

**FEASIBILITY STUDY WORK PLAN
7TH STREET AND MISSOURI AVENUE
WQARF REGISTRY SITE
PHOENIX, ARIZONA**



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Arizona Department of Environmental Quality
Remedial Projects Unit
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Figure 1. 7th Street and Missouri Avenue WQARF Site – Phoenix, 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
cDCE	cis-1,2-dichloroethene
COC	Contaminants of Concern
FS	Feasibility Study
PCE	Tetrachloroethene
RO	Remedial Objectives
RI	Remedial Investigation
SRP	Salt River Project
SRL	Soil Remediation Level
tDCE	trans-1,2-dichlorodethene
TCE	Trichloroethene
USTs	Underground Storage Tanks
VOC	Volatile Organic Compound
WP	Work Plan
WQARF	Water Quality Assurance Revolving Fund
VC	Vinyl chloride

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 7th Street and Missouri Avenue Water Quality Assurance Revolving Fund (WQARF) site (the site) in Phoenix, 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 bounded approximately by north by Bethany Home Road, to the south by East Georgia Avenue, to the east by North 12th Street, and to the west by North 6th 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 are tetrachloroethene (PCE) and its degradation products trichloroethene (TCE), and cis-1,2-dichloroethene (cDCE), trans-1,2-dichloroethene

(tDCE) and vinyl chloride (VC). Other contaminants detected at the site include benzene and other gasoline related constituents, likely related to former Underground Storage Tanks (USTs) near the potential source area of the site. As PCE is the most extensive contaminant at the site, it is used to define the extent of contamination at the site.

The extent of PCE contamination in the soil and soil-gas is limited to the potential source area. PCE over Soil Remediation Levels (SRLs) have been detected under the underground parking garage of the Missouri Falls building, the former location of the former Kino Drapery Cleaners (Figure 1). Soil gas outside of the footprint of this building have for the most part remained below soil vapor screening levels for vapor intrusion.

PCE in the groundwater over Aquifer Water Quality Standards (AWQS) extends from the southwest corner of 7th Street and Missouri Avenue to the northeast until approximately Bethany Home Road and 12th Street. A Salt River Project (SRP) well located approximately 350 feet northwest of the junction of 7th Street and Missouri Avenue currently used for irrigation contains PCE from the site over AWQS.

Land use in the area around the potential source area consists of residential and commercial uses. There is no appreciable surface water within the site boundaries. Groundwater is currently used for irrigation in the vicinity of the site. Future uses of the groundwater include municipal uses by SRP for the City of Goodyear by 2020 - 2021, as well as potential municipal uses by the City of Phoenix to supplement their water supplies should water demand or available supplies change in the future. The potential receptors most likely to be influenced by further downgradient progress of releases from the site are believed to be a private well owner and the City of Phoenix.

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, ADEQ input, RO solicitation from the public, 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. The ROs for the site are available in the Final RO Report, appendix K in the Final RI Report.

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 area. 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. Standard measurements for comparison of alternative remedies are included in appendix A of A.A.C. R18-16-407 and may be used, as applicable, for comparison of the relevant factors. 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 Arizona Revised Statutes (A.R.S.) §49-282.06.

3.0 COMMUNITY INVOLVEMENT

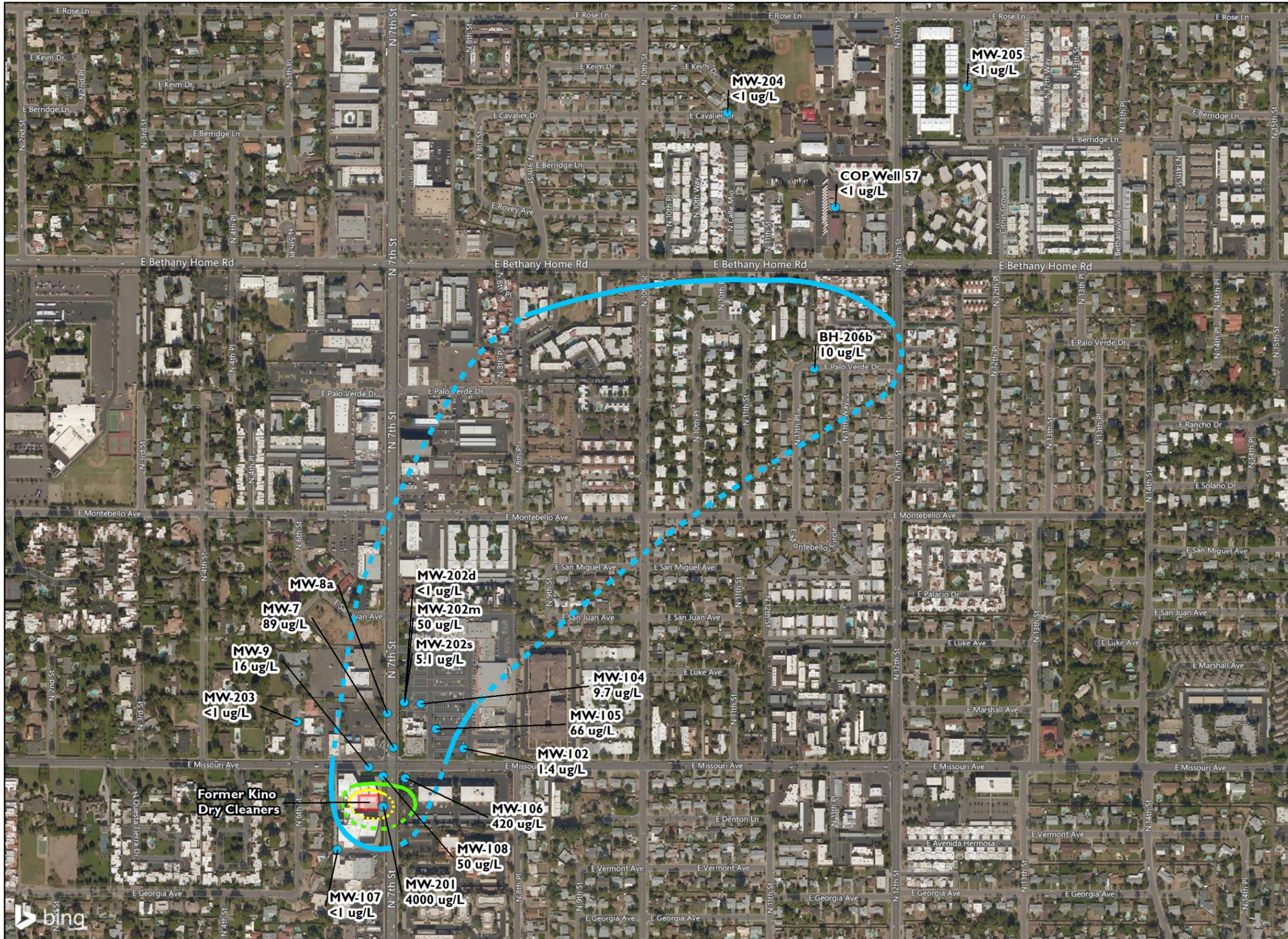
ADEQ will issue a Notice to the Public announcing availability of the work plan to implement the Feasibility Study on ADEQ's website at www.azdeq.gov. The notice may be mailed to the Public Mailing List for the site; water providers, the Community Advisory Board, and any other interested parties.

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



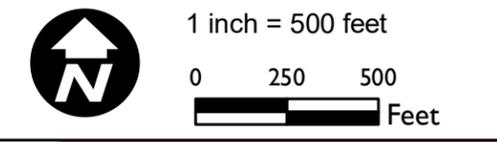
Legend

- Monitoring Well
- Source Area

PCE Concentration (ug/L) Sept. 2017



Notes:
 Tetrachloroethene (PCE) concentration used for interpolation is highest reported in each well during this sampling event.
 The reporting limit was used for interpolation where results were not detected above the reporting limit.
 Only groundwater wells sampled during this sampling event are shown.
 a - Due to the shallower depth of screen, PCE results from MW-8 were not included in the interpolation.
 b - BH-206 was sampled during drilling in April 2017. No well was installed.
 ug/L - micrograms per liter



Pinyon
 Environmental, Inc.

**7th Street and Missouri Avenue
 WQARF Site – Phoenix, Arizona**

Phoenix, Arizona Drawn By:

Site Location: Sections 9, 16 and 17, Township 2N, Range 3E, Gila and Salt River Meridian

Pinyon Project Number: 7/17-1006-03.REM001.2

JAF	Figure: 1
Reviewed By: AMG	Date: 11/12/2018