

APPENDIX A

SCOPE OF WORK FOR ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMOVAL SITE EVALUATION

FOR SECTION 9 LEASE ABANDONED URANIUM MINE

Introduction

This Scope of Work (“SOW”) specifies actions required to be completed by Babbitt Ranches, LLC (“Respondents”) pursuant to the Administrative Settlement Agreement and Order on Consent (“AOC”) CERCLA Docket No. 2016-13 entered into voluntarily with the United States Environmental Protection Agency (“EPA”). All terms used in this SOW shall be interpreted in a manner consistent with the definitions provided in the AOC. In the event of any conflict between this SOW and the AOC, the AOC shall control. The work to be performed includes a Removal Site Evaluation (“RSE”) on private land belonging to Babbitt Ranches LLC and on federal land. This RSE will investigate the extent of contamination related to uranium mining activities at the “Site” as defined in the AOC, including the Areas to be Addressed described below, and the placement of warning signs.

Areas To Be Addressed

The Site location and layout are shown in Attachments 1 and 2 to this SOW. The Areas to be Addressed by this SOW include:

- The following Abandoned Uranium Mine (“AUM”) areas:
 - AUM 457, including areas on Sections 9 and 10 where hazardous substances have come to be located;
 - AUM 458 (located on Section 9);
 - AUM 459, to only include areas where hazardous substances have come to be located on Section 9;
- Areas of technologically enhanced naturally occurring radioactive material (“TENORM”) in the immediate vicinity of the AUMs (i.e., step out areas) if EPA determines that this is appropriate based on exceedances of the Investigation Levels (as defined in Section 1.3) at the margins of the Areas to be Addressed;
- The mine haul roads, along with their shoulders, on Section 9, as designated on Attachment 3 to this SOW, and areas impacted by any mine waste found on these roads;
- The area of the riparian corridor within the floodplain of the Little Colorado River (“LCR”) identified as “Wetlands 3” in the Figure 3-1 of the Site Investigation Report (see Attachment 5);
- Drainage Areas and Drainage Networks in the vicinity of the AUMs, as designated in Attachment 4 to this SOW;

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- The structures in AUM 457; and
- Pits in the AUMs described above.

In addition, Respondents may be required to characterize additional areas of mine waste identified in Section 9.

1.0 General Requirements

- 1.1 Priority Media:** Priority media, i.e., media that presents the greatest potential risk to human health and the environment, which will be addressed at the Site include soils and sediments.
- 1.2 Potential Contaminants of Concern:** Respondents shall analyze soil and sediment samples from selected locations for the following Potential Contaminants of Concern (“PCOC”): radium 226 (“²²⁶Ra”), uranium, arsenic, molybdenum, mercury, selenium and vanadium. ²²⁶Ra and its associated gamma emission is the primary risk driver associated with uranium ore extraction. Gamma radiation levels that potentially exceed background levels have been detected at the Site. The other PCOCs are frequently associated with mining activities.
- 1.3 Investigation Levels:** For the purposes of this RSE, the “Investigation Level” for ²²⁶Ra is 1.24 pCi/g above background. Scanning measurements must meet a scan minimum detectable concentration (“MDC”) of 50% of the Investigation Level. Investigation Levels for other potential contaminants of concern shall be taken from the EPA Region 9 Regional Screening Level (“RSL”) tables, available at <http://www.epa.gov/region9/superfund/prg>.
- 1.4 Multi-Agency Radiation Survey & Site Investigation Manual (“MARSSIM”):** The activities conducted as part of this RSE shall be conducted in a manner consistent with MARSSIM specifications to facilitate implementation of a final status survey at the completion of all mitigation activities.
- 1.5 Notice of Fieldwork and Sampling:** Respondents shall provide EPA with at least five (5) working days’ notice prior to conducting any on-site Work. In addition, Respondents shall provide 2-week notice of all sampling activities, including soil, sediment sampling and scanning. This notice will assist EPA in providing appropriate oversight and notice to potentially affected community members.
- 1.6 Split Samples:** Upon request from EPA, Respondents shall provide 10% splits to EPA to be analyzed by EPA’s laboratory for corroboration analysis.
- 1.7 Cultural Resources Survey:** Respondents shall perform a Cultural Resources Survey and shall submit a Cultural Resources Survey Report to EPA, for EPA to use in its consultations under the National Historic Preservation Act (NHPA).

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Respondents shall also provide a copy of the Cultural Resources Survey Report to the Bureau of Reclamation. Unless required for completion of the Cultural Resources Survey, no intrusive work on the Site shall be performed prior to EPA approval of the undertaking, or portion thereof, that is subject to consultation under the NHPA.

- 1.8 Biological Resources Survey:** Respondents shall perform a Biological Resources Survey and submit a Biological Resources Survey Report to EPA. The US Fish and Wildlife Service provided a letter on April 22, 2016 finding that “there are no federally listed or proposed species, or designated critical habitat known to occur at or adjacent to the project area.” Based on that letter, a Biological Assessment is not required. The Biological Resources Survey Report shall include avoidance and mitigation measures for species identified by the Arizona Game and Fish Department (letters dated April 8, 2016 and May 20, 2016) and mobile species identified by the Navajo Nation Heritage Program (letter dated May 5, 2016). A copy of the final Biological Resources Survey Report and all related correspondence shall be submitted to EPA. No intrusive work on the Site shall be performed prior to EPA approval of the Biological Resources Survey Report. Upon completion, a courtesy copy of the Biological Resources Survey Report shall also be provided to the Bureau of Reclamation, Navajo Nation EPA, and Navajo Fish and Wildlife.

2.0 Requirements for the Work

This SOW requires three phases of work. Each phase shall be performed pursuant to approved work plans and may overlap to some degree.

2.1 Phase 1 – Site Signage

- **Site Signage:** Respondents shall install bilingual (English and Navajo) signs in locations sufficient to warn visitors, including trespassers, of the risks, to be approved by EPA. Signs shall be placed in such locations that alert human receptors that a mine waste area is nearby. The template for the signs will be provided by EPA.

2.2 Phase 2 – Transect Gamma Scan and Background Study

- **Background Study:** Respondents shall conduct a background study consistent with MARSSIM. Respondents shall propose reference areas based on geologically similar soils, upgradient and upwind of the Site in areas undisturbed by uranium mining. A gamma scan of the background area(s) will be performed, in addition to collection and testing of surface soil for ^{226}Ra activity, total uranium, and stable metals (including arsenic, molybdenum, selenium, vanadium, and mercury). Static gamma scan counts shall be collocated with the surface soil samples in the background areas.
- **Transect Gamma Scan:** Respondents shall conduct a full area transect gamma scan of the “Areas to be Addressed” designed with an appropriate step out areas to determine the lateral limits of contamination defined by the Investigation Level for ^{226}Ra . The

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gamma scan survey will be conducted as overlapping transects using radiation detecting instruments in order to provide information on where hazardous substances have come to be located.

- **TENORM vs. NORM Identification:** Respondents' and EPA's representatives may consult in the field to identify any outcrops or soil within the scanned areas that are naturally occurring radioactive materials ("NORM"). If there is not agreement in the field, then Respondents shall denote those areas as proposed NORM on appropriate figures or maps and provide a Technical Memorandum to EPA containing the basis for their opinions. The final determination between NORM and TENORM shall be made by EPA after reviewing the Respondents' proposals and by field inspecting the proposed NORM areas.
- **Sampling for Gamma Scan/Soil Concentration Correlation:** Respondents shall develop a site-specific statistical correlation between gamma scan instrument results and ^{226}Ra concentrations in soil. Respondents shall collect sufficient gamma scan data and surface soil samples to calculate a correlation between gamma scan counts and soil concentrations of ^{226}Ra .

2.3 Phase 3 – Removal Site Evaluation ("RSE")

- **Characterization of Surface, Subsurface Soils and Sediments:** Respondents shall sample and analyze surface and sub-surface soils for the PCOCs in the areas described in "Areas to be Addressed" of this SOW. Respondents may incorporate data from the 2014 Site Investigation, if EPA confirms that this data meets the Data Quality Objectives for the RSE. Sampling in all mine process areas, riparian areas, pits, Drainage Areas and Drainage Networks adjacent to mine areas, and the step out areas shall include surface sampling and subsurface sampling at appropriate intervals to a depth that confirms the vertical extent of TENORM contamination, as determined by a field gamma meter and confirmatory soil and sediment sampling. Respondents shall sample for ^{226}Ra throughout the Areas to be Addressed and sample for uranium and the metals referenced in paragraph 2.2.1 at depth intervals from at least 8 locations at the mining areas and 4 locations from the area identified as Wetlands 3 in the Site Investigation Report (see Attachment 5).
- **Characterization of Pits:** Respondents shall measure and calculate volumes of mining pits to estimate their capacity to receive mining wastes.
- **Streamlined Risk Evaluation:** Respondents shall conduct a Streamlined Risk Evaluation consistent with EPA Guidance EPA540-R-93-057 to establish the contaminants of concern (COCs) and to calculate risk to potential future receptors under current Site conditions. Respondents shall also calculate proposed action levels for COCs that will be protective for users under the current and planned future use at the Site. In so doing, Respondents may consider any recorded covenants restricting the use of the land.

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- **Waste Volumes:** Respondents shall calculate the volumes of contaminated soil and sediment with concentrations above the screening levels and with concentrations above the proposed risk based action levels.

3.0 Work Plans

Respondents are required to develop the following work plans and to submit them for EPA review and approval or approval with modifications, consistent with the AOC. Respondents are also required to provide copies of the following work plans to the Bureau of Reclamation.

- 3.1 Phase 1, 2, and 3 Work Plans:** The individual work plans for Phases 1, 2, and 3 of work may be submitted separately, progressively, or as part of a single overall work plan.
- 3.2 Health & Safety Plan:** This plan shall identify all hazards and include both directives and specific operating procedures that will be used to mitigate those hazards. Health & Safety Plan is not subject to EPA approval.
- 3.3 Quality Assurance Project Plan:** This plan shall document the planning, implementation, and assessment procedures for a particular project, as well as any specific quality assurance and quality control activities. See the EPA “Guidance on for Quality Assurance Project Plans”, dated December 2002, EPA/240/R-02/009.
- 3.4 Field Sampling Plan/Quality Assurance Sampling and Analysis Plan (FSP/QASP):** This plan shall address vertical and lateral characterization and verification sampling. Respondents shall utilize an appropriate statistical approach and a sufficient radiological scanning approach to develop this plan. In addition, Respondents should use an approach consistent with MARSSIM. Respondents can use Visual Sampling Plan software to properly document that the soil sampling approach is statistically representative.
- 3.5 Data Management Plan:** This plan shall present a framework for the generation, validation, and distribution of the removal assessment data deliverables. EPA will provide a sample Data Management Plan to use as a model.
- 3.6 Streamlined Risk Evaluation Workplan:** This plan shall propose the pathways to be considered in the Streamlined Risk Evaluation and describe the procedures proposed to conduct the Streamlined Risk Evaluation.

4.0 Schedules

The Work to be performed pursuant to the AOC and this SOW shall be performed in compliance with the following schedule, unless otherwise agreed upon by the parties or excused by a Force Majeure:

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- 4.1 Phase I Cultural Resources Surveys, Biological Survey, and Signage**
 - 4.1.1 Cultural Resources Survey Report** - Submit the Cultural Resources Survey Report within 60 days of the effective date of the AOC;
 - 4.1.2 Biological Resources Survey Report** – Submit the Biological Resources Survey Report within 60 days of the effective date of the AOC;
 - 4.1.3 Draft Work Plan for Phase 1**– Submit the draft Work Plan for Phase 1 within 45 days of the effective date of the AOC; and
 - 4.1.4 Warning Signs** - Install signs within 30 days from approval of the Work Plan for Phase 1, or upon approval from EPA, within 30 days of completion of gamma scanning under Phase 2.

- 4.2 Phase II Background Determination, Gamma Scanning, Soil Correlation**
 - 4.2.1 Draft Work Plan for Phase 2 (Background Determination and Gamma Scanning)** – Submit the draft Work Plan for Phase 2 within 45 days of the effective date of the AOC;
 - 4.2.2 Field Work for Phase 2 (Background Determination and Gamma Scanning Data Collection)** – Begin field work for Phase 2 within 30 days from approval of the Work Plan for Phase 2; and
 - 4.2.3 Phase 2 Summary Report** – Submit Phase 2 Summary Report, including any TENORM vs. NORM Technical Memoranda, within 45 days from completion of field work for Phase 2 and receipt of all validated analytical data.

- 4.3 Phase III RSE Evaluation, Vertical Profiling, Risk Evaluation, Volumes**
 - 4.3.1 Draft Work Plan for Phase 3 (RSE Investigation)** – Submit the draft Work Plan for Phase 3 within 30 days of EPA approval of the Phase 2 Summary Report;
 - 4.3.2 Field Work for Phase 3 (RSE)** – Begin Field Work for Phase 3 within 30 days from approval of the Phase 3 Work Plan; and
 - 4.3.3 Completion Report for Phase 3 (includes RSE Report)** – Submit within 90 days of completion of all field work for Phase 3 and receipt of all validated analytical data.

5.0 Reporting

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- 5.1 Weekly Technical Calls:** Respondents shall, as needed, participate in weekly technical conference calls with EPA's project manager and consultants, and shall provide invitations to the Bureau of Reclamation's project coordinator to participate in these calls. On the weekly call, Respondents' representatives shall provide updates on all tasks and raise issues that may need to be resolved in order to expedite completion of the Work.
- 5.2 Monthly Reporting:** Respondents shall provide a Monthly Report to the OSC/RPM and the Bureau of Reclamation's project coordinator, via email, no later than the last day of the first full month following the Effective Date of the AOC. All subsequent Monthly Reports shall be submitted by email no later than the last day of each full month following the initial submittal. Monthly Reports shall include in each report a complete update on all field, analytic and planning activities.
- 5.3 Final RSE and Completion Report:** The RSE Report shall integrate all data used and collected into a single coherent characterization report deliverable. This report shall be provided as specified in the AOC.
- 5.4 Data Submission:** Respondents shall submit data to EPA and the Bureau of Reclamation under this SOW, according to the following technical specifications for those submissions:

Respondents shall submit sampling and monitoring data in the standard EPA regional Electronic Data Deliverable (EDD) format that EPA identifies. EPA may change this EDD format upon written notice to the Respondents. EPA may allow Respondents to use other non-EDD Format data delivery methods upon Respondents' showing that the EDD Format presents a significant burden to Respondents or upon Respondents showing that technological improvements make the EDD Format outdated.

Respondents shall submit spatial data, including spatially-referenced data and geospatial data, in the ESRI File Geodatabase, and as unprojected geographic coordinates in decimal degree format using North American Datum 1983 (NAD83) or World Geodetic System 1984 (WGS84) as the datum. If applicable as determined by EPA, Respondents shall include descriptions of the data collection methods in their data submissions. At EPA's discretion, Respondents shall include projected coordinates with documentation. Respondents shall include metadata with all spatial data submission. Respondents shall ensure that all metadata that they submit is compliant with the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata and its EPA profile, and the EPA Geospatial Metadata Technical Specification. An add-on metadata editor for ESRI software, the EPA Metadata Editor (EME), complies with these FGDC and EPA metadata requirements and is available at <https://edg.epa.gov/EME/>

Respondents shall ensure that each data file that Respondents submit includes an attribute name for each AUM for which data is submitted. Respondents shall consult and use the information published by EPA at

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<http://www.epa.gov/geospatial/policies.html>, as Respondents identify and name data attributes.

6.0 List of Attachments

Attachment 1: Site Location Map

Attachment 2: Site Layout Map

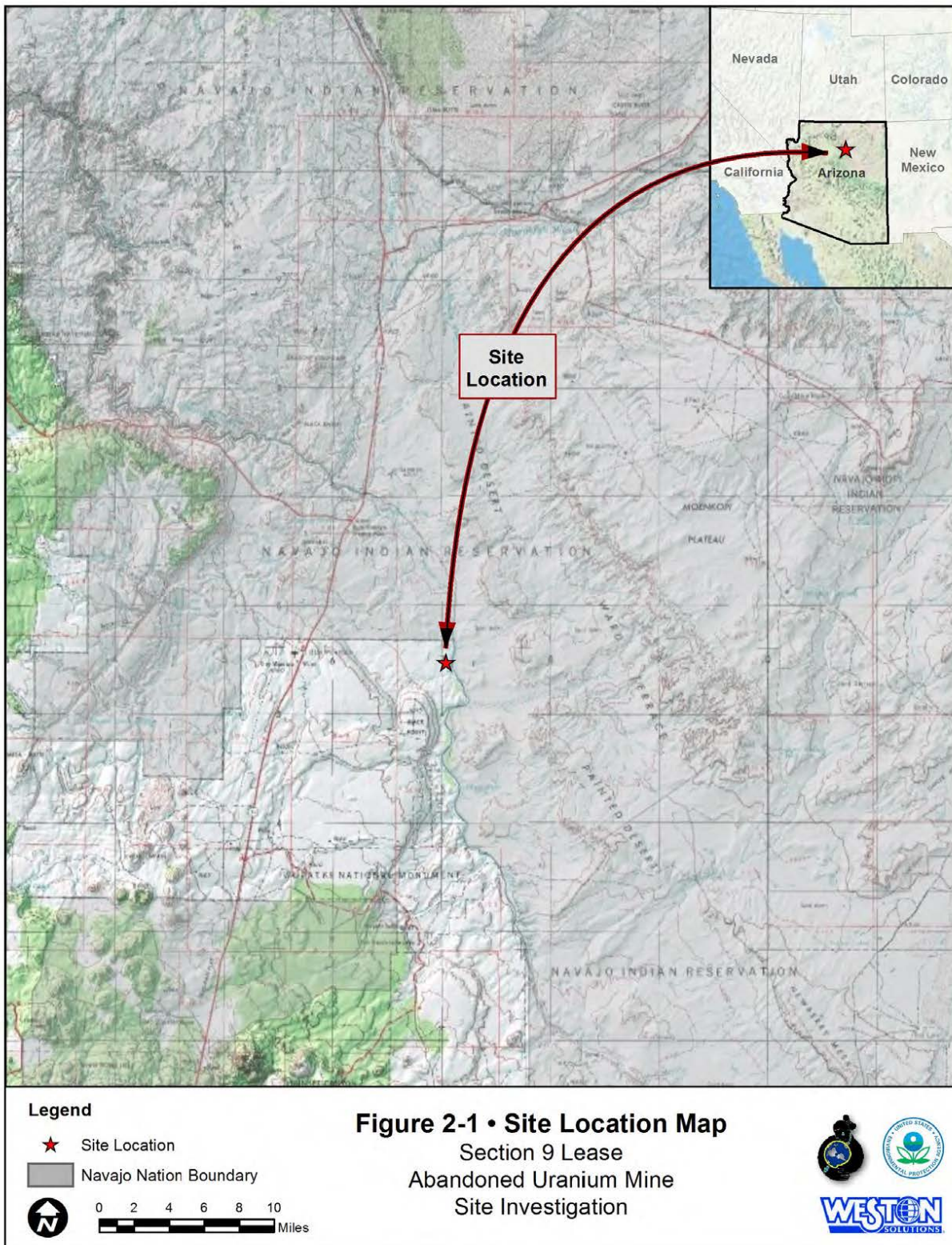
Attachment 3: Detailed Haul Road Map

Attachment 4: Detailed Drainage Map

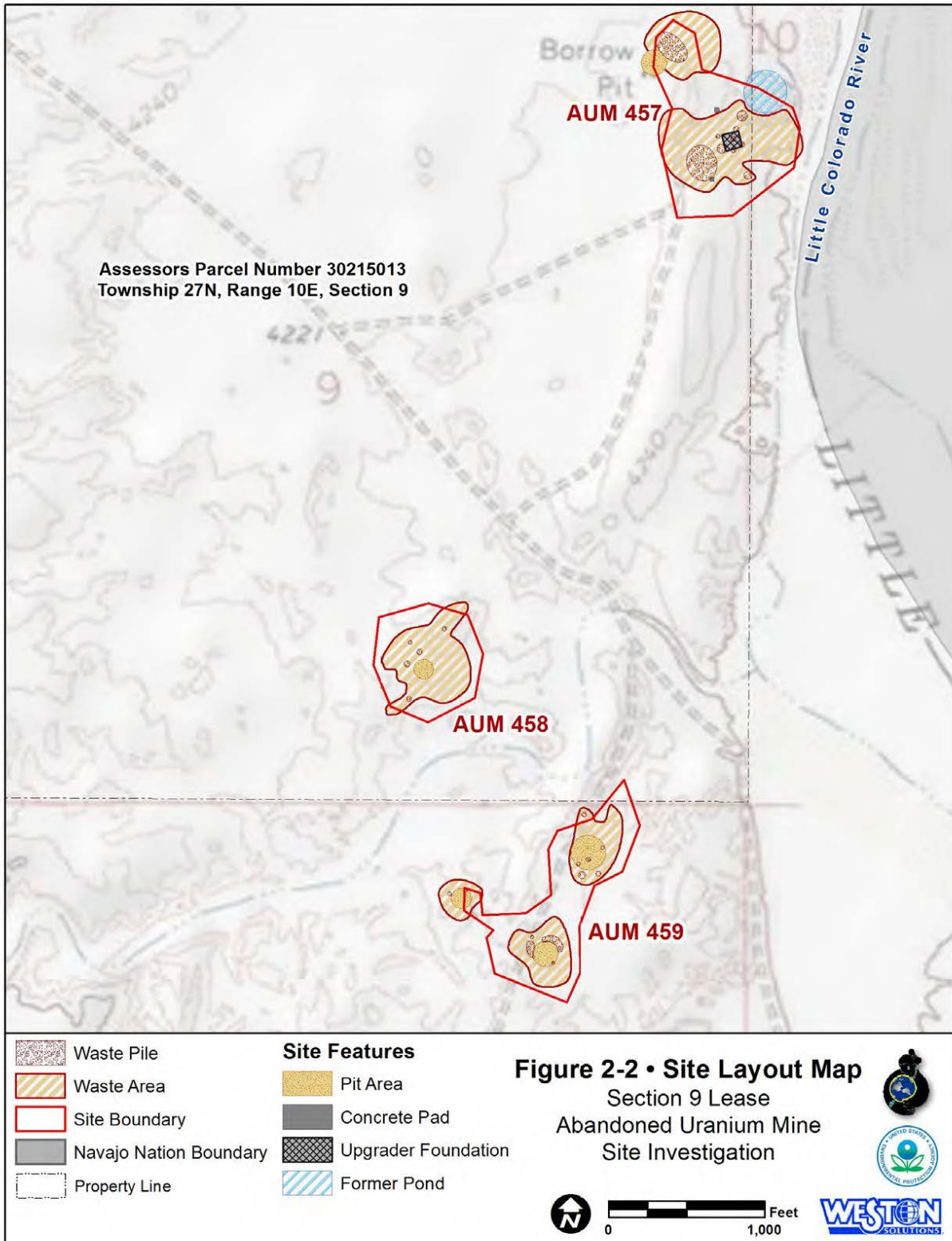
Attachment 5: Site Investigation Figure 3-1

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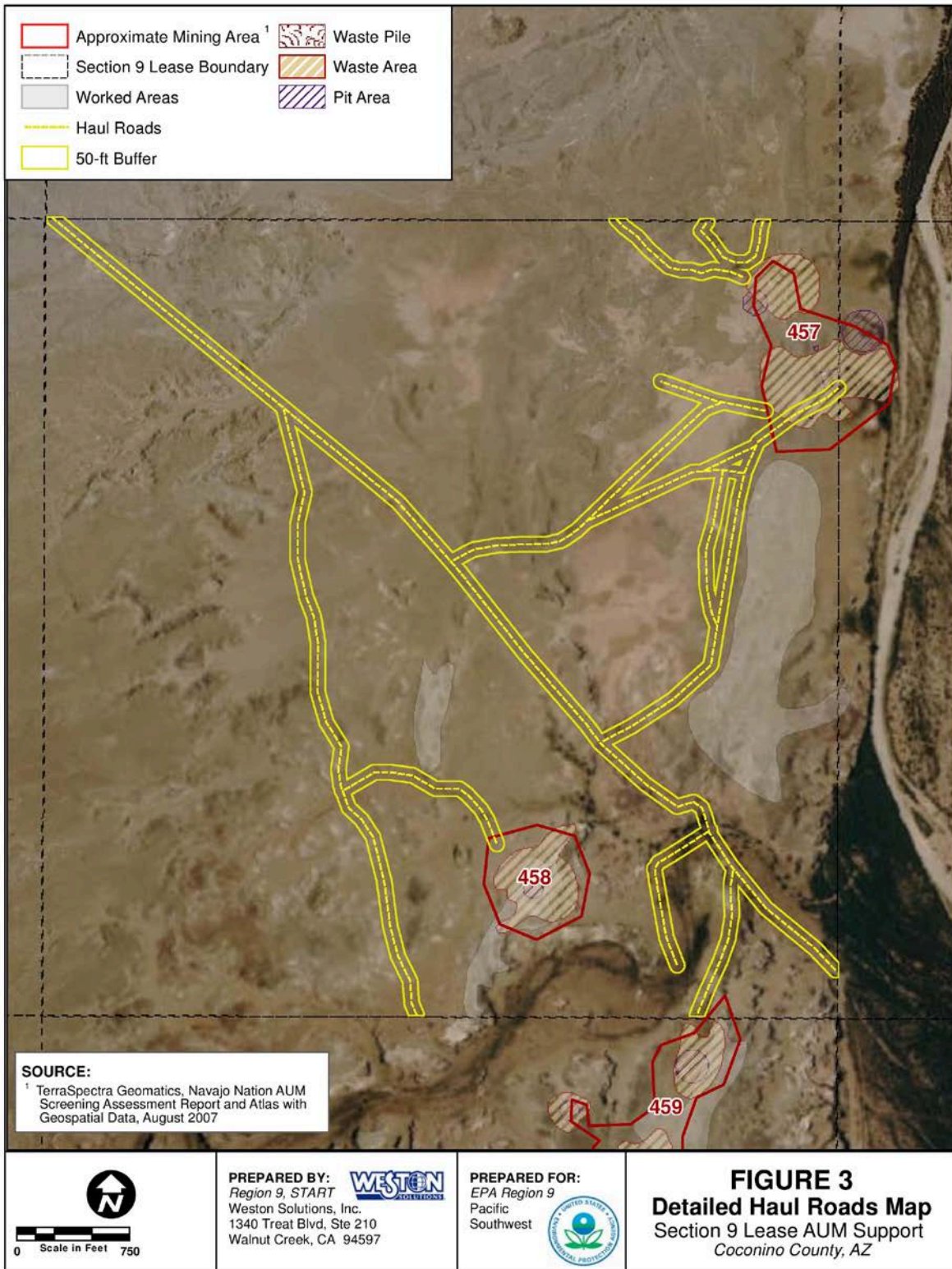
Attachment 1: Site Location Map



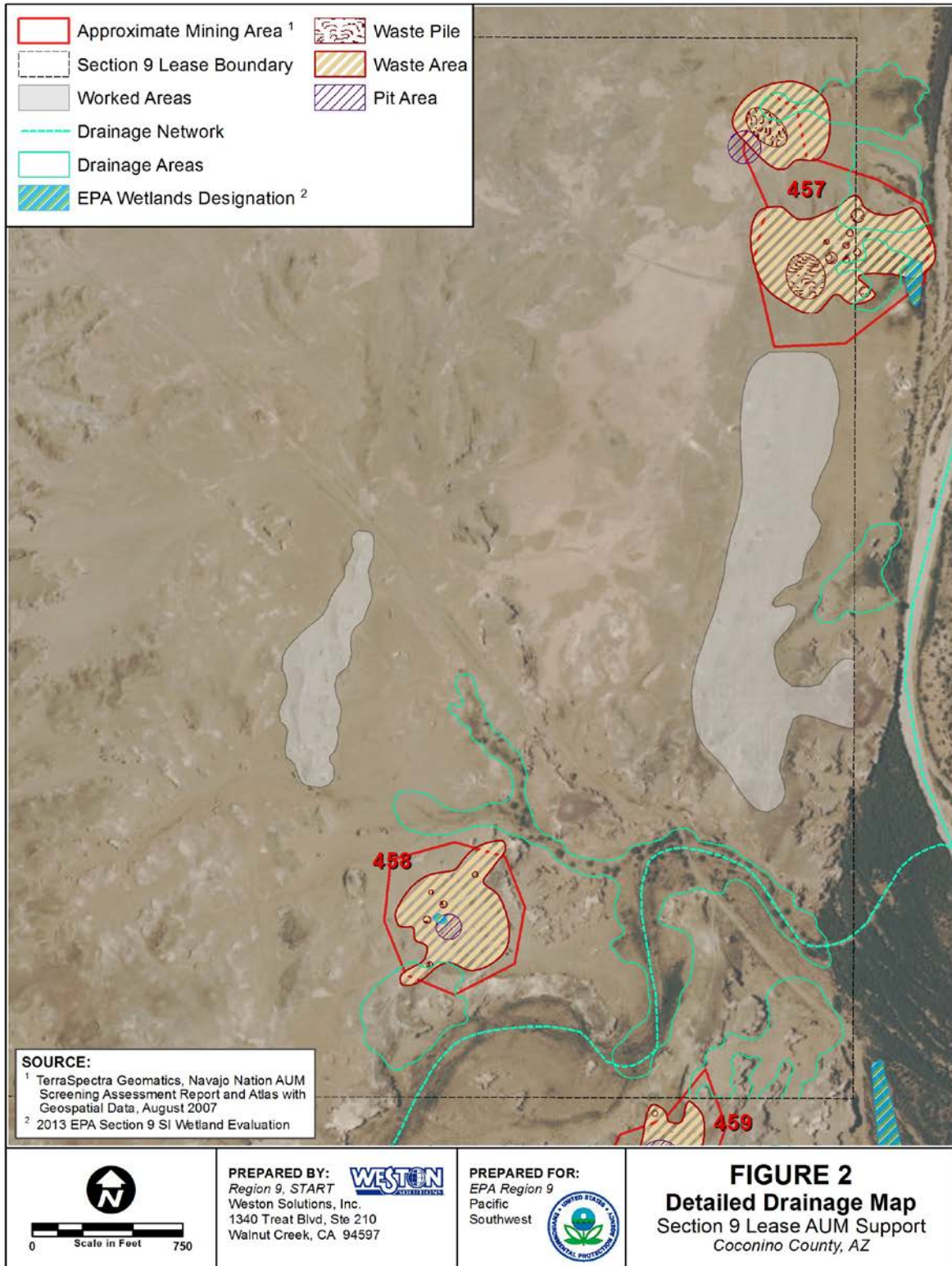
Attachment 2: Site Layout Map



Attachment 3: Detailed Haul Road Map



Attachment 4: Detailed Drainage Map



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Attachment 5: Site Investigation Figure 3-1

