



# Lake Havasu Avenue and Holly Avenue WQARF Site Community Meeting for Draft Remedial Investigation

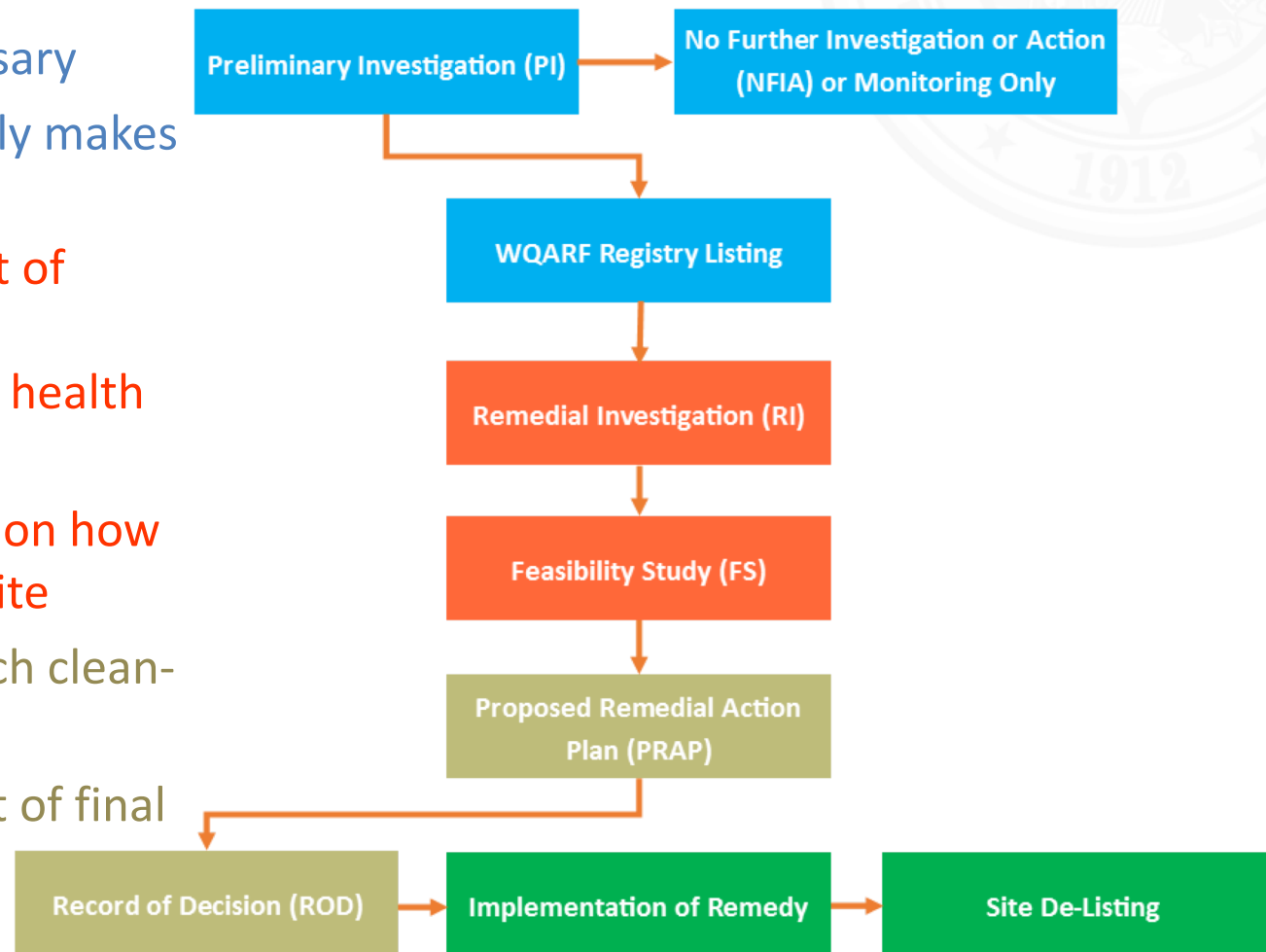
Hazel Cox  
Project Manager  
4/2/2020



- WQARF =  
Water Quality Assurance Revolving Fund
- Also called State Superfund program
  - Assessing and resolving the threat of contaminated soil and groundwater sites in the state
  - WQARF uses state funds to conduct cleanups and oversee privately funded efforts.

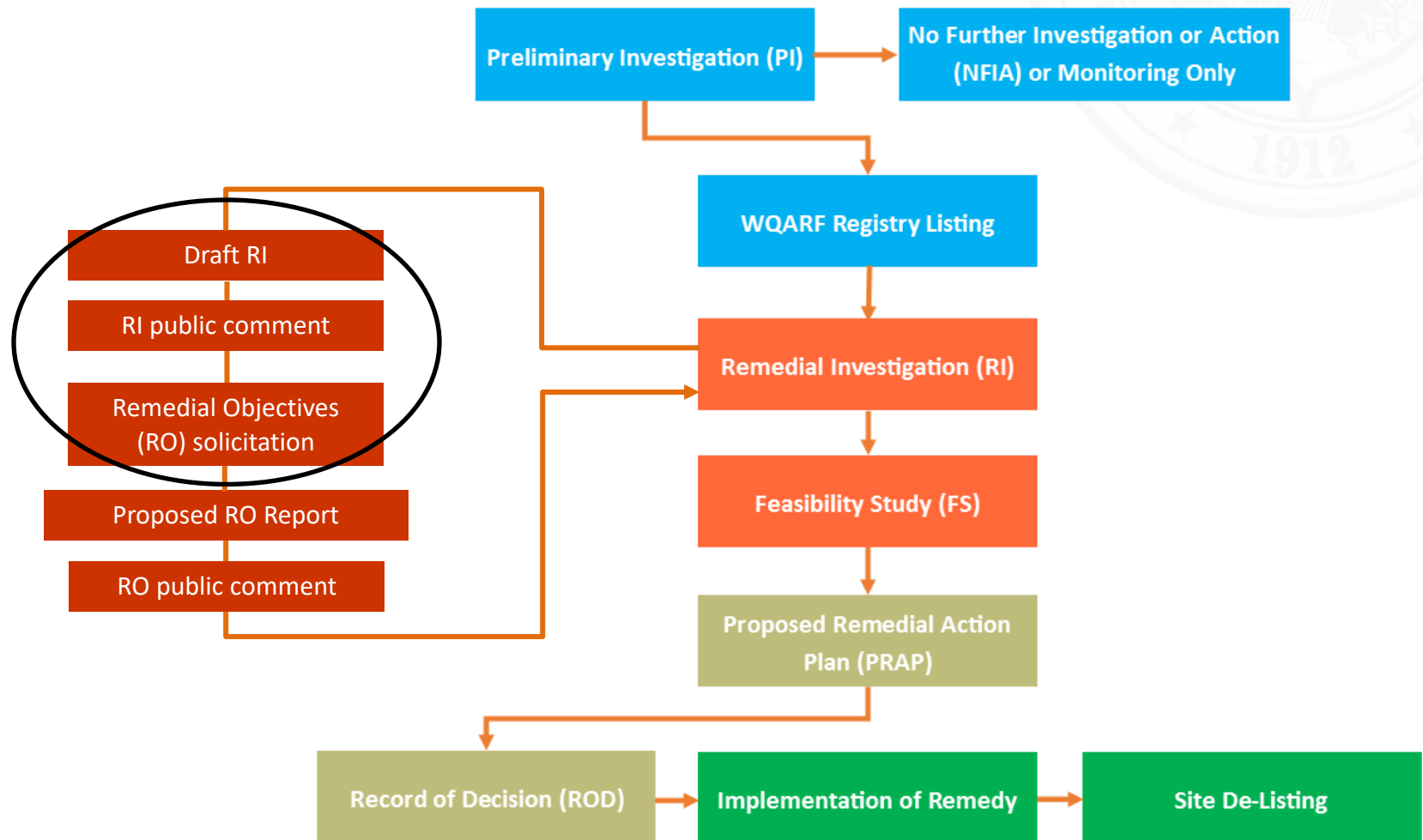
# Steps in WQARF

- PI - confirms the release and determines if further investigation is necessary
- Registry Listing - legally makes it a WQARF site
- RI –determines extent of release and evaluates public/environmental health risk
- FS – provides options on how best to clean up the site
- PRAP – proposes which clean-up option is the best
- ROD – announcement of final remedy for the site



# Lake Havasu Ave and Holly Ave

Current phase

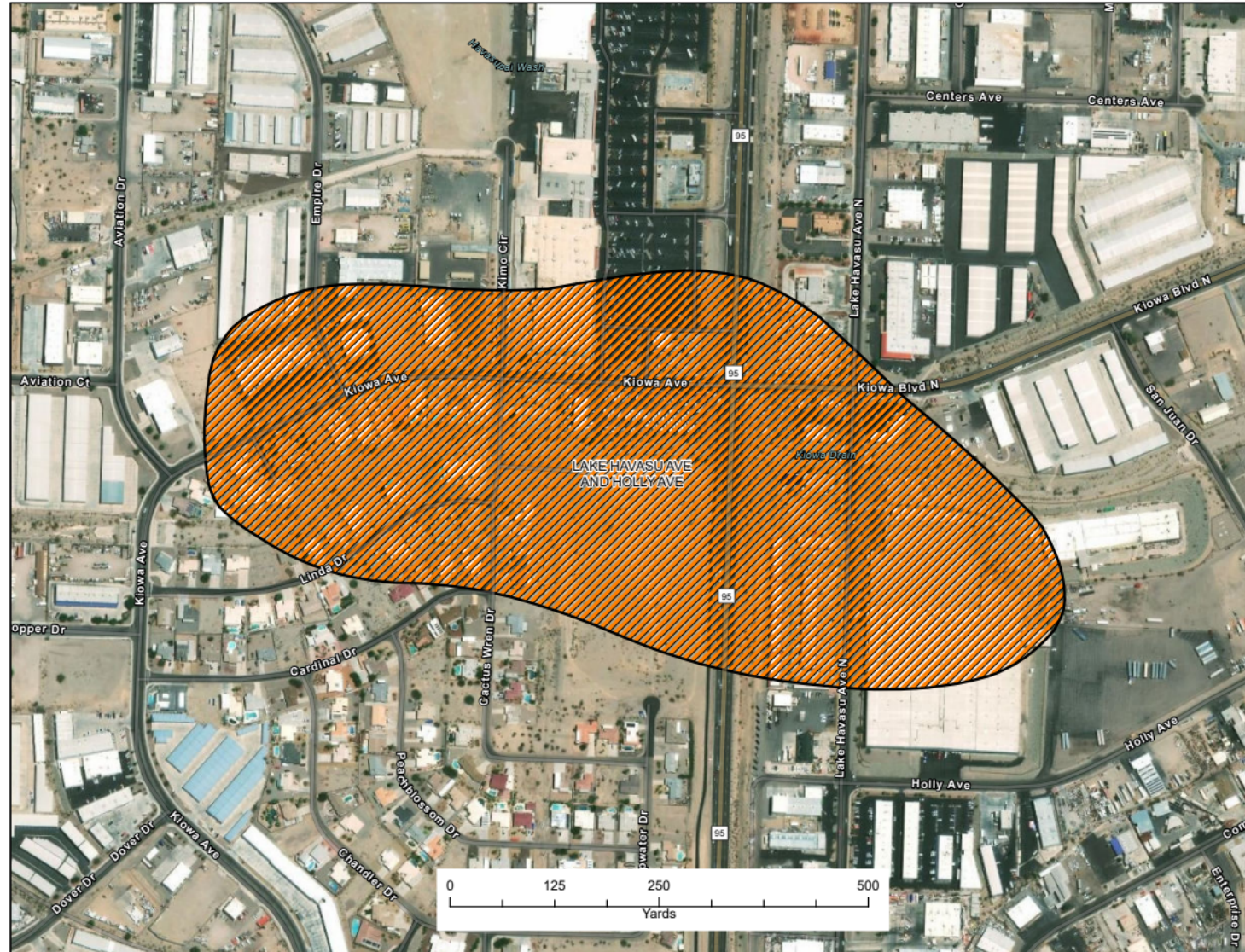




# Lake Havasu Ave and Holly Ave Site

## ■ Site location

DITAT DEUS



 WQARF

(WQARF) Water Quality Assurance  
Revolving Fund Site

Publication Number: M 19-82  
Plume Data Update: 1/1/2020

Plume boundaries depicted on the site map represent ADEQ's interpretation of data available at the time the map was constructed. The map is intended to provide the public with basic information as to the estimated geographic extent of known contamination as of the date of map production. The actual extent of contamination may be different. Therefore, the plume for this site may change in the future as new information becomes available.

- Multiple soil and groundwater investigations have been conducted at the Site since the 1980s
- Preliminary Investigation completed 2015
- Site officially listed on the WQARF Registry December 4, 2017
- Started Remedial Investigation (RI) April 2018



**ADEQ**  
Arizona Department  
of Environmental Quality

Douglas A. Dvoay, Governor • Misael Cabrera, Director



**FACT SHEET**

Publication Number: FS 16-10

### Lake Havasu Ave and Holly Ave Water Quality Assurance Revolving Fund Site

*This fact sheet is a publication of the Arizona Department of Environmental Quality (ADEQ) to inform community members near the Lake Havasu Ave and Holly Ave site of current site activities in Mohave County. If you receive your drinking water from Lake Havasu City, your current drinking water is not affected by the groundwater contamination at the site.*

*A glossary of terms is located at the end of this fact sheet.*

#### Site History and Investigation

ADEQ recently added the Lake Havasu Ave and Holly Ave site to the Water Quality Assurance Revolving Fund (WQARF) Registry on December 4, 2017, with an eligibility and evaluation (EE) score of 50 out of 120, due to the presence of soil and groundwater contamination. The Lake Havasu Ave and Holly Ave WQARF Site (the Site) is located in Lake Havasu City, Arizona, and is generally bounded to the north by Kiowa Boulevard, to the south by Holly Avenue, to the east by San Juan Drive, and to the west by Cactus Wren Drive (Figure 1, Page 4). The Site is in an urban setting that includes a mixture of commercial businesses, light industrial, warehouse and residential neighborhoods.

Manufacturing at the former McCulloch facility began in the late 1960s. Initially, it was used for assembly of Singer sewing machine motors and gyroscopes. In 1972, McCulloch purchased the property. The facility expanded over the years to include manufacturing of small gasoline powered equipment. McCulloch also manufactured products for parent companies, Black & Decker and ShopVac Corporation (ShopVac). A variety of chemicals were used at the facility

Including a variety of solvents and vapor degreasing agents. Manufacturing continued until 1998 when McCulloch filed for bankruptcy. Following bankruptcy, ShopVac conducted investigative and remedial activities until 2008.

ShopVac ceased characterization and monitoring activities after 2008. ADEQ conducted sampling in 2014.

As of 2014, concentrations of one or more of the contaminants of concern exceed regulatory limits. Groundwater in this area occurs at depths ranging from 96 to 170 feet below the ground surface. Based on historic and recent data collected from the Site, the direction of groundwater flow is to the west-northwest.

The property is currently occupied by several small businesses.

#### What are the contaminants at this Site?

Groundwater and soil at the Site is contaminated with tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), as well as nitrate and hexavalent chromium. PCE and TCE are man-made solvents which were used to degrease parts at the facility. TCE and PCE are present in the groundwater at levels that exceed the aquifer water quality standard (AWQS) of 5 micrograms per liter ( $\mu\text{g/L}$ ). Both 1,1-DCE and 1,2-DCA are breakdown products of PCE and TCE, and are also present in groundwater at levels exceeding the AWQS of 7 and 5  $\mu\text{g/L}$ , respectively. Chromium, historically used in plating operations, is present in the groundwater at levels exceeding the

AWQS of 0.1 milligrams per liter ( $\text{mg/L}$ ). Specific regulatory standards have not yet been established for hexavalent chromium. Nitrate is present in the groundwater at levels exceeding the AWQS of 10  $\text{mg/L}$ .

Exposure to PCE, TCE and chromium through contact with soil is unlikely. The soil in the area of the suspected release is covered with concrete, asphalt and buildings. However, asphalt and concrete may be removed or buildings demolished; additional soil vapor sampling for PCE and TCE and additional soil sampling for chromium will help ADEQ to better understand this exposure route and if there is a possible health risk.

#### What are the health risks associated with this contamination?

Studies indicate that drinking water containing concentrations of PCE, TCE, 1,1-DCE, 1,2-DCA, and hexavalent chromium in excess of regulatory limits over many years could cause health problems to the liver, kidneys, lungs, eyes and skin and may increase risk of cancer. Listing of the Site on the WQARF Registry will prompt further investigation and analysis at the Site, and does not necessarily represent a determination that the release of hazardous substances at the Site poses a current or future threat to public health or the environment.

There are eight (8) back up drinking water production wells approximately 3/4-mile west from the Site that are not in service at this time. Water supplied to the surrounding community by Lake Havasu City meets all federal and state drinking water standards.



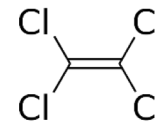
## Purpose of an RI

- Collect data needed to understand the site to select the best possible remediation in the feasibility study (FS)
  - Understand the nature and extent of contamination
  - Identify current and potential impacts to public health, welfare and the environment
  - Identify the current and reasonably foreseeable uses of land and waters of the state

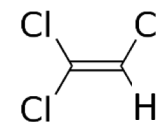
## Main site contaminants:

- Tetrachloroethene –PCE and Trichloroethene -TCE
  - PCE and TCE are Volatile Organic Compound (VOC) used de-greasers
  - Aquifer Water Quality Standard (AWQS) for TCE = 5 micrograms per liter ( $\mu\text{g/L}$ )

PCE



TCE



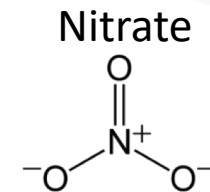
- Chromium -Cr

- Cr is a heavy metal used in chrome plating
- Cr mostly comes in two forms
  - Trivalent chromium -Cr(III)
  - Hexavalent -Cr(VI)
- Cr(VI) is what typically transports in groundwater
- AWQS for Cr is 0.1 milligram per liter (mg/L)

## Main site contaminants:

- Nitrate

- Found in fertilizers, acids, sewage/septic wastes
- AWQS for nitrate is 10 mg/L

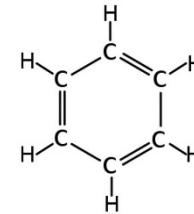


- Milligrams per liter
  - mg/L
  - Parts per million (ppm)
  - 1 mg/L  $\approx$  1 drop of water in a 10-gallon fish tank
- Micrograms per liter
  - $\mu$ g/L
  - Parts per billion (ppb)
  - 1000X smaller than mg/L
  - 100  $\mu$ g/L = 0.1 mg/L
  - 1  $\mu$ g/L  $\approx$  1 drop of water in a backyard swimming pool

## ■ Other potential site contaminants

### – Benzene

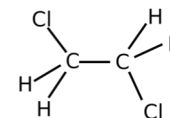
- Constituent of gasoline and solvents
- AWQS = 5 µg/L



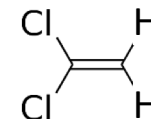
### – 1,2-dichloroethane (1,2-DCA) and 1,1-dichloroethene (1,1-DCE)

- AWQS for 1,2-DCA = 5 µg/L
- AWQS for 1,1-DCE = 7 µg/L

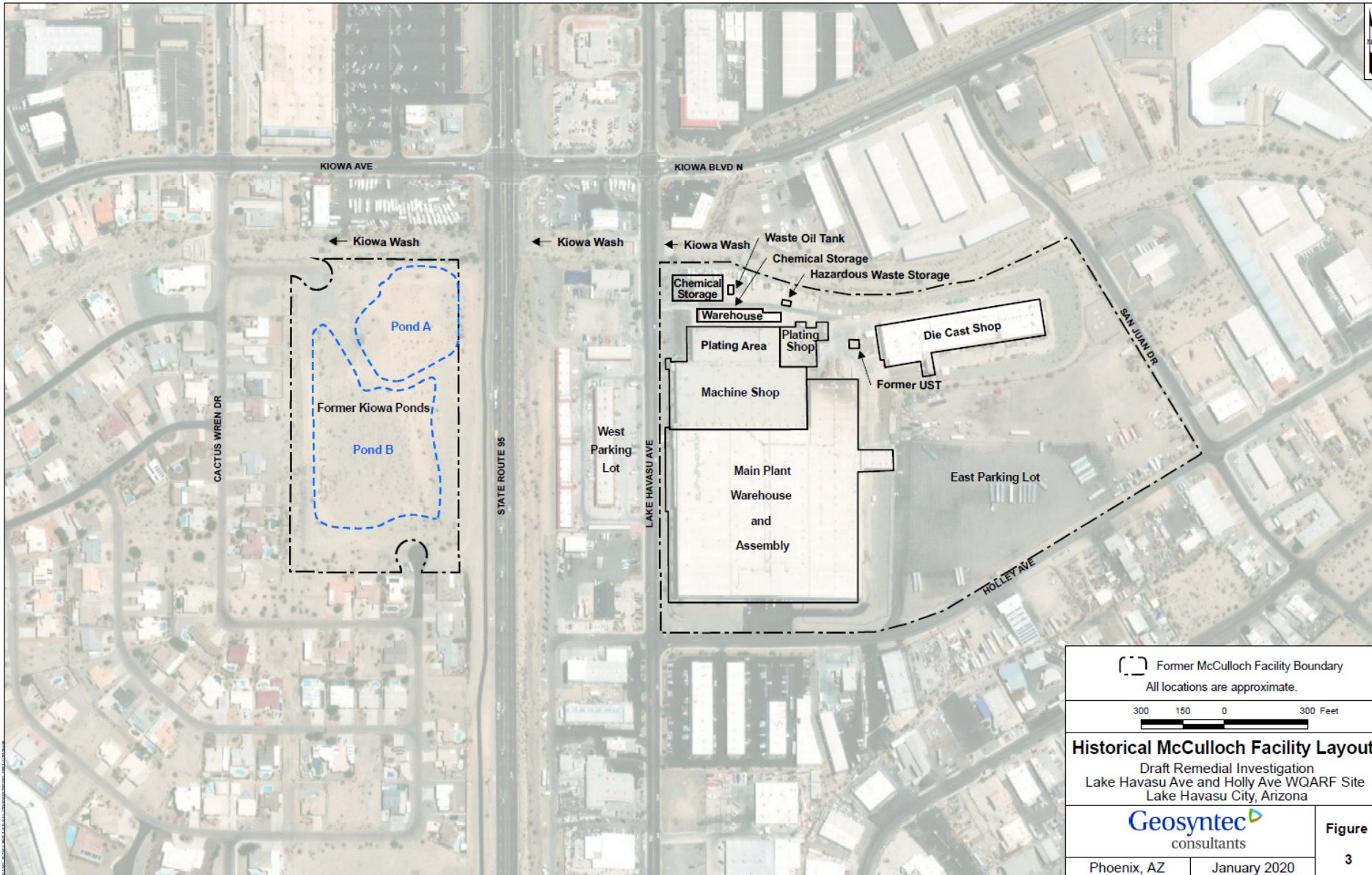
1,2-DCA



1,1-DCE

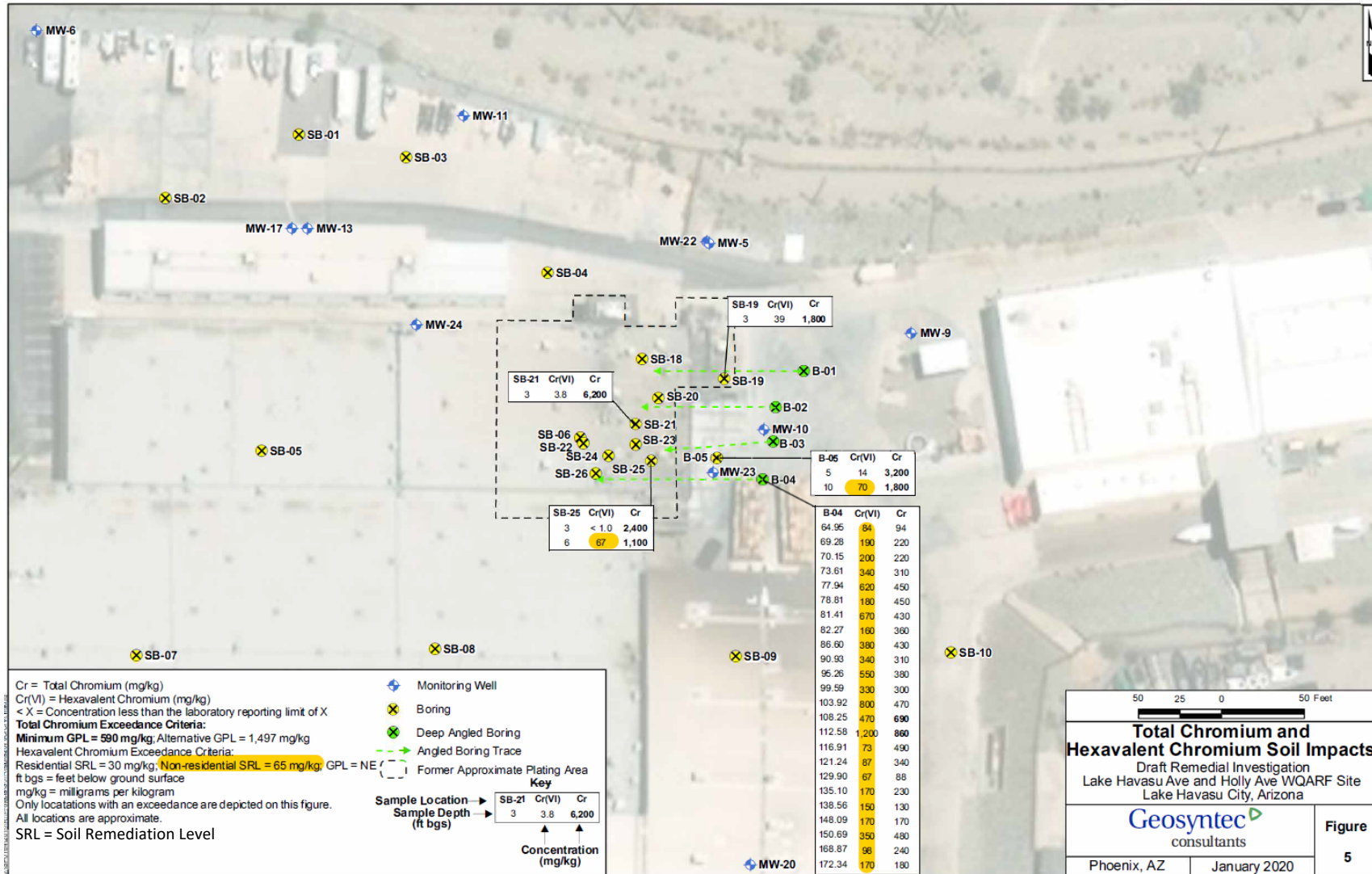


# Remedial Investigation

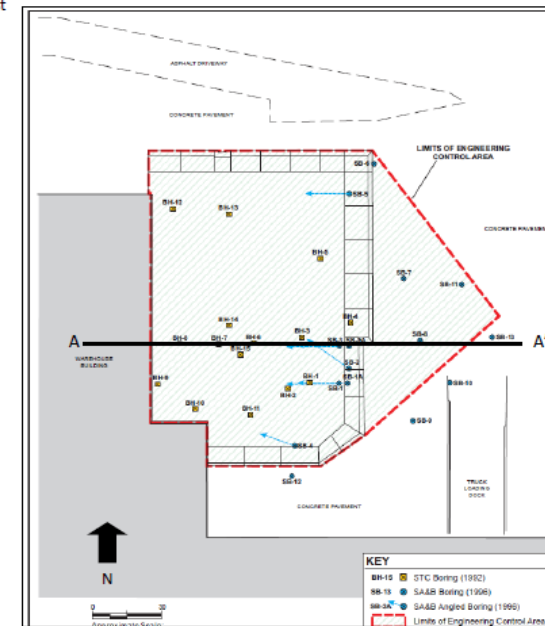
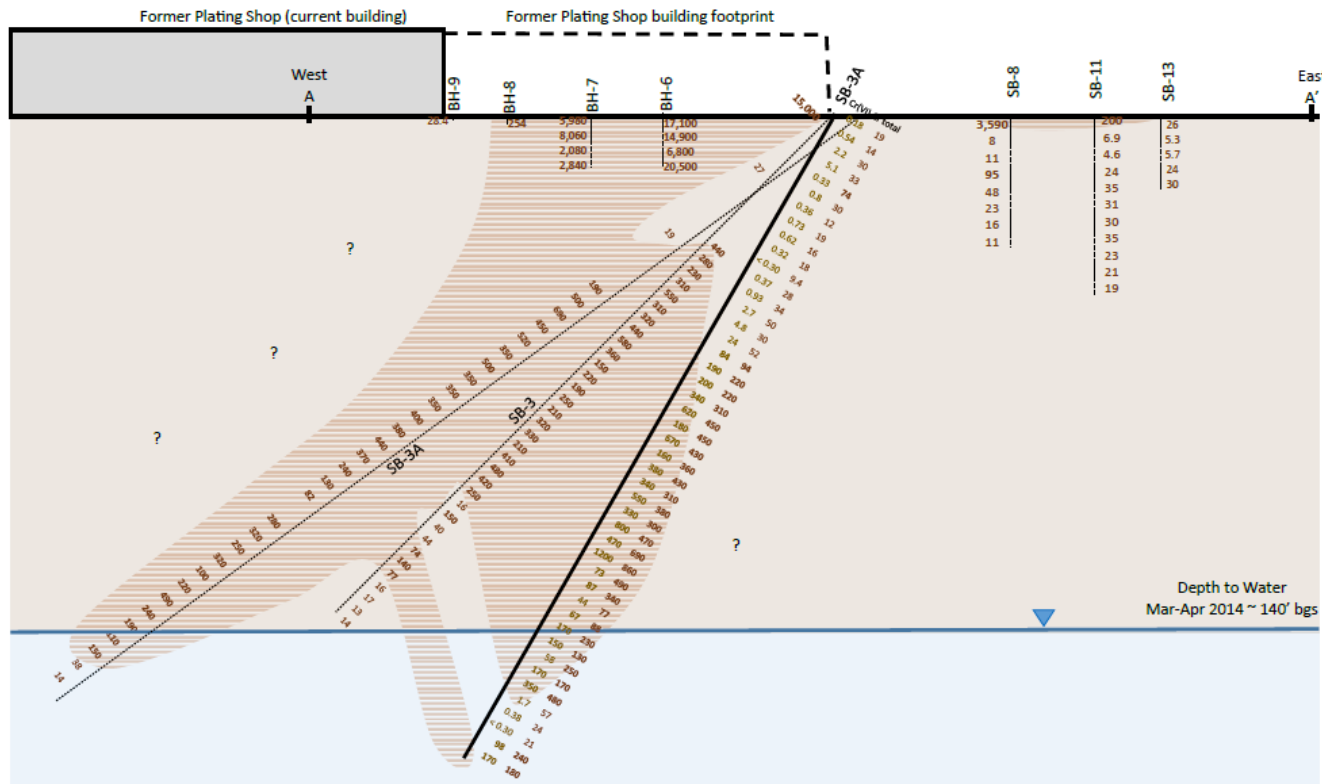




## Chromium and hexavalent chromium in soils



## Chromium and hexavalent chromium in soils

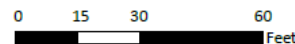


### Legend

- Historical borings
- ADEQ boring
- Groundwater level
- 254 Total chromium result in mg/kg
- 250 Hexavalent chromium result in mg/kg
- Approximate area of chromium in soils

- Vadose zone
- Saturated zone

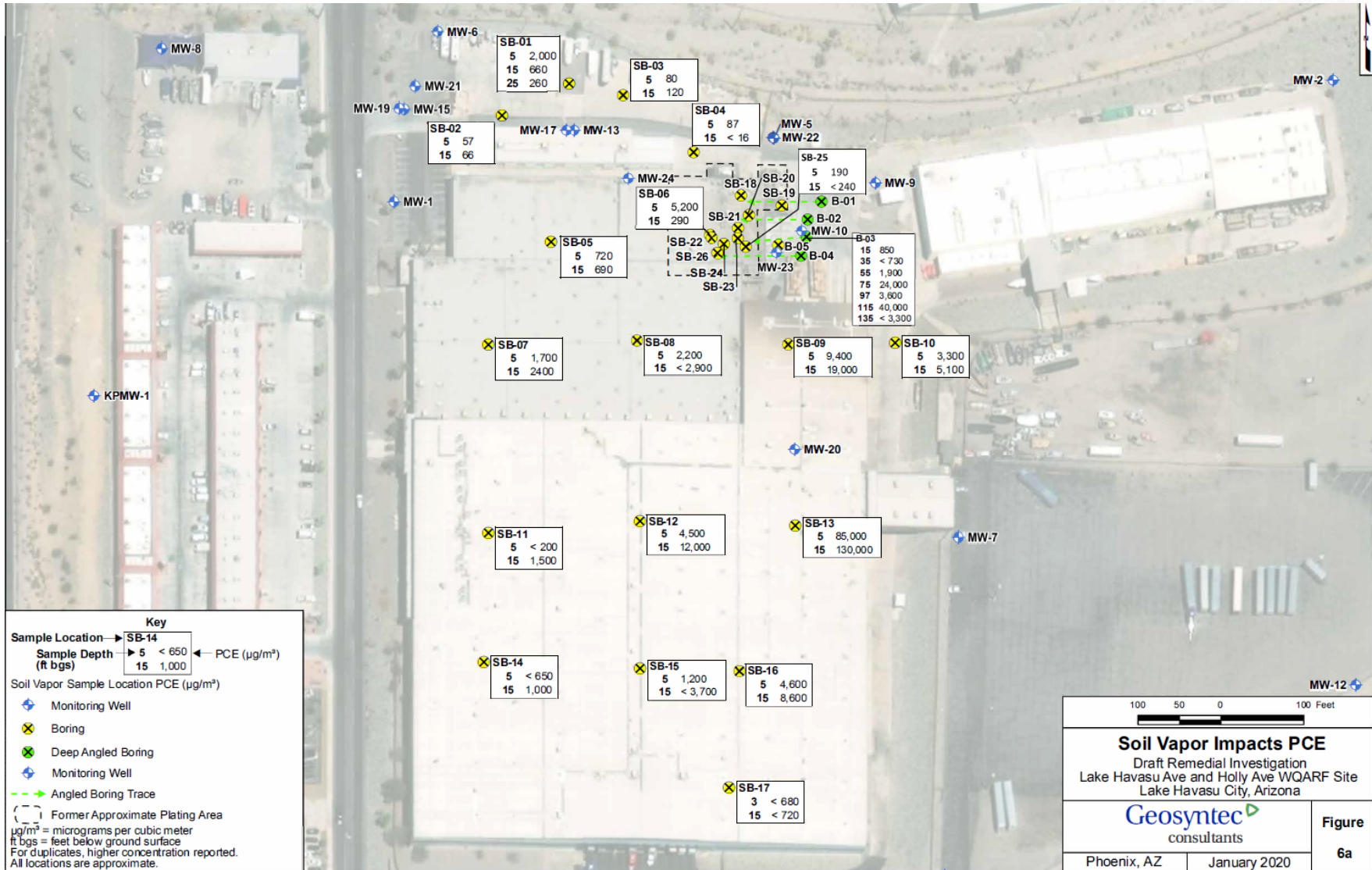
### Approximate scale



### Historical data from:

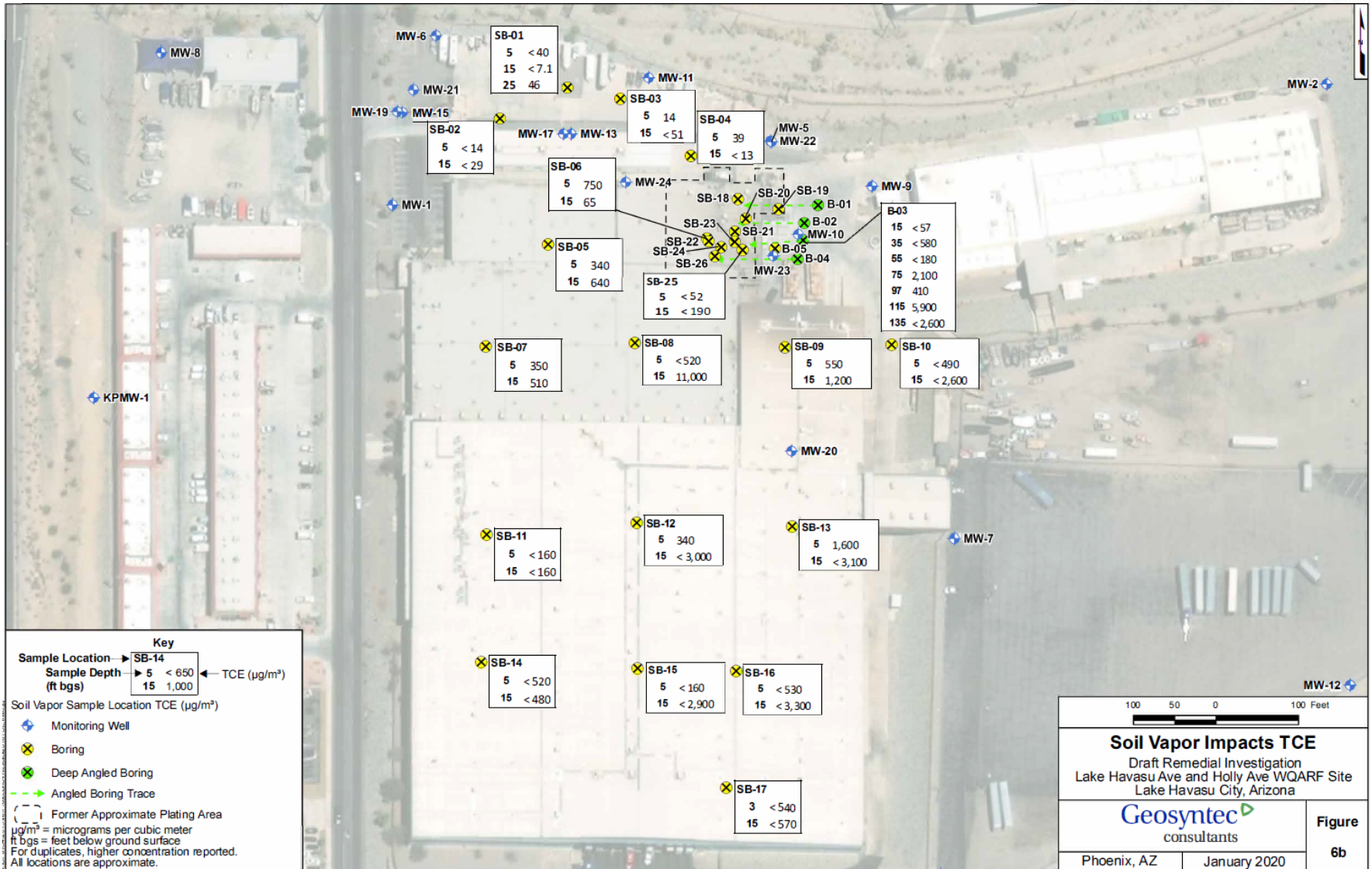
N&M, 2014b, *Engineering Control Plan Former McCulloch Facility Plating Shop Area*, 25 July.

## ■ PCE in soil gas



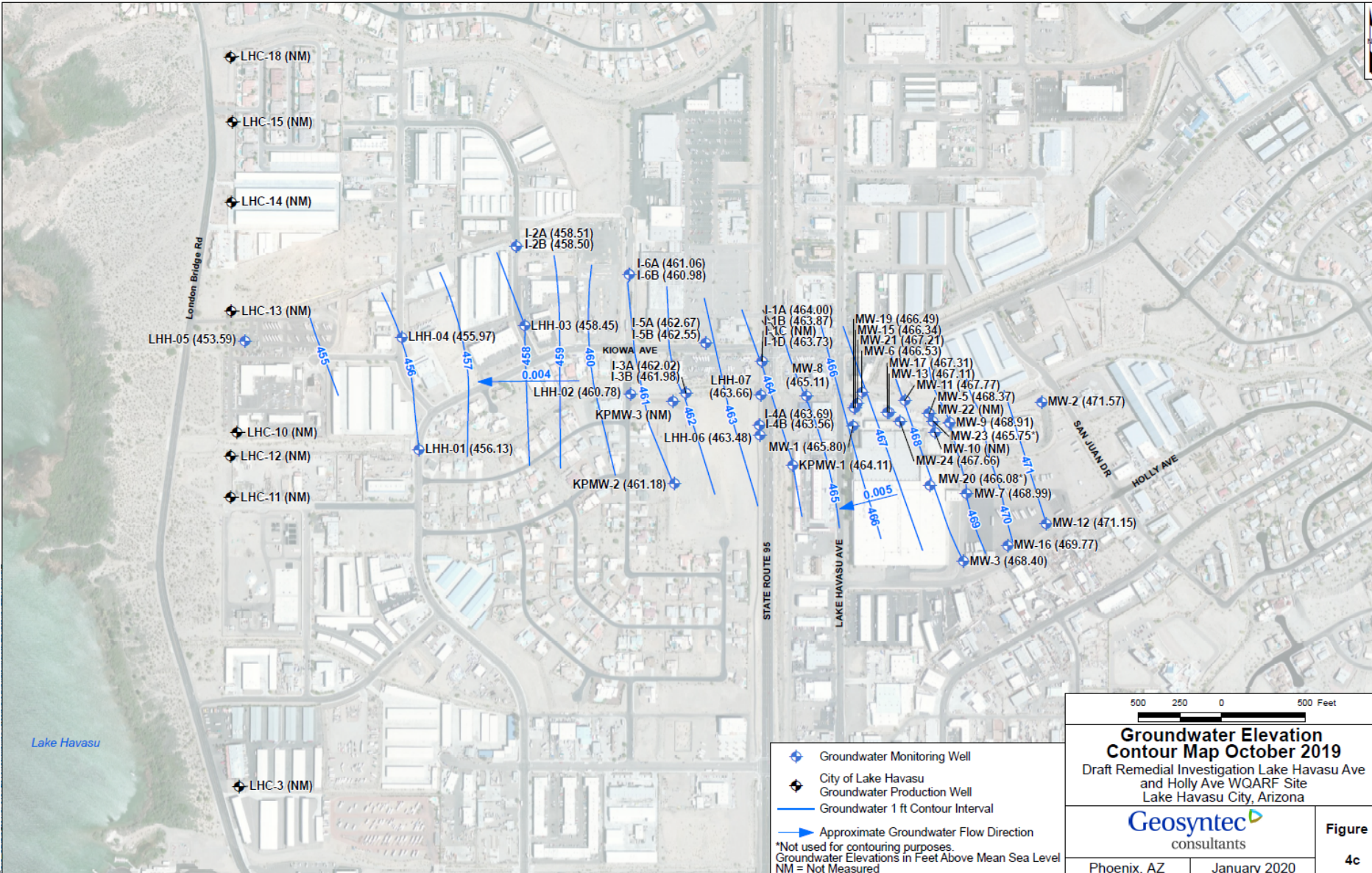


## TCE in soil gas



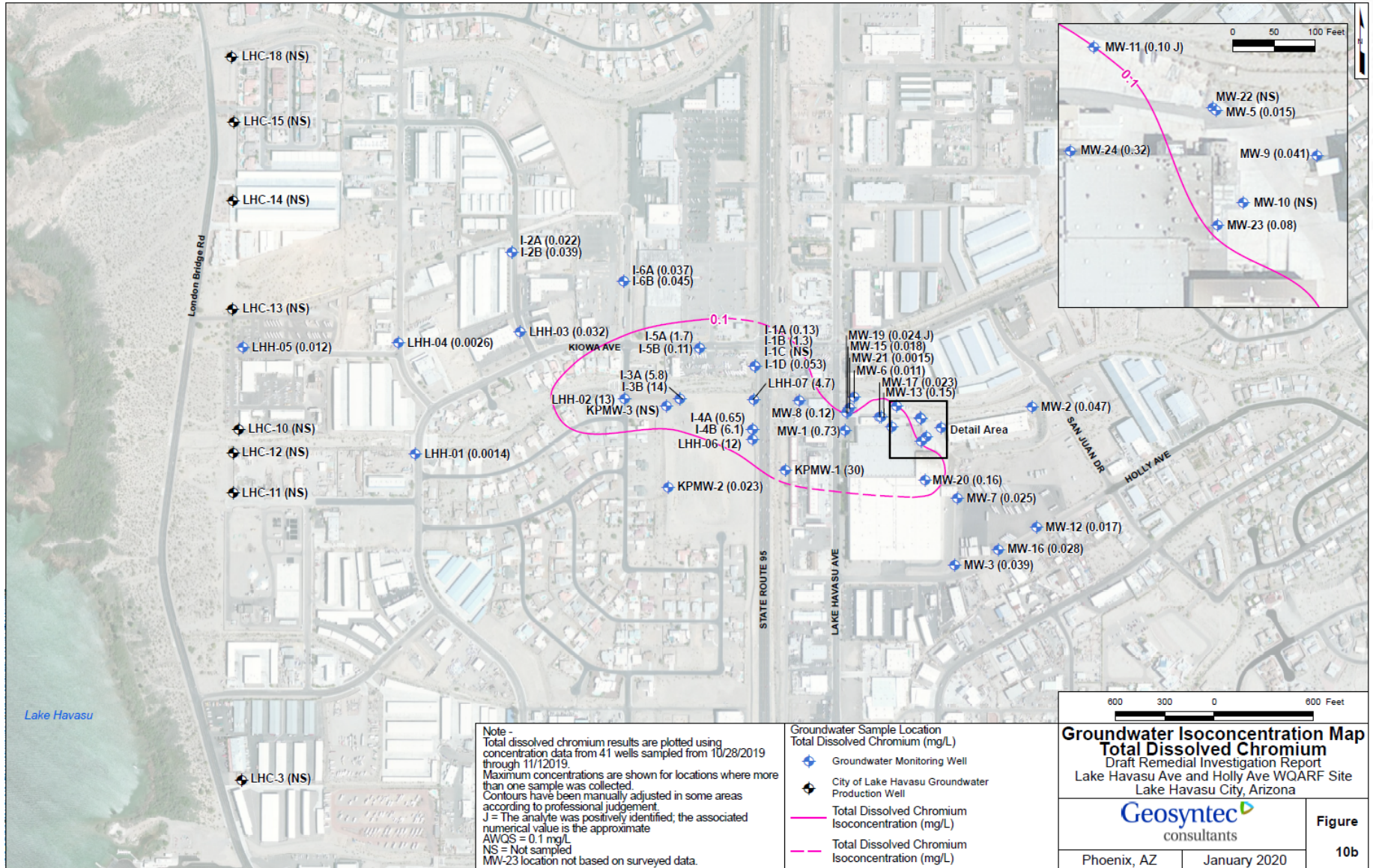


## Groundwater Flow Direction



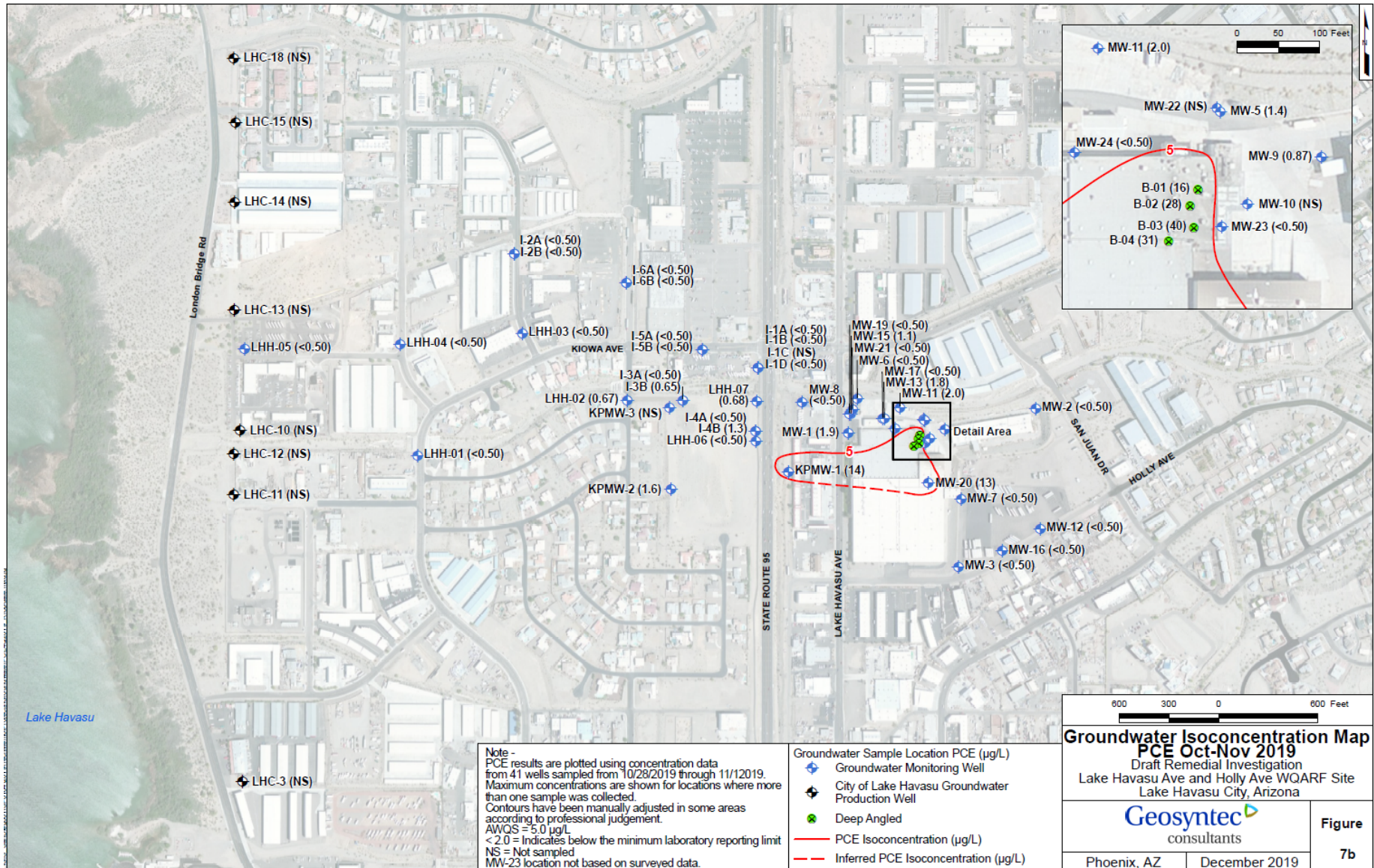


## Groundwater results - chromium





## Groundwater results - PCE



Note -  
 PCE results are plotted using concentration data from 41 wells sampled from 10/28/2019 through 11/12/2019. Maximum concentrations are shown for locations where more than one sample was collected. Contours have been manually adjusted in some areas according to professional judgement.  
 AWQS = 5.0 µg/L  
 < 2.0 = Indicates below the minimum laboratory reporting limit  
 NS = Not sampled  
 MW-23 location not based on surveyed data.

Groundwater Sample Location PCE (µg/L)

- ◆ Groundwater Monitoring Well
- ◆ City of Lake Havasu Groundwater Production Well
- ◆ Deep Angled
- PCE Isoconcentration (µg/L)
- - - Inferred PCE Isoconcentration (µg/L)

600 300 0 600 Feet

**Groundwater Isoconcentration Map**  
**PCE Oct-Nov 2019**  
 Draft Remedial Investigation  
 Lake Havasu Ave and Holly Ave WQARF Site  
 Lake Havasu City, Arizona

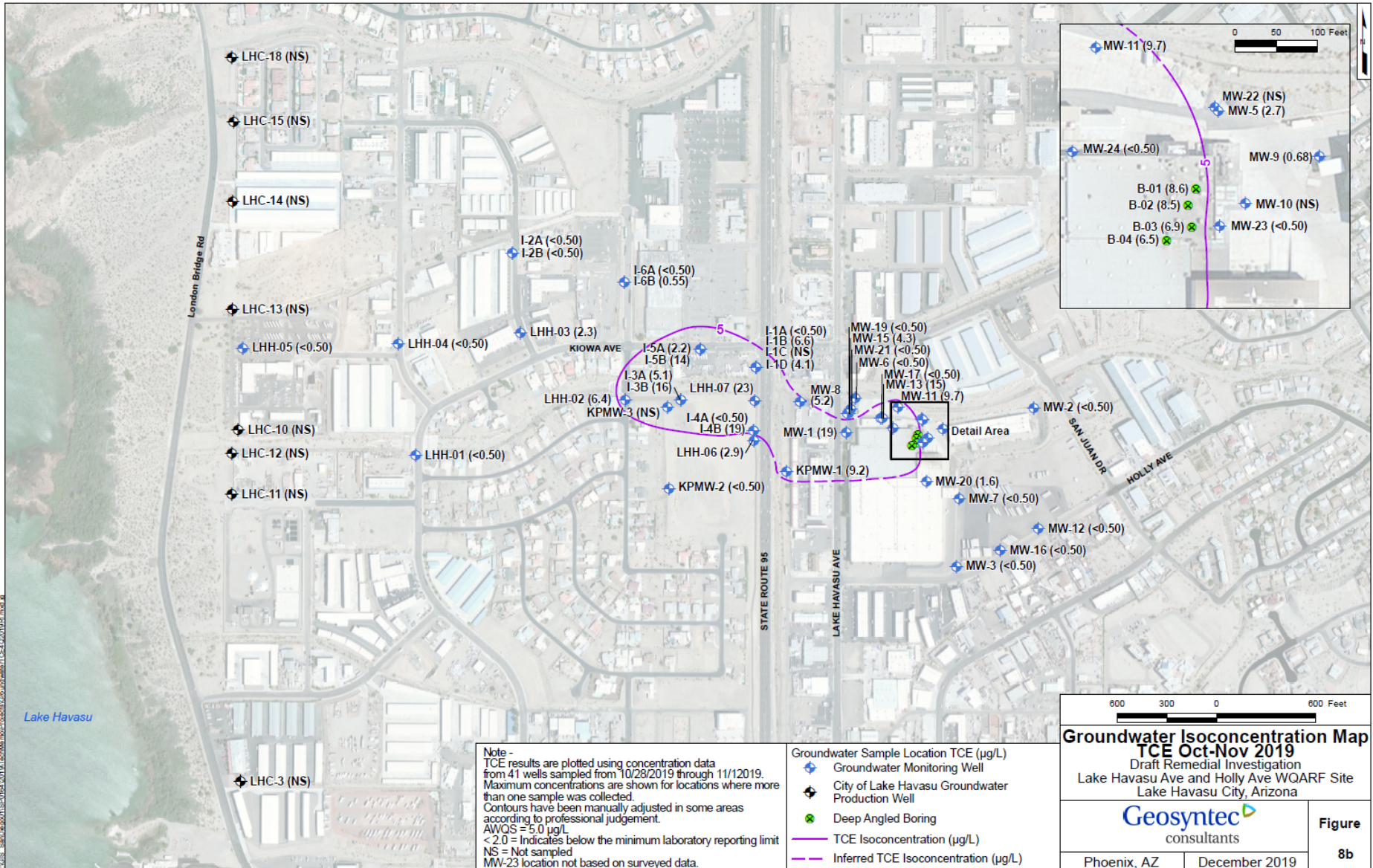
**Geosyntec**  
 consultants

Phoenix, AZ | December 2019

**Figure 7b**

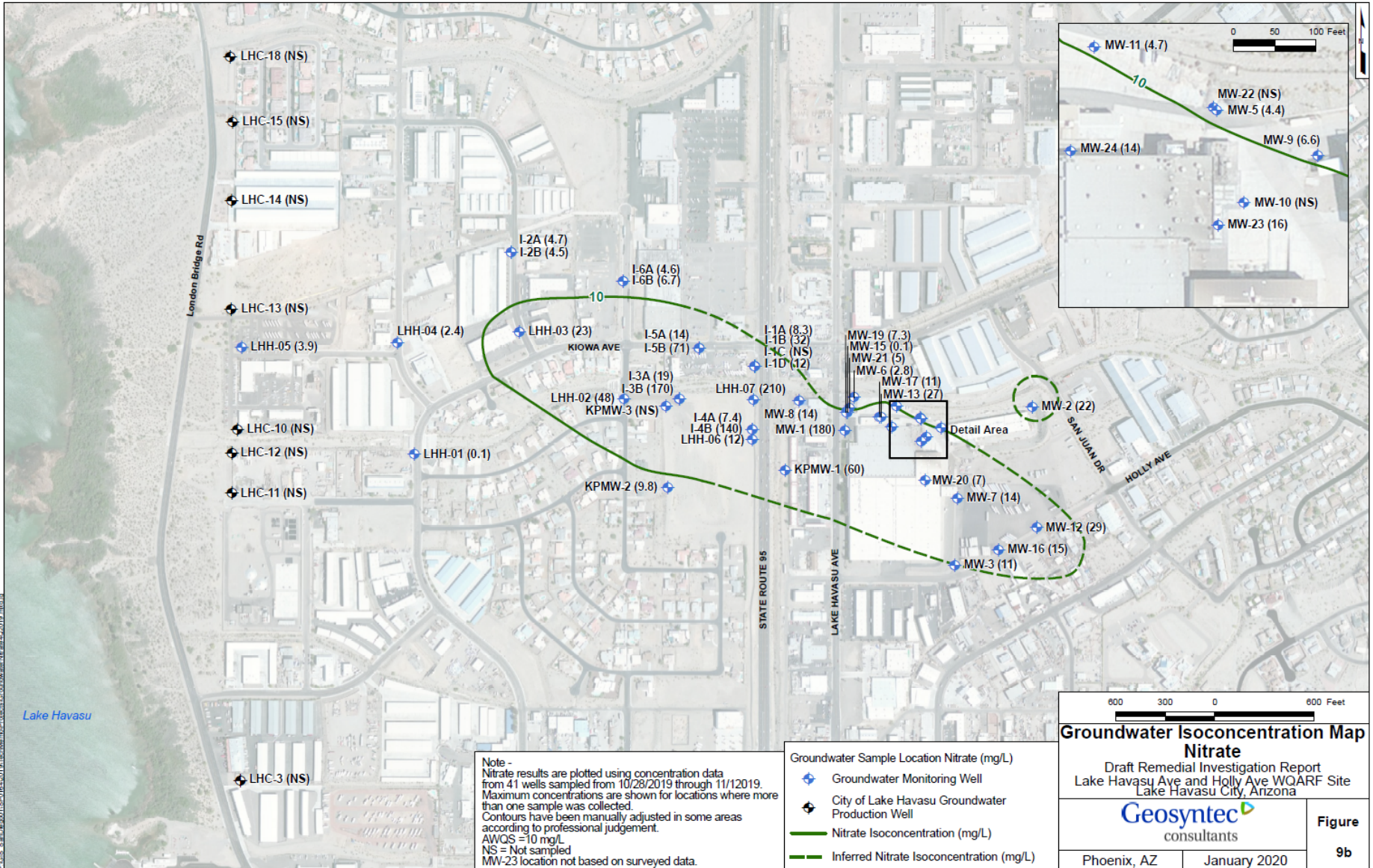


## Groundwater results - TCE

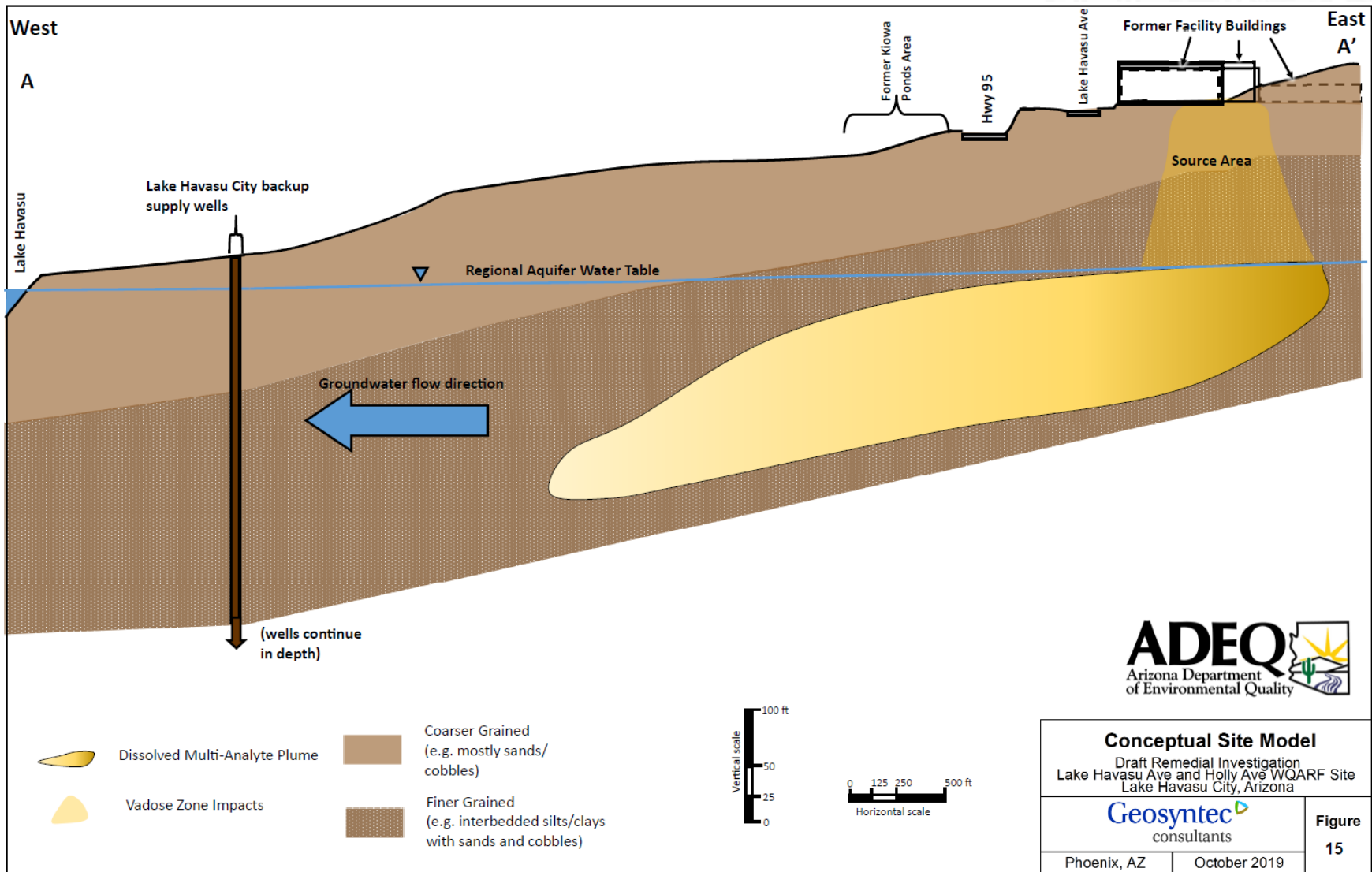




## Groundwater results - nitrate



## ■ Conceptual Site Model



## ■ Data Gaps

- Currently there is no sentinel well for Lake Havasu (west of City wells) if contamination were to move past the City wells
- No indoor air samples have been collected
- The Kiowa Wash has not been analyzed for Cr(VI) and nitrate
- Additional characterization may be needed to fully characterize the nitrate source



- Comment period on the RI Report ends Thursday, May 7

- **How to comment:**

- **By Email:** [cox.hazel@azdeq.gov](mailto:cox.hazel@azdeq.gov) (timestamped *May 7, 2020*)
- **By Mail** (*Must be postmarked by May 7, 2020*):

Hazel Cox  
ADEQ  
400 W Congress, Ste 433  
Tucson, AZ 85701



- State law provides for a Community Advisory Board (CAB) for public oversight of WQARF sites
- Not enough responses yet to form a CAB
- Let us know if you're interested
- More information on ADEQ Web Site:  
<http://www.azdeq.gov/node/255>

Wendy Flood, Community Involvement  
Coordinator/Manager  
602) 771-4410  
(800) 234-5677 ext. 6027714410  
Flood.Wendy@azdeq.gov





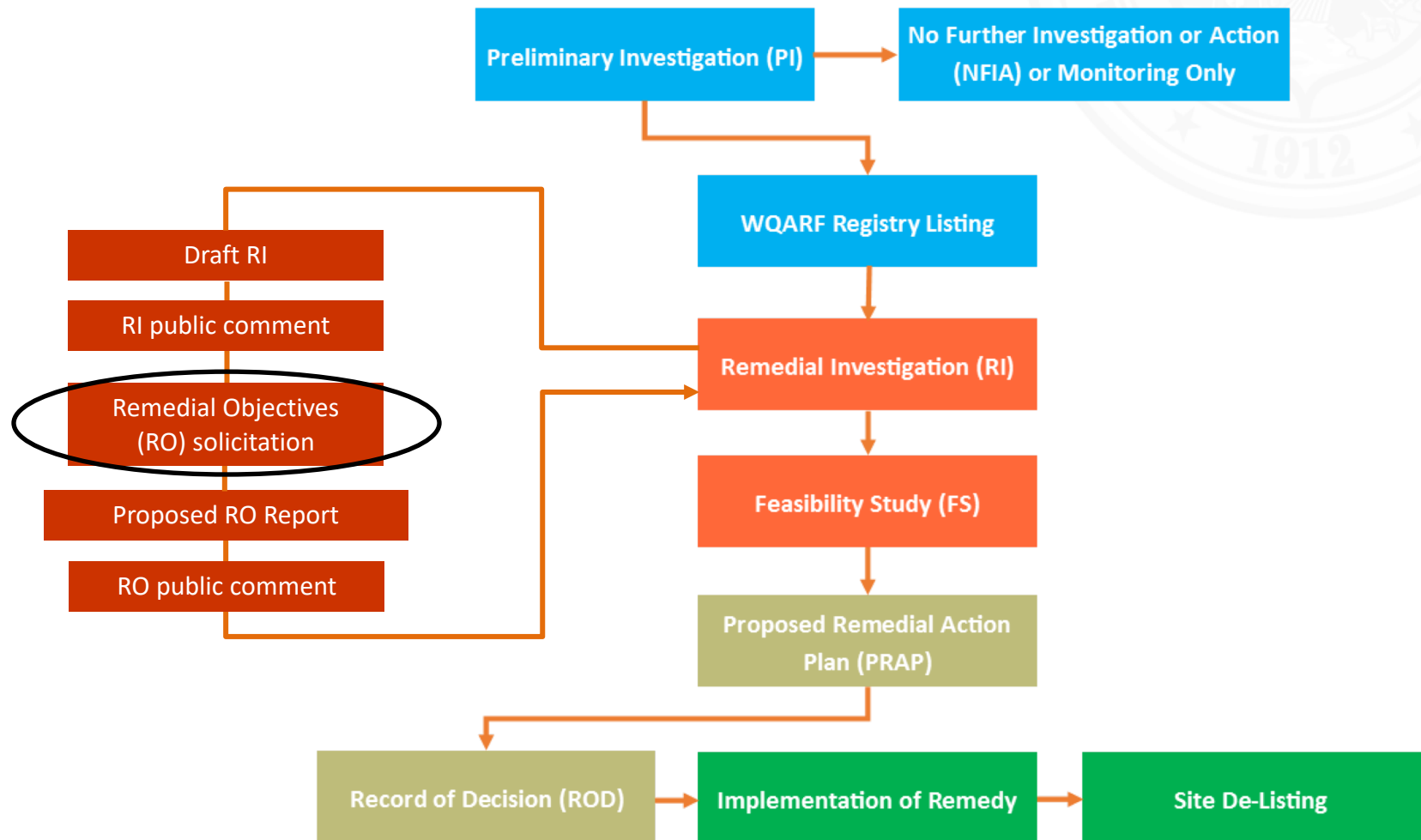
# Lake Havasu Avenue and Holly Avenue WQARF Site Public Meeting Remedial Objectives Solicitation

Hazel Cox  
Project Manager  
4/2/2020



# Lake Havasu Ave and Holly Ave

Current phase



- As defined by Arizona Administrative Code R18-16-401, a remedial objective means the goal to be achieved by a selected remedy
  - What remediation goal has to be reached to say clean-up at the site is complete



- State regulations say ROs shall be written in the form of:
  1. Protecting against the loss or impairment of each listed use that is threatened by the release
  2. Restoring, replacing, or otherwise providing for each listed use
  3. Time frames when the action is needed
  4. The projected duration of the action needed

e.g. Phoenix site 32<sup>nd</sup> St and Indian School RO for GW use:

1 **The RO for potable use at the Site is:**

**Protect against the loss or impairment of potable water threatened by contaminants of concern at the [Site]. Where protection cannot be achieved in a reasonable, necessary or cost-effective manner; restore, replace, or**

2 **otherwise provide for potable water that is lost or impaired by**  
3 **contaminants of concern at the [Site]. Action is needed for as long as necessary to ensure that,**  
& **while the water exists and the resource remains available, the contamination associated with Site**  
4 **does not prohibit or limit the designated use of groundwater.**

- Impacted media (from RI)
  - Soil
  - Groundwater
- Soil uses (within impacted soil area)
  - Non-residential
- Groundwater uses (from land and water use study)
  - Backup water source for the City (potable/domestic water use)

## Example possible remedial objectives for soil uses

- Non-residential use

**To restore soil conditions at the Lake Havasu Avenue and Holly Avenue Site to remediation standards for non-residential use as specified in A.A.C. R18-7-204 (background remediation standards), A.A.C. R18-7-205 (pre-determined remediation standards), or A.A.C. R18-7-206 (site-specific remediation standards) that are applicable to the hazardous substances identified to be impacting soils at the Lake Havasu Avenue and Holly Avenue Site. The concentrations remaining in soil after remediation standards are met will not cause or threaten to cause a violation of groundwater remediation standards specified in A.A.C. R18-7-203. This action is needed for the present time and for as long as the level of soil contamination exceeds applicable cleanup standards.**

## Example possible remedial objectives for groundwater uses

- Potable/domestic water use

**Protect against the loss or impairment of potable water threatened by contaminants of concern at the Lake Havasu Avenue and Holly Avenue Site by restoring, replacing, or otherwise providing for potable water that is lost or impaired by contaminants of concern at the Lake Havasu Avenue and Holly Avenue Site. The actions will be needed for as long as necessary to ensure that, while the water exists and the resource remains available, the contamination associated with Lake Havasu Avenue and Holly Avenue Site does not prohibit or limit the designated use of groundwater.**

- Solicitation of Remedial Objectives
  - State your name
  - Affiliation

- After compiling solicitations, the Proposed ROs Report will be released for 30-day public comment
- Comment period dates on the Proposed ROs Report TBD –
- Information on how to comment and comment period dates will be included in public notice, but will be same method as for RI:
  - **By Email:** [cox.hazel@azdeq.gov](mailto:cox.hazel@azdeq.gov)
  - **By Mail:**

Hazel Cox

ADEQ

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# Contact Us!

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