## Initial

# Application

## Part I

Received 6/29/21

| 1 | /-C-1000 |
|---|----------|
|   |          |

6/29/21 REVIEW

SWD

APP NO:

pBL2118136745

ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

### **NEW MEXICO OIL CONSERVATION DIVISION**

- Geological & Engineering Bureau – 1220 South St. Francis Drive, Santa Fe, NM 87505



| 1220 000111011  | Transis Birro, Garria re  | 3,11111 37 333                   | SERVATION ON SE                              |
|---|---|----------------------------------|--|
|   | STRATIVE APPLICATION  |                                  |  |
|   | R ALL ADMINISTRATIVE APPLICATION:<br>H REQUIRE PROCESSING AT THE DIVIS                                  |                                  | ES AND                                       |
| Applicant: Anthem Water So  | olutions, LLC   | OGRID Numbe                      | r: 330069                                    |
| Vell Name: Waxwing 252634 Fede  | ral SWD 1   | API: <u>30-025-XX</u>            | XXX  |
| ool: <u>SWD; Devonian-Silurian</u>  |   | Pool Code: <u>978</u>            | 369  |
| SUBMIT ACCURATE AND COMPLETE  | INFORMATION REQUIRED INDICATED BELOW  | TO PROCESS THE TYPE O            | FAPPLICATION                                 |
| 1) <b>TYPE OF APPLICATION:</b> Check tho A. Location – Spacing Unit – Sim   |   | DRATION UNIT) SD                 | SWD-243                                      |
| B. Check one only for [1] or [1]  [1] Commingling – Storage -  DHC CTB  [11] Injection – Disposal – Pre  WFX PMX  | -Measurement  PLC PC OLS  | ☐ PPR                            | OR OCD ONLY                                  |
| A. X Offset operators or lease has a Royalty, overriding royalty C. X Application requires publication and/or concues. X Notification and/or concues. X Surface owner G. X For all of the above, proof the No notice required | nolders<br>y owners, revenue owners<br>ished notice<br>urrent approval by SLO<br>urrent approval by BLM | Not App Con                      | ice Complete<br>olication<br>ntent<br>mplete |
| CERTIFICATION: I hereby certify the administrative approval is accura understand that no action will be notifications are submitted to the  | <b>te</b> and <b>complete</b> to the k<br>taken on this application                                     | pest of my knowledge. I          | also   |
| Note: Statement must be con   | npleted by an individual with man   | agerial and/or supervisory capac | ity.   |
|   |   | 6/29/2021                        |  |
| Marshall Tippen   | Ī   | Date                             |  |
| Print or Type Name  |   | (972) 795-4201                   |  |
| nn /  |   | Phone Number                     |  |
| /// // <sub>2</sub>   |   | THORIC MORRIDGE                  |  |
| / Mum un  |   | mtippen@anthemwsllc              | .com   |
| Sianature   |   | e-mail Address                   |  |



6/29/2021

New Mexico Oil Conservation Division 1220 South St. Francis Drive Santa Fe, New Mexico, 87505

Re: Application of Anthem Water Solutions, LLC to drill and permit the saltwater disposal well Waxwing 252634 Federal SWD 1 located in Unit D, Section 25, Township 26 South, Range 34 East, NMPM, Lea County, New Mexico.

To Whom it May Concern:

Please find the enclosed C-108 Application for Authority to Inject, supporting the above-referenced request for saltwater disposal. The well will be operated as a commercial endeavor offering operations in the area additional options for produced water disposal. Please find the enclosed C-108 Application for Authority to Inject along with supporting documents.

I would like to point out that this application for a proposed Devonian-Silurian SWD interval includes the following: Published legal notice ran 6/17/2021 in The Lovington Leader and all offset operators and other interested parties have been notified individually. The legal notice affidavit is included herein. This application also all information required for a completed Form C-108, as well as a wellbore schematic, area of review maps, affected party plat and other required and pertinent information. This well is located on federal land and federal minerals; a copy of the application has been sent to the appropriate regulatory bodies.

I respectfully request that the approval of this saltwater disposal well proceed swiftly and if your staff requires additional information or has any questions, please do not hesitate to call or email me.

Sincerely,

Marshall Tippen

**Anthem Water Solutions** 

mtippen@anthemwsllc.com | (972) 795-4201

STATE OF NEW MEXICO ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

#### Oil Conservation Division 1220 South St. Francis Dr. Santa Fe, New Mexico 87505

FORM C-108 Revised June 10, 2003

#### APPLICATION FOR AUTHORIZATION TO INJECT

| I.     | PURPOSE: Secondary Recovery Pressure Maintenance X Disposal Storage Application qualifies for administrative approval? Yes No   |
|--------|---|
| II.    | OPERATOR: Anthem Water Solutions, LLC   |
|        | ADDRESS: 5914 W. Courtyard Drive, Suite 320, Austin TX 78730  |
|        | CONTACT PARTY: Marshall Tippen PHONE: (979) 795-4201  |
| III.   | WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection.  Additional sheets may be attached if necessary.   |
| IV.    | Is this an expansion of an existing project? Yes Yo   |
| V.     | Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.   |
| VI.    | Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.  |
| VII.   | Attach data on the proposed operation, including:   |
|        | <ol> <li>Proposed average and maximum daily rate and volume of fluids to be injected;</li> <li>Whether the system is open or closed;</li> <li>Proposed average and maximum injection pressure;</li> <li>Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,</li> <li>If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).</li> </ol> |
| *VIII. | Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.   |
| IX.    | Describe the proposed stimulation program, if any.  |
| *X.    | Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted)  |
| *XI.   | Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.   |
| XII.   | Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.  |
| XIII.  | Applicants must complete the "Proof of Notice" section on the reverse side of this form.  |
| XIV.   | Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.  |
|        | NAME: Marshall Tippen TITLE: Director of Engineering  |
|        | NAME: Marshall Tippen TITLE: Director of Engineering  SIGNATURE: DATE: 6/29/2021  |
| *      | E-MAIL ADDRESS:mtippen@anthemwsllc.com  If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted.  Please show the date and circumstances of the earlier submittal:   |

#### III. WELL DATA

- A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:
  - (1) Lease name; Well No.; Location by Section, Township and Range; and footage location within the section.
  - (2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.
  - (3) A description of the tubing to be used including its size, lining material, and setting depth.
  - (4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District Offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

- B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.
  - (1) The name of the injection formation and, if applicable, the field or pool name.
  - (2) The injection interval and whether it is perforated or open-hole.
  - (3) State if the well was drilled for injection or, if not, the original purpose of the well.
  - (4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.
  - (5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any.

#### XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

- (1) The name, address, phone number, and contact party for the applicant;
- (2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;
- (3) The formation name and depth with expected maximum injection rates and pressures; and,
- (4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

## Item III – Subject Well Data (Attachment 1)

#### A. Well Data

#### 1) General Well Data

Operator: Anthem Water Solutions, LLC

Lease Name and Well Number: Waxwing 252634 Federal SWD 1

Location Footage Calls: 125' from FNL, 134' from FWL

Legal Location: Unit D, Section 25, Township 26 South, Range 34 East, NMPM

**Ground Elevation:** 3215 feet

Proposed Injection Interval: 18810 - 19977 (open hole)

County: Lea

### 2) - 3) Casing , Tubing & Cement Information

| - 3) casing , rub | Casing Information |             |                  |                |                       |               |  |  |  |  |  |  |
|-------------------|--------------------|-------------|------------------|----------------|-----------------------|---------------|--|--|--|--|--|--|
| Туре              | Conductor (1)      | Surface (2) | Intermediate (3) | Production (4) | Liner (5)             | Open Hole (6) |  |  |  |  |  |  |
| OD                | 30"                | 16"         | 13 3/8"          | 9 5/8"         | 7 5/8"                | N/A           |  |  |  |  |  |  |
| Weight            | N/A                | 84 lb / ft  | 68 lb / ft       | 53.5 lb / ft   | 39 lb / ft            | N/A           |  |  |  |  |  |  |
| Grade             | N/A                | J-55 BTC    | L-80 EZ-GO FJ3   | HCP-110 BTC    | HCP-110 EZ-<br>GO FJ3 | N/A           |  |  |  |  |  |  |
| Hole Size         | N/A                | 18 1/8"     | 14 3/4"          | 12 1/4"        | 8 1/2"                | 6 1/2"        |  |  |  |  |  |  |
| Depth Set Top     | -                  | -           | -                | -              | 14,369                | 18,810        |  |  |  |  |  |  |
| Depth Set Bottom  | 120                | 805         | 5,401            | 14,569         | 18,810                | 19,977        |  |  |  |  |  |  |
| тос               | Surf               | Surf        | Surf             | Surface        | -                     | -             |  |  |  |  |  |  |
| TOC Method        | Circ               | Circ        | Circ             | Circ           | CBL                   | -             |  |  |  |  |  |  |
| Volume (Sacks)    | 250                | 404         | 962              | 4,293          | 736                   | N/A           |  |  |  |  |  |  |
| DV Tool 1         | N/A                | N/A         | N/A              | 5,451          | N/A                   | N/A           |  |  |  |  |  |  |
| DV Tool 2         | N/A                | N/A         | N/A              | 11,141         | N/A                   | N/A           |  |  |  |  |  |  |

| Tubing Information |                  |                  |  |  |  |  |  |  |
|--------------------|------------------|------------------|--|--|--|--|--|--|
| Туре               | Upper String (7) | Lower String (8) |  |  |  |  |  |  |
| OD                 | 5 1/2"           | 4 1/2"           |  |  |  |  |  |  |
| Weight             | 20 lb / ft       | 18 lb / ft       |  |  |  |  |  |  |
| Grade              | HCL-80 BTC       | HCL-80 LTC       |  |  |  |  |  |  |
| Hole Size          | N/A              | N/A              |  |  |  |  |  |  |
| Depth Set Top      | -                | 14,269           |  |  |  |  |  |  |
| Depth Set Bottom   | 14,269           | 18,760           |  |  |  |  |  |  |

<sup>\*</sup>Wellbore Diagram Attached

#### 4) Packer Information:

Arrowset AS1-X or equivalent packer set at approximately 18760 feet \*Packer Schematic Attached

#### **B.** Completion Information

1) Injection Formation Name: Devonian-Silurian

Pool Name: SWD; Devonian-Silurian

**Pool Code: 97869** 

2) Injection Interval: 18810 - 19977 (open hole)

3) Drilling Purpose: Drilled for injection

4) **Overlying Oil and Gas Zones:** Below are approximate tops for known oil and gas producing zones in the area.

Delaware: 5351'Bone Spring: 10472'Wolfcamp: 12549'Strawn: 14918'

Atoka: 15146'Morrow: 16156'

5) **Underlying Oil and Gas Zones:** No underlying oil and gas zones exist.

## Item V – Well and Lease Maps (Attachment 2)

- 1) 2-mile oil & Gas Well Map
- 2) 1-mile Well Detail List
- 3) 2-Mile Lease Map
- 4) 2-Mile Mineral Ownership Map
- 5) 2-Mile Surface Ownership map
- 6) 1.5-Mile Deep SWD Map (Devonian-Silurian)
- 7) Potash Lease Map

## Item VI – AOR Well List (Attachment 2)

There have been 13 wells drilled within the 1-mile AOR. None of these wells nor any new or permitted wells penetrate the injection zone.

## Item VII – Proposed Operation (Attachment 3)

- 1) Proposed Maximum Injection Rate: 30,000 bwpd Proposed Average Injection Rate: 15,000 bwpd
- 2) A closed system will be used.
- 3) **Proposed Maximum Injection Pressure:** 3762 psi (surface)
- 4) **Proposed Average Injection Pressure:** 2257 psi (surface)
- 5) **Source Water Analysis:** It is expected that the injected fluid will consist of water produced from the Wolfcamp and Bone Springs formations. Water samples from these formations are included in Attachment 3.
- 6) **Injection Formation Water Analysis:** The proposed SWD will be injecting water into the Devonian-Silurian formation which is a non-productive zone known to be compatible with formation water from the Wolfcamp and Bone Springs formations. Water analyses from the Devonian-Silurian formation in the area are included in attachment 3.

## Item VIII - Geologic Description

The proposed injection interval includes the Devonian–Silurian formation from 18810 feet to 19977 feet. This formation consists of interbedded carbonate rocks consisting of dolomites and limestones with some interbedded siltstones and shales. Several thick sections of porous and permeable intervals capable of taking water are present within the subject formations in the area.

The base of the lowermost Underground Source of Drinking Water (USDW) is at a depth of approximately 755 feet. The USDW is covered by 16-inch casing set at 805 feet and cemented to surface, additionally the USDW is covered by intermediate casing set at 5401 feet and cemented to surface. Geophysical log assessment was conducted to accurately determine the top of the Rustler formation, as well as the top and base of the Salado formation in the area.

## **Item IX – Proposed Stimulation**

A small cleanup acid job may be used to remove mud and drill cutting from the formation. However, no other formation stimulation is currently planned.

## Item X – Logging and Test Data

Log data will be submitted to the OCD upon completion of this well.

## Item XI – Fresh Groundwater Samples (Attachment 4)

Based on a review of the data from the New Mexico Office of State Engineer there are no fresh water wells within a 1-mile radius of the proposed location. As a result, no groundwater samples were obtained.

## XII - No Hydrologic Connection Statement (Attachment 5)

Anthem has examined available geologic and engineering data, and has found no evidence of faulting present in the area that would provide a hydrologic connection between the injection interval and overlying USDWs. Additionally, the casing and cementing progam has been designed to further insure there will be no hydrologic connection between the injection interval and overlying USDWs. A letter from a knowledgeable and qualified expert stating that there is a low risk of seismic activity from the proposed injection activities is included in Attachment 5.

## XIII - Proof of Notice (Attachment 6)

A Public Notice was filed with The Lovington Leader and an affidavit is included in Attachment 6.

A copy of the application was mailed to the OCD District Office, landowners, appropriate regulatory bodies, and leasehold operators within a 1-mile radius of the proposed SWD location. A list of recipients, as well as delivery confirmations, is included in Attachment 6.

## **Attachments Table of Content:**

#### Attachment 1:

C-102

Proposed Wellbore Diagram

**Packer Schematic** 

#### Attachment 2:

2-mile Oil & Gas Well Map

1-mile Well Detail List

2-Mile Lease Map

2-Mile Mineral Ownership Map

2-Mile Surface Ownership map

1.5-Mile Deep SWD Map (Devonian-Silurian)

Potash Lease Map

#### Attachment 3:

Source Water Analysis

Formation Water Analysis

#### Attachment 4:

1-Mile Fresh Ground Water Map

Fresh Ground Water Samples

#### Attachment 5:

Letter of Seimic Activity

#### Attachment 6:

**Public Notice Affidavit** 

List of Notification Applicants & Delivery Confirmations

#### **Attachment 1: Form C-102**

<u>District I</u> 1625 N. French Dr., Hobbs, NM 88240 Phone: (575) 393-6161 Fax: (575) 393-0720 <u>District II</u> 811 S. First St., Artesia, NM 88210

Phone: (575) 748-1283 Fax: (575) 748-9720 <u>District III</u> 1000 Rio Brazos Road, Aztec, NM 87410 Phone: (505) 334-6178 Fax: (505) 334-6170

District IV 1220 S. St. Francis Dr., Santa Fe, NM 87505 Phone: (505) 476-3460 Fax: (505) 476-3462 State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102 Revised August 1, 2011 Submit one copy to appropriate District Office

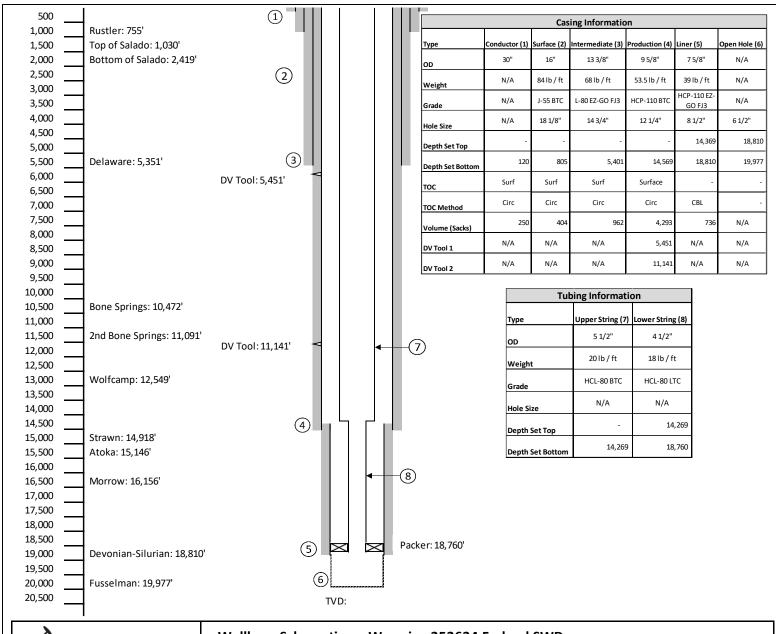
#### WELL LOCATION AND ACREAGE DEDICATION PLAT

| 1                     | API Numb                           | er          |                            | <sup>2</sup> Pool Coo | de                   |                  | <sup>3</sup> Pool N | ame   |           |                        |        |
|-----------------------|------------------------------------|-------------|----------------------------|-----------------------|----------------------|------------------|---------------------|-------|-----------|------------------------|--------|
| 30-0                  | )25-XXX                            | XX          |                            | 97869                 |                      | SWD; Devonian-   | Silurian            |       |           |                        |        |
| <sup>4</sup> Property | Code 5 Property Name 6 Well Number |             |                            |                       | er                   |                  |                     |       |           |                        |        |
|                       |                                    | Wax         | Waxwing 252634 Federal SWD |                       |                      |                  |                     |       |           |                        |        |
| 7 OGRID               | No.                                |             |                            |                       | <sup>8</sup> Operato | r Name           |                     |       |           | <sup>9</sup> Elevation | i      |
| 330069                |                                    | Anth        | nem Water S                | Water Solutions, LLC  |                      |                  |                     |       |           | 5                      |        |
|                       |                                    |             |                            |                       | 10 Surface I         | Location         |                     |       |           |                        |        |
| UL or lot no.         | Section                            | Township    | Range                      | Lot Idn               | Feet from the        | North/South line | Feet from the       | East/ | West line |                        | County |
| D                     | 25                                 | 26S         | 34E                        |                       | 125                  | North            | 134                 | We    | est       | Lea                    |        |
|                       |                                    | •           | п Bot                      | ttom Hol              | e Location If        | Different Fron   | n Surface           |       |           | ,                      |        |
| UL or lot no.         | Section                            | Township    | Range                      | Lot Idn               | Feet from the        | North/South line | Feet from the       | East/ | West line |                        | County |
|                       |                                    |             |                            |                       |                      |                  |                     |       |           |                        |        |
| 12 Dedicated Acres    | 13 Joint of                        | r Infill 14 | Consolidation              | Code 15 Or            | rder No.             |                  |                     |       |           |                        |        |
|                       |                                    |             |                            |                       |                      |                  |                     |       |           |                        |        |

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

| 125′ |                    | 1<br>             | <br>   | 17 OPERATOR CERTIFICATION  I hereby certify that the information contained herein is true and complete |
|------|--------------------|-------------------|--------|--|
| 134' | <br>               | 1<br>1<br>1       |        | to the best of my knowledge and belief, and that this organization either                              |
| 134  |                    |                   |        | owns a working interest or unleased mineral interest in the land including                             |
| D    |                    | В                 | Α      | the proposed bottom hole location or has a right to drill this well at this                            |
| D    |                    | 0                 |        | location pursuant to a contract with an owner of such a mineral or working                             |
|      | <br>               | I<br>I<br>I       |        | interest, or to a voluntary pooling agreement or a compulsory pooling order                            |
|      |                    | <u> </u>          |        | heretofore entered by the division.  |
|      | LAT = 32.0         | 0212350 N         |        | nerciajore enerca by the arrision.   |
|      | LONG = -10         | 3.431722 W        |        |  |
|      |                    |                   | į      | Signature Date   |
|      | <br>               | 1<br>1<br>1       | i      |  |
| Г    | F                  |                   |        | Printed Name   |
| E    | Г                  | G                 | Н      |  |
|      | <br>               | <br>              |        |  |
|      | GEODET             | IC DATA           |        | E-mail Address   |
|      | NAD 83 GRID        | - NM EAST         |        |  |
|      |                    | 1<br>1            |        | 18SURVEYOR CERTIFICATION   |
|      |                    |                   |        | I hereby certify that the well location shown on this plat   |
|      |                    |                   |        | was plotted from field notes of actual surveys made by   |
|      | K                  |                   | 1      |  |
| _    |                    | , J               | '      | me or under my supervision, and that the same is true  |
|      | <br>               | !<br>!            |        | and correct to the best of my belief.  |
|      | Waxwing 252        | 634 Federal SWD 1 |        |  |
|      | LAT = 32.          | 0212350 N         |        | Date of Survey   |
|      | LONG = -10         | 3.431722 w        |        | '  |
|      |                    | <br>              |        | Signature and Seal of Professional Surveyor:   |
|      |                    |                   | į      |  |
| М    | N                  |                   | D      | PRELIMINARY  |
| IVI  | N                  | 0                 | Р      | Certified survey to be conducted and   |
|      | 1<br>              | !<br>!<br>!       |        | submitted úpon C-108 approval  |
|      |                    | <br>              |        | Certificate Number   |
|      | !<br>!<br><u>L</u> | I<br>I<br>L       | 1<br>1 |  |

#### **Attachment 1: Proposed Wellbore Diagram**



| NTHEM                                    | Wellbore Schematic: | Waxwing 252634 Federal SWD |          |       |
|--|---------------------|----------------------------|----------|-------|
| WATER SOLUTIONS                          | API: 30-025-XXXXX   |                            | Section: | 25    |
| WATER SOLUTIONS                          | NMOCD District: 1   |                            | Township | : 26S |
|  | Prepared By: PMT    |                            | Range:   | 34E   |
| 5914 W. Courtyard Dr. Suite 320, Austin, |                     |                            | County:  | Lea   |
| Texas, 78730                             | Notes:              |                            |          |       |
|  |                     |                            |          |       |

## AS1-X MECHANICAL PACKER



The ACT AS1-X Packer is the most versatile of the mechanically set retrievable packers and may be used in any production application. Treating, testing, injecting, pumping wells, flowing wells, deep or shallow, the AS1-X is suited for all. The packer can be left in tension or compression, depending on well conditions and the required application. A large internal by-pass reduces swabbing when running and retrieving. The by-pass closes when the packer is set and opens prior to releasing the upper slips when retrieving to allow pressure equalization.

The J-slot design allows easy setting and releasing; 1/4 turn right-hand set, right-hand release. A patented upper-slip releasing system reduces the force required to release the packer. A non directional slip is released first, making it easier to release the other slips. The AS1-X packer can withstand 7,000 psi (48 MPa) of differential pressure above or below.

#### FEATURES, ADVANTAGES AND BENEFITS:

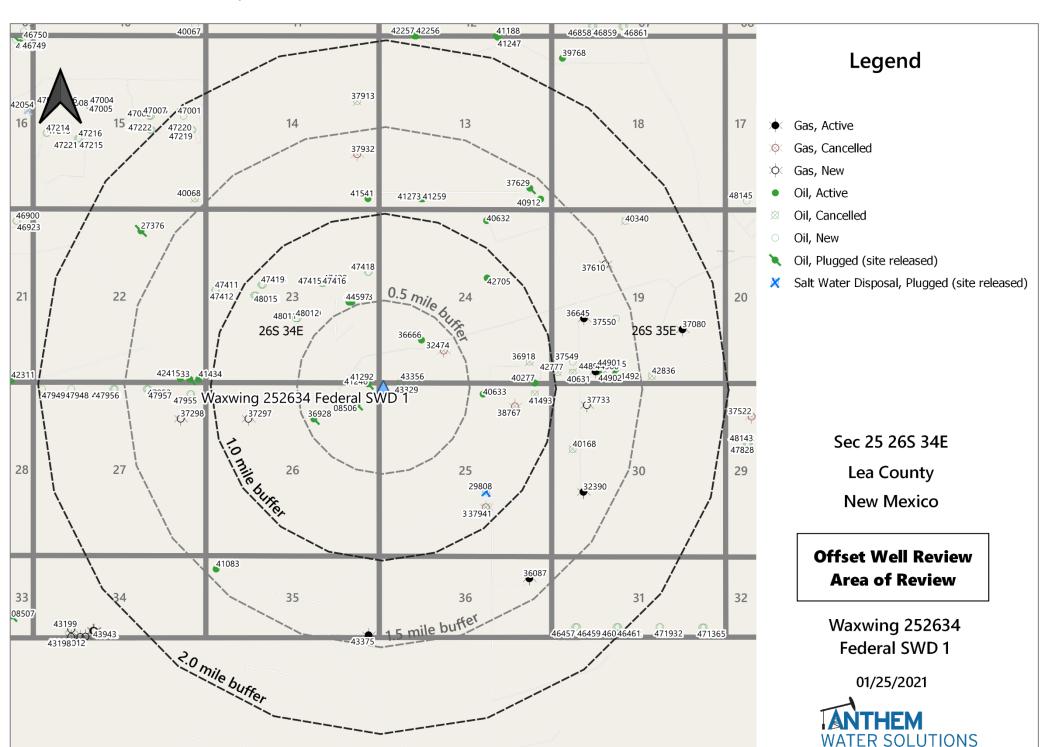
- The design holds high differential pressure from above or below, enabling the packer to meet most production, stimulation, and injection needs
- The packer can be set with compression, tension, or wire line, enabling deployment in shallow and deep applications
- . The packer can be set and released with only a one-quarter turn of the tubing
- The bypass valve is below the upper slips so that debris are washed from the slips when the valve is opened, reducing the times for circulation and total retrieval

- The full opening enables unrestricted flow and the passage of wire line tools and other packer systems
- The packer can be run with the T-2 on-off tool, which enables the tubing to be disconnected and retrieved without retrieving the
  packer

#### OPTIONS:

- Elastomer options are available for hostile environments
- · Optional safety releases are available

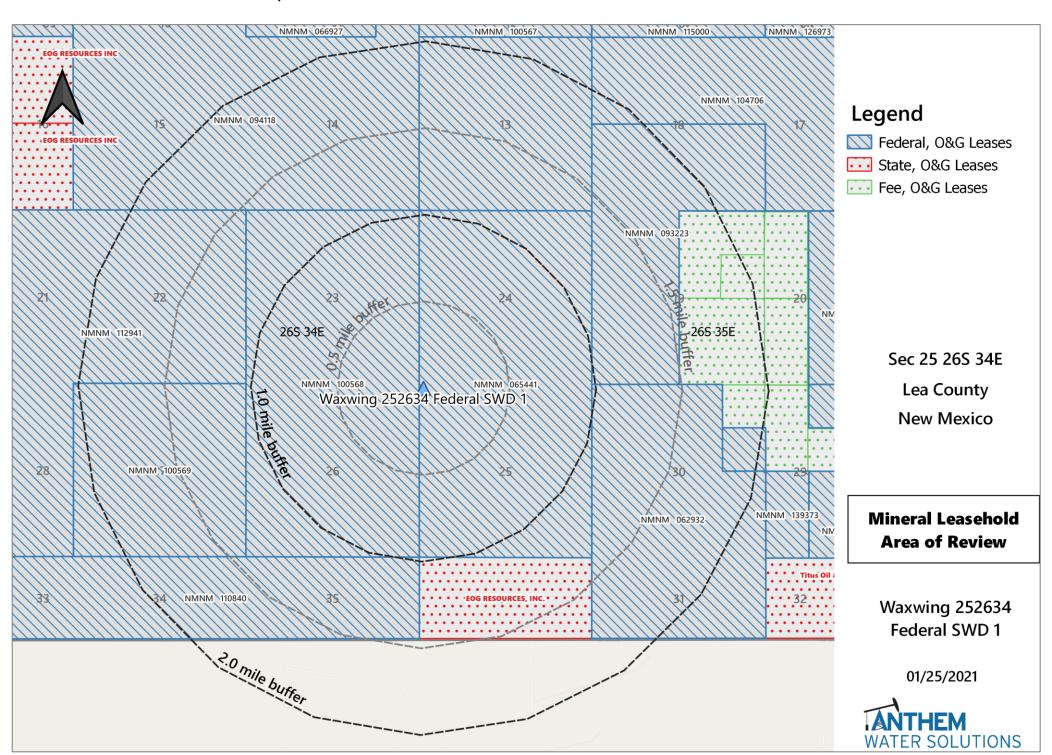
Attachment 2: 2-Mile Oil & Gas Map



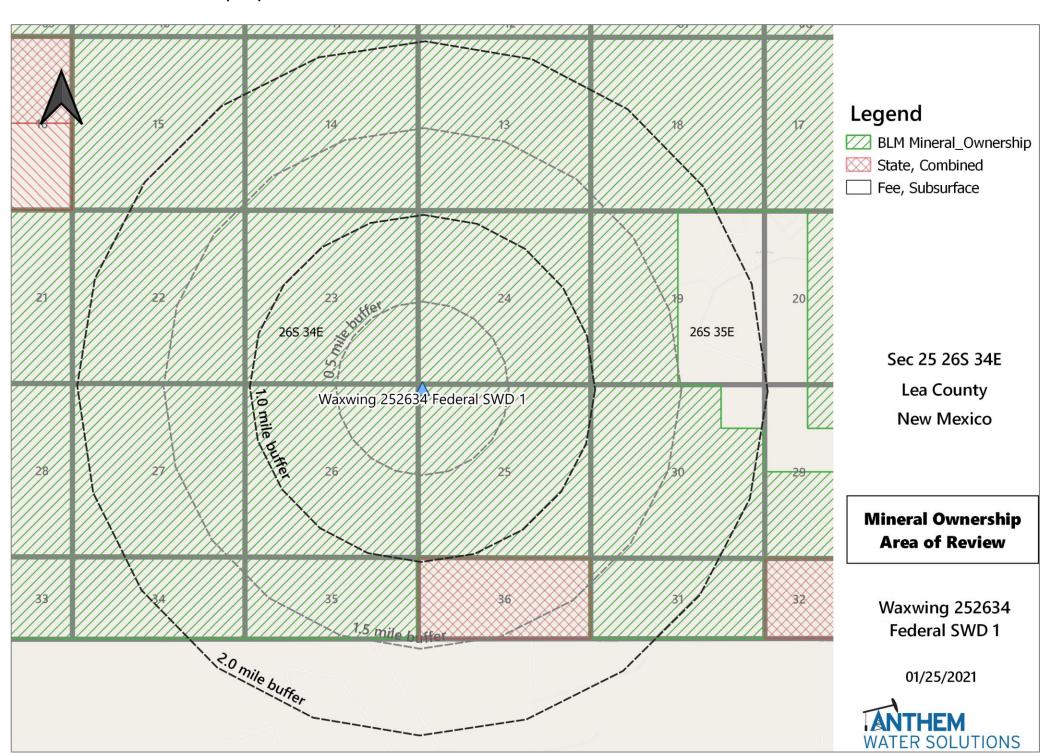
## **Attachment 2: 1-mile Well Detail List**

| Well Type Gas Oil      | released)  Active  Active  | DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP PRE-ONGARD WELL OPERATOR (Kirklin Drilling Co) DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC | N/A  12/10/2004  10/2/2018  9/7/1961  2/3/2019  N/A  N/A  9/30/2018  1/6/2019  9/20/2004  9/15/2014  8/11/2014   | A-26-26S-34E  D-25-26S-34E  M-24-26S-34E  I-23-26S-34E  I-23-26S-34E  M-24-26S-34E  A-26-26S-34E  A-26-26S-34E   | 16,600 12,714 5,473 10,982 12,637 10,737 16,600 9,105  | no n   |
|--|--|--|--|--|--|--|
| Oil                    | Plugged (site released) Active Plugged (site released) Active New New Active Active Active Active Active Plugged (site released) Active er Plugged (site released) Active Active Active                                    | COMPANY, LP  DEVON ENERGY PRODUCTION COMPANY, LP  DEVON ENERGY PRODUCTION COMPANY, LP  PRE-ONGARD WELL OPERATOR (Kirklin Drilling Co) DEVON ENERGY PRODUCTION COMPANY, LP  MARATHON OIL PERMIAN LLC  DEVON ENERGY PRODUCTION COMPANY, LP  DEVON ENERGY PRODUCTION COMPANY, LP  MARATHON OIL PERMIAN LLC  DEVON ENERGY PRODUCTION COMPANY, LP  MARATHON OIL PERMIAN LLC  DEVON ENERGY PRODUCTION COMPANY, LP  DEVON ENERGY PRODUCTION COMPANY, LP  MARATHON OIL PERMIAN LLC  MARATHON OIL PERMIAN LLC   | 12/10/2004<br>10/2/2018<br>9/7/1961<br>2/3/2019<br>N/A<br>N/A<br>9/30/2018<br>1/6/2019<br>9/20/2004<br>9/15/2014<br>8/11/2014  | B-26-26S-34E I-23-26S-34E   | 16,600<br>12,714<br>5,473<br>10,982<br>-<br>-<br>12,637<br>10,737<br>16,600<br>9,105   | no   |
| Oil                    | released) Active Plugged (site released) Active New New Active Active Active Active Plugged (site released) Active er Plugged (site released) Active | COMPANY, LP  DEVON ENERGY PRODUCTION COMPANY, LP  PRE-ONGARD WELL OPERATOR (KIRKIIN DRIILING CO)  DEVON ENERGY PRODUCTION COMPANY, LP  MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP  DEVON ENERGY PRODUCTION COMPANY, LP  MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP  MERATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC  MARATHON OIL PERMIAN LLC  MARATHON OIL PERMIAN LLC   | 10/2/2018<br>9/7/1961<br>2/3/2019<br>N/A<br>N/A<br>9/30/2018<br>1/6/2019<br>9/20/2004<br>9/15/2014<br>8/11/2014  | I-23-26S-34E  A-26-26S-34E  I-23-26S-34E  M-24-26S-34E  I-23-26S-34E  I-23-26S-34E  M-24-26S-34E  M-24-26S-34E  A-26-26S-34E  A-26-26S-34E   | 12,714 5,473 10,982 12,637 10,737 16,600 9,105   | no   |
| Oil                    | Active Plugged (site released) Active New New Active Active Active Active Plugged (site released) Active Plugged (site released) Active Active Active  | DEVON ENERGY PRODUCTION COMPANY, LP PRE-ONGARD WELL OPERATOR (Kirklin Drilling Co) DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC  | 10/2/2018<br>9/7/1961<br>2/3/2019<br>N/A<br>N/A<br>9/30/2018<br>1/6/2019<br>9/20/2004<br>9/15/2014<br>8/11/2014  | I-23-26S-34E  A-26-26S-34E  I-23-26S-34E  M-24-26S-34E  I-23-26S-34E  I-23-26S-34E  M-24-26S-34E  M-24-26S-34E  A-26-26S-34E  A-26-26S-34E   | 5,473<br>10,982<br>-<br>-<br>12,637<br>10,737<br>16,600<br>9,105   | no no no no no no no no no   |
| Oil                    | released) Active New New Active Active Active Plugged (site released) Active Plugged (site released) Active Active   | PRE-ONGARD WELL OPERATOR (Kirklin Drilling Co) DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC   | 9/7/1961<br>2/3/2019<br>N/A<br>N/A<br>9/30/2018<br>1/6/2019<br>9/20/2004<br>9/15/2014<br>8/11/2014   | A-26-26S-34E  D-25-26S-34E  M-24-26S-34E  I-23-26S-34E  I-23-26S-34E  M-24-26S-34E  A-26-26S-34E  A-26-26S-34E  P-23-26S-34E   | 10,982<br>-<br>-<br>12,637<br>10,737<br>16,600<br>9,105  | no<br>no<br>no<br>no<br>no<br>no   |
| Oil                    | Active New Active Active Active Plugged (site released) Active Plugged (site released) Active Active   | DEVON ENERGY PRODUCTION COMPANY, LP  MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC  | 2/3/2019<br>N/A<br>N/A<br>9/30/2018<br>1/6/2019<br>9/20/2004<br>9/15/2014<br>8/11/2014   | I-23-26S-34E D-25-26S-34E M-24-26S-34E I-23-26S-34E I-23-26S-34E M-24-26S-34E A-26-26S-34E P-23-26S-34E  | 12,637<br>10,737<br>16,600<br>9,105  | no<br>no<br>no<br>no<br>no   |
| Oil                    | Active Active Active Plugged (site released) Active Plugged (site released) Active Active Active Active  | MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC   | N/A<br>N/A<br>9/30/2018<br>1/6/2019<br>9/20/2004<br>9/15/2014<br>8/11/2014   | D-25-26S-34E<br>M-24-26S-34E<br>I-23-26S-34E<br>I-23-26S-34E<br>M-24-26S-34E<br>A-26-26S-34E<br>P-23-26S-34E   | 12,637<br>10,737<br>16,600<br>9,105<br>9,116   | no<br>no<br>no<br>no   |
| Oil                    | Active Active Active Plugged (site released) Active Plugged (site released) Active Active Active Active  | MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC  | 9/30/2018<br>1/6/2019<br>9/20/2004<br>9/15/2014<br>8/11/2014   | M-24-26S-34E<br>I-23-26S-34E<br>I-23-26S-34E<br>M-24-26S-34E<br>A-26-26S-34E<br>P-23-26S-34E   | 12,637<br>10,737<br>16,600<br>9,105<br>9,116   | no<br>no<br>no<br>no   |
| Oil Oil Oil Oil Oil Oil Oil Oil Salt Wate Disposal Oil Oil | Active Active Active Plugged (site released) Active er Plugged (site released) Active Active Active  | DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC   | 9/30/2018<br>1/6/2019<br>9/20/2004<br>9/15/2014<br>8/11/2014<br>12/30/1986   | I-23-26S-34E<br>I-23-26S-34E<br>M-24-26S-34E<br>A-26-26S-34E<br>P-23-26S-34E   | 12,637<br>10,737<br>16,600<br>9,105<br>9,116   | no<br>no<br>no   |
| Oil Oil Oil Salt Wate Disposal Oil Oil                     | Active Plugged (site released) Active Plugged (site released) Active Active Active   | DEVON ENERGY PRODUCTION COMPANY, LP  MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP  DEVON ENERGY PRODUCTION COMPANY, LP  MARATHON OIL PERMIAN LLC  MARATHON OIL PERMIAN LLC   | 1/6/2019<br>9/20/2004<br>9/15/2014<br>8/11/2014<br>12/30/1986  | I-23-26S-34E<br>M-24-26S-34E<br>A-26-26S-34E<br>P-23-26S-34E   | 9,105<br>9,116   | no<br>no   |
| Oil Salt Wate Disposal Oil Oil                             | Plugged (site<br>released)  Active  Plugged (site<br>released)  Active  Active   | MARATHON OIL PERMIAN LLC DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC   | 9/20/2004<br>9/15/2014<br>8/11/2014<br>12/30/1986  | M-24-26S-34E<br>A-26-26S-34E<br>P-23-26S-34E   | 9,105<br>9,116   | no   |
| Oil Salt Wate Disposal Oil Oil                             | Plugged (site<br>released)  Active  Plugged (site<br>released)  Active  Active   | DEVON ENERGY PRODUCTION COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC  | 9/15/2014<br>8/11/2014<br>12/30/1986   | A-26-26S-34E<br>P-23-26S-34E   | 9,105<br>9,116   | no   |
| Oil Salt Wate Disposal Oil Oil                             | released) Active Plugged (site released) Active Active   | COMPANY, LP DEVON ENERGY PRODUCTION COMPANY, LP MARATHON OIL PERMIAN LLC MARATHON OIL PERMIAN LLC  | 8/11/2014<br>12/30/1986  | P-23-26S-34E   | 9,116  |  |
| Salt Wate<br>Disposal<br>Oil<br>Oil                        | er Plugged (site<br>released)<br>Active<br>Active  | COMPANY, LP  MARATHON OIL PERMIAN LLC  MARATHON OIL PERMIAN LLC  | 12/30/1986   |  |  | no   |
| Disposal Oil Oil   | released) Active Active  | MARATHON OIL PERMIAN LLC   | 12/30/1986   | J-25-26S-34E   |  |  |
| Oil  | Active   |  |  |  | 9,515  | no   |
| Oil  | Active   |  | 1 9/28/2013  | B-25-26S-34E   | 8,944  | no   |
|  |  |  |  | P-24-26S-34E   | 9,070  |  |
| OII  | Active   | MEWBOURNE OIL CO   |  | M-08-26S-32E   | 9,247  |  |
| Oil  | New  | DEVON ENERGY PRODUCTION<br>COMPANY, LP   | N/A  | J-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION<br>COMPANY, LP   | N/A  | J-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION COMPANY, LP  | N/A  | J-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION COMPANY, LP  | N/A  | K-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION<br>COMPANY, LP   | N/A  | K-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION COMPANY, LP  | N/A  | K-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION<br>COMPANY, LP   | N/A  | F-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION<br>COMPANY, LP   | N/A  | F-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION<br>COMPANY, LP   | N/A  | G-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION<br>COMPANY, LP   | N/A  | G-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION  |  | H-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION  |  | H-23-26S-34E   | -  | no   |
| Oil  | New  | DEVON ENERGY PRODUCTION  |  | F-23-26S-34E   | -  | no   |
|  | New  | DEVON ENERGY PRODUCTION  |  | G-23-26S-34E   | -  | no   |
|  | Oil Oil Oil Oil Oil  | Oil New Oil New Oil New Oil New Oil New Oil New  | OII New DEVON ENERGY PRODUCTION COMPANY, LP  OII New DEVON ENERGY PRODUCTION COMPANY, LP | OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A  OII New DEVON ENERGY PRODUCTION N/A  OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A | OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A F-23-26S-34E  OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A G-23-26S-34E  OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A G-23-26S-34E  OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A H-23-26S-34E  OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A H-23-26S-34E  OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A H-23-26S-34E  OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A F-23-26S-34E  OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A G-23-26S-34E  OII New DEVON ENERGY PRODUCTION COMPANY, LP N/A G-23-26S-34E | OII   New   DEVON ENERGY PRODUCTION   COMPANY, LP   N/A   F-23-265-34E   - COMPANY, LP   N/A   F-23-265-34E   - COMPANY, LP   N/A   G-23-265-34E   C-23-265-34E   C-23-26 |

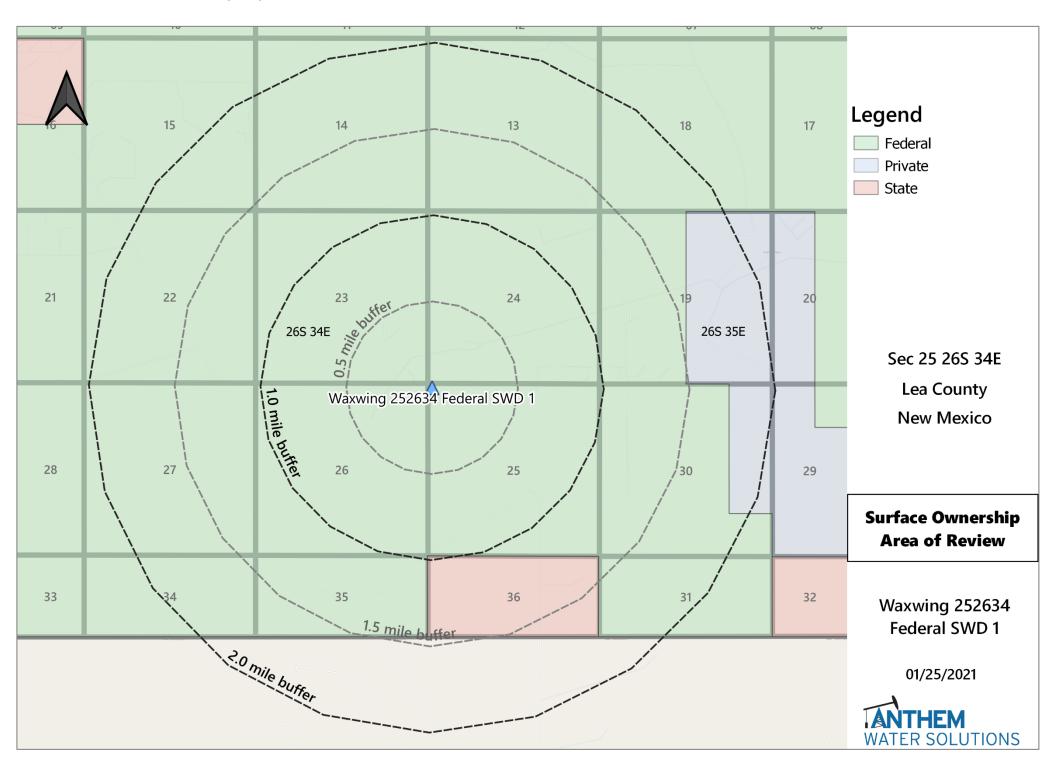
Attachment 2: 2-Mile Oil & Gas Lease Map



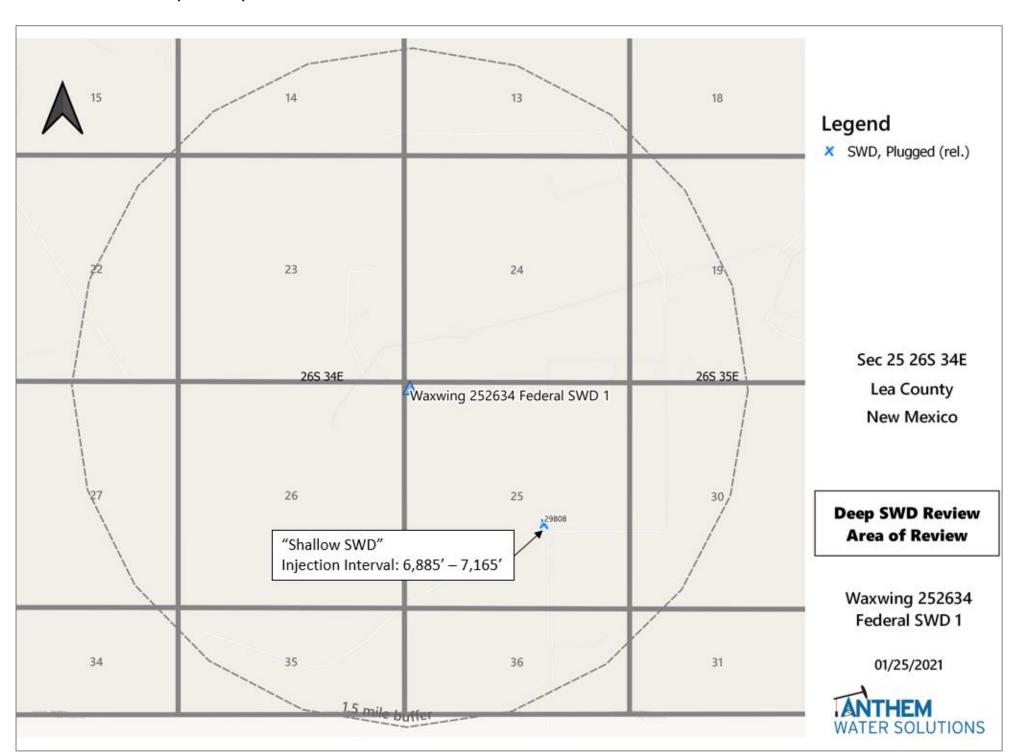
**Attachment 2: Mineral Ownership Map** 



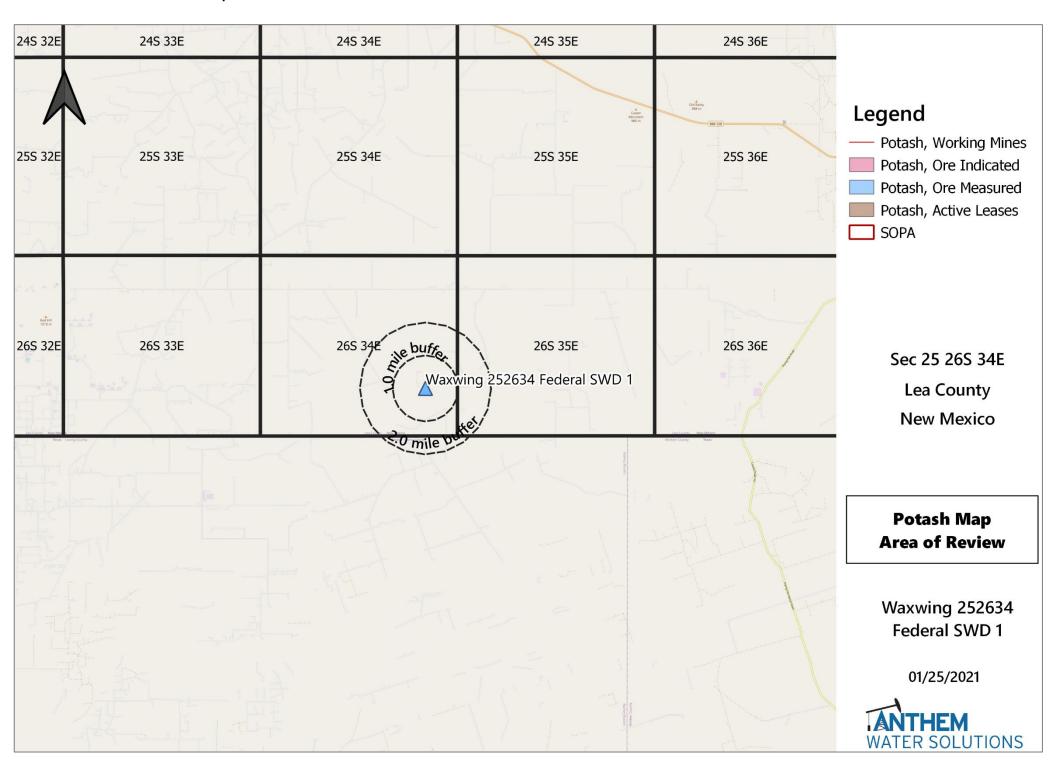
**Attachment 2: Surface Ownership Map** 



Attachment 2: 1.5 Mile Deep SWD Map



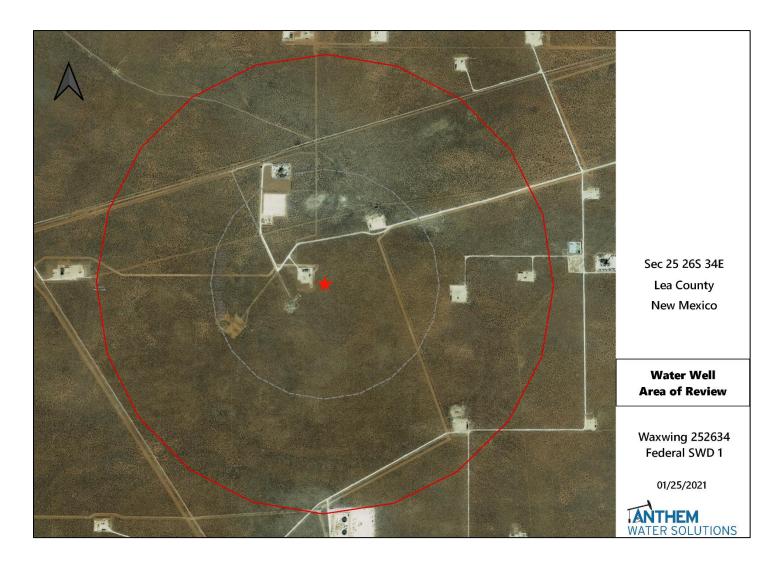
**Attachment 2: Potash Lease Map** 



## **Attachment 3: Formation & Source Water Analysis**

|   |  |  |  | Injec   | tion For   | rmatio   | n Wate   | r Analy:   | sis   |   |  |  |   |  |  |  |  |  |  |
|---|--|--|--|---|--|--|--|--|---|---|--|--|---|--|--|--|--|--|--|
|   | Anthem Water Solutions, LLC  |  |  |   |  |  |  |  |   |   |  |  |   |  |  |  |  |  |  |
| Well Name   | API  | Latitude   | Longitude  | Section   | Township   | Range  | County   | State  | Field   | Formation   | TDS (Mg/L)   | Bicarbonate (MG/L)   | Sulfate (Mg/L)  |  |  |  |  |  |  |
| RIO BLANCO 33 FEDERAL #002  | 30-025-36360   | 32.3499985   | -103.4771576   | 33  | 22S  | 34E  | Lea  | NM   | BELL LAKE   | DEVONIAN  | 69,797   | 456  | 1,074   |  |  |  |  |  |  |
| RIO BLANCO 9 STATE #001   | 30-025-36302   | 32.3246078   | -103.4733582   | 9   | 23S  | 34E  | Lea  | NM   | BELL LAKE   | DEVONIAN  | 192,154  | 122  | 943   |  |  |  |  |  |  |
| RIO BLANCO 33 FEDERAL #001  | 30-025-36359   | 32.3436928   | -103.4783325   | 33  | 22S  | 34E  | Lea  | NM   | BELL LAKE   | DEVONIAN  | 77,881   | 366  | 1,941   |  |  |  |  |  |  |
| MAD DOG 15 FEDERAL COM #001   | 30-025-36778   | 32.2992020   | -103.4514999   | 15  | 23S  | 34E  | Lea  | NM   | ANTELOPE RIDGE  | DEVONIAN  | 72,188   | 332  | 1,198   |  |  |  |  |  |  |
| ANTELOPE RIDGE UNIT #003  | 30-025-21082   | 32.2593155   | -103.4610748   | 34  | 23S  | 34E  | Lea  | NM   | APACHE RIDGE  | DEVONIAN  | 80,187   | 476  | 900   |  |  |  |  |  |  |
| LEA UNIT #009   | 30-025-02432   | 32.5785980   | -103.5121155   | 13  | 20S  | 34E  | Lea  | NM   | LEA   | DEVONIAN  | 45,778   | 1,145  | 729   |  |  |  |  |  |  |
| LEA UNIT #008   | 30-025-02431   | 32.5927162   | -103.5116730   | 12  | 20S  | 34E  | Lea  | NM   | SWD   | DEVONIAN  | 35,094   | 1,272  | 1,096   |  |  |  |  |  |  |
| KING SWD #001   | 30-015-20257   | 32.5933838   | -104.4920578   | 9   | 20S  | 25E  | Lea  | NM   | SWD   | DEVONIAN  | 7,989  | 808  | 1,748   |  |  |  |  |  |  |
| BELL LAKE UNIT #006   | 30-025-08483   | 32.3282585   | -103.5071030   | 6   | 23S  | 34E  | Lea  | NM   | BELL LAKE   | DEVONIAN  | 71,078   | 500  | 1,000   |  |  |  |  |  |  |
| STATE B COM #001  | 30-025-09716   | 32.1794052   | -103.2212524   | 36  | 24S  | 36E  | Lea  | NM   | CUSTER  | DEVONIAN  | 176,234  | 128  | 1,004   |  |  |  |  |  |  |
| WEST DOLLARHIDE DEVONIAN U  | N 30-025-12297   | 32.1720123   | -103.0761032   |   | 24S  | 38E  | Lea  | NM   | DOLLARHIDE  | DEVONIAN  | 50,858   | 183  | 980   |  |  |  |  |  |  |
| E C HILL B FEDERAL #001   | 30-025-10945   | 32.2658463   | -103.1443634   |   | 23S  | 37E  | Lea  | NM   | TEAGUE  | DEVONIAN  | 112,959  | 288  | 2,765   |  |  |  |  |  |  |
| E C HILL D FEDERAL #004   | 30-025-10950   | 32.2653503   | -103.1443634   | 34  | 23S  | 37E  | Lea  | NM   | TEAGUE  | DEVONIAN  | 236,252  | 129  | 781   |  |  |  |  |  |  |
| STATE NJ A #001   | 30-025-11398   | 32.1647491   | -103.1273346   | 2   | 25S  | 37E  | Lea  | NM   | JUSTIS  | DEVONIAN  | 105,350  | 660  | 4,950   |  |  |  |  |  |  |
| PRE-ONGARD WELL #001  | 30-025-10717   | 32.3025551   | -103.1358261   | 14  | 23S  | 37E  | Lea  | NM   | CLINE   | DEVONIAN  | 118,979  | 462  | 2,593   |  |  |  |  |  |  |
| PRE-ONGARD WELL #001  | 30-025-11818   | 32.0994835   | -103.1656723   |   | 25S  | 37E  | Lea  | NM   | CROSBY  | DEVONIAN  | 27,506   | 1,089  | 1,079   |  |  |  |  |  |  |
| PRE-ONGARD WELL #006  | 30-025-11950   | 32.0777245   | -103.1624680   |   | 26S  | 37E  | Lea  | NM   | CROSBY  | DEVONIAN  | 31,931   | 302  | 591   |  |  |  |  |  |  |
|   |  |  |  |   |  |  |  |  |   |   |  |  |   |  |  |  |  |  |  |
|   | Source Water Analysis  |  |  |   |  |  |  |  |   |   |  |  |   |  |  |  |  |  |  |
|   |  |  |  |   |  |  |  |  | Anthem Water Solutions, LLC   |   |  |  |   |  |  |  |  |  |  |
| Well Name   |  |  |  |   |  |  |  |  |   |   |  |  |   |  |  |  |  |  |  |
|   | ΔΡΙ  | Latitude   | Longitude  | Section   |  | _  |  | <del>r                                      </del> | Field   | Formation   | TDS (Mg/L)   | Ricarbonate (MG/L)   | Sulfate (Mg/L)  |  |  |  |  |  |  |
|   | API<br>30-025-34456  | Latitude<br>32,2557449   | Longitude  |   | Township   | Range  | County   | State  | Field   |   | TDS (Mg/L)   |  | Sulfate (Mg/L)  |  |  |  |  |  |  |
| THISTLE UNIT #004   | 30-025-34456   | 32.2557449   | -103.562294  | 34  | Township<br>23S  | Range<br>33E   | <b>County</b><br>Lea                           | State<br>NM  | JOHNSON RANCH   | WOLFCAM   | 21,758   | 163  | 150   |  |  |  |  |  |  |
| THISTLE UNIT #004<br>THISTLE UNIT #005  | 30-025-34456<br>30-025-34580   | 32.2557449<br>32.2630043   | -103.562294<br>-103.562302   | 34<br>34  | Township<br>23S<br>23S   | Range<br>33E<br>33E  | County<br>Lea<br>Lea                           | State<br>NM<br>NM                                  | JOHNSON RANCH   | WOLFCAM<br>WOLFCAM  | 21,758<br>74,186   | 163<br>386   | 150<br>269  |  |  |  |  |  |  |
| THISTLE UNIT #004<br>THISTLE UNIT #005<br>FLAGLER FEDERAL #001  | 30-025-34456<br>30-025-34580<br>30-025-30599   | 32.2557449<br>32.2630043<br>32.1505394   | -103.562294<br>-103.562302<br>-103.596481  | 34<br>34<br>8   | 23S<br>23S<br>25S  | 33E<br>33E<br>33E<br>33E   | County<br>Lea<br>Lea<br>Lea                    | State<br>NM<br>NM<br>NM                            | JOHNSON RANCH<br>JOHNSON RANCH<br>JOHNSON RANCH   | WOLFCAM<br>WOLFCAM<br>WOLFCAM   | 21,758<br>74,186<br>40,770   | 163<br>386<br>122  | 150<br>269<br>6   |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002   | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529   | 32.2557449<br>32.2630043<br>32.1505394<br>32.3364449   | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145   | 34<br>34<br>8   | 23S<br>23S<br>23S<br>25S<br>23S  | 33E<br>33E<br>33E<br>33E<br>32E                                    | County Lea Lea Lea Lea                         | State<br>NM<br>NM<br>NM<br>NM                      | JOHNSON RANCH<br>JOHNSON RANCH<br>JOHNSON RANCH<br>RED TANK   | WOLFCAM<br>WOLFCAM<br>WOLFCAM<br>BONE SPRI  | 21,758<br>74,186<br>40,770<br>172,896  | 163<br>386<br>122<br>781   | 150<br>269<br>6<br>1,150  |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001   | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344   | 32.2557449<br>32.2630043<br>32.1505394<br>32.3364449<br>32.288414  | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743  | 34<br>34<br>8<br>1<br>24  | 23S<br>23S<br>23S<br>25S<br>23S<br>23S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E                             | Lea<br>Lea<br>Lea<br>Lea<br>Lea                | State<br>NM<br>NM<br>NM<br>NM<br>NM                | JOHNSON RANCH<br>JOHNSON RANCH<br>JOHNSON RANCH<br>RED TANK<br>DIAMONDTAIL  | WOLFCAM<br>WOLFCAM<br>WOLFCAM<br>BONE SPRI<br>BONE SPRI   | 21,758<br>74,186<br>40,770<br>172,896<br>172,490   | 163<br>386<br>122<br>781<br>199  | 150<br>269<br>6<br>1,150  |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001 MESA VERDE 6 FEDERAL #014   | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753   | 32.2557449<br>32.2630043<br>32.1505394<br>32.3364449<br>32.288414<br>32.252753   | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.717583   | 34<br>34<br>8<br>1<br>24  | 23S<br>23S<br>25S<br>25S<br>23S<br>23S<br>23S<br>24S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E                      | Lea<br>Lea<br>Lea<br>Lea<br>Lea<br>Lea         | NM<br>NM<br>NM<br>NM<br>NM<br>NM                   | JOHNSON RANCH<br>JOHNSON RANCH<br>JOHNSON RANCH<br>RED TANK<br>DIAMONDTAIL<br>MESA VERDE  | WOLFCAM<br>WOLFCAM<br>WOLFCAM<br>BONE SPRI<br>BONE SPRI<br>BONE SPRI  | 21,758<br>74,186<br>40,770<br>172,896<br>172,490<br>254,344  | 163<br>386<br>122<br>781<br>199<br>83  | 150<br>269<br>6<br>1,150<br>2<br>1,128  |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001 MESA VERDE 6 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL #   | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753<br>40 30-025-32754  | 32.2557449<br>32.2630043<br>32.1505394<br>32.3364449<br>32.288414<br>32.252753<br>32.2763062   | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.717583<br>-103.715485  | 34<br>34<br>8<br>1<br>24<br>6   | Township 23S 23S 25S 25S 23S 23S 24S 23S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E<br>32E        | County Lea Lea Lea Lea Lea Lea Lea Lea         | State NM                | JOHNSON RANCH<br>JOHNSON RANCH<br>RED TANK<br>DIAMONDTAIL<br>MESA VERDE<br>SAND DUNES SOL   | WOLFCAM<br>WOLFCAM<br>WOLFCAM<br>BONE SPRI<br>BONE SPRI<br>BONE SPRI<br>BONE SPRI   | 21,758<br>74,186<br>40,770<br>172,896<br>172,490<br>254,344<br>274,347   | 163<br>386<br>122<br>781<br>199<br>83<br>83  | 150<br>269<br>6<br>1,150<br>2<br>1,128<br>1,202   |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001 MESA VERDE 6 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006   | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753<br>40 30-025-32754<br>30-025-32397  | 32.2557449<br>32.2630043<br>32.1505394<br>32.3364449<br>32.288414<br>32.252753<br>32.2763062<br>32.244917  | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.717583<br>-103.715485<br>-103.71629  | 34<br>34<br>8<br>1<br>24<br>6<br>30   | Township 23S 23S 23S 25S 23S 23S 24S 24S 24S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E<br>32E<br>32E | County Lea | State NM       | JOHNSON RANCH<br>JOHNSON RANCH<br>RED TANK<br>DIAMONDTAIL<br>MESA VERDE<br>SAND DUNES SOU<br>MESA VERDE   | WOLFCAM<br>WOLFCAM<br>WOLFCAM<br>BONE SPRI<br>BONE SPRI<br>BONE SPRI<br>BONE SPRI<br>BONE SPRI  | 21,758<br>74,186<br>40,770<br>172,896<br>172,490<br>254,344<br>274,347<br>147,698  | 163<br>386<br>122<br>781<br>199<br>83<br>83<br>933   | 150<br>269<br>6<br>1,150<br>2<br>1,128<br>1,202<br>3,804  |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001 MESA VERDE 6 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006 MESA VERDE 6 FEDERAL #005   | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753<br>40 30-025-32754<br>30-025-32397<br>30-025-32504  | 32.2557449<br>32.2630043<br>32.1505394<br>32.3364449<br>32.288414<br>32.252753<br>32.2763062<br>32.244917<br>32.2482376  | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.717583<br>-103.715485<br>-103.71629<br>-103.711617   | 34<br>34<br>8<br>1<br>24<br>6<br>30<br>6  | Township 23S 23S 25S 25S 23S 23S 24S 24S 24S 24S 24S   | Range 33E 33E 33E 32E 32E 32E 32E 32E 32E 32E                      | County Lea | State NM       | JOHNSON RANCH JOHNSON RANCH RED TANK DIAMONDTAIL MESA VERDE SAND DUNES SOU MESA VERDE MESA VERDE  | WOLFCAM<br>WOLFCAM<br>WOLFCAM<br>BONE SPRI<br>BONE SPRI<br>BONE SPRI<br>BONE SPRI<br>BONE SPRI  | 21,758<br>74,186<br>40,770<br>172,896<br>172,490<br>254,344<br>274,347<br>147,698<br>263,977   | 163<br>386<br>122<br>781<br>199<br>83<br>83<br>933   | 150<br>269<br>6<br>1,150<br>2<br>1,128<br>1,202<br>3,804  |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006 MESA VERDE 6 FEDERAL #005 RED BULL 31 STATE #001  | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753<br>40 30-025-32754<br>30-025-32397<br>30-025-32504<br>30-025-36798  | 32.2557449<br>32.2630043<br>32.1505394<br>32.3364449<br>32.288414<br>32.252753<br>32.2763062<br>32.244917<br>32.2482376<br>32.2574569  | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.717583<br>-103.715485<br>-103.71629<br>-103.711617<br>-103.405709  | 34<br>34<br>8<br>1<br>24<br>6<br>30<br>6  | Township 23S 23S 25S 23S 23S 23S 24S 24S 24S 24S 24S 24S 24S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E<br>32E<br>32E | County Lea | State NM       | JOHNSON RANCH JOHNSON RANCH RED TANK DIAMONDTAIL MESA VERDE SAND DUNES SOL MESA VERDE MESA VERDE ANTELOPE RIDGE   | WOLFCAM WOLFCAM BONE SPRI   | 21,758<br>74,186<br>40,770<br>172,896<br>172,490<br>254,344<br>274,347<br>147,698<br>263,977<br>280,094  | 163<br>386<br>122<br>781<br>199<br>83<br>83<br>933<br>104  | 150<br>269<br>6<br>1,150<br>2<br>1,128<br>1,202<br>3,804<br>567<br>385                          |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001 MESA VERDE 6 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006 MESA VERDE 6 FEDERAL #005 RED BULL 31 STATE #001 THISTLE UNIT #056H   | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753<br>40-025-32754<br>30-025-32597<br>30-025-32504<br>30-025-36798<br>30-025-41340   | 32.2557449<br>32.2630043<br>32.1505394<br>32.3364449<br>32.288414<br>32.252753<br>32.2763062<br>32.244917<br>32.2482376<br>32.2574569<br>32.2693145                                      | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.717583<br>-103.715485<br>-103.711617<br>-103.405709<br>-103.558234   | 34<br>34<br>8<br>1<br>24<br>6<br>30<br>6<br>6<br>6<br>31  | Township 23S 23S 25S 25S 23S 23S 24S 24S 24S 24S 24S 24S 24S 23S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E<br>32E<br>32E | County Lea | State NM       | JOHNSON RANCH JOHNSON RANCH RED TANK DIAMONDTAIL MESA VERDE SAND DUNES SOU MESA VERDE MESA VERDE ANTELOPE RIDGE TRIPLE X  | WOLFCAM WOLFCAM BONE SPRI   | 21,758<br>74,186<br>40,770<br>172,896<br>172,490<br>254,344<br>274,347<br>147,698<br>263,977<br>280,094<br>135,196   | 163<br>386<br>122<br>781<br>199<br>83<br>83<br>933<br>104<br>87  | 150<br>269<br>6<br>1,150<br>2<br>1,128<br>1,202<br>3,804<br>567<br>385                          |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001 MESA VERDE 6 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006 MESA VERDE 6 FEDERAL #005 RED BULL 31 STATE #001 THISTLE UNIT #056H APPLESEED FEDERAL COM #001  | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753<br>40 30-025-32754<br>30-025-32504<br>30-025-32504<br>30-025-36798<br>30-025-41340<br>30-025-20377  | 32.2557449<br>32.2630043<br>32.1505394<br>32.3364449<br>32.288414<br>32.252753<br>32.2763062<br>32.244917<br>32.2482376<br>32.2574569<br>32.2574569<br>32.2693145<br>32.5750008          | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.717583<br>-103.715485<br>-103.711617<br>-103.405709<br>-103.558234<br>-103.473038  | 344<br>348<br>8 1<br>244<br>66<br>300<br>66<br>65<br>311<br>222   | Township 23S 23S 23S 25S 23S 23S 24S 24S 23S 24S 24S 23S 24S 24S 20S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E<br>32E<br>32E | County Lea | State NM       | JOHNSON RANCH JOHNSON RANCH RED TANK DIAMONDTAIL MESA VERDE SAND DUNES SOU MESA VERDE MESA VERDE ANTELOPE RIDGE TRIPLE X LYNCH  | WOLFCAM WOLFCAM BONE SPRI   | 21,758<br>74,186<br>40,770<br>172,896<br>172,490<br>254,344<br>274,347<br>147,698<br>263,977<br>280,094<br>135,196<br>173,141                                  | 163<br>386<br>122<br>781<br>199<br>83<br>83<br>933<br>104<br>87<br>500                                       | 150<br>269<br>6<br>1,150<br>2<br>1,128<br>1,202<br>3,804<br>567<br>385<br>765                   |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001 MESA VERDE 6 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006 MESA VERDE 6 FEDERAL #005 RED BULL 31 STATE #001 THISTLE UNIT #056H APPLESEED FEDERAL COM #001 BERRY APN STATE #001   | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753<br>40 30-025-32754<br>30-025-32397<br>30-025-36798<br>30-025-41340<br>30-025-20377<br>30-025-27250  | 32.2557449 32.2630043 32.1505394 32.3364449 32.252753 32.2763062 32.244917 32.2482376 32.2574569 32.2693145 32.5750008 32.5060349  | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.717583<br>-103.715485<br>-103.711617<br>-103.405709<br>-103.558234<br>-103.473038<br>-103.498344   | 344<br>348<br>8<br>1<br>244<br>66<br>30<br>66<br>63<br>31<br>222<br>17                                  | Township 23S 23S 23S 25S 23S 23S 24S 24S 23S 24S 24S 23S 24S 24S 23S 24S 24S 23S 21S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E<br>32E<br>32E | County Lea | State NM       | JOHNSON RANCH JOHNSON RANCH RED TANK DIAMONDTAIL MESA VERDE SAND DUNES SOU MESA VERDE MESA VERDE ANTELOPE RIDGE TRIPLE X LYNCH BERRY  | WOLFCAM WOLFCAM WOLFCAM BONE SPRI   | 21,758<br>74,186<br>40,770<br>172,896<br>172,490<br>254,344<br>274,347<br>147,698<br>263,977<br>280,094<br>135,196<br>173,141<br>128,117                       | 163<br>386<br>122<br>781<br>199<br>83<br>83<br>933<br>104<br>87<br>500<br>5,174                              | 150<br>269<br>6<br>1,150<br>2<br>1,128<br>1,202<br>3,804<br>567<br>385<br>765<br>7,916          |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001 MESA VERDE 6 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006 MESA VERDE 6 FEDERAL #005 RED BULL 31 STATE #001 THISTLE UNIT #056H APPLESEED FEDERAL COM #001 BERRY APN STATE #001 HUNT APO STATE #001   | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33544<br>30-025-32753<br>40 30-025-32754<br>30-025-32397<br>30-025-32504<br>30-025-41340<br>30-025-20377<br>30-025-27250<br>30-025-27135  | 32.2557449 32.2630043 32.1505394 32.3364449 32.288414 32.252753 32.2763062 32.244917 32.2482376 32.2574569 32.2693145 32.5750008 32.5060349 32.5070038                                   | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.717583<br>-103.715485<br>-103.71629<br>-103.711617<br>-103.405709<br>-103.558234<br>-103.473038<br>-103.498344<br>-103.481232  | 344<br>88<br>11<br>244<br>66<br>300<br>66<br>66<br>311<br>222<br>177<br>5                               | Township 23S 23S 23S 25S 23S 24S 24S 23S 24S 24S 23S 24S 24S 23S 21S 21S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E               | County Lea | State NM       | JOHNSON RANCH JOHNSON RANCH RED TANK DIAMONDTAIL MESA VERDE SAND DUNES SOL MESA VERDE MESA VERDE ANTELOPE RIDGE TRIPLE X LYNCH BERRY GRAMA RIDGE                                | WOLFCAM WOLFCAM BONE SPRI   | 21,758<br>74,186<br>40,770<br>172,896<br>172,490<br>254,344<br>274,347<br>147,698<br>263,977<br>280,094<br>135,196<br>173,141<br>128,117<br>294,627            | 163<br>386<br>122<br>781<br>199<br>83<br>83<br>933<br>104<br>87<br>500<br>5,174<br>567                       | 150<br>269<br>6<br>1,150<br>2<br>1,128<br>1,202<br>3,804<br>567<br>385<br>765<br>7,916<br>1,723 |  |  |  |  |  |  |
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| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001 MESA VERDE 6 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006 MESA VERDE 6 FEDERAL #005 RED BULL 31 STATE #001 THISTLE UNIT #056H APPLESEED FEDERAL COM #001 BERRY APN STATE #001 HUNT APO STATE #001 LEA UNIT #005 MAHAFFEY ARC FEDERAL #001               | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753<br>40 30-025-32754<br>30-025-32504<br>30-025-32504<br>30-025-32504<br>30-025-20377<br>30-025-27250<br>30-025-27135<br>30-025-02429<br>30-025-01735              | 32.2557449 32.2630043 32.1505394 32.3364449 32.252753 32.2763062 32.244917 32.2482376 32.2574569 32.2693145 32.5750008 32.5060349 32.5070038 32.5858536 32.5785904                       | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.715485<br>-103.715485<br>-103.71629<br>-103.711617<br>-103.405709<br>-103.558234<br>-103.473038<br>-103.498344<br>-103.481232<br>-103.51165<br>-103.636131               | 34<br>34<br>8<br>1<br>24<br>6<br>30<br>6<br>6<br>6<br>31<br>22<br>17<br>5<br>4<br>12<br>14              | 23S<br>23S<br>23S<br>25S<br>23S<br>23S<br>24S<br>23S<br>24S<br>24S<br>23S<br>24S<br>23S<br>24S<br>21S<br>21S<br>20S<br>21S<br>20S<br>21S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E               | County Lea | State NM       | JOHNSON RANCH JOHNSON RANCH JOHNSON RANCH RED TANK DIAMONDTAIL MESA VERDE SAND DUNES SOL MESA VERDE MESA VERDE ANTELOPE RIDGE TRIPLE X LYNCH BERRY GRAMA RIDGE LEA TEAS         | WOLFCAM WOLFCAM WOLFCAM BONE SPRI                     | 21,758 74,186 40,770 172,896 172,490 254,344 274,347 147,698 263,977 280,094 135,196 173,141 128,117 294,627 202,606 28,079                                    | 163<br>386<br>122<br>781<br>199<br>83<br>83<br>933<br>104<br>87<br>500<br>5,174<br>567<br>74<br>5,196<br>791 | 150 269 6 1,150 2 1,128 1,202 3,804 567 385 765 7,916 1,723 403 992 1,885                       |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006 MESA VERDE 6 FEDERAL #005 RED BULL 31 STATE #001 THISTLE UNIT #056H APPLESEED FEDERAL COM #001 BERRY APN STATE #001 HUNT APO STATE #001 LEA UNIT #005 MAHAFFEY ARC FEDERAL #001 LEA UNIT #004H                          | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753<br>40-025-32754<br>30-025-32504<br>30-025-32504<br>30-025-32504<br>30-025-20377<br>30-025-27250<br>30-025-27135<br>30-025-02429<br>30-025-02424                 | 32.2557449 32.2630043 32.1505394 32.3364449 32.252753 32.2763062 32.244917 32.2482376 32.2574569 32.2693145 32.5750008 32.5070038 32.5858536 32.5785904 32.5772604                       | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.71583<br>-103.715485<br>-103.71629<br>-103.711617<br>-103.405709<br>-103.558234<br>-103.498344<br>-103.481232<br>-103.51165<br>-103.636131<br>-103.524571                | 34<br>34<br>8<br>1<br>24<br>6<br>30<br>6<br>6<br>6<br>31<br>22<br>17<br>5<br>4<br>12<br>14<br>11        | 70wnship<br>23S<br>23S<br>23S<br>25S<br>23S<br>24S<br>23S<br>24S<br>24S<br>23S<br>24S<br>24S<br>23S<br>24S<br>23S<br>20S<br>21S<br>20S<br>21S<br>20S<br>20S  | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E               | County Lea | State NM       | JOHNSON RANCH JOHNSON RANCH JOHNSON RANCH RED TANK DIAMONDTAIL MESA VERDE SAND DUNES SOU MESA VERDE MESA VERDE ANTELOPE RIDGE TRIPLE X LYNCH BERRY GRAMA RIDGE LEA TEAS LEA     | WOLFCAM WOLFCAM WOLFCAM BONE SPRI           | 21,758 74,186 40,770 172,896 172,490 254,344 274,347 147,698 263,977 280,094 135,196 173,141 128,117 294,627 202,606 28,079                                    | 163 386 122 781 199 83 83 933 104 87 500 5,174 567 74 5,196 791 634  | 150 269 6 1,150 2 1,128 1,202 3,804 567 385 765 7,916 1,723 403 992 1,885                       |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006 MESA VERDE 6 FEDERAL #005 RED BULL 31 STATE #001 THISTLE UNIT #056H APPLESEED FEDERAL COM #001 BERRY APN STATE #001 HUNT APO STATE #001 LEA UNIT #005 MAHAFFEY ARC FEDERAL #001 LEA UNIT #004H LEA UNIT #008            | 30-025-34456<br>30-025-34580<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-32753<br>40-025-32754<br>30-025-32504<br>30-025-32504<br>30-025-32504<br>30-025-20377<br>30-025-27135<br>30-025-27135<br>30-025-02429<br>30-025-02424<br>30-025-02424 | 32.2557449 32.2630043 32.1505394 32.3364449 32.288414 32.252753 32.2763062 32.244917 32.2482376 32.2574569 32.2574569 32.57750008 32.5070038 32.5858536 32.5785904 32.5772604 32.5927162 | -103.562294<br>-103.562302<br>-103.596481<br>-103.625145<br>-103.634743<br>-103.71583<br>-103.715485<br>-103.71629<br>-103.711617<br>-103.405709<br>-103.558234<br>-103.498344<br>-103.481232<br>-103.51165<br>-103.636131<br>-103.524571<br>-103.511673 | 34<br>34<br>8<br>1<br>24<br>6<br>30<br>6<br>6<br>31<br>22<br>17<br>5<br>4<br>12<br>14<br>11<br>12       | 70wnship 23S 23S 23S 25S 23S 23S 24S 24S 24S 24S 22S 24S 22S 20S 20S 20S 20S 20S 20S   | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E               | County Lea | State NM       | JOHNSON RANCH JOHNSON RANCH JOHNSON RANCH RED TANK DIAMONDTAIL MESA VERDE SAND DUNES SOU MESA VERDE MESA VERDE ANTELOPE RIDGE TRIPLE X LYNCH BERRY GRAMA RIDGE LEA TEAS LEA SWD | WOLFCAM WOLFCAM WOLFCAM BONE SPRI | 21,758 74,186 40,770 172,896 172,490 254,344 274,347 147,698 263,977 280,094 135,196 173,141 128,117 294,627 202,606 28,079 29,436 35,094                      | 163 386 122 781 199 83 83 933 104 87 500 5,174 567 74 5,196 791 634 1,272                                    | 150 269 6 1,150 2 1,128 1,202 3,804 567 385 765 7,916 1,723 403 992 1,885 1,142 1,096           |  |  |  |  |  |  |
| THISTLE UNIT #004 THISTLE UNIT #005 FLAGLER FEDERAL #001 THYME APY FEDERAL #002 DIAMONDTAIL 24 FEDERAL #001 MESA VERDE 6 FEDERAL #014 TRESNOR MITCHELL 30 FEDERAL # MESA VERDE 6 FEDERAL #006 MESA VERDE 6 FEDERAL #005 RED BULL 31 STATE #001 THISTLE UNIT #056H APPLESEED FEDERAL COM #001 BERRY APN STATE #001 HUNT APO STATE #001 LEA UNIT #005 MAHAFFEY ARC FEDERAL #001 LEA UNIT #005 | 30-025-34456<br>30-025-34580<br>30-025-30599<br>30-025-33529<br>30-025-33344<br>30-025-32753<br>40-025-32754<br>30-025-32504<br>30-025-32504<br>30-025-32504<br>30-025-20377<br>30-025-27250<br>30-025-27135<br>30-025-02429<br>30-025-02424                 | 32.2557449 32.2630043 32.1505394 32.3364449 32.252753 32.2763062 32.244917 32.2482376 32.2574569 32.2693145 32.5750008 32.5070038 32.5858536 32.5785904 32.5772604                       | -103.562294 -103.562302 -103.596481 -103.625145 -103.634743 -103.71583 -103.715485 -103.71629 -103.711617 -103.405709 -103.558234 -103.498344 -103.481232 -103.51165 -103.636131 -103.524571 -103.511078   | 34<br>34<br>8<br>1<br>24<br>6<br>30<br>6<br>6<br>31<br>22<br>17<br>5<br>4<br>12<br>14<br>11<br>12<br>18 | 70wnship<br>23S<br>23S<br>23S<br>25S<br>23S<br>24S<br>23S<br>24S<br>24S<br>23S<br>24S<br>24S<br>23S<br>24S<br>23S<br>20S<br>21S<br>20S<br>21S<br>20S<br>20S  | 33E<br>33E<br>33E<br>33E<br>32E<br>32E<br>32E<br>32E               | County Lea | State NM       | JOHNSON RANCH JOHNSON RANCH JOHNSON RANCH RED TANK DIAMONDTAIL MESA VERDE SAND DUNES SOU MESA VERDE MESA VERDE ANTELOPE RIDGE TRIPLE X LYNCH BERRY GRAMA RIDGE LEA TEAS LEA     | WOLFCAM WOLFCAM WOLFCAM BONE SPRI           | 21,758 74,186 40,770 172,896 172,490 254,344 274,347 147,698 263,977 280,094 135,196 173,141 128,117 294,627 202,606 28,079 29,436 35,094 204,652              | 163 386 122 781 199 83 83 933 104 87 500 5,174 567 74 5,196 791 634  | 150<br>269<br>6<br>1,150<br>2<br>1,128<br>1,202<br>3,804  |  |  |  |  |  |  |

Attachment 4: 1-mile Fresh Water Map and Tabular List



| Water Well Sampling Rational  |  |  |  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|--|--|
| Waxwing 252634 Federal SWD 1  |  |  |  |  |  |  |  |  |  |
| Water Wells Owner Available Contact Information Use Sampling Required Notes |  |  |  |  |  |  |  |  |  |
| There are no fre  | There are no fresh water wells within a 1-mile radius. |  |  |  |  |  |  |  |  |



NM Oil Conservation Division 1220 S. St. Francis Dr. Santa Fe, NM 87505

Re: Geology Statement
Anthem Water Solutions, LLC
Waxwing 252634 Federal SWD No. 1
Section 25, T. 26S, R. 34E
Lea County, New Mexico

To whom it may concern:

Publicly available geologic and engineering data related to the proposed well have been thoroughly reviewed, and no evidence for open faults or any other hydrologic connection between the proposed Devonian-Silurian injection zone and any underground sources of drinking water has been found. Please see the attached seismic risk assessment for additional information.

Sincerely,

Cory Walk Geologist

## Seismic Risk Assessment

## **Anthem Water Solutions, LLC**

## Waxwing 252634 Federal SWD No. 1

## Section 25, Township 26 South, Range 34 East

Lea County, New Mexico

Cory Walk, M.S.

Cory Walk

Geologist

**Permits West Inc.** 

June 2, 2021

#### **GENERAL INFORMATION**

Waxwing 252634 Federal SWD No. 1 is located in the NW 1/4, section 25, T26S, R34E, about 15 miles southwest of Jal, NM in the Permian Basin. Anthem Water Solutions proposes the injection zone to be within the Devonian-Silurian formation through an open hole from 18,810'-19,977' below ground surface. This report assesses concerns relating to induced seismicity along deep penetrating Precambrian faults or the connection between the injection zone and known underground potable water sources.

#### SEISMIC RISK ASSESSMENT

#### Historical Seismicity

Searching the USGS earthquake catalog resulted in no (0) earthquakes above a magnitude 2.5 within 6 miles (9.7 km) of the proposed deep disposal site since 1970 (Fig. 1). The nearest earthquake occurred on November 8, 2020 about 8.6 miles (~13.9 km) south of the proposed SWD site and had a magnitude of 2.7.

#### **Basement Faults and Subsurface Conditions**

A structure contour map (Fig. 1) of the Precambrian basement shows the Waxwing 252634 Federal SWD #1 is approximately 8.9 miles from the nearest basement-penetrating fault inferred by Ewing et al (1990). **Information about nearby faults is listed in Table 1**.

Snee and Zoback (2018) state, "In the western part of Eddy County, New Mexico,  $S_{Hmax}$  is ~north-south (consistent with the state of stress in the Rio Grande Rift; Zoback and Zoback, 1980) but rotates to ~east-northeast-west-southwest in southern Lea County, New Mexico and the northernmost parts of Culberson and Reeves counties, Texas." Around the Waxwing 252634 Federal SWD site, Snee and Zoback indicate a  $S_{Hmax}$  direction of N075°E and an  $A_{\phi}$  of 0.60, indicating an extensional (normal) stress regime.

Induced seismicity is a growing concern of deep SWD wells. Software developed by the Stanford Center for Induced and Triggered Seismicity allows for the probabilistic screening of deeply penetrating faults near the proposed injection zone (Walsh et al., 2016; Walsh et al., 2017). This software uses parameters such as stress orientations, fault strike/dip, injection rates, fault friction coefficients, etc. to estimate the potential for fault slip. Using this software, Snee and Zoback (2018) indicate that the nearest fault (9 miles to the northwest) has a 0% probability of fault slip (Fig. 2). Other nearby faults inferred by Todd Reynolds (NMOCD case numbers 20141 and 21090) have similar strikes to those inferred by Ewing et al (1990) and therefore are expected to have similar low Fault Slip Potential (FSP) probabilities.

#### **GROUNDWATER SOURCES**

Three principal aquifers are used for potable groundwater in Lea County; these geologic units include the Triassic Santa Rosa formation, Tertiary Ogallala formation, and Quaternary alluvium. Nicholson and Clebsch (1961) state, "Potable ground water is not available below the Permian and Triassic unconformity but, because this boundary is not easily defined, the top of the Rustler anhydrite formation is regarded as the effective lower limit of 'potable' ground water." Around the Waxwing 252634 Federal SWD #1, the top of the Rustler Formation lies at a depth of approximately 755' bgs.

#### VERTICAL MIGRATION OF FLUIDS

Permeability barriers exist above (Woodford shale; 300 ft thick) and below (Simpson Group; 1125 ft thick) the targeted Devonian-Silurian injection zone (Plate 2, Comer et al., 1991; Fig. 8, Frenzel et al., 1988). Precambrian structure contours (Ruppel, 2009) show the basement to be at a depth of approximately 22,850' in this area. Therefore, the injection zone lies approximately 2,870' above the Precambrian basement and approximately 18,055' below the previously stated lower limit of potable water at the top of the Rustler anhydrite formation. The stratigraphy suggests that the Woodford Shale and Simpson Group are adequate confining barriers that would prevent the vertical migration of injected fluids.

#### **CONCLUSION**

After examination of publicly available geologic and engineering data, there is no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.

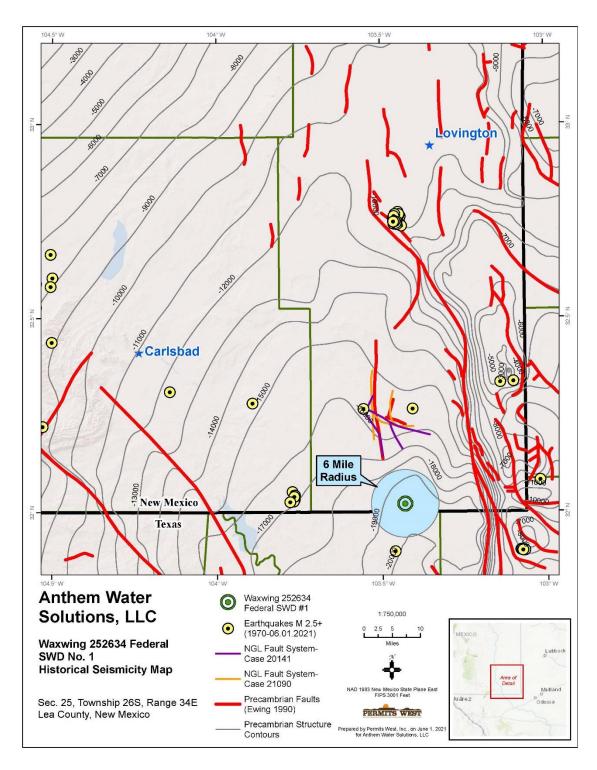


Figure 1. Structural contour map of the Precambrian basement in feet below sea level. Red lines represent the locations of Precambrian basement-penetrating faults (Ewing et al., 1990). Purple and orange lines represent the locations of basement-penetrating faults inferred by Todd Reynolds representing NGL in NMOCD Case Nos. 20141 and 21090. The Waxwing 252634 Federal SWD #1 well lies ~8.9 miles southeast of the closest deeply penetrating fault and ~8.6 miles north of the closest historic earthquake.

**Table 1: Nearby Fault Information** 

| Fault Number | Distance to       |            |         |         |
|--------------|-------------------|------------|---------|---------|
| (Fig. 2)     | proposed SWD (mi) | Strike (°) | Dip (°) | FSP (%) |
| 1            | 8.9               | 348        | 50-90   | 0       |

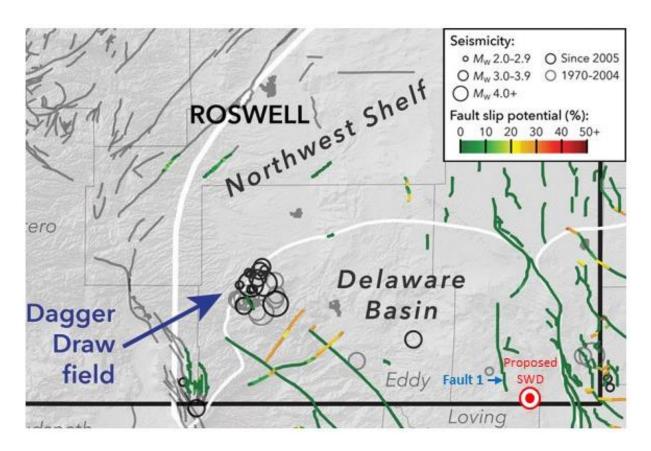


Figure 2. Modified Figure 3 from Snee and Zoback (2018). Map showing proposed location of Waxwing 252634 Federal SWD #1 in relation to Snee and Zoback's results of their FSP analysis.

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#### Affidavit of Publication

STATE OF NEW MEXICO ) ss. COUNTY OF LEA

Joyce Clemens being first duly sworn on oath deposes and says that she is Advertising Manager of THE LOVINGTON LEADER, a once a week newspaper of general paid circulation published in the English language at Lovington, Lea County, New Mexico: that said newspaper has been so published in such county continuously and uninterruptedly for a period in excess of Twenty-six (26) consecutive weeks next prior to the first publication of the notice hereto attached as hereinafter shown; and that said newspaper is in all things duly qualified to publish legal notices within the meaning of Chapter 167 of the 1937 Session Laws of the State of New Mexico.

That the notice which is hereto attached, entitled Legal Notice was published in a regular and entire issue of THE LOVINGTON LEADER and not supplement thereof, for one (1) day(s), beginning with the issue of June 17, 2021 and ending with the issue of June 17, 2021.

And that the cost of publishing said notice is the sum of \$ 48.13 which sum has been (Paid) as Court Costs.

Joyce Clemens, Advertising Manager Subscribed and sworn to before me this 21st day of June, 2021.

Notary Public, Lea County, New Mexico My Commission Expires June 30, 2022

Official Seal **GINA FORT** Notary Public State of New Mexic My Comm. Expires 4 30/22

APPLICATION FOR AUTHORITY TO INJECT To Whom it May Con-

cern, NOTICE IS HEREBY GIVEN; That Anthem Water Solutions, LLC. 5914 W. Courtyard Dr., Austin Suite 320, Austin Texas, 78730, is requesting that the New Mexico Oil Conservation Division administratively approve the APPLICATION FOR AUTHORITY TO IN-JECT as follow: PURPOSE: The in-

tended purpose of the injection well is to dispose of salt water produced from permitted oil and gas wells.

WELL NAME AND LOCATION: Waxwing 252634 Federal SWD 1 Located 16 miles southwest of Jal. NW1/4 of the NW1/4 Section 25, Township 26S, Range 34E, 125 from North Line & 134' from West Line, Lea County, New Mexico. NAME AND DEPTH

OF DISPOSAL ZONE: Devonian-Silurian (18810' - 19977' EXPECTED

MUM INJECTION RATE: 30,000 barrels/day

EXPECTED MAXI-INJECTION MUM PRESSURE: 3762 psi (surface)

Objections or requests for hearing must be filed with the New Mexico Oil Conservation Division within fifteen (15) days. Any objections or requests for hearing should be mailed to the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505. Additional information

may be obtained by Marshall contacting Tippen (972) 795-4201.

Published in the Lov-Ington Leader June 17, 2021

## **Attachment 6: List of Notification Applicants & Delivery Confirmations**

| Waxwing 252634 Federal SWD 1 - Notice of Application Receipts |                       |               |       |            |  |  |  |
|---|-----------------------|---------------|-------|------------|--|--|--|
| Entity  | Address               | City          | State | Zip Code   |  |  |  |
| Landowner and Mineral Owner                                   |                       |               |       |            |  |  |  |
| New Mexico BLM  | 620 E Greene St.      | Carlsbad      | NM    | 88220      |  |  |  |
|   | OCD District          |               |       |            |  |  |  |
| NMOCD District 1  | 1625 N. French Drive  | Hobbs         | NM    | 88240      |  |  |  |
| Leasehold Operators (1-mile)                                  |                       |               |       |            |  |  |  |
| MARATHON OIL PERMIAN LLC                                      | 5555 SAN FELIPE ST    | HOUSTON       | TX    | 77056      |  |  |  |
| OXY USA INC   | PO BOX 27570          | HOUSTON       | TX    | 77227      |  |  |  |
| ECHO PROD INC   | PO BOX 1210           | GRAHAM        | TX    | 76450      |  |  |  |
| CHEVRON USA INC   | 6301 DEAUVILLE        | MIDLAND       | TX    | 79706      |  |  |  |
| EOG RESOURCES, INC  | P.O BOX 4362          | HOUSTON       | TX    | 77210-4362 |  |  |  |
| MEWBOURNE OIL CO  | P.O BOX 7698          | TYLER         | TX    | 75711      |  |  |  |
| DEVON ENERGY PRODUCTION COMPANY, LP                           | 333 WEST SHERIDAN AVE | OKLAHOMA CITY | ОК    | 73102      |  |  |  |

Notes: The table above shows the Entities who were idenfified as parties of interest requiring notification on either the 1-mile well detail list (Attachment 2) or on the 2-mile Mineral Lease Map (Attachment 2).



New Mexico BLM 620 E Greene St. Carlsbad, NM 88220

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NAME AND DEPTH OF DISPOSAL ZONE: Devonian-Silurian (18810' – 19977')

**EXPECTED MAXIMUM INJECTION RATE:** 30,000 barrels/day

**EXPECTED MAXIMUM INJECTION PRESSURE:** 3762 psi (surface)

Objections or requests for hearing must be filed with the New Mexico Oil Conservation Division within fifteen (15) days. Any objections or requests for hearing should be mailed to the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505.

Additional information may be obtained by contacting Marshall Tippen (972) 795-4201.

Regards,

Marshall Tippen



NMOCD District 1 1625 N. French Drive Hobbs, NM 88240

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OXY USA INC PO BOX 27570 HOUSTON, TX 77227

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EOG RESOURCES, INC P.O BOX 4362 HOUSTON, TX 77210-4362

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MEWBOURNE OIL CO P.O BOX 7698 TYLER, TX 75711

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DEVON ENERGY PRODUCTION COMPANY, LP 333 WEST SHERIDAN AVE OKLAHOMA CITY, OK 73102

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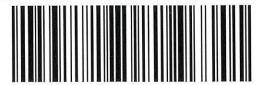
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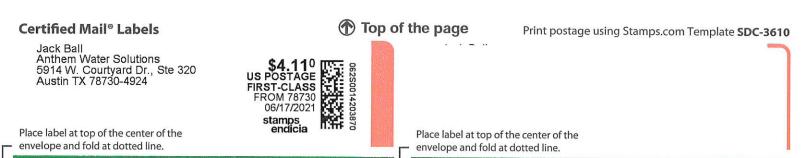
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