CAERUS OIL AND GAS

A18-495 WELL PAD LOCATION
TOPSOIL PROTECTION PLAN

Prepared for:
Caerus Oil and Gas
143 Diamond Ave.
Parachute, CO 81635

Prepared by:

WestWater Engineering
2516 FORESIGHT CIRCLE, #1
GRAND JUNCTION, COLORADO 81505

Amie Wilsey, Environmental Scientist/Biologist

MARCH 2022

I. INTRODUCTION

At the request of Caerus Oil and Gas (Caerus), WestWater Engineering (WestWater) has prepared this topsoil management plan for the proposed A18-495 well pad. The proposed well pad would be located in Rio Blanco County, Colorado in Sections 7 and 18, Township 4 South, Range 95 West, Sixth Principal Meridian (Figure 1). The proposed well pad would disturb approximately 11.71 acres during initial clearing and grading. Upon completion of interim reclamation, approximately 2.6 acres would remain as working pad surface. Site layout drawings of the proposed location are attached in Appendix A. This topsoil management plan applies to the areas where Caerus plans to cause surface disturbance associated with the proposed well pad and addresses the requirements of the Colorado Oil and Gas Conservation Commission's (COGCC) 1002.b rules for reclamation regulations.

II. PROJECT AREA DESCRIPTION

The proposed A18 495 well pad and associated access road would be located on a ridge at the upper elevations of the Roan Plateau. The terrain surrounding the project consists primarily of northerly sloping ridge tops and steep adjacent hillsides. Elevation in the project area is approximately 8,000 feet. The current primary uses of the land are natural gas development, rangeland, and wildlife habitat. The historical and current land use description at the site (per COGCC descriptions on Form 2A) is Rangeland.

Soils

The A18 495 well pad would be located on the top of a ridge with predominant slopes ranging from 3 to 10 percent with moderate (approximately 15-20 percent) shoulder slopes. No rock outcroppings or active springs or seeps were observed during the site survey. The dominant native vegetation community in the project area and vicinity would be characterized as a montane shrubland and sagebrush shrubland.

The current proposed project footprint would be located on three soil types as described in Table 1, and shown on Figure 2 (NRCS 2021).

Table 1. Soils occurring in the project area.

Map Unit Symbol	Soil Name	Description
42	Irigul-channery loam complex, 5 to 50 percent slopes	Soils are formed from residuum weathered from sandstone and shale. Occurs on mountainsides and ridges and is well drained.
58	Parachute loam, 25 to 75 percent slopes	Occurs on mountaintops and ridges. Parent material is residuum weathered from sandstone.
87	Starman-Vandamore complex, 5 to 40 percent slopes	Soils are formed from residuum weathered from shale. Occurs on ridges and is well drained.

Vegetation

The vegetation communities present in the project area include a relatively barren ridge top with a fringe of sagebrush shrublands, dense stands of Gambel's Oak intermixed with mountain shrublands. Scattered aspen stands intermixed with mountain shrublands are present along hillsides surrounding the project area. Common plants observed in the project area are described in Table 2.

Table 2. Common plant species occurring in the project area.

Common Name	*Scientific Name*	Abundance*	Habitat Type
Grasses			
Bluebunch wheatgrass	*Pseudoroegneria spicata*	xx	Open rocky slopes, reclaimed areas
Western wheatgrass	*Pascopyrum smithii*	xx	Reclaimed areas
Cheatgrass	*Bromus tectorum*	xx	Disturbed areas
Slender wheatgrass	*Elymus trachycaulus*	x	Mountain shrublands, reclaimed areas
Kentucky bluegrass	*Poa pratensis*	xx	Mountain shrublands, Oak woodlands
Muttongrass	*Poa fenderiana*	xx	Mountain shrublands
Forbs			
Arrowleaf balsamroot	*Balsamorhiza sagittata*	xx	Mountain shrublands
Monument plant	*Frasera speciosa*	xx	Mountain shrublands, Aspen woodlands
Brittle prickly pear	*Opuntia fragilis*	xx	Mountain shrublands
Shortstyle bluebells	*Mertensia brevistyla*	xx	Mountain shrublands
Sagebrush buttercup	*Ranunculus glaberrimus*	xx	Mountain shrublands
Bulbous woodland-star	*Lithophragma glabrum*	x	Mountain shrublands
Scrambled eggs	*Corydalis aurea*	x	Mountain shrublands, roadsides
Nuttall's violet	*Viola nuttalia*	x	Mountain shrublands
Maiden blue eyed Mary	*Collinsia parviflora*	xx	Mountain shrublands
Low pussytoes	*Antennaria dimorpha*	xxx	Mountain shrublands
Shrubs/Trees			
Antelope bitterbrush	*Purshia tridentata*	xxx	Mountain shrublands
Basin big sagebrush	*Artemisia tridentata spp. tridentata*	xx	Drainage bottoms
Creeping barberry	*Mahonia repens*	xx	Oak woodlands
Saskatoon serviceberry	*Amelanchier alnifolia*	xxx	Mountain shrublands, Aspen woodlands

Table 2. Common plant species occurring in the project area.

Common Name	*Scientific Name*	Abundance*	Habitat Type
Broom snakeweed	*Gutierrezia sarothrae*	xx	Mountain shrublands
Quaking aspen	*Populus tremuloides*	xxx	Aspen woodlands
Rubber rabbitbrush	*Ericameria nauseosa*	xx	Reclaimed areas, roadsides
Gambel oak	*Quercus gambelii*	xxx	Oak woodlands
Alderleaf mountain mahogany	*Cercocarpus montanus*	xxx	Mountain shrublands
Prairie sagewort	*Artemesia frigida*	xx	Mountain shrublands
Roundleaf snowberry	*Symphoricarpos rotundifolius*	xxx	Aspen woodlands, mountain shrublands
Wood's rose	*Rosa woodsii*	xx	Aspen woodlands, mountain shrublands
Wyoming sagebrush	*Artemisia tridentata wyomingensis*	xxx	Sagebrush shrublands

*Abundance:
xxx = common frequency throughout project area
xx = moderate frequency throughout project area
x = uncommon frequency throughout project area

III. SOIL ASSESSMENT

Methods

Soil survey and baseline soils information were obtained from the Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA) (NRCS 2021). On-site visual and tactile soil investigations were conducted in hand-dug soil pits to evaluate macroscopic characteristics of disturbed soils from two locations for fertility testing within the proposed disturbance area as shown on Figure 2.

The soil samples were collected from within the proposed disturbance area at depths from 0 to 6 inches and 0 to 8 inches. Samples were homogenized into a single composite sample for laboratory analysis. All soil samples were analyzed for soil chemical and physical properties to determine topsoil quality and recommendations for nutrient amendments following procedures provided by Caerus.

Results

The proposed pad would occur within three mapped soil types according to NRCS (NRCS 2021) (Figure 2). Soil samples were collected from within the proposed well pad disturbance boundary and are described in Appendix B. Field observations, including photographs, color, texture, and other pertinent information is provided in Appendix B for each soil pit location.

Based on field observations and laboratory analysis, the soils within the pad disturbance area appear to provide suitable topsoil to a minimum depth of 5-inches. For the soil pits where topsoil is available to a depth of 5-inches, a weathered sandstone layer was present at 5+ inches limiting topsoil availability. In some areas topsoil availability is present to a depth of 8-inches. Low to

moderate organic matter was present at the sample locations. Soil texture varied from silty sand to loam. Topsoil depths were determined based on soil color/texture changes, root structure, organic content, and restrictive layers.

Topsoil Stripping Notes – The entire well pad is suitable to be stripped for topsoil. It is estimated that 9,697 cubic yards of topsoil is available to be salvaged on the well pad. A site plan depicting the topsoil storage areas is attached in Appendix A and shown on Figure 2. Caerus will preserve all available topsoil to the appropriate depth.

IV. TOPSOIL PROTECTION & MANAGEMENT

Working Surface Preparation/Construction Activities

During well pad construction, areas of bare soil will be minimized as much as possible within the work zone. Vegetation that is cleared and grubbed during initial ground clearing activities will be shredded and set aside in wind-rows, separate from soil stockpiles for later use to help support reclamation success. Topsoil management considerations will be applied to the storage of topsoil to ensure erosion and sediment transportation is minimized, in addition to ensuring that potential contamination and compaction is also mitigated per COGCC Regulation 1002.c and e.

Topsoil Handling

Proper handling and storage of topsoil is critical to successful revegetation, especially in the case of reestablishing important native plant species on disturbed areas. The topsoil contains soil microbes (i.e., bacteria, mycorrhiza, invertebrates), and seed banks of viable seed for the native plants present on the site. Many native plant species depend upon the activity of soil microbes for germination in some instances and for establishment and survival of most seedlings.

Per COGCC Regulation 1002.b(2) and (3), the top 6-inches of soil will be stockpiled and separated to prevent mixing with any other trench material. If the topsoil horizons are too rocky, or too thick, the topsoil shall be segregated to the greatest extent possible and stored. Soils that are comprised of 35% or more rock, or have soil horizons that are less than 6-inches in thickness, fit this classification.

Topsoil will be protected from erosion and weed invasion. Topsoil will be stockpiled in separate piles from other soil horizons on stable slopes and will be positioned to minimize exposure to wind and water erosion. The topsoil stockpiles will be separated from other subsoils by an appropriate erosion control measure (i.e. straw wattles, earthen berm) to prevent mixing of topsoil and subsoils. Caerus plans to stockpile topsoil in an uncompacted storage pile along the northern edge of the well pad as shown in Figure 2. Topsoil piles stored for longer than 30 days will be seeded with the seed mix described in Table 3 to provide cover which will help to reduce erosion, provide competition for weed species, and to maintain viability of the soil fungi and microbe communities. The timeframes the topsoil is stockpiled on-site will be monitored to ensure seeding takes place in a timely manner as applicable. Using the recommended seed mix on long-term storage piles will help maintain biological activity and provide a seed bank of viable seed. If long-term stockpiling or deep stockpiling cannot be avoided, application of mycorrhizal inoculants (see section below) may also be beneficial to help ensure the topsoil maintains optimal condition for reclamation purposes.

The stockpiled topsoil will be spread out along the pad's surface after construction has been completed. Re-contouring of the pad surface to its original or near-original grade will occur after soils have been re-spread.

A Storm Water Management Plan (SWMP) will be prepared in accordance with COGCC Regulation 1002.f for this project which will include additional descriptions of soil stabilization methods and Best Management Practices (BMPs) that should be used during construction and post- construction.

Soil Preparation

Before seeding begins, the soil needs to be prepared. The objective is to have the top 12-inches of soil decompacted to allow for root growth and still be firm enough on the surface to allow for good seed to soil contact (Whisenant 2003). Compaction can reduce water infiltration and also hinder the penetration of the sprouting seed. During interim reclamation, it is recommended that the following practices are implemented to help reduce compaction and prepare the seedbed: scarification, tillage, disking, chisel plowing, cultipacking, or harrowing (Colorado Natural Areas Program et al. 1998). In the event there is significant compaction, ripping with heavy equipment should be implemented when soil moisture levels are below 35% of field capacity, to a depth of 18-inches as recommended by COGCC Regulation 1003.c.

The proposed project will be located on relatively flat slopes (0-10% slope) which should facilitate reseeding success due to minimization of potential erosion from runoff (Figure 1). Imprinting the soil is recommended to help reduce soil runoff. Imprinting can be done in the form of dozer tracks or furrows perpendicular to the direction of slope. When utilizing hydro-seeding followed by mulching, imprinting should be done prior to seeding unless the mulch is to be crimped into the soil surface. If broadcast seeding and harrowing, imprinting will be done as part of the harrowing. Other simple imprinting methods include deep hand raking and harrowing, always perpendicular to the direction of slope. The effectiveness of the imprinting will be reviewed during standard storm water inspections. If needed, the imprinting will undergo maintenance to ensure the topsoil conditions facilitate revegetation efforts and minimize erosion.

Soil Amendments

The addition of soil amendments in rangeland reclamation projects can create more optimal growing conditions for non-native or invasive plant species, with which native plants compete poorly. There is potential that the use of soil amendments (fertilizer) containing nitrogen will disproportionately benefit undesirable annual plants (Perry et al. 2010). If the company determines the use of soil amendments to be beneficial, the type and rate should be based on results from lab analysis of soil samples collected at the site. The bioavailability of the nutrients found in the soil is an important consideration when assessing whether or not to add particular amendments.

A potentially beneficial alternative method to enhance reclamation success, particularly where there is poor or destroyed topsoil, is the application of vesicular-arbuscular mycorrhizal fungi (AMF). These fungi, mostly of the genus *Glomus*, are symbiotic with about 80 percent of all vegetation. Endo-mycorrhizal fungi are associated mostly with grasses and forbs and could be helpful in reclamation. In symbiosis, the fungi can increase water and nutrient transfer capacity of the host root system (Barrow and McCaslin 1995). Over-the-counter commercial products are available, and the best products should contain more than one fungus species.

Compacted soils respond well to fossilized humic substances and by-products called humates. These humates, including humic and fulvic acids and humin were formed from pre-historic plant and animal deposits and can benefit reclamation efforts on compacted soils when applied as directed. The use of these humic products will also help facilitate an environment in which the beneficial microbial activity is increased while also improving the soil structure and making the nutrients in the native soils more bioavailable for plant uptake (Khaled and Fawy 2011).

Seed Mixture

Caerus will use the seed mix described in Table 3 for topsoil protection and during interim reclamation. This seed mix is well suited for mountain and brushy loams in the Roan Plateau region and includes perennial native grasses and forbs that should establish well, protect topsoil, and provide a basis for rehabilitation of the site upon reclamation.

Table 3. Seed Mix

Cultivar	Common Name	Scientific Name	Application Rate (lbs PLS/acre)
UP Plateau	Sandberg bluegrass	*Poa secunda ssp. sandbergii*	0.5
San Luis	slender wheatgrass	*Elymus trachycaulus ssp. trachycaulus*	2
Sherman	big bluegrass	*Poa secunda ssp. ampla*	1
Bromar	mountain brome	*Bromus marginatus*	2
Maple Grove	Lewis flax	*Linum lewisii*	1
Bandera	Rocky Mountain penstemon	*Penstemon strictus*	0.5
Canbar	Canby bluegrass	*Poa secunda ssp. canbyi*	0.5
VNS	balsamroot	*Balsamorhiza sagittata*	3
VNS	American Vetch	*Vicia americana*	1
Quickguard	Sterile Triticale Hybrid	*Triticum Aestivum X Secale Cereale*	8
		Total Drill Rate	19.5

Please note that the seed application rate should be doubled for broadcast applications such as hydroseeding or hand broadcasting of seed (CNAP 1998).

Seeding Methods

Seeding should be conducted no more than 24 hours following completion of final seedbed preparation (BLM 2019). For best results and success, reseeding should be done in late autumn. If seeding is completed in the late autumn, it is recommended that a hydromulch is applied post-construction to stabilize the soils until seeding is completed. However, if Caerus determines it is more beneficial and cost-effective to seed immediately following project construction, it is recommended that hydroseeding and/or hand broadcast seeding is completed.

Due to the relatively flat slopes of the site, the preferred seeding method would be hydroseeding or drill seeding at the standard seeding rate. If the site is hydroseeded, it is recommended that a

soil amendment and erosion control mulch is applied to help with vegetation establishment. For broadcast seeding, the following two seeding methods can also be implemented to improve germination success.

- harrow with just enough soil moisture to create a rough surface, broadcast seed and re-harrow, preferably at a 90-degree angle to the first harrow; or

- hand raking and broadcast followed by re-raking at a 90-degree angle to the first raking.

These are not the only means of replanting the site. However, these methods have been observed to be effective in similar landscapes.

Mulching

If areas are broadcast seeded it is recommended that an application of certified weed-free straw, mulch, erosion control netting (i.e., Jute, wood excelsior, etc.), or erosion control blankets are installed within 24 hours of seeding to help protect soil from erosion and increase soil moisture content. Potential detrimental effects of mulching include the introduction of weed species and the establishment of non-native cereal grains. Use of a certified weed-free sterile wheat hybrid straw mulch would limit these effects. Straw mulch is most effective on gentle to moderate slopes and can be hand broadcast in a uniform depth across the project site of 2-3 inches. The application rate of straw mulch is approximately 2 tons per acre (NRCS 2002). If straw mulch is used it should be crimped into the soil surface. Erosion control blankets and netting are typically used in applications where there is a steep slope, but can also be used to help maintain soil stability while seedlings establish in areas where the slope is not considered moderate to steep. The material is often biodegradable and does not need to be removed once it has been installed.

BMPs

Topsoil protection BMPs that apply to this project are attached in Appendix C. A Storm Water Management Plan will be prepared for this project which will provide additional details for the appropriate Best Management Practices (BMPs) to be utilized during and post-construction activities. For more specific details, please refer to the respective document.

Noxious Weeds

Increased traffic and activities in the project area may promote conditions that facilitate the spread of invasive noxious weeds from outside the project area. The application of a weed management plan for this project site is recommended to: 1) prevent the invasion and expanded range of noxious weeds; and 2) promote the establishment of desirable plant life upon rehabilitation of the proposed well pad during interim and final reclamation.

Caerus will implement the protocol specified in their Integrated Vegetation Management Plan for the NPR (WestWater 2009). This Vegetation Management Plan was written with respect to the COGCC Regulations 1003.F, and the Colorado Noxious Weed Act, C.R.S 35-5.5-115. Subsequent to soil disturbances, vegetation communities can be susceptible to infestations of invasive or exotic weed species. Vegetation removal and soil disturbance during construction can create optimal conditions for the establishment of invasive, non-native species. Construction equipment traveling from weed-infested areas into weed-free areas could disperse noxious or invasive weed seeds and propagates, resulting in the establishment of these weeds in previously weed-free areas.

The following practices will be adopted for any activity to reduce the costs of noxious weed control through prevention. The practices include:

- Prior to delivery to the site, equipment should be thoroughly cleaned of soils remaining from previous construction sites which may be contaminated with noxious weeds.
- If working in sites with weed-seed contaminated soil, equipment should be cleaned of potentially seed-bearing soils and vegetative debris at the infested area prior to moving to uncontaminated terrain.
- All maintenance vehicles should be regularly cleaned of soil.
- Avoid driving vehicles through areas where weed infestations exist.

V. REFERENCES

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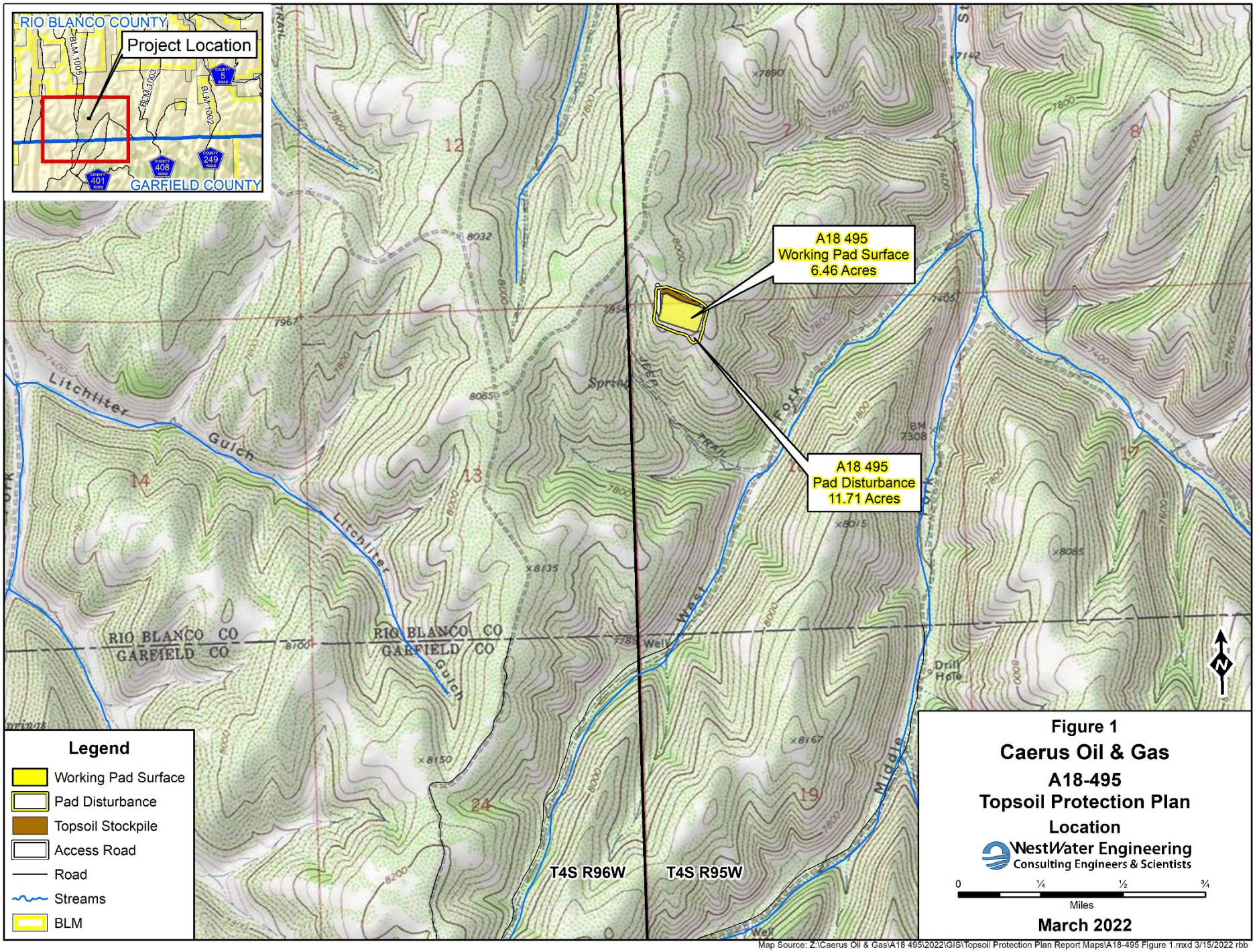
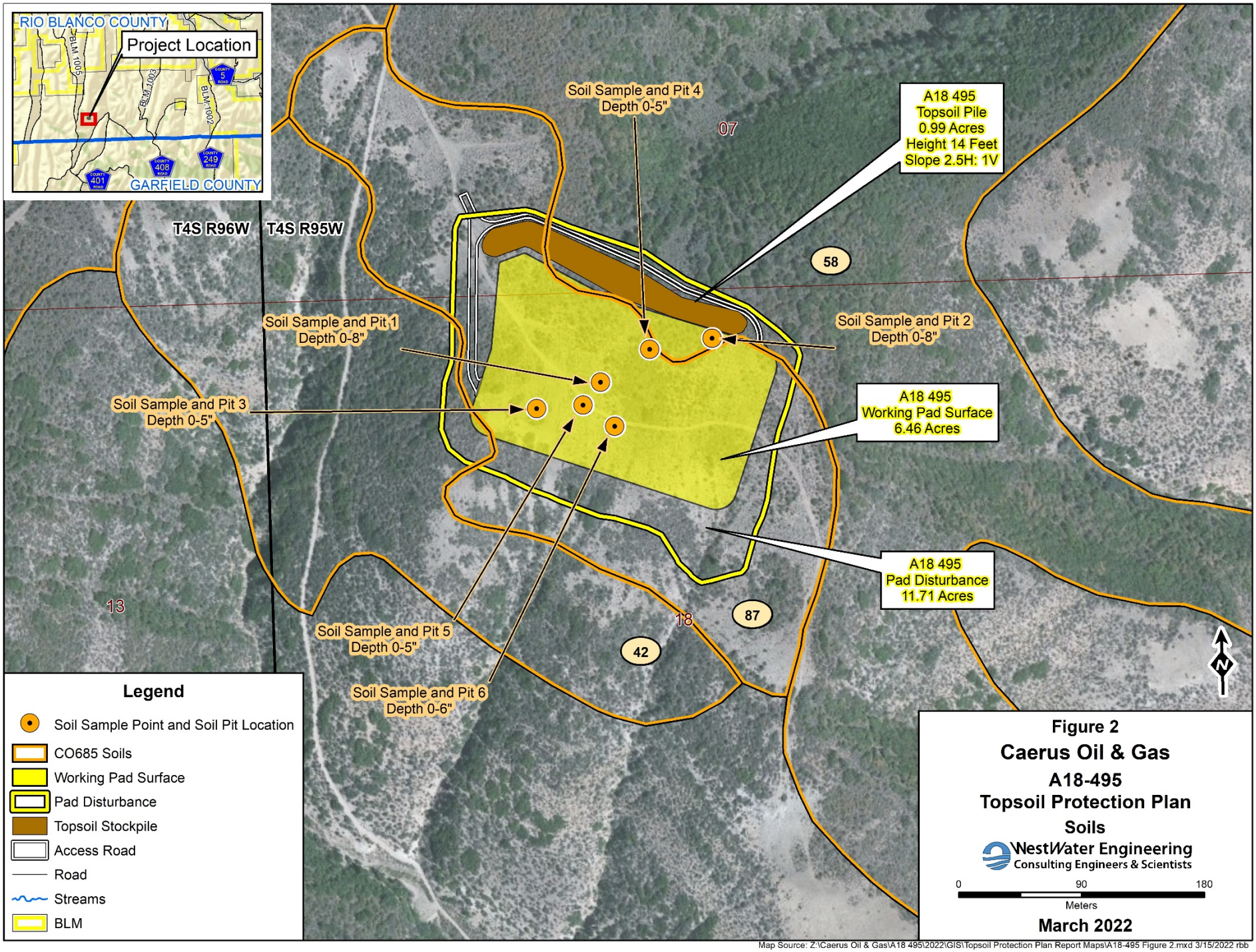
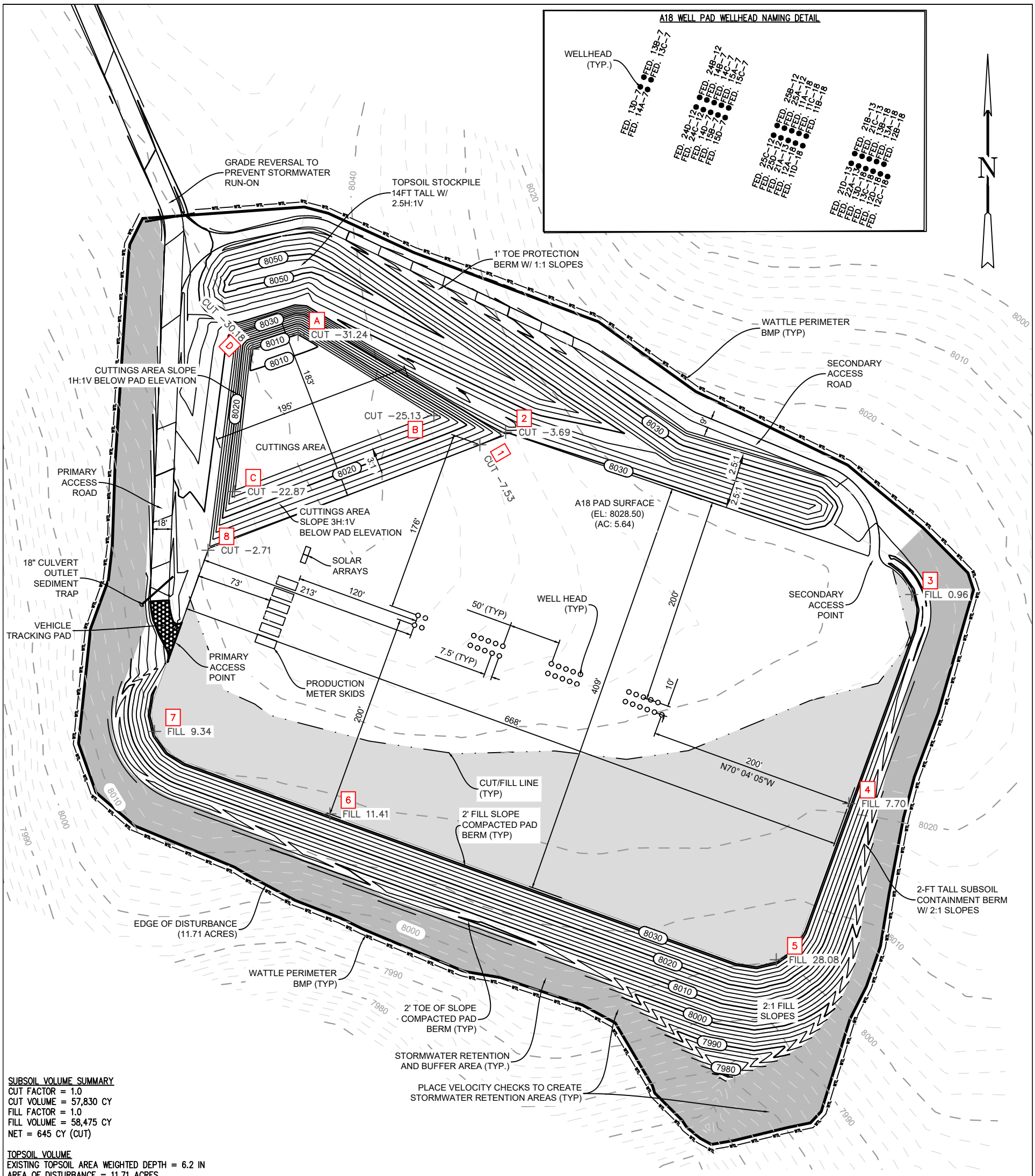


Map Source: Z:\Caerus Oil & Gas\A18 495\2022\GIS\Topsoil Protection Plan Report Maps\A18-495 Figure 1.mxd 3/15/2022 rbb


RIO BLANCO COUNTY
Project Location
GARFIELD COUNTY
BLM 1005
BLM 1003
BLM 1002
T4S R96W
T4S R95W
Soil Sample and Pit 4
Depth 0-5"
A18 495
Topsoil Pile
0.99 Acres
Height 14 Feet
Slope 2.5H: 1V
Soil Sample and Pit 1
Depth 0-8"
Soil Sample and Pit 2
Depth 0-8"
Soil Sample and Pit 3
Depth 0-5"
A18 495
Working Pad Surface
6.46 Acres
A18 495
Pad Disturbance
11.71 Acres
Soil Sample and Pit 5
Depth 0-5"
Soil Sample and Pit 6
Depth 0-6"
07
13
18
58
87
42
Legend
Soil Sample Point and Soil Pit Location
CO685 Soils
Working Pad Surface
Pad Disturbance
Topsoil Stockpile
Access Road
Road
Streams
BLM
Figure 2
Caerus Oil & Gas
A18-495
Topsoil Protection Plan
Soils
WestWater Engineering
Consulting Engineers & Scientists
0
90
180
Meters
March 2022
Map Source: Z:\Caerus Oil & Gas\A18 495\2022\GIS\Topsoil Protection Plan Report Maps\A18-495 Figure 2.mxd 3/15/2022 rbb

APPENDIX A

SITE LAYOUT DRAWINGS



SUBSOIL VOLUME SUMMARY
CUT FACTOR = 1.0
CUT VOLUME = 57,830 CY
FILL FACTOR = 1.0
FILL VOLUME = 58,475 CY
NET = 645 CY (CUT)

TOPSOIL VOLUME
EXISTING TOPSOIL AREA WEIGHTED DEPTH = 6.2 IN
AREA OF DISTURBANCE = 11.71 ACRES
TOPSOIL VOLUME = 9,697 CY (CUT)
TOPSOIL PILE VOLUME = –10,309 CY (FILL)

PRIMARY ACCESS ROAD VOLUME SUMMARY
CUT FACTOR = 1.0
CUT VOLUME = 1,360 CY
FILL FACTOR = 1.0
FILL VOLUME = 1,459 CY
NET = –99 CY (FILL)

GRAVEL FOR PRIMARY ROAD
(ASSUMING 6–INCH DEPTH)
2,095 CY
AT 1.48 TONS/CY = 3,100 TONS

SECONDARY ACCESS ROAD VOLUME SUMMARY
CUT FACTOR = 1.0
CUT VOLUME = 115 CY
FILL FACTOR = 1.0
FILL VOLUME = 122 CY
NET = –7 CY (FILL)

CUTTINGS AREA VOLUME
REQUIRED = 520 CY/WELL X 35 WELLS = 18,200 CY
VOLUME PROVIDED WHILE MAINTAINING 8–FT OF COVER UNDER INTERIM & FINAL RECLAMATION PHASES = 20,761 CY

STORMWATER VOLUME
DESIGN STORM = 25–YEAR 24–HOUR
NOAA POINT PRECIP. = 2.14 INCHES
SCS CURVE NUMBER = 89 (COMPACTED DIRT/D SOIL TYPE)
SCS LOSSES = 0.99 INCHES
RESULTING RUNOFF = 1.15 INCHES
REQUIRED RETENTION VOLUME = 48,218 CUBIC FEET
VOLUME PROVIDED = 50,656.5 CUBIC FEET
(ASSUMING AVERAGE DEPTH OF 0.75–FT)

NOTES
1. CONTOUR INTERVAL IS 2 FEET.
2. EXISTING TOPOGRAPHY AND FEATURE DATA WERE COLLECTED BY WASATCH SURVEYING.
3. WELL PAD DIMENSIONS PROVIDED BY CAERUS OIL & GAS LLC.

COLORADO LICENSED JAMISEN KENNEY 41215 2022-03-13 PROFESSIONAL ENGINEER

100' 0' 100'
SCALE: 1 INCH = 100 FEET
CONTOUR INTERVAL = 2 FT

WASATCH SURVEYING
WASATCH SURVEYING ASSOCIATES
906 MAIN STREET, EVANSTON, WY 82930
(307) 789–4545

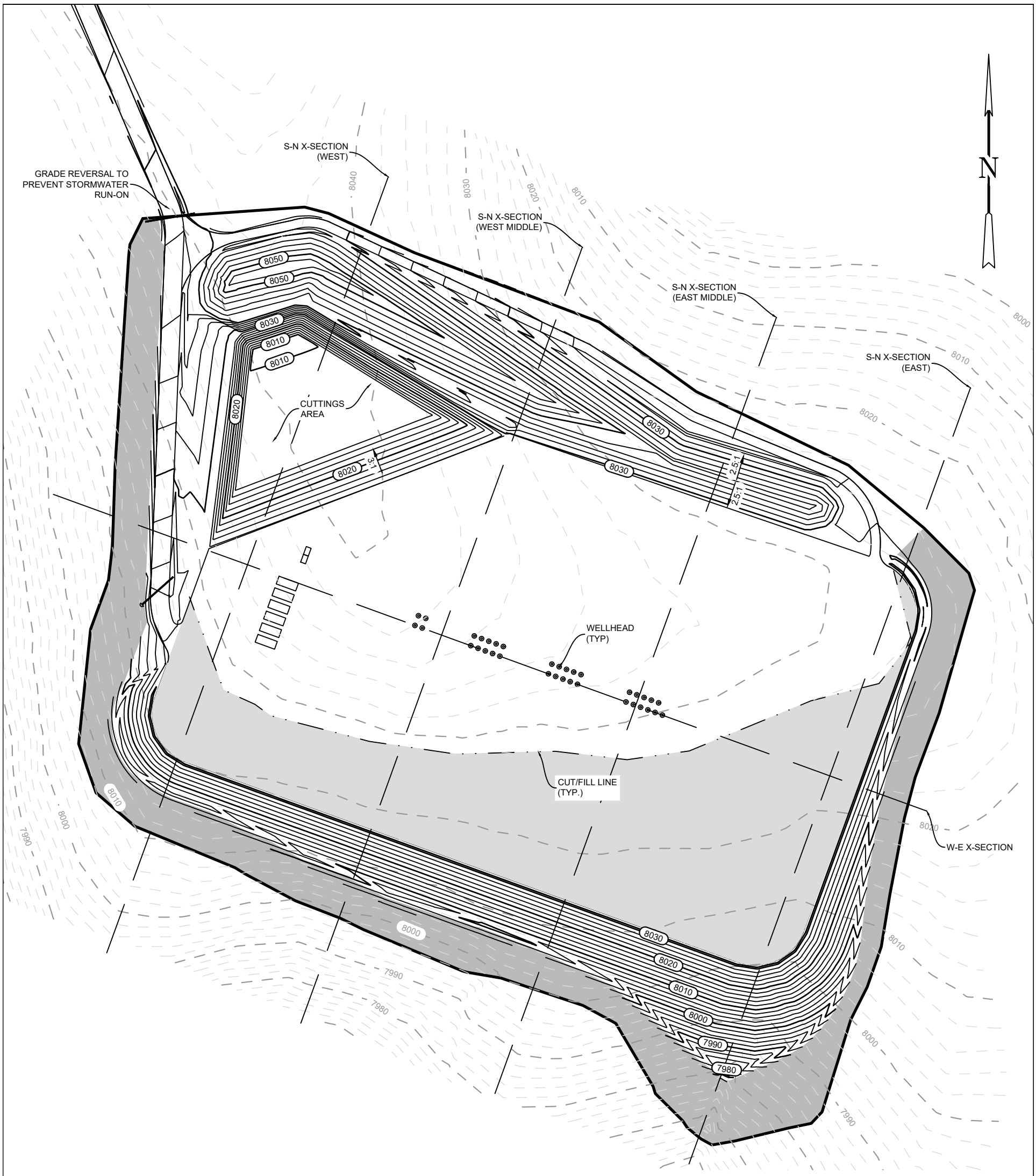
KLJ
1601 Riverfront Drive
Grand Junction, CO 81501

CAERUS OIL & GAS LLC

ELU A18 495 WELL PAD
NW1/4 NW1/4, SECTION 18, T4S, R95W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

CONSTRUCTION LAYOUT

DESIGNED BY: MJK	DATE: 2020.06.09	**FIGURE #1**	
DRAWN BY: ES	DATE: 2022.03.13	PROJECT NO: 2107–00252.14	Rev: 0



NOTES
1. CONTOUR INTERVAL IS 2 FEET.
2. EXISTING TOPOGRAPHY AND FEATURE DATA WERE COLLECTED BY WASATCH SURVEYING.

COLORADO LICENSED
MARC JAMISEN KENNEY
41215
2022-03-13
PROFESSIONAL ENGINEER

100' 0' 100'
SCALE: 1 INCH = 100 FEET
CONTOUR INTERVAL = 2 FT

WASATCH SURVEYING
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Grand Junction, CO 81501

CAERUS OIL & GAS LLC

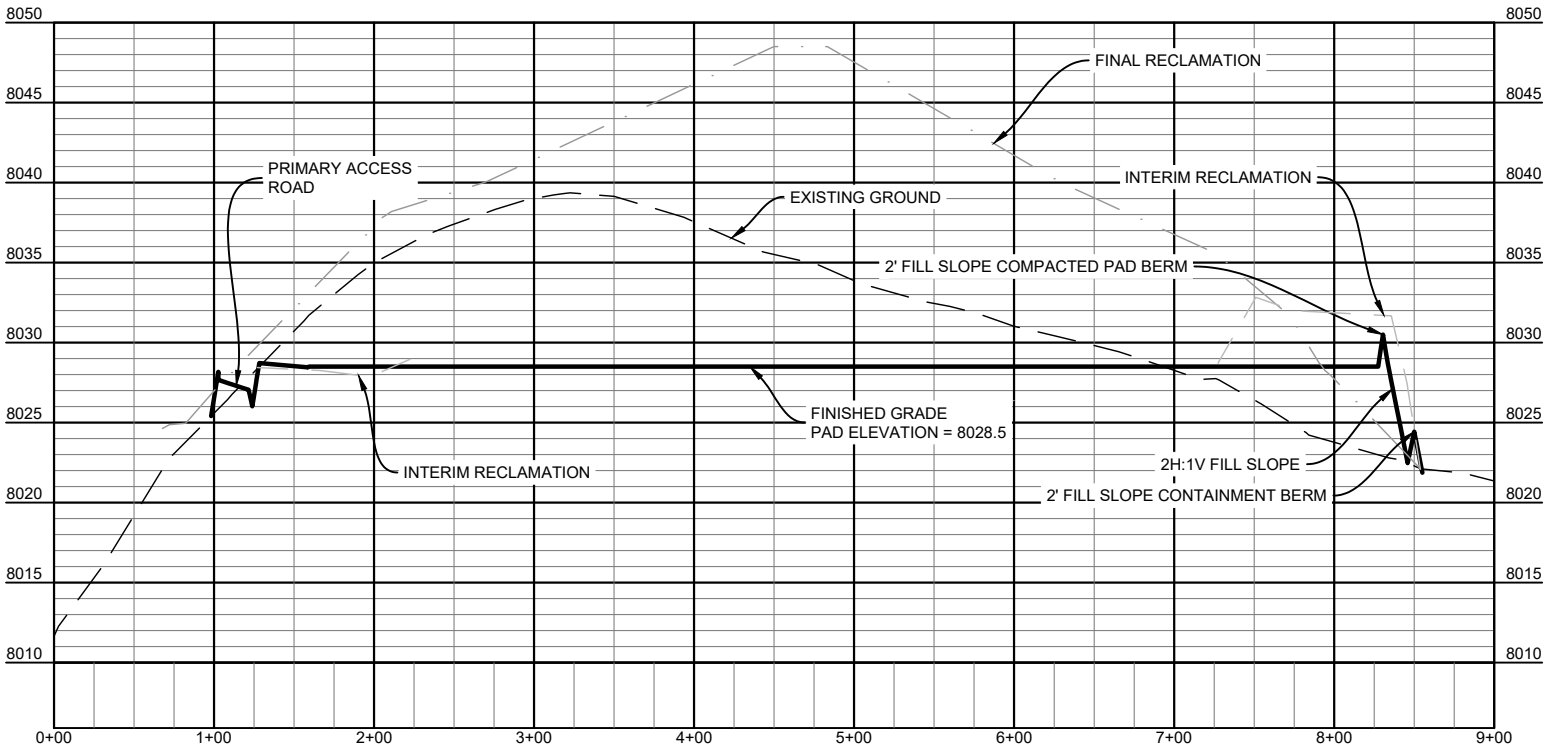
ELU A18 495 WELL PAD
NW1/4 NW1/4, SECTION 18, T4S, R95W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

PAD CROSS SECTIONS SHEET 1/3

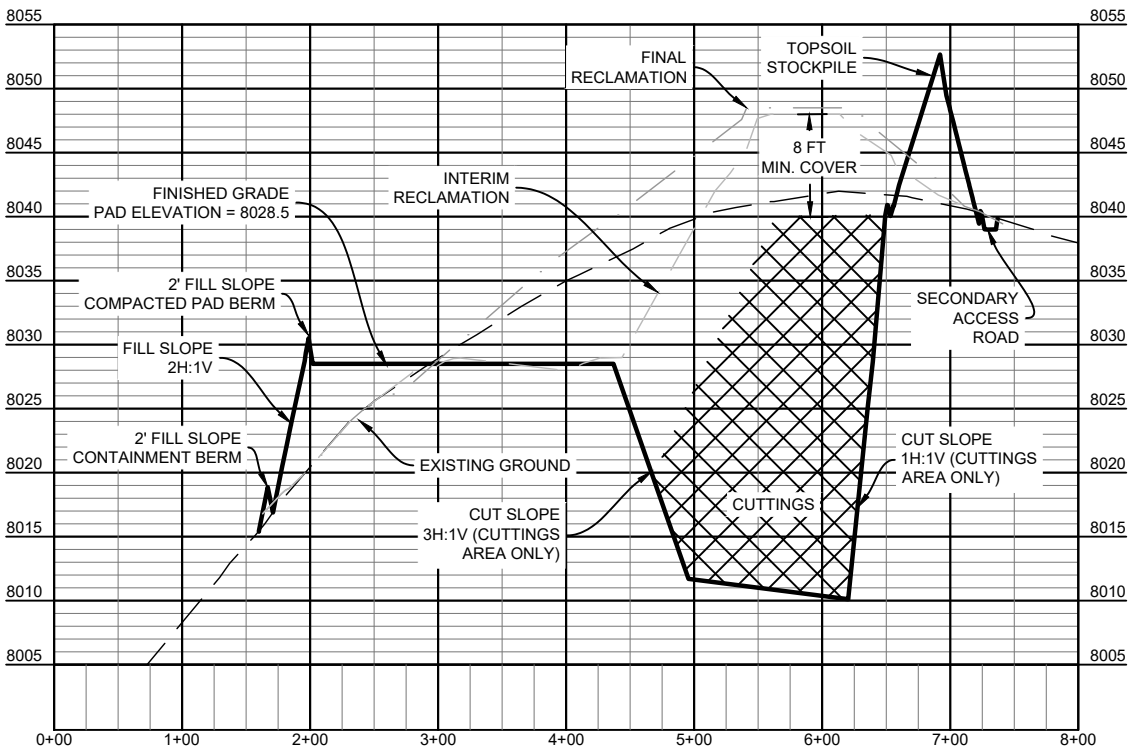
DESIGNED BY: MJK	DATE: 2020.06.09	**FIGURE #2A**	
DRAWN BY: ES	DATE: 2022.03.13	PROJECT NO: 2107-00252.14	

Rev: 0

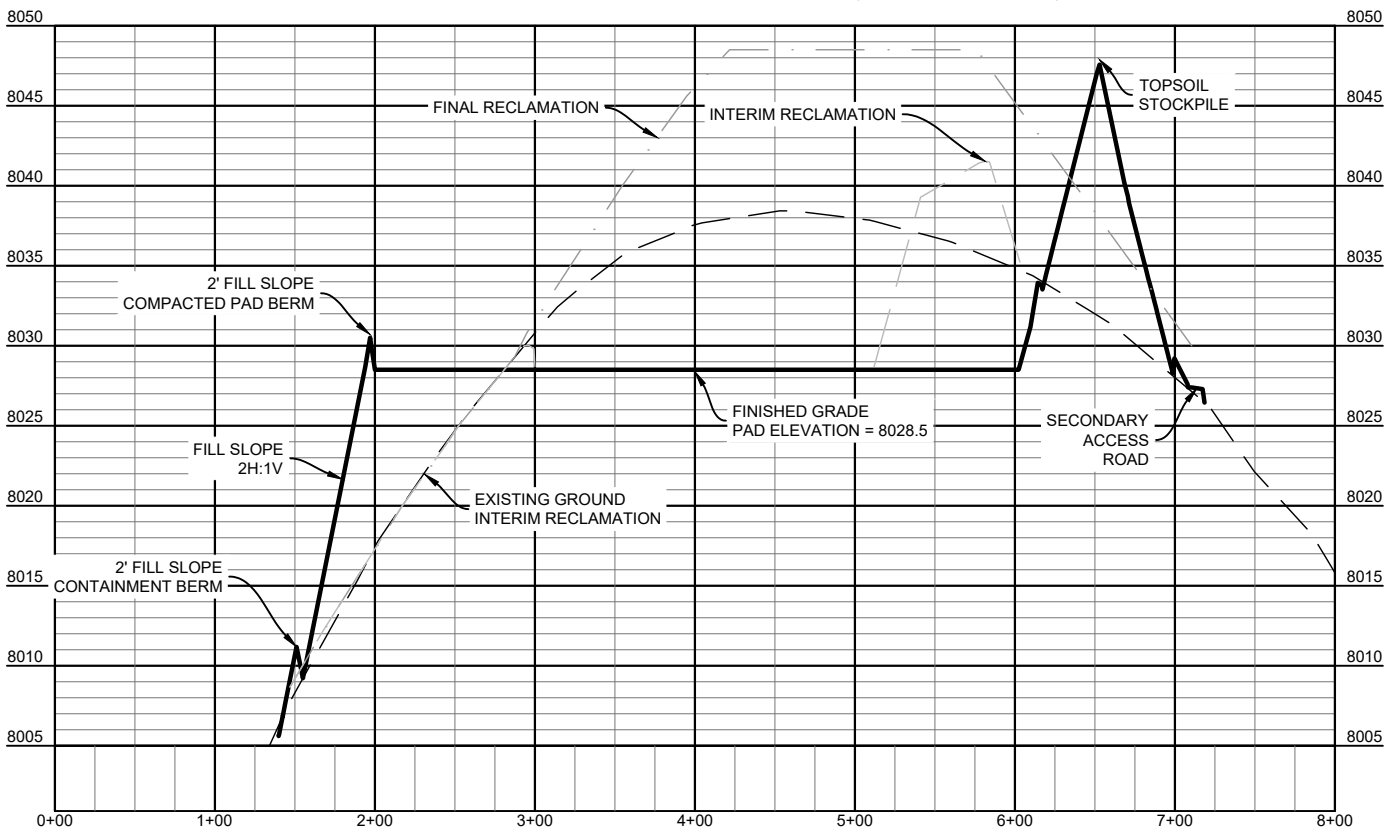
PROFILE VIEW OF A18 W-E X-SECTION



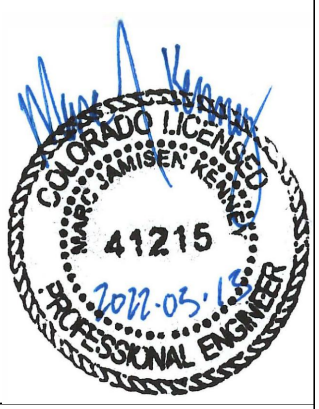
PROFILE VIEW OF A18 S-N X-SECTION (WEST)



PROFILE VIEW OF A18 S-N X-SECTION (WEST MIDDLE)



NOTES
1. VERTICAL EXAGGERATION = 5



100' 0' 100'

SCALE: 1 INCH = 100 FEET
CONTOUR INTERVAL = 2 FT

WASATCH SURVEYING ASSOCIATES
906 MAIN STREET, EVANSTON, WY 82930
(307) 789-4545

1601 Riverfront Drive
Grand Junction, CO 81501

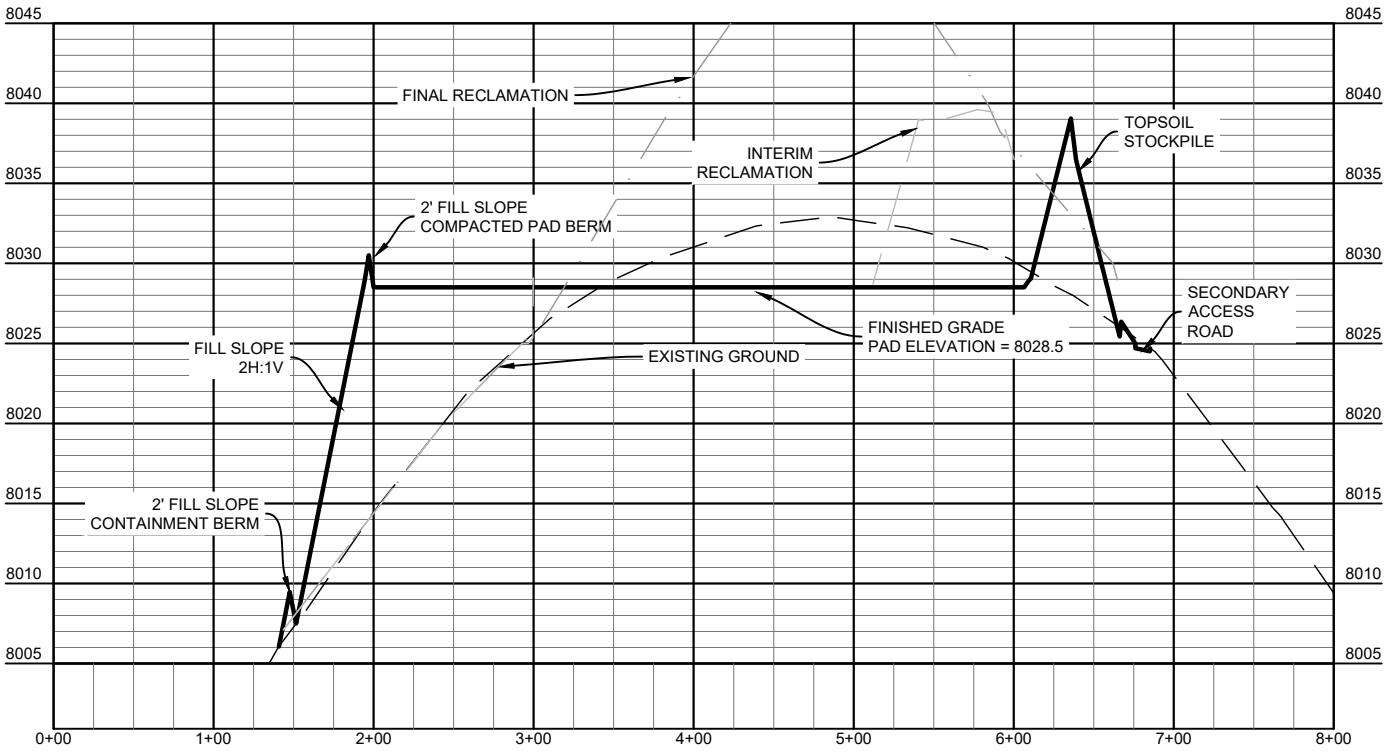
CAERUS OIL & GAS LLC

ELU A18 495 WELL PAD
NW1/4 NW1/4, SECTION 18, T4S, R95W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

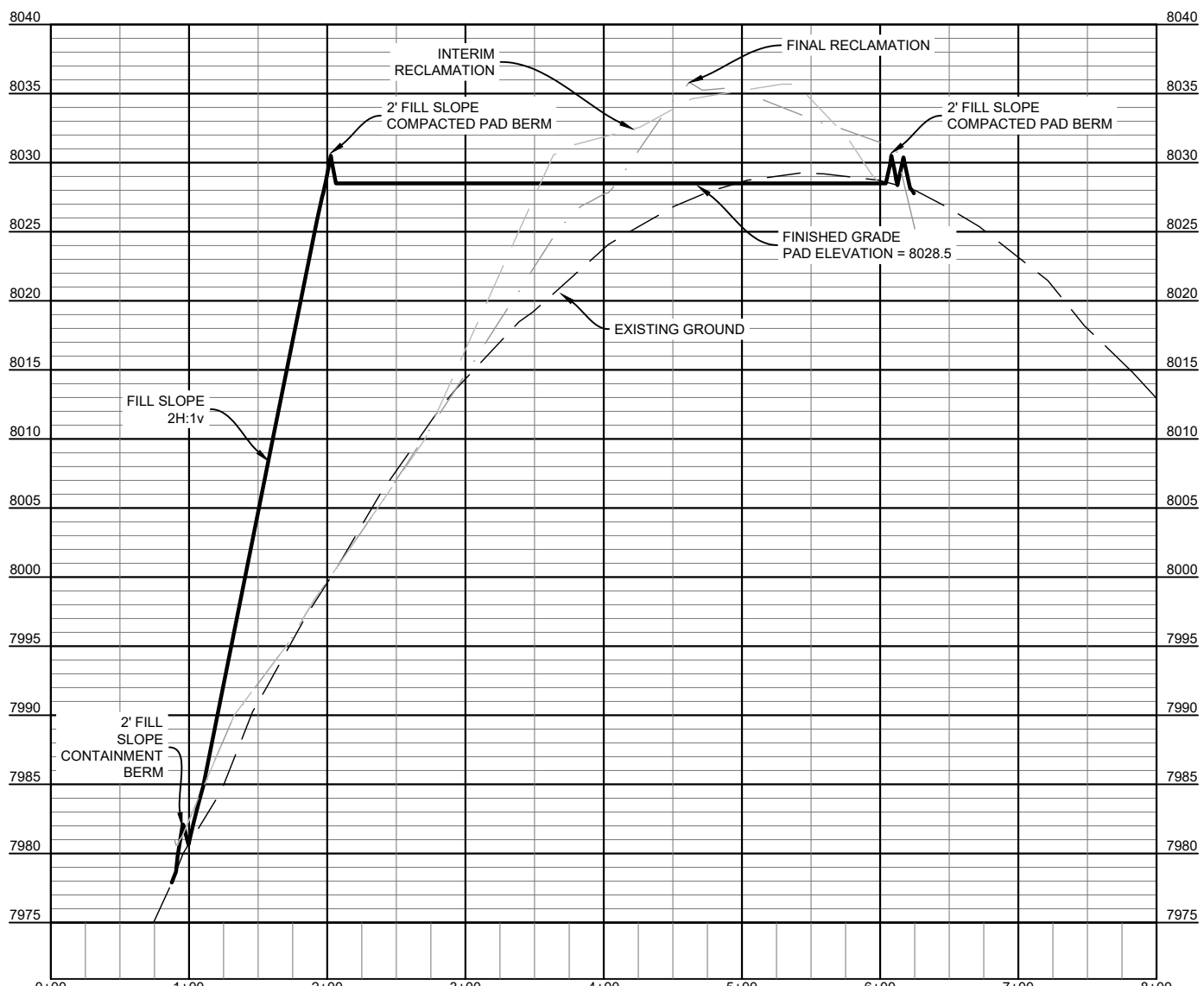
PAD CROSS SECTIONS SHEET 2/3			
DESIGNED BY: MJK	DATE: 2020.06.09	FIGURE #2B	
DRAWN BY: ES	DATE: 2022.03.13	PROJECT NO: 2107-00252.14	

Rev: 0

PROFILE VIEW OF A18 S-N X-SECTION (EAST MIDDLE)



PROFILE VIEW OF A18 S-N X-SECTION (EAST)



NOTES
1. VERTICAL EXAGGERATION = 5

100' 0' 100'

SCALE: 1 INCH = 100 FEET
CONTOUR INTERVAL = 2 FT

WASATCH SURVEYING ASSOCIATES
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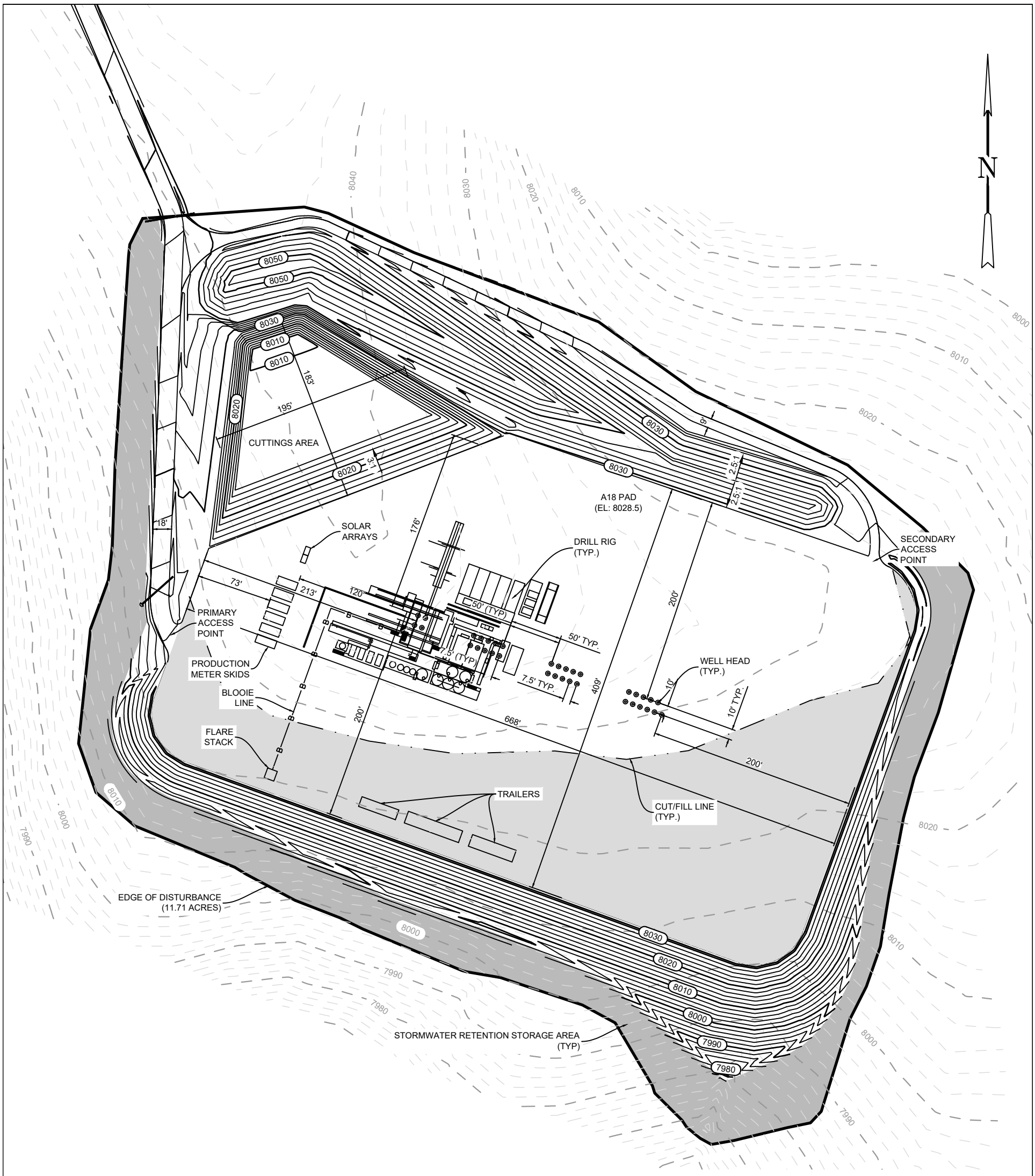
Grand Junction, CO 81501

CAERUS OIL & GAS LLC

ELU A18 495 WELL PAD
NW1/4 NW1/4, SECTION 18, T4S, R95W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

PAD CROSS SECTIONS SHEET 3/3			
DESIGNED BY: MJK	DATE: 2020.06.09	FIGURE #2C	
DRAWN BY: ES	DATE: 2022.03.13	PROJECT NO: 2107-00252.14	

Rev: 0



NOTES
1. CONTOUR INTERVAL IS 2 FEET.
2. EXISTING TOPOGRAPHY AND FEATURE DATA WERE COLLECTED BY WASATCH SURVEYING.
3. WELL PAD DIMENSIONS PROVIDED BY CAERUS OIL & GAS LLC.

COLORADO LICENSED
JAMISEN KENNEY
41215
2022-03-13
PROFESSIONAL ENGINEER

100' 0' 100'

SCALE: 1 INCH = 100 FEET
CONTOUR INTERVAL = 2 FT

WASATCH SURVEYING
WASATCH SURVEYING ASSOCIATES
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KLJ
1601 Riverfront Drive
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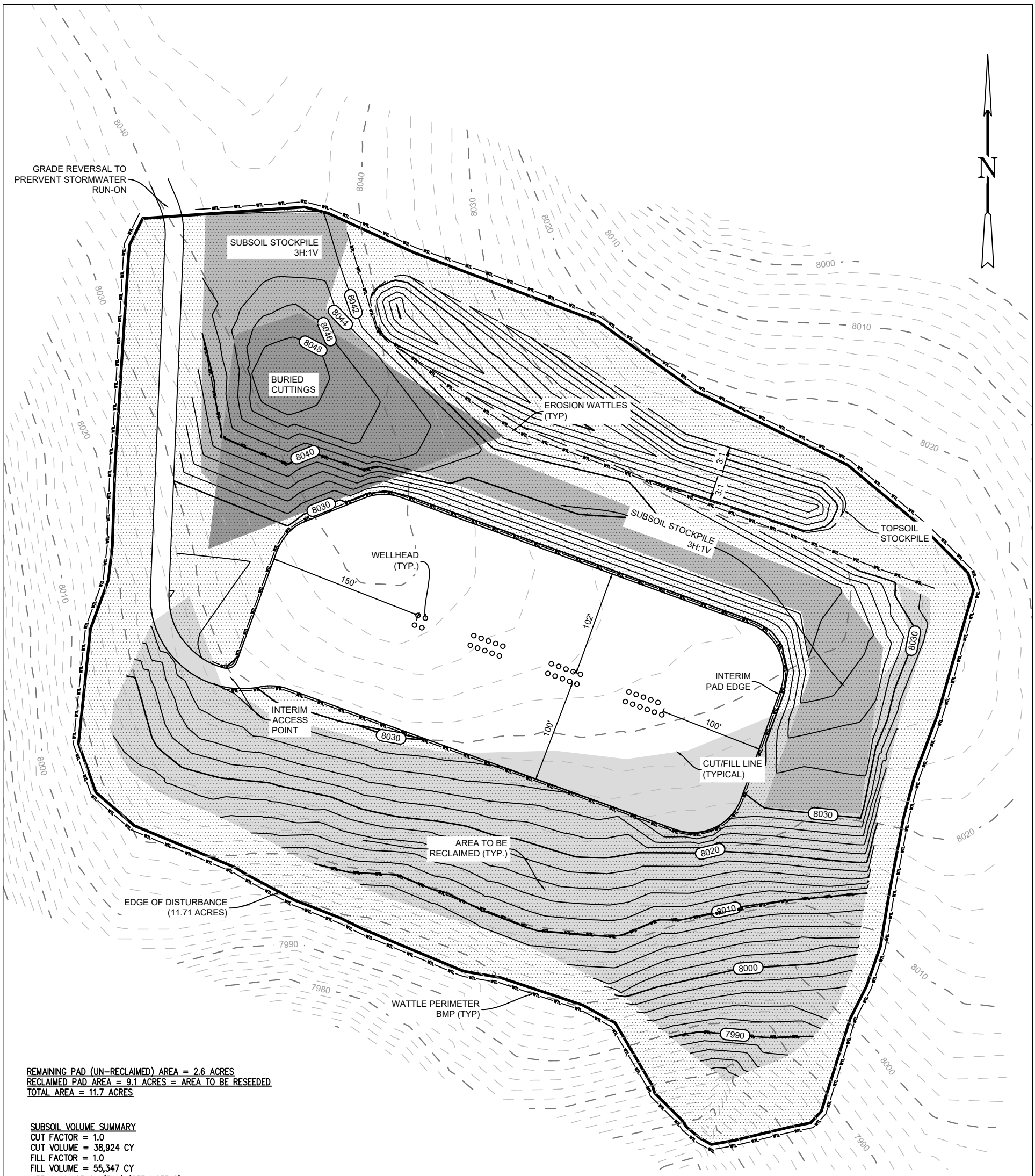
CAERUS OIL & GAS LLC

ELU A18 495 WELL PAD
NW1/4 NW1/4, SECTION 18, T4S, R95W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

TYPICAL RIG LAYOUT

DESIGNED BY: MJK	DATE: 2020.06.09	FIGURE #3	
DRAWN BY: ES	DATE: 2022.03.13	PROJECT NO: 2107-00252.14	

Rev: 0

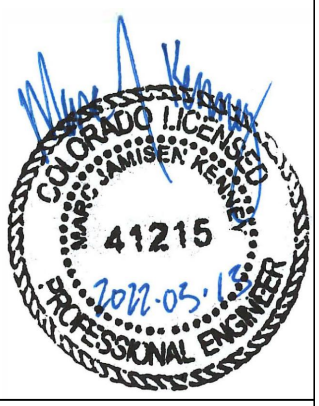


REMAINING PAD (UN-RECLAIMED) AREA = 2.6 ACRES
RECLAIMED PAD AREA = 9.1 ACRES = AREA TO BE RESEEDED
TOTAL AREA = 11.7 ACRES

SUBSOIL VOLUME SUMMARY
CUT FACTOR = 1.0
CUT VOLUME = 38,924 CY
FILL FACTOR = 1.0
FILL VOLUME = 55,347 CY
NET = 16,423 CY (FILL) (SEE NOTE 2)

TOPSOIL VOLUME
EXISTING TOPSOIL AREA WEIGHTED DEPTH = 6.2 IN
AREA OF DISTURBANCE = 9.1 ACRES
EXISTING TOPSOIL PILE VOLUME = 9,697 CY (FILL)
TOPSOIL VOLUME USED FOR INTERIM RECLAMATION = 7,604 CY (CUT)
TOPSOIL PILE VOLUME AFTER INTERIM RECLAMATION = 2,903 CY (FILL)

NOTES
1. CONTOUR INTERVAL IS 2 FEET.
2. IN ORDER FOR SOILS TO BALANCE THE NET FILL WOULD NEED TO BE EQUAL TO THE VOLUME OF CUTTINGS (ESTIMATED AT 18,200 CY) EXCESS SUBSOIL MATERIAL WILL BE TAKEN OFF SITE AND USED TO IMPROVE INFRASTRUCTURE (EG. ROADWAYS) ON CONOCOPHILIPS LANDHOLDINGS.
3. EXISTING TOPOGRAPHY AND FEATURE DATA WERE COLLECTED BY WASATCH SURVEYING.
4. WELL PAD DIMENSIONS PROVIDED BY CAERUS OIL & GAS LLC.



100' 0' 100'
SCALE: 1 INCH = 100 FEET
CONTOUR INTERVAL = 2 FT

WASATCH SURVEYING ASSOCIATES
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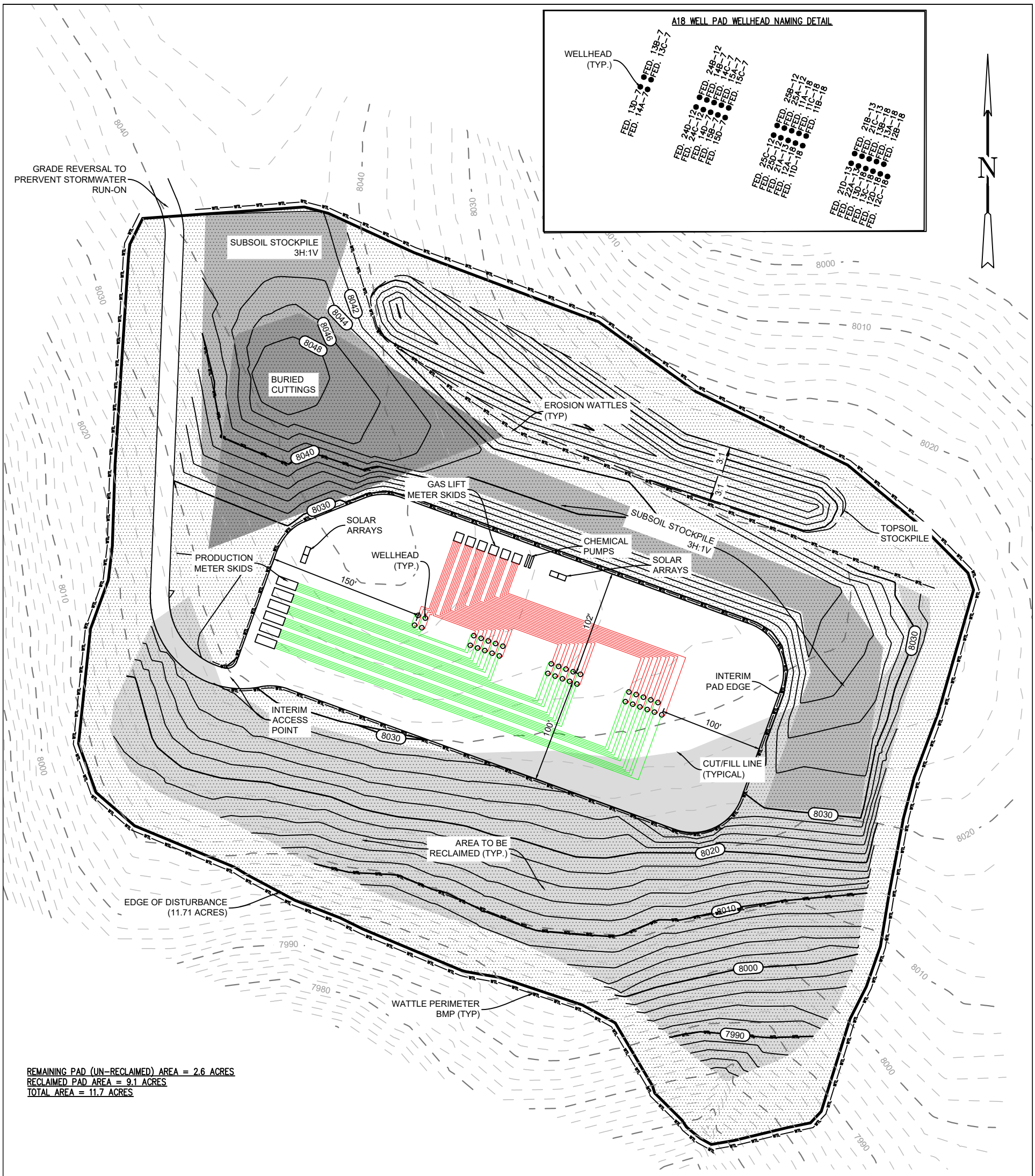
ELU A18 495 WELL PAD
NW1/4 NW1/4, SECTION 18, T4S, R95W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

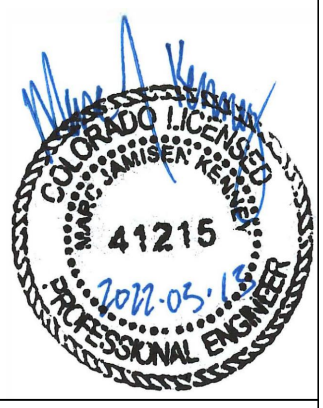
INTERIM RECLAIMATION PLAN

DESIGNED BY: MJK	DATE: 2020.06.09	FIGURE #4A	
DRAWN BY: ES	DATE: 2022.03.13	PROJECT NO: 2107-00252.14	Rev: 0



REMAINING PAD (UN-RECLAIMED) AREA = 2.6 ACRES
RECLAIMED PAD AREA = 9.1 ACRES
TOTAL AREA = 11.7 ACRES

NOTES
1. CONTOUR INTERVAL IS 2 FEET.
2. EXCESS MATERIAL WILL BE TAKEN OFF SITE WHERE IT WILL BE USED TO IMPROVE INFRASTRUCTURE (EG. ROADWAYS) OF CONOCOPHILIPS LANDHOLDINGS.
3. EXISTING TOPOGRAPHY AND FEATURE DATA WERE COLLECTED BY WASATCH SURVEYING.
4. WELL PAD DIMENSIONS PROVIDED BY CAERUS OIL & GAS LLC.



100' 0' 100'
SCALE: 1 INCH = 100 FEET
CONTOUR INTERVAL = 2 FT

WASATCH SURVEYING ASSOCIATES
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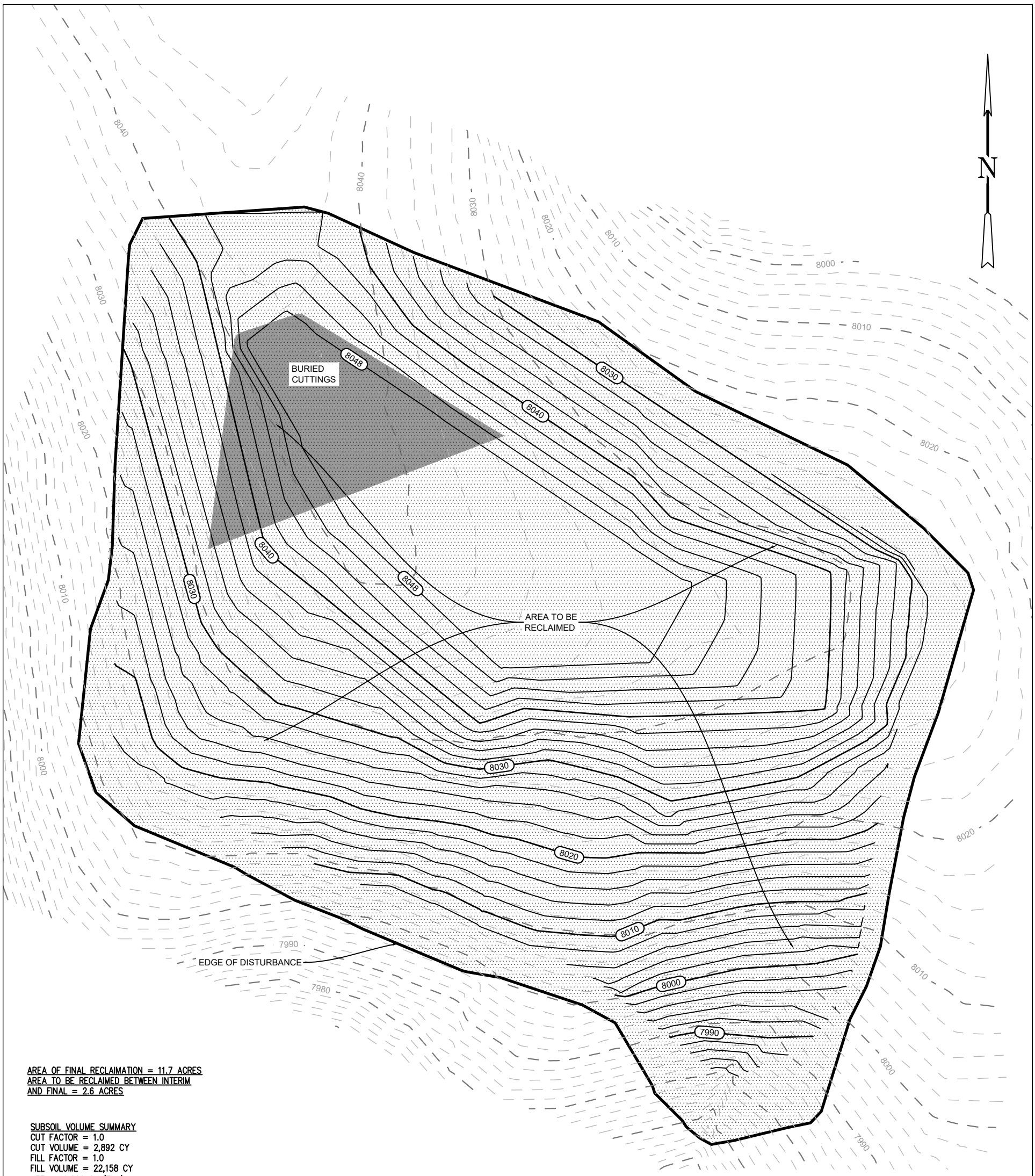
ELU A18 495 WELL PAD
NW1/4 NW1/4, SECTION 18, T4S, R95W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

INTERIM RECLAIMATION AND PLAN PRODUCTION SCHEMATIC			
DESIGNED BY: MJK	DATE: 2020.06.09	FIGURE #4B	
DRAWN BY: ES	DATE: 2022.03.13	PROJECT NO: 2107-00252.14	Rev: 0



AREA OF FINAL RECLAIMATION = 11.7 ACRES
AREA TO BE RECLAIMED BETWEEN INTERIM AND FINAL = 2.6 ACRES

SUBSOIL VOLUME SUMMARY
CUT FACTOR = 1.0
CUT VOLUME = 2,892 CY
FILL FACTOR = 1.0
FILL VOLUME = 22,158 CY
NET = 19,266 CY (FILL)

TOPSOIL VOLUME
EXISTING TOPSOIL AREA WEIGHTED DEPTH = 6.2 IN
AREA OF DISTURBANCE = 2.6 ACRES
EXISTING TOPSOIL PILE VOLUME = 2,903 CY (FILL)
TOPSOIL VOLUME USED FOR FINAL RECLAMATION = 2,169 CY (CUT)

NOTES
1. CONTOUR INTERVAL IS 2 FEET.
2. EXISTING TOPOGRAPHY AND FEATURE DATA WERE COLLECTED BY WASATCH SURVEYING.
3. WELL PAD DIMENSIONS PROVIDED BY CAERUS OIL & GAS LLC.

COLORADO LICENSED
MARC JAMISEN KENNEY
41215
2022-03-13
PROFESSIONAL ENGINEER

100' 0' 100'
SCALE: 1 INCH = 100 FEET
CONTOUR INTERVAL = 2 FT

WASATCH SURVEYING
WASATCH SURVEYING ASSOCIATES
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Grand Junction, CO 81501

CAERUS OIL & GAS LLC

ELU A18 495 WELL PAD
NW1/4 NW1/4, SECTION 18, T4S, R95W, 6TH P.M.
RIO BLANCO COUNTY, COLORADO

FINAL RECLMATION

DESIGNED BY: MJK	DATE: 2020.06.09	**FIGURE #5**	
Rev: 0 DRAWN BY: ES	DATE: 2022.03.13	PROJECT NO: 2107-00252.14	

APPENDIX B

TOPSOIL SAMPLES FIELD OBSERVATIONS AND LABORATORY ANALYSIS

SOIL SAMPLE AND PIT LOCATION 1

Topsoil Depth	Munsell Color	Texture	Comments
0-8”	10 YR 3/3	Sandy clay loam	No gravel present, low on granular, moderate organic content, dry
8+”	10 YR 4/4	Loamy sand	Weathered sandstone layer at approximately 8 inches in depth.

Laboratory Analysis Results 0-8 Inches Composite Soil Sample	
Parameter	
pH	6.7
EC (Conductivity) mmhos/cm	0.13
Texture	Clay loam
SAR	N/A
Nitrate-N Ca-P, ppm N	4.1
Nitrate-N, lbs N/Acre	10
Phosphorus Olsen P, ppm P	9.6
Potassium NH4OAc, ppm K	126
Sulfate Ca-P, ppm S	4.5
Zinc DTPA, ppm Zn	0.45
Iron DTPA, ppm Fe	19.7
Manganese DTPA, ppm Mn	4.6
Copper DTPA, ppm Cu	0.52
Calcium NH4OAc, ppm Ca	4471
Magnesium NH4OAc, ppm Mg	769
Sodium NH4OAc, ppm Na	68
Soil Organic Matter LOI, %	6.1
Cation Exchange Capacity (CEC)	N/A
Overall Rating	Good

Please note a photo is unavailable for this soil pit location.

SOIL SAMPLE AND PIT LOCATION 2

Topsoil Depth	Munsell Color	Texture	Comments
0-8”	10 YR 4/4	Loam	No gravel present, low on granular, low to moderate organic content, dry
8+”	10 YR 4/4	Loamy sand	Weathered sandstone layer at approximately 8 inches in depth.

Laboratory Analysis Results 0- 8 Inches Composite Soil Sample	
Parameter	
pH	6.8
EC (Conductivity) mmhos/cm	0.1
Texture	Loam
SAR	N/A
Nitrate-N Ca-P, ppm N	1.9
Nitrate-N, lbs N/Acre	5
Phosphorus Olsen P, ppm P	21.5
Potassium NH4OAc, ppm K	152
Sulfate Ca-P, ppm S	2.7
Zinc DTPA, ppm Zn	0.58
Iron DTPA, ppm Fe	34.6
Manganese DTPA, ppm Mn	5.5
Copper DTPA, ppm Cu	0.74
Calcium NH4OAc, ppm Ca	4071
Magnesium NH4OAc, ppm Mg	659
Sodium NH4OAc, ppm Na	17
Soil Organic Matter LOI, %	3.7
Cation Exchange Capacity (CEC)	N/A
Overall Rating	Good

Please note a photo is unavailable for this soil pit location.

SOIL SAMPLE AND PIT LOCATION 3

Topsoil Depth	Munsell Color	Texture	Comments
0-5 inches	10 YR 3/3	Loam	Low organic matter, granular
5+ inches	10 YR 4/4	Loamy sand	Weathered sandstone, low to moderate friable

Laboratory Analysis Results 0- 5 Inches Composite Soil Sample	
Parameter	
pH	7.5
EC (Conductivity) mmhos/cm	0.1
Texture	Loam
Nitrate-N NO_3-N, ppm N	0.1
Phosphorus AB-DTPA, ppm P	0.2
Potassium NH4OAc, ppm K	34
Sulfate Ca-P, ppm S	0.0
Zinc AB-DTPA, ppm Zn	0.1
Iron AB-DTPA, ppm Fe	5.7
Manganese AB-DTPA, ppm Mn	0.4
Copper AB-DTPA, ppm Cu	0.2
Calcium CaCO3, ppm Ca	0.1
Soil Organic Matter LOI, %	2.8
Exchangeable Sodium Percentage (ESP)	0.56
Overall Rating	Good

Soil Sample and Pit Location 3

SOIL SAMPLE AND PIT LOCATION 4

Topsoil Depth	Munsell Color	Texture	Comments
0-5”	10 YR 4/4	Sandy clay loam	Presence of root structure, low organic material
5+”	10 YR 4/4	Loamy sand	Weathered sandstone, low to moderate friable

Laboratory Analysis Results 0- 5 Inches Composite Soil Sample	
Parameter	
pH	7.2
EC (Conductivity) mmhos/cm	0.1
Texture	Loam
Nitrate-N NO_3-N, ppm N	0.1
Phosphorus AB-DTPA, ppm P	0.2
Potassium NH4OAc, ppm K	67
Sulfate Ca-P, ppm S	0.0
Zinc AB-DTPA, ppm Zn	0.1
Iron AB-DTPA, ppm Fe	6.8
Calcium CaCO3, ppm Ca	0.1
Manganese AB-DTPA, ppm Mn	1.5
Copper AB-DTPA, ppm Cu	0.8
Soil Organic Matter LOI, %	3.8
Exchangeable Sodium Percentage (ESP)	0.64
Overall Rating	Good

Soil Sample and Pit Location 4

SOIL SAMPLE AND PIT LOCATION 5

Topsoil Depth	Munsell Color	Texture	Comments
0-5”	10 YR 4/4	Sandy clay loam	Presence of root structure, low organic material
5+”	10 YR 4/4	Loamy sand	Weathered sandstone, low to moderate friable

Laboratory Analysis Results 0- 5 Inches Composite Soil Sample	
Parameter	
pH	7.4
EC (Conductivity) mmhos/cm	0.1
Texture	Loam
Nitrate-N NO3-N, ppm N	0.1
Phosphorus AB-DTPA, ppm P	0.3
Potassium NH4OAc, ppm K	91.1
Sulfate Ca-P, ppm S	0.0
Zinc AB-DTPA, ppm Zn	0.1
Iron AB-DTPA, ppm Fe	4.0
Calcium CaCO3, ppm Ca	0.1
Manganese AB-DTPA, ppm Mn	1.2
Copper AB-DTPA, ppm Cu	0.5
Soil Organic Matter LOI, %	4.4
Exchangeable Sodium Percentage (ESP)	0.71
Overall Rating	Good

Soil Sample and Pit Location 5

SOIL SAMPLE AND PIT LOCATION 6

Topsoil Depth	Munsell Color	Texture	Comments
0-6”	10 YR 4/4	Sandy clay loam	Presence of root structure, low organic material
6+”	10 YR 4/4	Loamy sand	Weathered sandstone, low to moderate friable

Laboratory Analysis Results 0- 6 Inches Composite Soil Sample	
Parameter	
pH	7.5
EC (Conductivity) mmhos/cm	0.1
Texture	Sandy clay loam
Nitrate-N NO_3-N, ppm N	0.1
Phosphorus AB-DTPA, ppm P	0.2
Potassium NH4OAc, ppm K	61.7
Sulfate Ca-P, ppm S	0.0
Zinc AB-DTPA, ppm Zn	0.1
Iron AB-DTPA, ppm Fe	4.0
Manganese AB-DTPA, ppm Mn	1.0
Copper AB-DTPA, ppm Cu	0.5
Soil Organic Matter LOI, %	4.1
Exchangeable Sodium Percentage (ESP)	0.71
Overall Rating	Good

Soil Sample and Pit Location 6

APPENDIX C

TOPSOIL PROTECTION BEST MANAGEMENT PRACTICES

Topsoil Protection BMPs

- Protection from Contamination - based on changes in physical characteristics (e.g., organic content, color, texture, density, or consistency) soil horizons will be segregated and stockpiled separately; topsoil stockpiles will be separated by compacted earthen berms, sediment control logs, straw bale barriers, etc.; and stabilizing stockpile surfaces to control for erosion and sedimentation;
- Protection from Compaction - topsoil stockpiles will be indicated on site with signage; stockpiles will be placed in areas away from vehicle and equipment traffic; and when stockpiling, compaction will be minimized by limiting the number of equipment passes, limiting stockpile height, and using vegetation;
- Maintaining Microbial Activity – topsoil stockpiles will be seeded with an ecologically site appropriate seed mix for long-term storage piles to help maintain biological activity and provide a seed bank of viable seed. If long-term stockpiling or deep stockpiling cannot be avoided, application of mycorrhizal inoculants (see section below) may also be used to help ensure the topsoil maintains optimal condition for reclamation purposes.
- Protection from Wind Erosion - surface roughening, applying hydro-seed/mulch, using soil tackifier, covering stockpiles with rolled erosion control products or other similar measures;
- Protection from Water Erosion - surface roughening, applying hydro-seed/mulch, using soil tackifier, covering stockpiles with rolled erosion control products or other similar measures; and
- Weed Establishment Prevention - mechanical, biological, and chemical controls will be used to prevent the establishment of weeds.