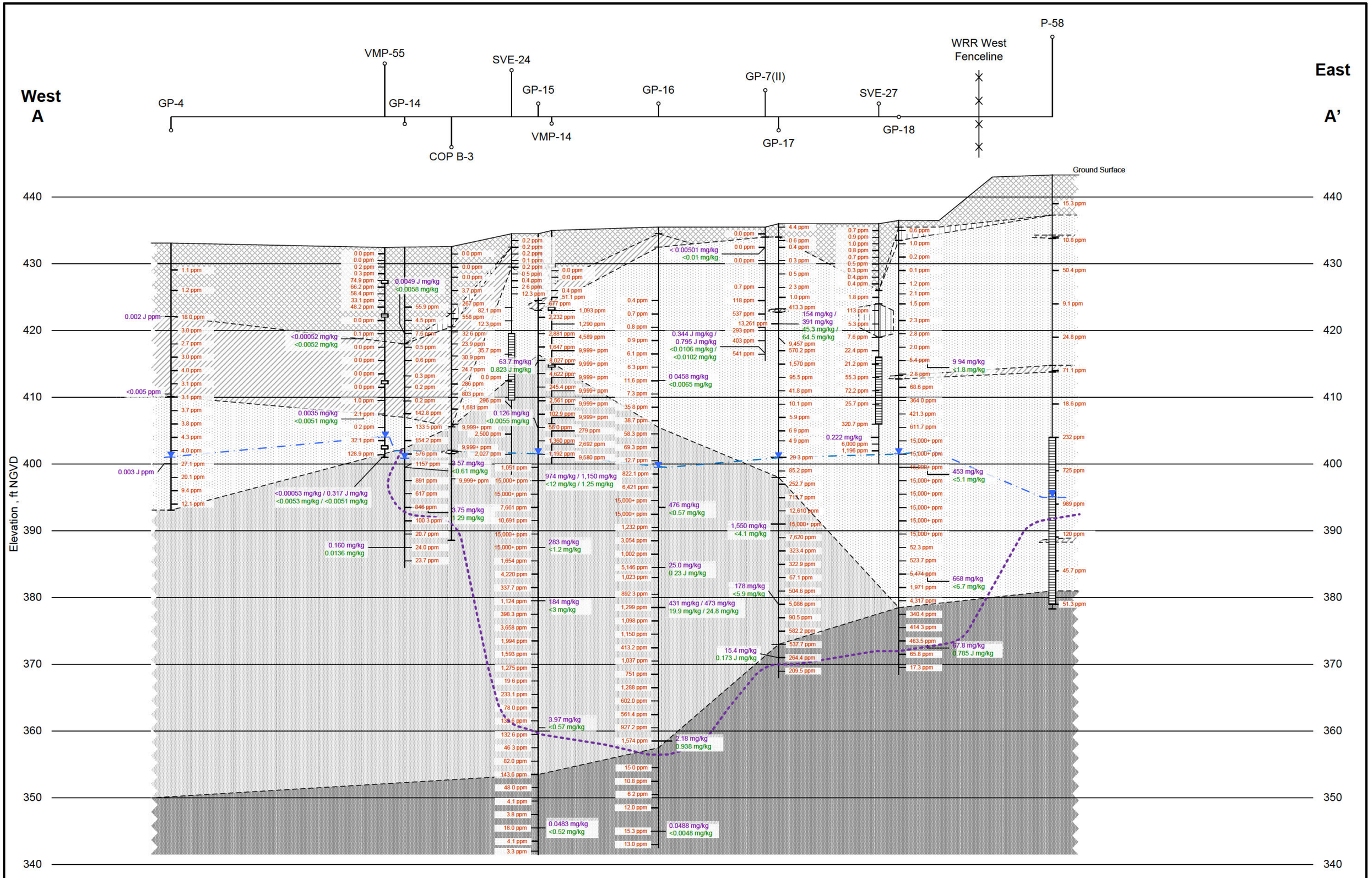


Notes:
This cross section is generally based on interpretation of borings generated by URS during investigative activities between 2008 through 2013. Location of cross section can be found on key map (Figure 1).

Construction details (screen length and depth, seal interval, total depth, etc) of monitoring wells and vapor monitoring ports installed were based on geologic conditions observed during drilling and sampling activities. Actual geologic conditions observed within monitoring well boring can be viewed in field boring logs.

Cross section trace line shows distance and direction each point was projected to construct this cross section.

Approximate horizontal and vertical extent of impact is based on benzene analytical exceedances of TACO industrial/commercial and construction worker screening criteria, and/or PID headspace screening results greater than 500 ppm.

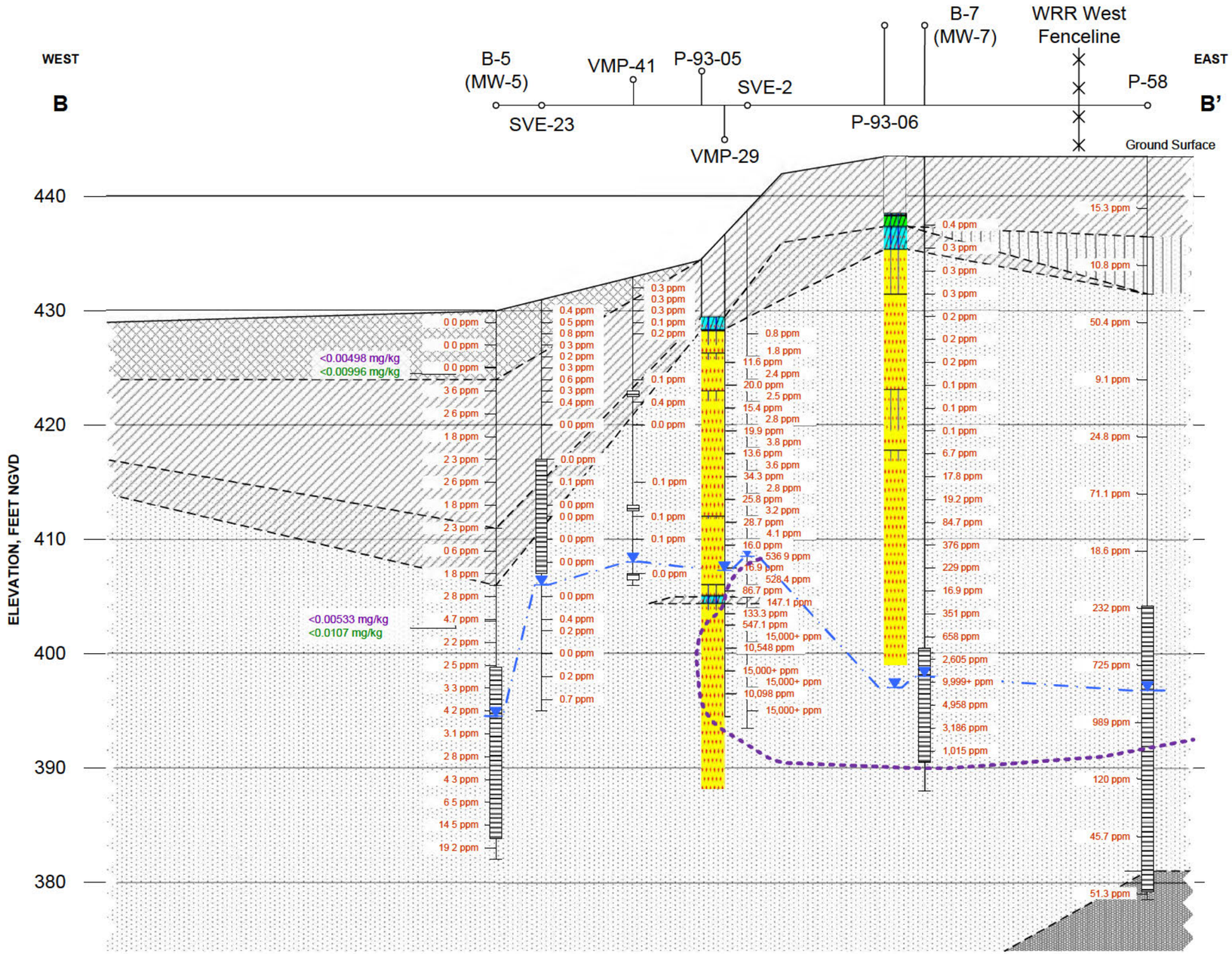
Legend:

- Fill projected between borings
- Clay projected between borings
- Silt projected between borings
- Fine to Medium Sand projected between borings
- Medium to Coarse Sand projected between borings
- Coarse Sand with coarse gravel projected between borings
- Stratum boundary - estimated
- Well Screen
- 55.6 mg/kg — Soil Sampling Benzene Result
- 0.938 mg/kg — Soil Sampling Naphthalene Result
- 132.6 ppm — Soil Sampling Headspace Screening Result
- Potentiometric Surface – At Time of Drilling
- Approximate Vertical Extent of Impact into Groundwater (see note)

Vertical Scale: 0 10

Plan View and Horizontal Scale: 0 50

SHELL OIL PRODUCTS US ROXANA, ILLINOIS	PROJECT NO. 21562850
URS	
DRN. BY: mpm/wmp 9/10/13 DSGN. BY: wmp CHKD. BY: b3/rt	Cross Section A - A' Public Works Yard
	FIG. NO. 2



Legend:

- Fill (gravel, clay, etc.) projected between points
- Silt projected between points
- Clay projected between points
- Clayey Sand projected between points
- Fine to Medium Sand projected between borings
- Medium to Coarse Sand projected between borings
- Coarse Sand with coarse gravel projected between borings
- CPT interpreted Clay
- CPT interpreted Sandy Clay
- CPT interpreted Sand
- Stratum boundary - assumed
- Well Screen
- 55.6 mg/kg Soil Sampling Benzene Result
- 0.938 mg/kg Soil Sampling Naphthalene Result
- 132.6 ppm Soil Sampling Headspace Screening Result
- Water Level
- Potentiometric Surface - assumed
- Approximate Vertical Extent of Impact into Groundwater (see note)

Vertical Scale: 0 10

Plan View and Horizontal Scale: 0 100

Notes:

This cross section is generally based on interpretation of borings generated by URS during investigative activities between 2008 through 2013. Location of cross section can be found on key map (Figure 1).

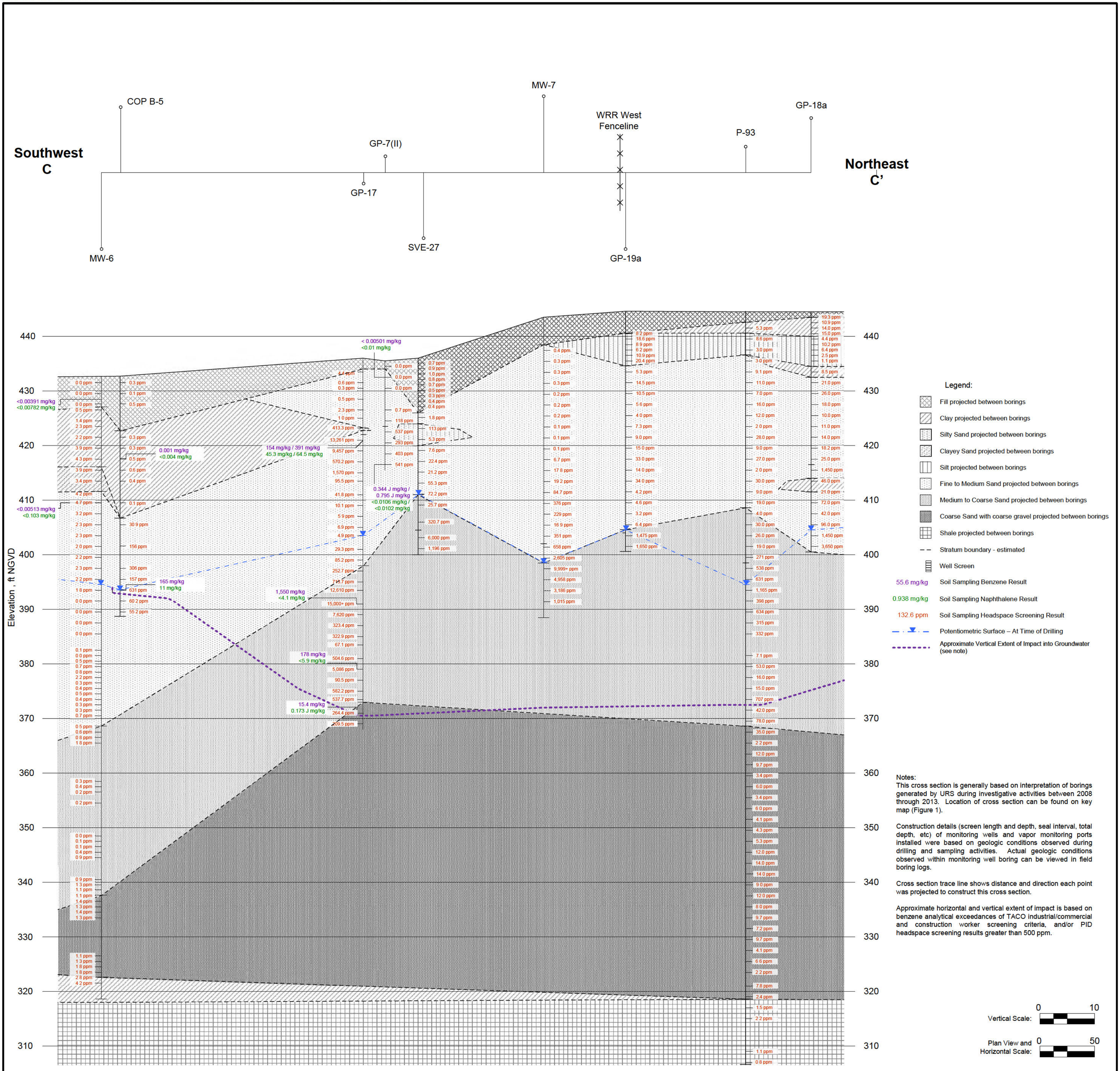
Construction details (screen length and depth, seal interval, total depth, etc) of monitoring wells and vapor monitoring ports installed were based on geologic conditions observed during drilling and sampling activities. Actual geologic conditions observed within monitoring well boring can be viewed in field boring logs.

Cross section trace line shows distance and direction each point was projected to construct this cross section.

Approximate horizontal and vertical extent of impact is based on benzene analytical exceedances of TACO industrial/commercial and construction worker screening criteria, and/or PID headspace screening results greater than 500 ppm.

SHELL OIL PRODUCTS US ROXANA, ILLINOIS	PROJECT NO. 21562850
URS	
DRN. BY: mpm/wmp 9/10/13 DSGN. BY: mpm CHKD. BY: b3/rt	Cross Section B - B' Public Works Yard
	FIG. NO. 3

G:\StLouis\DCS\Projects\ENV\SHELL\SHELL 2013\ROXANA\21562850-1J_ROXANA DR LLING\Public Works Soil Sampling\Further Delineation Request\Figures\Figure 4 Section C-C'.vsd 7/10/2018 4 08 PM



Notes:
This cross section is generally based on interpretation of borings generated by URS during investigative activities between 2008 through 2013. Location of cross section can be found on key map (Figure 1).

Construction details (screen length and depth, seal interval, total depth, etc) of monitoring wells and vapor monitoring ports installed were based on geologic conditions observed during drilling and sampling activities. Actual geologic conditions observed within monitoring well boring can be viewed in field boring logs.

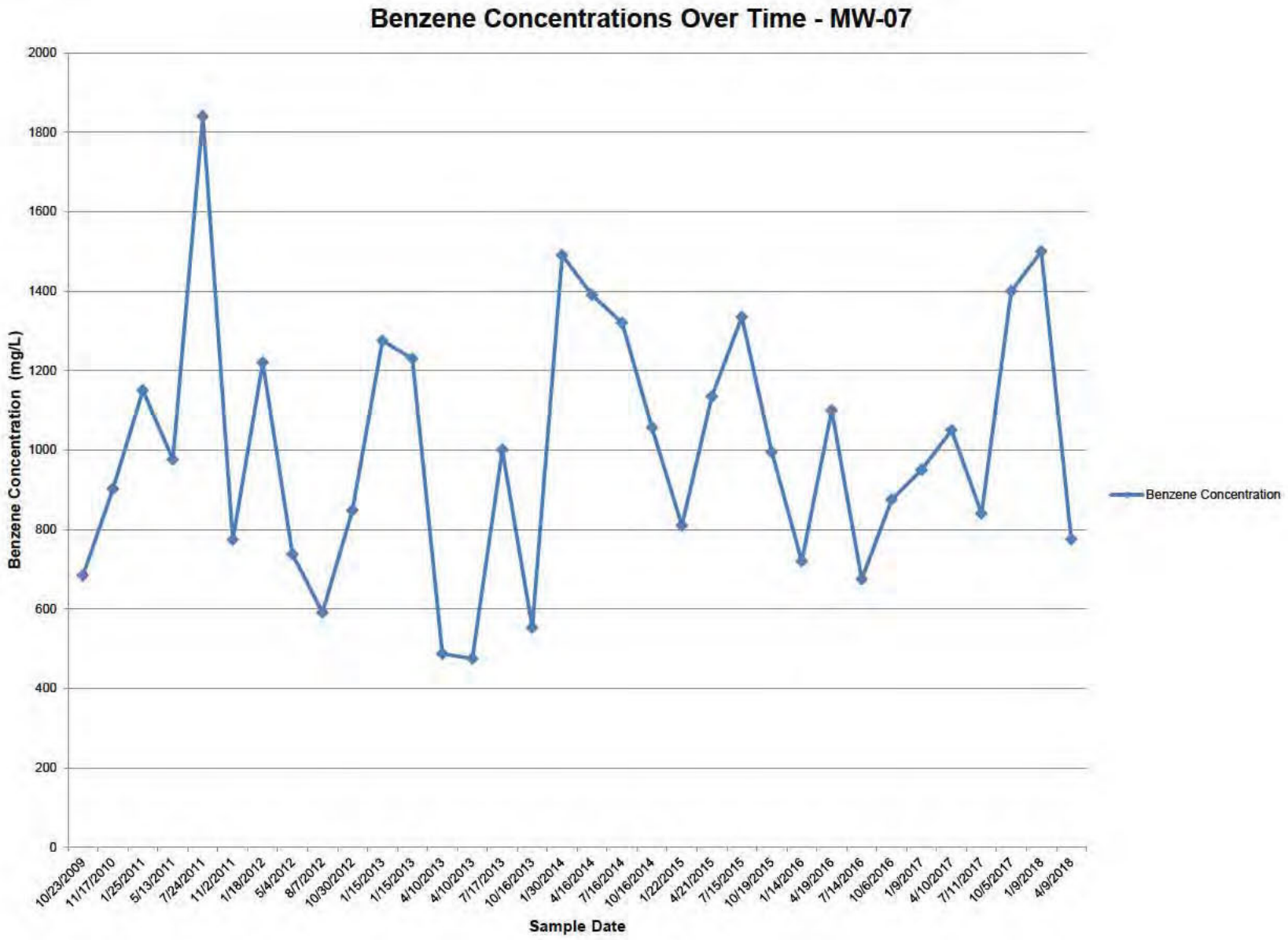
Cross section trace line shows distance and direction each point was projected to construct this cross section.

Approximate horizontal and vertical extent of impact is based on benzene analytical exceedances of TACO industrial/commercial and construction worker screening criteria, and/or PID headspace screening results greater than 500 ppm.

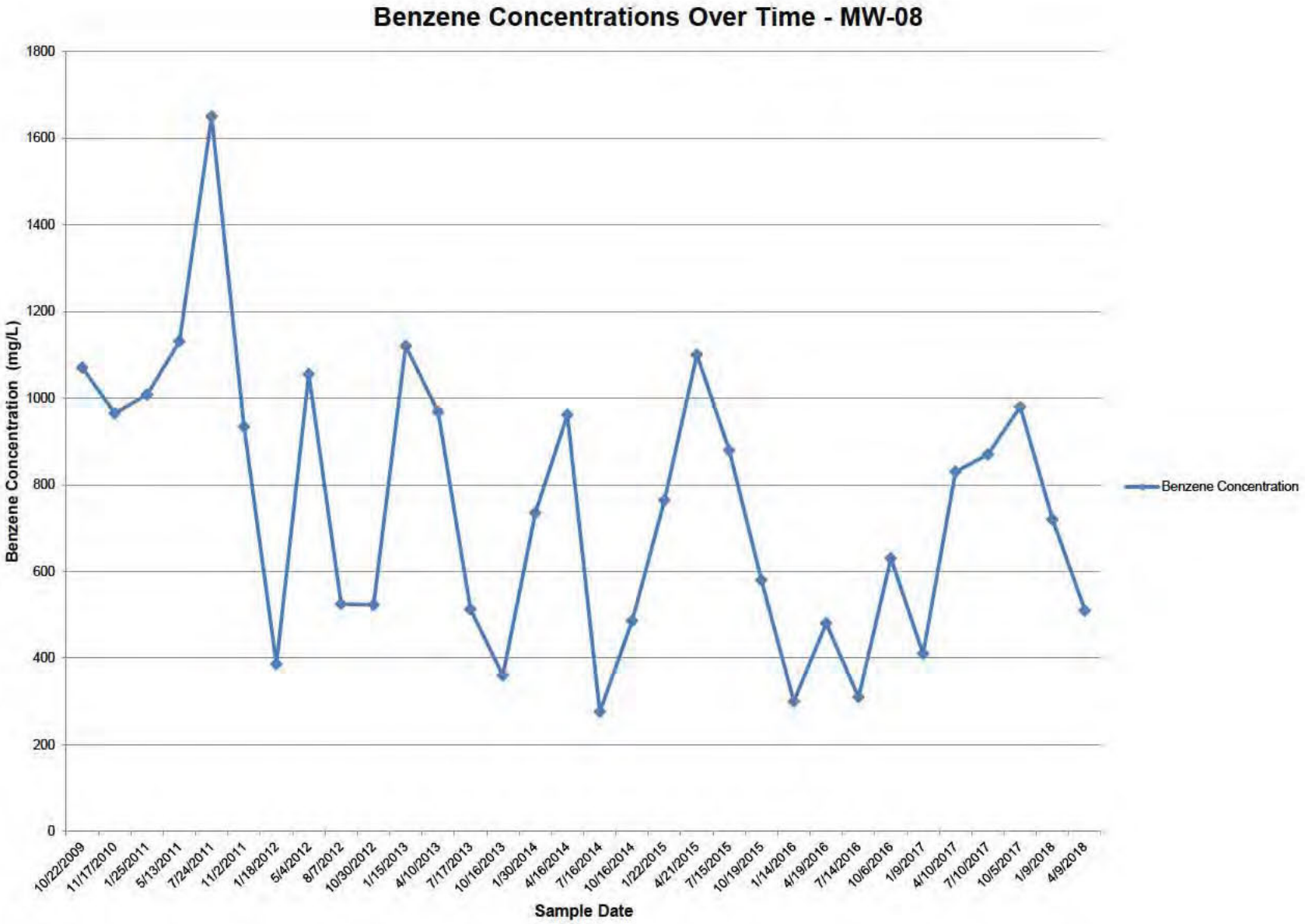
Vertical Scale: 0 10

Plan View and Horizontal Scale: 0 50

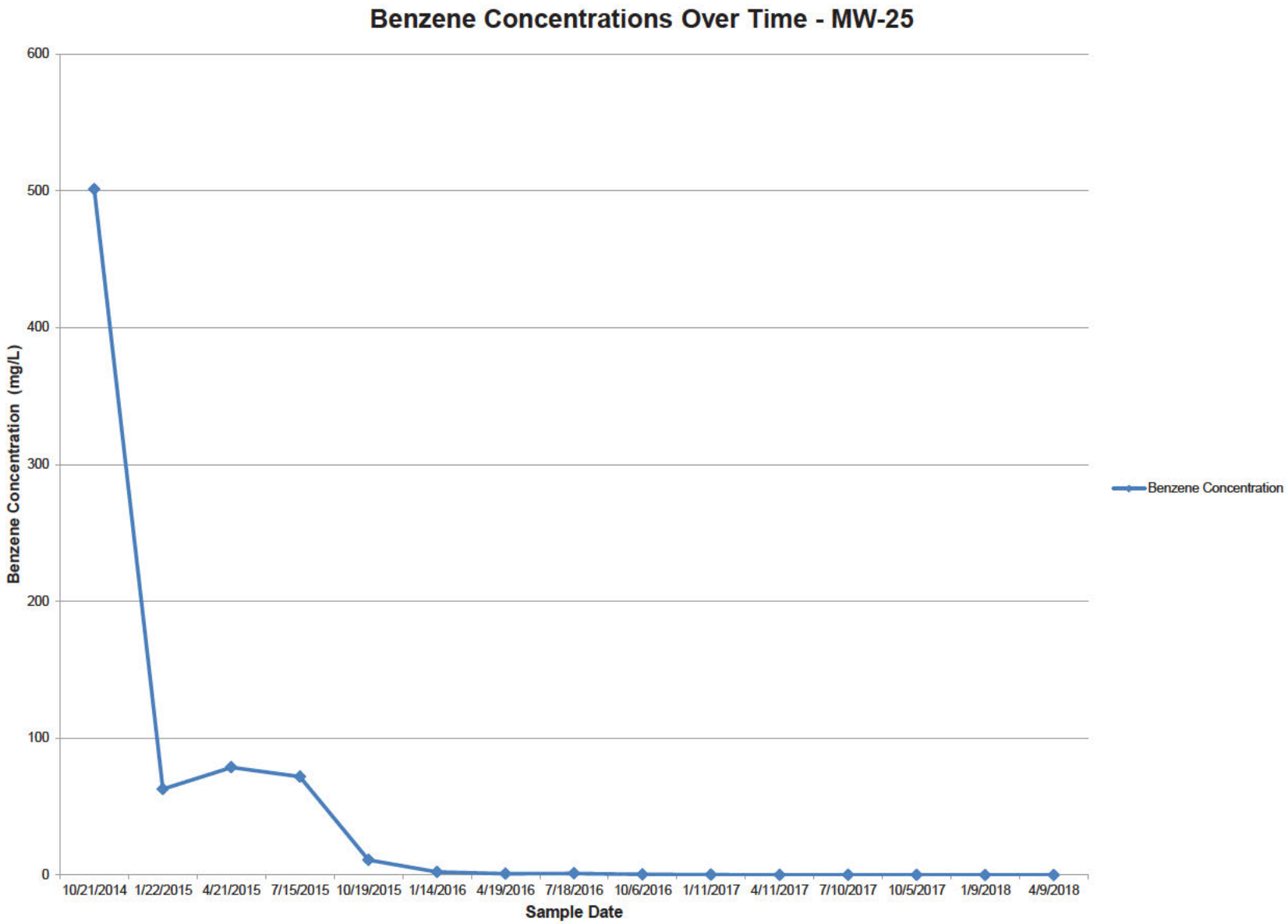
SHELL OIL PRODUCTS US ROXANA, ILLINOIS	PROJECT NO. 21562850
URS	
DRN. BY: mpm/wmp 9/10/13 DSGN. BY: wmp CHKD. BY: b3/rt	Cross SectionC - C' Public Works Yard
	FIG. NO. 4



Notes:
mg/L = milligrams per liter
Duplicate values were averaged.
Timeframe specific to available data.

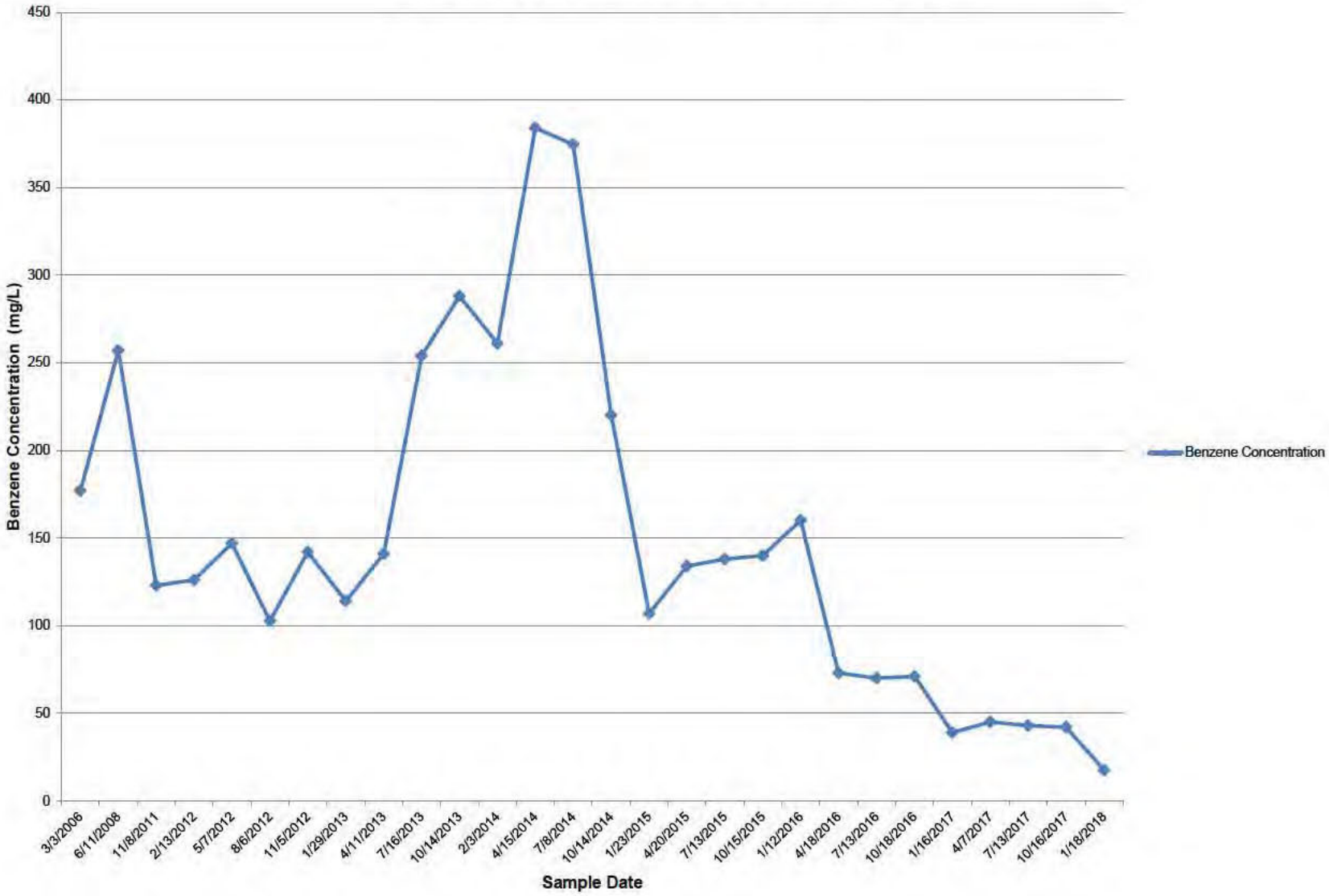


Notes:
mg/L = milligrams per liter
Duplicate values were averaged.
Timeframe specific to available data.

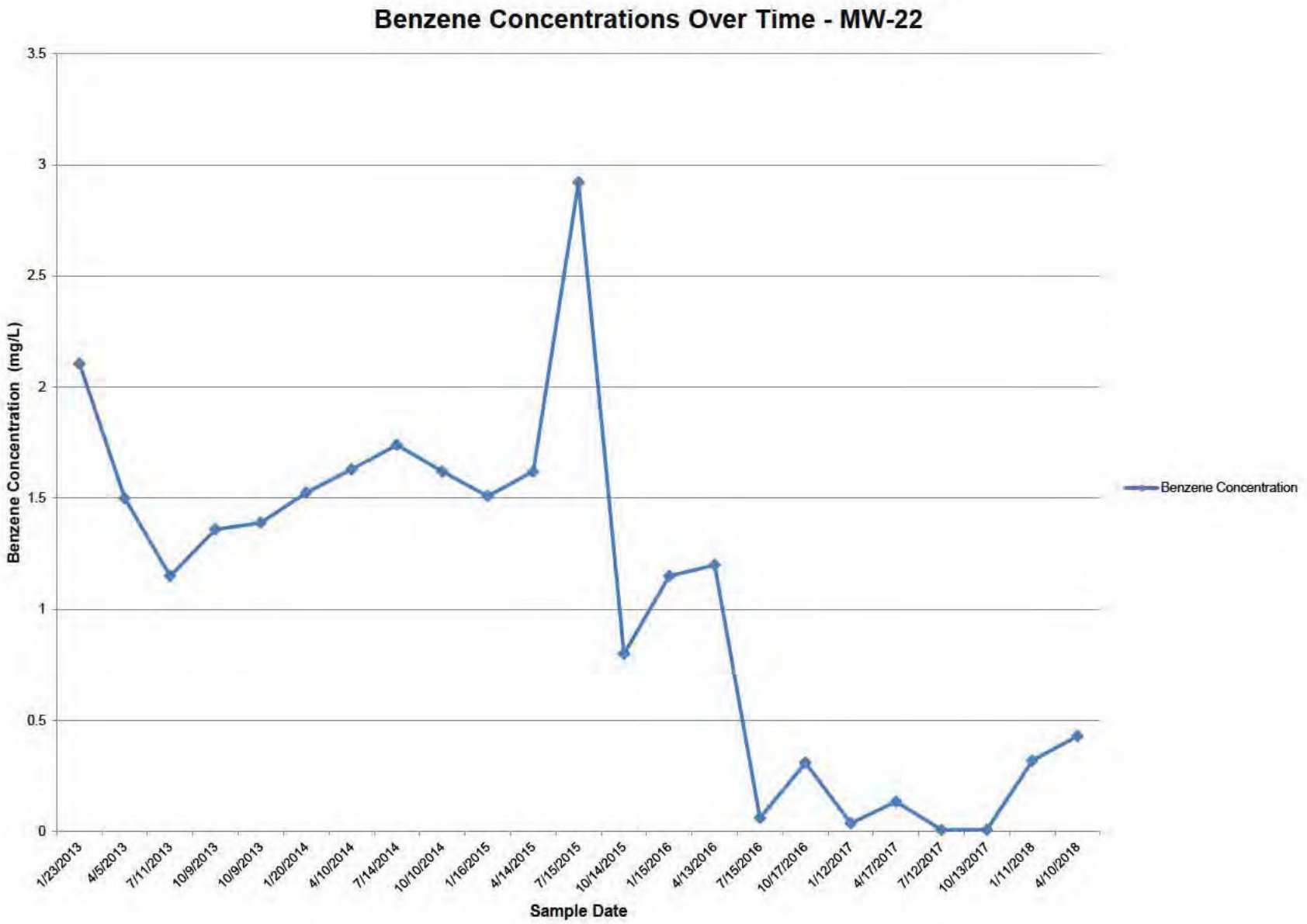


Notes:
mg/L = milligrams per liter
Duplicate values were averaged.
Timeframe specific to available data.

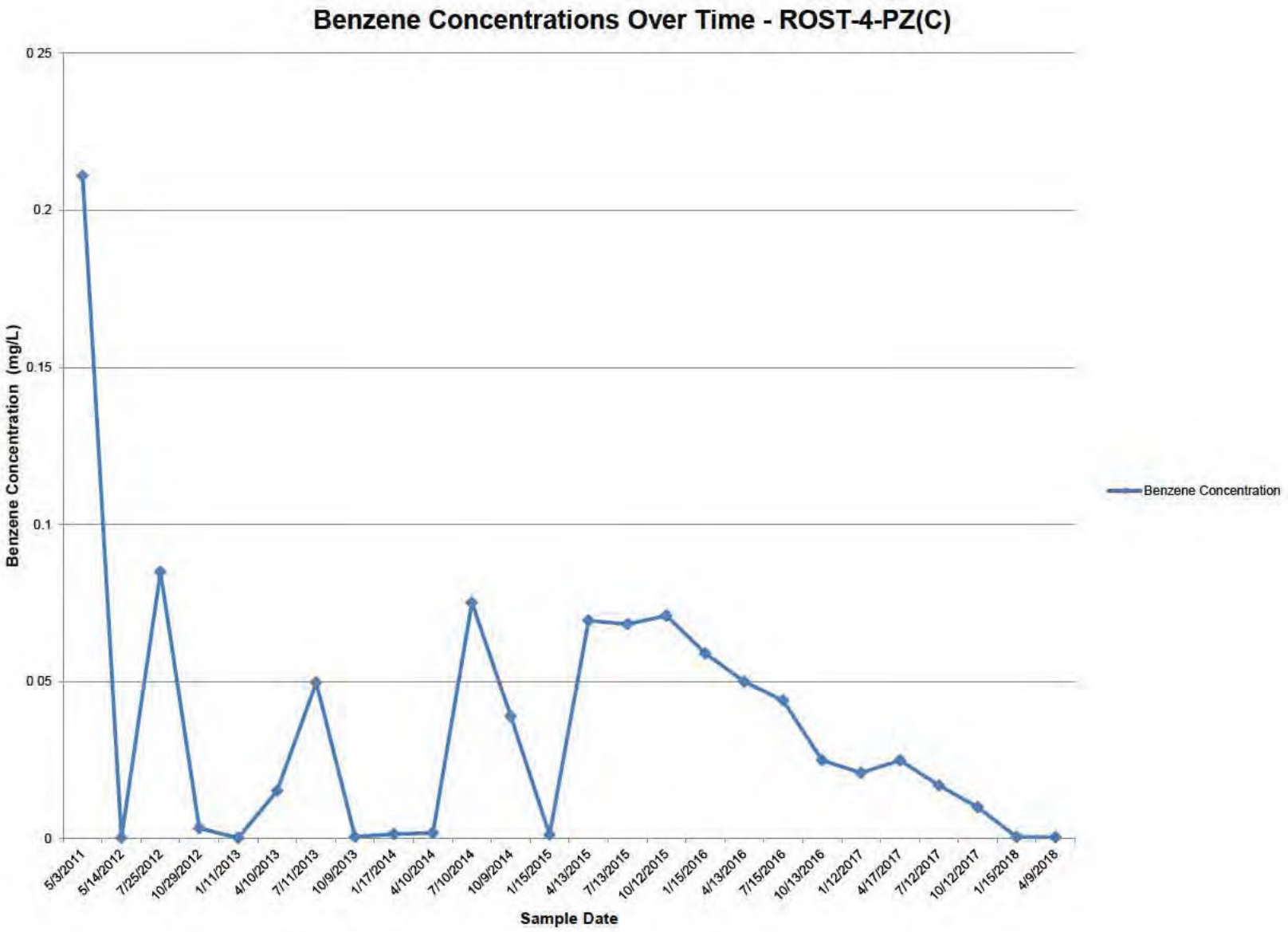
Benzene Concentrations Over Time - P-57



Notes:
mg/L = milligrams per liter
Duplicate values were averaged.
Timeframe specific to available data.

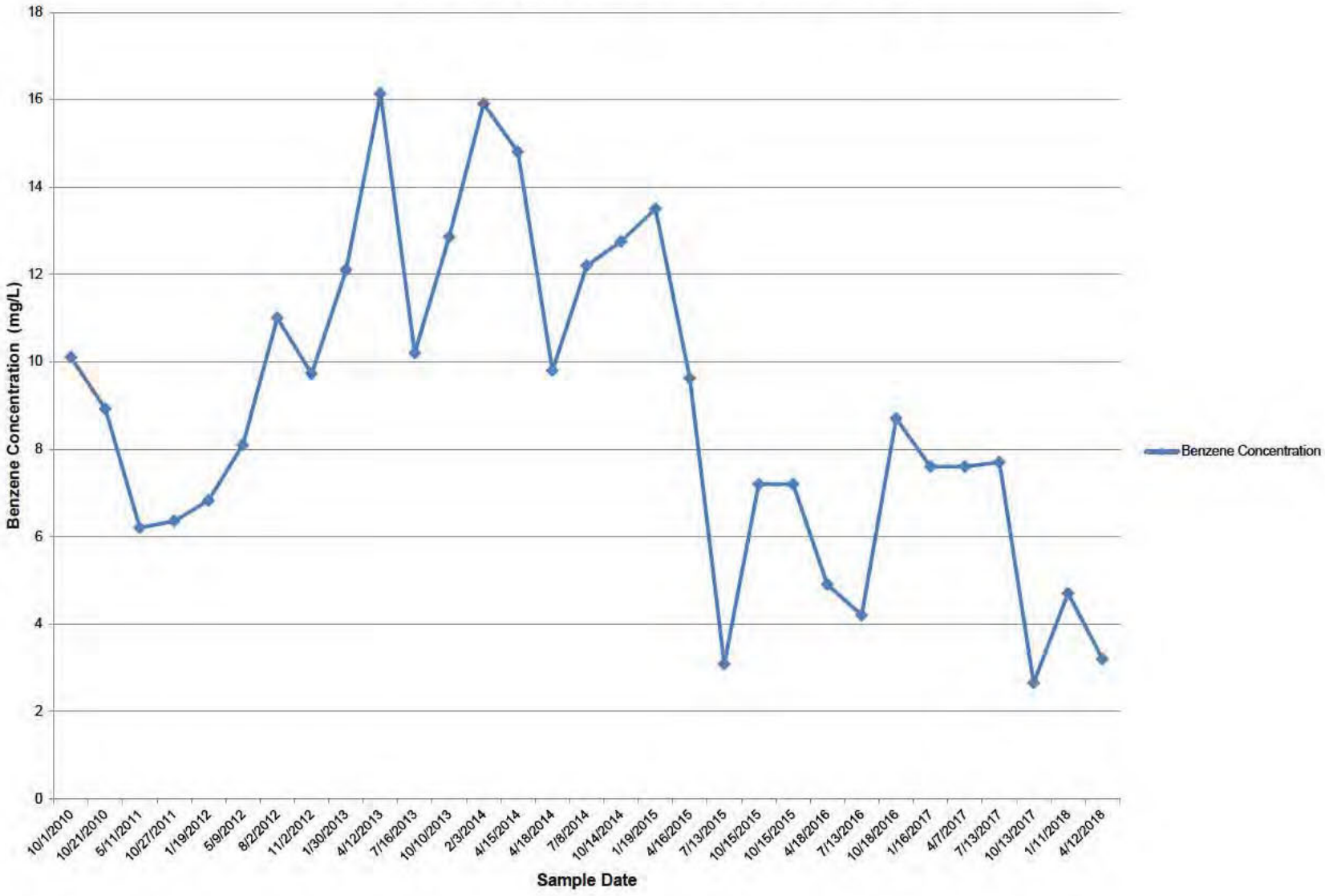


Notes:
mg/L = milligrams per liter
Duplicate values were averaged.
Timeframe specific to available data.



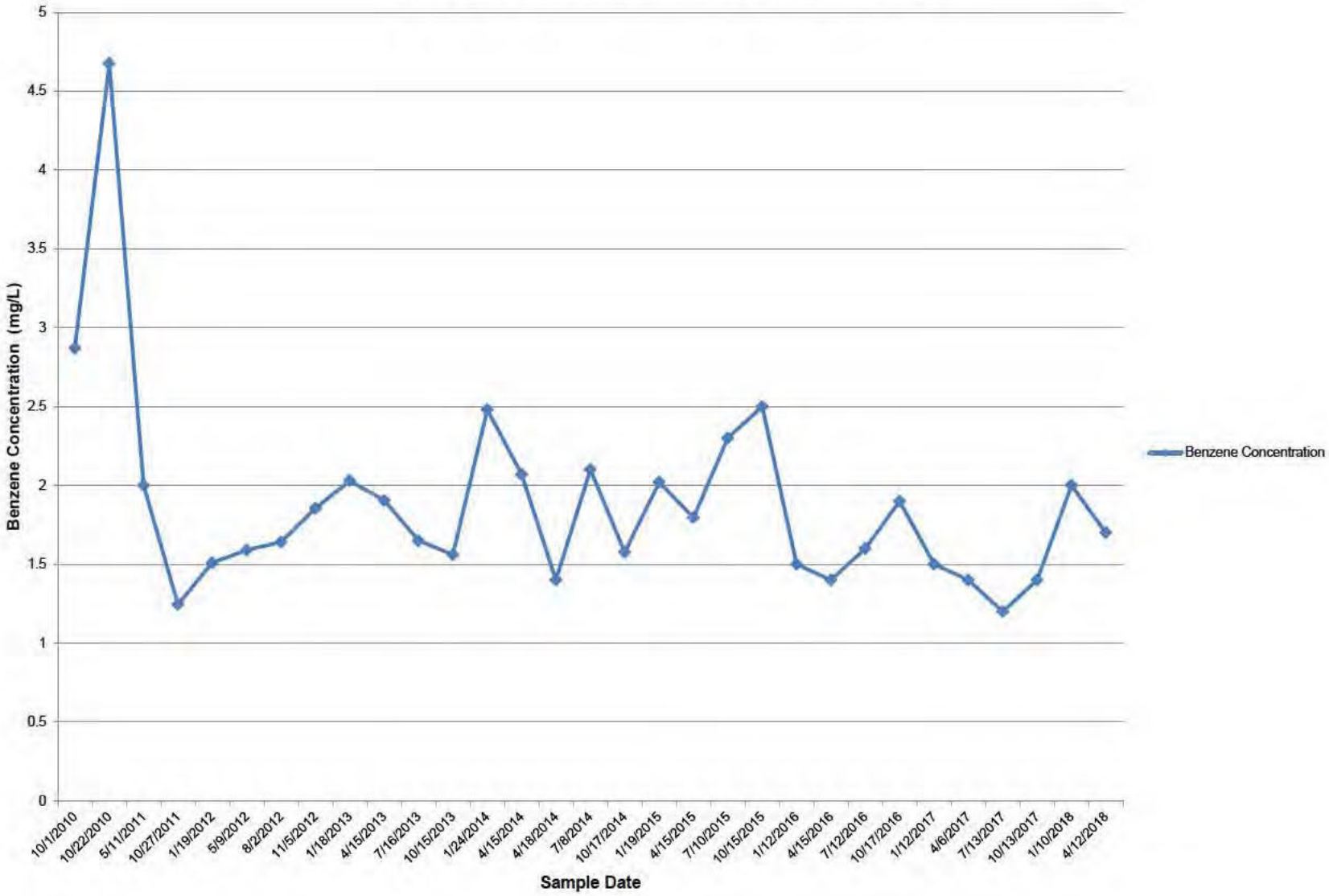
Notes:
mg/L = milligrams per liter
Duplicate values were averaged.
Timeframe specific to available data.
Non-detect values are shown at half the reporting limit.

Benzene Concentrations Over Time - P-59



Notes:
mg/L = milligrams per liter
Duplicate values were averaged.
Timeframe specific to available data.

Benzene Concentrations Over Time - T-12



Notes:
mg/L = milligrams per liter
Duplicate values were averaged.
Timeframe specific to available data.