

FORM  
2A

Rev  
08/13

State of Colorado  
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203  
Phone: (303) 894-2100 Fax: (303) 894-2109



Document Number:

401524113

Date Received:

02/26/2018

Oil and Gas Location Assessment

☒ New Location ☐ Refile ☐ Amend Existing Location Location#: \_\_\_\_\_

This Oil and Gas Location Assessment is to be submitted to the COGCC for approval prior to any ground disturbance activity associated with oil and gas operations. Approval of this Oil and Gas Location Assessment will allow for the construction of the below specified Location; however, it does not supersede any land use rules applied by the local land use authority. Please see the COGCC website at <http://cogcc.state.co.us/> for all accompanying information pertinent this Oil and Gas Location Assessment.

Location ID:

Expiration Date:

☒ This location assessment is included as part of a permit application.

CONSULTATION

- ☐ This location is included in a Comprehensive Drilling Plan. CDP # \_\_\_\_\_
- ☐ This location is in a sensitive wildlife habitat area.
- ☐ This location is in a wildlife restricted surface occupancy area.
- ☐ This location includes a Rule 306.d.(1)A.ii. variance request.

Operator

Operator Number: 10459

Name: EXTRACTION OIL & GAS INC

Address: 370 17TH STREET SUITE 5300

City: DENVER State: CO Zip: 80202

Contact Information

Name: Alyssa Andrews

Phone: (720) 481-2379

Fax: ( )

email: aandrews@extractionog.com

RECLAMATION FINANCIAL ASSURANCE

☒ Plugging and Abandonment Bond Surety ID: 20130028 ☐ Gas Facility Surety ID: \_\_\_\_\_

☐ Waste Management Surety ID: \_\_\_\_\_

LOCATION IDENTIFICATION

Name: NORTHWEST A PAD Number: \_\_\_\_\_

County: BROOMFIELD

QuarterQuarter: NWNW Section: 9 Township: 1S Range: 68W Meridian: 6 Ground Elevation: 5314

Define a single point as a location reference for the facility location. When the location is to be used as a well site then the point shall be a well location.

Footage at surface: 1305 feet FNL from North or South section line

744 feet FWL from East or West section line

Latitude: 39.983115 Longitude: -105.013168

PDOP Reading: 1.3 Date of Measurement: 12/21/2017

Instrument Operator's Name: T. WINNICKI

## RELATED REMOTE LOCATIONS

(Enter as many Related Locations as necessary. Enter the Form 2A document # only if there is no established COGCC Location ID#)

**This proposed Oil and Gas Location is:**

**LOCATION ID #**

**FORM 2A DOC #**

Well Site is served by Production Facilities

401606721

401525931

401606738

## FACILITIES

Indicate the number of each type of oil and gas facility planned on location

Wells	8	Oil Tanks*		Condensate Tanks*		Water Tanks*		Buried Produced Water Vaults*	
Drilling Pits		Production Pits*		Special Purpose Pits		Multi-Well Pits*		Modular Large Volume Tanks	
Pump Jacks		Separators*		Injection Pumps*		Cavity Pumps*		Gas Compressors*	
Gas or Diesel Motors*		Electric Motors		Electric Generators*		Fuel Tanks*		LACT Unit*	
Dehydrator Units*		Vapor Recovery Unit*		VOC Combustor*		Flare*		Pigging Station*	

## OTHER FACILITIES\*

**Other Facility Type**

**Number**

GAS LIFT METERED BUILDING

1

\*Those facilities indicated by an asterisk (\*) shall be used to determine the distance from the Production Facility to the nearest cultural feature on the Cultural Setbacks Tab.

Per Rule 303.b.(3)C, description of all oil, gas, and/or water pipelines:

Extraction will trench flowlines in one piping corridor that runs between the drill pad and the separator pad and be placed at 12" centers. These lines will most likely be 2" or 3" fusion bonded SCH160 steel pipe and have proper cathodic protection throughout the run. Extraction will then sweep up with a long radius that will tie off each line to the appropriate separator. All welds on these are 100% x-ray and hydro tested to the API and Manufactures specs for a class 1500 series flange. Also meets ASME code B31.4.

## CONSTRUCTION

Date planned to commence construction: 07/01/2018 Size of disturbed area during construction in acres: 4.43

Estimated date that interim reclamation will begin: 10/01/2018 Size of location after interim reclamation in acres: 1.07

Estimated post-construction ground elevation: 5314

## DRILLING PROGRAM

Will a closed loop system be used for drilling fluids: Yes

Is H<sub>2</sub>S anticipated? No

Will salt sections be encountered during drilling: No

Will salt based mud (>15,000 ppm Cl) be used? No

Will oil based drilling fluids be used? Yes



## DRILLING WASTE MANAGEMENT PROGRAM

Drilling Fluids Disposal: OFFSITE

Drilling Fluids Disposal Method: Commercial Disposal

Cutting Disposal: OFFSITE

Cuttings Disposal Method: Commercial Disposal

Other Disposal Description:

The oil-based cuttings will be disposed of similarly and the water-based cuttings may be applied to the land application, facility ID 449314. Both disposal methods may be used for the water-based cuttings.

Beneficial reuse or land application plan submitted? \_\_\_\_\_

Reuse Facility ID: \_\_\_\_\_ or Document Number: \_\_\_\_\_

Centralized E&P Waste Management Facility ID, if applicable: \_\_\_\_\_

## SURFACE & MINERALS & RIGHT TO CONSTRUCT

Name: City&County of Broomfield

Phone: \_\_\_\_\_

Address: One DesCombes Dr.

Fax: \_\_\_\_\_

Address: \_\_\_\_\_

Email: \_\_\_\_\_

City: Broomfield State: CO Zip: 80020

Surface Owner: ☒ Fee ☐ State ☐ Federal ☐ Indian

Check all that apply. The Surface Owner: ☒ is the mineral owner

☒ is committed to an oil and Gas Lease

☒ has signed the Oil and Gas Lease

☐ is the applicant

The Mineral Owner beneath this Oil and Gas Location is: ☒ Fee ☐ State ☐ Federal ☐ Indian

The Minerals beneath this Oil and Gas Location will be developed from or produced to this Oil and Gas Location: No

The right to construct this Oil and Gas Location is granted by: Surface Use Agreement

Surface damage assurance if no agreement is in place: \_\_\_\_\_ Surface Surety ID: \_\_\_\_\_

Date of Rule 306 surface owner consultation \_\_\_\_\_

## CURRENT AND FUTURE LAND USE

Current Land Use (Check all that apply):

Crop Land: ☐ Irrigated ☒ Dry land ☐ Improved Pasture ☐ Hay Meadow ☐ CRP

Non-Crop Land: ☐ Rangeland ☐ Timber ☐ Recreational ☐ Other (describe): \_\_\_\_\_

Subdivided: ☐ Industrial ☐ Commercial ☐ Residential

Future Land Use (Check all that apply):

Crop Land: ☐ Irrigated ☒ Dry land ☐ Improved Pasture ☐ Hay Meadow ☐ CRP

Non-Crop Land: ☐ Rangeland ☐ Timber ☐ Recreational ☐ Other (describe): \_\_\_\_\_

Subdivided: ☐ Industrial ☐ Commercial ☐ Residential

## CULTURAL DISTANCE INFORMATION

Provide the distance to the nearest cultural feature as measured from Wells or Production Facilities onsite.

	From WELL	From PRODUCTION FACILITY
Building:	816 Feet	910 Feet
Building Unit:	1045 Feet	1104 Feet
High Occupancy Building Unit:	4147 Feet	4044 Feet
Designated Outside Activity Area:	5280 Feet	5280 Feet
Public Road:	318 Feet	224 Feet
Above Ground Utility:	1246 Feet	1150 Feet
Railroad:	5280 Feet	5280 Feet
Property Line:	66 Feet	6 Feet

### INSTRUCTIONS:

- All measurements shall be provided from center of nearest Well or edge of nearest Production Facility to nearest of each cultural feature as described in Rule 303.b.(3)A.
- Enter 5280 for distance greater than 1 mile.
- Building - nearest building of any type. If nearest Building is a Building Unit, enter same distance for both.
- Building Unit, High Occupancy Building Unit, and Designated Outside Activity Area - as defined in 100-Series Rules.
- For measurement purposes only, Production Facilities should only include those items with an asterisk(\*) on the Facilities Tab.

## DESIGNATED SETBACK LOCATION INFORMATION

Check all that apply. This location is within a:

- ☐ Buffer Zone
- ☐ Exception Zone
- ☐ Urban Mitigation Area

- Buffer Zone - as described in Rule 604.a.(2), within 1,000' of a Building Unit.
- Exception Zone - as described in Rule 604.a.(1), within 500' of a Building Unit.
- Urban Mitigation Area - as defined in 100-Series Rules.
- Large UMA Facility - as defined in 100-Series Rules.

Pre-application Notifications (required if location is within 1,000 feet of a building unit):

Date of Rule 305.a.(1) Urban Mitigation Area Notification to Local Government: \_\_\_\_\_

Date of Rule 305.a.(2) Buffer Zone Notification to Building Unit Owners: \_\_\_\_\_

## FOR MULTI-WELL PADS AND PRODUCTION FACILITIES WITHIN DESIGNATED SETBACK LOCATIONS ONLY:

- ☐ Check this box if this Oil and Gas Location has or will have Production Facilities that serve multiple wells (on or offsite) and the Production Facilities are proposed to be located less than 1,000 feet from a Building Unit. *(Pursuant to Rule 604.c.(2)E.i., the operator must evaluate alternative locations for the Production Facilities that are farther from the Building Unit, and determine whether those alternative locations were technically feasible and economically practicable for the same proposed development.)*
- ☐ By checking this box, I certify that no alternative placements for the Production Facilities, farther from the nearest Building Unit, were available based on the analysis conducted pursuant to Rule 604.c.(2)E.i.

In the space below, explain rationale for siting the multi-well Production Facility(ies) that supports your Rule 604.c.(2)E.i determination. Attach documentation that supports your determination to this Form 2A.

## SOIL

List all soil map units that occur within the proposed location. attach the National Resource Conservation Service (NRCS) report showing the "Map Unit Description" report listing the soil typical vertical profile. This data is to be used when segregating topsoil.

The required information can be obtained from the NRCS web site at <http://soildatamart.nrcs.usda.org/> or from the COGCC web site GIS Online map page found at <http://colorado.gov/cogcc>. Instructions are provided within the COGCC web site help section.

NRCS Map Unit Name: ReD—Renohill loam, 3 to 9 percent slopes

NRCS Map Unit Name: UIC—Ulm loam, 3 to 5 percent slopes

NRCS Map Unit Name: \_\_\_\_\_

## PLANT COMMUNITY:

Complete this section only if any portion of the disturbed area of the location's current land use is on non-crop land.

Are noxious weeds present: Yes ☐ No ☒

Plant species from: ☐ NRCS or, ☐ field observation Date of observation: \_\_\_\_\_

List individual species: \_\_\_\_\_

### Check all plant communities that exist in the disturbed area.

- ☐ Disturbed Grassland (Cactus, Yucca, Cheatgrass, Rye)  
☐ Native Grassland (Bluestem, Grama, Wheatgrass, Buffalograss, Fescue, Oatgrass, Brome)  
☐ Shrub Land (Mahogany, Oak, Sage, Serviceberry, Chokecherry)  
☐ Plains Riparian (Cottonwood, Willow, Aspen, Maple, Poplar, Russian Olive, Tamarisk)  
☐ Mountain Riparian (Cottonwood, Willow, Blue Spruce)  
☐ Forest Land (Spruce, Fir, Ponderosa Pine, Lodgepole Pine, Juniper, Pinyon, Aspen)  
☐ Wetlands Aquatic (Bullrush, Sedge, Cattail, Arrowhead)  
☐ Alpine (above timberline)  
☐ Other (describe): \_\_\_\_\_

## WATER RESOURCES

Is this a sensitive area: ☐ No ☒ Yes

Distance to nearest

downgradient surface water feature: \_\_\_\_\_ 60 Feet

water well: \_\_\_\_\_ 956 Feet

Estimated depth to ground water at Oil and Gas Location \_\_\_\_\_ 50 Feet

Basis for depth to groundwater and sensitive area determination:

Surface water feature: Ditch 314' E from the reference area point - 60 feet from the edge of disturbance.  
Nearest water well: Permit # 90995- - , 675' S abandoned, Active water well permit 88207 is 956 feet north with a depth of 70 feet.  
Monitoring well permit number 47271MH approx 1130 feet SW has a depth of 50 feet - used 50 feet as depth to groundwater

Is the location in a riparian area: ☒ No ☐ Yes

Was an Army Corps of Engineers Section 404 permit filed ☒ No ☐ Yes If yes attach permit.

Is the location within a Rule 317B Surface Water Supply Area buffer \_\_\_\_\_ No  
zone:

If the location is within a Rule 317B Surface Water Supply Area buffer have all public water supply systems within 15 miles been notified: \_\_\_\_\_

Is the Location within a Floodplain? ☒ No ☐ Yes Floodplain Data Sources Reviewed (check all that apply)

☐ Federal (FEMA)

☒ State

☐ County

☐ Local

☐ Other \_\_\_\_\_

## GROUNDWATER BASELINE SAMPLING AND MONITORING AND WATER WELL SAMPLING

Water well sampling required per Rule \_\_\_\_\_ 318A

## WILDLIFE

☐

This location is included in a Wildlife Mitigation Plan

☐ This location was subject to a pre-consultation meeting with CPW held on \_\_\_\_\_

### Operator Proposed Wildlife BMPs

No BMP

### CPW Proposed Wildlife BMPs

No BMP

## DESIGNATED SETBACK LOCATION EXCEPTIONS

Check all that apply:

- ☐ Rule 604.a.(1)A. Exception Zone (within 500' of a Building Unit) and is in an Urban Mitigation Area
- ☐ Rule 604.b.(1)A. Exception Location (existing or approved Oil & Gas Location now within a Designated Setback as a result of Rule 604.a.)
- ☐ Rule 604.b.(1)B. Exception Location (existing or approved Oil & Gas Location is within a Designated Setback due to Building Unit construction after Location approval)
- ☐ Rule 604.b.(2) Exception Location (SUA or site-specific development plan executed on or before August 1, 2013)
- ☐ Rule 604.b.(3) Exception Location (Building Units constructed after August 1, 2013 within setback per an SUA or site-specific development plan)

## RULE 502.b VARIANCE REQUEST

☐ Rule 502.b. Variance Request from COGCC Rule or Spacing Order Number \_\_\_\_\_

ALL exceptions and variances require attached Request Letter(s). Refer to applicable rule for additional required attachments (e.g. waivers, certifications, SUAs).

## OPERATOR COMMENTS AND SUBMITTAL

Comments

Reference well for Location Identification: Northwest A S20-25-6N

Notification Zone Drawing and UMA Check Exhibit both attached as "OTHER". This location is not in a buffer zone. This location is not within a Large UMA.

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.

Signed: \_\_\_\_\_ Date: 02/26/2018 Email: aandrews@extractionog.com

Print Name: Alyssa Andrews Title: Regulatory Analyst

Based on the information provided herein, this Application for Permit-to-Drill complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: \_\_\_\_\_ Director of COGCC Date: \_\_\_\_\_

## Conditions Of Approval

**All representations, stipulations and conditions of approval stated in this Form 2A for this location shall constitute representations, stipulations and conditions of approval for any and all subsequent operations on the location unless this Form 2A is modified by Sundry Notice, Form 4 or an Amended Form 2A.**

<b>COA Type</b>	<b>Description</b>
Planning	In addition to the samples collected in accordance with Rule 318A.f, Extraction shall submit the analytical results to COGCC of all other samples collected from permitted water wells and permitted springs in both Adams County and Broomfield that are within 1/2 mile of the Oil and Gas Location. The operator shall notify the director immediately if there are methane detections as described in Rule 318A.F(8) or if BTEX compounds or TPH are detected in a water sample. The operator shall submit the analytical results to COGCC via a Form 4 Sundry, in an electronic data deliverable (EDD) format, consistent with the procedures in Rule 318.f.(10).
Construction	The Approved Form 2A permit will be posted at the location during construction, drilling, and completions operations.

### **Best Management Practices**

<b>No</b>	<b>BMP/COA Type</b>	<b>Description</b>
1	Planning	Site security will be maintained at all times. Location will be adequately fenced to restrict access by unauthorized persons. The site will have gated access to keep unauthorized vehicles out and fencing will be placed around all production equipment.
2	Planning	The location was approved by an Oil and Gas Operator Agreement with Broomfield on October 24, 2017. The development of this location is subject to a Comprehensive Drilling Plan (CDP) approval from The City and County of Broomfield. Operator is currently working through the CDP application with the City and County of Broomfield staff.
3	Planning	Backup stabbing valves will be required on well servicing operations during reverse circulation. Valves shall be pressure tested before each well servicing operation using both low-pressure air and high-pressure fluid.
4	Planning	All ground within twenty-five (25) feet of any tank, or other structure containing flammable or combustible materials, shall be kept free of dry weeds, grass or rubbish, and shall conform to COGCC 600 Series Safety Regulations and the applicable Fire Code.
5	Planning	Extraction maintains a Tactical Response Plan (TRP), also at times referred to as the Emergency Response Plan, which is designed to provide Extraction employees and designated Emergency Response Team (ERT) members with the information necessary to respond to incidents in a safe, rapid, effective, and efficient manner. The TRP is kept at Extraction's office and a copy is provided to the North Metro Fire Rescue District and the City of Broomfield. Extraction will place the TRP summary card in strategic places on the facilities during specific operational and copies of the summary card is provided to the North Metro Fire Rescue District to be kept in the responding fire engines.
6	Planning	Operator will bring a new oil, gas, and water pipelines, to send produced volumes immediately down the pipeline. No production will flow to tanks on this location. Production will be piped to the Central Gathering System. If the CGF is not ready at the time of production, the wells will be temporarily shut in.
7	Community Outreach and Notification	Extraction will establish a live, 24-hour telephone hotline, as well as an email address, to receive feedback on our drilling and completion activities with the goal of having a tool for us to immediately investigate and address any complaints that arise.  Prior to the initiation of 24-hour operations (drilling) Extraction will mail a post card (to include the email address and 24 hour manned phone number) to residents within 1/2 mile of the location.
8	Traffic control	Access Roads: The access road will be constructed to accommodate local emergency vehicles. This road will be maintained for access at all times. Traffic will be routed to minimize local interruption. During construction and through the life of this location, Operator will utilize watering, via water trucks, to control fugitive dust. Additionally, the access road will be constructed with aggregate road base material and recycled asphalt and vehicle speeds will be limited to twenty five miles per hour to reduce dust. No untreated produced water or other process fluids shall be used for dust suppression.

9	Traffic control	A traffic plan is required by the City and County of Broomfield and shall be coordinated with the local jurisdiction prior to commencement of move in and rig up. Any subsequent modification to the traffic plan must be coordinated with the local jurisdiction.
10	General Housekeeping	Removal of Debris. All construction-related debris shall be removed from the site for proper disposal in a timely manner. The site shall be maintained free of debris and excess materials at all times during operation. Operator shall not burn or bury debris at any time on the Well Sites. Maintain appearance with garbage clean-up; a trash bin will be located on site to accumulate waste by the personnel drilling the wells. Site will have unused equipment, trash and junk removed immediately and legally disposed of as applicable.
11	General Housekeeping	Leak Detention Plan: Extraction will monitor production facilities weekly at a minimum to a maximum of daily to identify fluid leaks, including, but not limited to, visually inspecting all wellheads, tanks and fittings. Additionally annual SPCC inspections will be conducted and documented. Annual flowline testing will also occur according to COGCC rules 1101 and 1102. Inspection and record retention of flowline testing will be in accordance per COGCC regulation. All records will be made available to the COGCC upon request.
12	Storm Water/Erosion Control	Implement and maintain BMPs to control stormwater runoff in a manner that minimizes erosion, transport of sediment offsite, and site degradation. Co-locate flowlines and/or gathering lines whenever feasible, and mitigate any erosion problems that arise due to the construction of any gathering lines. Location will be covered under Extraction Oil & Gas's field wide permit, permit number COR03M013. Typical stormwater BMPs installed include a diversion ditch and berm with sediment traps and installation of wattles where necessary. Please see the attached Stormwater BMP drawings.
13	Material Handling and Spill Prevention	Automatic Safety Protective Systems and Surface Safety Valve. An automated safety system, governed by safety devices and a programmable logic computer, will be installed at the Well Sites. The automated safety system shall include the installation, monitoring and remote control of a Surface Safety Valve ("SSV") among many other engineered measures and devices that are implemented to greatly reduce or eliminate the potential for a well event. All New Wells will have a SSV installed prior to the commencement of the Production Phase connected to the production tubing at the surface. The SSV will be equipped to operate remotely via the automated safety protective system, which monitors multiple flowing pressures and rates which have predetermined maximum and/or minimum threshold values programmed and will remotely shut the well in should certain upset conditions be detected. Additionally, the automated safety system provides the ability to remotely shut-in wells on demand through operator remote intervention. The SSV will have documented quarterly testing to ensure functionality.
14	Material Handling and Spill Prevention	The location will be completely automated to monitor all production operations remotely. In the event that the facility is not operating under normal conditions, the automation system will immediately notify the operator. The automation system also has the ability to remotely perform an emergency shut down if necessary.
15	Dust control	805.c. Operator shall employ practices for control of fugitive dust caused by their operations. Such practices shall include but are not limited to the use of speed restrictions, regular road maintenance, restriction of construction activity during highwind days, and silica dust controls when handling sand used in hydraulic fracturing operations. Additional management practices such as road surfacing, wind breaks and barriers may be used. No untreated produced water or other process fluids shall be used for dust suppression.
16	Construction	803. Permanent lighting will be installed around the facility to allow both the operator and haulers to conduct safe operations at night. All lights will be directed downward, inward and shielded so light pollution is minimized.  During the Drilling and Completion Phases, consistent with applicable law, Operator will construct a 32 foot perimeter wall surrounding the well pads and operations area, as permitted, to reduce light escaping from the site.
17	Construction	Base beams will be used and not guy line anchors.

18	Construction	<p>Containment Berms. The Operator shall utilize steel-rim berms around all permanent facility equipment at the Well Sites with sufficient capacity to contain 1.5 times the maximum volume of all liquids that will be contained at a facility at any given time plus sufficient freeboard to prevent overflow. All berms and containment devices shall be inspected quarterly by the Operator and maintained in good condition. No potential ignition sources shall be installed inside the secondary containment area unless the containment area encloses a fired vessel or such sources are rated in accordance with industry codes and standards. Secondary containment such as duck ponds or lined earthen berms for temporary tanks shall also be used.</p> <p>A. Permanent containment berms shall be constructed of steel rings, designed and installed to prevent leakage and resist degradation from erosion or routine operation. B. Secondary containment for tanks shall be constructed with a synthetic or engineered liner that contains all primary containment vessels and is mechanically connected to the steel ring to prevent leakage.</p>
19	Noise mitigation	Quiet Technology. The Operator agrees to use the Liberty Quiet Fleet or comparable technology from an alternative vendor on all Well Sites for completion activities.
20	Noise mitigation	Thirty-two foot sound walls will be used during drilling and completion operations. Sound walls will be installed on the edges impacting nearest neighbors. Sound walls will be placed on the west, south, and south-east corner edges of the pad.
21	Noise mitigation	<p>Baseline noise monitoring will be conducted prior to commencement of pad construction. Additional sound mitigation measures will be considered and implemented pursuant to third party recommendations. All noise survey data will be made available to the COGCC inspector upon request.</p> <p>The Operator shall continuously monitor noise and continuously collect and store noise readings with instruments placed between the Oil and Gas Location and residential Building Units. The Operator shall conduct the monitoring and data collection during construction, drilling, and completions operations. This data shall be available to COGCC on tables or graphs within 48 hours of being requested by COGCC. The Operator shall conduct a 72 hour baseline noise survey from a minimum of three points prior to the commencement of construction.</p>
22	Noise mitigation	For the development wells, to provide long term noise mitigation at this location all production equipment will powered by electricity. If needed, sound mitigation panels will be installed around the compressors during production operations to shield sensitive areas.
23	Noise mitigation	Electrified Drilling Rig - Extraction is working with United Power to supply sufficient electrical power for the drilling rig to drill the wells. Easements are being procured from the Landowners and the existing infrastructure is being upgraded in order to handle the larger electrical loads. While Extraction plans on drilling these wells on electrical power only, the rig will have diesel-powered generators in the event of an upset condition with the electrical supply from United Power. At that point, Extraction would use the diesel generators to power the rig until service from United Power was restored.
24	Emissions mitigation	<p>This location is designed without permanent tanks. Oil, Gas, and produced water will be transported through a pipeline gathering to a Central Gathering Facility. Saleable gas will not be flared, it will be sent downline. For maintenance or upset conditions the use of a maintenance vessel and emission control devices will be utilized. Uncontrolled venting is prohibited other than where necessary for safety.</p> <p>Production will be piped to the Central Gathering System. If the CGF is not ready at the time of production, the wells will be temporarily shut in.</p>

25	Emissions mitigation	<p>Reduced Emission Completions (Commonly known as Green Completions). At Well Sites Operator shall employ reduced emission completions, also commonly known as green completions, which comply with federal and state requirements. In addition, Operator shall comply with the following:</p> <p>A. Gas gathering lines, separators, and sand traps capable of supporting green completions as described in COGCC Rule 805 shall be installed per the provisions of COGCC Rule 805.</p> <p>B. Operator shall comply with 40 CFR 60.5375(a)(1), (2) for green completions.</p> <p>C. Uncontrolled venting is prohibited other than where necessary for safety.</p> <p>D. Temporary flowback flaring and oxidizing equipment where allowed shall include the following:</p> <ol style="list-style-type: none"> <li>1. Adequately sized equipment to handle 1.5 times the largest flowback volume of gas from a vertical/directional and/or horizontally completed well respectively as reported to the COGCC in a ten mile radius;</li> <li>2. Valves and porting available to divert gas to flaring and oxidizing equipment; pursuant to the above Rules 40 CFR 60.5375 &amp; COGCC Rule 805;</li> <li>3. Auxiliary fueled with sufficient supply and heat to combust or oxidize noncombustible gases in order to control odors and hazardous gases. The flowback combustion device shall be equipped with a reliable continuous ignition source over the duration of flowback, except in conditions that may result in a fire hazard or explosion; and</li> <li>4. The Operator has a general duty to safely maximize resource recovery and minimize releases to the atmosphere during flowback and subsequent recovery/operation.</li> </ol>
26	Emissions mitigation	<p>Leak Detention Plan: Operator will monitor production facilities weekly at a minimum to a maximum of daily to identify fluid leaks, including, but not limited to, visually inspecting all wellheads and equipment. As part of Extraction's Leak Detection and Repair (LDAR) program, all equipment including above ground flowlines and piping will be inspected quarterly with an infra-red camera for the first 5 years of production.</p>
27	Emissions mitigation	<p>Exhaust. The exhaust from all engines, motors, coolers and other mechanized equipment shall be vented up or in a direction away from the nearest occupied building.</p>
28	Odor mitigation	<p>805. Oil &amp; gas facilities and equipment shall be operated in such a manner that odors do not constitute a nuisance or hazard to public welfare. Extraction will use a mud cooling system to control the release of odors within the drilling and fracturing fluids. Odor preventing additives will be on site for use if and when needed. Extraction will use a base fluid that will decrease the measurable BTEX and aromatic properties by more than 50% of regular diesel. Operator is prohibited from masking odors from any oil and gas facility site by using masking fragrances.</p>
29	Drilling/Completion Operations	<p>Blowout Prevention Equipment ("BOPE"): A double ram and annular preventer will be used during drilling. Stabbing valves shall be installed in the event of reverse circulation and shall be prior tested with low and high pressure fluid.</p>
30	Drilling/Completion Operations	<p>All fresh water for completions shall be transported to the well site via temporary water lines.</p>
31	Drilling/Completion Operations	<p>BOPE testing for drilling operations. Upon initial rig-up and at least once every thirty (30) days during drilling operations thereafter, pressure testing of the casing string and each component of the blowout prevention equipment including flange connections shall be performed to seventy percent (70%) of working pressure or seventy percent (70%) of the internal yield of casing, whichever is less. Pressure testing shall be conducted and the documented results shall be retained by the operator for inspection by the Director for a period of one (1) year. Activation of the pipe rams for function testing shall be conducted on a daily basis when practicable.</p>
32	Drilling/Completion Operations	<p>Closed chamber drill stem tests shall be allowed. All other drill stem tests shall require approval by the Director. None planned for this well.</p>
33	Drilling/Completion Operations	<p>All loadlines shall be bull plugged or capped.</p>
34	Drilling/Completion Operations	<p>Closed-Loop Pitless Systems for the Containment and/or Recycling of Drilling Fluids. Wells shall be drilled, completed and operated using closed-loop pitless systems for containment and/or recycling of all drilling, completion, flowback and produced fluids. Operator shall recycle fluids to the maximum extent practicable.</p>



35	Drilling/Completion Operations	Flowback Monitoring System: Autonomous 4 gas monitors will be placed around the location during the flowback phase.
36	Drilling/Completion Operations	Bradenhead Monitoring. Operator will conduct bradenhead monitoring on the New Wells as required on the relevant Applications for Permit to Drill - Form 2.
37	Drilling/Completion Operations	Well Integrity. Operator must equip the bradenhead access to the annulus between the production and the surface casing, as well as any intermediate casing, with a fitting to allow safe and convenient determinations of pressure and fluid flow. Valves used for annular pressure monitoring shall remain exposed and not buried to allow for visual inspection. The Operator shall take bradenhead pressure readings as required by the COGCC.
38	Interim Reclamation	Operator shall be responsible for segregating the topsoil, backfilling, re-compacting, reseeding, and re-contouring the surface of any disturbed area so as not to interfere with Owner's operations and shall reclaim such area to be returned to pre-existing conditions as best as possible with control of all noxious weeds.
39	Final Reclamation	Within 90 days subsequent to the time of plugging and abandonment of the entire site, superfluous debris and equipment shall be removed from the site. Identification of plugged and abandoned wells will be identified pursuant to 319.a.(5) The operator shall also inscribe or imbed the well number and date of plugging upon the permanent monument.
40	Final Reclamation	Reclamation. Operator must submit an oil and gas site reclamation plan and reclaim a Well Site not later than six (6) months after plugging and abandoning the last New Well at such Well Site, weather and planting season permitting.

Total: 40 comment(s)

### **Attachment Check List**

<b><u>Att Doc Num</u></b>	<b><u>Name</u></b>
2316326	EXHIBIT B
2316327	CORRESPONDENCE
2316365	LOCATION DRAWING
2316366	HYDROLOGY MAP
2316371	CORRESPONDENCE
2316391	PUBLIC COMMENT RESPONSE
401524113	FORM 2A SUBMITTED
401526544	OTHER
401526556	ACCESS ROAD MAP
401526587	FACILITY LAYOUT DRAWING
401526611	LOCATION PICTURES
401526612	MULTI-WELL PLAN
401526642	OTHER
401526649	NRCS MAP UNIT DESC
401526650	NRCS MAP UNIT DESC
401526653	SURFACE AGRMT/SURETY
401562835	OTHER
401573025	WASTE MANAGEMENT PLAN

Total Attach: 18 Files

### **General Comments**

<b><u>User Group</u></b>	<b><u>Comment</u></b>	<b><u>Comment Date</u></b>
OGLA	Email from Operator for updated distances to HOBu and replaced location drawing, updated water information and replaced hydrology map - discussed monitoring well depth to water via phone, updated disposal info for water based cuttings, updated BMPs per discussions between City of Broomfield, COGCC, and Operator. Attached Exhibit B from City of Broomfield MOU as reference.	07/06/2018

Permit	Permitting review complete.	07/05/2018
OGLA	OGLA review: Add related remote locations, need more for beneficial reuse as referenced in waste management plan, HOBUE appears to be closer than indicated on 2A or location drawing, dryland cropland, but NRCS is checked, water resources – surface water body is closer, should be sensitive area based on surface water, water well on 2A is abandoned; monitoring well with shallower depth and active well to the north, Hydrology map appears to have buffer from reference area point.	06/27/2018
LGD	<p>As the Local Government Designee for the City and County of Broomfield (Broomfield), Broomfield would like to provide the COGCC with an update related to Extraction Oil and Gas, LLC (Extraction) Form 2A permits, by the Colorado Oil and Gas Conservation Commission (COGCC), including the following permit applications:</p> <p>401524109 United Pad</p> <p>401524113 Northwest A Pad</p> <p>401525931 Northwest B Pad</p> <p>By way of an update to the COGCC, on October 24, 2017, Extraction and Broomfield entered into an Amended and Restated Operator Agreement (Agreement). Section 9 of the Agreement provides that Extraction must submit a “Comprehensive Drilling Plan and Application” to Broomfield for such new wells or well sites (Plan). Per the Agreement, that Plan is subject to the review and approval by the City.</p> <p>Broomfield has not approved the Plan as required by the Agreement. Broomfield has been working diligently with Extraction on the Plan, through weekly meetings and timely and reasonable communications with Extraction. The COGCC spacing orders for these spacing units, dated as of October 31, 2017, indicate that any Permits for the wells within these spacing units must “comport with” the Agreement.</p> <p>As stated above, Section 9 of the Agreement provides that Extraction must submit the Plan for all of the well sites that is subject to Broomfield’s approval. On December 15, 2017, Extraction submitted a draft Plan for the Livingston and Interchange B well pads. On January 22, 2018, Broomfield submitted 220 comments on that draft Plan, which included the comment that the Agreement requires the Plan to be for all of the well sites (Comments). Broomfield is still reviewing the last draft of the Plan, which is over 1460 pages in length. Many of Broomfield’s comments on the Plan and Extraction’s responses have included the addition of best management practices that may be enforceable by the COGCC.</p> <p>In both citizens’ and staff comments we have identified areas where Broomfield is requesting additional information and where we believe the Plan is not complete. Broomfield believes that Extraction has an obligation to correct or update any deficient statements in the Plan. The issues that remain outstanding in the Plan include the following:</p> <ul style="list-style-type: none"> <li>•At meetings with Extraction, Broomfield continues to identify engineering issues that need to be resolved before permitting of the pipeline for all the well sites could go forward.</li> <li>•As of the date of these comments, Broomfield is still working with Extraction on required updates to its Emergency Response Plan and Risk Analysis Plan before those can be approved. Extraction has not identified each type of hazard for each location and specific mitigation measures.</li> <li>•It is Broomfield’s understanding that Extraction has yet to talk with all affected Broomfield and Adams County residents to determine their desired mitigation measures for the well sites and truck roads to the north, even though Extraction committed to such individual communications.</li> <li>•Extraction has not committed in writing to all necessary specific mitigation measures between residents and well sites to the north and east of residents in</li> </ul>	05/25/2018

	<p>Adams County and Broomfield.</p> <ul style="list-style-type: none"> <li>•Extraction has not submitted a final pavement design report for approval by the City and County Engineer.</li> <li>•Extraction has yet to agree in the Plan to ensure the safety of emergency response teams, construction workers and the general public. Extraction has yet to agree in the Plan that Buffers shall be created as required on site to shield dust, noise, and light from residents</li> <li>•Broomfield is still reviewing Extraction'slong term reclamation plan.</li> <li>•Extraction has not provided a complete explanation of its noise modeling approach.</li> <li>•Extraction has not detailed the noise reduction levels it can achieve.</li> <li>•Extraction has not provided written detail on the process of "Conduct Recovery Operations" including involvement of Broomfield's Public Health Division.</li> <li>•</li> <li>•Extraction has not complied with 2 requirements for the Wetlands Plan.</li> <li>•Extraction has given only general responses to specific environmental site review requests.</li> <li>•Extraction has not provided a detailed visual mitigation plan for the well sites, service road, or pig launcher station.</li> <li>•Extraction has not provided a Drainage Report signed and stamped by a Colorado RegisteredProfessional Engineer. Should be in accordance with Section 100 and 600 of the Broomfield Standards and Specifications.</li> </ul> <p>oPer section 610.00 All ponding facilities shall be of the detention type. Retention Ponds will not be approved</p> <p>oAll ponds should provide water quality</p> <p>oAll ponds must drain completely within 72 hours.</p> <p>oShould be designed for a minor storm of 10yr and a major of 100yr</p> <p>oAll reports should include the SDI spreadsheet. For more information see the following website:<a href="https://maperture.digitaldataservices.com/gvh/?viewer=cswdif">https://maperture.digitaldataservices.com/gvh/?viewer=cswdif</a></p> <ul style="list-style-type: none"> <li>•Provide a Drainage letter for the access road plans.</li> </ul> <p>oProvide historic and proposed drainage basin map</p> <p>oProvide location and sizing for crossroad pipes both existing and proposed</p> <p>Other Comments concerning the Form 2A permits include:</p> <p>Interchange, Northwest, and United Pads Form 2 A Comments</p> <ul style="list-style-type: none"> <li>•The FACILITIES section indicates there are 2 gas compressors planned for the location.Extraction should provide information associated with the purpose of the compressors and how will they be fueled.</li> <li>•The waste management plan only addresses EP Waste.It does not discuss secondary containment and stormwater measures as required by Item 41 in the Best Management Practices of the Operator Agreement.</li> </ul> <p>Interchange, Northwest, and United Pads Form 2 A Comments</p>		
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	<ul style="list-style-type: none"> <li>•Extraction has committed to a Form 2A BMP on weed control in their Comprehensive Development Plan for Broomfield.Please verify that the weed control BMP is included in the Interchange, Northwest, and United Pad Form 2As.</li> <li>•Broomfield requests that COGCC take a close look at the offset well evaluations provided by Extraction Oil and Gas to verify the estimates of offset distances of existing wells (including plugged and abandoned wells) from the new proposed horizontal wells.Broomfield was unable to confirm many of the distances indicated in the OPERATOR COMMENTS AND SUBMITTAL section of the Form 2s based on the OFFSET WELL EVALUATIONS spreadsheet or from the ANTI-COLLISION reports provided.</li> <li>•According to the OFFSET WELL EVALUATIONS spreadsheet provided in the Form 2s, there are many plugged and abandoned wells and several producing wells that have horizontal offsets of less than 150 feet from the proposed new horizontal wells and it is indicated that No Remediation Is Required for these wells.Broomfield is very concerned about the short offset distance for some of these wells; therefore, Broomfield requests that COGCC take a close look to verify the proposed mitigation measures indicated by Extraction Oil and Gas are appropriate as defined by the DJ Basin Horizontal Offset Policy.</li> </ul> <p>Broomfield asks that COGCC leave the comment period on the Permits open until all issues are resolved regarding the Plan.Broomfield will continue to work diligently with Extraction on the Plan.</p>		
LGD	<p>1)The COGCC mandated during the October 30, 2017 hearing that it reviews each of the Form 2A locations that impact Adams County residents in a public hearing.Adams County respectfully requests the following Form 2A's be heard before the COGCC in public hearings;</p> <p>a)Interchange A Pad</p> <p>b)Interchange B Pad</p> <p>c) United Pad</p> <p>d)Northwest A Pad</p> <p>e)Northwest B Pad</p> <p>2)Understanding that selecting an appropriate location for an oil and gas facility is the crux of compatibility, the proposed locations will impact the maximum number of residents by the proposed development. Four locations were initially proposed to access the identified minerals, and only 44 homes were within 1,500 feet of those locations. Today, six locations are proposed to access those same minerals, and approximately 94 homes are within 1,500 feet of those locations, more than doubling the number of people impacted by this proposed development. Those additional impacted residences are located within Adams County, yet as the elected representatives for this neighborhood, the Adams County Board of Commissioners did not have authority in the approval of these sites.</p> <p>Adams County remains deeply concerned about the locations of the well pads and the cumulative impacts they will have on our residents. The Comprehensive Drilling Plan (CDP) that was shared with Adams County does not fully capture the entire proposed development and the cumulative impacts that will be felt by neighbors. Many Adams County residents will be impacted by four or more of the well pads at one time.</p> <p>3)The Broomfield Comprehensive Plan setbacks necessitated Extraction break up the well pads so that each contains fewer wells. The result of fewer wells on each pad is the distribution of impacts over a larger area, ultimately shifting the burden to a larger number of residents. Adams County has seen increased development of oil and gas facilities, and the current industry standard is the consolidation of wells and their impacts on a single pad, rather than spreading those impacts over a larger area. The proposed Interchange A and B well pads total 33 wells and are proposed</p>	05/01/2018	

	<p>to consume over 21 acres of land and shrink to 9 acres during interim reclamation. In Adams County, by contrast, 30+ well pads disturb only about 11 acres of land and are shrunk to about 5.5 acres during interim reclamation. COGCC 1000 Series rules discuss proper reclamation of the land, including the minimization of surface area disturbance to reduce cumulative impacts, as well as facility consolidation to reduce the fragmentation of wildlife habitat. Extraction's proposal does the opposite of industry standard and COGCC rules.</p> <p>4)While minimizing the surface disturbance, the consolidation of many wells on a single pad reduces the need for haul roads. Haul roads are planned to be constructed to connect Sheridan Parkway to Huron Street, across the backyards of Adams County residences. These haul roads will see significant construction traffic, creating noise, dust, and safety concerns. Berms or walls have been proposed by the operator, and the mitigation of these significant impacts remains to be addressed in the plans.</p> <p>5)Many residents have provided public testimony or written comments with concerns about potential impacts to public health, safety, welfare and the environment that this project may cause. There are also many residents who desired to provide testimony and were not awarded the opportunity by Broomfield throughout the process or by the COGCC when representatives of the COGCC were in Broomfield on October 12, 2017.</p> <p>As allowed by COGCC Rule 216 Comprehensive Drilling Plans, Adams County respectfully recommends the Director of the COGCC request a Comprehensive Drilling Plan from Extraction Oil and Gas for the well pads identified in comment one (1).</p> <p>a)Residents of the City and County of Broomfield as well as Adams County were under the impression that a Comprehensive Drilling Plan process was going to be part of Broomfield's Administrative Review by Memorandum of Understanding as outlined in section 9 of City and County of Broomfield Resolution No. 2017-186.</p> <p>i.City and County of Broomfield Oil and Gas Land Use Regulations Chapter 17-54-020 Definitions does not provide a definition for Comprehensive Drilling Plan which infers the definition provided by the COGCC Rule 216.</p> <p>b)The inclusion of agencies such as Colorado Department of Public Health and Environment, Colorado Parks and Wildlife, Local Government Designees as well as surface owners could aid in easing concerns expressed by many residents which will be impacted by this development. In addition, a CDP would ensure that appropriate parties are provided a fair and equitable opportunity to weigh in on concerns.</p>		
OGLA	Comment period extended 10 days at the request of the Broomfield LGD now ending on 5/27/18		04/30/2018
Agency	Passed Completeness.		04/27/2018
OGLA	Passed OGLA Completeness review. Address BMPs/COAs and other issues during the technical review.		04/27/2018
OGLA	This 2A is being pushed back to draft for lack of production information. No completions information is provided. Groundwater depth and comments are not consistent on the 2A. BMPs for engineering controls of storm water and erosion control for this location are not provided. COGCC staff has discussed the same issues on previous permits (Livingston and Interchange A and B) with the Operator.		02/28/2018

Total: 9 comment(s)

## Public Comments

The following comments were provided by members of the public and were considered during the technical review of this application.

No.	Comment	Comment Date
1	<p>I am a resident directly impacted by Extraction's plans to place large scale facilities next to an established residential community in unincorporated Adams County. While the wells/pads will be in Broomfield, it has the largest impact on residents in Adams County. We have seen a dramatic shift from small, singular vertical drilling sites in predominantly remote agricultural locations to industrial scale multi-well, multi-pad facilities near neighborhoods, schools and sometimes in tax payer funded open space.</p> <p>These industrial scale facilities have a cumulative impact on property values, quality of life, transportation, emergency preparedness and response, and most importantly public health and safety.</p> <p>The industry touts that Colorado has the "best" rules on the books. That is a sad commentary. The rules are inadequate and unacceptable and the COGCC needs to follow the intent of the Martinez decision and put the health and safety of people, the environment and wildlife first. Impacts of urban drilling can be minimized by siting far from homes and neighborhoods. The original sites for these pads (Northwest and Interchange) were FURTHER from existing homes.</p> <p>The original proposed locations unveiled in 2/2017 at the Broomfield First Bank Center had the Northwest Pads and Interchange Pads NORTH of the Northwest Parkway, further from residential communities. These were moved South of the NW Parkway, adjacent to the Adams County border &amp; my neighborhood. This was done with no input from Adams County residents. As stated in the MOU signed in October 2017 between Extraction and the City and County of Broomfield, one of the benefits of moving these pads into Broomfield open space up against the Adams County border was "Further from future development". So the health and safety of my neighborhood, which has been here for decades, is being sacrificed for the prosperity of a developer's future development.</p> <p>This flies in the face of the COGCC's guidance which encourages fewer consolidated pads located as far from neighborhoods as possible. I reviewed Extraction's Comprehensive Drilling Plan and was appalled at the outages, discrepancies and inaccuracies. Broomfield asked Extraction to NOT submit their Form 2A(s) to the COGCC until the Drilling Plan was revised.</p> <p>Extraction moved forward anyway.</p> <p>In addition to the very real risk of fire/explosion (EG: Extraction Windsor facility Dec 22, 2017), there are other impacts of urban drilling so close to homes that are equally concerning.</p> <ul style="list-style-type: none"> <li>•Oil &amp; gas industry spills increased by 17% around Colorado last year. <a href="http://dpo.st/2qWlmF5">http://dpo.st/2qWlmF5</a></li> <li>•Studies are beginning to show the dangerous impacts of these sites on surrounding populations.</li> </ul> <p>Hydraulic fracturing and infant health: New evidence from Pennsylvania:  <a href="http://advances.sciencemag.org/content/3/12/e1603021.full">http://advances.sciencemag.org/content/3/12/e1603021.full</a></p> <ul style="list-style-type: none"> <li>•Increased asthma-related incidents exacerbated by air inversions which slow dispersion extending exposure times.</li> <li>•Exposure to chemicals, carcinogens and methane including VOCs such as benzene, toluene, ethylbenzene and xylene (BTEX). Colorado School of Public Health states "Sufficient exposures to these chemical compounds are associated with serious negative health outcomes such as lung disease in children and adults (i.e., asthma, chronic bronchitis, obstructive disease), cardiovascular disease, poor birth outcomes (premature birth, low birth weight), various cancers, and other long and short-term health issues." Witter, R et al. "Health Impacts Assessment for Battlement Mesa in Garfield County," Colorado School of Public Health, part I, page 7</li> <li>•Peer reviewed study by Lisa McKenzie, a researcher at the Colorado School of Public Health Anschutz Medical Campus, found that children suffering from acute lymphocytic leukemia (ALL), the most common childhood cancer, were more than four times more likely to be living in areas with the highest density of gas wells.</li> </ul>	05/27/2018

	<p>•Increases in seismicity not only from injection wells but fracking itself “Tiny tremors caused by hydraulic fracturing of natural gas near the surface could be early signs of stressful conditions deep underground that could destabilize faults and trigger larger earthquakes.”</p> <p><a href="https://news.stanford.edu/2017/12/12/small-earthquakes-fracking-sites-may-indicate-bigger-tremors-come/">https://news.stanford.edu/2017/12/12/small-earthquakes-fracking-sites-may-indicate-bigger-tremors-come/</a></p> <p>The USGS National Seismic Hazard Model (NSHM) forecasts earthquake hazard &amp; now takes into account induced earthquakes from underground fluid injection or extraction</p> <p><a href="https://earthquake.usgs.gov/research/induced/hazards.php">https://earthquake.usgs.gov/research/induced/hazards.php</a></p> <p>We’ve seen tragedy strike with the Firestone explosion &amp; the explosion Dec. 22, 2017 at the Extraction Windsor facility which never did identify a definitive root cause. If they have no definitive root cause, why do they believe similar safety events won't happen near my home which is close to the Northwest and Interchange Pad sites.</p> <p>In Extraction's own risk management section of the Comprehensive Drilling Plan submitted to Broomfield, Extraction includes a list of 12 individual catastrophic risks – each with a 3-10% chance of occurrence – among other risks. The cumulative risk is estimated to be up to 72% with an average cumulative risk of 55%. Risks include vapor cloud explosion, fire, well blowout, and more. This is not appropriate so close to existing residential communities</p> <p>Please deny these permits and ask Extraction and Broomfield to go back to the original locations or other alternate locations, NORTH of the Northwest Parkway, much further from existing homes.</p> <p>Thank you.</p>		
2	<p>I am concerned about the 49 proposed wells in our area. I live at 1331 W. 156th Ave., I am in Adams County unincorporated. When we built our house 30 yrs. ago the ground behind our house was Adams County and was to be open space or wildlife. Some how it has got switched to Broomfield county. We have had no vote and very little say about drilling wells in this area. I can see 3 of the 4 proposed sites from my house. Still no answer for the Windsor Site explosion. When they leased my gas and oil rights no one was horizontal drilling or fracking. We are on a water well and it is our only source of water. When they did the gas and oil studies they were 5 miles or more away. Now they have moved them right in our back yard. The original sites that Extraction and Broomfield had agreed to in early 2017 were much further from existing residences. Now shoved up against Adams County homes to profit new development around the original sites.</p> <p>We would appreciate your looking into this.</p>	05/27/2018	
3	<p>My husband &amp; I reside in unincorporated Adams county in close proximity to Extraction's proposed Northwest and Interchange sites.</p> <p>I am the victim of corporate greed taking precedence over health and safety when a gas pipeline exploded in San Bruno, CA Sept 9 2010.</p> <p>The pipe had been scheduled to be replaced after many reports of gas smells and failing pilot lights. It was buried in 1957 and through a series of false starts and pressure increases, defective welds in the pipeline, improper installation, lack of safety measures and "other projects taking priority" the pipe never was replaced and finally blew in my Mother's back yard, which killed my Mother and 7 others families and Children, destroyed 37 homes and injured many others.</p> <p>I myself was in St Francis Burn Unit in San Francisco for 6 and 1/2 months with burns over 70% of my body and more skin grafts than I can count. My Lungs were scraped and washed 7 times and I had to spend 4 months in Kaiser, Vallejo, Ca. Rehab learning to walk again. I would gladly return every dime that was paid to me by Pacific Gas and Electric, if they could just give me back the wonderful life I had before it was taken from me in the name of corporate profit.</p> <p>In 2012, an independent audit from the State of California issued a report stating that PG&amp;E had illegally diverted over \$100 million from a fund used for safety operations, and instead used it for executive compensation and bonuses.</p> <p>We see similar concerns with O&amp;G operations in Colorado where profit takes precedence over safety as noted in the Broomfield/Extraction Agreement where siting of the pads is to benefit future</p>	05/27/2018	

	<p>development dollars.</p> <p>Please reconsider the danger you are placing on the safety of individuals, and the environment before you proceed with the approval of these oil fracking locations so close to our homes. There were alternative sites, further from existing homes and those were discarded simply for corporate profit. I will happily testify before your committees and show the hundreds of documents regarding the damages I have endured. I beg of you to look in to the long term effects of what you are about to do. PLEASE think this through thoroughly before any action is taken.</p>		
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Total: 3 comment(s)



# ATTACHMENTS

## **EXHIBIT B**

### **BEST MANAGEMENT PRACTICES FOR WELL SITES AND NEW WELLS AT WELLS SITES**

Operator shall include the BMPs listed in this Exhibit B on all Applications for Permit-to-Drill, Form 2 ("Form 2"), and Oil and Gas Location Assessments, Form 2A ("Form 2A"), submitted to the Commission for a "New Well" on the Well Sites. For the purposes of this provision, "New Well" shall mean any Operator-operated well spudded during the term of this Agreement, and located on the Well Sites, including any production facilities directly associated with such well, and its associated Well Pad, insofar as it covers lands located in the City limits. The BMPs shall apply to all New Wells drilled by the Operator on the Well Sites, while this Agreement is effective. The re-entry of a previously plugged and abandoned well is not allowed.

1. *Well Sites.* The Operator agrees that the maximum number of New Wells to be drilled at each of the Well Sites set forth on Exhibit A shall be as follows:

- Livingston Pad – 19 New Wells;
- Northwest A Pad – 8 New Wells;
- Northwest B Pad – 8 New Wells;
- United Pad – 16 New Wells;
- Interchange A Pad – 16 New Wells; and
- Interchange B Pad – 17 New Wells.

For purposes of this Agreement, the phases of operation at a Well Site shall be defined as follows:

"Construction Phase" shall mean the conducting of civil and earth work in connection with the construction and installation of drilling pads, visual mitigation measures, access routes, pipelines and launcher/receiver locations.

"Drilling Phase" shall mean the period in which a drilling rig is utilized to penetrate the surface of the earth with a drill bit and the installation of well casing and cement at one or more wells.

"Completion Phase" shall mean the period of hydraulic fracturing, coiling, workover, installation of tubing and flowback of one or more wells.

"Production Phase" shall mean the period in which one or more wells is capable of producing hydrocarbons that flow through permanent separator facilities and into the pipeline gathering system.

For the avoidance of doubt, it is possible for multiple phases of operation to be occurring at the same time with respect to a single Well Site. Notwithstanding the

foregoing, Operator agrees that it will not conduct hydraulic fracturing and drilling operations simultaneously at a single Well Site.

2. *Quiet Technology.* The Operator agrees to use the Liberty Quiet Fleet or comparable technology from an alternative vendor on all Well Sites.
3. *Use of Pipelines.* The Operator agrees to build pipelines for the transport of oil, gas, and produced water from the Well Sites to the specifications set forth in Exhibit D and to utilize such pipelines at the Well Sites before the Production Phase commences. During the Completion Phase, the Operator will use pipelines for produced water for flowback to the maximum extent feasible. All fresh water shall be transported to the Well Sites by means other than by truck. The Operator's obligation to build and utilize such pipelines is subject to the City granting Operator all necessary right-of-way and the City issuing Operator the necessary Public/Private Improvement Permits. Operator shall be permitted to utilize temporary tanks during drilling, flowback, workover, completion, hydraulic fracturing and maintenance operations. If requested by the City, Operator will conduct a risk analysis to identify potential risks associated with pipelines and the measures implemented that are intended to mitigate such risks.
4. *Air Modeling Study.* The Operator has completed an air modeling study that meets the standards requested by the City and such study has been conducted and indicates that emissions from the equipment proposed on the Well Sites meets EPA standards.
5. *Regulations.* The Operator shall comply with all applicable state, and federal regulations in addition to the terms of this Agreement and the BMPs set forth in this Exhibit B. The City agrees that it will not impose any fine on the Operator for violation of this Agreement if the activity or condition that created the violation is also subject to regulation by the COGCC, and if the violation results in action taken by the COGCC against the Operator.
6. *Notification to the City Regarding Commencement of Operations.* Operator shall provide written notice to the City no less than thirty (30) days prior to the commencement of any of the following: Construction Phase (unless the Construction Phase commences within 45 days of the approval of the applicable Form 2 or Form 2A), Drilling Phase, Completion Phase, or any recompletion, re-drilling or plugging and abandonment of a New Well. Any notification provided by Operator to City pursuant to this Agreement may be used by the City for public notification.
7. *Inspections.* The City shall have the right to have the City's designated oil and gas inspector (the "Inspector") inspect the Well Sites, upon reasonable notice to the Operator and the Operator shall provide a safety escort to accompany the Inspector. Reasonable notice may include notification by the Inspector at the Well Site. If the Inspector notifies the Operator of any conditions that the Inspector believes are out of compliance with this Agreement, Operator shall promptly address such conditions. If the Operator disagrees

with the findings of the Inspector, the City and Operator shall resolve the disagreement consistent with the provisions set forth in Section 22 of the Agreement.

8. *Containment Berms.* The Operator shall utilize steel-rim berms around all permanent facility equipment at the Well Sites with sufficient capacity to contain 1.5 times the maximum volume of liquids that such facility will contain at any given time plus sufficient freeboard to prevent overflow. All berms and containment devices shall be inspected quarterly by the Operator and maintained in good condition. No potential ignition sources shall be installed inside the secondary containment area unless the containment area encloses a fired vessel or such sources are rated in accordance with industry codes and standards. Secondary containment such as duck ponds or lined earthen berms for temporary tanks shall also be used.
  - A. Permanent containment berms shall be constructed of steel rings, designed and installed to prevent leakage and resist degradation from erosion or routine operation.
  - B. Secondary containment for tanks shall be constructed with a synthetic or engineered liner that contains all primary containment vessels and is mechanically connected to the steel ring to prevent leakage.
  - C. For locations within five hundred (500) feet and up-gradient of a surface water body, tertiary containment, such as an earthen berm, is required around production facilities.
9. *Closed-Loop Pitless Systems for the Containment and/or Recycling of Drilling Fluids.* Wells shall be drilled, completed and operated using closed-loop pitless systems for containment and/or recycling of all drilling, completion, flowback and produced fluids. Operator shall recycle fluids to the maximum extent practicable, with the understanding that Operator is limited in its ability to recycle all fluids, as doing so would necessitate the use of permanent tanks, which is otherwise prohibited by the terms of the Agreement, and result in the potential for additional emissions. Other than for irrigating landscape material, Operator shall not use City water for any of its oil and gas operations. Operator shall not store waste onsite for periods longer than 30 days.
10. *Anchoring.* All New Well equipment and all existing equipment at the Well Sites shall be anchored to the extent necessary to resist flotation, collapse, lateral movement, or subsidence in compliance with applicable Federal Emergency Management Agency (FEMA) (as administered by this City) and COGCC rules and regulations.

All guy line anchors left buried for future use shall be identified by a marker of bright color not less than four (4) feet in height and not greater than one (1) foot east of the guy line anchor.
11. *Burning.* No open burning shall occur on the site of any oil and gas operation.

12. *Chains.* Traction chains from heavy equipment shall be removed before entering a City street.
13. *Chemical Disclosure and Storage.* All fracturing chemicals must be disclosed to the City pursuant to the process set forth below before bringing on site. Prior to the bringing of such chemicals onto the property, the Operator shall make available to the City, in table format, the name, Chemical Abstracts Service (CAS) number, storage, containment and disposal method for such chemicals to be used on the Well Sites, which the City may make available to the public as public records. Fracturing chemicals shall be uploaded onto the Frac Focus website within sixty days of the completion of fracturing operations. The Operator shall not permanently store fracturing chemicals, flowback from hydraulic fracturing, or produced water in the City limits. Operator shall remove all hydraulic fracturing chemicals at a Well Site within thirty (30) days following the completing of hydraulic fracturing at that Well Site.

In addition to any substances that not permitted to be used in accordance with state or federal rules or regulations in place from time to time, the following chemicals shall not be utilized in hydraulic fracturing fluid at the Well Sites:

<b>Ingredient Name</b>	<b>CAS #</b>
Benzene	71-43-2
Lead	7439-92-1
Mercury	7439-97-6
Arsenic	740-38-2
Cadmium	7440-43-9
Chromium	7440-47-3
Ethylbenzene	100-41-4
Xylenesf	1330-20-7
1,3,5-trimethylbenzene	108-67-8
1,4-dioxane	123-91-1
1-butanol	71-36-3
2-butoxyethanol	111-76-2

N,N-dimethylformamide	68-12-2
2-ethylhexanol	104-76-7
2-mercaptoethanol	60-24-2
benzene, 1,1'-oxybis-, tetrapropylene derivatives, sulfonated, sodium salts (BOTS)	119345-04-9
butyl glycidyl ether	8/6/2426
polysorbate 80	9005-65-6
quaternary ammonium compounds, dicoco alkyldimethyl, chlorides (QAC)	61789-77-3
bis hexamethylene triamine penta methylene phosphonic acid (BMPA)	35657-77-3
diethylenetriamine penta (methylene-phosphonic acid)(DMPA)	15827-60-8
FD&C blue no. 1	3844-45-9
Tetrakis(triethanolaminate) zirconium(IV) (TTZ)	101033-44-7

14. *Color.* Permanent facilities shall be painted in a uniform, non-contrasting, non-reflective color, to blend with the surrounding landscape and, with colors that match the land rather than the sky, consistent with COGCC regulations. If the City desires a specific color or colors, it shall notify Operator of such color or colors prior to the Pad Construction of a Well Site and Operator shall utilize such color or colors.
15. *Cultural and Historical Resource Protection.* The Operator has completed a site assessment and is not currently aware of any historical or cultural sites on the Well Sites. However, if a significant surface or sub-surface archaeological site is discovered during construction, the Operator shall be responsible for immediately contacting the City to report the discovery. If any disturbance of a site deemed by the State Historic Preservation Office to be a historical or cultural resource occurs, the Operator shall be responsible for mitigating the disturbance to the cultural or historical property through a data recovery plan in consultation with the City's Historic Landmark Board and the State Historic Preservation Office, with copy to the City.
16. *Discharge Valves.* Open-ended discharge valves on all storage tanks, pipelines and other containers within the Well Site shall be secured and shall not be accessible to the general



public. Open-ended discharge valves within the Well Site shall be placed within the interior of the secondary containment area.

17. *Fugitive Dust Suppression.* Dust associated with on-site activities and traffic on access roads shall be minimized throughout construction, drilling and operational activities such that there are no visible dust emissions from access roads or the Well Sites to the extent practical given wind conditions. No untreated produced water or other process fluids shall be used for dust suppression. The Operator will avoid creating dust or dust suppression activities within three hundred (300) feet of the ordinary high water mark of any waterbody, unless the dust suppressant is water. Material Safety Data Sheets (MSDS) for any chemical based dust suppressant, other than magnesium chloride, shall be submitted to the City prior to use. Operator must submit to the City a grading, drainage, dust mitigation and erosion control plan in accordance with Section 37.
18. *Electric Equipment.* The drilling rig(s) used during the Drilling Phase and all permanent production equipment, such as compressors, motors and pump jacks, shall utilize electric line power in order to mitigate noise and to reduce emissions.
19. *Emergency Preparedness Plan.* The Operator is required to complete a detailed Emergency Plan in accordance with the provisions of this Section, and Operator shall pay for any reasonably necessary training and equipment of emergency response personnel specifically required due to the operations contemplated by this Agreement, including any inventory of Aqueous film forming foam (AFFF) required to be purchased from time to time so that sufficient quantities are on-hand to respond to emergencies on the Well Sites. The City and the North Metro Fire Rescue District must approve of the Emergency Plan before the Drilling Phase commences. As long as all requirements of this Section are met, the City and the North Metro Fire Department shall not unreasonably withhold approval and shall approve the Emergency Plan within thirty (30) days of submittal.

The Emergency Plan shall be filed with the City and the North Metro Fire Rescue District and updated on an annual basis or as conditions change (responsible field personnel change, ownership changes, etc.). The Emergency Plan shall include a notification system for potentially affected citizens and occupied buildings and an evacuation plan.

The Emergency Plan shall consist of at least the following information:

- A. Name, address and phone number, including twenty-four (24)-hour emergency numbers for at least two persons responsible for emergency field operations as well as the contact information for any subcontractor of Operator engaged for well-control emergencies.
- B. An as-built facilities map in a format suitable for input into the City's GIS system depicting the locations and type of above and below ground facilities, including sizes and depths below grade of all oil and gas flow lines and associated equipment, isolation valves, surface operations and their functions, as well as transportation routes to and from exploration and development sites, for

emergency response and management purposes. The information concerning flowlines and isolation valves shall be held confidentially by the City and shall only be disclosed in the event of an emergency or to emergency responders or for the training of emergency responders. The City shall deny the right of inspection of the as-built facilities maps to the public pursuant to C.R.S. § 24-72-204.

- C. Detailed information addressing each reasonable potential emergency that may be associated with the operation. This may include any or all of the following: explosions, fires, gas, oil or water pipeline leaks or ruptures, hydrogen sulfide or other toxic gas emissions, or hazardous material vehicle accidents or spills. A provision that any spill outside of the containment area, that has the potential to leave the facility or to threaten waters of the state, or as required by the City-approved Emergency Plan shall be reported to the local emergency dispatch and the COGCC Director in accordance with COGCC regulations.
- D. Detailed information identifying access or evacuation routes, and health care facilities anticipated to be used.
- E. A project-specific plan for any project that involves drilling or penetrating through known zones of hydrogen sulfide gas.
- F. A statement and detailed information indicating that the Operator has adequate personnel, supplies, and training to implement the Emergency Plan immediately at all times during construction and operations.
- G. The Operator shall have current Material Safety Data Sheets (MSDS) for all chemicals used or stored on a site. The MSDS sheets shall be provided immediately upon request to City officials, a public safety officer, or a health professional as required by COGCC Rule 205.
- H. The Emergency Plan shall include a provision establishing a process by which the Operator notifies surrounding neighbors to inform them about the on-site operations and provide sufficient contact information for surrounding neighbors to communicate with the Operator.
- I. All training associated with the Emergency Plan shall be coordinated with the City and the North Metro Fire Rescue District.
- J. A provision obligating the Operator to reimburse the appropriate emergency agencies for their expenses resulting from the Operator's operations, to the extent required by Colorado State Statutes.



- K. Operator shall provide the City with its emergency shutdown protocols and promptly notify the City of any emergency shut downs that would have an impact to any area beyond the confines of the Well Site.
20. *Air Quality.* In order to minimize degradation to air quality, Operator agrees to the provisions set forth in this Section. Operator must eliminate, capture, or minimize all potentially harmful emissions and minimize dust associated with onsite activities and traffic on access roads pursuant to the terms of this Agreement. Operator shall comply with all applicable state and federal regulations including regulations promulgated by CDPHE, COGCC and US EPA.
- A. Minimization of Emissions.
- To protect air quality, the following will be required:
1. The use of electric equipment and line power, as detailed in Section 18.
  2. The use of Tier 2 and liquefied natural gas dual fuel hydraulic fracturing pumps. If Tier 4 fracturing pumps become commonly available, Operator will begin using Tier 4 fracturing pumps.
  3. Comply with traffic provisions set forth in Section 40. Limitations on truck traffic to and from the site.
  4. The utilization of pipelines pursuant to Section 3.
  5. Manufacture test or other data demonstrating hydrocarbon destruction or control efficiency that complies with a design destruction efficiency of 98% or better.
  6. The use of no-bleed continuous and intermittent pneumatic devices. This requirement can be met by replacing natural gas with electricity or instrument air, or routing the discharge emissions to a closed loop-system or process.
  7. Any flare, auto ignition system, recorder, vapor recovery device or other equipment used to meet the hydrocarbon destruction or control efficiency requirement shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals.
  8. No use of glycol dehydrators.
  9. No use of desiccant gas processing dehydrators.
  10. Year-round application of odor requirements pursuant to COGCC and CDPHE regulations.
  11. Reduction or elimination of emissions of associated gas from hybrid gas-oil wells (i.e. gas that is co-produced from a well that primarily produces oil), including prohibition of uncontrolled venting.

12. Best management practices during liquids unloading (i.e. maintenance activities to remove liquids from existing wells that are inhibiting production), including at least 90% emissions reduction when utilizing combustion and the installation of artificial lift or unloading through the separator where feasible.
13. Reduction or elimination of emissions from oil and gas pipeline maintenance activities such as pigging or blowdowns. If any maintenance activity will involve the intentional venting of gas from a well tank, compressor or pipeline, beyond routine pipeline maintenance activity and pigging, the operator shall provide forty eight (48) hour advance written notice to the City of such proposed venting. Such notice shall identify the duration and nature of the venting event, a description as to why venting is necessary, a description of what vapors will likely be vented, what steps will be taken to limit the duration of venting, and what steps the operator proposes to undertake to minimize similar events in the future. If emergency venting is required, or if accidental venting occurs, the operator shall provide such notice to the City of such event as soon as possible, but in no event longer than 24 hours from the time of the event, with the information listed above and with an explanation as to the cause and how the event will be avoided in the future.
14. Compliance with dust suppression techniques set forth in Section 17.
15. Compliance with odor requirements set forth in Section 48.
16. Consolidation of product treatment and storage facilities within a Well Site.
17. Centralization of compression facilities within a Well Site.
18. Telemetric control and monitoring systems, including surveillance monitors to detect when pilot lights on control devices are extinguished.
19. Operator will comply with all CDPHE air permits, if any, and will comply with all OSHA work practice requirements with respect to benzene.
20. Flaring shall be eliminated or minimized to the maximum extent practicable.
21. Exhaust from all engines, motors, coolers, and all other equipment must be vented up and away from nearest residences.
22. Operator agrees to participate in Natural Gas STAR program or other voluntary programs to encourage innovation in pollution control at well sites.
23. Use of a pressure-suitable separator and vapor recovery unit (VRU) where applicable.
24. Pipeline infrastructure will be constructed prior to the Production Phase.

B. *Leak Detection and Repair.* Operator shall develop and maintain an acceptable leak detection and repair (“LDAR”) program as required by CDPHE using modern leak detection technologies such as infra-red cameras for equipment used on the Well Sites. For the five (5) year period beginning with the start of the Drilling Phase at the first Well Site, Operator shall conduct quarterly IR camera monitoring of all equipment at the Well Sites. When an IR camera is used, Operator must retain an infrared image or video of all leaking components before and after repair. Such records must be maintained for two years and must be made available to the City upon request. Except when an emergency circumstance would necessitate an immediate repair, Operator must repair leaks as quickly as practicable. If more than 48-hours repair time is needed after a leak is discovered, an explanation of why more time is required must be submitted to the City. Operator shall conduct continuous pressure monitoring to detect leaks. At least once per year, the Operator shall notify the City five (5) business days prior to an LDAR inspection of its facilities to provide the City the opportunity to observe the inspection.

C. *Ambient Air Sampling.* The Operator shall conduct, as approved by the City, a specific ambient air quality test that includes:

1. Pre-construction baseline air quality testing shall be completed within 500 feet of the Well Sites by a consultant approved by the City and paid for by the Operator.
2. Operator agrees to provide the City \$20,000 annually towards air quality sampling. The City may use these funds for sampling within its discretion. Extraction will provide initial funds prior to the Construction Phase. Such amount shall be adjusted each year by the increase or decrease in the Consumer Price Index issued by the United States Bureau of Labor Statistics for the Denver – Boulder metropolitan area.
3. In addition, the City may require the Operator to conduct additional air monitoring as needed to respond to emergency events such as spill, process upsets, or accidental releases.
4. Operator shall provide access to the Well Sites to the City’s designated inspector to allow air sampling to occur.

An air modeling and emissions inventory based upon the proposed development and equipment have been completed by a third-party consultant.

D. *Air Quality Action Days.* The Operator shall respond to air quality Action Day advisories posted by the Colorado Department of Public Health and Environment for the Front Range Area by implementing their suggested air emission reduction measures as feasible. Emission reduction measures shall be implemented for the duration of an air quality Action Day advisory and may include measures such as:

1. Minimize vehicle and engine idling;
  2. Reduce truck traffic and worker traffic;
  3. Delay vehicle refueling;
  4. Suspend or delay use of fossil fuel powered ancillary equipment; and
  5. Postpone construction activities, if feasible.
  6. Within 30 days following the conclusion of each annual Air Quality Action Day season, Operator must submit a report to the City that details which measures it implemented during any Action Day advisories.
- E. *Compliance.* The Operator must submit annual reports to the City certifying (a) compliance with these air quality requirements and documenting any periods of material non-compliance, including the date and duration of each such deviation and a compliance plan and schedule to achieve compliance, (b) that the equipment at the Well Sites continues to operate within its design parameters, and if not, what steps will be taken to modify the equipment to enable the equipment to operate within its design parameters. The annual report must contain a certification as to the truth, accuracy and completeness of the reports, signed by a responsible corporate official. The Operator may satisfy this reporting obligation in whole or in part by submitting its AQCC Regulations No. 7 annual reports for the prior calendar year to the City, and supplementing them as needed to meet these reporting requirements for covered facilities within the City. The Operator will also provide the City with a copy of any self-reporting submissions that Operator provides to the CDPHE due to any incidence of non-compliance with any CDPHE air quality rules or regulations at the Well Sites.
21. *Reduced Emission Completions (Commonly known as Green Completions).* At Well Sites Operator shall employ reduced emission completions, also commonly known as green completions, which comply with federal and state requirements. In addition, Operator shall comply with the following:
- A. Gas gathering lines, separators, and sand traps capable of supporting green completions as described in COGCC Rule 805 shall be installed per the provisions of COGCC Rule 805.
  - B. Operator shall comply with 40 CFR 60.5375(a)(1), (2) for green completions.
  - C. Uncontrolled venting is prohibited other than where necessary for safety.
  - D. Temporary flowback flaring and oxidizing equipment where allowed shall include the following:

1. Adequately sized equipment to handle 1.5 times the largest flowback volume of gas from a vertical/directional and/or horizontally completed well respectively as reported to the COGCC in a ten mile radius;
  2. Valves and porting available to divert gas to flaring and oxidizing equipment; pursuant to the above Rules 40 CFR 60.5375 & COGCC Rule 805;
  3. Auxiliary fueled with sufficient supply and heat to combust or oxidize non-combustible gases in order to control odors and hazardous gases. The flowback combustion device shall be equipped with a reliable continuous ignition source over the duration of flowback, except in conditions that may result in a fire hazard or explosion; and
  4. The Operator has a general duty to safely maximize resource recovery and minimize releases to the atmosphere during flowback and subsequent recovery/operation.
22. *Exhaust.* The exhaust from all engines, motors, coolers and other mechanized equipment shall be vented up or in a direction away from the nearest occupied building.
23. *Fencing.* Permanent perimeter fencing shall be installed around production equipment unless such fencing is not required by the Visual Mitigation Plan for a Well Site, and shall be secured. The main purpose of the fencing is to deter entrance by unauthorized people and a Well Site shall be properly secured prior to the commencement of drilling at the Well Site. The Operator shall use visually interesting fencing, when feasible, but the parties recognize that there is a need for air circulation, and for the field personnel who regularly inspect the facilities to be able to identify visual operational deficiencies when driving by. Landscaping may be used for screening. If a chain link fence is required to achieve safety requirements set by the COGCC, then landscaping and other screening mechanisms shall be required that comply with the City's Land Use Code regulations and the Operator's safety requirements.
24. *Flammable Material.* All ground within twenty-five (25) feet of any tank, or other structure containing flammable or combustible materials, shall be kept free of dry weeds, grass or rubbish, and shall conform to COGCC 600 Series Safety Regulations and the applicable Fire Code.
25. *Flares and Combustion Devices.* To the extent flares, thermal oxidizers, or combustion devices are utilized, all such flares shall be designed and operated as follows:
- A. The flare must be fired with natural gas and designed to operate with a 98% of higher hydrocarbon destruction efficiency.
  - B. The flare must be designed and operated in a manner that will ensure no visible emissions during normal operation. Visible emissions means observations of smoke for any period or periods of duration greater than or equal to one (1)



minute in any fifteen (15) minute period during normal operation, pursuant to EPA Method 22. Visible emissions do not include radiant energy or water vapor.

- C. The flare must be operated with a flame present at all times when emissions may be vented to it, or other mechanism that does not allow uncontrolled emissions.
  - D. All combustion devices must be equipped with an operating auto-igniter.
26. *Water Quality Monitoring Plan.* Oil and gas operations shall, to the extent practicable, avoid causing degradation to surface or ground waters within the City and to wetlands within the City. The following standards set forth by the City are consistent with the COGCC rules and regulations. If Operator needs to seek a variance from a COGCC provision then an approved COGCC variance will apply to this Agreement upon notice of such variance from Operator to the City.

Using records of the Colorado Division of Water Resources, Operator must implement a water quality monitoring and well testing plan that includes the following:

- A. Operator must obtain initial baseline samples and subsequent monitoring samples from all available water sources within a one-half (1/2) mile radius of the Well Sites. Water sources include registered water wells or permitted or adjudicated springs.
- B. Operator must collect initial testing of baseline samples from available water sources prior to the commencement of drilling a well, or prior to the re-stimulation of an existing well for which no samples were collected and tested during the previous 6-12 months.
- C. Post-stimulation samples of available water sources shall be collected and tested pursuant to the following time frame:
  - 1. One sample approximately one (1) year after commencement of the Production Phase;
  - 2. One sample approximately three (3) years after commencement of the Production Phase; and
  - 3. One sample approximately six (6) years after commencement of the Production Phase.
- D. Operator shall collect a sample from at least one upgradient and two down-gradient water sources within a one-half (1/2) mile radius of a Well Site. If no such water sources are available, Operator shall collect samples from additional water sources within a radius of up to one (1) mile from the Well Site until samples from a total of at least one upgradient and two down-gradient water sources are collected. Operator should give priority to the selection of water sources closest to the Well Site.

- E. Operator may rely on existing groundwater sampling data from any water source within the radii described above that was collected in accordance with accepted standards, provided the data was collected within the 12 months preceding the commencement of Drilling Phase for such Well Site, the data includes measurement of all of the constituents measured in Table 1 below and there has been no significant oil and gas activity within a one-mile radius in the time period between the original sampling and the commencement of the Drilling Phase for such Well Site.
- F. Operator shall make reasonable efforts to obtain the consent of the owner of the water source. If the Operator is unable to locate and obtain permission of the water source, the Operator must advise the City that Operator could not obtain access to the water source from the surface owner.
- G. Testing for the analytes listed in Table 1 below, and subsequent testing as necessary or appropriate.
- H. Operator must follow standard industry procedures in collecting samples, consistent with the COGCC model Sampling and Analysis Plan.
- I. Operator must report the location of the water source using a GPS with submeter resolution.
- J. Operator must report results of field observations including reporting on damaged or unsanitary well conditions, adjacent potential pollution sources, odor, water color, sediment, bubbles, and effervescence.
- K. Operator must provide copies of all test results described above to the City, the COGCC, and the water source owners within 30 days after receiving the samples.
- L. Subsequent sampling. If sampling shows water contamination, additional measures may be required including:
  - 1. If free gas or a dissolved methane concentration level greater than one (1) milligram per liter (mg/l) is detected in a water source, determination of the gas type using gas compositional analysis and stable isotope analysis of the methane (carbon and hydrogen).
  - 2. If the test results indicate thermogenic or a mixture of thermogenic and biogenic gas, an action plan to determine the source of the gas.

3. Immediate notification to the City, the COGCC, and the owner of the water well if the methane concentration increases by more than five (5) mg/l between sampling periods, or increases to more than ten (10) mg/l.
4. Immediate notification to the City, the COGCC and the owner of the water well if BTEX and/or TPH are detected as a result of testing. Such detections may result in required subsequent sampling for additional analytes.
5. Further water well sampling in response to complaints from water source owners.
6. Timely production and distribution of test results in electronic deliverable format to the City, the COGCC and the water source owners.
7. Qualified Independent Professional Consultant. All water source testing must be conducted by the Operator or, if requested by a surface owner, by a qualified independent professional consultant.

Additionally, the City may make available a water testing program to any persons with an available water sources within one-half (1/2) mile of the radius of the proposed track of the borehole of any proposed New Well. If such sampling shows water contamination, the Operator shall work with the City and the COGCC to help identify the source of the contamination.

**TABLE 1**

**GENERAL WATER QUALITY**

Alkalinity, Conductivity & TDS, pH, Dissolved Organic Carbon (or Total Organic Carbon), Bacteria, and Hydrogen Sulphide

**MAJOR IONS**

Bromide, Chloride, Fluoride, Magnesium, Potassium, Sodium, Sulfate, and Nitrate + Nitrite as N

**METALS**

Arsenic, Barium, Boron, Chromium, Copper, Iron, Lead, Manganese, Selenium, Strontium, Mercury, Uranium, and Radium



## DISSOLVED GASES and VOLATILE ORGANIC COMPOUNDS

Methane, Ethane, Propane, BTEX as Benzene, Toluene, Ethylbenzene and Xylenes, Total Petroleum, and Hydrocarbons (TPH)

## OTHER

Water Level, Stable isotopes of water (Oxygen, Hydrogen, Carbon), Phosphorus.

27. *Landscaping.* Operator shall implement the Visual Mitigation Plan for a Well Site approved during the application process for such Well Site..
28. *Lighting.* The intent of this provision is to minimize light spillage beyond the perimeter of the Well Sites and for the Operator to take appropriate steps in order to achieve this. All permanent lighting or lighting higher than a perimeter wall must be downward facing. All bulbs must be fully shielded to prevent light emissions above a horizontal plane drawn from the bottom of the fixture. Prior to installation of permanent lighting on any facility, the Operator agrees to submit to the City a lighting plan and the City shall communicate with Operator any modifications to the plan that it deems appropriate and Operator shall make such modifications if reasonable or required by law. The lighting plan shall indicate the location of all outdoor lighting on the site and any structures, and include cut sheets (manufacturer's specifications with picture or diagram) of all proposed fixtures. During the Drilling and Completion Phases, consistent with applicable law, Operator will construct a minimum 32 foot wall around as much of the perimeter of the well pads as operations allow to reduce light escaping from the site, unless shorter walls are mutually agreed to by City and Operator on a site-specific basis.
29. *Maintenance of Machinery.* Routine field maintenance of vehicles or mobile machinery shall not be performed within three hundred (300) feet of any water body. All fueling must occur over impervious material.
30. *Mud Tracking.* The Operator shall take all practicable measures to ensure that vehicles do not track mud or debris onto City streets. If mud or debris is nonetheless deposited on City streets, in excess of *de minimus* levels, the streets shall be cleaned immediately by the Operator. If for some reason this cannot be done, or needs to be postponed, the City shall be notified of the Operator's plan for mud removal.
31. *Noise Mitigation.* Noise mitigation measures shall be constructed along any edge of any Well Site if such edge is in proximity to existing residential development. The noise mitigation measures shall use the most current equipment to minimize noise impact during the Drilling and Completion Phases, including those measures set forth in Sections 2 and 18. Operator shall comply with the sound limitation regulations set forth in COGCC 800 Series Aesthetic and Noise Control Regulations. The Operator shall not unload pipe between 8:00 p.m. and 7:00 a.m. The Operator will complete a baseline

noise mitigation study at each Well Site that demonstrates that noise is expected to be mitigated to the extent practicable and a copy will be provided to the City. A noise mitigation study has been completed that demonstrated that noise is expected to be mitigated to the extent practicable and to levels acceptable to the City. The Operator shall address C scale noise/vibration through berming and other associated BMPs. During the Drilling and Completion Phases, the operator shall construct a perimeter wall and/or use hay bales to mitigate noise as appropriate on a case-by-case or modeled basis. If Operator uses any engines that are not electrically operated, Operator shall use quiet design mufflers (also referred to as hospital grade or dual dissipative) or equivalent and shall use acoustically insulated housing or covers to enclose the engines.

The Operator shall comply with all provisions of COGCC Rule 802 on Noise Abatement with respect to the Well Sites; provided, however, that the Operator and City agree that the maximum permissible noise levels to be applied under Rule 802 shall be, other than during pad construction at the Well Sites, the greater of (i) the levels set forth for the land use type of "Residential/Agricultural/Rural" under Rule 802 if measurements are taken at 1,000 feet from the sound walls at the Well Site and (ii) 4 dB(A) higher than baseline ambient sound measured at 1,000 feet from the sound walls at the Well Site. During pad construction at the Well Sites, the Operator agrees that noise levels shall not exceed those produced by the construction of a typical residential or commercial development. All measurements considered for compliance with this Section 31 shall be taken by a third party contractor using industry standard equipment and practices.

Both the City and the Operator have conducted an Ambient noise survey for each Well Site at baseline and will place noise meters near Well Sites to monitor ongoing noise levels until the commencement of the Production Phase.

32. *Flowlines.* Any newly constructed or substantially modified flowlines on the Well Sites shall be constructed and operated under the provisions of the COGCC 1100 Series Flow line regulations, any future COGCC flowline regulations, and any applicable surface use agreements with the surface owners. Operator shall pressure test all flowlines following their construction, including those rated at less than 15 PSI. Operator will provide to the City all records required to be submitted to State agencies related to inspections, pressure testing, accidents and other safety incidents related to flowlines at the Well Sites and, upon specific request by the City, Operator will provide to the City any other records submitted to State agencies related to flowlines at the Well Sites.
33. *Recordation of Flowlines.* All new flowlines and pipelines shall have the legal description of the location recorded with the Clerk and Recorder of the City within thirty (30) days of completion of construction. Abandonment of any recorded flowlines shall be recorded with the Clerk and Recorder of the City within thirty (30) days after abandonment.
34. *Removal of Debris.* All construction-related debris shall be removed from the site for proper disposal in a timely manner. The site shall be maintained free of debris and excess

materials at all times during operation. Operator shall not burn or bury debris at any time on the Well Sites.

35. *Removal of Equipment.* All equipment used for drilling, re-completion and maintenance of the facility shall be removed from the site within thirty (30) days of completion of the work, weather condition permitting, unless otherwise agreed to by the surface owner. Permanent storage of removable equipment on Well Sites shall not be allowed.

36. *Plugged and Decommissioned Well Testing.* Prior to and following the fracturing of any New Well, Operator shall assess the integrity of plugged and decommissioned wells or removed from use and dry, or removed from use ("Previously Abandoned Wells), within one-quarter (¼) mile of the projected track of the borehole of the proposed New Well.

This shall include:

1. Based upon examination of COGCC and other publicly available records, identification of all Previously Abandoned Wells located within one-quarter (¼) mile of the projected track of the borehole of a proposed well.
  2. Risk assessment of leaking gas or water to the ground surface or into subsurface water resources, taking into account plugging and cementing procedures described in any recompletion or plugged and abandoned report filed with the COGCC.
  3. Notification of the City and COGCC of the results of the assessment of the plugging and cementing procedures.
  4. Permission from each surface owner with a Previously Abandoned Well on their property to access the property to test the soil within a 10' radius of the Previously Abandoned Well. If a surface owner has not provided permission to access and test after thirty (30) days from receiving notice, the Operator shall not be required to test the Previously Abandoned Well. Notice to the surface owner will be sent by Certified US Mail, return receipt requested, to assure that the surface owner receives proper notice.
  5. For each Previously Abandoned Well for which access and permission to test is granted, a soil gas survey to test the soil within a 10' radius of the Previously Abandoned Well shall be completed prior to production from the proposed New Well and again one (1) year after production has commenced on the New Well.
  6. Notification of the results of the soil gas survey to the City and the COGCC within three (3) months of conducting the survey or advise the City that access to the Previously Abandoned Wells could not be obtained from the surface owner.
37. *Stormwater Control Plan.* All oil and gas operations at the Well Sites shall comply and conform with the City's stormwater control regulations, including the submission of an Erosion Control Report and Plan.
38. *Temporary Access Roads.* Temporary access roads associated with oil and gas operations at the Well Sites shall be reclaimed and revegetated to the original state within

a reasonable amount of time, taking into account planting seasons, or as directed by the landowner in a Surface Use Agreement and subject to applicable COGCC variances. Operator must control erosion while access roads are in use.

39. *Trailers.* A construction trailer(s) is permitted as an accessory use during active drilling and well completion or workover operations only. No permanent residential trailers shall be permitted at the Well Sites; provided, however, that until ninety (90) days following the end of the Completion Phase on a Well Site, temporary residential and/or security trailers are permitted, as needed for on-site operations, for exclusive use by the Operator's personnel and the personnel of its subcontractors on a temporary basis.
40. *Transportation and Circulation.* The Operator will comply with all Transportation and Circulation requirements as contained in the City Land Use Code as may be reasonably required by the City's Traffic Engineer and will comply with all applicable hazardous material regulations. The Operator will submit a traffic plan to the City that includes detailed descriptions of all proposed access routes for equipment, water, sand, waste fluids, waste solids, mixed waste, and all other material to be hauled on the public streets and roads of the City. The Operator will obtain necessary access permits. The traffic plan shall include the following:
  - A. estimated weights of vehicles when loaded, a description of the vehicles, including the number of wheels and axles of such vehicles and trips per day.
  - B. Detail of access locations for each well site including sight distance, turning radius of vehicles and a template indicating this is feasible, sight distance, turning volumes in and out of each site for an average day and what to expect during the peak hour.
  - C. Truck traffic volumes converted to equivalent single axle loads and compared with existing volumes. Trucks anticipated on roadways that are being accessed to equivalent single axle loads using existing volumes and proposed with extraction activities.
  - D. Core drilled samples of City roads to be used and determined the adequacy of the existing roadway structure and determined that the roadway section is adequate for extraction activities.
  - E. Truck routing map and truck turning radius templates with a listing of required and determined that certain improvements are necessary at intersections along the route.
  - F. Complete traffic report, determining operational changes and geometric modifications necessary as a result of extraction activities.
  - G. Identification of need for any additional traffic lanes, which would be subject to the final approval of the City's engineer.



- H. Restriction of non-essential traffic to and from Well Sites to periods outside of peak am and pm traffic periods and during school hours (generally 7-9am and 3-6pm).
41. *Wastewater and Waste Management.* Operator must submit a waste management plan to the City that complies with the following: All fluids shall be contained and there shall be no discharge of fluids. Waste shall be stored in tanks, transported by tanker trucks and/or pipelines, and disposed of at licensed disposal or recycling sites. The plan shall incorporate secondary containment and stormwater measures consistent with Sections 8 and 37. No land treatment of oil impacted or contaminated drill cuttings are permitted. A copy of the Operator's Spill Prevention, Control, and Countermeasure Plan (SPCC) will be given to the City, which describes spill prevention and mitigation practices. The Operator shall not dispose of any wastewater within the City. All other waste shall be disposed of in accordance with state regulations.
42. *Water Supply.* The Operator agrees to comply with applicable State of Colorado, Department of Natural Resources and other applicable State regulations concerning the source(s) of water used in the Drilling Phase and Completions Phase. The Operator shall notify the City, upon its request, of the source(s) of water to be used at Well Sites during the Drilling Phase and Completion Phase and will provide the City with an estimate of the volumes of water to be utilized, with such estimates subject to change. All water volumes actually used by Operator shall be reported by the Operator to the State of Colorado in accordance with its regulations.
43. *Noxious Weed Control.* The Operator shall be responsible for ongoing noxious weed (as defined under State law) control at the Well Sites and along access roads per City or other applicable agency regulations.
44. *Insurance.* The Operator agrees to provide liability and insurance under the conditions, and in the amounts, set forth in Exhibit G.
45. *Injection Wells.* The Operator shall drill no injection wells in Broomfield.
46. *Alternative Site Analysis.* Operator has consulted with the City, to the City's satisfaction, in order to identify alternative sites based upon factors determined by the City. The Well Sites were mutually selected by the Operator and the City as the final sites following this consultation.
47. *General Maintenance.* Operator shall operate and maintain all equipment pursuant to manufacturer specifications consistent with technological limitations and reasonable and customary maintenance practices.
48. *Odor.* Odor emitting from Well Sites must be controlled. Operator to prevent odors from oil and gas operations by proactively addressing and, to the extent possible, resolving complaints filed by impacted members of the community, in coordination with City

public health staff. Operator must use a filtration system or additives to the drilling and fracturing fluids to minimize odors. Operator is prohibited from masking odors from any oil and gas facility site by using masking fragrances.

49. *Reclamation.* Operator must submit an oil and gas site reclamation plan and reclaim a Well Site not later than six (6) months after plugging and abandoning the last New Well at such Well Site, weather and planting season permitting.
50. *Well Integrity.* Operator must equip the bradenhead access to the annulus between the production and the surface casing, as well as any intermediate casing, with a fitting to allow safe and convenient determinations of pressure and fluid flow. Valves used for annular pressure monitoring shall remain exposed and not buried to allow for visual inspection. The Operator shall take bradenhead pressure readings as required by the COGCC.
51. *Fires and Explosions.* Any accident or natural event involving a fire, explosion or detonation shall be reported to the City within 24 hours. This report shall include such specifics, to the extent available:
  - A. Fuel source
  - B. Location
  - C. Proximity to residences and other occupied buildings
  - D. Cause
  - E. Duration
  - F. Intensity
  - G. Volume
  - H. Specifics and degree of damage to properties, if any beyond the Well Site
  - I. Injuries to person(s)
  - J. Emergency management response; and
  - K. Remedial and preventive measures to be taken within a specified amount of timeThe Operator shall provide the City with an additional report containing the information above after the conclusion of the accident or natural event if lasting more than 24 hours.
52. *Spills.* Operator must notify the City of any spill of any material on permeable ground on the Well Sites that has a reportable spill quantity under any law. The Operator will also provide the City with a copy of any self-reporting submissions that Operator provides to the COGCC due to any spills at the Well Sites.
53. *Bradenhead Monitoring.* Operator will conduct bradenhead monitoring on the New Wells in accordance with COGCC Rules.
54. *Variances.* Except as specifically provided elsewhere in the Agreement, including its Exhibits, all variances, waivers, exceptions, and similar modifications require written

approval from the City, such approval not to be unreasonably withheld, conditioned or delayed.

55. *Risk Assessment.* As part of Operator's application to the City, Operator agrees to provide a risk management plan, which will include the identification of potential risks, methods of risk avoidance and controls that implement techniques to prevent accidents and losses and reduce the impact or cost after the occurrence of identified potential events.
56. *Automatic Safety Protective Systems and Surface Safety Valve.* An automated safety system, governed by safety devices and a programmable logic computer, will be installed at the Well Sites. The automated safety system shall include the installation, monitoring and remote control of a Surface Safety Valve ("SSV") among many other engineered measures and devices that are implemented to greatly reduce or eliminate the potential for a well event. All New Wells will have a SSV installed prior to the commencement of the Production Phase connected to the production tubing at the surface. The SSV will be equipped to operate remotely via the automated safety protective system, which monitors multiple flowing pressures and rates which have predetermined maximum and/or minimum threshold values programmed and will remotely shut the well in should certain upset conditions be detected. Additionally, the automated safety system provides the ability to remotely shut-in wells on demand through operator remote intervention. The SSV will have documented quarterly testing to ensure functionality. The practice of utilizing automated safety protective systems, including SSV's, exceeds the current State regulations and requirements for wells operated within Colorado.
57. *Possible Berms, Bales or Sound Walls.* Operator shall utilize the additional mitigation measures of berms, bales, and/or sound walls at one or more of the locations set forth on Exhibit I if so requested by the City in writing. The particular measure(s) employed at any such location shall be as determined by mutual agreement between the City and the Operator.



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April 18, 2018

Tami Yellico  
City and County of Broomfield  
1 Descombes Drive  
Broomfield, Colorado 80020

Dear Ms. Yellico,

I write this letter as a follow up to our discussion on April 18, 2018. Specifically, City staff has asked Extraction for additional information regarding the implementation of operational changes following the fire that occurred on one of Extraction's well sites in Windsor, Colorado on December 22, 2017 (the "Windsor Incident").

For the purpose of this communication, it is important to note that the fire that occurred on a small portion of our Windsor site was controlled within hours and throughout the incident, was contained at all times to the site.

City staff has requested that Extraction explain differences between its operations in Windsor and those that are planned for Broomfield under our Amended and Restated Operator Agreement (the "Operator Agreement") entered into between Extraction and the City on October 24, 2017.

While Extraction recognizes the State of Colorado as the preeminent authority on oil and gas regulation and though there is no state requirement to provide additional information about this operation, we recognize that this is a topic of question among some Broomfield residents and it is our desire to address some of the key differences between these operations.

It is important to begin by noting that the wells Extraction will drill within the City and County of Broomfield (the "Broomfield Wells") will be done in accordance with the Operator Agreement. As such, the operational design of the Broomfield Wells and associated production facilities are significantly different from those on the well pad associated with the Windsor Incident in a number of ways.

The Windsor Incident occurred during temporary flowback operations, which at the Windsor site in question consisted of flowback liquids from the well, made up mostly of water and some oil, being stored in a series of large, temporary tanks located at the well site. As you are aware, the Operator Agreement we have with the City requires that Extraction install and utilize pipelines for the transportation of oil, gas and produced water and that "the Operator will use pipelines for produced water to the maximum extent feasible."



Extraction does plan on having temporary tanks on location during early flowback for the containment of some of the produced water from the Broomfield wells, which carries proportionately small amounts of hydrocarbons as it flows back from the reservoir. However, unlike the well in Windsor where the flowback tanks were the *primary* destination for all produced water from the well, the flowback tanks for the Broomfield Wells will only be utilized as a *backup* destination to the extent that the capacity of the produced water pipeline is not sufficient to handle peak water volumes. We expect the duration and use of the temporary produced water tanks to be minimal and will only be utilized during peak flowback. Additionally, all oil will flow into pipelines.

All this is to say that many of the contributing factors at play in the Windsor Incident have been designed out of the plans for the Broomfield Wells by specific provisions in the Operator Agreement that require the use of pipelines and the elimination of permanent produced oil or water tanks.

With respect to the Windsor Incident, we have also identified probable gas and ignition sources that could have contributed to the incident. Because it is difficult to pinpoint the exact contributing gas or ignition source as the definitive cause of the incident, we have implemented corrective actions that address all of these possible sources in our operations going forward. Again, the principle is to address them ALL.

### **Comprehensive List of Corrective Actions:**

All the following corrective actions have been implemented on all Extraction well pads. The list below encompasses all actions taken regardless of contributing factor:

1. Creation of a new department specifically for enhanced supervision of flowback operations, including a full-time Extraction flowback supervisor role.
2. Updated temporary flowback equipment layout specifications and guidelines.
3. Additional training required for flowback crew contractors.
4. Gas monitoring and detection equipment with flashing beacon installed on all flowback operations.
5. Pad-by-pad sound wall evaluation to increase air circulation.
6. Implementation of automated tank gauging on flowback operations, to avoid need for traditional “tank strapping” that requires the opening of the tanks.
7. Expanded internal Hot Work permitting requirements and additional gas monitoring during Hot Work.
8. Enhanced grounding requirements and inspections to mitigate for static electricity.
9. Comprehensive prestart-up review of flowback design.

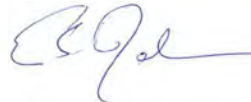
Ms. Tami Yellico  
City and County of Broomfield  
April 18, 2018  
Page 3

10. Engineered tank gas pipe header systems for temporary flowback.
11. Enhanced operations and maintenance of temporary tank gas lines.
12. Enhanced enforcement of 4-gas monitors worn by all personnel at all times.
13. Enhanced contractor training led by Extraction senior field leaders, with an emphasis on new or revised protocols.
14. In process of implementing remote-powered LED lighting system solutions, rather than diesel engine driven light plants, to eliminate that ignition source.

I would like to close by reiterating two key points: (i) we have addressed all probable contributing factors to the Windsor Incident across all our operations now and into the future and (ii) the scope, scale and duration of our temporary flowback operations in Broomfield are of a considerably smaller scale compared to those at the Windsor Incident. Our goal in Broomfield will be to eliminate temporary flowback entirely, even though we may require some temporary overflow water tankage as per the Operator Agreement.

Thank you in advance for your continued collaboration.

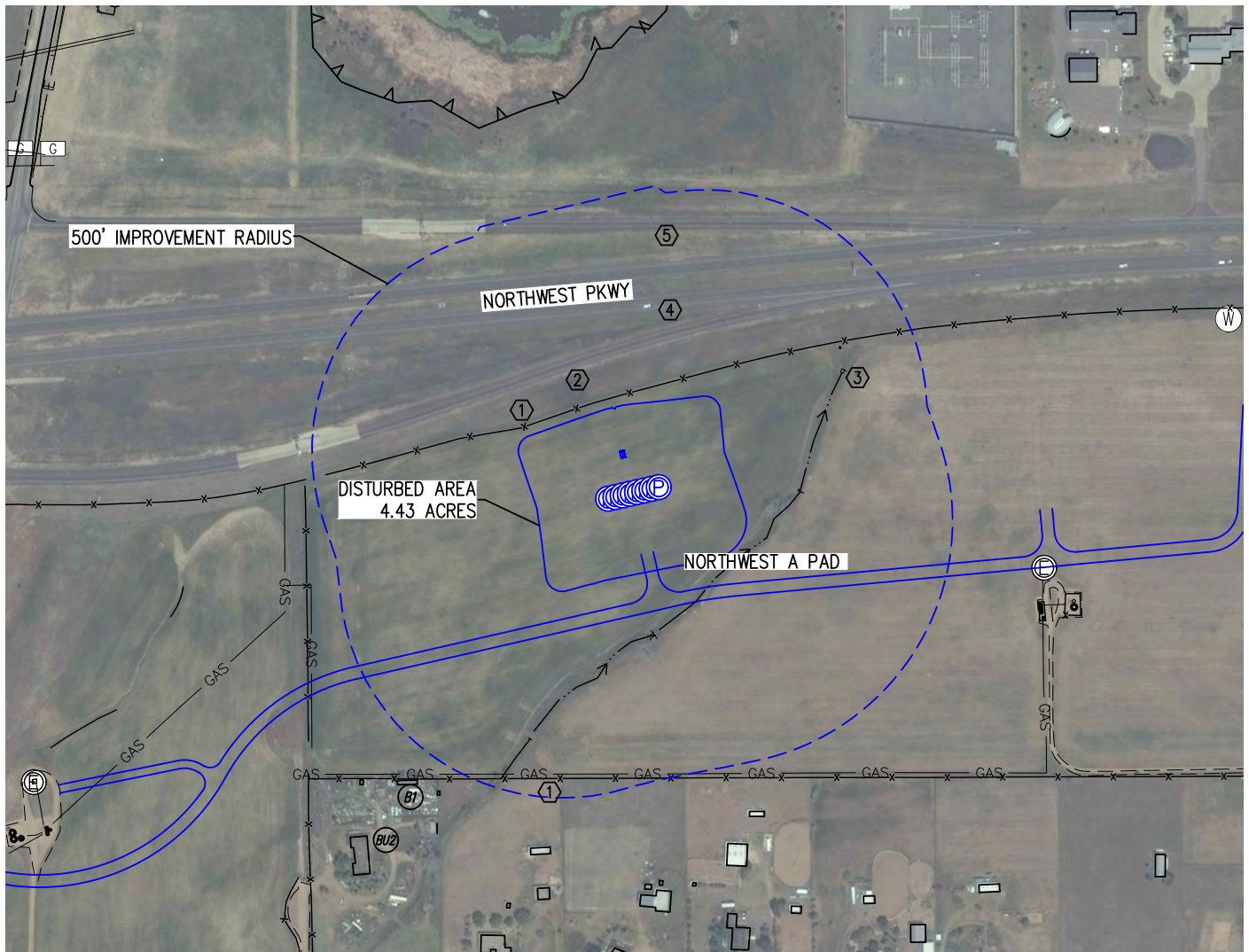
Sincerely,

A handwritten signature in blue ink, appearing to read 'Eric Jacobsen', with a stylized flourish at the end.

Eric Jacobsen  
Extraction Oil & Gas, Inc.

# LOCATION DRAWING NORTHWEST A PAD

SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.



(FROM NEAREST WELL)

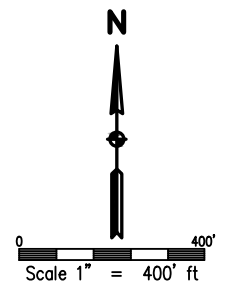
NEAREST: BUILDING 816' SE, BUILDING UNIT 1045' SW, HIGH OCCUPANCY BUILDING UNIT 4,147' N, DESIGNATED OUTSIDE ACTIVITY AREA 5,280'+  
PUBLIC ROAD 318' N, ABOVE GROUND UTILITY 1246' N, RAILROAD 5,280'+, PROPERTY LINE 66' S

(FROM GAS LIFT METERED BUILDING)

NEAREST: BUILDING 910' SE, BUILDING UNIT 1104' SW, HIGH OCCUPANCY BUILDING UNIT 4,044' N, DESIGNATED OUTSIDE ACTIVITY AREA 5,280'+  
PUBLIC ROAD 224' N, ABOVE GROUND UTILITY 1150' N, RAILROAD 5,280'+, PROPERTY LINE 6' N

## IMPROVEMENTS:

- ① FENCE: 231' N, 678' S
- ② NORTHWEST PKWY ON RAMP: 318' NW
- ③ DITCH: 532' NE
- ④ NORTHWEST PKWY: 432' N
- ⑤ NORTHWEST PKWY OFF RAMP: 622' N



## NOTE:

The size, type and location of underground utilities shown hereon are approximate, and are based on markings made by utility locate companies. It is not guaranteed that all utilities have been located. It shall be the responsibility of the contractor to verify the existence of all underground utilities in the area of the work before commencing new construction.

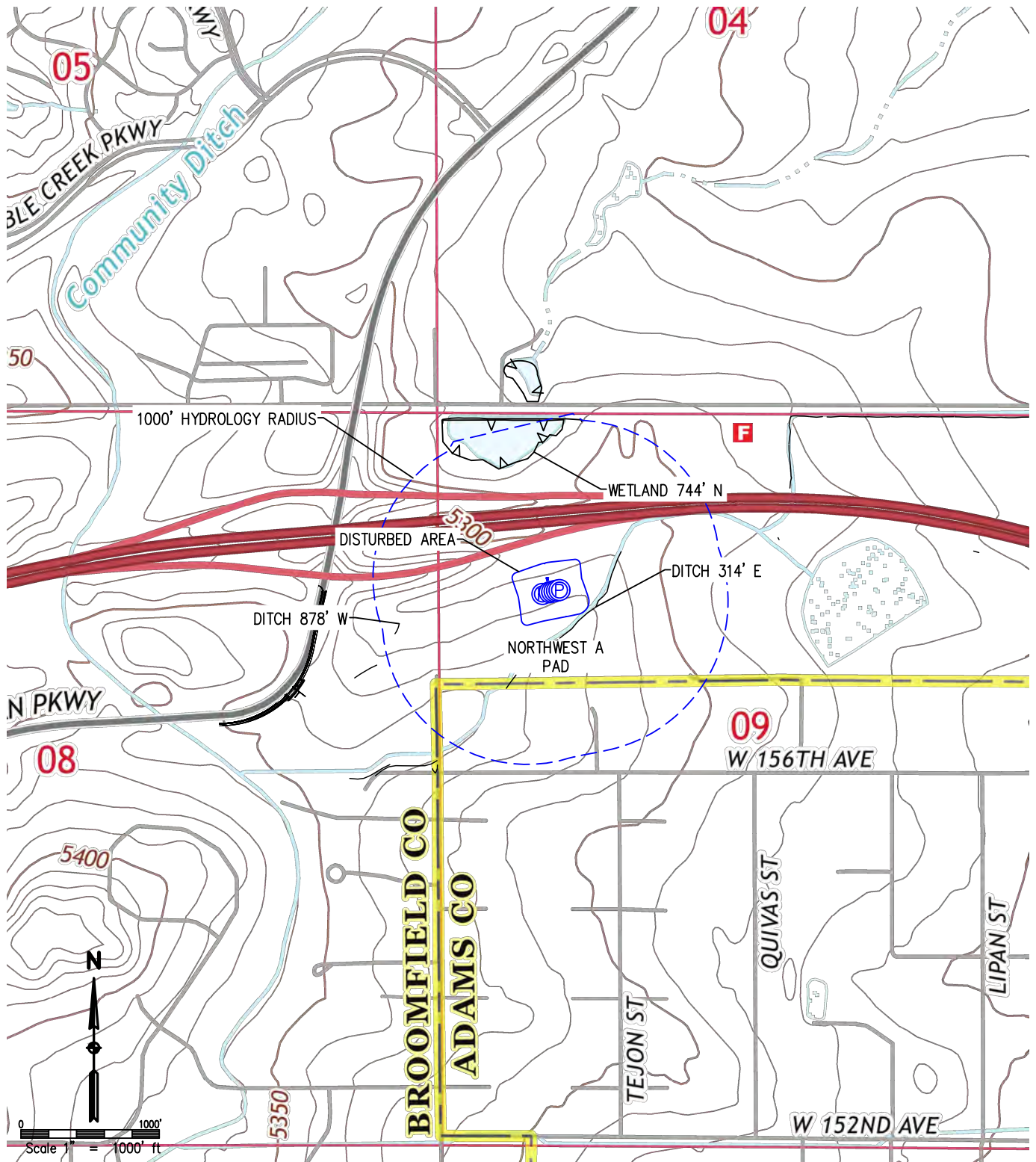


DRAWN BY	CHECKED BY
RPM	AAD
INITIAL SUBMITTAL	1/23/2017
REVISED	6/27/2018
DRAWING SIZE	8.5" X 11"
JOB NO.	EXT01568W09-01
SHEET	1 OF 1

**BASELINE**  
Engineering - Planning - Surveying  
4007 S. LINCOLN AVENUE, SUITE 405 - LOVELAND, COLORADO 80537  
P: 970.353.7600 - F: 970.353.7601 - www.baselinecorp.com

# HYDROLOGY MAP NORTHWEST A PAD

SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.



## LEGEND

- 1000' HYDROLOGY RADIUS
- WETLAND AREA



DRAWN BY RPM	CHECKED BY AAD
INITIAL SUBMITTAL 1/23/2017	REVISOR 6/27/2018
DRAWING SIZE 8.5" X 11"	JOB NO. EXT01568W09-01
SHEET 1 OF 1	

**BASELINE**  
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4007 S. LINCOLN AVENUE, SUITE 405 - LOVELAND, COLORADO 80537  
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7/6/2018

State.co.us Executive Branch Mail - Northwest A doc no 401524113



STATE OF  
COLORADO

Treitz - DNR, Rebecca <rebecca.treitz@state.co.us>

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## Northwest A doc no 401524113

2 messages

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Treitz - DNR, Rebecca <rebecca.treitz@state.co.us>  
To: Bonnie Lamond <blamond@extractionog.com>

Wed, Jun 27, 2018 at 3:14 PM

Bonnie,

COGCC is in the process of reviewing the Form 2A for the Northwest A Pad (doc no 401524113). In order to complete our review, please address the following:

1. I have added the Badger 2A doc numbers to the remote related locations, but it looks like the Northwest B 2A doc number should also be added?
2. Please provide a beneficial reuse/land application facility ID and more information on the disposal of water based cuttings. The 2A and the waste management plan are inconsistent in regards to water based cuttings.
3. Under the cultural distance section, there appears to be a High Occupancy Building Unit (Prospect Ridge Academy), closer than the 5280 indicated on the 2A for wells and production equipment. Please provide an updated distance to the nearest High Occupancy Building Unit. Based on this information, please provide an updated location drawing with the correct distances.
4. The 2A indicates the location is dryland cropland, but the plant community for NRCS is checked. Please confirm the land use.
5. Under the water resources section, the nearest surface water body is listed at 675 feet, but by the facility layout drawing, a ditch appears to be approximately 60 feet away. Please confirm the distance to the nearest surface water body. This also makes the water resources a sensitive area.
6. Under the water resources section, the nearest water well is 250 feet away (water well permit 90995). The water well permit listed is abandoned. Water well permit 88207 is approximately 785 feet to the north appears to be the nearest active water well. Water well permit 47271MH (1130 feet southeast of the location), while abandoned, had a depth of 35-50 feet to groundwater vs. the 90 feet depth to groundwater. Please provide updated information for groundwater.
7. The hydrology map appears to have the 1,000 foot buffer from the reference area point and not from the edge of disturbance. Please confirm and provide an updated hydrology map as necessary.

Please let me know if you have any questions or would like to discuss the above further.

Thank you,  
Rebecca

--

Rebecca Treitz  
Oil and Gas Location Assessment Specialist  
P 303.894.2100 x5173 | F 303.894.2109 |  
1120 Lincoln Street, Suite 801, Denver, CO 80203  
[Rebecca.Treitz@state.co.us](mailto:Rebecca.Treitz@state.co.us) | [www.colorado.gov/cogcc](http://www.colorado.gov/cogcc)

---

Bonnie Lamond <blamond@extractionog.com>  
To: Rebecca Treitz - DNR <rebecca.treitz@state.co.us>

Thu, Jun 28, 2018 at 1:26 PM

Hi Rebecca,

See responses below. Please let me know if you have any additional questions or concerns.

7/6/2018

State.co.us Executive Branch Mail - Northwest A doc no 401524113

Best,

Bonnie Lamond

Extraction Oil & Gas

370 17<sup>th</sup> Street, Suite 5300

Denver, CO 80202



Direct: (303) 250-9383

[www.extractionog.com](http://www.extractionog.com)

**From:** Treitz - DNR, Rebecca <rebecca.treitz@state.co.us>

**Sent:** Wednesday, June 27, 2018 3:14 PM

**To:** Bonnie Lamond <blamond@extractionog.com>

**Subject:** Northwest A doc no 401524113

Bonnie,

COGCC is in the process of reviewing the Form 2A for the Northwest A Pad (doc no 401524113). In order to complete our review, please address the following:

1. I have added the Badger 2A doc numbers to the remote related locations, but it looks like the Northwest B 2A doc number should also be added? Yes, please add the Northwest B doc number to the related locations as well.
2. Please provide a beneficial reuse/land application facility ID and more information on the disposal of water based cuttings. The 2A and the waste management plan are inconsistent in regards to water based cuttings. Extraction plans to dispose fluids offsite to a commercial disposal, as stated on the permit. The oil-based cuttings will be disposed of similarly and the water-based cuttings may be applied to the land application, facility ID 449314. Both disposal methods may be used for the water-based cuttings.
3. Under the cultural distance section, there appears to be a High Occupancy Building Unit (Prospect Ridge Academy), closer than the 5280 indicated on the 2A for wells and production equipment. Please provide an updated distance to the nearest High Occupancy Building Unit. Based on this information, please provide an updated location drawing with the correct distances. Updated drawing attached
4. The 2A indicates the location is dryland cropland, but the plant community for NRCS is checked. Please confirm the land use. The land use should remain dryland cropland
5. Under the water resources section, the nearest surface water body is listed at 675 feet, but by the facility layout drawing, a ditch appears to be approximately 60 feet away. Please confirm the distance to the nearest surface water body. This also makes the water resources a sensitive area. Please change to 60 feet.
6. Under the water resources section, the nearest water well is 250 feet away (water well permit 90995). The water well permit listed is abandoned. Water well permit 88207 is approximately 785 feet to the north appears to be the nearest active water well. Water well permit 47271MH (1130 feet southeast of the location), while abandoned, had a depth of 35-50 feet to groundwater vs. the 90 feet depth to groundwater. Please provide updated information for groundwater. Please use water well permit #88207, 956' northwest of the pad. It has a measured groundwater depth of 70'

7/6/2018

State.co.us Executive Branch Mail - Northwest A doc no 401524113

7. The hydrology map appears to have the 1,000 foot buffer from the reference area point and not from the edge of disturbance. Please confirm and provide an updated hydrology map as necessary. Updated hydrology map attached.

Please let me know if you have any questions or would like to discuss the above further.

Thank you,

Rebecca

--

Rebecca Treitz

Oil and Gas Location Assessment Specialist

P 303.894.2100 x5173 | F 303.894.2109 |

1120 Lincoln Street, Suite 801, Denver, CO 80203

Rebecca.Treitz@state.co.us | www.colorado.gov/cogcc

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**2 attachments**



**EXT01S68W09-01 (NORTHWEST A) 2A - LOCATION.PDF**  
11957K



**EXT01S68W09-01 (NORTHWEST A) 2A - HYDRO.PDF**  
2522K



July 16, 2018

## **Extraction Northwest A and Northwest B Pad Public Comment Response Document**

### **Introduction**

As part of the technical review of the Extraction Oil and Gas LLC's (Extraction) Northwest A Pad and Northwest B Pad, Form 2A Oil and Gas Location Assessment (Document #401524113 and #401525931) and related Form 2 Applications for Permit to Drill, Colorado Oil and Gas Conservation Commission (COGCC) staff reviewed and considered the Public Comments received. The COGCC is providing this memo with a summary of the received comments and how the issues raised in comments are addressed on the permits through COGCC Rules and operator proposed Best Management Practices (BMPs).

### **Background**

Extraction submitted the Northwest A and Northwest B Pad Form 2As in compliance with Rule 303.b.(1)A. The proposed locations are in the City and County of Broomfield (Broomfield) and are adjacent to each other. The Surface Owner for both proposed locations is the City and County of Broomfield and the right to construct is by Surface Use Agreement. There are eight planned horizontal wells at the Northwest A Pad and 8 wells and 16 separators planned at the Northwest B. There are no oil or water storage tanks planned for either the Northwest A Pad or the Northwest B Pad locations.

The nearest residential Building Units (homes) to the proposed locations are to the south in unincorporated Adams County. Northwest Parkway is north of the proposed locations.

At the planned Northwest A Pad, the nearest proposed well to a Building Unit is 1,045 feet, the closest planned production facility is 1,104 feet to a Building Unit, therefore the proposed Location is not within a COGCC defined Buffer Zone or Exception Zone setback. There were four residential buildings reported within 1,000 of the Oil and Gas location at the time of Form 2A submittal to COGCC, therefore the proposed location is not in a COGCC defined Urban Mitigation Area. The closest school building to a planned well is 4,147 feet; the closest planned production facility is 4,044 feet.

At the planned Northwest B Pad, the nearest a proposed well to a Building Unit is 1,010 feet. The closest planned production facility is 791 feet from a Building Unit, therefore, the proposed location is in a COGCC defined Buffer Zone setback. There were five residential buildings (Building Units) reported within 1,000 feet of the Oil and Gas Location at the time of Form 2A submittal to COGCC, therefore, the proposed location is not within a COGCC defined Urban Mitigation Area. The closest school building to a planned well is 4,304 feet; the closest planned production facility is 4,238 feet.





Extraction and Broomfield entered into an Operator Agreement approved by the Broomfield City Council on October 24, 2017. As part of the Operator Agreement, Extraction submitted to Broomfield a “Comprehensive Drilling Plan” (Broomfield CDP) which consisted of the information required in the local government’s Use by Special Review Permit and associated mitigation plans. The Broomfield CDP was not intended to meet the requirements of COGCC Rule 216., which provides operators may propose Comprehensive Drilling Plans – also referred to as CDPs- to the COGCC. Extraction did not, and was not required to submit a COGCC Rule 216. Comprehensive Drilling Plan to the COGCC. The COGCC was not involved in the Broomfield CDP process. The Broomfield CDP was not approved prior to submittal, review, or (contemplated) approval of the Northwest A Pad or Northwest B Pad Form 2As. However, the sites were selected through months-long negotiations between Broomfield and Extraction and was approved through the adoption of the Operator Agreement.

Extraction’s Form 2A and associated Form 2s for the Northwest A Pad and Northwest B Pad passed COGCC’s completeness review and were placed in process for COGCC staff technical review on April 27, 2018, at which time the public comment periods commenced. With extensions granted, the public comment periods were open until May 28, 2018. Since the applications have been in process, COGCC staff has had numerous discussions with the operator and has met with the operator and with Broomfield to discuss various aspects of this and other Oil and Gas Locations proposed in Broomfield. Among the topics discussed were the specific BMPs proposed on the Form 2A and how they relate to certain provisions of the Operator Agreement.

At COGCC’s request, Extraction prepared a document responding to the public comments submitted to COGCC. Extraction’s response document addresses the following public concerns: the operator agreement between Extraction and Broomfield; site-specific nuisances, including, traffic, noise, lights, odors, dust and emissions/leak detection; coordination with local emergency responders regarding safety, fire and explosion risks, and proximity to schools and potential spills. The document is attached to the Form 2A.

### **Public Comment Process**

COGCC received 10 public comments for the Northwest A and Northwest B Form 2As and Form 2s. There were three comments on the Form 2s and seven comments on the Form 2As. There were eight unique comments from six commenters.

COGCC Rule 305.d. describes the process for receiving comment on each permit application submitted. In the case of the Northwest A and Northwest B permits the normal 20 day comment period was extended by 10 days by the Director based on the request of the Local Governmental Designee (LGD). COGCC Staff reviewed and considered all public comments received on the Form 2A and Form 2 permit applications, however, COGCC does not respond to each individual comment or commenter. This longstanding public comment review and response policy was explained by the Commission in the Statement of Basis and Purpose to the 2008 Rulemaking, addressing COGCC Rule 305 (2008 Statement of Basis and Purpose at p.18).

COGCC rules allow the Director to place technically feasible and economically practicable Conditions of Approval (COAs) on permits when necessary and appropriate. For the Northwest A and Northwest B Pad Form 2As, COGCC worked with Extraction to develop site-specific BMPs for the Location and did not rely on prescriptive COAs. The BMPs were developed and applied to eliminate, minimize, or mitigate potential adverse impacts to public health, safety and welfare, including the environment; BMPs also provide specificity as to how Extraction plans to comply with certain provisions of COGCC rules.

The COGCC Oil and Gas Location Assessment (OGLA) group, Engineering group, and Permitting group reviewed the permits for compliance with COGCC rules. COGCC Staff found the Form 2 and Form 2A applications to be in compliance with COGCC's rules and with COGCC's mission to foster the responsible development of the state's oil and gas resource in a manner that will avoid or minimize adverse impacts, and protect public health, safety and welfare and the environment. The following section includes a discussion of some of the concerns and issues addressed in the public comments.

### **Public Comment Summary**

The dominant sentiment expressed in public comments received by COGCC on Extraction's permits in Broomfield was the request for COGCC to deny the permit applications based on a variety of reasons. However, it is not within COGCC's statutory mandate to deny a permit for a well that the operator has a demonstrable right to construct and mineral interest to develop unless the application fails to comply with COGCC Rules or the Colorado Oil and Gas Conservation Act.

The primary site-specific concern expressed in the comments is the proximity of the Northwest A and Northwest B Pads to the Adams County border and to Adams County residences and that the original proposed locations were further from Adams County residences.

As with other proposed Oil and Gas Locations, the Form 2A permit applications for the Northwest A and Northwest B pads were submitted to COGCC with the siting already established. Broomfield and Extraction determined the proposed location without input from COGCC and the selected site represents a culmination of more than a year of negotiations including numerous City Council meetings and ultimately City Council approval.

COGCC is aware that the Northwest A and Northwest B Pads were not in Extraction's original development plan presented to Broomfield in 2016 and the United and Sheridan Pad locations in the original plan were further from residences and further from the Adams County Line. However, COGCC does not have the regulatory authority to require the use of the original United or Sheridan Pad Locations or other areas that would be further from Adams County. COGCC has determined that the proposed Interchange A & B Pad location is in compliance with the COGCC 603 and 605 series setback rules. COGCC has also determined that operator's proposed Best Management Practices (BMPs) are sufficiently protective of health, safety, welfare and the environment given the proposed Location's proximity to residents.

On the Northwest A and Northwest B Pad or on the other Extraction permits in Broomfield, commenters expressed concerns about:

- The Operator Agreement between the City of Broomfield and Extraction;
- Submittal of permits to COGCC prior to finalizing the Broomfield CDP;
- Incorporating the BMPs as stated in the Operator Agreement into the Form 2A;
- Health and safety concerns regarding potential explosions, fires, and toxic releases;
- Water well and drinking water concerns;
- The proximity of pads (including other Oil and Gas Locations proposed by Extraction) to a school;
- The Martinez lawsuit;
- The proximity of pads (including other Oil and Gas Locations proposed by Extraction) to residential development in Adams County;
- VOCs and Odor Concerns;
- Traffic and access points;
- Environmental concerns, including contamination from spills; and
- Dust, noise, and lights.

The general concerns are discussed specifically in the sections that follow.

#### Operator Agreement with Extraction and Broomfield

Many comments expressed concerns that COGCC's permit process was not taking into account the Operator Agreement between Extraction and Broomfield. Aside from attending public meetings, presenting information to the City Council and Broomfield's Oil and Gas Task Force, and engaging in numerous meetings with Broomfield staff, COGCC was not party to the terms of the Operator Agreement and COGCC is not a signatory to the agreement. In its October meeting, COGCC Commissioners instructed staff to ensure that Extraction's Form 2A applications in Broomfield "comport with" the Operator Agreement. Consistent with the Commission's direction, Staff reviewed the Operator Agreement. COGCC finds that the proposed Oil and Gas Locations are those that were included in the executed Operator Agreement, including the Northwest A Pad and Northwest B Pad and that the negotiated BMPs and COAs are sufficiently protective of public health, safety, welfare and the environment, including wildlife resources. It is important to note that the exact terms and conditions of the Operator Agreement remain a private party agreement between two outside parties, and those terms and conditions are enforceable as civil matters by either party not the COGCC.

#### Form 2A processing and approval prior to finalizing the Broomfield CDP

A dominant concern was that Extraction did not finalize the Broomfield CDP prior to submitting permits to COGCC.

COGCC is aware that Broomfield and Extraction had not finalized the Broomfield CDP prior to Extraction's submittal of the Form 2A and Form 2 permits to COGCC. However, COGCC's permitting

process is independent from local permitting processes and operators commonly submit permit applications to COGCC prior to finalizing their agreements with local governments or obtaining their local permits. The timing of Broomfield's permitting process is also independent of COGCC's permitting process. COGCC's Rules include a provision for an operator to elect to develop a Comprehensive Drilling Plan, however, the process engaged by Extraction and Broomfield was not intended to satisfy Rule 216 and COGCC was not involved in the development of the Broomfield CDP.

#### Incorporation of BMPs on the Operator Agreement into the Form 2A and Form 2

Public commenters also expressed concern that COGCC did not incorporate all BMPs in Exhibit B of the Operator Agreement onto the Form 2A or Form 2. The BMPs in Exhibit B related to surface equipment or operations, not downhole work and are discussed below as they relate to the Northwest A Pad or Northwest B Pad Form 2As.

COGCC evaluated the BMPs on the Operator Agreement during the technical review and determined that many were not appropriate for inclusion on a Form 2A (COGCC's evaluation criteria is explained below). COGCC and Extraction worked to develop an alternative set of BMPs for the Form 2A and COGCC included Broomfield in this revision process. The BMPs incorporated into the Northwest A Pad and Northwest B Pad Form 2As are enforceable by COGCC and address human health, safety, welfare and the environment.

The terms and conditions in the Operator Agreement, including the BMPs in Exhibit B were negotiated and agreed to by Broomfield and Extraction; COGCC did not have a role in their development. Not including the Exhibit B BMPs on the Form 2A, does not diminish Broomfield's ability to enforce the BMPs and the other terms and conditions of the Operator Agreement.

BMPs on COGCC permits issued by COGCC are enforced in the same way as are Commission Rules, the Colorado Oil and Gas Conservation Act, and as other permit entries and information, including Conditions of Approval. COGCC does not include BMPs if (1) COGCC does not have the ability to respond to and resolve potential complaints regarding the BMP (not within COGCC's statutory authority), or (2) COGCC does not have the ability to inspect for compliance with the BMP (not within COGCC's jurisdictional authority or expertise).

COGCC used the following guidelines to determine if the Exhibit B BMP was appropriate for inclusion on the Northwest A Pad and Northwest B Pad Form 2As:

- Exhibit B BMPs that require compliance with local codes or local regulations cannot be regulated or enforced by COGCC and were not included on the Form 2A.
- Exhibit B BMPs that have subjective language where compliance determinations are made by Broomfield or a third party were not included on the Form 2A.
- Exhibit B BMPs that pertain solely to interactions between Broomfield and the operator (e.g. requirements for Extraction to meet with or provide notice or records to the local government) cannot be regulated or enforced by COGCC and were not included on the Form 2A.

- Exhibit B BMPs that restated a COGCC Rule or Rules were not included on the Form 2A because the operator is already required to comply with the COGCC Rules.
- Exhibit B BMPs that conflicted with or weakened a COGCC Rule or Rules or introduced language that would make it more difficult for COGCC to enforce a current Rule were not included on the Form 2A.
- Exhibit B BMPs that address issues that COGCC does not have authority to regulate and enforce (i.e. CDPHE or Federal jurisdiction) were not included on the Form 2A.

By using the above criteria, COGCC removed numerous Exhibit B BMPs, revised others, and replaced some with additional language appropriate for COGCC enforcement. This level of review results in a permit that COGCC's Field Inspection Unit has the authority to inspect and enforce, without sacrificing public health, safety or welfare and ensures that oil and gas operations are regulated in a consistent, effective manner throughout the state.

#### Health and Safety – concerns regarding Explosions, Fire and Toxic Releases

The majority of public comments expressed concerns about health and safety, with specific concerns about fires, explosions, and poisonous or toxic releases.

The Form 2As for the Northwest A Pad and Northwest B Pad contains information regarding the planned number of wells, number and type of facilities and distances from nearby homes and other building units.

Comments raising concerns regarding fires, explosions, and poisonous or toxic releases referenced an incident that occurred on an Oil and Gas Location operated by Extraction in December 2017, in which an explosion and fire occurred during flowback operations. The explosion and fire were confined to the Oil and Gas Location and although one contract worker was injured, no injuries to the public were reported. Extraction has reported to COGCC and Broomfield that it has examined its procedures and has taken numerous measures in response to the incident that they are implementing at all their Oil and Gas Operations, including at the Northwest A Pad and Northwest B Pad locations. These are detailed in Extraction's April 18, 2018 letter to Broomfield, which has been attached to the Northwest A and Northwest B Pad Form 2As as document # 2316327.

#### Water well, drinking water and environmental concerns

The nearest permitted constructed water well from the Northwest A location is approximately 960 feet north. The nearest permitted constructed well is approximately 1,200 feet south of the Northwest B Pad location. COGCC Rules require that all oil and gas bearing formations are isolated from aquifers and that aquifers are covered by surface casing and cement. COGCC engineering staff reviews all Form 2 Applications for Permit to drill to ensure that the well design has sufficient casing and cement to protect all drinking water aquifers and nearby domestic wells. COGCC also requires groundwater sampling of a limited number of water wells before and after drilling and hydraulic fracturing of an oil and gas well. Extraction, as part of its agreement with Broomfield, has committed to expanding its water sampling efforts by sampling all available permitted wells and springs that are up to ½ mile from the location and expanding the sampling radius to one-mile if at least one upgradient and two down-gradient water sources are unavailable within ½ mile. COGCC has added a COA on the Form 2A that requires

Extraction to provide the analytical results to COGCC of the water quality monitoring samples collected in Broomfield and Adams County and the analytical results will be publicly available on the COGCC website.

A pipeline network will be in place to transport oil, gas, and produced water from the location. The pipeline will eliminate the need for large capacity liquids storage (tanks) and loading and transport via trucks. The reduced quantities of liquids stored on site and reduced handling will decrease the likelihood of a spill and further decreases the potential for a large spill.

Although oil and water storage tanks are not listed on the Form 2A, COGCC recognizes that there will be vessels on location for retention time and liquids separation, and flashing off volatile gasses to stabilize the oil or condensate before transport and to store liquids during maintenance. The production facilities will be remotely monitored through Extraction's supervisory control and data acquisition (SCADA) system for upset conditions, loss of pressure, and other alarms which would indicate a spill. The monitoring system will allow for remote shut in, if necessary, and will have automatic shut in capabilities for certain situations.

Leak detection and flowline integrity - Extraction provided a best management practice for a leak detection plan following COGCC rules 604.c.(2).F. The leak detection plan BMP includes monitoring production facilities on daily to weekly basis by visually inspecting wellheads, vessels/tanks, and fittings. An infrared camera will be used to inspect above ground flowlines and piping on a quarterly basis for the first five years. Extraction has committed to bi-annual flow line testing per COGCC regulations. Testing flowlines twice as often as required by COGCC allows for earlier detection of potential leaks. Although the results of the individual inspections and pressure tests will not be provided to COGCC (for efficiency purposes), Extraction must maintain records of their inspections and COGCC can inspect them at any time, if necessary.

Secondary Containment - The separators and transfer tanks will have lined secondary containment. Extraction has committed to meet COGCC Rule 604.c.(2).G for process vessel or containers to be in a lined area with a steel-ring berm that is sized to hold 150 percent of the largest single vessel or container. The secondary containment for the production on location includes a synthetic or engineered liner that is tied back to the steel ring, preventing spill from leaving the contained area.

Extraction will install a system for the automated and remote (manual) monitoring and shutdown of production facilities. The system will automatically notify Extraction in the event of abnormal operations and Extraction will have the capability to remotely shut down production. If necessary, the system will automatically shut down production in emergencies. As part of the system, Extraction has designed the site with safety valves controlled by a programmable logic computer at each wellhead.

#### Proximity to schools

The closest planned well or production equipment on the Northwest A or Northwest P Pad to an existing school building is over 4,000 feet. The planned siting of the Oil and Gas Location is in compliance

with COGCC Rules which allow administrative permit approval if a proposed well or production facility is greater than 1,000 feet from a High Occupancy Building Unit.

#### Martinez Lawsuit

The COGCC received several comments regarding whether the Court of Appeals holding in the “Martinez” case (*Martinez v. Colo. Oil & Gas Conservation Comm’n*, 2017 COA 37) is applicable to staff’s review of Extraction’s Form 2As submitted in Broomfield. The Court of Appeals’ decision in *Martinez* is currently under review by the Colorado Supreme Court. Staff conducted its review of the Form 2As in accordance with its Rules and the Colorado Oil and Gas Conservation Act. The COGCC’s Rules provide for the protection of public health, safety, and welfare in connection with oil and gas development.

#### Volatile Organic Compound and Odor Concerns

Several public comments expressed concern with the health effects of potential air emissions and the odors associated with oil and gas operations. Extraction has provided BMPs on the Form 2A to address odors during the drilling, completions and flowback, and production phases of operation:

- **Drilling Phase:**

Extraction has committed to using a synthetic and diesel mix drilling mud with less aromatic properties than full diesel mud. A mud cooling system will be used to minimize the volatilization of hydrocarbons in the drilling mud. Extraction committed to using additives to prevent odors, but will not mask odors with the use of fragrances.

Extraction has committed to using an electric rig for drilling, minimizing diesel exhaust.

- **Completions/Flowback Phase:**

During completions and flowback, Extraction has provided information in compliance with COGCC Rule 805 and 912 for green completions. Flaring will only occur during upset conditions. Emissions control devices will be used during completions and flowback that meet CDPHE regulations. Extraction has committed that saleable gas will not be flared but either directed to a pipeline or the wells will be shut-in until the gas line is available.

Extraction has committed to ambient air monitoring for Volatile Organic Compounds (VOCs) and explosive gases during flowback with “4-gas” monitors placed throughout the Oil and Gas Location. The monitors will have high level alarms for worker safety and personnel will be trained to respond to alarm conditions.

- **Production Phase:**

Extraction has committed to a tankless location with piping of liquids and gas to an offsite centralized processing facility in Weld County. Eliminating production tanks eliminates the opening of thief hatches on tanks during truck load-out and thereby eliminating that source of hydrocarbon emissions to the atmosphere. There will be an emissions control device on location for controlling by-product from the separation process. Saleable gas will not be flared, unless in emergency or upset condition as allowed by COGCC Rules.

Production equipment on location will be powered by electricity, minimizing the need for diesel or natural gas generators, therefore minimizing exhaust sources from the location. The gas generator planned on the location a backup if there is an interruption in electricity.

The leak detection plan includes daily, weekly, and quarterly monitoring (both visually and with an infrared camera) of wellheads, production vessels, and fittings which will minimize the release of hydrocarbon vapors to the atmosphere. Additionally, Extraction has committed to conducting flowline integrity tests twice annually to identify subsurface leaks in a timely manner.

#### Traffic Concerns

Extraction has committed to coordinating a traffic plan with Broomfield prior to commencement of drilling operations. Extraction has committed to transporting fresh water to the Northwest A and Northwest B Pads via pipeline for completions operations. The planned liquids pipeline will eliminate the truck transport of oil and produced water from the location. The use of pipelines will result in a major reduction of truck traffic during the completion and production phases of operations.

#### Noise, lighting and Dust Concerns

Extraction has committed to the following noise mitigation measures; use of completions fleet with quiet technology, 32 foot tall sound walls, baseline and continuous noise monitoring, high-line power for electric drill rig.

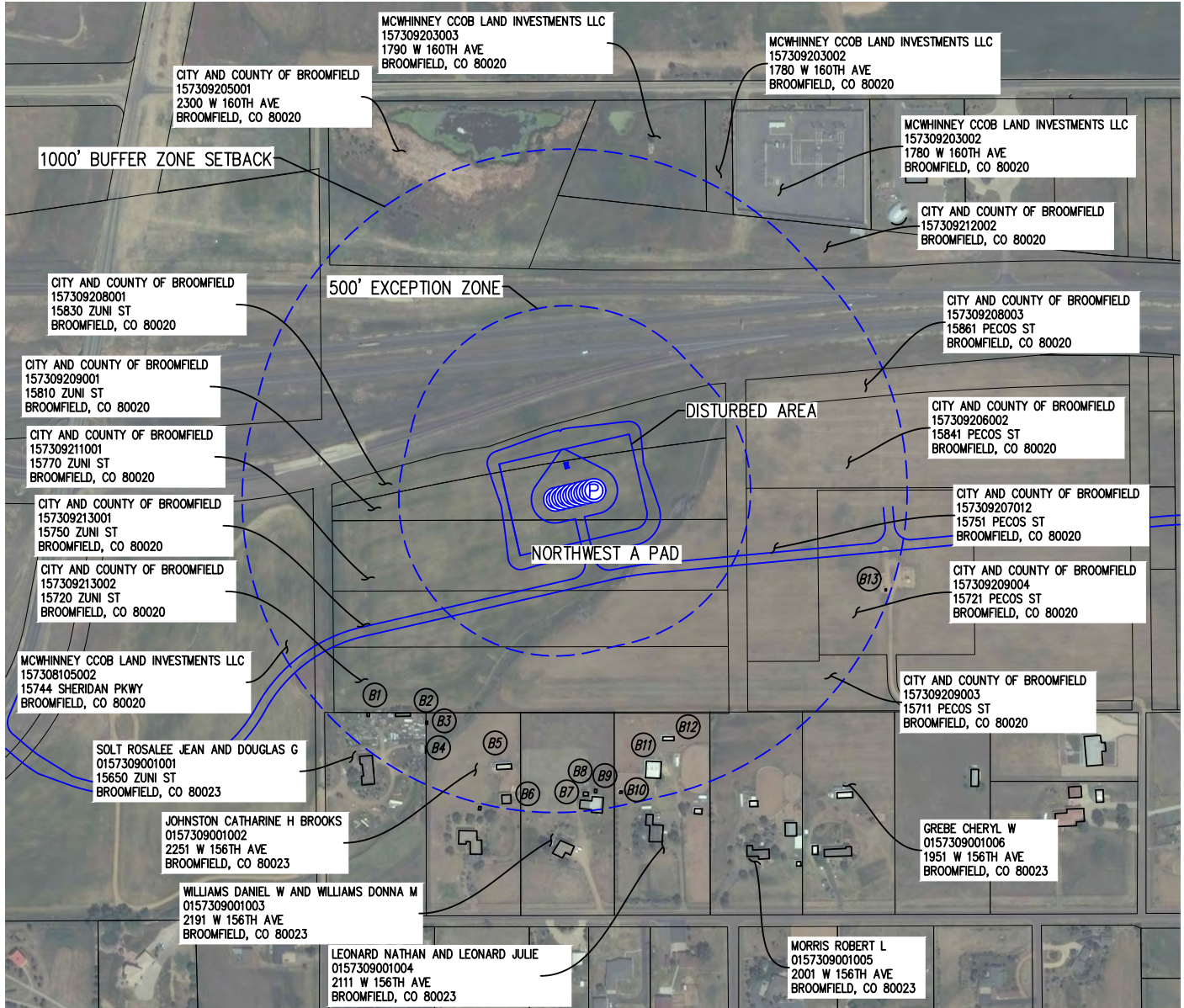
The permanent lighting around the facility will be shielded and the lights will be directed downward. The 32 foot soundwall will prevent light pollution during drilling and completions operations.

The mitigation measures for dust control include controls for access road traffic and controls for silica handling during completions.



# NOTIFICATION ZONE EXHIBIT NORTHWEST A PAD

NW1/4 NW1/4 SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.



NEAREST: BUILDING ±816' S, BUILDING UNIT ±1005' SW,  
(DISTANCES MEASURED FROM THE NEAREST WELL OR EQUIPMENT TO REFERENCED BUILDING UNIT)

## BUFFER ZONE:

BUILDING UNIT: NONE WITHIN 1000'

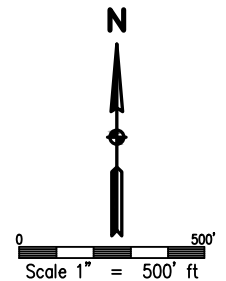
(B1) 904' SW	(B5) 856' S	(B9) 934' S	(B13) 981' E
(B2) 824' SW	(B6) 954' S	(B10) 953' S	
(B3) 818' SW	(B7) 964' S	(B11) 880' S	
(B4) 890' SW	(B8) 939' S	(B12) 816' S	

## EXCEPTION ZONE:

BUILDING UNIT: NONE WITHIN 500'

DATE OF AERIAL IMAGERY: 9/7/2013

DATE OF SURVEY: 12/21/2017



## LEGEND

- PROPERTY LINE
- (B1) BUILDING
- (B11) BUILDING UNIT



DRAWN BY RPM	CHECKED BY AAD
INITIAL SUBMITTAL 1/23/2017	
REVISED N/A	
DRAWING SIZE 8.5" X 11"	
JOB NO. EXT01568W09-01	
SHEET 1 OF 1	

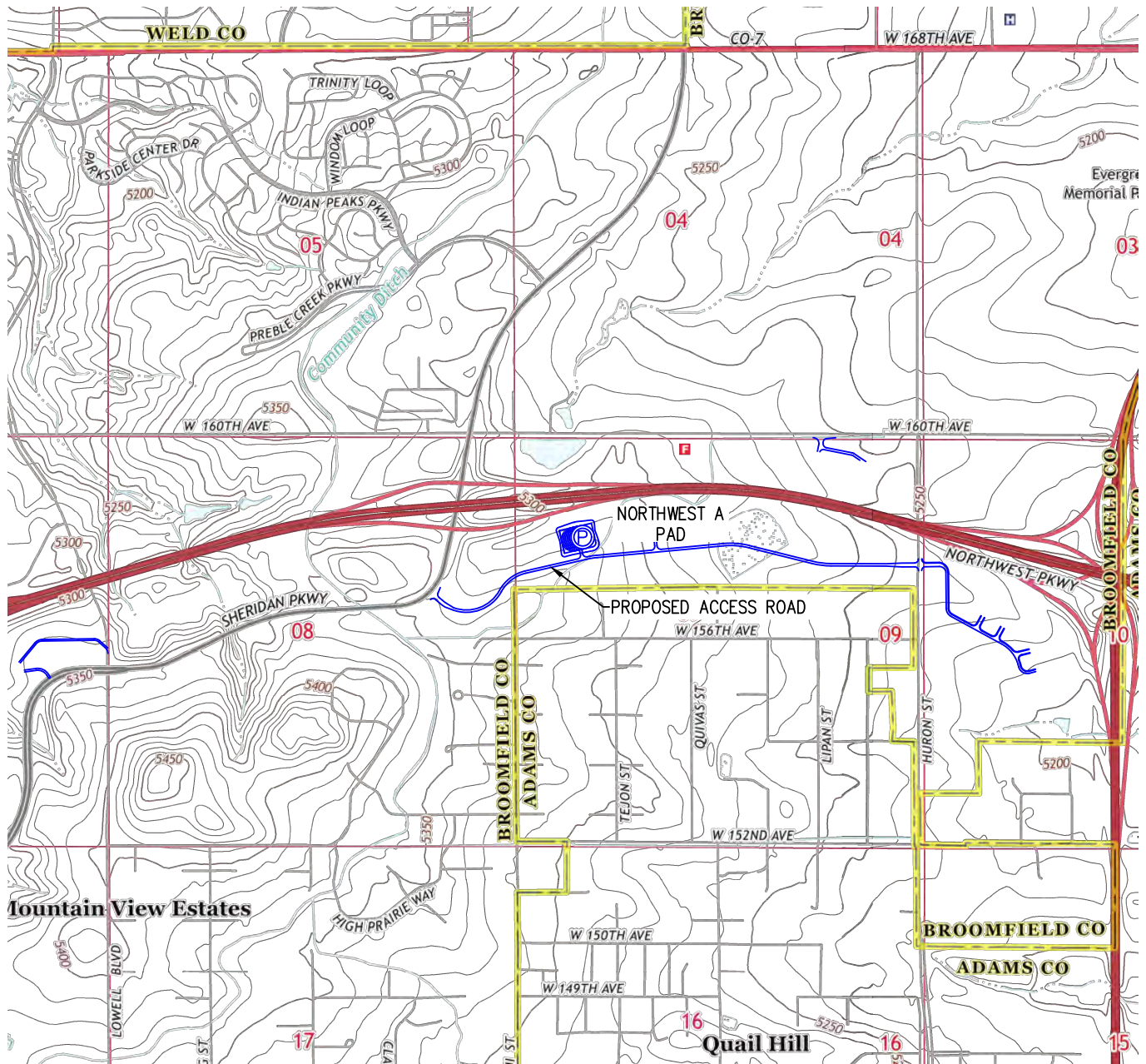
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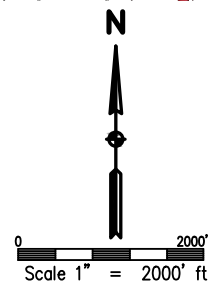
# ACCESS ROAD MAP NORTHWEST A PAD

SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.



**FROM BROOMFIELD, CO:** FROM THE INTERSECTION OF CO-287 AND WEST MIDWAY BLVD,  
DRIVE NORTH ON CO RD 287 E FOR  $\pm 2.5$  MILES TO WEST DILLON ROAD AND TURN RIGHT.  
DRIVE EAST ON WEST DILLON ROAD FOR  $\pm 0.3$  MILES TO NORTHWEST PKWY ON-RAMP.  
DRIVE EAST ON NORTHWEST PKWY FOR  $\pm 3.7$  MILES AND TAKE EXIT 48 FOR SHERIDAN PKWY AND TURN RIGHT.  
DRIVE SOUTH ON SHERIDAN PKWY FOR  $\pm 0.2$  MILES TO PROPOSED ACCESS ROAD AND TURN LEFT.  
DRIVE EAST ON PROPOSED ACCESS ROAD FOR  $\pm 0.5$  TO PROPOSED WELL PAD.

TOTAL DISTANCE FROM BROOMFIELD, CO TO PROPOSED WELL PAD LOCATION IS  $\pm 7.4$  MILES



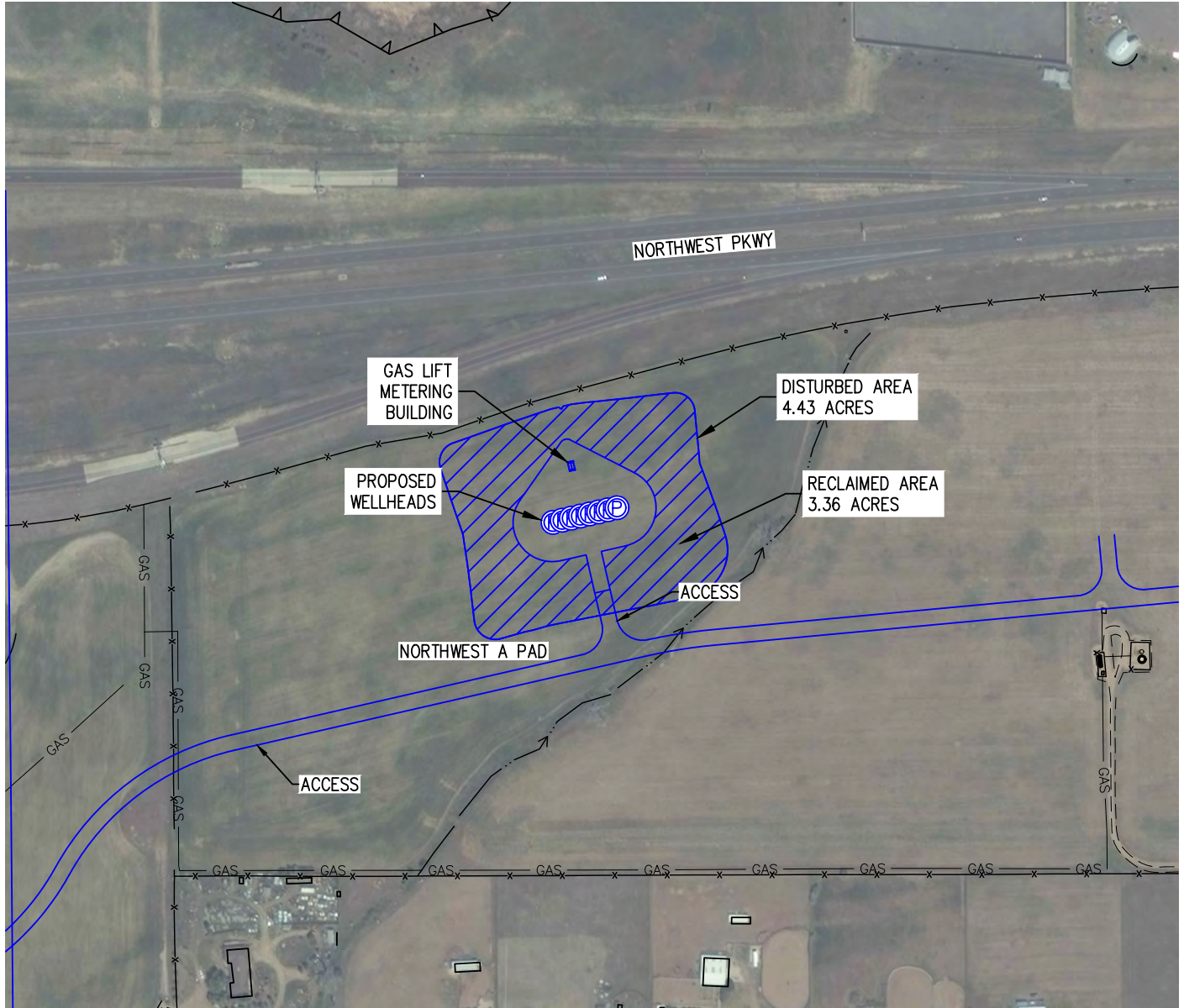
DRAWN BY RPM	CHECKED BY AAD
INITIAL SUBMITTAL	1/23/2017
REVISED	N/A
DRAWING SIZE	8.5" X 11"
JOB NO.	EXT01568W09-01
SHEET	1 OF 1

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# FACILITY LAYOUT DRAWING NORTHWEST A PAD

SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.

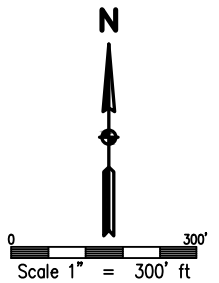


Ⓟ PROPOSED WELL HEAD

Ⓜ GAS MARKER

Ⓢ SIGN

NOTE: PROPOSED FEATURES SHOWN IN BLUE



## DISTURBED/RECLAIMED AREAS

TOTAL DISTURBED AREA OF  
LOCATION= 4.43 ACRES  
TOTAL DISTURBED AREA OF  
LOCATION AFTER RECLAMATION=  
1.07 ACRES



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RPM	AAD
INITIAL SUBMITTAL	1/23/2017
REVISED	N/A
DRAWING SIZE	8.5" X 11"
JOB NO.	EXT01568W09-01
SHEET	1 OF 1

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PLOT\_STAMP

LOCATION PICTURES  
**NORTHWEST A PAD**  
 SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.



VIEW NORTH



VIEW WEST



VIEW EAST



VIEW SOUTH

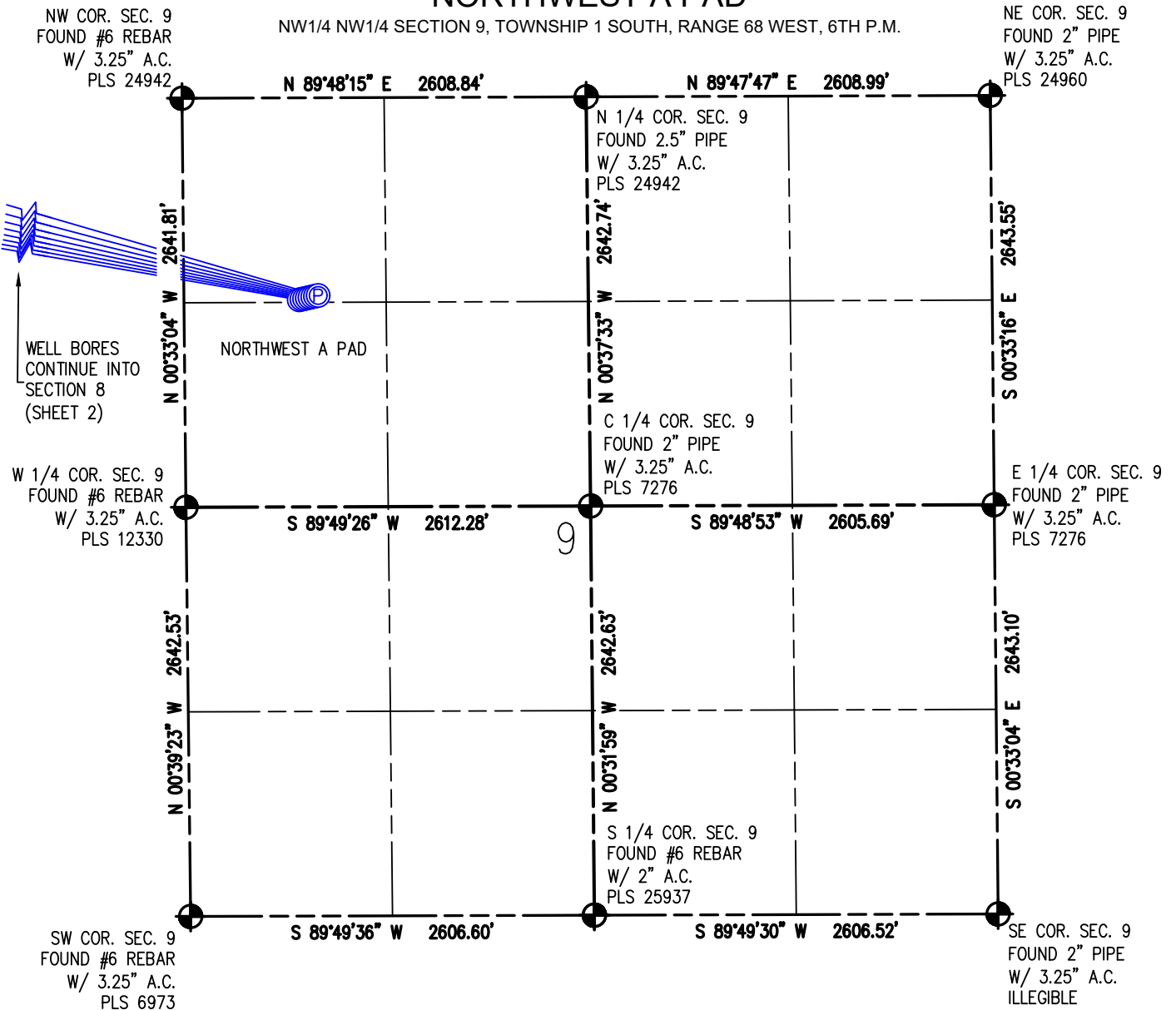


DRAWN BY	CHECKED BY
RPM	AAD
INITIAL SUBMITTAL	1/23/2017
REVISED	N/A
DRAWING SIZE	8.5" X 11"
JOB NO.	EXT01S68W09-01
SHEET	1 OF 1



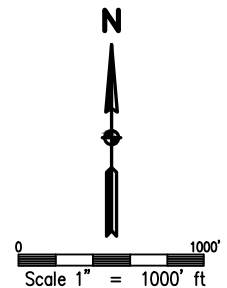
# MULTI WELL PLAN NORTHWEST A PAD

NW1/4 NW1/4 SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.



## NOTES (SURFACE HOLES):

NORTHWEST A S20-25-6N TO BE AT 1305' FNL, 744' FWL, SEC. 9  
 NORTHWEST A S20-25-7N TO BE AT 1301' FNL, 761' FWL, SEC. 9  
 NORTHWEST A S20-25-8C TO BE AT 1297' FNL, 779' FWL, SEC. 9  
 NORTHWEST A S20-25-9N TO BE AT 1293' FNL, 796' FWL, SEC. 9  
 NORTHWEST A S20-25-10N TO BE AT 1289' FNL, 814' FWL, SEC. 9  
 NORTHWEST A S20-25-11C TO BE AT 1285' FNL, 831' FWL, SEC. 9  
 NORTHWEST A S20-25-12N TO BE AT 1281' FNL, 849' FWL, SEC. 9  
 NORTHWEST A S20-25-13N TO BE AT 1277' FNL, 867' FWL, SEC. 9



## LEGEND

- FOUND/SET SURVEY MONUMENT PER MONUMENT RECORD EXCEPTIONS NOTED.
- CALCULATED SURVEY MONUMENT POSITION
- CALCULATED DIMENSION



DRAWN BY	CHECKED BY
RPM	AAD
INITIAL SUBMITTAL	1/23/2017
REVISED	N/A
DRAWING SIZE	8.5" X 11"
JOB NO.	EXT01568W09-01
SHEET	1 OF 4

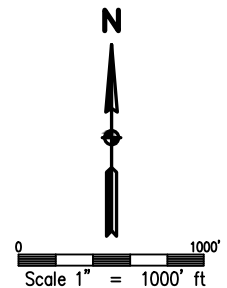
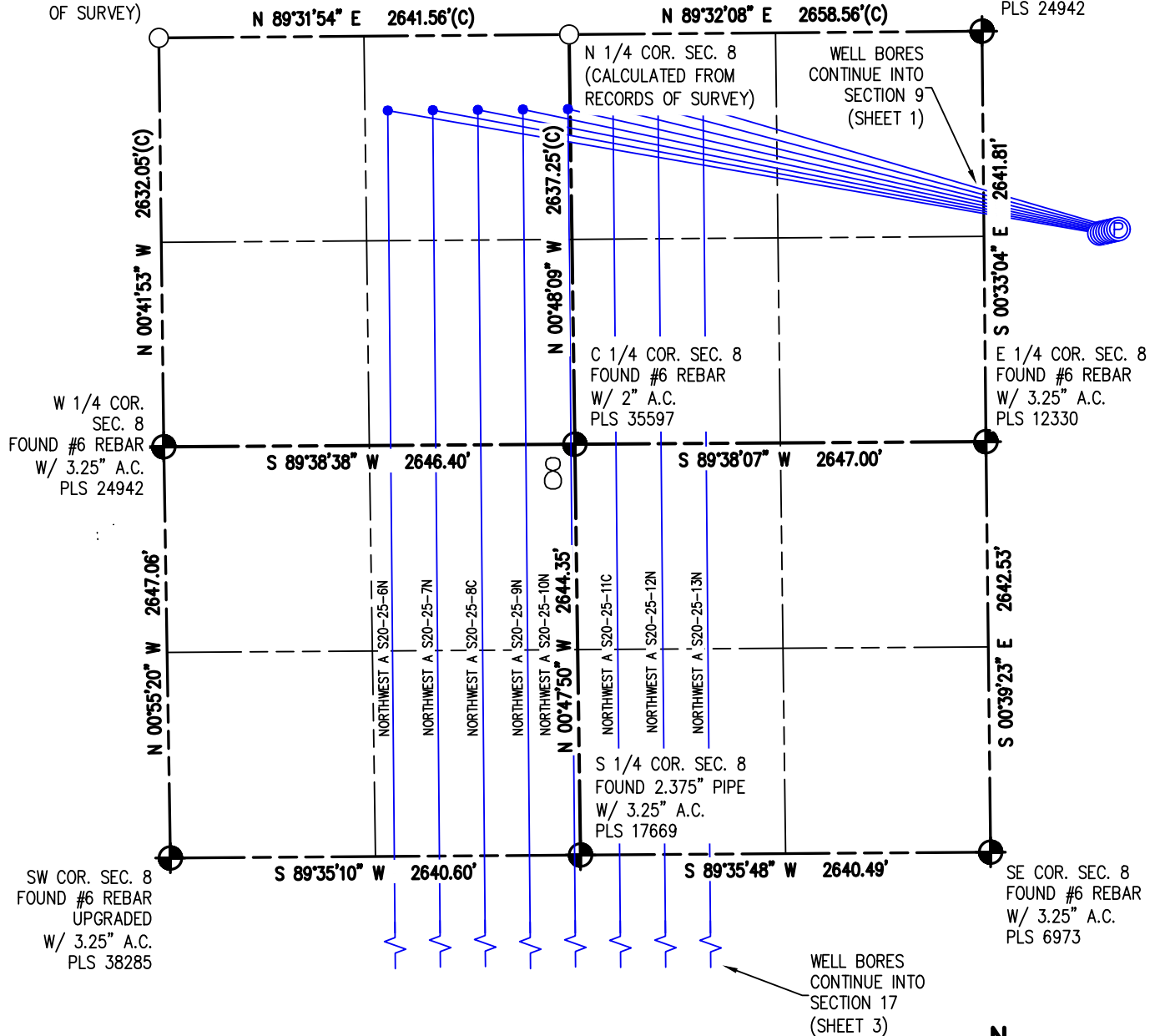
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# MULTI WELL PLAN NORTHWEST A PAD

NW1/4 NW1/4 SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.

NW COR. SEC. 8  
(CALCULATED  
FROM RECORDS  
OF SURVEY)

NE COR. SEC. 8  
FOUND #6 REBAR  
W/ 3.25" A.C.  
PLS 24942



## LEGEND

- - FOUND/SET SURVEY MONUMENT PER MONUMENT RECORD EXCEPTIONS NOTED.
- - CALCULATED SURVEY MONUMENT POSITION
- (C) - CALCULATED DIMENSION



DRAWN BY	RPM	CHECKED BY	AAD
INITIAL SUBMITTAL	1/23/2017		
REVISED	N/A		
DRAWING SIZE	8.5" X 11"		
JOB NO.	EXT01568W09-01		
SHEET	2	OF	4

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# MULTI WELL PLAN NORTHWEST A PAD

NW1/4 NW1/4 SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.

NW COR. SEC. 17  
FOUND #6 REBAR  
UPGRADED W/  
3.25" A.C.  
PLS 38285

WELL BORES  
CONTINUE INTO  
SECTION 8  
(SHEET 2)

N 1/4 COR. SEC. 17  
FOUND 2.375" PIPE  
W/ 3.25" A.C.  
PLS 17669

NE COR. SEC. 17  
FOUND #6 REBAR  
W/ 3.25" A.C.  
PLS 6973

W 1/4 COR.  
SEC. 17  
FOUND 2" AXLE  
W/ 3" A.C.  
PLS 13290

C 1/4 COR. SEC. 17  
FOUND 2" A.C. IN  
CONCRETE  
PLS 30100

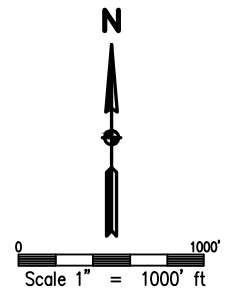
E 1/4 COR. SEC. 17  
(CALCULATED FROM  
RECORDS OF  
SURVEY)

SW COR. SEC. 17  
FOUND #6 REBAR  
W/ 2" A.C.  
PLS 15315

S 1/4 COR. SEC. 17  
FOUND 2" A.C.  
PLS 30100

SE COR. SEC. 17  
FOUND 2.5" A.C.  
ILLEGIBLE

WELL BORES  
CONTINUE INTO  
SECTION 20  
(SHEET 4)



## LEGEND

- ⊕ - FOUND/SET SURVEY MONUMENT PER MONUMENT RECORD EXCEPTIONS NOTED.
- - CALCULATED SURVEY MONUMENT POSITION
- (C) - CALCULATED DIMENSION



DRAWN BY	RPM	CHECKED BY	AAD
INITIAL SUBMITTAL	1/23/2017		
REVISED	N/A		
DRAWING SIZE	8.5" X 11"		
JOB NO.	EXT01568W09-01		
SHEET	3	OF	4

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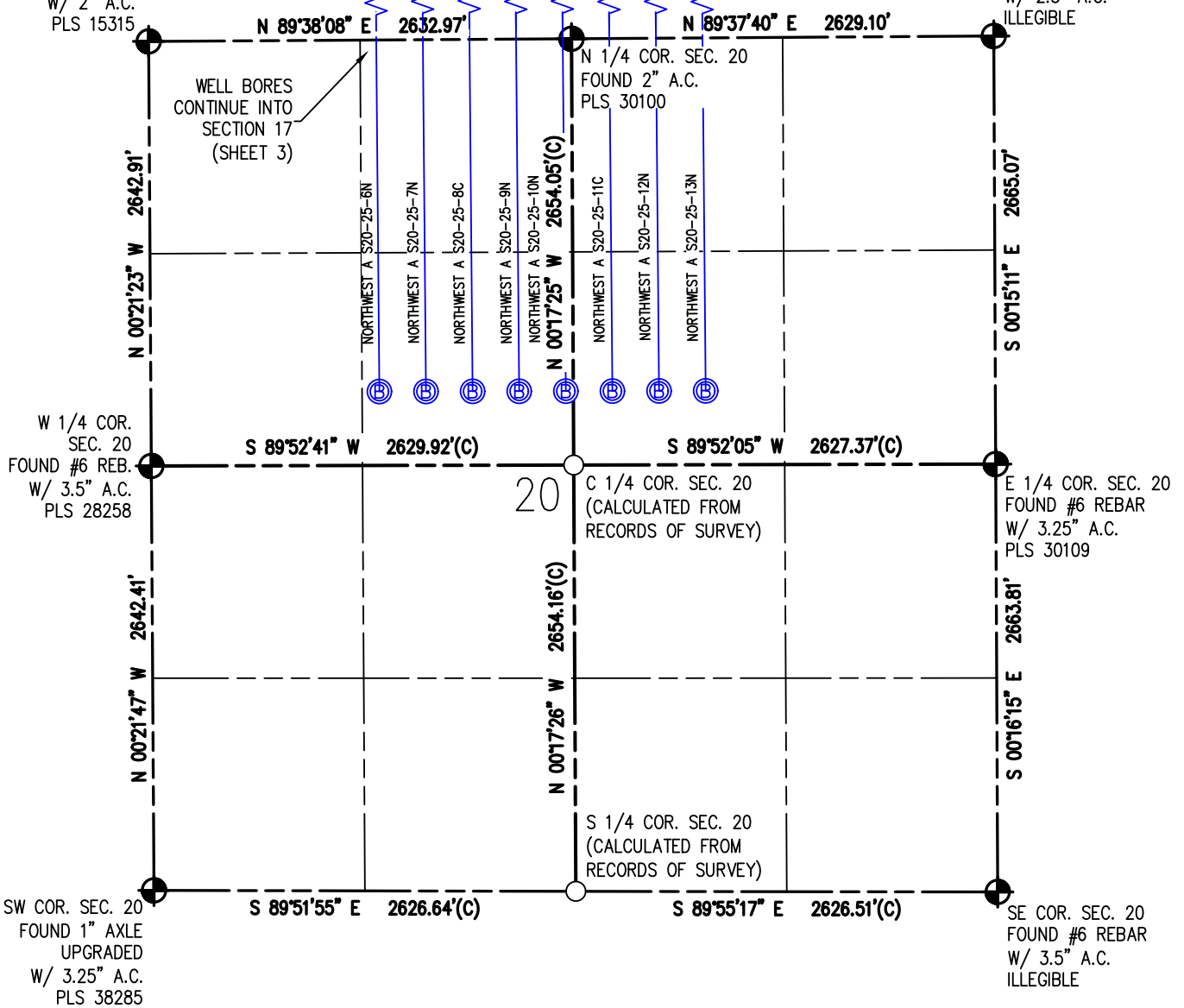
PLOT\_STAMP

# MULTI WELL PLAN NORTHWEST A PAD

NW COR. SEC. 20  
FOUND #6 REBAR  
W/ 2" A.C.  
PLS 15315

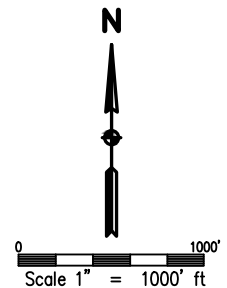
NW1/4 NW1/4 SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.

NE COR. SEC. 20  
FOUND 1.125" AXLE  
W/ 2.5" A.C.  
ILLEGIBLE



## NOTES (BOTTOM HOLES):

NORTHWEST A S20-25-6N TO BE AT 2189' FNL, 1423' FWL, SEC. 20  
 NORTHWEST A S20-25-7N TO BE AT 2190' FNL, 1713' FWL, SEC. 20  
 NORTHWEST A S20-25-8C TO BE AT 2191' FNL, 2003' FWL, SEC. 20  
 NORTHWEST A S20-25-9N TO BE AT 2193' FNL, 2294' FWL, SEC. 20  
 NORTHWEST A S20-25-10N TO BE AT 2194' FNL, 2584' FWL, SEC. 20  
 NORTHWEST A S20-25-11C TO BE AT 2195' FNL, 2384' FEL, SEC. 20  
 NORTHWEST A S20-25-12N TO BE AT 2196' FNL, 2094' FEL, SEC. 20  
 NORTHWEST A S20-25-13N TO BE AT 2197' FNL, 1804' FEL, SEC. 20



## LEGEND

- FOUND/SET SURVEY MONUMENT PER MONUMENT RECORD EXCEPTIONS NOTED.
- CALCULATED SURVEY MONUMENT POSITION
- (C) - CALCULATED DIMENSION



DRAWN BY	RPM	CHECKED BY	AAD
INITIAL SUBMITTAL	1/23/2017		
REVISED	N/A		
DRAWING SIZE	8.5" X 11"		
JOB NO.	EXT01568W09-01		
SHEET	4	OF	4

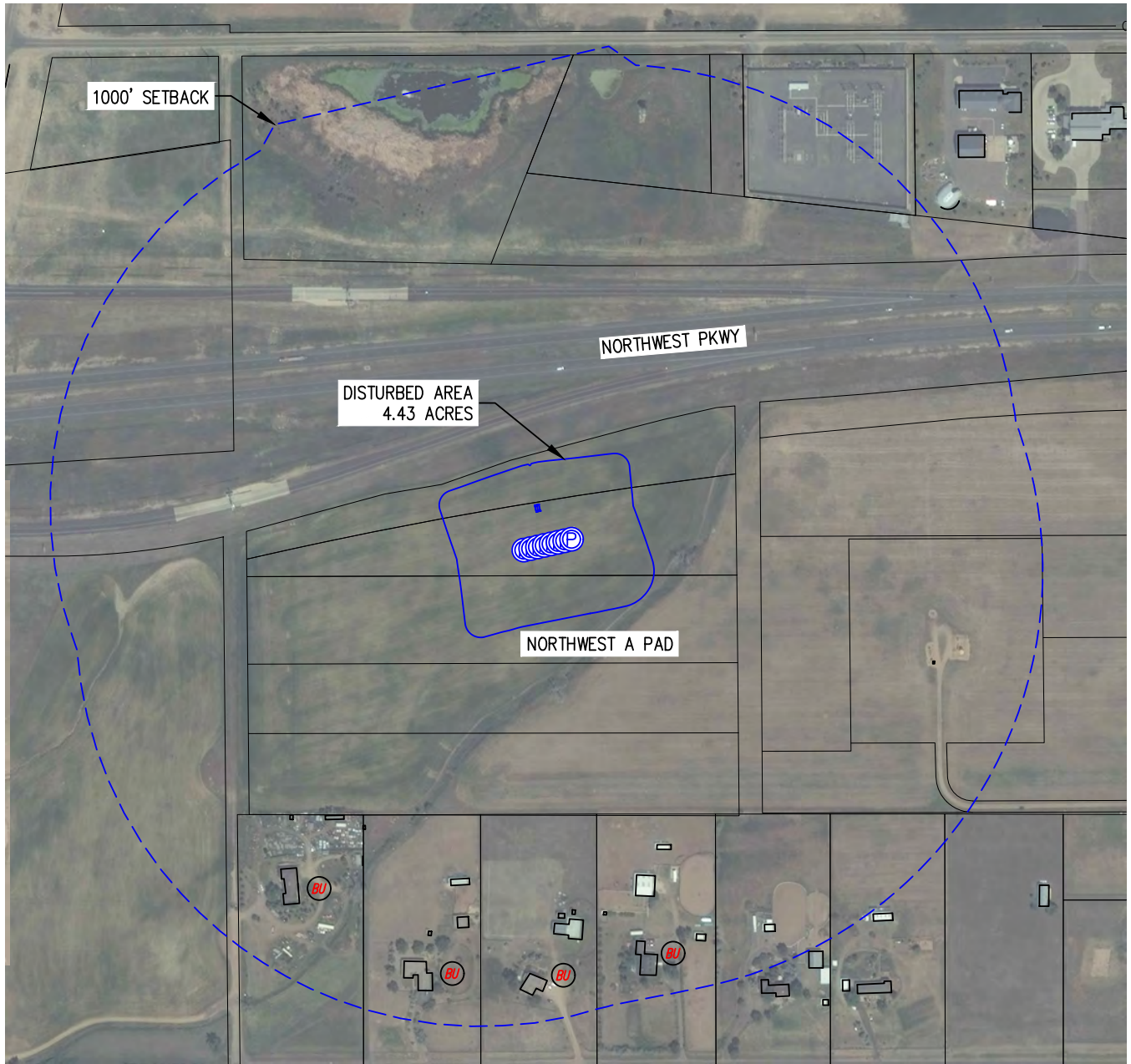
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# UMA CHECK EXHIBIT NORTHWEST A PAD

NW1/4 NW1/4 SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M

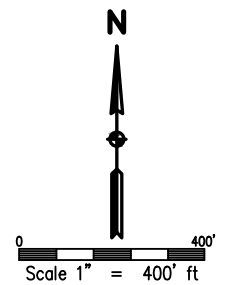


## BUILDING UNITS

EQUIVALENT BUILDING UNITS = 0 UNITS  
 RESIDENTIAL BUILDING UNITS = 4 UNITS  
 TOTAL = 4 UNITS (4 UNITS WITHIN SEMICIRCLE)

DATE OF AERIAL IMAGERY: 9/7/2013

DATE OF SURVEY: 12/21/2017



## NEAREST BUILDING/BUILDING UNIT

BUILDING: ±606' SW  
 BUILDING UNIT: ±794' SW  
 DISTANCES MEASURED FROM THE EDGE OF PROPOSED  
 DISTURBANCE LIMITS TO THE REFERENCED BUILDING UNIT



DRAWN BY	CHECKED BY
RPM	AAD
INITIAL SUBMITTAL	1/23/2017
REVISED	N/A
DRAWING SIZE	8.5" X 11"
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SHEET	1 OF 1

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## Adams County Area, Parts of Adams and Denver Counties, Colorado

### ReD—Renohill loam, 3 to 9 percent slopes

#### Map Unit Setting

*National map unit symbol:* 34wg  
*Elevation:* 4,000 to 5,600 feet  
*Mean annual precipitation:* 12 to 14 inches  
*Mean annual air temperature:* 48 to 52 degrees F  
*Frost-free period:* 125 to 155 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Renohill and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of  
the mapunit.*

#### Description of Renohill

##### Setting

*Landform:* Plains  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Residuum weathered from shale

##### Typical profile

*H1 - 0 to 4 inches:* loam  
*H2 - 4 to 23 inches:* clay  
*H3 - 23 to 28 inches:* clay loam  
*H4 - 28 to 32 inches:* unweathered bedrock

##### Properties and qualities

*Slope:* 3 to 9 percent  
*Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock  
*Natural drainage class:* Well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately low to moderately high (0.06 to 0.20 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 15 percent  
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0  
to 2.0 mmhos/cm)  
*Available water storage in profile:* Low (about 4.8 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 4e  
*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* D  
*Ecological site:* Loamy Plains (R067BY002CO)  
*Hydric soil rating:* No

#### **Minor Components**

##### **Terry**

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

##### **Shingle**

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

##### **Samsil**

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

### **Data Source Information**

Soil Survey Area: Adams County Area, Parts of Adams and Denver Counties,  
Colorado  
Survey Area Data: Version 14, Oct 5, 2017

## Adams County Area, Parts of Adams and Denver Counties, Colorado

### UIC—Ulm loam, 3 to 5 percent slopes

#### Map Unit Setting

*National map unit symbol:* 34x4  
*Elevation:* 4,000 to 5,600 feet  
*Mean annual precipitation:* 12 to 14 inches  
*Mean annual air temperature:* 48 to 52 degrees F  
*Frost-free period:* 125 to 155 days  
*Farmland classification:* Prime farmland if irrigated

#### Map Unit Composition

*Ulm and similar soils:* 80 percent  
*Minor components:* 20 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Ulm

##### Setting

*Landform:* Plains  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Residuum weathered from sandstone and shale

##### Typical profile

*H1 - 0 to 7 inches:* loam  
*H2 - 7 to 13 inches:* silty clay  
*H3 - 13 to 30 inches:* clay  
*H4 - 30 to 48 inches:* clay loam  
*H5 - 48 to 52 inches:* unweathered bedrock

##### Properties and qualities

*Slope:* 3 to 5 percent  
*Depth to restrictive feature:* 40 to 60 inches to paralithic bedrock  
*Natural drainage class:* Well drained  
*Runoff class:* Low  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately low to moderately high (0.06 to 0.20 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 15 percent  
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water storage in profile:* Moderate (about 8.2 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 3e

*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* C  
*Ecological site:* Loamy Plains (R067BY002CO)  
*Hydric soil rating:* No

### **Minor Components**

#### **Renohill**

*Percent of map unit:* 13 percent  
*Hydric soil rating:* No

#### **Shingle**

*Percent of map unit:* 5 percent  
*Hydric soil rating:* No

#### **Apishapa**

*Percent of map unit:* 2 percent  
*Landform:* Swales  
*Hydric soil rating:* Yes

## **Data Source Information**

Soil Survey Area: Adams County Area, Parts of Adams and Denver Counties, Colorado  
Survey Area Data: Version 14, Oct 5, 2017

## **SURFACE USE AGREEMENT**

This Surface Use Agreement (hereinafter "**Agreement**"), is made and entered into effective this 24th day of October, 2017 (the "**Effective Date**"), by and between Extraction Oil & Gas, Inc. ("**Operator**" or "**Extraction**"), a Delaware corporation located at 370 17<sup>th</sup> Street, Suite 5300, Denver, CO 80202 and the City and County of Broomfield, Colorado, a municipal corporation, with an address of One DesCombes Drive, Broomfield, Colorado 80020 ("**Surface Owner**" or "**City**"). Operator and Surface Owner may each be referred to herein individually as a "**Party**" and collectively as the "**Parties**."

### **RECITALS**

WHEREAS, City owns the surface and the minerals of certain lands located in City and County of Broomfield, which are more particularly described as:

**TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6<sup>th</sup> P.M.**

Section 9: Part of the N½ of Section 9, the City and County of Broomfield, State of Colorado and also designated as City and County of Broomfield Open Space ("**Open Space**"); and

**TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6<sup>th</sup> P.M.**

Section 7: Part of the NE¼ of the SE¼ of Section 7, the City and County of Broomfield, State of Colorado and also designated as City and County of Broomfield Open Lands ("**Open Lands**") on which the Livingston 43-7 well is currently owned and operated by Operator

Both as more particularly depicted on the map attached hereto as **Exhibit A** (the "**Surface Lands**" or "**Lands**");

WHEREAS, Operator owns interests in oil and gas leases covering lands adjacent to and including the Surface Lands (the "**Leases**");

WHEREAS, Operator intends to explore, develop, drill, construct, complete, produce, maintain, rework, operate, plug and abandon, and reclaim horizontal oil and gas wells ("**Northwest and United Wells**" and "**Livingston Wells**" or "**New Wells**") from the Surface Lands for purposes of producing oil, gas and other minerals from the Leases and other nearby lands. New Wells shall be located on the oil and gas Well Sites described on **Exhibit B** attached hereto known as production pads for the Northwest A & B and United B Well Site (the "**Northwest & United Well Sites**") and the Livingston Well Site (the "**Livingston Wells**", and collectively with the Northwest & United Well Sites, the "**Well Sites**");

WHEREAS, it is necessary that Operator enter, occupy and use a portion of the Surface Lands to explore, survey, develop, drill, construct, complete, produce, maintain, rework, operate, plug and abandon, and reclaim the Surface Lands of the New Wells, and all Facilities associated therewith including for Oil and Gas Operations. "**Oil and Gas Operations**" has the meaning set



forth for such term in the 100 Series of the Rules and Regulations of the Colorado Oil and Gas Conservation Commission (“COGCC”);

WHEREAS, Operator also desires to access and use on a non-exclusive basis the surface and subsurface of certain portions of the Lands in connection with Operator’s Oil and Gas Operations for the construction, use, and maintenance of access roads (including existing roads on the Lands) (“**Access Roads**”), oil, gas and water pipelines (the “**Pipelines**”), and the installation and location of electrical power lines and other specialized equipment necessary to support its Oil and Gas Operations, including but not limited to constructing production facilities, emission control devices, vapor recovery towers, vapor recovery units, flowlines, gathering lines, gas gathering systems, temporary above ground water lines, temporary above ground completion fluid lines or fresh water lines, separators, pig launchers, compressor sites, and receivers (each a “**Facility**” or collectively “**Facilities**”);

WHEREAS, the location of necessary Access Roads, Pipelines, and Facilities are more particularly depicted on the map attached hereto as **Exhibit C**;

WHEREAS, it is expected that Operator will need to use approximately thirty-two and one-half (32.5) acres of the City’s Lands for its Oil and Gas Operations and related Facilities;

WHEREAS, the Pipelines will connect wells to be developed at approved sites where Operator has rights to drill New Wells on the property pursuant to an Amended and Restated Oil and Gas Operator Agreement (“**Operator Agreement**”);

WHEREAS, the Operator Agreement shall be approved by City Council Resolution and executed contemporaneously with this Agreement and will have an effective date coinciding with the Effective Date of this Agreement;

WHEREAS, the Parties desire to enter into this Agreement to establish their respective rights and obligations with respect to the Surface Lands in accordance with the terms and provisions set forth herein, with such terms and provisions being expressly subject to the terms and conditions of the Operator Agreement entered into on even date herewith;

WHEREAS, all terms defined herein are intended to be consistent with the definitions set forth in the Operator Agreement and will have the definition set forth in the Operator Agreement, if available, and in the event of any inconsistency between the Operator Agreement and this Agreement, the Operator Agreement shall control; those terms not defined in the Operator Agreement but defined herein will have the definition set forth herein;

WHEREAS, Operator is the successor-in-interest to the Surface Use Agreement (the “**Prior SUA**”) between the Surface Owner and Noble Energy, Inc., and approved by the City Council for the City and County of Broomfield on November 13, 2012, and recorded at Reception No. 2012014944 and is the successor-in-interest to a Use by Special Review (“**USR**”) Permit that was approved by the City on July 12, 2011 and recorded at Reception No. 2011006781; and



WHEREAS, the City is willing to confirm and expressly convey to Operator rights to the Surface Lands as set forth herein.

NOW, THEREFORE, for and in consideration of the mutual covenants of the Parties and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

### **AGREEMENT**

1. **Incorporation of Recitals.** The foregoing recitals are hereby incorporated by reference and the Parties agree that they are true and correct.
2. **Livingston Well and Lands Presently Subject to the Prior SUA.** Operator presently owns and operates the Livingston 43-7 Well generally located in the NE/4SE/4 of Section 7, Township 1 South, Range 68 West (the "**Livingston Well**"). The Livingston Well is located on lands subject to the Prior SUA as discussed in Recital D and in other provisions of the Prior SUA. The Parties agree that Operator may continue to operate, maintain and produce from the Livingston Well and related facilities, subject to the requirement to plug and abandon such well in accordance with Section 8 of the Operator Agreement. All provisions of the Prior SUA and the USR permit limited to those applicable to the operation of the Livingston Well and related facilities, including those provisions relevant to access, roads, flowlines and pipelines, and compliance with state and local regulations, will remain in full force and effect until such time as Operator plugs and abandons such well in accordance with Section 8 of the Operator Agreement. After the Effective Date, the development of any New Wells and related facilities on or near lands subject to the Prior SUA shall be governed by the terms of the Operator Agreement and by this Agreement.
3. **Surface and Subsurface Use Rights.** City hereby grants Operator the non-exclusive right for it, its agents, employees, and contractors, and their agents and employees, to enter upon and conduct Oil and Gas Operations, including the use of all required Facilities, upon the surface and subsurface of the City's Lands, as such Lands are more particularly described in **Exhibit A**. This grant shall be pursuant to the terms and conditions described herein and in accordance with the Operator Agreement. Any use of the Lands or Surface Lands by the Operator shall be limited to such uses.
4. **New Wells and Well Sites.** The locations of New Wells and all associated Facilities to be constructed on the Surface Lands on the Well Sites have been discussed in negotiations between the City and the Operator and have been defined and designated in the Operator Agreement. New Wells may only be located upon the Well Sites as generally shown on **Exhibit B**. The Operator shall have exclusive use of the Well Sites until all drilling and completion phases of the Operator's Oil and Gas Operations have been completed for each individual Well Site; provided, however, nothing in this Agreement shall limit any of the City's rights of entry and inspection of the Well Sites as set forth in the Operator Agreement. Once all drilling and completion phases have been completed on any individual Well Site, such Well Site shall automatically reduce to only such portions of the Surface Lands that are reasonably

required for the Operator to safely conduct the operational phase of its Oil and Gas Operations. Any portion of the Surface Lands removed from a Well Site ("Reclaimed Premises") shall be considered a Shared Premises in accordance with Section 5 herein; provided that, some or all of such Reclaimed Premises may be re-utilized by Operator on a temporary basis from time to time as necessary to conduct maintenance, workover, re-entry or other well work so long as any such Reclaimed Premises are again reclaimed in accordance with this Agreement following such temporary use. Operator shall have the right to locate, build, repair and maintain Facilities of the New Wells within the Well Sites, in accordance with the terms and conditions of the Operator Agreement.

5. **Shared Premises.** Each Party hereby agrees and consents to each other Party's right, on a non-exclusive basis, to the use and access of those certain portions of the surface of the Surface Lands (collectively, "**Shared Premises**"), that are not Well Sites, provided that such use by any Party shall remain subject to the terms of this Agreement.

6. **Pipelines, Gathering Lines, Lines and Flowlines.**

6.1 **Grant of Easement.** Surface Owner hereby grants, conveys and warrants to Operator, its agents, successors and assigns, a non-exclusive permanent and perpetual right-of-way and easement ("**Easement**") to enter upon the Surface Lands and occupy and use the areas described on **Exhibit C** (the "**Easement Area**"), subject to the Term as set forth in Section 15 of this Agreement. The Easements are subject to the terms, conditions and limitations herein and subject to all existing easements and rights-of-way and all existing Surface Owner improvements, if any, located on, over or under the Surface Lands and shall be Shared Premises under this Agreement. Operator shall cross existing Surface Owners rights-of-way at the designated locations. The route and course of the right-of-way and easement granted and conveyed are more particularly described on **Exhibit C**. The width of the Easement Area shall be one-hundred feet (100') during initial construction and during subsequent repairs, replacement, relocation, rebuilding, reconstruction, or removal of the Lines (as defined below) and, at all other times, the width of the Easement Area shall be thirty feet (30'). In consideration for the grant of the Easement, Operator shall make a cash payment to the Surface Owner in an amount equal to \$20.00 per linear foot for the length of the Easement Area within the Open Space and there shall be no payment for use of the Easement Area within the Open Lands.

6.2 **Scope of Easement.** The Easement granted to Operator is limited in scope to the following permitted rights: to survey, lay, place, travel across, use, construct, maintain, inspect, operate, repair, replace, relocate, modify, rebuild, change the size of, reconstruct, mark, monitor, abandon, remove and reclaim a pipeline and/or transmission line system consisting of one or more pipelines, electric power lines, equipment and appurtenances (collectively, the "**Lines**"), all of which shall be below ground, for the transportation or transmission of oil, gas, petroleum products, produced water, electricity, hydrocarbons and any other substances, whether electronic, fluid, solid or gaseous, and any products, derivatives, combinations or mixtures of any of the foregoing, in, on, over, under, or through the Easement Area except for the fresh water line that will carry fresh

water above ground from the Weber H Unit 1 Well Pad, which was approved by the City on February 12, 2013 for a use by special review permit by Resolution No. 2013-22, to the New Well Sites. Operator shall have all rights, privileges and benefits necessary or convenient for the full use and enjoyment of this Agreement, including but not limited to, the right of ingress and egress in, to, over and through the Surface Lands for the exercise of each of the permitted rights granted herein and in the Operator Agreement, as well as the right to maintain, add to, increase or decrease the diameter of any replacement Lines, modify, repair, replace or remove the Lines, and to replace all or any part of the Lines or any portion thereof by first laying replacement Lines.

6.3. **Temporary Work Easement.** During the initial and any subsequent construction of the Lines, Surface Owner does hereby grant to Operator the right, as reasonably needed from time to time, to additional temporary workspace on and adjacent to the Surface Lands in order to access, travel across, use, survey, construct, maintain, inspect, operate, repair, alter, replace, modify, change the size of, reconstruct, mark, monitor, abandon or remove the Lines or install additional equipment or appurtenances. Operator will require one-hundred feet (100') feet in width of temporary work easement in order to complete the necessary work to bury the Lines at least 48 inches beneath the surface and complete other repairs, replacement, relocation, rebuilding, reconstruction, or removal of the Lines. Operator may install and operate temporary Lines on the surface while permanent Lines are being constructed, repaired, or maintained. Any temporary surface Lines shall be limited in use, and shall not be used for any period of greater than 90 days without the express written authorization of the City.

6.4. **Limitations of Use.** Operator acknowledges and agrees that City utilizes the Surface Lands for its water line (the "**Water Line**"), and that any Lines installed by Operator hereunder shall be separated from Surface Owner's Water Line. City retains the right to the use and occupancy of the Easement Area insofar as such use and occupancy is consistent with and does not in any way interfere with or impair the rights herein granted. Operator agrees that its use of the Easement Area is non-exclusive and that other uses, including pipelines and utilities, may be installed in the Easement Area as long as such uses do not interfere with Operator's rights as herein granted. City agrees not to build, construct, or permit to be built or constructed any building, fence, landscaping, reservoir, engineering works, or other structures or improvements over, under or across the Easement Area which may interfere with the Operator's use of the Easement Area without prior written consent of Operator which consent will not be unreasonably withheld. The Parties acknowledge that City may use the Easement Area for public access and may construct an access drive, fence, landscaping, signs, sidewalk, or trail upon or within the Easement Area provided such improvements do not interfere with the Operator's use of the Easement Area.

Lines shall be placed on certain specified locations called "**Line Easements**", which are depicted on **Exhibit C**. Any deviation of the location of the Line Easements shall be mutually agreed upon in writing giving due consideration to utilizing the most direct economic routing and such agreement shall not be unreasonably withheld,

conditioned or delayed. If any Lines require relocation at City's written request, City shall provide written notice of the request with an alternative route and allow a reasonable amount of time for Operator to construct the alternative Line route and tie in. Operator may not object to any such relocation so long as relocation is reasonable and feasible from a technical and engineering standpoint and complies with all applicable rules and regulations and received notice and the time to construction the alternative route. All such relocations shall be at City's cost and expense as hereafter described. Operator shall abandon any portion of a Line, Easement Area, or Line Easements that will no longer be used for its operations. All abandoned flowlines or pipelines shall be abandoned in accordance with the Operator Agreement, the COGCC, and local, state and federal regulations. Additionally, Operator will provide notice to the City in writing of the abandonment and a map showing the location of the abandoned pipeline.

6.5 **Power Lines.** Operator will consult with City and, if applicable, with an independent power company supplying power to Operator with respect to the location of power lines prior to construction. All power lines will be underground in accordance with City policy.

7. **Access Roads.**

7.1 **Access Roads.** City agrees to allow Operator to construct new access roads or improve existing access roads on the Surface Lands at Operator's own expense (the "**Access Roads**"). The Access Roads shall be on the locations depicted on **Exhibit C**.

7.2 **Existing Access Roads.** With respect to Access Roads existing as of the Effective Date, Operator shall maintain such Access Roads in at least as good or better condition as such roads are found prior to Operator's use. The Operator retains the right to abandon use of an Access Road at any time. There will not be any additional consideration for use of the Access Roads.

7.3 **Grant of Easement.** Owner hereby grants to Operator, its successors and assigns, a non-exclusive right-of-way and easement over and across the Surface Lands for purposes of vehicular and pedestrian ingress, egress and regress. The location of the right-of-way and easement is more particularly described and shown on the survey included on **Exhibit C** (the "**Road Access Area**"). The Road Access Area shall be a Shared Premises under this Agreement.

7.4 **Maintenance.** Operator shall have the financial responsibility for maintenance of the Access Roads. Maintenance of the Access Roads shall include the use of preventive measures as are necessary to mitigate dust and maintain the surface of the Access Roads in a level, smooth and evenly-covered condition with the type of surfacing material originally installed or such substitute as shall in all respects be equal in quality, use, and durability.

7.5 **No Interference with Use.** Neither Party shall use the Access Roads in



any manner that would interfere with or be inconsistent with the other Party's use thereof. The Parties acknowledge that the City may use the Access Roads for authorized City use and shall also be permitted to allow use otherwise in accordance with City regulations for Open Space and Open Lands, as applicable, provided that such use does not interfere with the Operator's use of the Access Roads. The Parties acknowledge that the City shall be permitted to construct fencing, landscaping, signage, sidewalks or trails adjacent to the Access Roads.

8. **Location of New Wells, Access Roads and Facilities.** The City and the Operator have discussed the locations of New Wells, the Access Roads and all associated Facilities to be constructed on the Surface Lands and shall be located as provided in the Operator Agreement or this Agreement.

9. **Modifications and Variances Affecting Surface Use.** Modifications and variances to the designated Oil and Gas Operations areas may be required from time-to-time at the request of the Surface Owner or the Operator. The Operator agrees to consider such variances or modifications to COGCC rules, Broomfield Municipal Code or other law as requested by the Surface Owner for surface use pursuant to this Agreement and agrees to prepare the modification or variance requests according to the applicable rules, regulation and laws. The Surface Owner also agrees to consider the Operator's requests for modifications or variances sought by Operator, with consent to such requests to not be unreasonably withheld, conditioned or delayed. It is also understood and agreed that additional Access Roads and Facilities located outside of the designated operating areas may be necessary for Operator's activities and in these circumstances Surface Owner and Operator agree to designate a mutually agreeable location for said Access Roads and Facilities. Operator agrees not to use any more of the surface of the Surface Lands than is reasonably necessary to conduct its operations.

10. **Best Management Practices.** The Oil and Gas Operations on the Well Sites shall be conducted in accordance with the BMPs set forth in **Exhibit B** to the Operator Agreement.

11. **Reclamation.** Operator shall reclaim any disturbed areas in accordance with the terms of the Operator Agreement.

12. **Conduct of Operations.** Operator's operations on the Surface Lands will be conducted pursuant to the terms of this Agreement, the Operator Agreement, the rules and regulations of the COGCC, applicable Colorado statutes and case law, and any applicable federal statutes and case law. This Agreement does not grant or otherwise vest in the Surface Owner a private right to enforce the rules and regulations of the COGCC or any other state statute, rule or law.

13. **City's Cooperation and Assistance with Operator's Other Regulatory Filings.** In the Operator Agreement and this Agreement, the City and Operator have reached agreement

on the location and other matters relating to designated Well Sites from which the Operator may drill, complete, and operate New Wells. The Operator Agreement and this Agreement also, among other things, established BMPs and other comprehensive processes by which the Operator will provide advance notice to the City of proposed oil and gas operations and otherwise work with the City as those operations move forward. As a result, the City agrees that, so long as Operator is in compliance with the terms of the Operator Agreement and this Agreement:

(a) the City hereby waives any right it may have under COGCC Rules or other law, as presently enacted or amended in the future, to receive advance notice of, or consult with the Operator about, proposed oil and gas operations subject to this Agreement. This waiver includes, but is not limited to, a waiver of the City's right, if any, to receive notice and consult with the Operator as provided in COGCC Rules 305, 305A and 306. The City agrees that the Operator may submit a copy of this Agreement to the COGCC as evidence of this waiver by the City.

(b) the City hereby waives any right it may have under COGCC rules or other law, as presently enacted or amended in the future, to protest or otherwise object to any permit application or other regulatory filings by Operator with the COGCC or any other government. This waiver includes, but is not limited to, a waiver of the City's right, if any, to receive notice and consult with the Operator as provided in COGCC Rule 303. The City agrees that the Operator may submit a copy of this Agreement to the COGCC as evidence of this waiver by the City.

(c) the City hereby waives any right it may have under COGCC rules or other law, as presently enacted or amended in the future, to protest or otherwise object to any setback proposed for a New Well by Operator with the COGCC or any other government. This waiver includes, but is not limited to, a waiver of the City's right, if any, to receive notice and consult with the Operator as provided in COGCC Rule 603. The City agrees that the Operator may submit a copy of this Agreement to the COGCC as evidence of this waiver by the City.

14. **Surface Use Payment.** The Parties acknowledge that prior compensation has been paid by Operator for surface use hereunder of the Livingston Well Site. The Parties intend that, in exchange for Operator's surface use hereunder of the Northwest & United Well Sites, which are designated as open space lands by the City, that Operator will convey to the City approximately thirty-nine (39) acres of other lands, as described in more detail on **Exhibit D** (the "**Exchange Lands**"), and the cash payment of a surface damage payment in the amount of \_\_\_\_\_ and the Operator will execute a special warranty deed no later than March 1, 2018 to convey the Exchange Lands to the City (the "**Conveyance Agreement**"), a form of which is attached hereto as **Exhibit E**. Operator will apply for a minor subdivision with the City to allow for a conveyance of the Exchange Lands to the City. City Council for the City has approved this Agreement at a public meeting through Resolution and has determined that the Exchange Lands and the Cash Payment are just compensation for Operator's surface use hereunder of the Northwest & United Well Sites and for the other use of the Surface Lands set forth in this Agreement.

15. **Term, Abandonment and Reclamation.** This Agreement will be effective upon City Council's approval by resolution and signature by both Parties (the "**Effective Date**"), and will continue in full force and effect as long as the Operator has operations or owns or controls wells at the Well Sites and has Oil and Gas Operations at the Well Sites ("**Term**"), unless and until terminated as herein provided or unless otherwise terminated by law. The Term shall be extended if it is necessary for the Operator to access the Surface Lands to plug and abandon the New Wells and to reclaim the Surface Lands as provided in this Agreement and for such other purposes as necessary to comply with the BMPs, the rules and regulations of the COGCC or any other government or other law. The Term of the Agreement will hereby continue until such wells are plugged and the land is reclaimed consistent with the BMPs, the rules and regulations of the COGCC or any other government or other law. The provisions of Section 23 shall survive following the end of the Term.

16. **Limitations on Use.** Operator shall not commit or permit any waste, injury or nuisance upon the Surface Lands, and shall not use or permit the Surface Lands to be used for any purpose contrary to state or federal law.

17. **Taxes.** Surface Owner shall pay any property taxes or taxes attributable to the Surface Lands assessed, due and payable against the Surface Lands during the Term of this Agreement.

18. **Surface Lands Excluded from New Special Taxing Districts.** To the extent not prohibited by law, the City and Operator agree that the City shall not take any affirmative action to approve, without Operator's written consent, the inclusion any of the Well Sites or any of the Surface Lands used by Operator for Oil and Gas Operations in any new or materially modified special districts or limited purpose governmental entities organized pursuant to the Colorado Special District Act, Article 1 of Title 32 of the Colorado Revised Statutes, or any other similar Colorado statutes or laws.

19. **Mineral Lands Excluded from New Special Taxing Districts.** Operator represents that, at present, it owns certain oil and gas leasehold or other mineral interests in the Lands (the "**Minerals**"). To the extent not prohibited by law, the City and Operator agree that the City shall not take any affirmative action to approve, without Operator's written consent, the inclusion of the Well Sites or any of the Minerals in any new or materially modified special districts or limited purpose governmental entities organized pursuant to the Colorado Special District Act, Article 1 of Title 32 of the Colorado Revised Statutes, or any other similar Colorado statutes or laws.

20. **Representations.** Each Party represents that it has the full right and authority to enter into this Agreement, and Surface Owner specifically confirms its capacity to validly execute the rights of way and easements provided herein. Surface Owner represents that it owns certain oil and gas leasehold interests on the Lands. Operator represents, and specifically asserts, that it does not have the right to bind any other oil and gas leasehold interest owner, mineral owner, lessee, or assignee for the Property.

21. **Successors and Assigns.** The Parties may transfer their respective rights or



interests in the Surface Land. No Party shall assign, sublet, mortgage, or otherwise transfer or encumber this Agreement or any right or privilege contemplated herein, without the prior written consent of each other Party hereto, which consent shall not be unreasonably withheld, conditioned or delayed. This Agreement constitutes an easement, right-of-way, and covenant running with the Surface Lands and will be binding upon and inure to the benefit of, and be enforceable by, the Parties and their respective successors, affiliates, administrators, trustees, executors, and assigns.

22. **Notices.** Any notice or other communication required or permitted under this Agreement shall be given in writing either by i) personal delivery; ii) expedited delivery service with proof of delivery; or iii) United States Mail, postage prepaid, and registered or certified mail with return receipt requested, addressed as follows:

**If to OPERATOR:**

Extraction Oil & Gas, Inc.  
370 17<sup>th</sup> Street, Suite 5300  
Denver, CO 80202  
Attention: Land Department

**If to SURFACE OWNER:**

City & County Manager  
City and County of Broomfield  
One DesCombes Dr.  
Broomfield, CO 80020

with a copy to:

City & County Attorney  
City and County of Broomfield  
One DesCombes Dr.  
Broomfield, CO 80020

Any Party may, by written notice so delivered to the other Party, change the address or individual to whom delivery shall thereafter be made.

23. **Indemnification and Hold Harmless Provisions.**

a. **Each Party Responsible for Its Operations/Ownership.** Each Party shall be and remain responsible for all losses, claims, damages, demands, court awards, suits, causes of action, fines, penalties, expenses and liabilities, including without limitation, attorneys' fees and other costs associated therewith (all of the foregoing collectively referred to "**Claims**"), arising out of or connected with each such Party's ownership or operations on the Surface Lands, regardless of when asserted, subject to

statute of limitations. The provisions in this section do not, and shall not be construed to, create any rights in persons or entities not a party to this Agreement, nor does it create any separate rights in Parties to this Agreement, other than the right to be indemnified or held harmless for Claims as specifically provided herein.

b. **Operator's Hold Harmless, Indemnity and Release Agreement.**

Operator shall release, defend, indemnify and hold the City and its Representatives harmless against all Claims that are threatened or awarded or incurred as a result of any loss, injury or damage sustained or claimed to have been sustained by anyone including, but not limited to, any person, firm, partnership, or corporation arising out of any action, inaction or act of commission by the Operator or any of its Representatives in the Operator's operations on or development of the Surface Lands to the extent the Claim is attributable to the action, inaction or act of commission of the Operator or its Representatives. This hold harmless provision running from the Operator to the City applies to all matters, including Environmental Claims (as defined below).

c. **Environmental Claims.** "Environmental Claims" shall mean all Claims asserted by the City, governmental bodies or other third parties for pollution or environmental damage of any kind, arising from Oil and Gas Operations on or ownership of Surface Lands or ownership of oil and gas interests or oil and gas leasehold interests by the Operator on the Surface Lands, whichever is applicable, and all cleanup and reclamation and/or remediation costs, fines and penalties associated therewith, including any Claims arising from any federal or state environmental laws. Environmental Claims shall not include the costs of any remediation undertaken voluntarily by any Party, unless such remediation is performed under the imminent threat of a Claim by a governmental body or other third party.

d. **Release.** Operator hereby releases, waives and discharges the City and its Representatives (the "City Group") from any and all liability for personal injury, death, property or other damage, or otherwise arising out of Operator's Oil and Gas Operations, actions, inactions or act of commission of the Operator or its Representatives under this Agreement, unless such injury, death or damage is the result of the City's negligence or willful misconduct or that of a member of the City Group.

e. **Exclusion from Indemnities and Hold Harmless Provisions.** The indemnities or hold harmless agreements of the Parties in this section shall not cover or include any amounts which the indemnified Party is actually reimbursed for by any third party. The indemnities in this Agreement shall not relieve any Party from any obligations to third parties.

24. **Injunctive Relief.** No section of this Agreement shall restrict either Party's right to seek injunctive relief or specific performance. Each Party shall be entitled to enforce specifically the terms and provisions of this Agreement in addition to any other remedy to which such holder may be entitled at Law, in equity, or otherwise.

25. **Further Assurances.** The Parties agree to execute and deliver such other documents as are reasonably necessary in order to effectuate the terms and intent of this Agreement.

26. **Governing Law.** This Agreement shall be governed by and construed in accordance with the laws of the State of Colorado. The Parties waive the right to trial by jury with respect of any action, suit, or proceeding arising out of or relating to this Agreement or any contemplated transaction.

27. **Insurance.** Operator shall maintain insurance at all times during the Term of this Agreement in accordance with the terms and conditions set forth on **Exhibit H** to the Operator Agreement.

28. **Third-Party Beneficiaries.** Nothing herein, express or implied, is intended to or does confer upon any other person or entity any legal or equitable right, benefit or remedy of any nature whatsoever under or by reason of this Agreement.

29. **Binding Effect.** This Agreement, all provisions, and the covenants and conditions herein contained shall be binding upon and inure to the benefit of the parties hereto and their respective transferees, successors, and assigns. Surface Owner agrees to contact any and all tenants of Surface Lands or other third parties utilizing the surface of the Surface Lands that may be affected by Operator's activities on the Surface Lands. It will be Surface Owner's sole responsibility to advise such third parties of the existence of this Agreement and Operator's right to utilize the surface of the Surface Lands pursuant to this Agreement for the payment of any consideration, if any, due such third party from Surface Owner.

30. **Recording.** The Parties agree Operator may record this Agreement in the real estate records of City and County of Broomfield, Colorado.

31. **Entire Agreement.** This Agreement and all its attachments, together with the Conveyance Agreement, Operator Agreement, Pipeline Easement Agreement and Settlement Agreement (the "**Other Agreements**") constitute the complete and exclusive statement of the entire understanding between and among the Parties regarding the matters addressed herein. This Agreement supersedes any prior agreements or understandings regarding the matters addressed herein, whether written or oral. In the event that there are conflicting terms between this Agreement and the Other Agreements, the terms of this Agreement shall control. This Agreement and the Other Agreements include all the agreements and stipulations between the Parties, and no representations, oral or written, have been made, modifying, adding to, or changing the terms hereof.

32. **Non-Waiver.** Waiver by either Party or of the failure of any Party to insist upon the strict performance of any provision of this Agreement shall not constitute a waiver of the right or prevent any such Party from requiring the strict performance of any provision in the future.

33. **Reasonable Accommodation.** Surface Owner acknowledges the use of the Surface Lands by Operator as herein described in in full satisfaction of the requirement that Operator conduct its Oil and Gas Operations in a manner that accommodates Surface Owner. Surface Owner further acknowledges Operator's use of the Surface Lands as provided herein constitutes "reasonable accommodation" by Operator, its successors, and assigns as provided in Colorado Revised Statute 34-60-127.

34. **Relationship of the Parties.** This Agreement shall not be construed to create an association, partnership, joint venture, employment or other agency relationship between the Parties. No Party is now, nor will any Party be construed to be, an employee, contractor, partner, joint venturer, agent or representative of any other party for any purpose under this Agreement.

35. **Amendments.** No modification or amendment of this Agreement shall be valid or binding unless the same is in writing and duly executed by all Parties hereto.

36. **Severability.** If any term or other provision of this Agreement is invalid, illegal, or incapable of being enforced by any rule, law or public policy, all other conditions and provisions of this Agreement shall nevertheless remain in full force and effect so long as the economic or legal substance of the transactions contemplated hereby is not affected in any adverse manner to either Party. Upon such determination that any term or other provision is invalid, illegal, or incapable of being enforced, the Parties shall negotiate in good faith to modify this Agreement so as to effect the original intent the Parties as closely as possible in an acceptable manner to the end that the transactions contemplated hereby are fulfilled to the extent possible.

37. **Force Majeure.** If any Party is rendered unable, wholly or in part, by Force Majeure (as defined in the Operator Agreement) to carry out its obligations under this Agreement, that party shall give to the other Party prompt written notice of the Force Majeure with reasonable full particulars concerning it; thereupon, the obligations of the party giving the notice, so far as they are affected by the Force Majeure, shall be suspended during, but no longer than, the continuance of the Force Majeure.

The affected Party shall use all reasonable diligence to remedy the Force Majeure situation as quickly as possible and practicable. The requirement that any Force Majeure shall be remedied with all reasonable dispatch shall not require the settlement of strikes, lockouts, or other labor difficulty by the party involved, contrary to its wishes; how all such difficulties shall be handles shall be entirely within the discretion of the Party concerned.

38. **Counterparts.** This Agreement may be executed in any number of counterparts, and each such counterpart hereof shall be deemed to be an original instrument, but all of such counterparts shall constitute for all purposes one agreement. Any signature hereto delivered by a party by facsimile transmission or other electronic transmission shall be deemed an original signature hereto.

39. **References; Rules of Construction.** All references in this Agreement to

Exhibits, Sections, subsections, and other subdivisions refer to the corresponding Exhibits, Sections, subsections, and other subdivisions of or to this Agreement unless expressly provided otherwise. Titles appearing at the beginning of any Sections, subsections, and other subdivisions of this Agreement are for convenience only, do not constitute any part of this Agreement, and shall be disregarded in construing the language hereof. The words "this Agreement," "herein," "hereby," "hereunder," and "hereof," and words of similar import, refer to this Agreement as a whole and not to any particular Article, Section, subsection, or other subdivision unless expressly so limited. The word "including" (in its various forms) means including, without limitation. Pronouns in masculine, feminine, or neutral genders shall be construed to state and include any other gender, and words, terms, and titles (including terms defined herein) in the singular form shall be construed to include the plural and vice versa unless the context otherwise requires. Except as expressly provided otherwise in this Agreement, references to any law or agreement means such law or agreement as it may be amended from time to time.

40. **Authority of Signatories.** The signatories below declare, warrant and represent that they have the authority to enter into this Agreement on behalf of their respective principals, if any.

41. **Effective Date.** This Agreement shall become effective on the Effective Date upon the execution of this Agreement by all Parties hereto and upon the approval of this Agreement by Resolution of the City Council.

42. **Headings.** The section headings contained herein are for convenience in reference and are not intended to define or limit the scope of any provision of this Agreement.

43. **Construction.** The Parties have participated jointly in the negotiating and drafting of this Agreement. In the event ambiguity or question of intent or interpretation arises, this Agreement shall be construed as if drafted jointly by the Parties, and no presumption or burden of proof shall arise favoring or disfavoring any Party by virtue of the authorship of any of the provisions of this Agreement. Any reference to any federal, state, local or foreign statute or law shall be deemed also to refer to all rules and regulations promulgated thereunder, unless the context requires otherwise. The word "including" shall mean including, without limitation.

*[Signature page to follow]*



IN WITNESS WHEREOF, Surface Owner and Operator have executed, agreed to and delivered this Surface Use Agreement as of the Effective Date.

**SURFACE OWNER:**


THE CITY AND COUNTY OF BROOMFIELD,  
COLORADO,  
A Colorado Municipal Corporation and County

  
Mayor



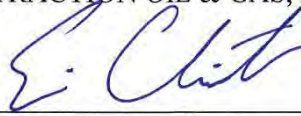
City & County Clerk

**APPROVED AS TO FORM:**

  
City & County Attorney Deputy

**OPERATOR:**

EXTRACTION OIL & GAS, INC.



Eric J. Christ, Vice President, General Counsel &  
Corporate Secretary

State of Colorado                    )  
  )ss.  
County of Broomfield            )

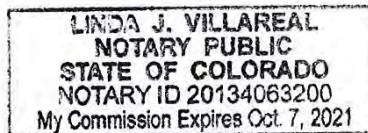
The foregoing instrument was acknowledged before me this 25<sup>TH</sup> day of October 2017  
by Eric J. Christ, Vice President of Extraction Oil & Gas, Inc.



Notary Public

My Commission expires: October 7, 2021

(Seal)

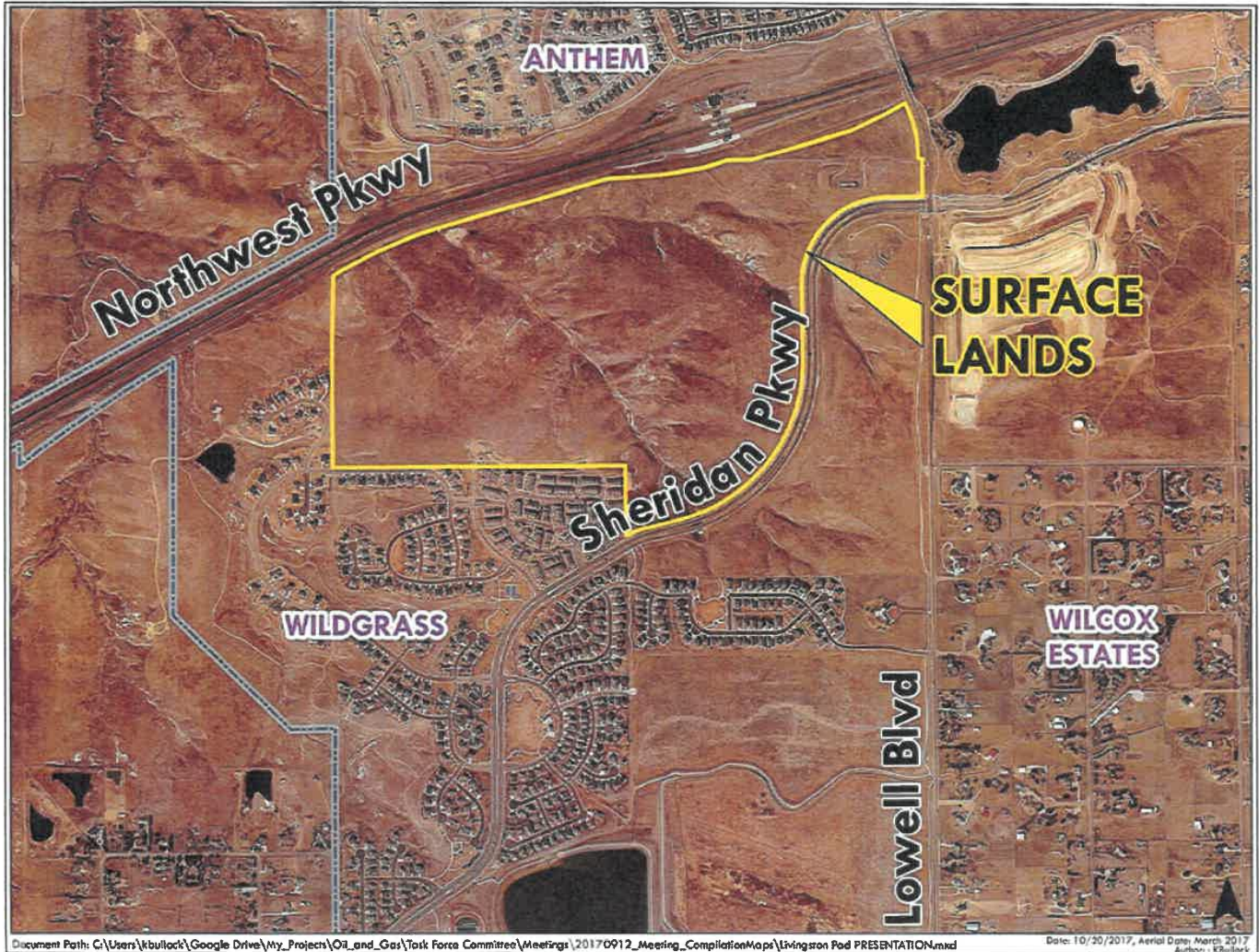




**EXHIBIT A**

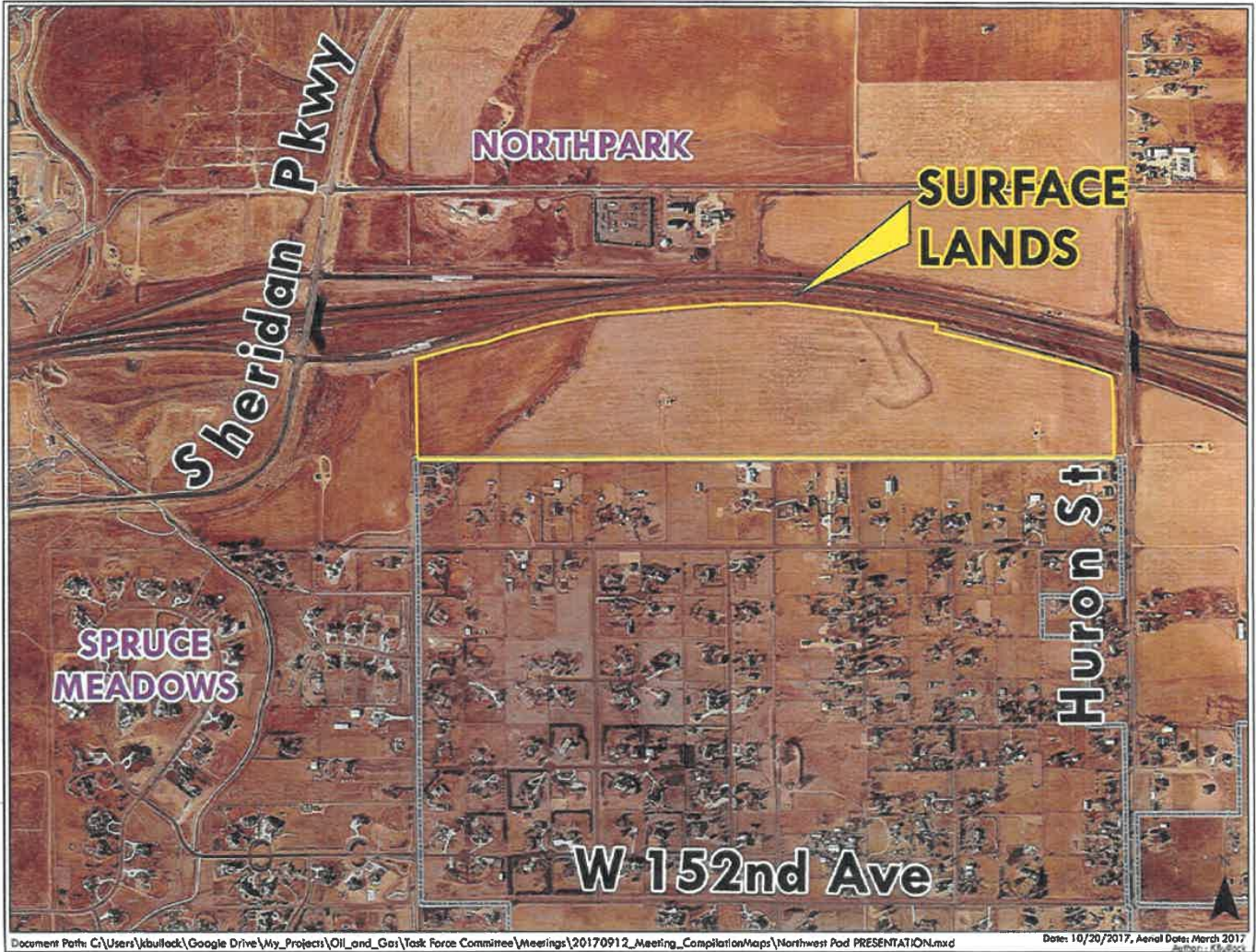
**Map of Surface Lands**

Sec. 7-1S-68W





Sec. 9-15-68W





Sec. 9-15-68W



**EXHIBIT B**

**Map of Well Sites**



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# EXHIBIT B



**EXHIBIT C**

**Access Roads, Pipelines and Facilities**





NEEL ROAD  
 DISTURBANCE AREA  
 FENCE LINE  
 BUILDING UNIT  
 AIRBORNE TRAFFIC  
 GROUND TRAFFIC  
 PROPOSED PIPELINE (DRAINAGE)

1

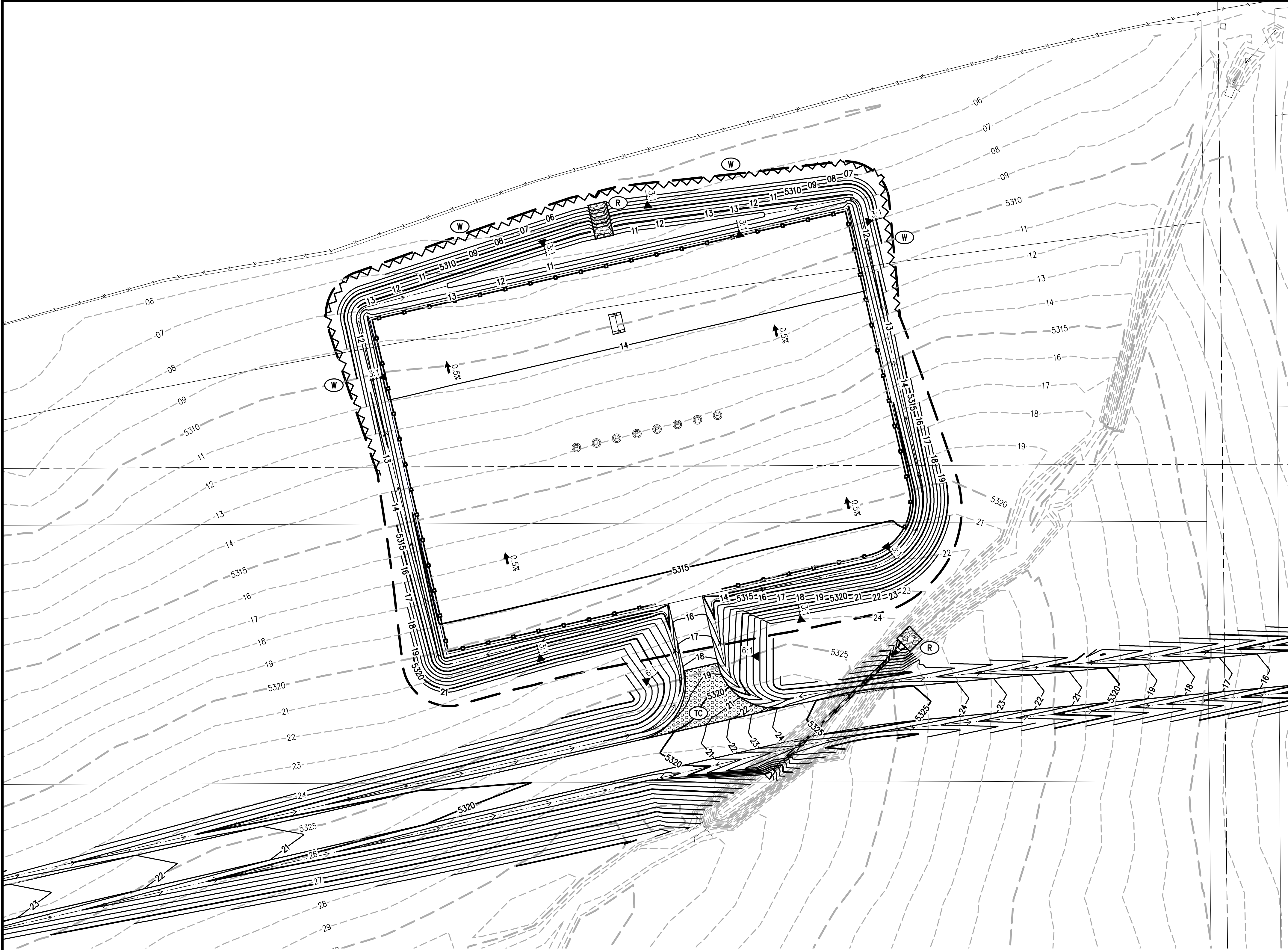
GRAPHIC SCALE  
0 50  
(IN FEET)  
1 INCH = 500 FT

CONCEPTUAL PAD LAYOUT

PRELIMINARY  
NOT FOR  
CONSTRUCTION

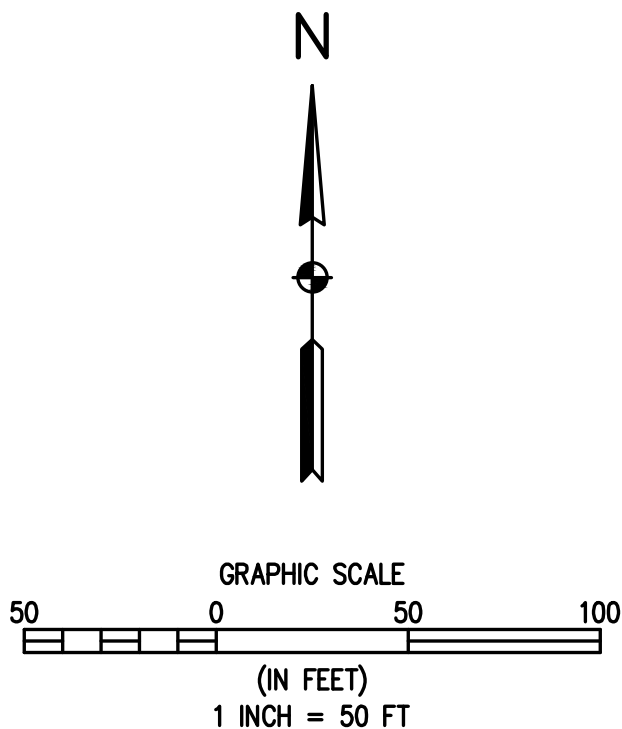
[illegible]





### LEGEND

EXISTING LINETYPES	PROPOSED LINETYPES		EXISTING SYMBOLS	PROPOSED SYMBOLS	
81	81	MINOR CONTOUR (1' INTERVAL)	25.44	25.36	CONTROL POINT
5280	5280	MAJOR CONTOUR (5' INTERVAL)	3:1	3:1	SPOT ELEVATION
		PROPERTY BOUNDARY			PERCENT SLOPE
		EDGE OF ASPHALT			NOMINAL SLOPE
		EDGE OF GRAVEL	EP		ELECTRIC PANEL
		SECTION LINE	IV		GAS MARKER
		CURB AND GUTTER (SPILL/CATCH)	W		IRRIGATION CONTROL VALVE
		WIRE FENCE	TC		PROPOSED WELL
		DITCH FLOWLINE			RIPRAP
		GASLINE			WATTLE
					TRACKING CONTROL



1  
Q1 Q1  
DRILLING STORMWATER MANAGEMENT PLAN

### SITE DESCRIPTION

CONSTRUCTION ACTIVITY	DRILLING OF 8 OIL & GAS WELLS, CONSTRUCTION OF ASSOCIATED PRODUCTION EQUIPMENT, AND CONSTRUCTION OF ACCESS ROAD.
CONSTRUCTION DATES	TBD
AREA OF SITE	±4.8 ACRES
LOCATION OF SITE	LATITUDE: 39°59'00" N LONGITUDE: 105°00'45" W
EXISTING VEGETATION	NATIVE GRASSES
SOIL CONDITION	ACCORDING TO THE NATURAL RESOURCES CONSERVATION SERVICES, THIS SITE IS 62% RENOHILL LOAM AND 38% ULM LOAM. THE PROPERTY GENERALLY SLOPES TO THE NORTH AT SLOPES OF 2%.
POTENTIAL POLLUTION SOURCES	DUST FROM DRILLING & ACCESS ROAD CONSTRUCTION, NON-VEGETATED SOILS, FUEL, OIL, AND FLUIDS UTILIZED DURING DRILLING, CONCRETE WASHOUTS, OUTDOOR STORAGE ACTIVITIES, PORTABLE RESTROOMS, GENERAL REFUSE.
LOCATION OF NON-STORMWATER DISCHARGE	NONE
SITE FEATURES & SENSITIVE AREAS TO BE PROTECTED	THE SITE INCLUDES A WELL PAD, ENTRANCE ROAD, AND 3:1 SLOPES THAT MATCH INTO EXISTING TOPOGRAPHY. SURROUNDING AREAS TO BE PROTECTED INCLUDE FIELDS AND PUBLIC ROADS.
NAME AND LOCATION OF RECEIVING WATERS	STORMWATER RUNOFF TRAVELS EASTERLY TO BIG DRY CREEK WHICH FLOWS TO THE SOUTH AND DISCHARGES INTO STANDLEY LAKE.

### OVERALL SCOPE / PROJECT CHARACTERISTICS

INDUSTRIAL ACTIVITIES	OIL AND GAS PRODUCTION
FINAL SITE DISPOSITION	ONCE THE PRODUCTION PHASE FOR THE SITE IS COMPLETE, THE PRODUCTION SITE WILL BE RECLAIMED, THE WELLS WILL BE PLUGGED, CAPPED, & ABANDONED. THE TANK BATTERY WILL BE REMOVED. ANY UNNECESSARY PORTIONS OF THE UPGRADED ACCESS ROAD WILL BE REMOVED. SOILS WILL BE CONTOURED TO THE EXISTING SURROUNDING TERRAIN. (STOCKPILED TOPSOIL WILL BE REDISTRIBUTED ALONG WITH THE SEEDING ACROSS THE DISTURBED SOIL AREA IN ORDER TO REESTABLISH VEGETATION COVERAGE)

### BEST MANAGEMENT PRACTICES (BMP'S)

STORM WATER QUALITY BEST MANAGEMENT PRACTICE SHALL BE IMPLEMENTED TO MINIMIZE SOIL EROSION, SEDIMENTATION, INCREASED POLLUTION LOADS AND CHANGED WATER FLOW CHARACTERISTICS RESULTING FROM LAND DISTURBING ACTIVITY TO THE MAXIMUM EXTENT PRACTICAL, AS TO MINIMIZE POLLUTION OF RECEIVING WATERS.

### IMPLEMENTED BMP'S

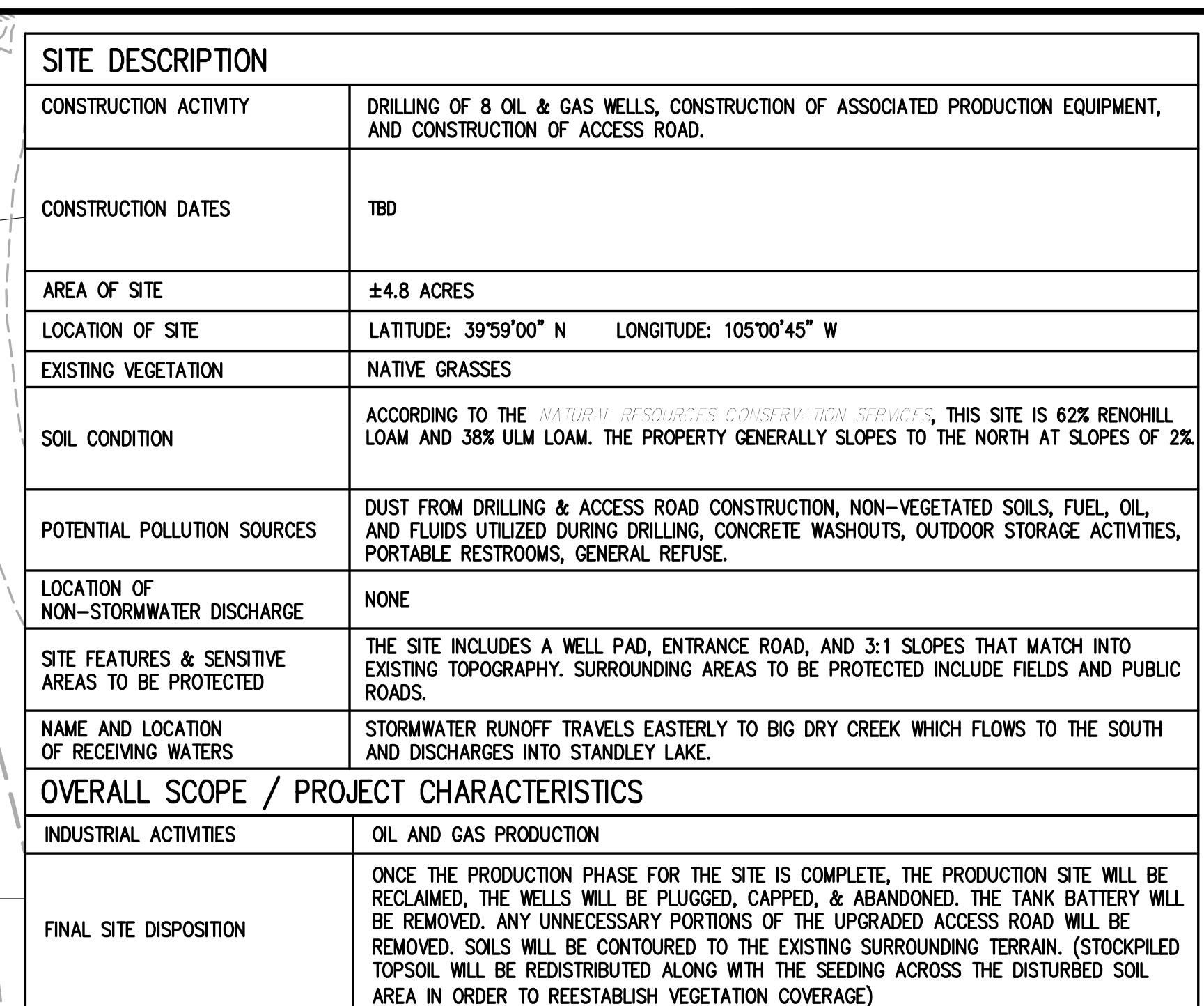
CONSTRUCTION STRUCTURAL BMP'S	PERMANENT STRUCTURAL BMP'S
<input checked="" type="checkbox"/> VTC PAD <input checked="" type="checkbox"/> DITCH & BERM SYSTEM <input type="checkbox"/> INLET PROTECTION <input type="checkbox"/> CULVERT OUTLET PROTECTION <input type="checkbox"/> WASH WATER SEDIMENTATION POND <input type="checkbox"/> SILT FENCING <input type="checkbox"/> RIP RAP <input type="checkbox"/> EROSION CONTROL MAT <input checked="" type="checkbox"/> SEDIMENT CONTROL LOG <input checked="" type="checkbox"/> SURFACE ROUGHENING ADDITIONAL BMP'S: _____	<input type="checkbox"/> VTC PAD <input type="checkbox"/> DITCH & BERM SYSTEM <input type="checkbox"/> CULVERT OUTLET PROTECTION <input type="checkbox"/> WASH WATER SEDIMENTATION POND <input type="checkbox"/> COGCC APPROVED CONTAINMENT BERM <input type="checkbox"/> RIP RAP <input checked="" type="checkbox"/> REVEGETATION ADDITIONAL BMP'S: _____

### EROSION AND SEDIMENT CONTROL

- TO THE EXTENT PRACTICABLE, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO GRADING ACTIVITIES. AT ALL TIMES DURING PROJECT CONSTRUCTION, ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED AND REPAIRED AS NEEDED TO PREVENT ACCELERATED EROSION ON THE SITE AND ON ANY ADJACENT PROPERTIES.
- ALL TOPSOIL, WHERE PHYSICALLY PRACTICABLE, SHALL BE SALVAGED AND NO TOPSOIL SHALL BE REMOVED FROM SITE EXCEPT AS SET FORTH IN THE APPROVED PLANS. TOPSOIL AND OVERBURDEN SHALL BE SEGREGATED AND STOCKPILED SEPARATELY. TOPSOIL AND OVERBURDEN SHALL BE REDISTRIBUTED WITHIN THE GRADED AREA AFTER ROUGH GRADING TO PROVIDE A SUITABLE BASE FOR AREAS WHICH WILL BE SEEDED AND PLANTED. RUNOFF FROM STOCKPILED AREA SHALL BE CONTROLLED TO PREVENT EROSION AND RESULTANT SEDIMENTATION OF RECEIVING WATER.
- PERMANENT OR TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED TO DISTURBED AREAS WITHIN 14 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MEASURES SHALL BE APPLIED WITHIN 14 DAYS TO DISTURBED AREAS WHICH MAY NOT BE AT FINAL GRADE, BUT WILL BE LEFT DORMANT FOR LONGER THAN 30 DAYS. IT IS RECOMMENDED THAT THE PERMANENT SEED MIX BE PLANTED AFTER OCTOBER TO KEEP SEEDLINGS FROM DEVELOPING BEFORE WINTER. TEMPORARY VEGETATIVE COVER CONSISTING OF ANNUAL RYE GRASS SHALL BE HYDRO SEEDED AT 20 POUNDS PURE LIVE SEED PER ACRE.
- FUGITIVE DUST EMISSIONS RESULTING FROM DRILLING & ACCESS ROAD CONSTRUCTION ACTIVITIES AND/OR WIND SHALL BE CONTROLLED USING WATER.
- ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED DURING CONSTRUCTION AND SHALL BE INSTALLED AS SOON AS PRACTICAL IF REQUIRED BY THE STORMWATER ADMINISTRATOR OR THEIR REPRESENTATIVE.
- AREAS WHERE SEDIMENT CONTROL LOGS ARE NOT INDICATED MAY REQUIRE SOME FORM OF SEDIMENT CONTROL. STRAW MULCH AND/OR TEMPORARY SEEDING MAY BE UTILIZED AS NECESSARY.

INSPECTION AND MAINTENANCE	INSPECTIONS: 1. PERFORM EVERY 14 DAYS, AND FOLLOWING A WEATHER EVENT CAUSING RUNOFF DURING THE CONSTRUCTION PHASE. PERFORM EVERY 30 DAYS DURING THE COMPLETED AND INTERIM PHASES. 2. AN INSPECTION REPORT WILL BE FILLED OUT, & FILED FOR EACH INSPECTION PERFORMED. 3. MAKE A COPY OF EACH INSPECTION REPORT AVAILABLE TO THE COUNTY UPON REQUEST. MAINTENANCE: 1. PERFORM MAINTENANCE AND REPAIRS AS SOON AS POSSIBLE ON ITEMS OR AREAS IDENTIFIED IN THE INSPECTION REPORT 2. PERFORM MAINTENANCE AS INDICATED IN THE URBAN DRAINAGE & FLOOD CONTROL DISTRICT, URBAN STORM DRAINAGE CRITERIA MANUAL, VOL 3, PER MANUFACTURER'S SPECIFICATIONS OR OTHER SOURCES DETERMINED TO BE ACCEPTABLE. AN EFFICIENT RECORD-KEEPING SYSTEM IS A HELPFUL TOOL IN MANAGING INSPECTION AND MAINTENANCE REPORTS, INSPECTION REPORTS, MAINTENANCE RECORDS, TRAINING LOGS, AND OTHER SITE RELATED CORRESPONDENCE WILL BE MAINTAINED IN THE MASTER EROSION CONTROL PLAN.
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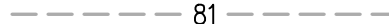

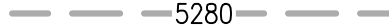



















BEST MANAGEMENT PRACTICES (BMP's)
STORM WATER QUALITY BEST MANAGEMENT PRACTICE SHALL BE IMPLEMENTED TO MINIMIZE SOIL EROSION, SEDIMENTATION, INCREASED POLLUTION LOADS AND CHANGED WATER FLOW CHARACTERISTICS RESULTING FROM LAND DISTURBING ACTIVITY TO THE MAXIMUM EXTENT PRACTICAL, AS TO MINIMIZE POLLUTION OF RECEIVING WATERS.



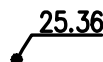














IMPLEMENTED BMP'S	
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ADDITIONAL BMP'S: _____ _____ _____	ADDITIONAL BMP'S: _____ _____ _____

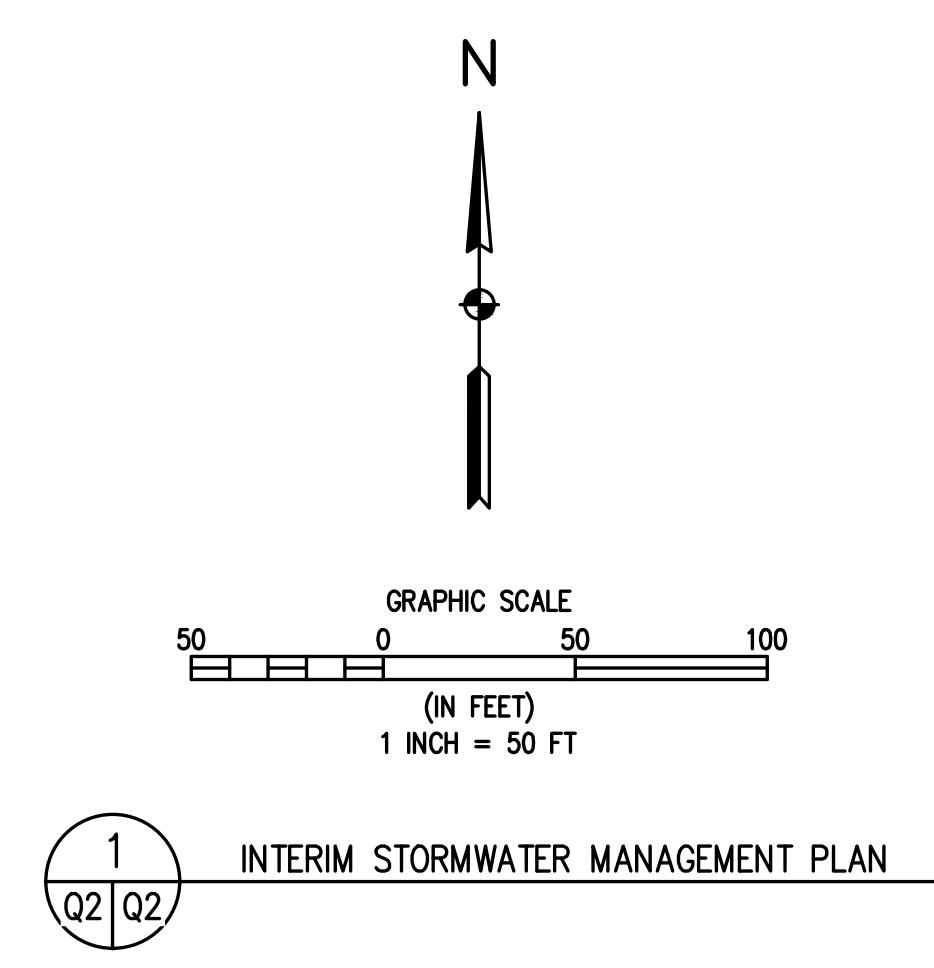
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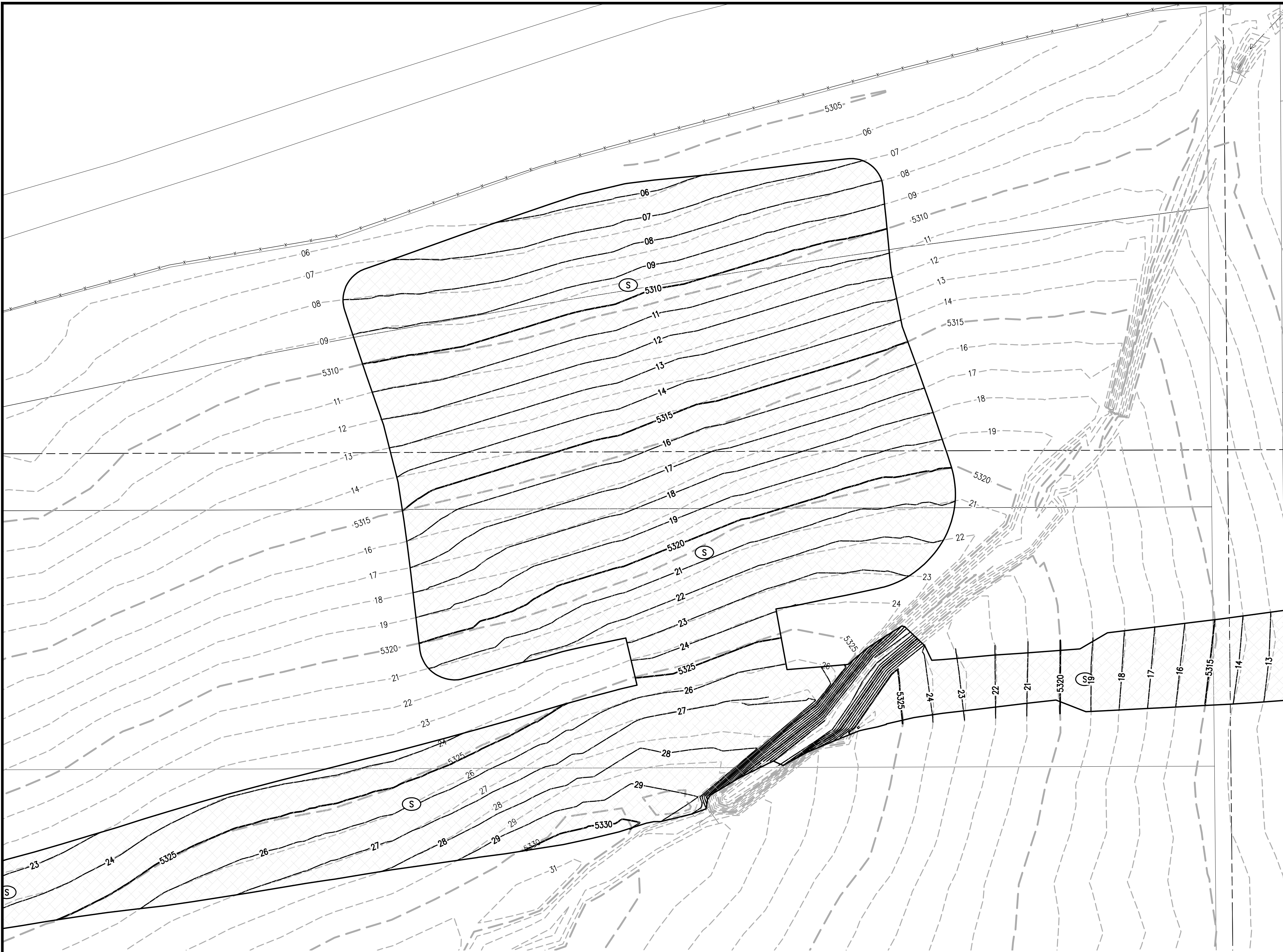
<b><u>LEGEND</u></b>		
<b><u>EXISTING LINETYPES</u></b>	<b><u>PROPOSED LINETYPES</u></b>	
 81	 81	MINOR CONTOUR (1' INTERVAL)
 5280	 5280	MAJOR CONTOUR (5' INTERVAL)
		PROPERTY BOUNDARY
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		EDGE OF GRAVEL
		SECTION LINE
		CURB AND GUTTER (SPILL/CATCH)
		WIRE FENCE
		DITCH FLOWLINE
 GAS	 GAS	GASLINE

<b><u>EXISTING SYMBOLS</u></b>	<b><u>PROPOSED SYMBOLS</u></b>	
		CONTROL POINT
		SPOT ELEVATION
		PERCENT SLOPE
		NOMINAL SLOPE
		ELECTRIC PANEL
		GAS MARKER
		IRRIGATION CONTROL VALVE
		PROPOSED WELL
		TRACKING CONTROL
		SEEDING
		RIPRAP

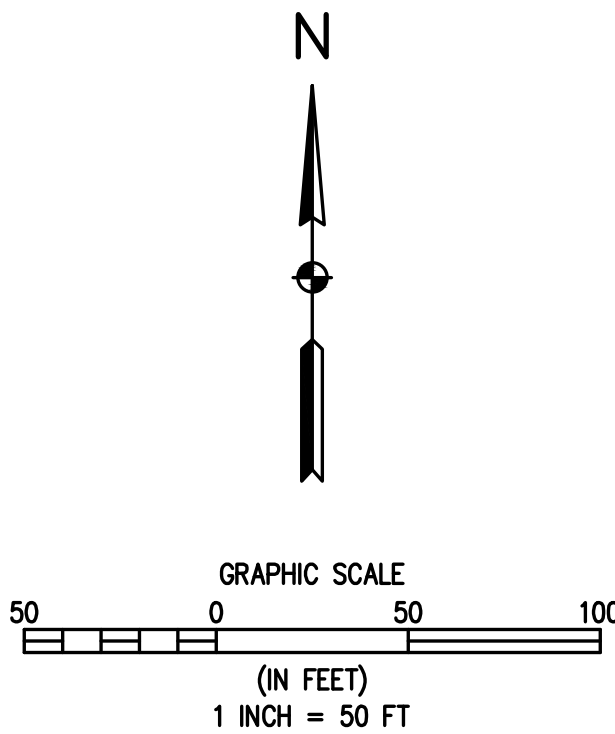






### LEGEND

EXISTING LINETYPES	PROPOSED LINETYPES		EXISTING SYMBOLS	PROPOSED SYMBOLS	
81	81	MINOR CONTOUR (1' INTERVAL)	△	△	CONTROL POINT
5280	5280	MAJOR CONTOUR (5' INTERVAL)	25.4+	25.36	SPOT ELEVATION
		PROPERTY BOUNDARY	→	→	PERCENT SLOPE
		EDGE OF ASPHALT	→	→	NOMINAL SLOPE
		EDGE OF GRAVEL	EP		ELECTRIC PANEL
		SECTION LINE	GM		GAS MARKER
		CURB AND GUTTER (SPILL/CATCH)	IV		IRRIGATION CONTROL VALVE
x x x x x	x x x x x	WIRE FENCE	W		PROPOSED WELL
→ → → →	→ → → →	DITCH FLOWLINE	TC	TC	TRACKING CONTROL
GAS	GAS	GASLINE	S	S	SEEDING



1  
Q3 Q3  
RECLAMATION STORMWATER MANAGEMENT PLAN

SITE DESCRIPTION	
CONSTRUCTION ACTIVITY	DRILLING OF 8 OIL & GAS WELLS, CONSTRUCTION OF ASSOCIATED PRODUCTION EQUIPMENT, AND CONSTRUCTION OF ACCESS ROAD.
CONSTRUCTION DATES	TBD
AREA OF SITE	±4.8 ACRES
LOCATION OF SITE	LATITUDE: 39°59'00" N LONGITUDE: 105°00'45" W
EXISTING VEGETATION	NATIVE GRASSES
SOIL CONDITION	ACCORDING TO THE <i>NATURAL RESOURCES CONSERVATION SERVICES</i> , THIS SITE IS 62% RENOHILL LOAM AND 38% ULM LOAM. THE PROPERTY GENERALLY SLOPES TO THE NORTH AT SLOPES OF 2%.
POTENTIAL POLLUTION SOURCES	DUST FROM DRILLING & ACCESS ROAD CONSTRUCTION, NON-VEGETATED SOILS, FUEL, OIL, AND FLUIDS UTILIZED DURING DRILLING, CONCRETE WASHOUTS, OUTDOOR STORAGE ACTIVITIES, PORTABLE RESTROOMS, GENERAL REFUSE.
LOCATION OF NON-STORMWATER DISCHARGE	NONE
SITE FEATURES & SENSITIVE AREAS TO BE PROTECTED	THE SITE INCLUDES A WELL PAD, ENTRANCE ROAD, AND 3:1 SLOPES THAT MATCH INTO EXISTING TOPOGRAPHY. SURROUNDING AREAS TO BE PROTECTED INCLUDE FIELDS AND PUBLIC ROADS.
NAME AND LOCATION OF RECEIVING WATERS	STORMWATER RUNOFF TRAVELS EASTERLY TO BIG DRY CREEK WHICH FLOWS TO THE SOUTH AND DISCHARGES INTO STANDLEY LAKE.
OVERALL SCOPE / PROJECT CHARACTERISTICS	
INDUSTRIAL ACTIVITIES	OIL AND GAS PRODUCTION
FINAL SITE DISPOSITION	ONCE THE PRODUCTION PHASE FOR THE SITE IS COMPLETE, THE PRODUCTION SITE WILL BE RECLAIMED, THE WELLS WILL BE PLUGGED, CAPPED, & ABANDONED. THE TANK BATTERY WILL BE REMOVED. ANY UNNECESSARY PORTIONS OF THE UPGRADED ACCESS ROAD WILL BE REMOVED. SOILS WILL BE CONTOURED TO THE EXISTING SURROUNDING TERRAIN. (STOCKPILED TOPSOIL WILL BE REDISTRIBUTED ALONG WITH THE SEEDING ACROSS THE DISTURBED SOIL AREA IN ORDER TO REESTABLISH VEGETATION COVERAGE)
BEST MANAGEMENT PRACTICES (BMP'S)	
STORM WATER QUALITY BEST MANAGEMENT PRACTICE SHALL BE IMPLEMENTED TO MINIMIZE SOIL EROSION, SEDIMENTATION, INCREASED POLLUTION LOADS AND CHANGED WATER FLOW CHARACTERISTICS RESULTING FROM LAND DISTURBING ACTIVITY TO THE MAXIMUM EXTENT PRACTICAL, AS TO MINIMIZE POLLUTION OF RECEIVING WATERS.	
IMPLEMENTED BMP'S	
CONSTRUCTION STRUCTURAL BMP'S	PERMANENT STRUCTURAL BMP'S
<input checked="" type="checkbox"/> VTC PAD <input checked="" type="checkbox"/> DITCH & BERM SYSTEM <input type="checkbox"/> INLET PROTECTION <input type="checkbox"/> CULVERT OUTLET PROTECTION <input type="checkbox"/> WASH WATER SEDIMENTATION POND <input type="checkbox"/> SILT FENCING <input type="checkbox"/> RIP RAP <input type="checkbox"/> EROSION CONTROL MAT <input checked="" type="checkbox"/> SEDIMENT CONTROL LOG <input checked="" type="checkbox"/> SURFACE ROUGHENING ADDITIONAL BMP'S: _____	<input type="checkbox"/> VTC PAD <input type="checkbox"/> DITCH & BERM SYSTEM <input type="checkbox"/> CULVERT OUTLET PROTECTION <input type="checkbox"/> WASH WATER SEDIMENTATION POND <input type="checkbox"/> COGCC APPROVED CONTAINMENT BERM <input type="checkbox"/> RIP RAP <input checked="" type="checkbox"/> REVEGETATION ADDITIONAL BMP'S: _____
EROSION AND SEDIMENT CONTROL	
<p>1. TO THE EXTENT PRACTICABLE, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO GRADING ACTIVITIES. AT ALL TIMES DURING PROJECT CONSTRUCTION, ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED AND REPAIRED AS NEEDED TO PREVENT ACCELERATED EROSION ON THE SITE AND ON ANY ADJACENT PROPERTIES.</p> <p>2. ALL TOPSOIL, WHERE PHYSICALLY PRACTICABLE, SHALL BE SALVAGED AND NO TOPSOIL SHALL BE REMOVED FROM SITE EXCEPT AS SET FORTH IN THE APPROVED PLANS. TOPSOIL AND OVERBURDEN SHALL BE SEGREGATED AND STOCKPILED SEPARATELY. TOPSOIL AND OVERBURDEN SHALL BE REDISTRIBUTED WITHIN THE GRADED AREA AFTER ROUGH GRADING TO PROVIDE A SUITABLE BASE FOR AREAS WHICH WILL BE SEEDED AND PLANTED. RUNOFF FROM STOCKPILED AREA SHALL BE CONTROLLED TO PREVENT EROSION AND RESULTANT SEDIMENTATION OF RECEIVING WATER.</p> <p>3. PERMANENT OR TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED TO DISTURBED AREAS WITHIN 14 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MEASURES SHALL BE APPLIED WITHIN 14 DAYS TO DISTURBED AREAS WHICH MAY NOT BE AT FINAL GRADE, BUT WILL BE LEFT DORMANT FOR LONGER THAN 30 DAYS. IT IS RECOMMENDED THAT THE PERMANENT SEED MIX BE PLANTED AFTER OCTOBER TO KEEP SEEDLINGS FROM DEVELOPING BEFORE WINTER. TEMPORARY VEGETATIVE COVER CONSISTING OF ANNUAL RYE GRASS SHALL BE HYDRO SEEDED AT 20 POUNDS PURE LIVE SEED PER ACRE.</p> <p>4. FUGITIVE DUST EMISSIONS RESULTING FROM DRILLING &amp; ACCESS ROAD CONSTRUCTION ACTIVITIES AND/OR WIND SHALL BE CONTROLLED USING WATER.</p> <p>5. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED DURING CONSTRUCTION AND SHALL BE INSTALLED AS SOON AS PRACTICAL IF REQUIRED BY THE STORMWATER ADMINISTRATOR OR THEIR REPRESENTATIVE.</p> <p>6. AREAS WHERE SEDIMENT CONTROL LOGS ARE NOT INDICATED MAY REQUIRE SOME FORM OF SEDIMENT CONTROL. STRAW MULCH AND/OR TEMPORARY SEEDING MAY BE UTILIZED AS NECESSARY.</p>	
INSPECTION AND MAINTENANCE	<p>INSPECTIONS:</p> <ol style="list-style-type: none"><li>PERFORM EVERY 14 DAYS, AND FOLLOWING A WEATHER EVENT CAUSING RUNOFF DURING THE CONSTRUCTION PHASE. PERFORM EVERY 30 DAYS DURING THE COMPLETED AND INTERIM PHASES.</li><li>AN INSPECTION REPORT WILL BE FILLED OUT, &amp; FILED FOR EACH INSPECTION PERFORMED.</li><li>MAKE A COPY OF EACH INSPECTION REPORT AVAILABLE TO THE COUNTY UPON REQUEST.</li></ol> <p>MAINTENANCE:</p> <ol style="list-style-type: none"><li>PERFORM MAINTENANCE AND REPAIRS AS SOON AS POSSIBLE ON ITEMS OR AREAS IDENTIFIED IN THE INSPECTION REPORT</li><li>PERFORM MAINTENANCE AS INDICATED IN THE URBAN DRAINAGE &amp; FLOOD CONTROL DISTRICT, URBAN STORM DRAINAGE CRITERIA MANUAL, VOL 3, PER MANUFACTURER'S SPECIFICATIONS OR OTHER SOURCES DETERMINED TO BE ACCEPTABLE.</li></ol> <p>AN EFFICIENT RECORD-KEEPING SYSTEM IS A HELPFUL TOOL IN MANAGING INSPECTION AND MAINTENANCE REPORTS, INSPECTION REPORTS, MAINTENANCE RECORDS, TRAINING LOGS, AND OTHER SITE RELATED CORRESPONDENCE WILL BE MAINTAINED IN THE MASTER EROSION CONTROL PLAN.</p>

BASILINE

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DESIGNED BY  
AAD

DRAWN BY  
LDS

CHECKED BY  
AAD

DATE

PREPARED BY

REVISION DESCRIPTION

EXTRACTION OIL & GAS

COUNTY OF BROOMFIELD

EXHIBIT Q – NORTHWEST A PAD

NW QUARTER OF SECTION 9, TOWNSHIP 1 SOUTH, RANGE 68 WEST, 6TH P.M.

RECLAMATION STORMWATER MANAGEMENT PLAN

PREPARED UNDER THE DIRECT SUPERVISION OF

PRELIMINARY  
NOT FOR  
CONSTRUCTION

FOR AND ON BEHALF OF  
BASILINE CORPORATION

INITIAL SUBMITTAL 10/28/2016

DRAWING SIZE 24" X 36"

SURVEY FIRM BASILINE

SURVEY DATE 5/5/2016

JOB NO. C015272

DRAWING NAME Northwest A Reclamation.dwg

SHEET 3 OF 3

Q3



## **MATERIALS & WASTE MANAGEMENT PRACTICES**

Extraction Oil & Gas, Inc. (Extraction) ensures compliance with applicable federal, state, and local materials and waste management regulations by utilizing a comprehensive program of materials handling, and waste minimization, segregation, transportation, and disposal. The program is maintained by environmental professionals employed by Extraction with formal education in materials and waste management, and years of experience in the oil and gas (O&G) industry. These personnel oversee a team of environmental consultants and professionals responsible for implementing the program and ensuring processes are consistent with current regulations.

The following provides a brief overview of Extraction's Materials and Waste Management Practices, and summarizes activities and practices for ensuring compliance with exploration and production (E&P) waste regulations administered by the Colorado Oil & Gas Conservation Commission (COGCC), and applicable solid, hazardous, and universal waste regulations administered by the Colorado Department of Public Health and Environment (CDPHE).

Consistent with good materials and waste management practices, Extraction maintains records of material/waste source, transporter, and final disposition or disposal. These records are maintained under usual and customary practice and are made available as necessary.

### **E&P Waste**

As an upstream O&G operator, most waste streams generated by Extraction are subject to exploration and production (E&P) waste regulations administered by the COGCC and detailed in the 900 Series Rules

Typically, the largest volume of E&P waste generated on an annual basis is drill cuttings. To minimize waste volumes, Extraction separates surface cuttings generated with water-based mud, from production cuttings generated with oil-based mud. Water-based surface cuttings may be applied to farmer's fields with sandy soil to improve soil texture for agricultural use, under an approved COGCC beneficial reuse plan. Oil-based mud is transported offsite with proper manifesting for disposal at landfills permitted to receive E&P waste.

Produced water with no commercial value is disposed of in permitted injection wells. In the event produced water needs to be disposed of at an offsite location, properly permitted disposal facilities are utilized.

Soils impacted with production fluids may be remediated onsite with COGCC, landowner, and if necessary local authority approval, or transported offsite for disposal at landfills permitted to receive E&P waste. All incidents are reported in accordance with COGCC 900 Series Rules.

### **Solid, Hazardous, and Universal Waste**

Extraction minimizes the generation of waste by ensuring that material products are fully used for their intended purpose. If unused materials remain following an activity, contractors are required to take unused product with them for reuse at the next applicable project. Contractors are contractually required to comply with applicable material and waste management practices.

In the event of an unintended release of material by a contractor, Extraction requires the contractor to report the release as needed, and to remediate impacts in accordance with applicable cleanup standards. Extraction tracks all contractor releases to closure by requiring formal documentation, supported by laboratory analysis demonstrating cleanup of site impacts, proper waste characterization as needed, waste disposal approval, and manifests or load tickets tracking waste from source, through transport, to final disposal.

Please direct any questions about this practice to Blake Ford (Environmental Coordinator) at 970-576-3446, or [bford@ExtractionOG.com](mailto:bford@ExtractionOG.com).