Remediation and Reclamation Summary Report

Chalupa #4 SWD – South Remediation Area
1RP-4632
Lea County, NM

Prepared for:

FOUNDATION ENERGY MANAGEMENT

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Prepared by:

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October 29, 2019

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1. Introduction

Tasman Geosciences, Inc., (Tasman), on behalf of Foundation Energy Management (FEM) has prepared this Remediation and Reclamation Summary Report for Chalupa #4 Saltwater Disposal facility (Site) with associated RP case number 1RP-4632. This report details remediation and reclamation activities that were performed at the Site to address chloride impacted soil resulting from a produced water surface release that was discovered on February 23, 2017. In accordance with the *Soil Remediation Work Plan for Chalupa #4 SWD Release Site* (Remediation Work Plan) which was approved by the New Mexico Oil Conservation Division (NMOCD) on June 6, 2018, Site assessment, remediation, and reclamation activities within the root zone were conducted within a downgradient area adjacent to the Site referred to as the Southern Release Area (SRA).

2. Site Location and Background

The Site is located in Lea County, NM in the west half of the southwest quarter of Section 13, Township 14 South, Range 33 East and the approximate coordinates are 33.103422, -103.576112 (Figure 1). The Site is located approximately 0.3 miles south of State Highway 108 (Anderson Road) in a rural area on New Mexico State Trust Lands administered by the New Mexico State Land Office (NMSLO) and leased to Norman and Elwanda Hahn Ranches, LTD for agriculture use. The nearest town of Lovington, NM is located approximately 16 miles southeast of the Site.

On February 23, 2017 FEM discovered a release of produced water at the Site from a clamp securing a hose to the Chalupa #4 SWD wellhead that failed, releasing saltwater on the ground surface. The release occurred in the SRA as displayed on Figure 2, which is approximately 2,500-feet south of the tank battery location. Approximately 125 bbls of saltwater were released to the ground surface and approximately 25 bbls were recovered. on March 6, 2017, FEM submitted a Release Notification Corrective Action Form C-141 to the NMOCD for the release and the NMOCD established a maximum permissible chloride level in soil of 600 milligrams per kilogram (mg/kg). On behalf of FEM, Enviro Clean Cardinal, LLC (ECC) performed initial Site investigation activities which included a walkover survey using an EM-38 electrical conductivity (EC) meter and soil boring activities to delineate the horizontal and vertical extents of chloride impacts. As presented in the *Release Characterization Report* that was submitted to the NMOCD on February 16, 2018, the lateral extents of chloride impacts in the SRA covered approximately 0.64 acres and extended vertically to between 34 and 59 feet below ground surface (bgs).

Subsequent to the initial response and investigation activities described above, FEM retained Tasman to conduct additional Site assessment, investigation, remediation, and reclamation activities at the Site within the root zone of the SRA between the surface and four (4) feet bgs as described in the Remediation Work Plan which was approved by the NMOCD on June 6, 2018 and by the NMSLO on June 8, 2018.

As described in Section 3.1 of the Remediation Work Plan, background soil sampling for analysis of cation exchange capacity (CEC), sodium absorption ratio (SAR), mechanical grain size distribution, soil classification, and 12 essential plant nutrients was proposed to be conducted to help determine the

nutrients that would be required to facilitate vegetation re-growth at the Site. However, due to the alternative remediation approach that was ultimately chosen for the Site, as discussed in Section 3 below, background soil sampling for soil nutrient information was not required. Also as described Section 3, clean organic topsoil typically used in the area for excavation, backfilling, and vegetation re-growth was utilized.

3. Remediation and Reclamation Activities

On May 8, 2019, chloride impacted soil excavation activities were initiated within the SRA between the surface and approximately 4 feet bgs. However, during initial excavation activities, a very hard caliche layer was encountered within the in the first 18 inches of soil. Subsequent to further excavation and subsurface investigation, due to the volume and consistency of the caliche material, it was determined that the native material was not conducive to the preferred remedial alternative presented in the Remediation Work Plan which included on-Site treatment through excavation, impermeable liner installation, backfilling, and soil washing. Concerns that the liner and soil washing system would be severely damaged during backfilling and compaction of the native caliche material rendered the soil washing remediation approach infeasible. Therefore, soil remediation activities were transitioned to traditional dig and haul methods for subsequent disposal of the top four feet of impacted material and subsequent impermeable liner installation and backfilling using clean fill material that would not puncture the liner.

Between May 8 and 19, 2019, approximately 4,091 cubic yards (yd^3) of chloride impacted soil was transported under waste manifest procedures to an approved off-Site disposal facility (Gandy Marley Inc.) located near Caprock, NM. On May 20, 2019, prior to backfilling activities, a 20-millimeter thick linear low-density polyethylene (LLDPE) sealed liner manufactured by Raven Industries, Inc. was installed at the base of the excavation area. On May 22-23, 2019, approximately 3,422 yd^3 of clean sand was used to backfill the bottom of the excavation up to 18 inches bgs and approximately 1,315 yd^3 of a clean organic topsoil was backfilled and compacted within the disturbed area to match the previous grade.

On June 6, 2019, the NMSLO approved an amended seed mixture to be used at the Site and on September 11, 2019, prior to heavy precipitation events that were forecasted for the area, re-seeding activities were performed at the Site using a tractor with a drop seed tiller. During a Site visit on October 8, 2019 to observe vegetation re-growth at the Site, Tasman personnel observed sprouted seedlings throughout the disturbed area indicating that the re-seeding effort has successfully propagated vegetation at the Site. Photos of the observed seedlings are provided in Appendix A.

4. Conclusions and Recommendations

Based on the remediation and reclamation activities described herein, chloride impacts to soil within the root bearing zone between the surface and 4 feet bgs have been remediated. Additionally, based on the October 8, 2019 Site visit, vegetation propagation appears to have been successful through the excavation area. Periodic Site monitoring will be performed during the growing season of 2020 to ensure vegetation re-growth is successful.

Figures

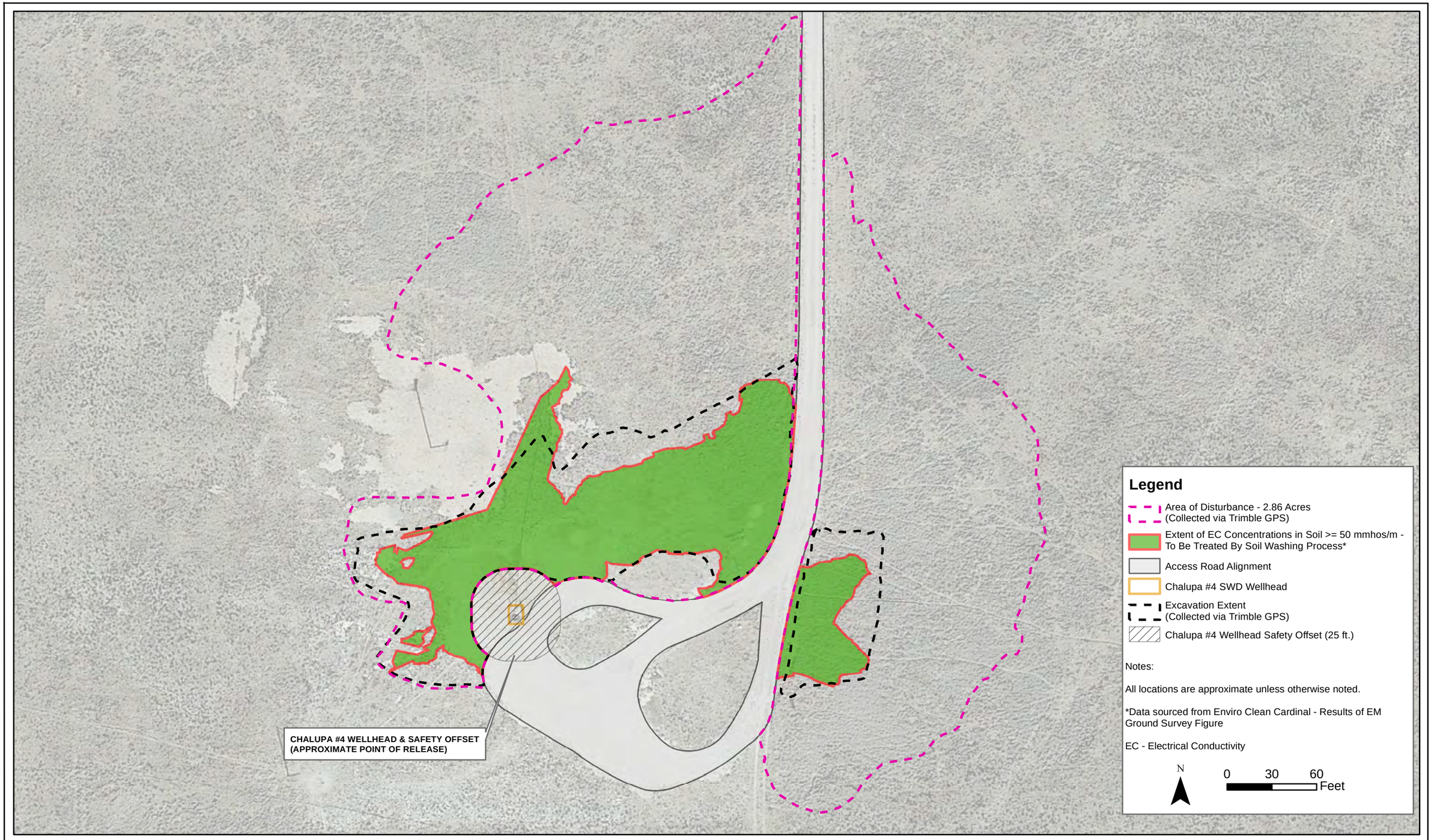
0 750 1,500 Feet

Figure 1

Site Location Map
Chalupa #4 SWD Well Site
S13 T14S R33E
Lea County, New Mexico

TASMAN GEOSCIENCES

Drawn By: DBA
Date: 5/8/2018



DATE: May 2018 DESIGNED BY: M. Lindstrom DRAWN BY: D. Arnold	TASMAN GEOSCIENCES **Tasman Geosciences, Inc.** **6899 Pecos Street - Unit C** **Denver, CO 80221**	**Foundation Energy Management, LLC** **Chalupa #4 SWD Well Site** Section 13, Township 14 South, Range 33 East Lea County, New Mexico	Southern Release Area Soil Remediation Layout Map	Figure 2

Appendix A


DIRECTION
S (T)
+33.09838°
-103.57519°
ACCURACY 15 ft
DATUM WGS84
FEM Chalupa
Seedlings
10/8/19, 2:51:37 PM


DIRECTION
NE (T)
+33.09805°
-103.57572°
ACCURACY 15 ft
DATUM WGS84
FEM Chalupa
Southern Area
10/8/19, 2:49:29 PM


DIRECTION
NE (T)
+33.09845°
-103.57528°
ACCURACY 20 ft
DATUM WGS84
FEM Chalupa
Southern Area
10/8/19, 2:51:20 PM


DIRECTION
NE (T)
+33.09805°
−103.57487°
ACCURACY 17 ft
DATUM WGS84
FEM Chalupa
Southern Area
10/8/19, 2:52:23 PM

District I
1625 N. French Dr., Hobbs, NM 88240
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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Operator:	OGRID:
FOUNDATION ENERGY MANAGEMENT, LLC 5057 KELLER SPRINGS RD ADDISON, TX 75001	370740
	Action Number: 3067
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
bbillings	Report accepted. This is not closure of incident as it was not asked for in report, and saw very little data, but as a high level summary it is fine	7/23/2021