Illinois Environmental Protection Agency

Bureau of Land • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

ILLINOIS EPA RCRA CORRECTIVE ACTION CERTIFICATION

This certification must accompany any document submitted to Illinois EPA in accordance with the corrective action requirements set forth in a facility's RCRA permit. The original and two copies of all documents submitted must be provided.

1.0 Facility Identification

Name: WRB Refining LP - Wood River Refinery
Street Address: 900 South Central Ave.
City: Roxana, IL 62084
County: Madison
Site No. (IEPA): 1191150002
Site No. (USEPA): ILD 080 012 305

2.0 Owner Information

Name: Not Applicable
Mail Address:
City:
State: Zip Code:
Contact Name:
Contact Title:
Phone:

3.0 Operator Information

Name: Equilon Enterprises LLC d/b/a Shell Oil Products US
Mail Address: 17 Junction Drive PMB #399
City: Glen Carbon
State: IL Zip Code: 62034
Contact Name: Kevin Dyer
Contact Title: Principal Program Manager
Phone: 618-288-7237

4.0 Type of Submission (check applicable item and provide requested information, as applicable)

- ☐ RFI Phase I Workplan/Report
- ☐ RFI Phase II Workplan/Report
- ☐ CMP Report;
- ☒ Other (describe): Groundwater Conditions near East 3rd & Chaffer St., Roxana, IL

IEPA Permit Log No.: B-43R
Date of Last IEPA Letter on Project: July 18, 2013
Log No. of Last IEPA Letter on Project: B-43R-CA-33, CA-45 & CA-48
Does this submittal include groundwater information: ☒ Yes ☐ No
Date of Submittal:

5.0 Description of Submittal: (briefly describe what is being submitted and its purpose)

Response to IEPA Letter dated April 8, 2013

6.0 Documents Submitted (identify all documents in submittal, including cover letter; give dates of all documents)

Corrective Action Certification and Letter

7.0 Certification Statement

(This statement is part of the overall certification being provided by the owner/operator, professional and laboratory in Items 7.1, 7.2 and 7.3 below). The activities described in the subject submittals have been carried out in accordance with procedures approved by Illinois EPA. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

For: Equilon Enterprises LLC d/b/a Shell Oil Products US

Date of Submission: _____

7.1 Owner/Operator Certification

(Must be completed for all submittals. Certification and signature requirements are set forth in 35 IAC 702.126.) All submittals pertaining to the corrective action requirements set forth in a RCRA Permit must be signed by the person designated below (or by a duly authorized representative of that person):

1. For a Corporation, by a principal executive officer of at least the level of vice president.
2. For a Partnership or Sole Proprietorship, by a general partner or the proprietor, respectively.
3. For a Governmental Entity, by either a principal executive officer or a ranking elected official.

A person is a duly authorized representative only if:

1. the authorization is made in writing by a person described above; and
2. the written authorization is provided with this submittal (a copy of a previously submitted authorization can be used).

Owner Signature: _____ Date: 7/26/13

Title: Principal Program Manager

Operator Signature: _____ Date: _____

Title: _____

7.2 Professional Certification (if necessary)

Work carried out in this submittal or the regulations may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. No one is relieved from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44 (h))

Professional's Signature: _____ Date: 7/29/13

Professional's Name: Robert B. Billman

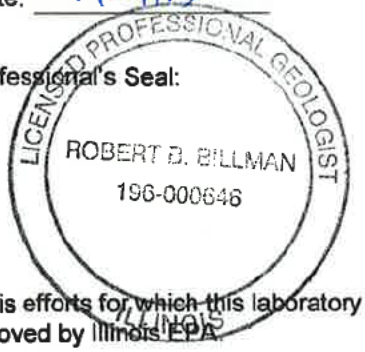
Address: URS Corporation, 1001 Highlands Plaza Drive West

City: St. Louis

State: MO Zip Code: 63110

Phone: 314-743-4108

Professional's Seal:



7.3 Laboratory Certification (if necessary)

The sample collection, handling, preservation, preparation and analysis efforts for which this laboratory was responsible were carried out in accordance with procedures approved by Illinois EPA.

Name of Laboratory _____

_____ Date: _____

Signature of Laboratory Responsible Officer

Mailing Address of Laboratory

Address _____

City _____

State _____ Zip Code _____

_____

Name and Title of Laboratory Responsible Officer

URS

July 29, 2013

Mr. Stephen Nightingale, P.E.
Illinois Environmental Protection Agency
Bureau of Land
1021 North Grand Avenue East
Springfield, Illinois 62794

Subject: **Response to IEPA Letter April 8, 2013**
Groundwater Conditions near East 3rd and Chaffer Streets,
Roxana, Illinois
Log No. B-43R-CA-38 and CA-41
1191150002 -- Madison County
Equilon Enterprises d/b/a Shell Oil Products US

Dear Mr. Nightingale:

URS Corporation (URS), on behalf of Shell Oil Product US (SOPUS), is providing this letter in response to the Agency's April 8, 2013 letter. In that letter, the Agency approved revisions to the 4th quarter 2010 Groundwater Monitoring Report and approved the 2nd quarter 2012 Groundwater Monitoring Report. The letter also included one condition (with parts a, b and c) with comments concerning groundwater conditions near East 3rd and Chaffer Streets in Roxana, Illinois.

Groundwater levels measured in monitoring wells located in the area of East 3rd and Chaffer Streets in Roxana indicate the presence of a local, northwest-trending piezometric high with contours that are convex to the southeast (**Figure 1**). The water level contours near the nose of the high are more closely spaced than elsewhere. Groundwater flow lines indicate that groundwater on and around the high flows towards the pumping centers at the Wood River Refinery (WRR) (**Figure 1**).

To gain an improved understanding of the hydrogeologic conditions associated with the piezometric high, a data review was conducted which involved boring logs, well construction diagrams, historical water level data, and groundwater contour maps. The results of the review are described below.

The piezometric high is related to a localized low-permeability zone of silty sand, silt, and clay layers occurring between 40 and 50 feet below the ground surface (**Figures 2 and 3**). Most of the ROST-series wells and well P-60-S are at least partially screened in this low-permeability material. As shown on the cross-section in **Figure 3**, localized pockets and lenses of silt and clay are common elsewhere within the high-permeability (high-k) sand-and-gravel deposits beneath Roxana and the WRR. Given the alluvial and glacio-fluvial depositional environments

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of sediments in the Mississippi River Valley (American Bottoms), it is possible that these silt and clay intervals represent the fill deposits of abandoned channels or perhaps the erosional remnants of overbank deposits.

Time series plots of water level elevation data were reviewed, and groundwater contour maps were prepared for rising head, falling head, and near static water level conditions (**Figure 4**). The plots and contour maps indicate that wells screened in the low-permeability zone are slower to respond to rising and falling water levels than wells screened in the surrounding sands. This suggests that the sandy intervals within and immediately above the low-permeability zone may contain more silt and clay than is indicated by the boring logs (see cross-section in **Figure 3**).

The review of hydrogeologic data also indicates that hydraulic conductivity within the low-permeability zone varies laterally. The highest water level elevations and steepest hydraulic gradients occur on the east side of the zone along Chaffer Street (**Figure 2**). This is consistent with boring logs, which show that the ROST wells along Chaffer Street are partially screened in clay and silt layers. In contrast, the hydraulic gradients are less steep on the western flank of the piezometric high. This is consistent with the boring log from ROST-3-PZ (ROST-3-MW), which indicates the presence of silty sand in the screened interval but not clay or silt layers.

Based on the results of the data review, an empirical hydrogeologic model of the low-permeability zone was developed. The model is shown on **Figure 5**. The approximate location of the hydrogeologic profile in the model is shown on **Figure 4**. The key hypotheses of the model are as follows:

- Under steady-state conditions in which the low-permeability zone is recharged by infiltration of precipitation and by groundwater flow from upgradient areas, the water level elevations in and above the low permeability zone are higher than those in the surrounding high-K sands. Higher groundwater elevation above the low-K zone is expected, because when infiltrating water meets the resistance of the zone, water has to dissipate to the surrounding areas. The hydraulic effect is similar to a perched zone, although water is not perched at the location of discussion.
- The differences in water level elevations between the low-permeability zone and surrounding high-K sands result in steeper hydraulic gradients (i.e., closely-spaced contours) near the edges of the low-permeability zone. The gradients are steepest near the eastern edge of the zone along Chaffer Street. (Examples are shown on the water level contour maps on **Figures 2 and 4**.)
- When the water table is rising or falling (i.e., transient conditions), there is a lag time between the response of water levels in the low-permeability zone relative to water-level changes in the surrounding high-K sands.

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Based on the findings of this review, we believe that heterogeneity of aquifer material can cause localized groundwater contour features, such as highs and lows. A localized high does not necessarily lead to loss of capture. As shown in Figure 1, water particles released in the localized high area are captured by the extraction wells. Water levels measured in the ROST-series piezometers and nearby wells will continue to be used to prepare water level contour maps. In addition, flow lines will be drawn on the contour maps to illustrate that groundwater flowing across the piezometric high flows towards the groundwater pumping centers at the WRR.

If you have any questions please contact Kevin Dyer, SOPUS Principal Program Manager at (618) 288-7237 or Kevin.dyer@shell.com or me at (314) 743-4108 or bob.billman@urs.com.

Sincerely,

Rudolph Torrini, Jr.

Rudy Torrini, Jr.
Senior Project Scientist

Robert B Billman

Robert B. Billman
Senior Project Manager

Enclosures

cc: Kevin Dyer, SOPUS
Amy Boley, IEPA
File

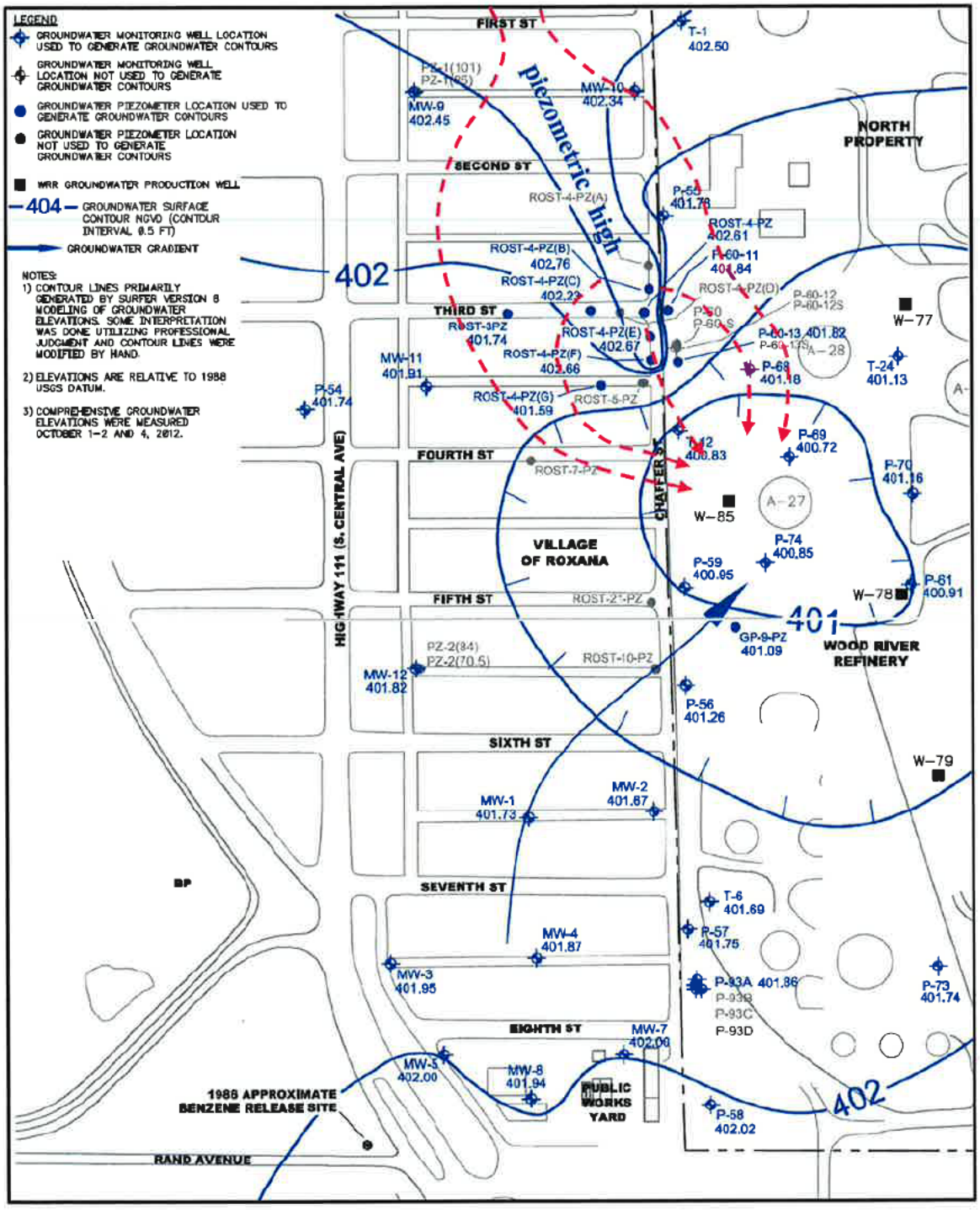

Figure 1. Water level contours from the 4th Quarter 2012 Groundwater Monitoring Event. The Figure has been modified with the dashed magenta flow lines that depict groundwater flow across the piezometric high towards the WRR.

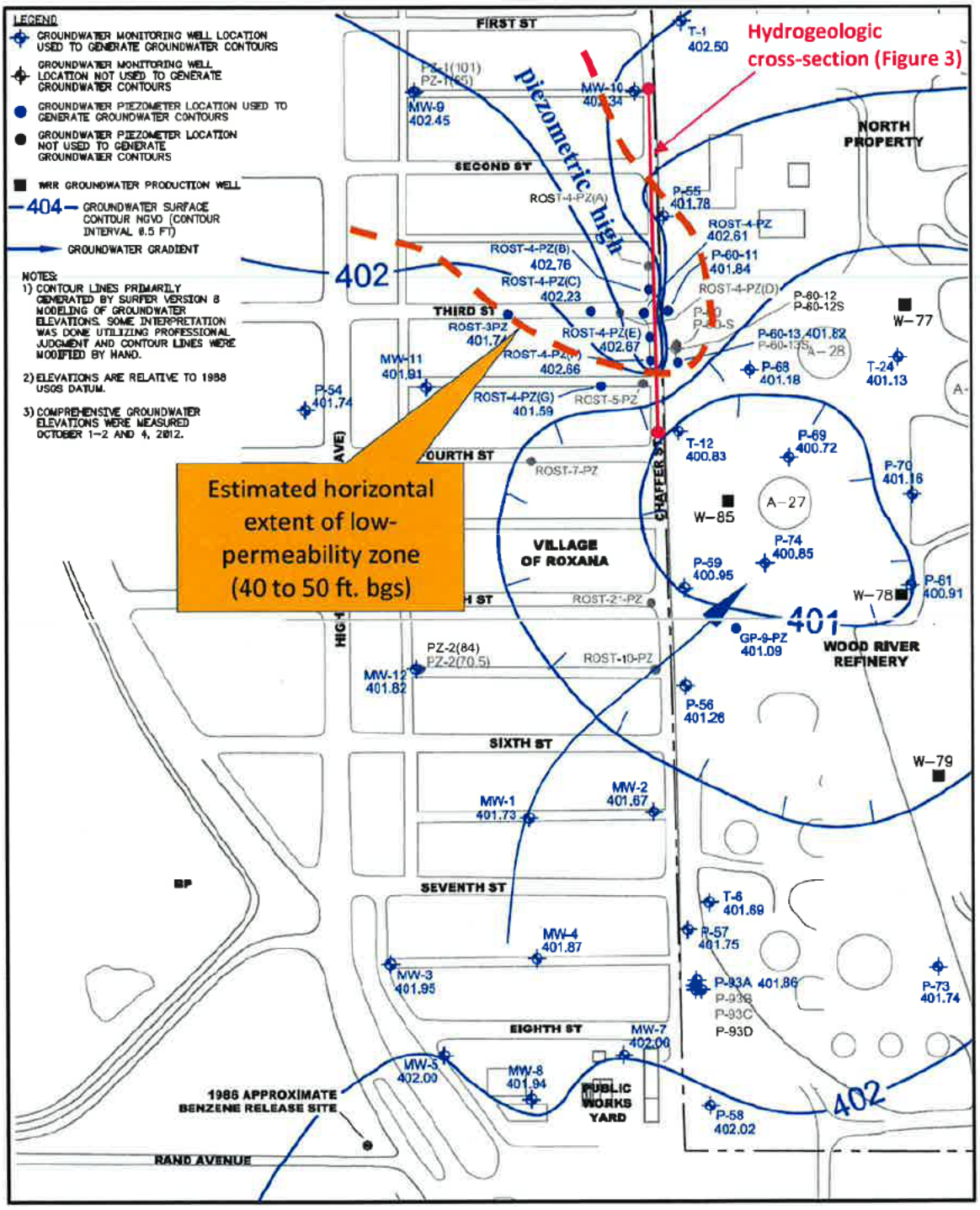

Figure 2. Horizontal extent of wells screened in low-permeability zone (dashed brown line) between East 1st and East 4th Streets in Roxana. The low-permeability zone consists of an interval of silty sand, silt, and clay layers occurring between 40 and 50 feet below the ground surface.

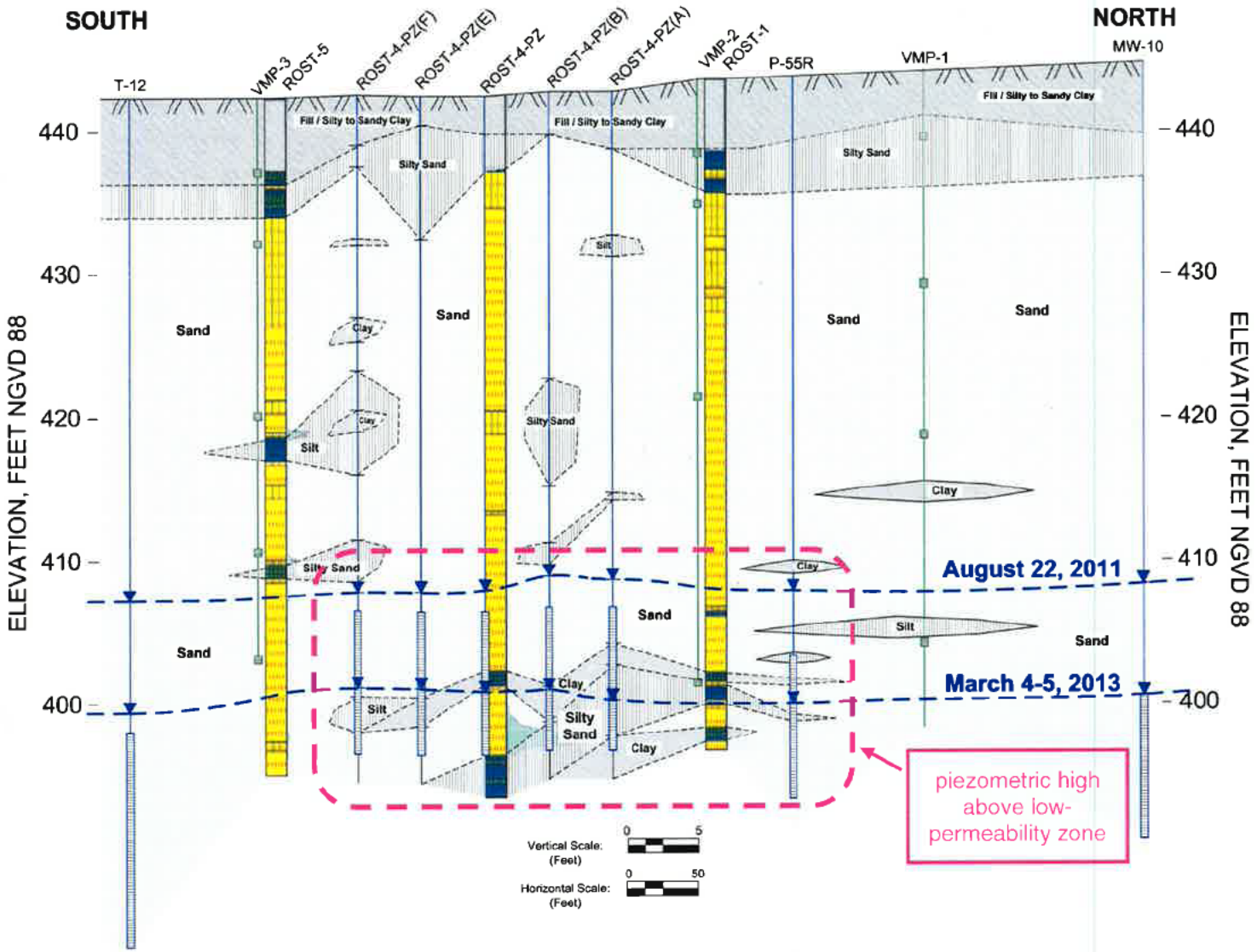

Figure 3. North-south hydrogeologic cross-section along Chaffer Street. The section location is shown on Figure 2. The cross-section shows a piezometric high defined by water levels in wells screened in a low-permeability zone of silty sand, silt and clay layers between 40 and 50 feet below the ground surface.

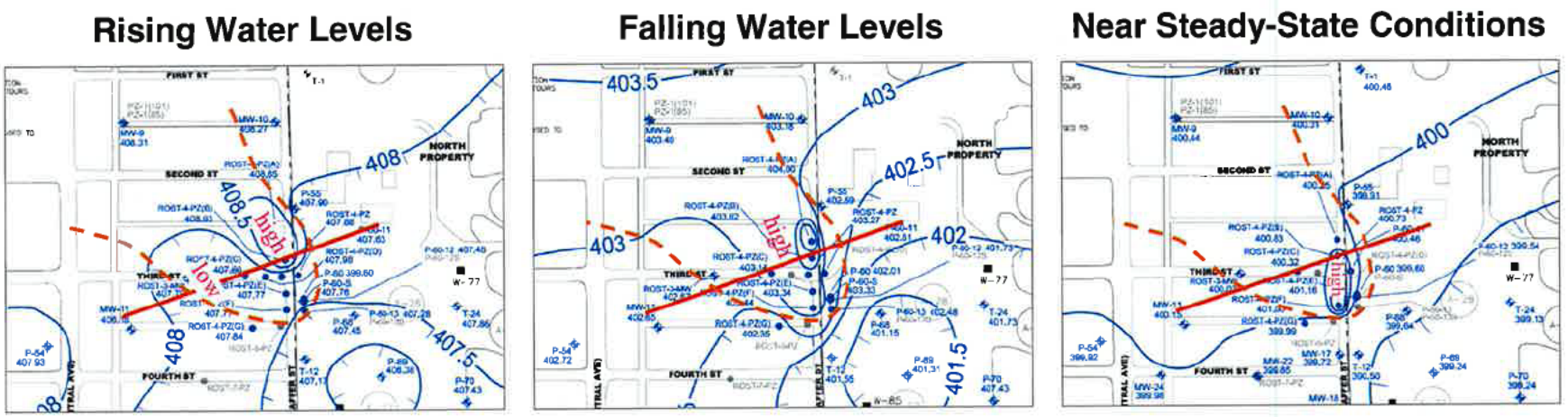

Figure 4. Water level contours in the vicinity of East 3rd and Chaffer Streets. The maps correspond to different hydraulic conditions that were identified based on time-series plots of historical water level data. The magenta line shows the approximate location of the hydrogeologic profile shown in the model in Figure 5. The near-steady state conditions correspond to an inflection point between falling and rising water levels.

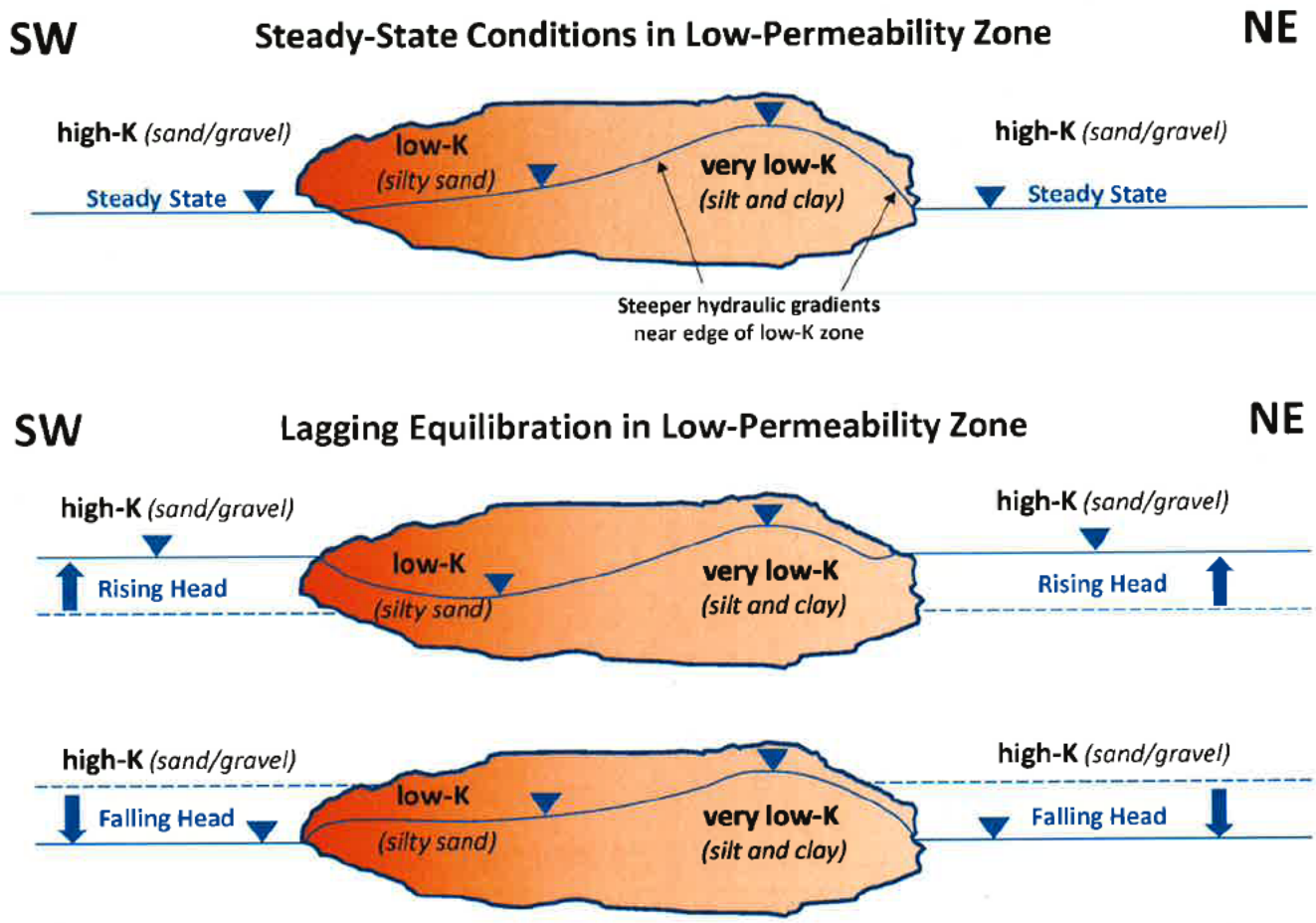

Figure 5. Empirical hydrogeologic model of the low-permeability zone occurring between 40 and 50 feet below the ground surface between 1st and 4th Streets in Roxana. The approximate location of the profile is shown in map view on Figure 4.