



P.O. Box 326, Cañon City, CO 81215

angela@envalternatives.com

719-275-8951

October 15, 2020

Patrick Lennberg  
Division of Reclamation Mining and Safety  
1313 Sherman Street, Room 213  
Denver, CO 80203

RE: M-2006-054 Ordway Pit  
Preliminary Adequacy Response; (AM-01) to 112 Permit

Dear Mr. Lennberg,

Please accept this correspondence in response to the Preliminary Adequacy Review dated September 3, 2020.

APPLICATION FORM

1. Please find Page 2 with corrected mine entrance coordinates that match the coordinates in Exhibit A.

Rule 6.4.3 Exhibit C Pre-mining and Mining Plan Maps

2. The primary corner GPS coordinates are provided on Exhibit C-1.
3. The areas of Lots 1 thru 4 are provided on Exhibit C-1.
4. During pre-submission site meetings, Mr. Lance Brundage of Brundage Surveying, brought to our attention the location of both the scale house and the scale. The scale house was relocated and is now inside the permit boundary. This is also depicted on Exhibit C-2. This area, 1.1 acres, is included in the permit boundary. Mr. Brundage included this acreage in Exhibit C-2 Notation 5. This area is included in page 2 of the application form and in Exhibit D.
5. Exhibit C-2 depicts stockpile locations as of September 2020.
6. Exhibit C-2 depicts stockpile locations as of September 2020.

Rule 6.4.4 Exhibit D Mining Plan

7. The 2006 DRMS approval included 98 acres. The requested change in acreage is 17.6 acres for a total new permit area of 115.6 acres.
8. Depending on success of reclamation, up to 40 acres may be disturbed at any one time with approximately 10 acres of active mining area, 16.6-acre processing

- and stockpile area and 11.3 acres in reclamation. The operator will notify the land owner when a 10-acre area is mined out and ready to begin reclamation.
9. The affected area is 115.6 acres.
  10. The Operator commits to planting native species as cover crop for stabilization for topsoil stockpiles that are exposed for longer than 120 days.
  11. Highwalls are not anticipated. Active mine faces are mined with dozers and loaders, maintaining a manageable slope.
  12. Exhibit C-2A is provided to show the 10-acre mining area and the 16.6-acre processing area.
  13. Both the applicant and the operator have identified end uses for the large stockpiles. The material will be hauled off-site to be used in construction projects.

Rule 6.4.5 Exhibit E Reclamation Plan

14. The Operator commits to planting native species as cover crop for stabilization for topsoil stockpiles that are exposed for longer than 120 days.
15. Approximately 10 tons of manure per acre will be incorporated into the topsoil prior to distribution. The revised exhibit is provided.
16. Ms. Brittany Pierce, the Weed Control Officer for Fremont County, prepared the enclosed Integrated Weed Management Plan.

Rule 6.4.6 Exhibit F Reclamation Plan Map

17. Exhibit F is labeled Reclamation Map.
18. The permit boundary aligns with Exhibit C.
19. Contours are clarified as requested.
20. The proposed permit boundary is corrected to match Exhibit C and includes disturbance in the SE corner.

Rule 6.4.7 Exhibit G Water Information

21. The requested copy of the District Court ruling is provided herein.

Rule 6.4.10 Exhibit J Vegetation Information

22. The subject area is not conducive to crop production due to poor soil quality. The carrying capacity is 1 animal unit per 25 acres based on historic ranch practices.

Rule 6.4.13 Exhibit M Other Permits and Licenses

23. No additional permits are required.

Rule 6.4.19 Exhibit S Permanent Man-made Structures

24. Arkansas Valley Ranch is the owner of the northern permit boundary fence.

Rule 6.3.6 Proof of Placing with Crowley County Clerk and Recorder

25. The proof of placing with Crowley County is provided herein.



In response to CPW's comments received by the Division September 25, 2020, the landowner will survey the area for prairie dogs, burrowing owls and fox during mining operations, especially as the time approaches to move active mining into the next 10-acre mining. In the event the aforementioned wildlife is located in the permit area, the recommended mitigation will be implemented.

Please direct correspondences and question to Angela Bellantoni at [angela@envalterntaives.com](mailto:angela@envalterntaives.com) or 719-275-8951.

Respectfully submitted,



Angela M. Bellantoni Ph.D.

Cc: Peter Hurt

Enclosures:

- Application form pages 1 and 2
- Exhibit A Legal Description
- Exhibit D Mining Plan
- Integrated Weed Control Plan
- Exhibit C Mine Plan Maps
- Exhibit F Reclamation Plan Map
- Exhibit R Proof of Filing with Crowley County Clerk
- District court Case No. 18CW3045

# STATE OF COLORADO

## DIVISION OF RECLAMATION, MINING AND SAFETY

Department of Natural Resources

1313 Sherman St., Room 215

Denver, Colorado 80203

Phone: (303) 866-3567

FAX: (303) 832-8106



### CONSTRUCTION MATERIALS REGULAR (112) OPERATION RECLAMATION PERMIT APPLICATION FORM

CHECK ONE: ☒ There is a File Number Already Assigned to this Operation

Permit # M - 2006 054 (Please reference the file number currently assigned to this operation)

☐

New Application (Rule 1.4.5)

☒

Amendment Application (Rule 1.10)

☐

Conversion Application (Rule 1.11)

Permit # M - 2006 054 (provide for Amendments and Conversions of existing permits)

The application for a Construction Materials Regular 112 Operation Reclamation Permit contains three major parts: (1) the application form; (2) Exhibits A-S, Addendum 1, any sections of Exhibit 6.5 (Geotechnical Stability Exhibit; and (3) the application fee. When you submit your application, be sure to include one (1) complete signed and notarized ORIGINAL and one (1) copy of the completed application form, two (2) copies of Exhibits A-S, Addendum 1, appropriate sections of 6.5 (Geotechnical Stability Exhibit, and a check for the application fee described under Section (4) below. Exhibits should **NOT** be bound or in a 3-ring binder; maps should be folded to 8 1/2" X 11" or 8 1/2" X 14" size. To expedite processing, please provide the information in the format and order described in this form.

#### GENERAL OPERATION INFORMATION

Type or print clearly, in the space provided, ALL information requested below.

1. **Applicant/operator or company name (name to be used on permit):** Arkansas Valley Ranch, LLC
  - 1.1 Type of organization (corporation, partnership, etc.): Foreign Limited Liability Company
2. **Operation name (pit, mine or site name):** ORDWAY PIT
3. **Permitted acreage (new or existing site):**

	<u>98</u>	permitted acres
3.1 Change in acreage (+)	<u>17.6</u>	acres
3.2 Total acreage in Permit area	<u>115.6</u>	acres
4. **Fees:**

4.1 New Application	<u>\$2,696.00</u>	application fee
4.2 New Quarry Application	<u>\$3,342.00</u>	quarry application
4.4 Amendment Fee	<u>\$2,229.00</u>	amendment fee
4.5 Conversion to 112 operation (set by statute)	<u>\$2,696.00</u>	conversion fee
5. **Primary commodity(ies) to be mined:** ROCK SAND GRAVEL FILL DIRT

5.1 Incidental commodity(ies) to be mined:	1. <u>N/A</u> - <u>      </u> lbs/Tons/yr	2. <u>N/A</u> / <u>      </u> lbs/Tons/yr
	3. <u>N/A</u> / <u>      </u> lbs/Tons/yr	4. <u>N/A</u> / <u>      </u> lbs/Tons/yr
		5. <u>N/A</u> / <u>      </u> lbs/Tons/yr

5.2 Anticipated end use of primary commodity(ies) to be mined: ROAD MAINTENANCE, CONCRETE OR ASPHALT AGGREGATE, CONSTRUCTION AGGREGATE MATERIAL

5.3 Anticipated end use of incidental commodity(ies) to be mined: N/A



6. **Name of owner of subsurface rights of affected land:** Arkansas Valley Ranch, LLC  
If 2 or more owners, "refer to Exhibit O".

7. **Name of owner of surface of affected land:** Arkansas Valley Ranch, LLC

8. **Type of mining operation:** ☒ Surface ☐ Underground

9. **Location Information:** The center of the area where the majority of mining will occur:

COUNTY: CROWLEY

PRINCIPAL MERIDIAN (check one): ☒ 6th (Colorado) ☐ 10th (New Mexico) ☐ Ute

SECTION (write number):

S 16

TOWNSHIP (write number and check direction):

T 22 ☐ North ☒ South

RANGE (write number and check direction):

R 58 ☐ East ☒ West

QUARTER SECTION (check one):

☒ NE ☐ NW ☐ SE ☐ SW

QUARTER/QUARTER SECTION (check one):

☒ NE ☐ NW ☐ SE ☐ SW

GENERAL DESCRIPTION: (the number of miles and direction from the nearest town and the approximate elevation): \_\_\_\_\_

APPROXIMATELY 2 MILES NORTH & 2 MILES WEST OF MANZANOLA & APPROXIMATELY 2 MILES SOUTH & 2 MILES EAST OF OLNEY SPRINGS

10. **Primary Mine Entrance Location** (report in either Latitude/Longitude OR UTM):

Latitude/Longitude:

Example: (N) 39° 44' 12.98"  
(W) 104° 59' 3.87"

Latitude (N): deg \_\_\_\_\_ min \_\_\_\_\_ sec \_\_\_\_\_ (2 decimal places)

Longitude (W): deg \_\_\_\_\_ min \_\_\_\_\_ sec \_\_\_\_\_ (2 decimal places)

OR

Example: (N) 39.73691°  
(W) -104.98449°

Latitude (N) 38 137111 (5 decimal places)

Longitude(W) -103 893799 (5 decimal places)

OR

Universal Tranverse Mercator (UTM)

Example: 201336.3 E NAD27 Zone 13  
4398351.2 N

UTM Datum (specify NAD27, NAD83 or WGS 84) Nad 83 Zone 13

Easting \_\_\_\_\_

Northing \_\_\_\_\_

# 6.4.1 Exhibit A

## Legal Description

### DESCRIPTION OF TRACTS

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#### EXISTING MINING AREA:

All of Lots 1, 2, 3, and 4, Section 16, Township 22 South, Range 58 West of the 6th P.M.  
County of Crowley, State of Colorado.

#### Also described as:

A tract of land lying in Section 16, Township 22 South, Range 58 West of the 6th P.M. being more particularly described as follows:

Beginning at the Northeast corner of Section 16, thence South along the East line of said Section 16, a distance of 1130.5 feet, more or less, to a point on the Northerly line of Indian Claims No. 8; thence in a Northwesterly direction along the Northerly line of said Indian Claim, a distance of 5390 feet, more or less, to a point on the West line of said Section 16; thence North along the West line of said Section 16, a distance of 466 feet, more or less, to the Northwest corner of said Section 16; thence East, along the North line of said Section 16, a distance of 5346.5 feet, more or less, to the point of beginning. County of Crowley, State of Colorado.

#### PROPOSED MINING EXPANSION AREA:

A tract of land located in the N1/2 of Section 16, Township 22 South, Range 58 West of the 6th P.M. being a part of Indian Claim #8 lying within said Section 16 and more particularly described as follows: Beginning at the Northeast corner of said Sec. 16; thence S.0°24'04"E., along the East line of said Section 16, a distance of 1130.50 feet, more or less, to a point on the Northerly line of Indian Claim No. 8 and the TRUE POINT OF BEGINNING; along said Indian Claim No. 8 line N.82°50'29"W., 1497.83 feet; thence S.14°22'10"W., 396.52 feet; thence S.74°59'33"E., 840.72 feet; thence N.87°58'16"E., 227.04 feet; thence S.87°44'37"E., 179.37 feet; thence S.78°57'41"E., 289.02 feet; thence N.82°33'02"E., 86.66 feet to a point on the East line of said Sec. 16; thence N.0°24'04"W., 458.30 feet to the True Point of Beginning. The Tract contains 16.5 Acres. County of Crowley, State of Colorado.

The mine entrance, 38.137111N -103.893799W, is onto a private ranch road that adjoins County Road B.

## 6.4.4 Exhibit D

### Mining Plan

The Ordway Pit is an open pit sand and gravel operation in Crowley County, Colorado. The currently 112 Permit area includes 98.00 acres of which approximately 38.4 acres are disturbed. This amendment will increase the permit area 17.6 acres to include disturbance outside the permit boundary. The amended total permit boundary will encompass 115.6 acres. The remaining life of the mine is estimated to be 30 years if production rates are consistent with recent years.

The target deposit is Cascajo gravel deposits north of the Arkansas River. Gravel is estimated to be between six feet and eight feet thick with little overburden. Sandy loam lies beneath the Cascajo gravel. The primary commodities are sand and gravel for the construction industry specifically road construction and concrete and ready-mix vendors.

The permit area will continue to be mined from east to west as 10-acre mined areas plus the processing and stockpile area of approximately 16 acres. The active mine area will be limited to a 10-acre disturbance. The processing and stockpile area will remain in the current location throughout the life of the mine and will include the processing plant, the recirculating water ponds, stockpile areas, interior haul roads, entrance road and scale house.

Mining will rely on excavators, dozers, and loaders for earth moving. The native topsoil, less than four inches, will be salvaged using a scraper if a sufficient quantity justifies use. Otherwise, topsoil will be pushed to the side using a dozer and moved to a topsoil stockpile near the active mine area with a loader. Material will be removed from the mine face with a loader and placed in a stockpile near the feed hopper or fed directly into the processing plant. The mine face will be sloped 3H:1V whenever possible. In the event the mine face becomes steeper, it will be shaped to 3H:1V a bulldozer whenever necessary. Processed material will be moved from the production pile to the finished product stockpile using a loader.

Water is necessary to wash the concrete aggregate product. Water is available for industrial uses thru CWPDA's augmentation plan (Case No. 07CW128). Arkansas Valley Ranch is a member of CWPDA (membership number 3517). The well (ID 1705571) is located near the scale house. Exhibit G contains the water case ruling and well permit.

Ancillary improvements for mining include the entrance road from County Road B to the scale house and into the mine area. The road is compacted gravel and approximately 20 feet wide. Whereas that portion of the access road from County Road B, pass the scale house and into the mine area will be consistently located throughout the life of the mine, the road in the mine will change as the mine progresses to the west.

The mining operation does not require chemical additives or blasting. This is a dry mine operation.



## CROWLEY COUNTY

### *Integrated Weed Management Plan*

**Name of Property Owner/Manager** Arkansas Valley Ranch    **DATE** October 14, 2020

**Address (and location of property):** Section 16, T22S, R 58W, approximately 2 miles north and 2 miles west of Manzanola, CO

#### **List of Noxious Weeds and Control Plan:**

*Noxious Weeds Present Control Measures:*  
Reference "Guideline for Weed Management Plans April 2015"

State Law requires all landowners to manage noxious weed on their property. The following weeds under Colorado Noxious Weed Act, if present, are considered a threat to the economic and environmental value of our state lands. These listed under the Noxious Weed Act shall be managed under the provisions of this article. The following species under this act that have been identified in this county and should be managed in the appropriate manner as mandated throughout the term of the permit and thereafter.

"List A" species - These are rare noxious weed species that are subject to eradication upon confirmed identification during any interval of reclamation to the site. Such List A species that are confirmed in Crowley County may include, but are not limited to:

Myrtle Spurge, Japanese Knotweed, Giant Reed, Yellow Star Thistle

"List B" species - These are noxious weed species distributed throughout the State of Colorado and are subject to eradication, containment, or suppression in order to halt continued spread. Species identified within Crowley County may include, but are not limited to:

Absinth Wormwood, Black Henbane, Bouncingbet, Bull Thistle, Canada Thistle, Common Tansy, Common Teasel, Dalmatian Toadflax, Diffuse Knapweed, Hoary Cress, Houdstongue, Hybrid Knapweed, Hybrid Toadflax, Jointed Goatgrass, Leafy Spurge, Musk Thistle, Perennial Pepperweed, Russian Knapweed, Russian-olive, Salt Cedar, Scotch Thistle, Spotted Knapweed, Yellow Toadflax.

"List C" species - Are well-established noxious weed species and are widespread throughout the State for which control is only recommended. Common species in Crowley County may include, but are not limited to:

Chicory, Common Burdock, Common Mullein, Downy Brome, Field Bindweed, Halogeton, Johnsongrass, Perennial Sowthistle, Poison Hemlock, Puncturevine, Redstem Filaree

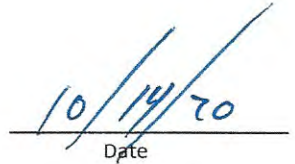
Identification can be confirmed through the Colorado Department of Agriculture or your local partnering agency. Please see Fremont County Weed Control's booklet, "Guideline for Weed Management Plans" for more details such as herbicide rates and specifics about weed control methods.

**Other Required Action:** The property owner will utilize weed control practices recommended in the 4<sup>th</sup> Edition of the Guideline for Weed Management Plans for Fremont and Duster Counties since Crowley County does not have a weed control officer or department.



A handwritten signature in blue ink, consisting of stylized initials and a surname, positioned above a horizontal line.

Property Owner/Manager



A handwritten date in blue ink, '10/14/20', positioned above a horizontal line.

Date

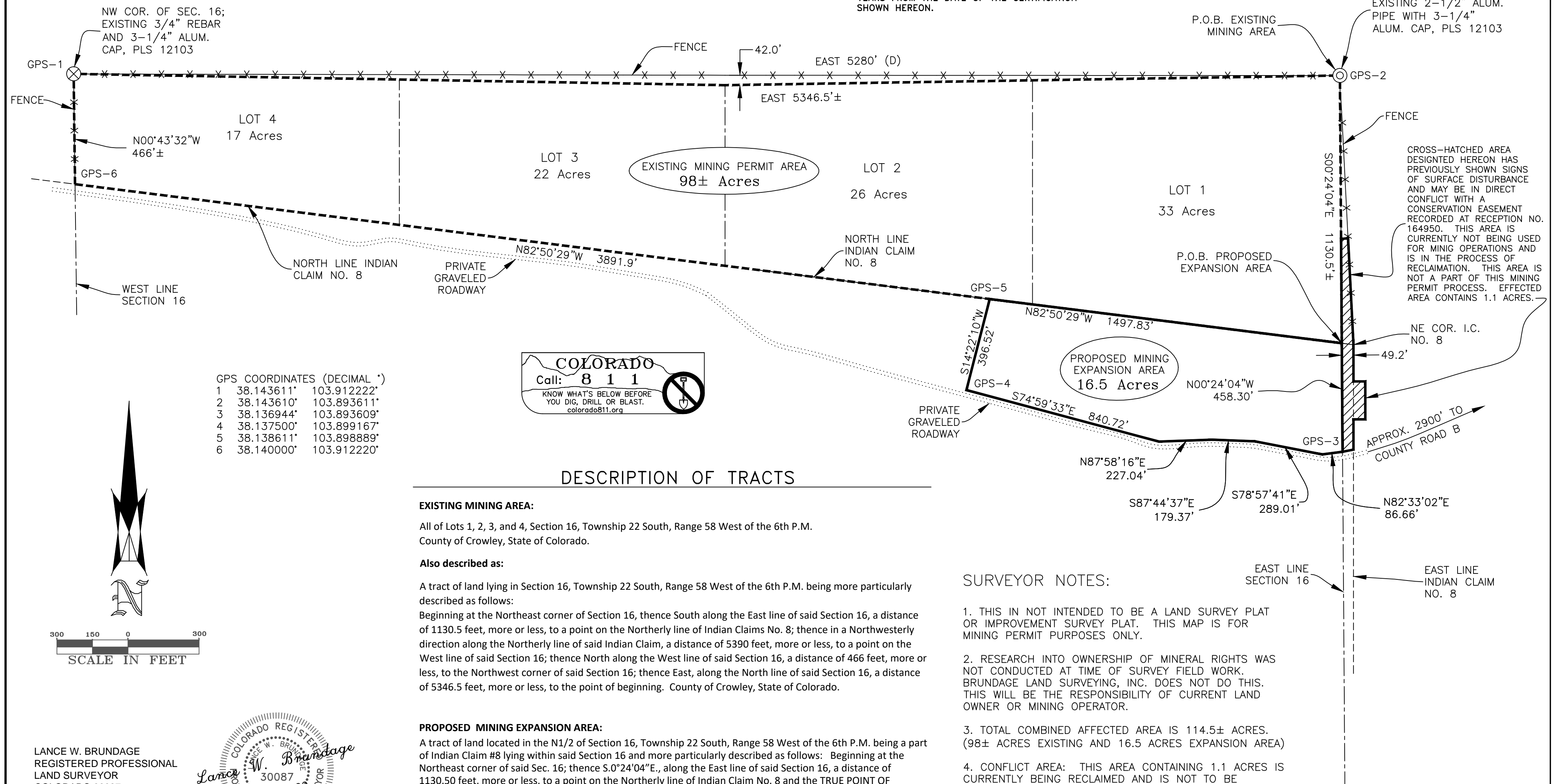
# EXHIBIT "C-1" - MINING PLAN

1"=300'

PART OF SEC. 16,  
T.22S., R.58W., 6th P.M.,  
CROWLEY COUNTY, COLO.

BEARINGS BASED UPON TRUE  
MERIDIAN AS DETERMINED BY  
G.P.S. OBSERVATIONS ON LINE  
BETWEEN SECTION CORNER  
MONUMENTS AS SHOWN.

NOTICE: ACCORDING TO COLORADO LAW YOU  
MUST COMMENCE ANY LEGAL ACTION BASED UPON  
ANY DEFECT IN THE SURVEY WITHIN THREE YEARS  
AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO  
EVENT MAY ANY ACTION BASED UPON ANY DEFECT  
IN THIS SURVEY BE COMMENCED MORE THAN TEN  
YEARS FROM THE DATE OF THE CERTIFICATION  
SHOWN HEREON.



LANCE W. BRUNDAGE  
REGISTERED PROFESSIONAL  
LAND SURVEYOR  
COLORADO 30087



PREPARED BY

BRUNDAGE LAND SURVEYING, INC.  
Arizona, Colorado, Kansas, Nebraska, North Dakota, South Dakota  
P.O. BOX 441  
LA JUNTA COLORADO 81050  
PHONE: 719-383-4627  
FAX: 719-383-4628



DATE:  
MAY 15, 2020  
PROJECT NO.  
46AKVR20

DRAWING NO.  
EXHIBIT C-1  
SHEET NO.  
1 OF 1

MINING PLAN  
EXHIBIT "C-1"

PROJECT LOCATION:  
PART OF THE N1/2, SEC. 16, T.22S., R.58W.,  
6th P.M., CROWLEY COUNTY, COLORADO

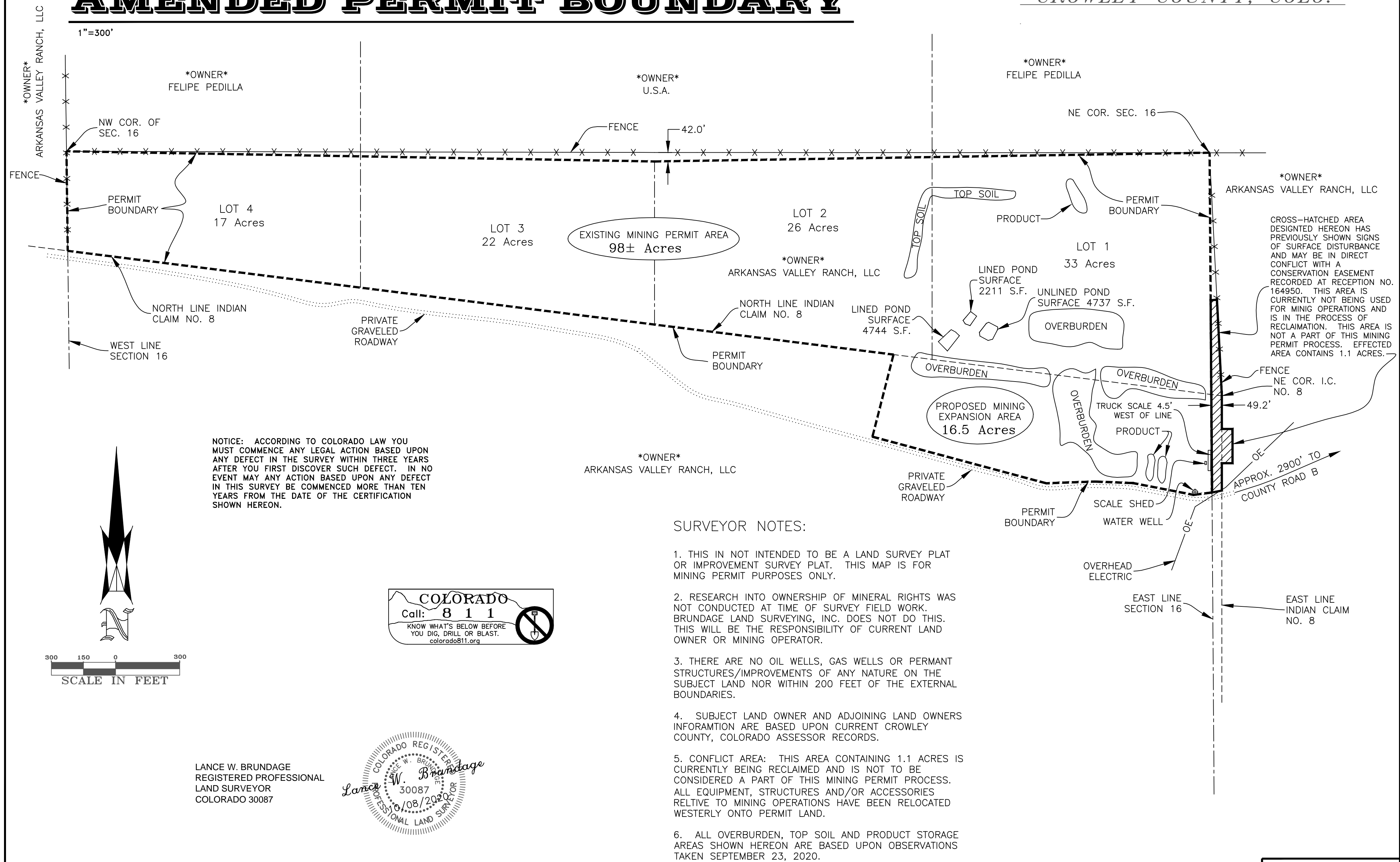
CLIENT:  
ARKANSAS VALLEY RANCH  
ORDWAY COLORADO

REVISED: SEPT. 28, 2020  
GENERAL ADDITIONS/NOTES



EXHIBIT "C-2" - EXISTING AND AMENDED PERMIT BOUNDARY

PART OF SEC. 16, T.22S., R.58W., 6th P.M., CROWLEY COUNTY, COLO.



PREPARED BY

BRUNDAGE LAND SURVEYING, INC.  
Arizona, Colorado, Kansas, Nebraska, North Dakota, South Dakota  
P.O. BOX 441  
LA JUNTA COLORADO 81050  
PHONE: 719-383-4627  
FAX: 719-383-4628

BLSI

DATE: MAY 15, 2020  
PROJECT NO. 46AKVR20

DRAWING NO. EXHIBIT C-2  
SHEET NO. 1 OF 1

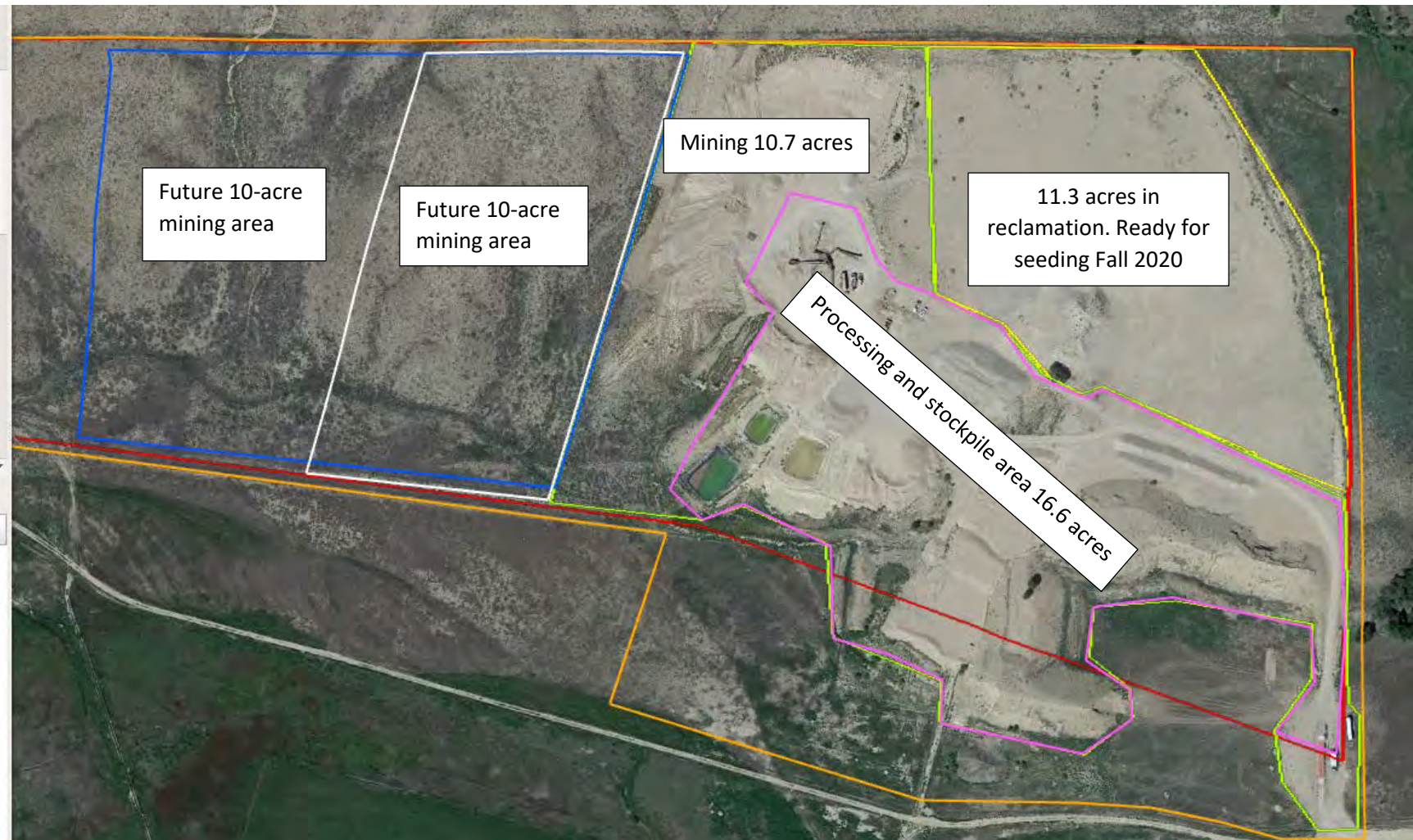
MINING PLAN  
EXHIBIT "C-2"

PROJECT LOCATION:  
PART OF THE N1/2, SEC. 16, T.22S., R.58W.,  
6th P.M., CROWLEY COUNTY, COLORADO

CLIENT:  
ARKANSAS VALLEY RANCH  
ORDWAY COLORADO

REVISED: OCT. 8, 2020  
GENERAL ADDITIONS/NOTES

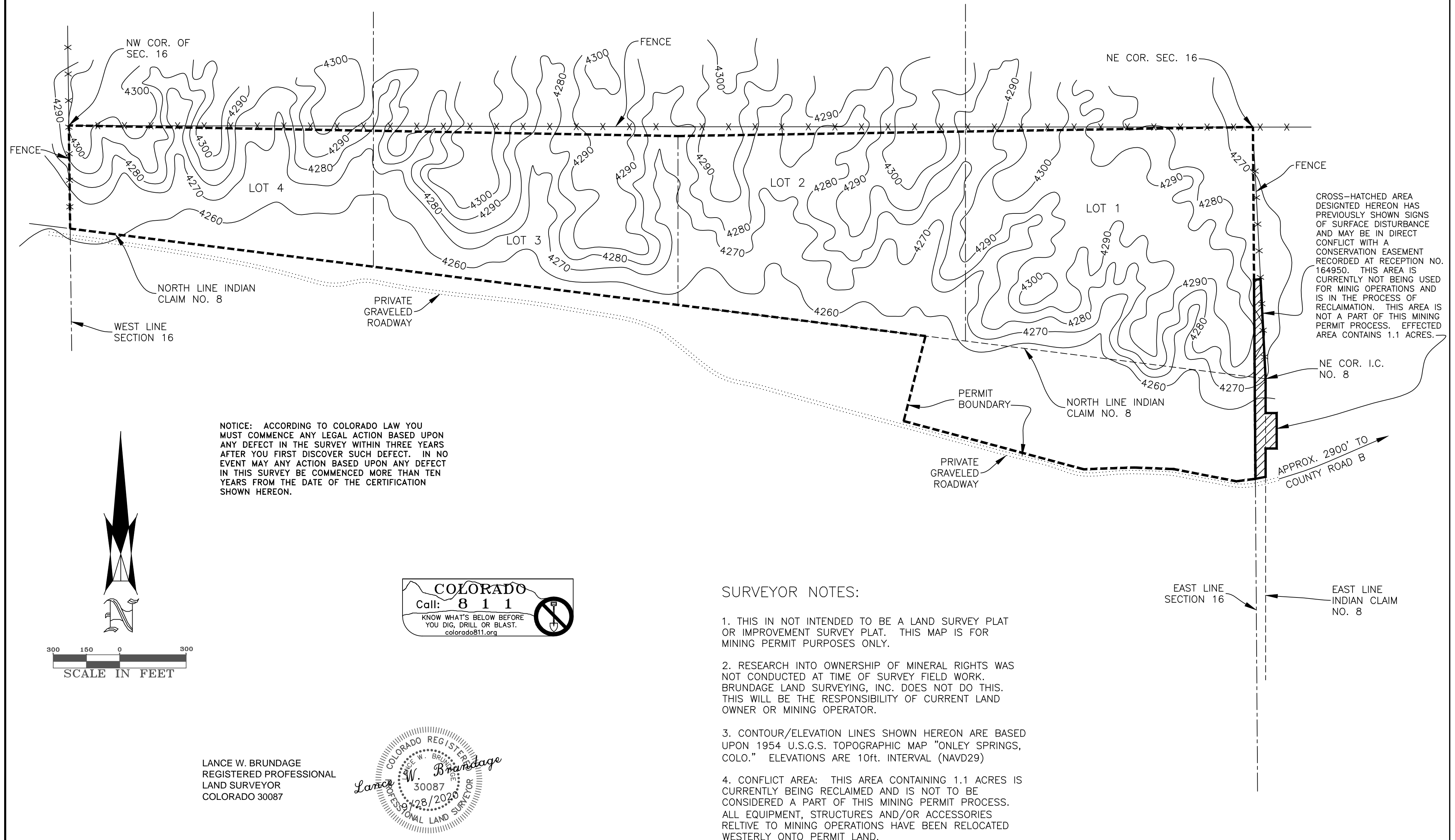
Exhibit C-2A: Mine Plan Map  
Land use acres including acres being reclaimed.



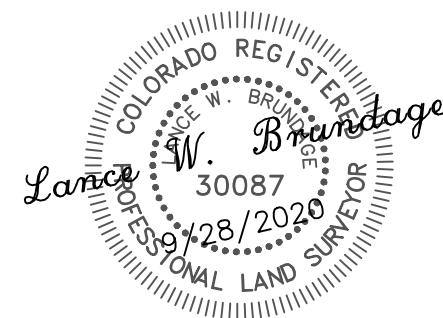
# EXHIBIT "C-3" - PERMIT AREA TOPOGRAPHY

1"=300'/CONTOUR INTERVAL-10ft.

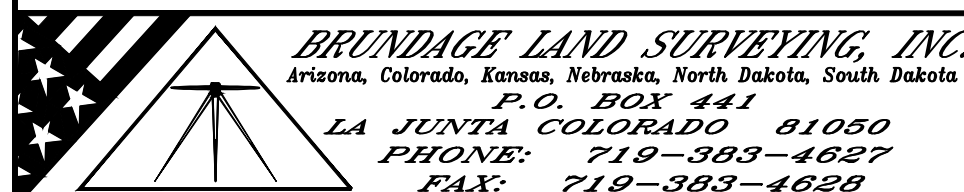
PART OF SEC. 16,  
T.22S., R.58W., 6th P.M.,  
CROWLEY COUNTY, COLO.



LANCE W. BRUNDAGE  
REGISTERED PROFESSIONAL  
LAND SURVEYOR  
COLORADO 30087



PREPARED BY



DATE:  
MAY 15, 2020  
PROJECT NO.  
46AKVR20

DRAWING NO.  
EXHIBIT C-3  
SHEET NO.  
1 OF 1

*MINING PLAN*  
*EXHIBIT "C-3"*

PROJECT LOCATION:  
PART OF THE N1/2, SEC. 16, T.22S., R.58W.,  
6th P.M., CROWLEY COUNTY, COLORADO

CLIENT:  
ARKANSAS VALLEY RANCH  
ORDWAY COLORADO

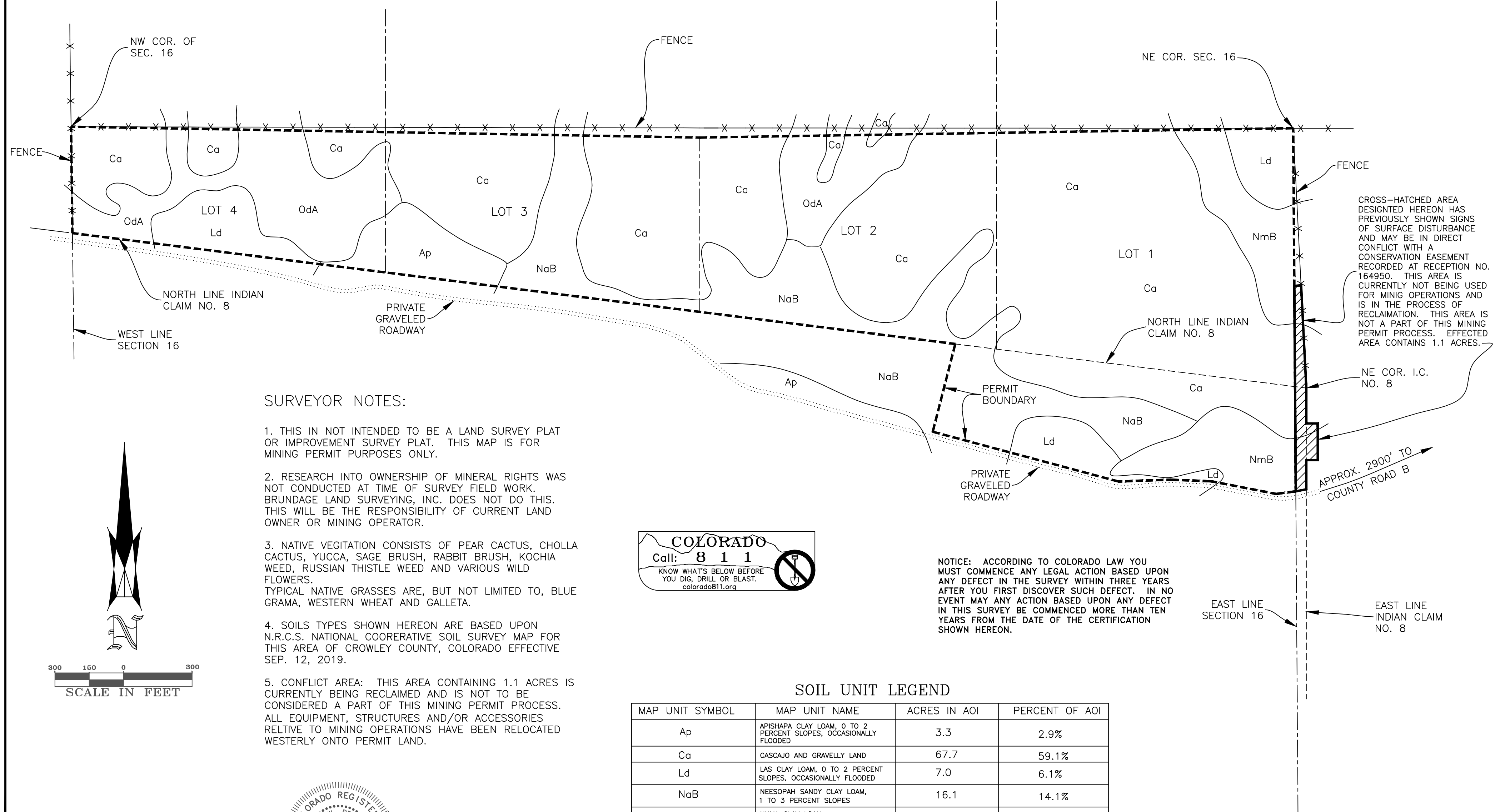
REVISED: SEPT. 28, 2020  
GENERAL ADDITIONS/NOTES



**EXHIBIT "C-4" - PERMIT  
AREA SOIL & VEGETATION**

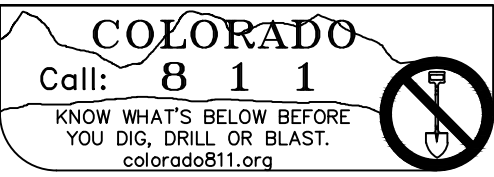
*PART OF SEC. 16,  
T.22S., R.58W., 6th P.M.,  
CROWLEY COUNTY, COLO.*

1"=300'



**SURVEYOR NOTES:**

1. THIS IS NOT INTENDED TO BE A LAND SURVEY PLAT OR IMPROVEMENT SURVEY PLAT. THIS MAP IS FOR MINING PERMIT PURPOSES ONLY.
2. RESEARCH INTO OWNERSHIP OF MINERAL RIGHTS WAS NOT CONDUCTED AT TIME OF SURVEY FIELD WORK. BRUNDAGE LAND SURVEYING, INC. DOES NOT DO THIS. THIS WILL BE THE RESPONSIBILITY OF CURRENT LAND OWNER OR MINING OPERATOR.
3. NATIVE VEGETATION CONSISTS OF PEAR CACTUS, CHOLLA CACTUS, YUCCA, SAGE BRUSH, RABBIT BRUSH, KOCHIA WEED, RUSSIAN THISTLE WEED AND VARIOUS WILD FLOWERS. TYPICAL NATIVE GRASSES ARE, BUT NOT LIMITED TO, BLUE GRAMA, WESTERN WHEAT AND GALLETA.
4. SOILS TYPES SHOWN HEREON ARE BASED UPON N.R.C.S. NATIONAL COOPERATIVE SOIL SURVEY MAP FOR THIS AREA OF CROWLEY COUNTY, COLORADO EFFECTIVE SEP. 12, 2019.
5. CONFLICT AREA: THIS AREA CONTAINING 1.1 ACRES IS CURRENTLY BEING RECLAIMED AND IS NOT TO BE CONSIDERED A PART OF THIS MINING PERMIT PROCESS. ALL EQUIPMENT, STRUCTURES AND/OR ACCESSORIES RELATIVE TO MINING OPERATIONS HAVE BEEN RELOCATED WESTERLY ONTO PERMIT LAND.



NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THE SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.

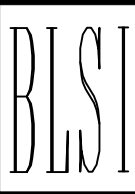
**SOIL UNIT LEGEND**

MAP UNIT SYMBOL	MAP UNIT NAME	ACRES IN AOI	PERCENT OF AOI
Ap	APISHAPA CLAY LOAM, 0 TO 2 PERCENT SLOPES, OCCASIONALLY FLOODED	3.3	2.9%
Ca	CASCAJO AND GRAVELLY LAND	67.7	59.1%
Ld	LAS CLAY LOAM, 0 TO 2 PERCENT SLOPES, OCCASIONALLY FLOODED	7.0	6.1%
NaB	NEESOPAH SANDY CLAY LOAM, 1 TO 3 PERCENT SLOPES	16.1	14.1%
NmB	NUMA CLAY LOAM 1 TO 3 PERCENT SLOPES	8.0	7.0%
OdA	OTERODRY SANDY LOAM, DRY 1 TO 4 PERCENT SLOPES	12.4	10.8%
TOTALS FOR AREA OF INTEREST (AOI)		114.5±	100%

LANCE W. BRUNDAGE  
REGISTERED PROFESSIONAL  
LAND SURVEYOR  
COLORADO 30087



PREPARED BY



DATE: MAY 15, 2020	DRAWING NO. EXHIBIT C-4
PROJECT NO. 46AKVR20	SHEET NO. 1 OF 1

*MINING PLAN*  
*EXHIBIT "C-4"*

PROJECT LOCATION:  
PART OF THE N1/2, SEC. 16, T.22S., R.58W.,  
6th P.M., CROWLEY COUNTY, COLORADO

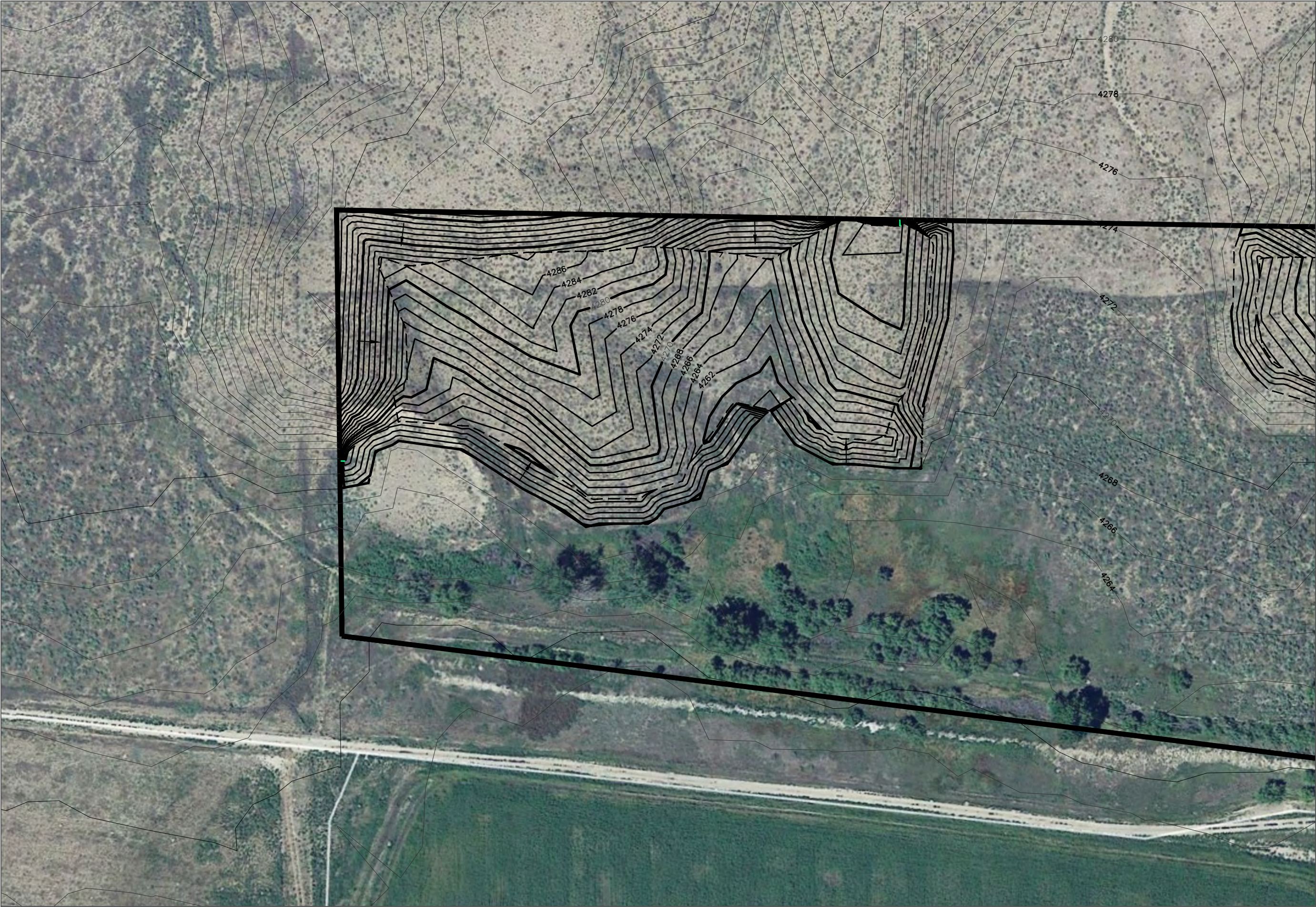
CLIENT:  
**ARKANSAS VALLEY RANCH**  
**ORDWAY COLORADO**

REVISED: SEPT. 28, 2020  
GENERAL ADDITIONS/NOTES









ARKANSAS VALLEY RANCH RECLAMATION MAP EXHIBIT F ORDWAY, CO				1			
				2			
				3			
				4			
				NO.	REVISION	APPV'D	DATE

DESIGNED BY	Andy Jesik
DRAWN BY	Matt Bishop
CHECKED BY	Andy Jesik
PROJECT NUMBER	



102-D Oneida Street  
Pueblo, Colorado 81003  
(719) 582-5588  
www.jesik.us

DATE  
10-11-2020

SCALE  
HORZ : 1:100  
VERT : ----


SHEET  
2





DESIGNED BY <b>Andy Jesik</b>		1	
DRAWN BY <b>Matt Bishop</b>		2	
CHECKED BY <b>Andy Jesik</b>		3	
PROJECT NUMBER		4	
DATE <b>10-11-2020</b>		NO. REVISION	
SCALE HORZ : 1:100 VERT : ----		APPR'D DATE	
SHEET <b>3</b>			

ARKANSAS VALLEY RANCH  
RECLAMATION MAP  
EXHIBIT F  
ORDWAY, CO



102-D Oneida Street  
Pueblo, Colorado 81003  
(719) 582-5588  
www.jesik.us





DESIGNED BY Andy Jesik				1			
DRAWN BY Matt Bishop				2			
CHECKED BY Andy Jesik				3			
PROJECT NUMBER				4			
NO. REVISION				APPROV'D DATE			

ARKANSAS VALLEY RANCH  
RECLAMATION MAP  
EXHIBIT F  
ORDWAY, CO



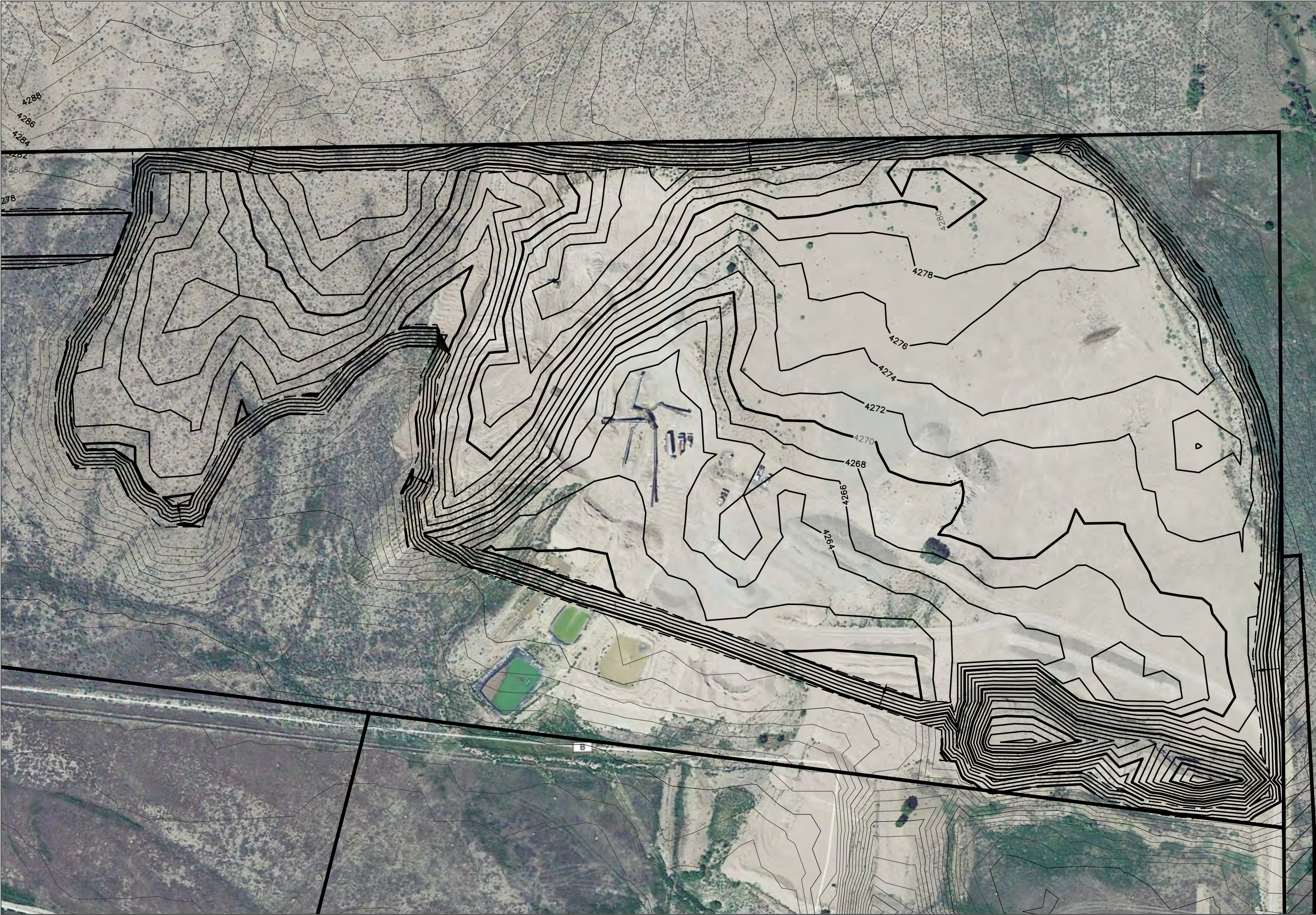
102-D Oneida Street  
Pueblo, Colorado 81003  
(719) 582-5588  
www.jesik.us

DATE  
10-11-2020

SCALE  
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VERT : ----

SHEET  
4





<div>DESIGNED BY Andy Jesik</div> <div>DRAWN BY Matt Bishop</div> <div>CHECKED BY Andy Jesik</div> <div>PROJECT NUMBER</div>		ARKANSAS VALLEY RANCH RECLAMATION MAP EXHIBIT F ORDWAY, CO		1			
				2			
				3			
				4			
				NO.	REVISION	APPV'D	DATE



DISTRICT COURT, WATER DIVISION NO. 2, COLORADO 501 North Elizabeth Street, Suite 116, Pueblo, Colorado 81003	<b>COURT USE ONLY</b>
<b>Concerning the Application for Water Rights of:</b> Colorado Water Protective and Development Association, in Crowley County.	
	Case No.: 18CW3045
FINDINGS OF FACT, CONCLUSIONS OF LAW, RULING OF REFEREE, JUDGMENT AND DECREE	

This matter comes before the Court on the Application for Approval of Plan for Augmentation. The Court, having considered the pleadings and being advised of the premises, hereby finds and rules:

**FINDINGS OF FACT**

1. The Applicant, Colorado Water Protective and Development Association ("CWPDA"), 1220 E. 3<sup>rd</sup> St., La Junta, CO 81050, (719) 384-2754, filed the Application in this matter on August 21, 2018.

2. The time for filing statements of opposition has expired. No statements of opposition were filed.

3. The Division Engineer submitted a Consultation Report on December 13, 2018, which has been considered.

4. Timely and adequate notice of the Application was published as required by law, and the Court has jurisdiction over the subject matter of this proceeding and over the parties affected thereby, whether they have appeared or not.

5. The water rights and property involved in this Application are not within the boundaries of a designated ground water basin.

6. CWPDA is a non-profit corporation organized to, among other things, provide a means for its members to replace out-of-priority depletions from their wells. The Application requests inclusion of an additional augmented structure in CWPDA's plan for augmentation approved in Case No. 07CW128 on June 7, 2016 ("07CW128 Plan"), pursuant to section 13.20 of the Findings of Fact, Conclusions of Law, Judgment and Decree entered in Case No. 07CW128 ("07CW128 Decree").

7. The following well currently owned by Ordway Feed yard, LLC is being added to the 07CW128 Plan as an augmented structure ("Structure"):

a. Name: King Well No. 13, WDID 1705571;

b. Location of the Structure: SE1/4NE1/4, Section 16, T.22S., R.58W., 6<sup>th</sup> P.M., Crowley County, CO, approximate UTM coordinates; 596920 E, 4221590 N (NAD 83), as approximately shown on Exhibit 1 attached hereto;

c. Source of water for the Structure: groundwater tributary to the Arkansas River.

8. A water right for this well was adjudicated effective on September 13, 1973 in Case No. W-1777, District Court, Water Division No. 2 for irrigation and stock purposes, appropriation date of December 31, 1926. This well currently is permitted with Well Permit No. 1400-R. This water right and these uses are not the subject of this proceeding. The purpose of this proceeding is to approve the inclusion of this Structure in the 07CW128 Plan for the purpose of augmenting new uses described below.

9. CWPDA shall augment out-of-priority depletions resulting from industrial and commercial uses of this Structure, including gravel washing and dust suppression in a gravel pit operation on the same property as the Structure ("Augmented Uses").

10. The Structure is located in and the Augmented Uses shall occur within the boundaries of the Southeastern Colorado Water Conservancy District ("Southeastern"). CWPDA is eligible to receive an annual allocation of Project Water and Project Return Flows from the Fryingpan-Arkansas Project, which it may purchase and use after the water is allocated to it by Southeastern. Any use of Project Water and Project Return Flows as an augmentation source is subject to Southeastern's Allocation Principles, Allocation Policy, and Return Flow Policy, as they may be amended. Southeastern's

Allocation Policy only allows for use of Project Water and Project Return Flows to augment depletions from structures located and used within Southeastern's boundaries.

12. This ruling and decree does not change any provisions of the 07CW128 Decree except as stated herein. CWPDA shall account for and replace all out-of-priority depletions resulting from the Augmented Uses of the Structure with fully-consumable water in accordance with the terms and conditions of the 07CW128 Decree and the decree in this case. CWPDA may augment such depletions with those water rights and sources of water identified in section 10 of the 07CW128 Decree, and such other water as may become available to CWPDA pursuant to the terms of the 07CW128 Decree. The existing augmentation water sources in the 07CW128 Decree will be sufficient to replace the depletions from the Structure and prevent injury to the owners of or persons entitled to use vested water rights.

13. Except as specifically provided herein, CWPDA shall determine the amount, timing, and location of the depletions from the Augmented Uses of the Structure in accordance with the methodologies approved in the 07CW128 Plan and shall project and augment well pumping, depletions, and augmentation deliveries pursuant to the methodologies provided in and the terms and conditions of the 07CW128 Decree. CWPDA estimates that depletions from the Augmented Uses of the well will be 100% of the amount pumped for Augmented Uses. Depletions from the Augmented Uses of this well shall accrue to H-I Model Reach 6 of the Arkansas River ranging from the confluence with the Apishipa River and the Catlin Canal Diversion Dam to the Fort Lyon Canal Diversion Dam. The projected depletion patterns and proposed unit response functions to calculate the timing of depletions from the Augmented Uses of this Structure are:

Month	URF	Month	URF
1	0.068	13	0.005
2	0.26	14	0.003
3	0.212	15	0.002
4	0.146	16	0.002
5	0.1	17	0.001
6	0.068	18	0.001
7	0.046	19	
8	0.032	20	
9	0.022	21	
10	0.015	22	
11	0.01	23	
12	0.007	24	
Total	0.0986		0.014
Cumulative total			1.0



## CONCLUSIONS OF LAW AND RULING OF REFEREE

14. CWPDA has furnished acceptable proof as to the claims made.

15. Subject to the terms and conditions of this decree, the addition of the Structure to the 07CW128 Plan will not injuriously affect the owners of or persons entitled to use water under vested water rights or decreed conditional water rights.

16. The addition of the Structure to the 07CW128 Plan is contemplated by law.

17. The addition of the Structure to the 07CW128 Plan is approved subject to the terms and conditions contained herein.

18. It is further ordered that copies of this ruling shall be mailed as provided by statute.

Dated: December 17, 2018.

BY THE REFEREE:

*Mardell R. DiDomenico*



---


Mardell R. DiDomenico  
Water Referee  
Water Division No. 2

NO PROTEST WAS FILED IN THIS MATTER. THE FOREGOING RULING IS  
CONFIRMED AND APPROVED, AND IS MADE THE JUDGMENT AND DECREE OF  
THIS COURT.

Dated: January 8, 2019

-----  
BY THE COURT:

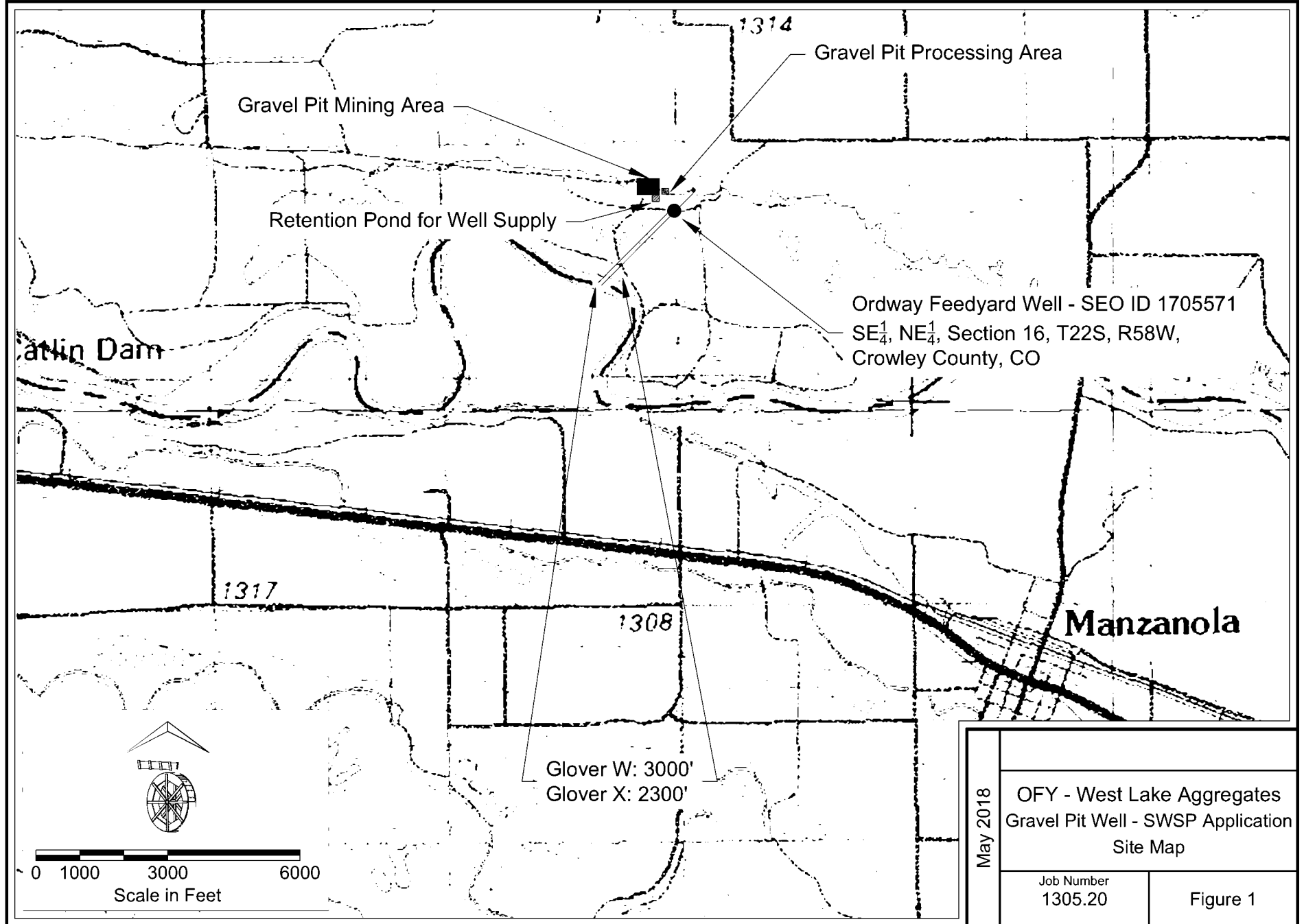


  
\_\_\_\_\_  
LARRY C. SCHWARTZ, WATER JUDGE  
WATER DIVISION 2



# Exhibit 1

C:\Users\Bret\appdata\local\temp\AcPublish\_13664\swsp basemap 5-23-18 04:45pm Bret XREFS: F37103E1; F37104E1; F37105E1; F38103A1; F38103E1; F38104A1; F38104E1; F38105A1; F38105E1; F38106E1; F39104A1; F39105A1; F39106A1; wh-weel1a;



# **GUIDELINE FOR WEED MANAGEMENT PLANS**

**FOR FREMONT AND CUSTER COUNTIES**



**SO MANY WEEDS, SO LITTLE TIME  
APRIL 2015**



## THIS GUIDELINE WAS PREPARED BY FREMONT COUNTY WEED MANAGEMENT & PARTNERS

- ◆ Hayden Masar, Fremont County Weed Management Specialist
- ◆ Debbie Mitchell, Fremont Conservation District
- ◆ J.R. Phillips, Fremont County Weed Advisory Board Chairman
- ◆ Jana Rapetti, Fremont County Weed Management Director
- ◆ Rick Romano, NRCS District Conservationist Canon City
- ◆ Tony Telck, Fremont County Weed Management Coordinator
- ◆ Robin Young, CSU Extension Custer County

~ F O U R T H E D I T I O N ~

### INTRODUCTION:

#### **SO MANY WEEDS, SO LITTLE TIME ...**

*This has been developed to be used as a tool to address noxious weed infestations in the greater Fremont and Custer County areas. Herbicide recommendations and other control methods are based on observations and research efforts throughout the western United States including local research results and applied experience.*

*Brand names and families of herbicides are shown for reference only as similar formulations developed by numerous manufacturers and providers may also be substituted. **FOR CHEMICAL CONTROL, ALWAYS READ THE LABEL. THE LABEL IS THE LAW!!!***

The invasive species to the right may be listed for control or eradication with Fremont and Custer Counties. Other plants not found on this list can be submitted to the Fremont County Weed Management Director for recommendations. Please submit all plant parts in good condition or email photos to [jana.rapetti@fremontco.com](mailto:jana.rapetti@fremontco.com).

The following pages address management of the individual weed species listed here. Many recommended control methods include biological, chemical, cultural, and mechanical methods and are suggested to offer the landowner/manager an opportunity to incorporate a variety of options. The invasive plants in this document are listed in alphabetical order by common name. Photographs are also included.

Biological controls include insects and plant pathogens. The Colorado Department of Agriculture's Insectary in Palisade develops host-specific organisms for weed control. Keep in mind that bio-controls are not a viable option when full eradication is the goal (as with A-list species); they will never completely eliminate their host. Bio-controls are included in this guideline when applicable; however, bio-control options have limited availability and vary in success.

The preferred method of control **is highlighted and shown in italics.** These methods are used by Fremont County Weed Management.

The last few pages of this document contain "Integrated Weed Management Forms" to track control measures you choose to take in your weed management efforts. Enjoy!

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LIST OF NOXIOUS WEEDS			
<u>Common Name</u>	<u>Scientific Name</u>	<u>List</u>	<u>Pages</u>
Bouncingbet	<i>Saponaria officinalis</i>	B	3, 4
Bull thistle	<i>Cirsium vulgare</i>	B	5, 6
Canada thistle	<i>Cirsium arvense</i>	B	7, 8
Cypress spurge	<i>Euphorbia cyparissias</i>	A	9, 10
Dalmatian toadflax	<i>Linaria genistifolia dalmatica</i>	B	11, 12
Diffuse knapweed	<i>Centaurea diffusa</i>	B	13, 14
Downy brome	<i>Bromus tectorum</i>	C	15, 16
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This list of noxious weeds is organized to be used with “Weed Management Preferences” chart dated April, 2015.



# BOUNCINGBET



## **Management**

Bouncingbet is most often found in rights-of-way, meadows and disturbed areas. It is an escaped ornamental and has become increasingly common in Colorado. Bouncingbet is a B list weed in Colorado and is toxic to grazing animals. In Fremont and Custer Counties it has been designated for eradication.

### **Mechanical Control of Bouncingbet**

Mechanical control is not recommended because the plant reproduces clonally from its root system. Hand pull or dig only single plants/new infestations when soil is moist to make sure the entire root system is excavated.

### **Cultural Control of Bouncingbet**

Prevent the establishment of new infestations by minimizing disturbance and seed dispersal.

### **Chemical Control of Bouncingbet**

Telar XP herbicide (chlorsulfuron) can be used at a rate of 0.5 to 1 ounce/acre. Apply during late spring to mid-summer when plants are at bolting to bud-growth stage.

***Fremont County Weed Management has also has success treating bouncingbet with Perspective herbicide (aminocyclopyrachlor), however, this chemical is not currently labeled for rangeland use.***

### **Biological Control of Bouncingbet**

Currently, no biological controls are available for bouncingbet control through the Palisade Insectary.



## BULL, MUSK, AND SCOTCH THISTLES



Scotch Thistle



Musk Thistle



Bull Thistle

### **Mechanical Control of Musk thistle, Bull thistle, & Scotch thistle**

These thistles will not tolerate tillage and can be removed easily by severing its root below ground with a shovel or hoe. Mowing can effectively reduce seed output if plants are cut when the terminal head is in the late-flowering stage. Gather and burn mowed debris to destroy any seed that has developed.

### **Cultural Control of Musk thistle, Bull thistle, & Scotch thistle**

Maintaining pastures and rangeland in good condition is a primary factor for musk thistle, bull thistle and scotch thistle management. To favor pasture and rangeland grass growth, do not overgraze. Fertilize when necessary and according to soil testing recommendations. To successfully manage musk thistle, prevent seed formation.

***Also, Robin Young with the CSU Extension in Custer County currently utilizes goats for localized grazing on musk thistle in Custer County.***

### **Chemical Control of Musk thistle, Bull thistle, & Scotch thistle**

***In Fremont and Custer Counties, Range Star at 1.5 pints to 2 quarts/acre and Milestone at 3 to 5 ounces/acre have shown to be more effective on bull and musk thistles than other herbicides. These herbicides perform best before seed production. Labels recommend using non-ionic surfactants.***

Escort XP (metsulfuron) or Telar XP (chlorsulfuron) also can be used. Use Telar XP in noncrop areas only and Escort XP in pastures, rangeland or non-crop areas. Research from Colorado State University and the University of Nebraska shows that Telar XP or Escort XP prevents or dramatically reduces viable seed formation when applied in spring, up to early flower growth stages. The latest time to apply these herbicides is when developed terminal flowers have opened up to the size of a dime. Apply Telar XP at 1 ounce/acre or Escort XP at 0.5 ounce/acre. Add a good nonionic surfactant at 0.25 percent v/v2 to Escort XP or Telar XP treatments for greater success.

Perspective herbicide (aminocyclopyrachlor) at a rate of 3 to 4.5 ounces/acre is effective, though this chemical is not yet labeled for rangeland.

### **Biological Control of Musk thistle, Bull thistle, & Scotch thistle**

There are not currently any biological controls available for bull thistle or Scotch thistle. There is seed head weevile available for musk thistle through Colorado Department of Agriculture's Palisade Insectary. There is some concern with the weevil, as it also hosts on native thistles.



# CANADA THISTLE



Photo to right from New Mexico  
State University:  
[weeds.nmsu.edu](http://weeds.nmsu.edu)



## Management

The key principle to Canada thistle control is to stress the plant and force it to use stored root nutrients. Canada thistle can recover from almost any stress, including control attempts, because of root nutrient stores. Therefore, returning infested land to a productive state occurs only over time. Success requires a sound management plan implemented over several years.

## Mechanical Control of Canada thistle

Mowing hay meadows can be an effective tool if combined with herbicide treatments. Mowing alone is not effective. Always combine mowing with cultural and chemical control. Mowing at hay cutting time stimulates new Canada thistle shoots to develop from its root system.

In irrigated grass hay meadows, fall herbicide treatments that follow mowing can be an effective management system because more Canada thistle foliage is present after cutting to intercept herbicide. Additionally, root nutrient stores decrease after mowing because the plant draws on them to develop new shoots.

If a Canada thistle infestation exists in a field that will be rotated to alfalfa, control the weed before seeding alfalfa. Alfalfa is an effective competitor only after it is established. It will not adequately establish in a well-developed Canada thistle infestation. A Canada thistle management system can start with crop or grass competition combined with herbicides, with the field rotated to alfalfa when the management plan ends.

## Cultural Control of Canada thistle

Grasses and alfalfa can compete effectively with Canada thistle if their growth is favored by good management. Maintain fertility and, if possible, moisture at optimum levels to favor grass or alfalfa growth. Soil analysis can easily determine fertility needs. Be cautious with nitrogen fertilizers, because excess available soil nitrogen may favor weed growth. These are essential management steps to ensure optimum desirable plant growth and competition. However, competition alone seldom is effective against Canada thistle.

## Chemical Control of Canada thistle

Recent research at Colorado State University shows that the performance of Milestone (aminopyralid) to control Canada thistle can be improved when preceded by other control methods including mowing. ***When Canada thistle infestations occur in most areas, apply Milestone at 5 to 7 ounces/acre in summer or in fall about one month after crop mowing. Follow this regimen for two to three consecutive years. This is the most effective herbicide to date.***

## Biological Control of Canada thistle

The Palisade Insectary, through the Colorado Department of Agriculture, is currently in the trial phase for a Canada thistle rust. Please visit the Insectary website for more information.

<https://www.colorado.gov/pacific/agconservation/biocontrol>



## CYPRESS SPURGE



## Management

Cypress spurge has been found in Colorado in limited areas. It is an introduced species and an **A list** weed in Colorado. Cypress spurge is an escaped ornamental, popular in xeriscaping and rock garden. It is toxic to horses and cattle, and caustic and irritating to human skin. The best way to manage the spread is to prevent establishment. Eradication is required by Colorado State law.

### Mechanical Control of Cypress spurge

Hand pulling or digging is a viable option when managing new, small infestations. Tillage may encourage the spread. Wear rubber gloves, long sleeves, long pants and eye protection to minimize contact with skin and irritation.

### Cultural Control of Cypress spurge

Keep desirable vegetation healthy and thick.

### Chemical Control of Cypress spurge

RangeStar (2,4-D plus dicamba) at 2 quarts/acre. Applied flowering stage (springtime) can be effective. Similarly, E-2 herbicide (a combination of 2,4-D, dicamba and fluroxypyr) can be used to treat Cypress spurge as well. Adding methylated seed oil will help the chemical break into the waxy leaf surface. Escort XP (metsulfuron) may be effective at 1 ounce/acre when combined with a methylated seed oil; Or Perspective (aminocyclopyrachlor) at 3 to 4.5 ounces/acre when used with a methylated seed oil. Perspective is not currently labeled for rangeland use.

### Biological Control of Cypress spurge

Currently, no biological controls are available for Cypress spurge control through the Insectary. Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. Since Cypress spurge is designated for eradication, bio-control is not a viable option.



## DALMATIAN TOADFLAX



## Management

This differs from yellow toadflax principally in being larger and having differently shaped leaves. Clumps of stems are 3 to 4 feet tall. Waxy leaves are broad, ovate, sometimes heart shaped and upper leaves clasp the stem (an important difference). Seeds are irregular in shape, angular, somewhat flattened, thin-edged, strongly netted, tan-gray and 1/24 to 1/16 inch across. It is not as common, but is more aggressive than yellow toadflax. It is reported in various parts of the state from 5,000 to 7,000 feet.

All toadflax species are very difficult to control and management plans should integrate as many strategies as possible to increase potential for success. Assess the condition and composition of the existing plant community in an infested area then determine the approximate composition of the desired plant community needed to achieve land management goals and objectives. Create a management plan that combines various control strategies to foster development of the desired plant community.

### Chemical and Cultural Management of Dalmatian toadflax

The combination of spraying and seeding competitive grasses controlled dalmatian toadflax better than spraying alone. Three years after treatments were started, control of dalmatian toadflax ranged from 61 percent to 86 percent where grasses were seeded in April and from 76 percent to 95 percent from the August seeding, compared to no control from spraying alone.

***Dalmatian Toadflax can also be treated using Escort XP (metsulfuron) at 1.5 to 2 ounces/acre or Telar XP (chlorsulfuron) at 2 to 3 ounces/acre. A fall application is best in Fremont and Custer Counties and a non-ionic surfactant is recommended.***

### Biological Control of Dalmatian toadflax

There is currently a bio-control available at Colorado Department of Agriculture's Insectary in Palisade, Colorado for Dalmatian toadflax control; a toadflax-feeding noctuid moth. The moth larvae feed extensively on leaves and flowers of toadflax, severely damaging the plants. It is established in Colorado and is available upon request through the Insectary. A stem boring weevil that has also shown success for control of Dalmatian toadflax also exists. It kills the above-ground plant by boring into and killing the stems where the larvae live and feed. These beetles have proven very effective against Dalmatian toadflax at a number of sites around the state. We now have collection sites where we can obtain large enough numbers for redistribution. Please visit the Insectary website for more information.

<https://www.colorado.gov/pacific/agconservation/biocontrol>



## DIFFUSE AND SPOTTED KNAPWEED



Diffuse Knapweed



Spotted Knapweed

## Management

Diffuse and spotted knapweed can be managed similarly to Russian Knapweed. They are readily controlled with herbicides. However, the weeds will reinvade unless cultural techniques are used.

### Mechanical Control of Spotted Knapweed and Diffuse knapweed

If desirable grass competition is evident in diffuse or spotted knapweed stands, judicious herbicide application that does not injure grasses may allow them to compete effectively with the weeds. Irrigation (where possible) may help stimulate grass competition in these cases. However, infested rangeland or pastures often are degraded, allowing knapweed invasion, and herbicides alone will not restore the land to a productive state. Seeding suitable perennial grasses is necessary to prevent weed reinvansion.

### Chemical Control of Spotted Knapweed and Diffuse knapweed

Spotted knapweed and diffuse knapweed generally occupy the same plant communities in Colorado, so the same herbicide treatments can be applied. ***Weed scientists locally indicate that 5 to 7 ounces/acre of Milestone should control spotted knapweed for several years, but the weed may reinvade the area unless other management techniques are used.*** RangeStar herbicide (2,4-D plus dicamba) can be used in other areas (such as on BLM lands) at a rate of 4 to 6 pints/acre when plants are actively growing. Likewise, Perspective herbicide (aminocyclopyrachlor) is effective at 4.75 to 8 ounces/acre; however this chemical is not currently labeled for rangeland use.

### Biological Control of Diffuse knapweed

There are currently bio-controls available for spotted and diffuse knapweed through the Colorado Department of Agriculture's Insectary in Palisade, Colorado. These include root boring beetles, seed head feeding flies, seed head feeding weevils and seed head feeding moths. Several of these are well established in Colorado. Please visit the Insectary website for more information.

<https://www.colorado.gov/pacific/agconservation/biocontrol>



## DOWNY BROME OR “CHEAT GRASS”



## **Management of Downy brome**

Downy brome (also known as cheat grass), is an introduced plant and is a C list weed in the Noxious Weeds of Colorado book. It is a problem weed state wide, in dry land agriculture, forests, rangeland, pastures and rights-of-way. Downy brome grows in dense stands that can become a fire hazard.

### **Cultural Control of Downy brome**

Grazing can help with management of Downy brome. It does not compete well with established perennial grasses. Downy brome provides good quality forage for 6-8 weeks early in the growing season. Putting grazing animals out in the spring for a high intensity, short duration grazing period and again in the fall when green will help reduce the density and size.

### **Mechanical Control of Downy brome**

Hand pulling, cutting, or digging work best for small infestations, Tillage or disking may further stimulate growth since disturbance coupled with a well-altered seedbed favors downy brome. If disking is done repeatedly it may be effective if the seed is at least buried 4-6 inches deep.

Prescribed burnings can be a highly disruptive tool in Downy brome stands, but it often leads to a displacement of native desirable plants and an increase in dominance and density of downy brome.

### **Chemical Control of Downy brome**

Imazapic (Plateau) at 2-12 ounces product/A. plus 1 quart methylated seed oil applied during the fall or spring. Glyphosate (RoundUp Pro, Rodeo) at .5-1 pint product/A. applied early spring after downy brome emerges and before native perennial seedlings emerge. Sulfometuron methyl and Chlorsulfuron (Landmark XP) at 1-1.5 ounces/ 100 gallons of water applied during warm moist conditions following application accelerates herbicide activity.

### **Biological Control of Downy brome**

Currently, no bio-control agents are available for downy brome at the Palisade Insectary.



## ELONGATED MUSTARD



## Management

Elongated mustard is an **A-list** species in the state of Colorado. The only known location of this species currently occurs in Wellsville, Colorado on the Chaffee-Fremont County line. It can be found on the north and south sides of the Arkansas River and Highway 50. It is believed to have been transported unintentionally on mining equipment. Elongated mustard grows in very cliffy, craggy, rocky soils. Due to the rough terrain, this plant is very difficult to access during control efforts. The seeds spread a number of ways: high winds in the area cause the weed to snap off at the base and tumble; flooding has occurred, causing a flush of new plants; and the highway and river corridors are vectors for spread, as well. Eradication is required by Colorado State law.

### Mechanical and Cultural Control of Elongated Mustard

Because this is the only known infestation in the state, experience with treatment options is limited. Due to the extensive root system (see picture to the left), hand-pulling is not a viable option. Other mechanical methods (such as mowing) would be impossible, due to the terrain and inaccessibility. Keeping ground disturbance to a minimum and thoroughly cleaning possibly contaminated equipment before leaving a contaminated site is of utmost importance. Also, spotting new infestations before they proliferate will help prevent further spread.

### Chemical Control of Elongated Mustard

Fremont County, Chaffee County, Bureau of Land Management, and Colorado Department of Agriculture have been joining efforts to chemically treat elongated mustard. ***A spot-spray method is recommended using a tank-mix of 2,4-D at 1 quart/acre and Escort XP (metsulfuron) at 1 ounce/acre with a good surfactant has proven successful in accessible areas.*** Because this species is designated for eradication, multiple treatments per year will be necessary.

### Biological Control of Elongated Mustard

Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. Since elongated mustard is designated for eradication, bio-controls are not a viable option.



## FIELD BINDWEED



## Management

Establishment of selected, aggressive grasses can be an effective cultural control of field bindweed. Contact your local Colorado State University Extension office or Natural Resources Conservation Service office for seed mix recommendations. Good grazing management will stimulate grass growth and keep pastures healthy. Healthy pastures may be more resistant to field bindweed invasion. Bare spots caused by overgrazing are prime habitat for weed infestations.

## Mechanical and Cultural Control of Field bindweed

Cutting, mowing, or pulling has a negligible effect unless the plants are cut below the surface in the early seedling stage. Well-established populations have a large seed bank in the soil that can remain viable for over 40 years.

## Chemical Control of Field bindweed

The following are recommendations for herbicides that can be applied to range and pasturelands. Optimum results occur when the plants have recently received moisture and are actively growing.

Herbicide rate, application and timing include using Clarity + 2,4-D Amine at a rate of 1 quart/acre for each product in the Spring at or just after full-bloom and/or fall. DO NOT apply when outside temperatures will exceed 85 degrees. DO NOT apply near or under trees or where soils have rapid permeability or where water level is high. Roundup Ultra (glyphosate) is a non-selective herbicide and will kill all vegetation, so spot-treatment is advised. Apply 4 to 5 quarts/acre at full-bloom and/or in the fall. Adding a non-ionic surfactant will improve control. Use caution when applying near grasses or other desirable vegetation. Roundup will possibly kill surrounding vegetation.

## Cultural Control of Downy brome

Due to the population of this common weed throughout Colorado, ***Fremont County recommends good grazing management, reducing areas of disturbance and seeding grasses for competition.***

## Biological Control of Field bindweed

There is currently a bio-control for field bindweed control available through Colorado Department of Agriculture's Insectary in Palisade, Colorado. It is a mite that produces galls and stunts the plant's ability to reproduce. A defoliating moth is also available.



# HALOGETON



## **Management of Halogeton**

Halogeton is a poisonous C-list noxious weed. It was introduced from Eurasia into the United States in the early 20<sup>th</sup> century. Halogeton can be found along rights-of-way and in rangeland. It is very toxic to sheep and cattle. Animals commonly avoid halogeton because of its bitter taste, but can be problematic if other forage is limited. Consumption of less than 1.5 pounds of halogeton can result in death. Salt from the soil accumulates in the plant tissue and leaches from dead plants and roots back onto the soil surface increasing salinity and favoring establishment of halogeton over other species. Halogeton plants are prolific seed producers and thrive on disturbed sites. Halogeton has recently been found to be forming dense infestations in Fremont County.

### **Mechanical Control of Halogeton**

Halogeton can be controlled by tillage. For long term control reseeding of desirable plants must occur.

### **Cultural Control of Halogeton**

The best control method for halogeton is prevention. This can be achieved by not disturbing the soil in potential infestation sites. If disturbance of a site is required, follow disturbance by planting with species adapted to the harsh environment. Reclamation species include crested wheatgrass, Siberian wheatgrass, Russian wildrye, tall wheatgrass and forage kochia. Native species options include thickspike and steambank wheatgrass, Sandberg bluegrass, slender wheatgrass, western wheatgrass, bottlebrush squirreltail, sand dropseed, saltbush and globemallow species.

### **Chemical Control of Halogeton**

Apply Escort XP (metsulfuron) or Telar XP (chlorsulfuron) at 0.5 ounces product/acre. to actively growing plants with a surfactant. 2,4-D LV ester can be applied at 2 pints/acre when plants are actively growing before bloom stage in mid-summer. RoundUp (glyphosate) can be used to spot-treat small infestations as well.

### **Biological Control of Halogeton**

Currently, no biological controls are available for halogeton control through the Insectary.



## HOARY CRESS OR "WHITE TOP"



## Management

Hoary cress is typically found on generally open, unshaded, disturbed ground. Hoary cress grows well on alkaline soils that are wet in late spring and generally does better in areas with moderate amounts of rainfall. It is widespread in fields, waste places, meadows, pastures, croplands, and along roadsides. Hoary cress is commonly found with saltcedar, antelope bitterbrush, bluebunch wheatgrass, big sagebrush, and Wyoming big sagebrush. Hoary cress flowers from May to June, are self-incompatible, and are pollinated by insects. Hoary cress will set seed by mid-summer. If conditions are favorable, a second crop of seeds can be produced in the fall. Hoary cress spreads by creeping roots and by seeding.

### Mechanical Control of Hoary cress

Mowing 2-3 times a year for several years may slow the spread and reduce seed production of hoary cress. Mowing may increase the effectiveness of subsequent herbicide application. Mowing should be conducted during the bud stage and repeated when the plants re-bud. The effectiveness of a mowing program can be increased by planting perennial grasses as competitors. Burn Control of Hoary cress is not recommended since Hoary cress has a rapid growth rate when compared to non noxious weeds.

### Chemical Control of Hoary cress

Hoary cress is most commonly controlled with herbicides. However, multiple applications are usually needed to provide lasting control. The best time to apply herbicides is in May or June before or at flowering. The non-crop herbicides Escort XP (metsulfuron) and Telar XP (chlorsulfuron) are the most effective herbicides as long as the plants still have green tissue. It is important to use a non-ionic surfactant with the herbicide. 2,4-D+dicamba (RangeStar or WeedMaster) is somewhat effective when applied during the early pre-bud stage (late April through early June). ***Locally, Escort XP has been an effective control when applied at 0.5 to 1 ounce/acre with a non-ionic surfactant. Telar XP has proven effective at 0.5 to 1 ounce/acre.*** Perspective can be used at 3 to 4.5 ounces/acre; however this chemical is not currently labeled for rangeland use.

### Biological Control of Hoary cress

Currently, no biological controls are available for hoary cress control through the Insectary.



## HOUNDSTONGUE



## Management

Houndstongue contains toxic alkaloids that stop liver cells from reproducing. Therefore, houndstongue reduces livestock and wildlife forage and grazing animals should be kept away. Animals may live six or more months after eating a lethal dose of houndstongue. Houndstongue is an early successional species on recently disturbed sites. Houndstongue is common on gravelly, alkaline soils. ***Maintaining a healthy population of native perennials is the best way to prevent the establishment and spread of Houndstongue.***

### Mechanical Control of Houndstongue

Mowing second year plants during flowering but before seed maturation reduces seed production and may kill the plant.

### Chemical Control of Houndstongue

***Escort XP (metsulfuron) applied at a rate of 1 ounce/acre in spring provides control of houndstongue. Spring treatments with metsulfuron are more effective than fall treatments.*** Telar XP (chlorsulfuron) applied 1 to 1.33 ounces/acre gave complete control when applied any time beginning with the rosette stage until the bolted plant had attained 10 inches in height.

### Biological Control of Houndstongue

Currently, no biological controls are available for houndstongue control through the Insectary.



## JAPANESE KNOTWEED



UGA5205098

## Management

Japanese knotweed has been found in Colorado in limited areas and is an **A list** weed in Colorado. Japanese knotweed is native to Japan and was brought to the US from Britain in the late 1800's as an ornamental. It produces allelopathic chemicals from the roots which inhibits the germination of surrounding plants. Japanese knotweed can be found in non-wetlands and wetlands and is currently known to occur in three isolated location in Cañon City, Colorado. Eradication is required by Colorado State law.

### Mechanical Control of Japanese knotweed

Mechanical control is effective for small populations or in environmentally sensitive areas. Digging or pulling will eliminate a portion of the root system but not all. Hand cutting, mowing, or other methods must be applied every two to three weeks from April to August to prevent seed production.

### Chemical Control of Japanese knotweed

Since Japanese knotweed generally occurs near water care must be taken to select the proper treatment. Aquatic-approved glyphosate (such as Aquamaster or Rodeo) can be used as a broadcast foliar treatment at 4 quarts/acre. at post emergence to foliage in mid-summer to autumn. Repeat applications will be necessary. Glyphosate is nonselective and will injure or kill other plants growing near treated areas. Imazapyr (Habitat or Polaris) can be used as a broadcast foliar treatment at 3-to pints/acre at post emergence to foliage in mid-summer to autumn when plants are fully leafed out.

***In Fremont County, varied success has been achieved with herbicide alone. Best results have occurred when using a combination of mechanical and chemical methods. Shoots have been cut with a weed trimmer, then burned to prevent re-rooting. Then the freshly cut stems have been treated with Rodeo herbicide according to the label on uplands only.***

### Biological Control of Japanese knotweed

Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. Because Japanese knotweed is designated for eradication, bio-controls are not a viable option.



# JOINTED GOATGRASS



## **Management**

Jointed goatgrass is an introduced species and is a B list weed. It is a major problem in winter wheat because of their similarities in appearance, seed size, growth pattern and genetics. It is mainly found in wheat fields or other cropland areas including alfalfa fields and pasture. Jointed goatgrass can be found in waste areas along roadways, railroad tracks and other rights-of-way. It is found between 820 and 6,500 feet in elevation. Increased populations have been noted in Fremont County along rights-of-way.

### **Mechanical Control of Jointed goatgrass**

Hand removal is acceptable, but difficult. It is an option for sparse or low density populations. Deep tillage with a moldboard plow or V-sweep can deter seed germination, mowing can be effective in late winter to early spring.

### **Cultural Control of Jointed goatgrass**

Sowing Jointed goatgrass-free seed wheat thoroughly cleaning machinery before moving from infested to non-infested areas will help decrease the spread of Jointed goatgrass.

### **Chemical Control of Jointed goatgrass**

Glyphosate (such as RoundUp or Rodeo) can be applied at a rate of 1 quart/acre. for young plants <6" tall and 1.5 to 4 quarts/acre for larger plants or plants under stress at post emergence in late winter to early spring. Plateau (imazapic) can be applied at a rate of 4 to 6 ounces/acre at pre emergence in fall or post emergence in early spring, depending on timing of surrounding wheat harvests.

### **Biological Control of Jointed goatgrass**

Naturally occurring bacterial strains that infect annual brome and Jointed goatgrass but have no effect on wheat have been isolated in Kansas and Washington State. Currently, no biological controls are available for jointed goatgrass control through Colorado's Insectary.



## LEAFY SPURGE



## Management

Leafy spurge is difficult to manage and can recover from almost any control effort. Therefore, a management scheme that combines control methods over four to five years is recommended. Even after that time, one must monitor infestations for recurrence and adopt a long-term maintenance program.

### Cultural Control of Leafy spurge

Vigorous grass growth is an important aspect of leafy spurge control. Overgrazing stresses grasses and makes them much less competitive with weeds, leafy spurge in particular. Irrigation, where applicable, may favor grass growth and make it more competitive with leafy spurge. Sow perennial grasses in late fall to provide competition. Reducing grazing during summer months is also preferred.

### Chemical Control of Leafy spurge

For optimum leafy spurge control, proper timing of herbicide application is imperative. ***Local favorable results have been obtained using RangeStar (dicamba+2,4-D). Fall application to leafy spurge regrowth also is the preferred timing for these herbicides. In addition, Plateau herbicide at 8 to 12 ounces/acre is effective in the fall.*** Perspective herbicide at a rate of 4.75 ounces/acre is effective, though this chemical is not yet labeled for rangeland.

Note: Avoid using soil-active herbicides near windbreak plants or other desirable woody vegetation. Plant injury or death can occur. Also, do not allow any herbicide to drift onto desirable woody vegetation for the same reasons. Plateau (imazapic) is registered to control leafy spurge. It can be used safely around trees but may temporarily injure cool-season perennial grasses. Apply Plateau at 8 or 12 ounces/acre in fall, followed by 4 ounces/acre the following spring at flowering. Add a methylated seed oil at 2 pints/acre to the spray solution.

### Biological Control of Leafy spurge

Bio-controls help reduce the need for chemical use. Colorado Department of Agriculture's Insectary in Palisade, Colorado develops host-specific organisms for weed control. Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. ***A leafy spurge flea beetle is available through the Insectary. It hosts on the leafy spurge root system. It has proven very successful in some areas of Fremont and Custer Counties, and not as successful in others. It is also very site-specific and requires certain conditions.***



# MYRTLE SPURGE



## Management

Myrtle spurge, also known as donkey tail or creeping spurge is an **A-list** weed in the state of Colorado. It is a native of Eurasia and was introduced as an ornamental and is often found in rock gardens. Myrtle Spurge is poisonous to touch and if digested causes nausea, vomiting and diarrhea. The milky sap can cause swelling, redness and blistering of the skin and irritation to the eyes. Myrtle spurge is usually spread by seed and root fragments. Eradication of this weed is required by Colorado State Law.

### Cultural and Mechanical Control of Myrtle spurge

This plant can be found in many rock gardens in the state of Colorado. Myrtle spurge can be controlled mechanically by hand digging or pulling. Eye protection, long sleeved shirt and gloves are required to prevent sap from contacting eyes and skin. To control infestations, remove as much of the root as possible and the area should be monitored in future years to prevent reinfestation.

### Chemical Control of Myrtle spurge

***Colorado State University has suggested that 2,4-D applied at a rate of 2 to 3 pints/acre will control myrtle spurge. RangeStar (2,4-D plus dicamba) will provide added control. Use a good non-ionic surfactant to help the chemical penetrate the waxy leaf.*** Annual reinspection of the areas infested is also recommended.

### Biological Control of Myrtle spurge

Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. Since eradication is the goal for this A-list species, bio-controls are not a viable option. Currently, no biological controls are available for myrtle spurge control through Colorado's Insectary.



## PERENNIAL PEPPERWEED OR “TALL WHITE TOP”



## Management

Perennial pepperweed is most often found in open, unshaded areas on disturbed, and often saline soils. It is most common in seasonally wet areas from 5,500 to 9,000 feet. Areas along the South Platte River, in the San Luis Valley are, and communities of the Piceance Basin of Colorado are susceptible to Perennial pepperweed. Locally, early detection and rapid response is planned. Best management is to treat as soon as found.

### Mechanical Control of Perennial pepperweed

Periodic mowing and spring burning have reduced perennial pepperweed density in Utah (FEIS 1996)

### Chemical Control of Perennial pepperweed

RoundUp (glyphosate) at 4 quarts/acre will control perennial pepperweed, as will or Landmaster (glyphosate plus 2,4-D). Other herbicides that proved to be effective include Habitat/Polaris (imazapyr) as well as Escort XP (metsulfuron) and Telar (chlorsulfuron). ***Fremont County Weed Control has experienced success controlling this species using Escort XP and Telar XP at a rate of 1 ounce/acre.*** Perspective herbicide can be effective when applied at a rate of 3 to 4.5 ounces/acre, although this chemical is not currently labeled for rangeland use.

### Biological Control of Perennial pepperweed

Currently, no biological controls are available for perennial pepperweed control through Colorado's Insectary.



## RUSSIAN KNAPWEED



### Management

Like other creeping perennials, the key to Russian knapweed control is to stress the weed and cause it to expend nutrients stored in its root system. An integrated management plan should be developed that places continual stress on the weed. Currently, the best management plan includes cultural control combined with mechanical and/or chemical control techniques. A single control strategy, such as mowing or an herbicide, usually is not sufficient.

## Cultural Control of Russian knapweed

Russian knapweed typically invades degraded areas, dominating the plant community and desirable plants (e.g. perennial grasses). Seeding competitive, perennial grass species after Russian knapweed has been stressed by other control measures (set-up treatments) is essential. Set-up treatments may include chemical or mechanical methods.

Russian knapweed tends to form monocultures and usually eliminates other plants. Therefore, sowing desirable plant species is necessary after the weed is controlled. Smooth brome will compete with Russian knapweed. Research shows that streambank wheatgrass, thickspike wheatgrass, crested wheatgrass and Russian wildrye established after Russian knapweed was suppressed with herbicides. Sod-forming perennial grasses, like streambank or thickspike wheatgrasses, help prevent reinvasion better than bunch grasses like crested wheatgrass.

If the Russian knapweed stand is not too old and grasses are still present, stimulating grass growth by irrigation (where possible) should increase grass competition with knapweed and keep the weed under continual stress.

In most circumstances, herbicides alone will not effectively manage Russian knapweed. However, there may be situations where desirable plants within a Russian knapweed infestation may compete effectively with the weed if it is stressed with a single weed management technique. When integrating chemical and cultural control, avoid using herbicide rates that injure grasses because effective competition will be reduced.

For Telar XP (chlorsulfuron), a noncrop herbicide that controls Russian knapweed, application timing is critical. Apply 1 ounce/acre when Russian knapweed is in the bloom to postbloom stage. Earlier applications do not control the weed effectively. Fall is a good time to apply Telar XP, but it may injure smooth brome or other brome species. Always add a good non-ionic surfactant at 0.25 to 0.5 percent v/v to the spray solution. ***Milestone is labeled for pasture and rangeland use. Apply it at 5 to 7 ounces/acre with a good nonionic surfactant. Optimum timing for Milestone is similar to Telar XP.*** Perspective herbicide can also be an effective treatment at 4.75 ounces/acre; however this chemical is not yet labeled for rangeland use.

## Biological Control of Russian knapweed

Currently, no biological controls are available for Russian knapweed control through Colorado's Insectary.

## RUSSIAN OLIVE



### Management

Russian olive tolerates a wide range of soil and moisture conditions, from sand to heavy clay, and can withstand flooding and silting. It grows best in deep sandy or loamy soils with only slight salt and alkali content. Russian olive can withstand temperatures ranging from  $-50$  degrees F to  $115$  degrees F. It is also shade tolerant, which means it can grow under larger trees. Russian olive reproduces by seed, which is usually produced after trees are four to five years old. It generally flowers from May through June. The fruits mature from August to October and remain on the tree throughout the winter.



Seeds are ingested with the fruit by birds, bears, small animals and dispersed in their droppings. Russian olive is a rapid growth rate tree with growth up to six feet a year. Control methods vary with tree size, habitat, and use of the area. Removal should be undertaken before seeds are fully developed to prevent further spread of seeds. Control is difficult once trees mature, so early detection and control are important.

### **Mechanical Control of Russian olive**

Russian olives with small diameters can be pulled out with a weed wrench when soils are moist. In certain situations larger trees can be removed using a tractor/chain. Any remaining exposed roots should be cut off below ground level and buried. Grinding and cutting are not effective controls by themselves. The tree may resprout below the cut area or along root line.

### **Cultural Control of Russian olive**

***In Fremont County, Darrell Deling with Canon City Area Recreation and Park District reports successful use of goats on Russian olive.***

### **Chemical Control of Russian olive**

Most translocating herbicides (e.g., glyphosate) are effective at label strength when applied during the growing season. Some dormant-season herbicides (e.g., imazapyr as Habitat or Polaris) are labeled for Russian olive control. Foliar spraying with Habitat has been successful, as has injecting herbicide capsules around base of trunk. When injecting herbicides into the tree, monitoring should occur to ensure that the entire tree is affected. When cutting the stump should be as close to the ground as possible and treated with 5 –10 cc of RoundUp or Rodeo (glyphosate) applied at full strength. Frill application should be applied to trees debarked at the base and herbicide sprayed or brushed immediately on the area at 25-100% concentration. Brushing on herbicide is the most effective application for Russian olive.

***In Fremont County, the Hydro-Axe has been very effective at cutting the trees in one growing season. Habitat herbicide is then applied to the regrowth in the following growing season along with a suitable surfactant. Mid-summer is best. Fremont County Weed Management has found that a combination of Habitat (imazapyr) plus Rodeo (glyphosate) provides greater control.***

### **Biological Control of Russian olive**

Currently, no biological controls are available for Russian olive control through Colorado's Insectary.

## SALT CEDAR OR "TAMARISK"



## Management

After managing saltcedar infestations, other vegetation must be established to prevent re-invasion. Competitive grasses and planted cottonwood cuttings have proven to be effective at reducing the chances of re-invasion. Contact your local Colorado State University Extension office or Natural Resources Conservation Service office for proper seed mix recommendations.

## Mechanical and Chemical Control of Saltcedar

A bulldozer or prescribed fire can be used to open up large stands of saltcedar. These methods must be followed up with an herbicide treatment of the resprouts when they are 1 to 2 meters tall. Locally, a Hydro-Axe shredding machine has been very effective in initial dry matter removal. This method followed by resprout spraying in the next growing season using Habitat (imazapyr) herbicide is also successful.

## Chemical Control of Saltcedar

For large stands of saltcedar that would essentially be monotypic, foliar applications of Habitat/Polaris (imazapyr) herbicide plus Roundup are effective. Late summer/early fall are optimum treatment times. This is recommended for areas that have little to no desirable shrubs and trees. In areas where woody native plants are present and their continued existence is desired, it may be necessary to cut and treat saltcedar stumps with a herbicide. This is referred to as the cut-stump method. Cuts should be made within 2 inches of the ground surface, immediately followed by an herbicide application to the perimeters of the cut-stems. The products Habitat and Garlon are effective but must be applied within a few minutes after cutting because wound healing occurs very quickly and decreases herbicide penetration.

***Habitat/Polaris (imazapyr) have replaced Arsenal as the EPA approved riparian area herbicide of choice. Thousands of acres have been treated utilizing spot treatment and aerial application in the Upper Arkansas drainage basin. A methylated seed oil is recommended.***

## Biological Control of Saltcedar

Biological control helps reduce the need for chemicals. Keep in mind that bio-controls will never completely eliminate their host. ***There is currently a bio-control available through the Insectary. The tamarisk leaf beetle hosts on the foliage of tamarisk. After repeated defoliations, the plant is often stressed enough to shut down completely. The tamarisk beetle has proven highly successful in Fremont County.***



# SPREADING DOGBANE



## **Management**

Spreading dogbane is a native to Colorado and is not a listed weed in Colorado. In Fremont and Custer Counties, it has been forming monocultures and displacing surrounding vegetation. It can be poisonous to livestock and also can be a host for several Prunus (plum) viruses.

### **Chemical Control of Spreading dogbane**

RangeStar (2,4-D plus Dicamba) can be used, but Fremont County Weed Management has success using E-2, which contains the active ingredients 2,4-D, dicamba and fluroxypyr. A good non-ionic surfactant is recommended to help the chemical absorb into the woody tissue and waxy leaf, or possibly even a methylated seed oil.

### **Biological Control of Spreading dogbane**

Currently, no biological controls are available for spreading dogbane control through Colorado's Insectary

# YELLOW STAR THISTLE





## Management

Yellow starthistle is an **A-list** weed in Colorado. It can be a serious problem in rangeland pastures and rights-of-way in the Western United States. It has the potential to become Colorado's worst weed problem, however, weed managers across the state are actively working toward eradication. Eradication is required by Colorado State law.

### Mechanical Control of Yellow Starthistle

Manual removal of yellow starthistle is effective for small infestations. Mowing can also help prevent seed production, but the plant has been known to then grow prostrate and flower low to the ground within the same growing season.

### Cultural Control of Yellow Starthistle

Intensive grazing by sheep, goats, or cattle prior to the plant producing spiny seed heads can be effective. The spines will deter cattle and sheep. Keep in mind, that yellow starthistle is designated for eradication. Grazing is a control measure, but will not completely eliminate the infestation.

### Chemical Control of Yellow Starthistle

2,4-D applied post-emergence at 2 pints/acre can be effective. In addition, Perspective (aminocyclopyrachlor) is also effective at 3 to 5 ounces/acre. ***Fremont County Weed Management recommends Milestone (aminopyralid) at 7 ounces/acre plus a non-ionic surfactant to be applied to actively growing plants.*** Transline (clopyralid) can also be an effective management tool.

### Biological Control of Yellow Starthistle

Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. Since this is an A-list species and eradication is mandated by the State, bio-controls are not an appropriate option for control. Several insects and pathogens have been established in some states, but there are not currently any biological controls available for yellow starthistle through the Palisade Insectary.

## YELLOW TOADFLAX



## Management

All toadflax species are very difficult to control and management plans should integrate as many strategies as possible to increase potential for success. Condition and composition of the existing plant community in an infested area determines the approximate composition of the desired plant community needed to achieve land management goals and objectives. Create a management plan that combines various control strategies to foster development of the desired plant community.

### Mechanical and Chemical Control of Yellow Toadflax

Mowing combined with spraying did not improve control in an experiment conducted near Hesperus, Colorado. Yellow toadflax control was the same (85 percent) whether chemical treatments were combined with mowing or not.

### Chemical Control of Yellow Toadflax

Yellow toadflax appears to be more difficult to manage than dalmatian toadflax. Telar XP may be used to control yellow toadflax in non-crop areas. In an experiment conducted in Middle Park near Parshall, ***Telar XP at 1.25 ounces/acre applied during flowering or in fall controlled 84% of yellow toadflax one year later.*** Plateau applied in the fall at 12 ounces/acre can also be effective.

Escort XP (metsulfuron), 2,4-D Amine, Banvel (dicamba), and Paramount (quinclorac) controlled from 5% to 24% of yellow toadflax one year after single treatments were applied at flowering. Plateau showed some potential to control yellow toadflax in another Colorado experiment where 8 ounces /acre applied once in fall controlled 59% of yellow toadflax one year later. While this level of control is unsatisfactory, sequential treatments may increase control but experiments must be conducted to test this hypothesis.

### Biological Control of Yellow Toadflax

Biological control helps reduce the need for chemical controls and is a vital component to integrated pest management. Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. There is currently a bio-control available at the Palisade Insectary through Colorado Department of Agriculture for yellow toadflax control. A toadflax-feeding noctuid moth. The moth larvae feed extensively on leaves and flowers of toadflax, severely damaging the plants. It is established in Colorado and is available upon request through the Insectary.



## GLOSSARY

**2,4-D** – a general use broad-leaf selective herbicide that is produced under a variety of trade names. It is also an active ingredient in RangeStar and E-2, as mentioned in this document.

**Allelopathy** –a toxin released by a plant which inhibits growth of surrounding vegetation.

**Aminocyclopyrachlor** – is a low use rate, broad-spectrum herbicide for difficult-to-control species such as leafy spurge, knapweeds, and thistles. This chemical is produced under the trade name Perspective. It is not currently labeled for rangeland use.

**Biological Control** – management methods that include microbial and microbial agents such as insects or pathogens used to minimize infestations. Note: Biological controls are used for suppression, never eradication.

**Broadleaf** – Having rather broad leaves, as opposed to grasses and sedges (which are more blade-like).

**Chemical Control** – application of an herbicide to weeds to control germination or growth.

**Chlorsulfuron** (such as Telar XP) and **Metsulfuron** (such as Escort XP) – are systemic, residual herbicides that kill broad-leaf weeds and some grasses. They inhibit cell formation in shoots and roots and have very low toxicity to mammals, birds, fish, and insects.

**Clopyralid** – a general use selective herbicide produced under the trade name Transline.

**Cultural Control** – management methods including grazing or grazing avoidance, fertilizing, encouraging plant competition, watering, re-seeding, etc.

**Dicamba** – is a pre- and post-emergent selective herbicide produced under product names such as Banvel, RangeStar, or WeedMaster.

**Fluroxypyr** – an active ingredient in certain general use chemicals such as Vista and E-2.

**Glyphosate** - a general use broad-spectrum, non-selective systemic herbicide. Trade names for products containing glyphosate include Roundup, Rodeo, and Pondmaster. It is useful on essentially all annual and perennial plants including grasses, sedges, broad-leaved weeds and woody plants.

**Imazapic** – a selective herbicide used for both pre- and post-emergence control produced under the trade name Plateau. Controls many broad-leaf weeds and controls or suppresses some grasses.

**Imazapyr** - a broad-spectrum herbicide manufactured under the product names Habitat, Polaris, and Arsenal Powerline. Imazapyr is non-selective therefore care must be taken of other non-targeted plants.

**Integrated Pest Management (IPM)** – an economical and environmentally-sensitive approach to pest management that implements any combination of chemical, biological, cultural, and/or mechanical control measures. It takes into consideration factors such as site, economics, environmental concerns and other potential hazards.

**Mechanical Control** – management methods including mowing, tilling, burning, hydro-axing, pulling, etc.

**Metsulfuron** (such as Escort XP) and **Chlorsulfuron** (such as Telar XP) – are systemic, residual herbicides that kill broad-leaf weeds and some grasses. They inhibit cell formation in shoots and roots and have very low toxicity to mammals, birds, fish, and insects.

**Pre-emergent** – of or relating to seedlings, before emerging or appearing before ground.

**Post-emergent** – emerged plants.

**Quinclorac** – trade name Paramount; has a supplemental rangeland label.

**Selective** – an herbicide other than broad-spectrum (example: 2,4-D is a “selective” herbicide, as it will not damage native grasses when applied correctly).

**Surfactant** –lowers the surface tension between the chemical and the plant tissue, helping the chemical absorb better into the plant.

## REFERENCES

93.jpg. New Mexico State University, Las Cruces. College Agriculture. Web. 18 May 2015.

"Biocontrol." *Biocontrol*. State of Colorado, n.d. Web. 20 May 2015.

Colorado State University, Department of Bioagricultural Sciences and Pest Management.

"Creating an Integrated Weed Management Plan-A Handbook for Owners and Managers of Lands with Natural Values" Caring for the Land Series Volume IV March 2000, written and distributed by Colorado Natural Areas Program in conjunction with Colorado State Parks in conjunction with Colorado Department of Natural Resources.

DiTomaso, Joseph M. *Weed Control in Natural Areas in the Western United States*. Davis, CA: U of California Weed Research and Information Center, 2013. Print.

"Weed Guide" developed by L.J. Development in 2006 for use in Division of Reclamation Mining and Safety mining permit applications.

"Weeds of the West" 9th Edition, 2000 Published by The western Society of Weed Science in cooperation with the Western United States Land Grand Universities Cooperative Extension Services, printed by Grand Teton Lithography, Jackson, Wyoming.

Invasive.org

USDA-NRCS Plant Database Plant Guide Fact Sheet – Halogeton, Contributed by: Aberdeen Plant Materials Center and Idaho NRCS State Office.

"Guideline for Weed Control Plans" developed by Fremont County in cooperation with Custer County, CSU Extension, NRCS, and Fremont Conservation District.



INTEGRATED WEED MANAGEMENT RECORD		
Name:		
Location of Application:		
Date:	Start Time:	End Time:
Target Pest:		
Site Type:		
Wind Speed:	Wind Direction:	
Temperature:	Clear, Cloudy, or Overcast:	
CHEMICAL CONTROL		
Trade Name of Herbicide Applied:	EPA Registration Number:	Dilution Rate (amt of product per unit of vol)
Trade Name of Surfactant Applied	EPA Registration Number:	Dilution Rate (amt of product per unit of vol)
Application Rate (total volume of the tank mix applied / unit area ... GPA)		
Amount Applied:		
Acres Treated:		
BIOLOGICAL CONTROL		
Bio-agent used:	Amt. Applied:	
Notes:		
CULTURAL CONTROL		
Notes (re-seeding mix, grazing, etc.):		
MECHANICAL CONTROL		
<input type="checkbox"/> Mowing / weed eating	<input type="checkbox"/> Tilling	
<input type="checkbox"/> Prescribed Burn	<input type="checkbox"/> Pulling	
<input type="checkbox"/> Chainsaw	<input type="checkbox"/> Other: _____	
Notes:		
MONITORING		
Date of Post-Treatment Monitoring:		
Notes:		

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**FREMONT COUNTY WEED MANAGEMENT**

201 N. 6<sup>th</sup> Street  
Cañon City, CO 81212  
Office: 719-276-7317  
Cell: 719-429-4753  
[jana.rapetti@fremontco.com](mailto:jana.rapetti@fremontco.com)



**CUSTER COUNTY WEED BOARD**

C/O: Robin Young, CSU Extension  
P.O. Box 360  
Westcliffe, CO 81252  
Phone: 719-783-2514

## 6.4.18 Exhibit R

### Proof of Filing with County Clerk and Recorder

I, Hope Schlundt, of Crowley County Clerk and Recorder's Office located at 631 Main Street, Suite 102, Ordway, Colorado received from Angela Bellantoni Ph.D. of Environmental Alternatives, Inc. the CO Division of Reclamation Mining and Safety amendment application for the Ordway Pit on behalf of Arkansas Valley Ranch.

Hope Schlundt  
Crowley County representative's signature

10-15-2020  
Date

CROWLEY COUNTY CLERK  
**RECEIVED**