WORK PLAN FOR
SOIL SAMPLING ACTIVITIES AT
CHEVRON AND
TOWN OF DEWEY-HUMBOLDT PARCELS
DEWEY-HUMBOLDT, ARIZONA

PREPARED FOR:

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PROJECT NO.:

20-384

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Engineering Progress

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LIST OF FIGURES

FIGURE NO.	DESCRIPTION
1	Site Location Map
2	Site Layout with Sampling Grid

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LIST OF ACRONYMS & ABBREVATIONS

ASTM	American Society for Testing and Materials
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
bgs	Below Ground Surface
C.F.R.	Code of Federal Regulations
COC	Constituent of Concern
DQOs	Data Quality Objectives
EPA/USEPA	United States Environmental Protection Agency
ft	Foot
GPS	Global Positioning System
HASP	Health and Safety Plan
IDW	Investigation-Derived Waste
MS/MSD	Matrix Spike/Matrix Duplicate Spike
PPE	Personal Protective Equipment
QAPP	Quality Assurance Program Plan
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
rRSL	Residential Regional Screening Level
TAT	Turnaround Time
TBD	To Be Determined
USCS	Unified Soil Classification System
XRF	X-Ray Fluorescence

1.0 INTRODUCTION

1.1 PROJECT OBJECTIVE

This Soil Sampling Work Plan (Work Plan), as prepared by Matrix New World Engineering, Land Surveying and Landscape Architecture, PC (Matrix), outlines procedures for soil sampling activities associated with the Chevron and Town of Dewey-Humboldt Parcels (the Site) located in Dewey-Humboldt, Arizona. The location of the Site is shown on **Figure 1**. The Site, which occupies approximately 2 acres, is shown on **Figure 2**.

Sampling activities will be performed in general accordance with Arizona Department of Environmental Quality (ADEQ) *Waste Programs Division Site Investigation Guidance Manual*, dated October 2014 (ADEQ, 2014), and the ADEQ *Hazardous Waste Program Quality Assurance Program Plan* (QAPP), dated January 12, 2015 (ADEQ). The Work Plan will outline procedures for sampling and analysis of surface soil to address public concern that residual lead may exist.

1.2 SITE DESCRIPTION AND BACKGROUND INFORMATION

The Site is located in Dewey-Humboldt, Arizona and occupies approximately 2 acres in the eastern portion of Section 15, Township 13 North, Range 1 East of the Gila and Salt River Baseline and Meridian (**Figure 1**). The surrounding, adjacent land use consists of residential to the north and west and Humboldt Elementary School to the east and south. The parcels associated with this Work Plan are: 402-09-013, 402-09-015, 800-27-004M, 800-27-004N, 800-27-004Q shown on **Figure 1**.

2.0 SOIL SAMPLING ACTIVITIES

2.1 SITE SPECIFIC HEALTH AND SAFETY PLAN

Prior to initiation of sampling at the Site, a site-specific Health and Safety Plan (HASP) will be developed to identify chemical, physical, and other identified or potential hazards associated with the Site. This HASP will be created in accordance with 29 Code of Federal Regulations (C.F.R.) 1910.120 *et seq.* and maintained throughout the sampling process to note any changes if deviations occur from the Work Plan.

2.2 SOIL SAMPLING

2.2.1 Sample Locations

A sampling grid will be established at the locations shown on **Figure 2**. Surface soil samples will be collected from the interval extending 0- 2-inches in depth using discrete sampling methods within the grid. A maximum of 66 discrete primary samples will be collected within the proposed sampling grid. A photo and GPS coordinates will be taken at each sample location and will be recorded using the Fulcrum application for real-time collection and tracking of each discrete sample. Each sample will be given a unique name based upon the grid location and will be identified prior to sampling. Additional samples may be taken at one foot below ground surface (ft bgs) using the criteria detailed in Section 3.2. A minimum of 5 deeper samples will be taken at locations across the sample site and sent to the lab for analysis.

2.2.2 Field Documentation

Field logbooks will be used to record significant events and observations during sampling events, including name of sampler, sampling method, and decontamination procedures. The Fulcrum application will be used to record the following for each sample:

- Sample ID
- Date and time of sample collection
- Depth at which sample was taken
- Discrete sample ID
- Sample location
- Soil type and color

3.0 SOIL SAMPLING PROCEDURES

Surface soil samples will be collected from the 0-2 inches depth interval at 66 locations and a minimum of 5 samples will be collected from the 12-14-inch depth interval at select locations. Additional deeper samples may also be collected based on field screening results. Field screening of the samples will be conducted for the Resource Conservation and Recovery Act (RCRA) 8 Metals, arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury. An X-ray Fluorescence (XRF) spectrometer will be used for field screening.

Since soil moisture can affect the XRF results by increasing variability and systematic bias, the proposed sampling event will not be conducted after a significant rain event. Matrix will allow the areas to sufficiently dry prior to mobilization and sample collection.

The composition of each soil sample will be logged by a qualified geologist or engineer using the Unified Soil Classification System (USCS) in accordance with ASTM International (ASTM) Standard D-2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Field observations, including evidence of contamination (e.g., odors or staining) and other observations will be included on field logs. After any rain event, Matrix will provide ample time to allow thorough drying of surface soils prior to testing. The following paragraphs describe the procedures to be used to collect surface and deep samples.

3.1 SURFACE SAMPLES

Each surface sample will be collected from the 0-2 inches depth interval using either a disposable steel scoop or a decontaminated steel scoop. The sampler will wear disposable nitrile gloves to avoid cross contamination between samples. At the desired depth, the scoop will be driven into the ground to collect a sample. Care will be taken to sieve out any small stones, organic plant debris (sticks, grass blades, roots), uncrushable aggregate particles, and other non-soil foreign debris to the extent practicable. Any small aggregate of clayey or cemented material will be crushed to break down. The sample will be transferred immediately to a Ziploc™ or similar sealed bag, mixed vigorously and physically manipulated to homogenize the soil. Then the sample will be field screened two times for the RCRA 8 metals using the XRF spectrometer and the results will be recorded for further evaluation. Prior to each day and at the end of every day, calibration checks on the XRF spectrometer will be conducted with standard reference materials for accuracy of results.

3.2 DEEP SAMPLES

The two field screened results from each surface sample location will be averaged. If the average result is within 75% or 300 mg/Kg of the residential Regional Screening Level (RSL) for lead of 400 mg/Kg, then a sample will be collected from the 12-14-inch depth interval using a decontaminated hand auger. Similar to surface soil sample collection care will be taken to sieve out any small stones, organic plant debris (sticks, grass blades, roots), uncrushable aggregate particles, and other non-soil foreign debris to the extent practicable. The sample will be transferred immediately to a Ziploc™ or similar-composition sealed bag and mixed vigorously to homogenize. Once mixed, the sample will be field screened two times for the RCRA 8 metals using the XRF spectrometer and the results will be on recorded field forms and stored internally on the XRF Spectrometer for download for further evaluation.

Enough sample volume will be collected at each depth and location to place a representative homogenized sample in an eight (8) ounce jar for potential laboratory analysis. Representative shallow and deep samples will be selected for laboratory analysis based on the field test results and consultation with ADEQ project manager. The samples will be labeled, logged on a chain-of-custody form and field logbook, and placed in a sample cooler maintained at approximately 4 degrees Celsius prior to submittal to Pace Analytical National Center for Testing and Innovation (Pace Analytical) in Mount Juliet, Tennessee (ADHS certification number AZ0612) for analysis.

4.0 LABORATORY ANALYSIS

It is estimated no more than 17 surface samples, 17 deep samples, and 3 field duplicate samples will be analyzed by the laboratory. Matrix will work in collaboration with ADEQ to evaluate the field screening results to determine which samples will be submitted for laboratory analysis.

The selected samples will be submitted to Pace Analytical National Center for Testing and Innovation (Pace Analytical) in Mount Juliet, Tennessee (ADHS certification number AZ0612) for analysis of;

- RCRA 8 metals in accordance with United States Environmental Protection Agency (EPA) Method 6010/7471 The samples will be analyzed on a 72-hour/3-day rush turnaround time (TAT) from receipt at the laboratory.

5.0 DECONTAMINATION PROCEDURES

The non disposable sampling equipment will be decontaminated prior to the collection of each sample to avoid cross-contamination and to maintain the integrity of samples. Equipment decontamination will be performed using the following procedures.

- Spray rinse and wash using a solution of Liquinox® or equivalent detergent and potable water
- Spray rinse with potable water
- Spray rinse with distilled water
- Spray rinse with deionized water
- Allow the equipment to air dry

5.1 INVESTIGATION DERIVED WASTES

Investigation-derived waste (IDW) which could be generated by the sampling and analysis program includes excavated soil, disposable personal protection equipment (PPE), residual decontamination fluids, and general debris. Any excess soil generated during sampling will be returned to the general area where the sample was collected. PPE and other waste which may be generated include disposable gloves, paper, and used plastic sheeting. These items will be disposed in a commercial solid waste receptacle. Any water used for decontamination purposes will be allowed to evaporate on site.

6.0 QA/QC PROCEDURES

Quality assurance and quality control (QA/QC) procedures will be implemented using methods that will ensure the Project's data needs for completeness, comparability, representativeness, accuracy, and precision are met. Based on these QA/QC objectives, the sample analyses will be completed in accordance with USEPA methodologies and ADEQ's Hazardous Waste Program QAPP (ADEQ, 2015).

6.1 QUALITY CONTROL SAMPLES

The QA/QC procedures for sample collection will include a blind field duplicate, equipment blank, and field rinsate blank sample analysis (as appropriate). The QC sample analyses objectives for samples collected in the field during this investigation are defined as follows:

- One blind field duplicate sample per ten (10) analytical samples, with at least one duplicate sample per day, will be collected to assess laboratory precision.
- One equipment blank sample per day will be collected for laboratory analysis. The equipment blank sample will be collected by pouring laboratory-provided deionized water over the sampling device into an appropriate sample container. These will only be collected over non-dedicated (i.e., reusable scoops, and hand auger tooling) sampling equipment.
- One trip blank sample will be collected to assess the representativeness of the soil samples and ensure no cross contamination occurred during transport. The trip blank will be prepared with laboratory deionized water and will accompany the sample cooler from the laboratory to the field and back to the laboratory.

6.2 LABORATORY QUALITY CONTROL

The laboratory will utilize QC samples to assess the validity of the analytical results of field samples. The laboratory QC sample analyses include method blank analysis, surrogate spike analysis, matrix spike/matrix spike duplicate (MS/MSD) analysis, internal standards analysis, duplicate sample analysis, and check standard analysis. Each analysis is discussed below.

Method blank analyses are performed to assess possible laboratory contamination at a frequency of at least one per 20 samples using "clean" deionized water. Surrogate spike analyses are used to evaluate the efficiency of the analytical procedure in recovering the true amount of a known compound. MS/MSD samples are used to evaluate the effect of the sample matrix on the analytical method at a frequency of at least one per 20 samples. Internal standards analyses are performed to confirm the analytical system remains in calibration. This standard is used to assess the laboratory's control of the analytical system. Duplicate sample analyses are conducted to evaluate the reproducibility of the analytical method at a

frequency of at least one per 10 samples. Check standard analyses will be used to verify the standard curve for each group of samples.

The laboratory QC sample analyses program will be used to screen the analytical procedures for the purpose of the laboratory maintaining control of the analytical method. The laboratory will institute corrective actions in the event the QC sample analyses indicate the system is not performing within established protocols. A Level II equivalent data package will be supplied by the laboratory for this investigation.

Data validation will be performed on data reported by the laboratory. The laboratory data will be screened for inclusion and frequency of laboratory QC data and to ensure appropriate corrective actions will be taken if out-of-control data are discovered. The measurement data will be invalidated if the laboratory QC data are found to be deficient or inappropriate corrective actions were taken. The measurement data will be reduced and validated according to the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (USEPA, 2002). Data validation and appurtenance precision and accuracy statements will be entered into the database management system.

Data Quality Objectives (DQOs) will be used as a guide for data quality assessment (USEPA, 2000). The DQOs are precision, accuracy, representativeness, completeness, and comparability, and represent qualitative and quantitative objectives that ensure data generated during this investigation meet the needs of the Project. The DQOs are defined below:

Precision is a measure of the reproducibility of concentrations reported for duplicate soil samples collected from the same location. Precision is calculated by determining the relative percent difference (RPD) between duplicate samples. The precision objective is an RPD of 20 percent for field duplicates.

Accuracy is the degree to which the measurement data approaches the “true” value for each analyte. Accuracy is assessed by calculating the percent recovery for a sample spiked with the analyte of concern (matrix spike). The accuracy objective will be 75 to 125 percent recovery.

Representativeness refers to the comparability of the sample collection procedures to those delineated in the sampling and analysis plan or work plan and the degree to which the analytical data represent the subsurface contaminant concentrations. Representativeness will be accomplished by consistent field sampling and analytical procedures.

Completeness is defined as the ratio of acceptable validated laboratory measurements to the total number of planned measurements for this investigation. The completeness objective for samples collected during this investigation is at least 90 percent.

Comparability is an evaluation of the relative consistency of the laboratory measurement data. Comparability cannot be measured quantitatively; instead, professional judgment is relied upon. Internal comparability will be achieved by consistent sample collection and analytical methods throughout the investigation.

The data set will be examined at the conclusion of this phase of the field sample collection and laboratory sample analysis program. The examination will focus on validating the degree to which the DQOs have been achieved, particularly the QA/QC analytical results.

6.3 XRF QUALITY ASSURANCE/QUALITY CONTROL

To ensure usability and accuracy of field screening data associated with the samples, Matrix will closely follow US EPA Method 6200, *Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment* (EPA, 2007). This document includes information about the type of interferences that could occur when screening, including physical characteristics of the sample, moisture content, positioning of XRF with the samples, and chemical properties of the samples. Prior to each day and at the end of every day, calibration checks will be conducted with standard reference materials for accuracy of results.

During each reading, samples will be placed on a background-reducing plate to lower the potential background x-ray readings from outside the intended sample bag. Each sample will be analyzed twice for a minimum of 60 second count times to account for the limits of detection and standard deviations calculated by the XRF. Detection limits are based on a statistical analysis of the sample readings.

As field screening results are recorded, field personnel will calculate the relative percent difference between sample sets at each location. If the RPD is >50%, then the collected samples will be again homogenized and re-analyzed using the XRF spectrometer.

7.0 REPORTING

Following completion of sampling activities and receipt of laboratory analyses described in this Work Plan, a draft Soil Sampling Results Report will be prepared to document the findings of the investigation. The report will include but will not be limited to the following;

- Soil sampling procedures and any deviations from the Work Plan,
- Tables with field screen results using the XRF spectrometer,
- Tables with laboratory analytical results including, GPS coordinates, Analytical results will be compared to the residential RSL for metals
- Figure(s) depicting analytical results with sampling grid and the locations where all samples were collected,
- Appendices with field notes, certified lab report(s), a concise photographic log, and any other pertinent information.

Following ADEQ's acceptance of the findings of the draft Soil Sample Results Report, a final report including recommendations will be prepared and submitted to ADEQ.

8.0 PROJECT SCHEDULE

The project schedule represents the estimated time it will take to complete the tasks described in this Work Plan, provided no additional remedial efforts other than those described in this Plan are required. The project schedule will begin on the date ADEQ approves this Work Plan for implementation. Field sampling will only proceed immediately following approval of site access to private property which is currently being conducted by ADEQ. This Project will be considered complete following ADEQ's approval of the final Soil Sampling Results Report.

EVENT	SCHEDULE
Receive feedback/comments from ADEQ for draft Soil Sampling Work Plan	June 29, 2020
Submit Final Soil Sampling Work Plan	July 14, 2020
Conduct Soil Sampling Activities	Pending Access Agreements
Receive laboratory results report	Within 5 business days following sample receipt at laboratory (preliminary results prior, assuming rush TAT)
Submit draft Soil Sampling Results Report to ADEQ	Within 20 days following receipt of all laboratory reports
Receive feedback/comments from ADEQ	Within 10 days following receipt of draft report
Submit Final Soil Sampling Results Report	Within 7 days following receipt of ADEQ's comments
ADEQ Approval of Soil Sampling Results Report	To be Determined (TBD)

9.0 REFERENCES

ADEQ, 2015. *Quality Assurance Program Plan*. ADEQ Hazardous Waste Program. January 2015.

ADEQ, 2014. *Site Investigation Guidance Manual.* ADEQ Waste Programs Division. October 2014.

EPA, 2002. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. March 2002.

EPA, 2000. *Guidance for the Data Quality Objectives Process.* USEPA/QA/G-4. August 2000.

EPA, 2007. *Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment*. February 2007.

FIGURES

FIGURES

EXPLANATION

Soil Sampling Area

TOWN OF DEWEY-HUMBOLDT AND CHEVRON PARCELS (800-27-004M / 004N / 004Q & 402-09-013 / 015) 25401 NORTH CENTRAL AVE DEWEY-HUMBOLDT, AZ 86329

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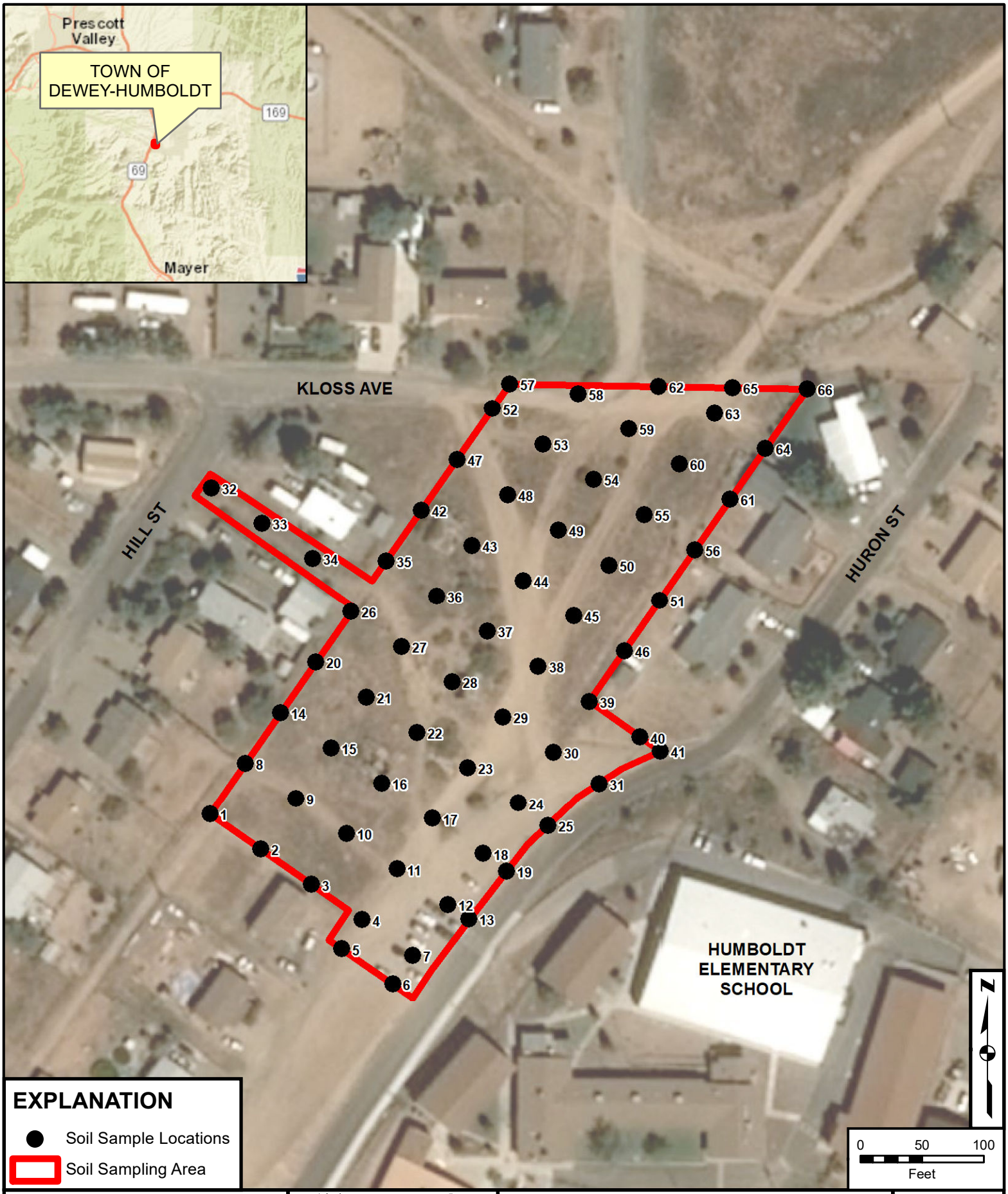
SITE LOCATION MAP

DRAWN BY:	DESIGNED BY:	APPROVED BY:	PROJECT NUMBER:
JJ	JJ	KM	20-384
DATE: 05-19-2020	DATE: 05-19-2020	DATE: 05-19-2020	SCALE: 1 " = 1,042 '

FIGURE NUMBER:

1



TOWN OF DEWEY-HUMBOLDT AND CHEVRON PARCELS (800-27-004M / 004N / 004Q & 402-09-013 / 015)
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SITE LAYOUT WITH SAMPLING GRID MAP

DRAWN BY: JJ	DESIGNED BY: JJ	APPROVED BY: KM	PROJECT NUMBER: 20-384
DATE: 06-15-2020	DATE: 06-15-2020	DATE: 06-15-2020	SCALE: 1 " = 100 '

FIGURE NUMBER:
2