

**PROPOSED REMEDIAL OBJECTIVES REPORT  
LAKE HAVASU AVENUE AND HOLLY AVENUE  
WATER QUALITY ASSURANCE REVOLVING FUND REGISTRY SITE  
LAKE HAVASU CITY, ARIZONA**



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## LIST OF ABBREVIATIONS & ACRONYMS

1,1-DCE	1,1-dichloroethene
1,2-DCA	1,2-dichloroethane
A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AMA	Active Management Area
A.R.S.	Arizona Revised Statutes
AWQS	Aquifer Water Quality Standard
CAP	Central Arizona Project
COC	Contaminants of Concern
FS	Feasibility Study
GPL	Groundwater Protection Limit
INA	Irrigation Nonexpansion Area
LHC	Lake Havasu City
LWUS	Land and Water Use Study
µg/L	micrograms per liter
µg/m <sup>3</sup>	micrograms per cubic meter
mg/L	milligrams per liter
mg/kg	milligrams per kilogram
PCE	tetrachloroethene
RO	Remedial Objective
RI	Remedial Investigation
SRL	Soil Remediation Level
TCE	trichloroethene
VOC	Volatile Organic Compound
WQARF	Water Quality Assurance Revolving Fund

## 1.0 INTRODUCTION

The Arizona Department of Environmental Quality (ADEQ) has prepared this Proposed Remedial Objective (RO) Report for the Lake Havasu Avenue and Holly Avenue Water Quality Assurance Revolving Fund (WQARF) Registry Site (the Site) to meet requirements established under Arizona Administrative Code (A.A.C.) R18-16-406.

The Site is located in Lake Havasu City (LHC) and is approximately bound to the north by Centers Avenue, to the south by Holly Avenue, to the east by San Juan Drive and to the west by London Bridge Avenue. The contaminants of concern (COC) for the Site are tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), nitrate and chromium.

This Proposed RO Report relies upon the Land and Water Use Study (LWUS, dated October 2019), and the solicitation of proposed ROs during a public meeting held on April 2, 2020. The LWUS is contained in Appendix E of the Draft Remedial Investigation (RI) Report prepared by Geosyntec Consultants, Inc., for ADEQ. The information pertaining to the RO solicitation is available in Appendix A of this document..

The ROs are established for the current and reasonably foreseeable uses of land and waters of the state that have been or are threatened to be affected by a release of a hazardous substance. Pursuant to A.A.C. R18-16-406(D), it is specified that reasonably foreseeable uses of land are those likely to occur at the site and the reasonably foreseeable uses of water are those likely to occur within one hundred years unless site-specific information suggests a longer time period is more appropriate.

Reasonably foreseeable uses are those likely to occur, based on information provided by water providers, well owners, land owners, government agencies, and others. Not every use identified in the LWUS will have a corresponding RO. Uses identified in the LWUS may or may not be addressed based on information gathered during the public involvement process, limitations of WQARF, and whether the use is reasonably foreseeable.

The ROs must be stated in the following terms: (1) protecting against the loss or impairment of each use; (2) restoring, replacing, or otherwise providing for each use; (3) when action is needed to protect or provide for the use; and (4) how long action is needed to protect or provide for the use.

The ROs chosen for the Site will be used during remedy screening in the feasibility study (FS) phase of the WQARF process. The FS will evaluate specific remedial measures and strategies required to meet ROs. A remedial strategy is one or a combination of six general strategies identified in Paragraph B.4 of Arizona Revised Statutes (A.R.S.) 49-282.06; plume remediation, physical containment, controlled migration, source control, monitoring, and no action. A remedial

measure is a specific action taken in conjunction with remedial strategies to achieve one or more ROs, for example, well replacement, well modification, water treatment, water supply replacement, and engineering controls.

Public comments on the proposed ROs will be accepted for 30 days following the release of this report. After the public comment period, the final ROs and a responsiveness summary will be included in the Final RI Report.

## **2.0 REMEDIAL OBJECTIVES FOR LAND USE**

The land uses in the area of the Site are established based on data from municipalities and the questionnaires sent to property owners during the LWUS. Typically, ROs for land use are established by the land use of those properties known to be contaminated with hazardous substances above a Soil Remediation Level (SRL), a Groundwater Protection Limit (GPL), or a risk-based level.

### **2.1 Summary of Current and Reasonably Foreseeable Land Use**

Land use within the study area consists of residential, recreation/resort, commercial/industrial, and undeveloped land. The residential element is dispersed throughout the Site, while the commercial and industrial elements are concentrated along Highway 95, Lake Havasu Avenue, North Kiowa Boulevard, and McCulloch Boulevard. Recreational properties and resorts are concentrated along the Lake Havasu shorelines. Land development within the area of the Site occurs in accordance with local zoning laws, which goes through a review and approval process with LHC. According to LHC there are no foreseeable plans to alter current zoning within the Site, or planned developments of the LHC-owned properties in the area. The land management plan for LHC indicated land use near to Lake Havasu Avenue and Highway 95 is expected to remain industrial, while properties to the west may be converted to resort-related properties, and open space or parks along the Lake Havasu shorelines. The LHC questionnaire response indicated land use was not anticipated to change in the study area.

Hexavalent chromium was detected in soils near to a former plating shop that was historically located at 900 North Lake Havasu Avenue (Figure 3 of the Draft RI). The Draft RI found that the maximum hexavalent chromium concentration detected at the Site was 1,200 milligrams per kilogram (mg/kg) at approximately 112.5 feet below ground surface, exceeding non-residential SRLs for hexavalent chromium of 65 mg/kg. Samples collected at 6 and 10 feet were 67 and 70 mg/kg, respectively. Total chromium was also detected at a maximum of 3,200 mg/kg, above its minimum GPL of 590 mg/kg. This property is currently used for non-residential purposes, and the current property owner's response to the LWUS questionnaire indicated their intent to continue this land use into the future.

The Draft RI also reported that PCE and TCE were detected in soil gas on the 900 North Lake Havasu Avenue property at a maximum of 130,000 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and 5,900  $\mu\text{g}/\text{m}^3$  respectively. This equates to approximately 0.2 mg/kg of PCE and 0.016 mg/kg of TCE in soils. These values are below the SRLs and minimum GPLs for these compounds. However, the soil gas values exceed the vapor intrusion screening levels, indicating additional work may be needed to characterize the potential vapor intrusion risk.

## 2.2 Soil Remedial Objective

The Draft RI found hexavalent chromium soil contamination at the Site above the non-residential SRLs and total chromium above the minimum GPL at the 900 North Lake Havasu Avenue property. This property has non-residential use.

The Proposed RO for soil for non-residential use is:

**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.**

### **3.0 REMEDIAL OBJECTIVES FOR GROUNDWATER USE**

The groundwater uses generally considered to establish the groundwater ROs are summarized from information gathered from the Arizona Department of Water Resources (ADWR), private well owners, water providers and municipalities. The water provider within the Site is LHC.

#### **3.1 Summary of Current and Reasonably Foreseeable Groundwater Use**

The Site is located in the Lake Havasu Basin of the Upper Colorado River Planning Area. The Lake Havasu Basin is located outside ADWR Active Management Areas (AMA) and Irrigation Nonexpansion Areas (INAs). The records from ADWR indicate that the only wells in the area of the Site are monitoring wells and LHC production wells. No private wells or small water systems were found in the vicinity of the Site during the LWUS.

The LHC owns and operates a water distribution system including wells, treatment plants, booster stations, transmission and distribution lines, and storage facilities. The water is used primarily for single-family residential, followed by residential and non-residential irrigation, then multi-family residential and commercial. Six city production wells are located downgradient of the Site, approximately 0.7 miles west of the 900 North Lake Havasu Avenue property (see Figure 2 of the RI). Since 2004, these wells have been reserved as an emergency backup water source, with production limited to occasional operation to maintain pump performance.

According to LHC, there is approved funding for the design and construction of up to two new production wells located in the general vicinity of the existing production wells near the Site along London Bridge Road. The wells are proposed to provide for a 100% redundant backup water source to allow for the main LHC production wells south of the Site to be taken out of service for scheduled maintenance.

According to the Draft RI report, the most recent groundwater sampling results showed the following maximum concentrations for the COCs at the Site:

- PCE at 14 micrograms per liter ( $\mu\text{g/L}$ ), exceeding the AWQS of 5  $\mu\text{g/L}$
- TCE at 23  $\mu\text{g/L}$ , exceeding the AWQS of 5  $\mu\text{g/L}$ ;
- 1,2-DCA at 15  $\mu\text{g/L}$ , exceeding the AWQS of 5  $\mu\text{g/L}$ ;
- 1,1-DCE at 9  $\mu\text{g/L}$ , exceeding the AWQS of 7  $\mu\text{g/L}$ ;
- Nitrate at 210 milligrams per liter ( $\text{mg/L}$ ), exceeding the AWQS of 10  $\text{mg/L}$ ; and,
- Total chromium at 31  $\text{mg/L}$ , exceeding the AWQS of 0.1  $\text{mg/L}$ .

Nitrite and selenium also exceeded their respective AWQS during this sampling event in limited locations.

The highest concentration of total chromium detected in the LHC production wells was 0.12 mg/L in March of 2014. The most recent sampling only analyzed for hexavalent chromium; the highest result was 0.089 mg/L in September 2018. There is no AWQS for hexavalent chromium. No other Site contaminants have been detected above AWQS in the LHC wells.

### **3.2 Groundwater Remedial Objectives**

Chromium, PCE, TCE, 1,1-DCE, 1,2-DCA, and nitrate concentrations exceed their respective AWQS in groundwater at the Site. Currently, groundwater within the Site is periodically used for potable water.

The Proposed RO for groundwater for potable use is:

**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.**

#### **4.0 REMEDIAL OBJECTIVES FOR SURFACE WATER USE**

The ROs for surface water are typically established by the listed use of surface waters impacted or threatened to be impacted by the Site. The information on surface water use in the LWUS was obtained from publically available documents about Lake Havasu and from information provided from LHC as part of the LWUS.

##### **4.1 Summary of Current and Reasonably Foreseeable Surface Water Use**

Several large-scale water providers including the Central Arizona Project (CAP) withdraw lake water approximately 21 miles down lake south of the Site. The lake is used for recreational activities including swimming, boating, watersports and fishing. Surface water from Lake Havasu in the vicinity of the Site is not provided as drinking water.

Groundwater at the Site is likely hydraulically connected to the Lake Havasu/Colorado River system, although a pathway of Site COCs to surface water is considered incomplete as the Site COCs do not appear to have reached the lake. The surface water use is not currently considered threatened by the contamination at the Site.

##### **4.2 Surface Water Remedial Objective**

The Draft RI found no contamination or threat of the contamination from the Site to surface water uses; therefore no surface RO is necessary at this time.

**APPENDIX A**

**Responses to Solicitation for Proposed Remedial Objectives**

## **Responses to Solicitation for Proposed Remedial Objectives**

As per A.A.C. R18-16-406(I), a community meeting was held at April 2, 2020, after 45 days but before 90 days from the release of the RI report. Per the State of Arizona Office of the Attorney General opinion dated March 13, 2020, Arizona Open Meeting Law permits for a public body to hold a remote meeting through technological means. Therefore due to the COVID-19 pandemic that was on-going at the time, ADEQ opted to hold this meeting remotely through technological means. The purpose of the meeting was to solicit proposed ROs for the Lake Havasu Avenue and Holly Avenue WQARF Site. ADEQ received no oral or written RO responses to the solicitation during the meeting.