

**FEASIBILITY STUDY WORK PLAN  
MILLER VALLEY ROAD AND HILLSIDE AVENUE  
WQARF REGISTRY SITE  
PRESCOTT, ARIZONA**



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**Figure 1. Miller Valley Road and Hillside Avenue WQARF Site – Prescott, Arizona**

## LIST OF ABBREVIATIONS & ACRONYMS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
A.R.S.	Arizona Revised Statutes
AWQS	Aquifer Water Quality Standard
bgs	below ground surface
COC	Contaminants of Concern
FS	Feasibility Study
GPL	Groundwater Protection Limits
PCE	Tetrachloroethene
RO	Remedial Objectives
RI	Remedial Investigation
SRL	Soil Remediation Level
TCE	Trichloroethene
VOC	Volatile Organic Compound
WP	Work Plan
WQARF	Water Quality Assurance Revolving Fund

# 1.0 INTRODUCTION

## 1.1 Purpose

This Work Plan (WP) presents the methodology that will be followed for completion of the feasibility study (FS) for the Miller Valley Road and Hillside Avenue Water Quality Assurance Revolving Fund (WQARF) site (the Site) in Prescott, Arizona. This work plan is required as part of the FS process, pursuant to Arizona Administrative Code (A.A.C.) R18-16-407(B).

The purpose of the FS is to develop and evaluate a reference remedy and alternative remedies that are capable of achieving the Site's Remedial Objectives (ROs). An FS report will be developed that relies on data and information from the Remedial Investigation (RI), and further work that may be conducted during the FS, and will evaluate the reference remedy and at least two alternative remedies, to ensure that each remedy meets the following in accordance with A.A.C. R18-16-407(H):

- achieves the ROs;
- is consistent with water management plans and general land use plans; and
- is evaluated with comparison criteria including practicability, risk, cost, and benefit.

One of the alternative remedies will be less aggressive than the reference remedy and one will be more aggressive as required by A.A.C. R18-16-407(E).

In accordance with A.A.C. R18-16-407(I), based on the evaluation of the reference remedy and the alternative remedies, the proposed remedy will be developed and described in the FS report. The FS report shall describe the reasons for selecting the remedy including all of the following:

- how the proposed remedy will achieve the ROs;
- how the comparison criteria were considered; and
- how the proposed remedy meets the requirements of Arizona Revised Statutes (A.R.S.) §49-282.06.

## 1.2 Site Description

The Site is located approximately one mile northwest of downtown Prescott. The Site is approximately bounded to the north by the Merritt Avenue alignment, to the south by Miller Creek, to the east by Division Street, and to the west by Miller Creek and Valley Street (Figure 1)

The purpose of the RI was to determine the nature and extent of contamination at the Site. The RI also identified present and reasonably foreseeable uses of land and waters of the state that have been or are threatened to be impacted by the contamination. Based upon the data collected, the following represents the interpretations and conclusions reached as a result of the RI.

The contaminants of concern (COCs) at the Site include tetrachloroethene (PCE) and trichloroethene (TCE), as these contaminants have been detected in private wells and monitoring wells at concentrations above Aquifer Water Quality Standards (AWQSs), as well as in soil vapor.

Three dry cleaning facilities have operated in the area: the former Village Cleaners from 1965 until 1985, the former Prescott Drive-In Cleaners from 1960 to 1975, and the current Village Cleaners which began operations in 1987. Elevated PCE concentrations in soil gas were located in the vicinity of the current and former Village Cleaners locations. PCE and TCE were not detected in indoor air samples collected in the buildings near to the highest PCE concentrations in the soil gas. There were no exceedances of Soil Remedial Levels (SRLs) or Groundwater Protection Limits (GPLs), and the soil vapor concentrations at the Site are not expected to impact human health.

Groundwater at the Site has been separated into three depth intervals based on lithology and hydrogeologic characteristics encountered during drilling: 1) a shallow depth interval from approximately 29 to 50 feet below ground surface (bgs); 2) an intermediate depth interval from approximately 80 to 115 feet bgs; and 3) a deep interval from approximately 165 to 200 feet bgs. A possible perched groundwater zone at about 16 feet bgs has been observed intermittently at the Site and appears to be separated from the underlying shallow depth interval. The shallow depth interval also appears to be perched, with a significant vadose zone generally extending from about 50 to 80 feet bgs in the area between the shallow and the intermediate depth interval groundwater. Groundwater flow in these depth intervals appears to be to the east or northeast

Plumes consisting mostly of PCE with low levels of TCE are present at all three depth intervals. The groundwater plumes appear to be of relatively limited extent moving slowly based on relatively low groundwater flow velocities and low rate of contaminant migration. The highest concentrations of PCE in the groundwater were in the vicinity of the former Drive-In Cleaners, directly downgradient of the location of the former Village Cleaners. Groundwater in the area of the current Village Cleaners was found to not be impacted with PCE or TCE.

Two private water supply wells located immediately south the potential source areas are currently impacted by COCs. Both wells are being used for irrigation purposes only. Other private wells within ½ mile of the Site were identified and sampled, where possible; all properties that use water in the immediate Site vicinity are using City of Prescott water for drinking.

Land use in the area around the facility consists of a mixture of residences and commercial businesses. Miller Creek is an intermittent stream that flows southeast along the southern edge of the Site to its confluence with Granite Creek, approximately one mile to the east; however, the RI determined that Miller Creek is not impacted by Site contaminants, and is not gaining from the contaminated groundwater aquifer. Groundwater is used for irrigation purposes at the Site, and domestic/potable uses in the vicinity of the Site. The potential receptors most likely to be

influenced by further downgradient progress of releases are believed to be those with private wells using the groundwater for drinking water.

## **2.0 FEASIBILITY STUDY TASKS**

This section discusses the tasks associated with the development of the FS report. The FS tasks will be performed in order to meet the requirements of A.A.C. R18-16-407. The FS process considers the data gathered during the RI and further work that may be conducted during the FS and;

- considers the ROs;
- includes the identification of potential treatment and containment technologies that satisfy the ROs;
- includes remedial technology screening;
- includes the development and analysis of remediation alternatives and technologies; and
- includes a comparison of the remedies and proposes a remedy.

### **2.1 Remedial Objectives**

The ROs developed as part of the RI process, pursuant to A.A.C. R18-16-406 (I), were based on field investigation results, the land and water use surveys, the screening level risk evaluation, and Arizona Department of Environmental Quality (ADEQ) input, and input from the community during the draft RO Report public comment period. ROs are used during remedial alternatives development to identify appropriate remedial technologies.

### **2.2 Development and Screening of Remedial Measures**

Remedial measures are remediation technologies or methodologies, and are screened based on anticipated removal or reduction of contaminants at a site and the ability to achieve the ROs. The FS evaluation will look at future risk under reasonably foreseeable uses of the source facility and surrounding properties. Typically, appropriate remediation alternatives and technologies are screened using the following criteria:

- compatibility with current and reasonably foreseeable land use,
- COC treatment effectiveness,
- regulatory requirements,
- constructability,
- operation and maintenance requirements,
- health and safety considerations,
- generation and management of waste products,
- flexibility/expandability, and
- cost.

Selected remedial measures will then be assembled with selected strategies to develop the reference remedy and alternative remedies. The remedial strategies to be developed, consistent with A.A.C. R18-16-407 (F), are listed below. Source control shall be considered as an element of the reference remedy and all alternative remedies, if applicable, except for the monitoring and no action strategies. A strategy may incorporate more than one remedial measure.

- plume remediation;
- physical containment;
- controlled migration;
- source control;
- monitoring; and,
- no action alternative.

### **2.3 Development of Reference Remedy and Alternative Remedies**

Based upon the retained remedial measures and strategies, a reference remedy and two alternative remedies will be developed as described in A.A.C. R18-16-407(E). The combination of the remedial strategy and the remedial measures for each alternative remedy shall achieve the ROs. The reference remedy and any alternative remedy also may include contingent remedial strategies or remedial measures to address reasonable uncertainties regarding the achievement of ROs or uncertain time-frames in which ROs will be achieved. The reference remedy and alternative remedies will be described in the FS report in sufficient detail to allow evaluation using the comparison criteria, but plans at construction level details are not required at this time. Where appropriate, the reference remedy and an alternative remedies may incorporate different strategies for different aquifers, or portions of aquifers.

The reference remedy shall be developed based upon best engineering, geological, or hydrogeological judgment following engineering, geological, or hydrogeological standards of practice, considering the following:

- the information in the RI;
- the best available scientific information concerning available remedial technologies;
- preliminary analysis of the comparison criteria and the ability of the reference remedy to comply with A.R.S. §49-282.06.

At a minimum, at least two alternative remedies shall be developed for comparison with the reference remedy. At least one of the alternative remedies must employ a remedial strategy or combination of strategies that is more aggressive than the reference remedy, and at least one of the alternative remedies must employ a remedial strategy or combination of strategies that is less aggressive than the reference remedy. A more aggressive strategy is a strategy that requires fewer

remedial measures to achieve the ROs; a strategy that achieves the ROs in a shorter period of time; or a strategy that is more certain in the long term and requires fewer contingencies.

In accordance A.A.C. R18-16-407(G), in identifying remedial measures, the needs of the well owners and the water providers and their customers will be considered, including quantity and quality of water, water rights, and other legal constraints on water supplies, reliability of water suppliers and any operational implications. Such remedial measures may include, but will not be limited to, well replacement, well modification, water treatment, provision of replacement water supplies and engineering controls. Where remedial measures are relied upon to achieve ROs, such remedial measures will remain in effect as long as required to ensure the continued achievement of those objectives.

A comparative evaluation of the reference remedy and the alternative remedies developed will be conducted. In accordance with A.A.C.18-16-407(H), each remedy will be evaluated using the following:

- A demonstration that the remedial alternative will achieve the ROs.
- An evaluation of consistency with the water management plans of the affected water providers and the general land use plans of the local governments with land use jurisdiction.
- An evaluation of the comparison criteria, including:
  - a. practicability of the alternative;
  - b. an evaluation of risk, including the overall protectiveness of public health and aquatic and terrestrial biota;
  - c. cost of the alternative;
  - d. benefit or value the alternative;
  - e. a discussion of the comparison criteria as evaluated in relation to each other.

Based upon the evaluation and comparison of the reference remedy and the other alternative remedies developed, a proposed remedy will be developed and described in the FS in accordance with A.A.C. R18-16-407(I). The FS report shall describe the reasons for selection of the proposed remedy including the following:

- how the proposed remedy will achieve the ROs;
- how the comparison criteria were considered; and
- how the proposed remedy meets the requirements of A.R.S. §49-282.06.

### **3.0 COMMUNITY INVOLVEMENT**

ADEQ will issue a Notice to the Public announcing availability of the work plan to implement the Feasibility Study on ADEQ's website at [www.azdeq.gov](http://www.azdeq.gov). The notice may be mailed to the Public Mailing List for the Site; water providers, the Community Advisory Board, and any other interested parties.

## **4.0 FEASIBILITY STUDY REPORT FORMAT**

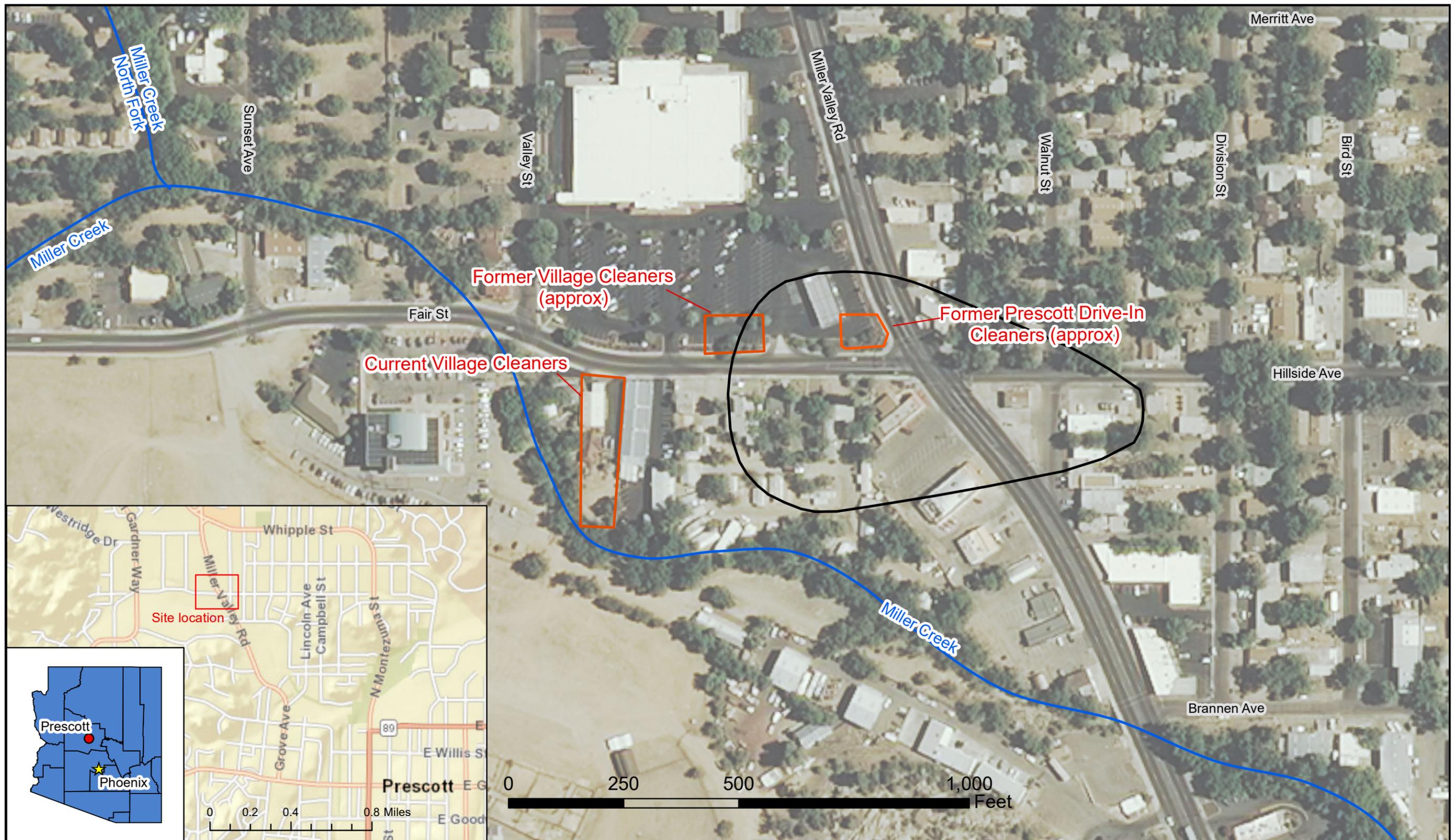
An FS report will be prepared documenting the FS process. The FS report will be organized into the following sections:

- **Section 1.0 INTRODUCTION**  
This section will summarize the purpose of the FS report.
- **Section 2.0 SITE BACKGROUND**  
This section will present a summary of the site description, physiographic setting, nature and extent of contamination and a risk evaluation.
- **Section 3.0 FEASIBILITY STUDY SCOPING**  
This section will present the regulatory requirements presented in statute and rule, delineate the remediation areas and present the ROs identified in the RI.
- **Section 4.0 IDENTIFICATION AND SCREENING OF REMEDIAL MEASURES AND REMEDIAL STRATEGIES**  
This section will present the evaluation and screening of various remedial measures and strategies related to contamination in soil and groundwater and lists the technologies that have been retained for evaluation as part of the reference and alternative remedies pursuant to A.A.C. R18-16-407 (E) and (F).
- **Section 5.0 DEVELOPMENT OF REFERENCE REMEDY AND ALTERNATIVE REMEDIES**  
This section will present the selected reference remedy and, at a minimum, a more aggressive remedy and a less aggressive remedy. Each remedy will include a discussion of the associated remedial measures and remedial strategies pursuant to A.A.C. R18-16-407(E).
- **Section 6.0 DETAILED COMPARISON OF THE REFERENCE REMEDY AND THE ALTERNATIVE REMEDIES**  
The remedies will be compared to each other based on the comparison criteria of practicability, cost, risk and benefit. Uncertainties, if identified, associated with each remedy or comparison criteria will be discussed pursuant to A.A.C. R18-16-407(H).
- **Section 7.0 PROPOSED REMEDY**  
This section will present the proposed remedy as required in A.A.C. R18-16-407(I), and discusses how it will achieve the ROs, how the comparison criteria were considered, and how the proposed remedy will meet the requirements of A.R.S. §49-282.06.

- **Section 8.0 COMMUNITY INVOLVEMENT**

This section will document the community involvement activities conducted in association with the FS.

## **FIGURES**



**Legend**

-  Property boundaries
-  Site boundary
-  Surface water



**Figure 1**  
Miller Valley Rd and Hillside Ave  
WQARF Site - Prescott, AZ