2.0 DESCRIPTION OF ALTERNATIVES

BLM resource specialists reviewed XTO's Proposed Action and assessed the type and magnitude of potential impacts to the RBU Project Area. Based on this review, the following alternatives were developed for analysis in this EA:

- Alternative A – No Action Alternative: Under this alternative, XTO would continue to develop the necessary infrastructure (i.e., roads and well pads) to drill the remaining 128 wells previously approved under EA No. 1997-49. Impact analyses would be conducted by the BLM on a site-specific basis during the APD process. Under the No Action Alternative, additional development would also continue on State and Tribal leases.
- Alternative B – Proposed Action: This alternative outlines the action XTO proposes to take in order to expand and fully develop natural gas resources from their Federal leases in the RBU Project Area. This would include the construction of necessary infrastructure to directionally and vertically drill 484 wells, including the 128 wells previously approved under EA No. 1997-49. Development on State and Tribal leases is also included in the Proposed Action. While the BLM does process the APDs for Tribal leases following concurrence with the BIA, the BLM does not have management authority over development on State or Tribal leases.
- Alternative C – Surface Pipeline Alternative: This alternative would be identical to the Proposed Action except that all proposed gas lines would be placed on the surface. Development would still include the construction of necessary infrastructure to directionally and vertically drill 484 wells, including the 128 wells previously approved under EA No. 1997-49. Development on State and Tribal leases is also included in the Proposed Action. While the BLM does process the APDs for Tribal leases following concurrence with the BIA, the BLM does not have management authority over development on State or Tribal leases.

These alternatives are discussed in detail in this chapter. Alternatives that were considered but eliminated from detailed analysis are also briefly summarized below.

2.1 ALTERNATIVE A – NO ACTION ALTERNATIVE

Oil and gas development in the RBU Project Area began in the 1950's, and from 1951 to 1998 approximately 180 wells were drilled. In February 1998, a DR/FONSI for Dominion's EA No. 1997-49 was issued for gas development in the vicinity of the RBU and the West Willow Creek Unit. The analysis area for EA No. 1997-49 covered approximately 21,760 acres and the associated DR/FONSI approved the development of 301 gas wells. Approximately 15,482 acres (93%) of the proposed RBU Project Area was included in the analysis area for EA No. 1997-49. As of August 2007, 173 of the 301 wells analyzed under EA No. 1997-49 had been developed. As such, approximately 128 wells previously analyzed under EA No. 1997-49 have not yet been drilled. Under the No Action Alternative, XTO would continue to construct roads and wells pads to facilitate the vertical and directional drilling of these 128 wells. Impacts associated with these activities would be analyzed by the BLM on a site-specific basis during the APD process.

Existing surface-disturbing activities associated with previous oil and gas development (i.e., 324 vertical and 28 directional wells) in the RBU Project Area consists of the construction of 324 well pads, 108 miles of road, and 137 miles of pipeline ROW. These activities have disturbed approximately 1,461 acres in the RBU Project Area. **Figure 1** displays existing development (i.e., well pads, roads, pipeline, and compressors) in the RBU Project Area. Under the No Action Alternative, development activities in the RBU Project Area would consist of the following:

- Construction of 74 new well pads and vertical drilling of up to 74 natural gas wells from these well pads;
- Directional drilling of up to 54 natural gas wells from existing well pads; and
- Construction of 15.7 miles of co-located road, gas lines, and produced water lines (**Figure 2**).

The surface disturbances associated with the construction of the project components under the No Action Alternative would result in approximately 332 acres of surface disturbance. Based upon the estimated life of the project (LOP), as well as the reclamation potential of the area, all disturbances associated with the No Action Alternative would be considered long-term. Long-term is defined as lasting the approximate 40-year life of the proposed project. Reclamation efforts conducted over this extended period, should they be successful, would result in revegetation of some disturbed areas.

2.2 ALTERNATIVE B - THE PROPOSED ACTION

XTO proposes to expand and fully develop gas production in the existing RBU Project Area through the use of vertical and directional drilling to attain 20-acre well spacing (**Figure 3**). Due to the extensive amount of pre-existing development via vertical drilling in the RBU Project Area, XTO has gained an intricate understanding of the sub-surface formations and associated pay zones. Based upon this knowledge, XTO is able to target additional pay zones via directional drilling in a technically and economically feasible manner, with lower risks for missing these targets. As such, full field development in the RBU Project Area would include the drilling of 484 additional wells, of which, 410 would be directionally drilled. As stated above, 128 of the 484 proposed wells (54 directional; 74 vertical) were previously analyzed in EA No. 1997-49, and development of these wells could continue regardless of the decision related to this EA, following site-specific analyses (see Alternative A – No Action Alternative). As the site-specific impacts of these wells have not been previously analyzed, these wells have been included in the Proposed Action in an effort to expedite the APD approval of these wells, should this alternative be selected. Development on State and Tribal leases is also included in the Proposed Action. While the BLM does process the APDs for Tribal leases following concurrence with the BIA, the BLM does not have management authority over development on State or Tribal leases.

Specifically, XTO's Proposed Action includes the following primary components:

- Directional drilling of up to 378 natural gas wells from 169 existing well pads (well pads would be expanded by 0.5 acre per well);
- Vertical drilling of up to 74 natural gas wells from 74 new well pads;
- Directional drilling of up to 32 wells from 19 of the 74 new well pads;
- Construction of 15.7 miles of new co-located road, gas lines, and produced water lines;
- Depending upon well production, installation of up to 120 miles of replacement gas lines that would transport gas produced from both existing and proposed wells to the main gathering lines. These replacement spur gas lines would be buried adjacent to the existing gas line ROWs; and
- Construction of one new compressor engine, and expansion of eight existing compressor engines that would increase estimated compression across the field to 103,500 horsepower and dehydration to 450 million cubic feet per day (MMcfd) (i.e., 50 MMcfd per station).

XTO expects to drill between 37 and 93 wells per year from 2008 to 2015. Construction activities would follow guidelines described in the "Gold Book," *Surface Operating Standards for Oil and Gas Extraction and Development 4th Edition* (Gold Book) (BLM and USFS 2007), as appropriate.

2.2.1 WELL PAD CONSTRUCTION AND EXPANSION

As mentioned previously, XTO plans to construct 74 new well pads and to expand 169 existing well pads in order to drill 484 proposed wells. All well pad construction and expansion would be conducted using guidelines described in the "Gold Book," *Surface Operating Standards for Oil and Gas Extraction and Development 4th Edition* (BLM and USFS 2007), as appropriate. Construction or expansion of a typical well pad would involve the use of heavy equipment. Equipment needs would vary depending on the site-specific conditions. All surface-disturbing activities would be supervised by a qualified company representative who is familiar with the terms and conditions in the approved EA and site-specific permits

In order to prepare surfaces for well pad construction or expansion, the existing topsoil and brush would be cleared and topsoil would be stockpiled along the side of the well pad. All cut and fill slopes needed would be constructed so that stability would be maintained for the LOP. If determined necessary by the Authorized Officer (AO) of the appropriate Surface Managing Agency (SMA), additional environmental protection measures (i.e., energy dissipaters such as straw bales and silt fences) would be implemented for well pads where the possibility of erosional down-cutting exists. These structures would be installed prior to construction, and would be left in place and maintained until the adjacent disturbed slopes have revegetated and stabilized.

Prior to drilling operations, a reserve pit would be excavated on each new well pad or previously utilized reserve pits on existing pads would be re-opened and enlarged. To avoid impacts to soils and shallow groundwater, the reserve pit would be lined with 16-millimeter thick synthetic reinforced material. If rock is encountered during excavation, the pit would be lined with a felt liner pad to protect the liner from punctures. The pit liner would overlap the pit walls and be covered with dirt and/or rocks to secure it in place. The pit liner would be resistant to deterioration by hydrocarbons. The reserve pit would be fenced to prevent access by wildlife and unauthorized personnel. The reserve pit fencing would be installed on three sides during drilling operations and on the fourth side when the rig moves off location and until the pit is backfilled.

On average, each newly constructed well pad would initially occupy approximately 2.5 acres. In addition, each existing and proposed well pad utilized for proposed directional drilling would be expanded by 0.5 acre for each additional directional well. This acreage would include reopening previously utilized reserve pits (i.e., 0.4 acre), and expanding the existing pads to accommodate drilling equipment and additional well heads and production facilities. Therefore, construction of 74 new well pads (of which 19 would contain multiple wells) and expansion of 169 existing well pads to drill the 484 total proposed wells would initially disturb approximately 395 acres. If the wells are productive, the reserve pit[1] and other areas not required for production would be reclaimed. Topsoil previously stockpiled adjacent to the well pad would be re-spread across the disturbed areas, and each of these areas would then be seeded with a seed mixture approved by the AO of the appropriate SMA. If a well is unproductive, all areas not required for production of existing wells would be reclaimed following well plugging and abandonment. In the case of

[1] As several directional wells would be drilled from individual well pads, reserve pits would be utilized for more than one well. Once all of the proposed directional wells have been drilled from a single location, the rig would be dismantled and moved to another location, and the reserve pits would then be drained and emptied of drilling fluids within 90 days of final well completion

either a productive or unproductive well, reclamation activities would take place within 180 days of final drilling activities, weather permitting.

Figure 3 illustrates the locations of the proposed and existing well pads that would be utilized in the RBU Project Area under the Proposed Action.

2.2.2 ACCESS ROADS

Primary access into the RBU Project Area would be via State Highway 88 to Seep Ridge Road. Two primary access roads enter the RBU Project Area from Seep Ridge Road: Wild Horse Bench Road and Willow Creek Road. Both roads are included on the Uintah County Transportation Map as Class D roads.

Existing roads would be utilized to the extent possible to minimize new surface disturbance, and upgrades to those roads would occur on an as-needed basis to facilitate access to each drilling location. All County road maintenance activities implemented by XTO would be coordinated with Uintah County. Utilized roads would be maintained in good repair during all drilling, completion, and testing operations. No road improvements would be made within existing road ROWs without prior written approval from the ROW owner. All required road upgrades would follow guidelines described in the Gold Book (BLM and USFS 2007). Overall, approximately 108 miles of existing roads occur in the RBU Project Area (**Figure 1**). Existing surface disturbance associated with these roads is approximately 366 acres.

In addition to the existing road network in the RBU Project Area, approximately 15.7 miles (82,896 feet) of new access road would be required to access the 74 proposed well pad locations. New access roads would be built in accordance with the *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* "Gold Book" 4th Edition (BLM and USFS 2007), as appropriate. New roads would be constructed within a 75-foot wide ROW[2]; however the road itself would only occupy a 22-foot wide running surface. No roads would be constructed through the middle of well pads. Vegetation removed during construction would be windrowed or scattered over adjacent disturbance to reduce erosion. Specific requirements for vegetation removal would be determined by the AO of the appropriate SMA. New access roads would be crowned (2 to 3%), ditched, and constructed to meet the standards of the anticipated traffic flow and all weather requirements and to provide a well-constructed and safe road. Surface materials would consist of native soil whenever possible. If additional surfacing materials are required, they would be purchased from a local contractor having a permitted source of materials. Prior to construction, the ground would be allowed to dry completely, and no road construction would take place when soils are frozen. For the analysis purposes in this EA, it is assumed that the entire 75-foot wide construction ROW would be utilized, and therefore, total surface disturbance from construction of approximately 15.7 miles (82,896 feet) of new road within the RBU Project Area would be approximately 145 acres.

Recommendations from the Army Corps of Engineers (ACOE) regarding drainage crossings would be identified for all road expansion and construction during the onsite process. If deemed necessary by the ACOE, XTO would prepare stream alteration permits for associated drainage crossings.

Timing of new road construction would depend on the drilling schedule, topographic constraints, and weather conditions. Roads would generally be constructed two to three weeks prior to well

[2] 75-foot ROW would be utilized for both road construction and installation of pipeline and waterlines.

pad construction. The roads would have a design speed of approximately 20 miles per hour (mph).

2.2.3 DRILLING OPERATIONS

Once construction or expansion of an individual well pad is completed, drilling equipment would be moved onto the new well pad. Wells would be drilled utilizing a conventional, mechanically-powered mobile drilling rig. The exact type and size of drilling rig would be dependant upon rig availability at the time of project implementation. XTO anticipates that no more than twelve drilling rigs would be operating in the RBU Project Area at any one time. Each well would take approximately 14-21 days to drill. XTO expects to drill between 37 and 93 wells per year from 2008 to 2015 (**Table 2-1**).

Table 2.1. Estimated Drilling Schedule for the Proposed Action

Drilling Year	Estimated Number of Wells
2008	46
2009	60
2010	93
2011	57
2012	66
2013	64
2014	61
2015	37
Total	**484**

The proposed wells would target sandstone intervals within the Mesaverde Group, and the average depth of each well would be approximately 8,500 feet. Drilling operations would consist of drilling the hole, running and cementing intermediate casing, drilling the production hole, and running and cementing production casing. Any shallow water zones encountered during drilling would also be isolated by both casing and cement. The casing and cementing program would be designed to isolate and protect the shallower formations encountered in the well bore and to prohibit pressure communication or fluid migration between zones. In addition, the cement would protect the well by preventing formation pressure from damaging the casing and retarding corrosion by minimizing contact between the casing and formation fluids. The type of casing used and the depth to which it is set would depend upon the physical characteristics of the formations that are drilled. Surface casing would be installed to protect near-surface aquifers. Production casing would subsequently be installed to the total depth. All casing would be new or reconditioned and tested in accordance with applicable regulations. Site-specific descriptions of drilling procedures would be included in the APD and the Conditions of Approval for each well.

Drilling operations would utilize an open-loop circulation system with reserve pits. Construction of the reserve pits was discussed previously in **Section 2.1.1**. As several directional wells would be drilled from individual well pads, reserve pits would be utilized for more than one well. Once all of the proposed directional wells have been drilled from a single location, the rig would be dismantled and moved to another location, and the reserve pits would then be drained and emptied of drilling fluids within 90 days of final well completion as required by Onshore Order No. 7.

2.2.4 WELL COMPLETION AND PRODUCTION

If drilled wells indicate economic potential, completion operations would commence. Completion operations would involve setting production casing to the total drilled depth and perforating the casing in target production zones, followed by hydraulically fracturing (fracing) the productive formation under high pressure. The fracing material would likely contain sand or other proppant material to keep the fractures open, thereby allowing hydrocarbons to flow more freely into the casing. The next phase would be to flow and test the well to determine rates of production. Completion and testing would take approximately 7 to 10 days.

Should testing suggest the potential for commercial production, facilities including a wellhead, pumping unit, separator, dehydrator, condensate tanks, and gas meter would be installed at each location. All permanent (on site for 6 months or longer) structures constructed or installed would be painted a flat, non-reflective, earth tone color using one of the standard environmental colors, as determined by the AO of the appropriate SMA. All facilities would be painted within 6 months of installation.

Periodically, a workover or recompletion on a well may be required to ensure that efficient production is maintained. Workovers can include repairs to the well bore equipment (casing, tubing, rods, or pump), the wellhead, or the production facilities. These repairs would usually be completed in 7 days per well, during daylight hours. The frequency for this type of work cannot be accurately projected because workovers vary by well; however, an average work time may be one workover per well per year after about 5 years of production. In the case of a recompletion, where the wellbore casing is worked on or valves and fittings are replaced to stimulate production, all byproducts would be stored in tanks and hauled from the location. For workover operations, it may be necessary to rework the surface location to accommodate equipment. At the completion of the work, the surface location would be re-graded to pre-work contours and reclaimed to pre-work vegetation characteristics.

2.2.5 NATURAL GAS LINES

Natural gas produced at existing wells is currently transported via 137 miles (723,360 feet) of surface gas lines which extend throughout the RBU Project Area. Construction-related activities associated with previous pipeline construction have created approximately 494 acres of surface disturbance.

If the proposed vertical and directional wells go into production, additional gas line construction would be needed throughout the RBU Project Area. Where existing gas lines are in place, the current system would be used to transport gas to market. However, as additional wells come on-line and pipeline capacities of existing 2- to 8-inch surface pipelines start to maximize, existing gas lines would be replaced with larger diameter gas lines. Depending upon well production, individual replacement gas lines that would connect each well to the main gathering lines would be constructed of 4- to 12-inch outer diameter steel pipe. These replacement gas lines would be buried immediately adjacent to the existing pipeline ROWs. If the existing ROW is adequate, no additional ROW would be necessary to accommodate burial of the replacement gas line. However, if the existing ROW is not adequate, a 45-foot ROW would be needed. Surface disturbance associated with the construction of 120 miles (633,600 feet)[3] of buried replacement gas lines would be approximately 527 acres[4], assuming a 45-foot ROW.

[3] Only existing 2- to 8-inch surface pipeline would be replaced. Existing 10- to 20- inch pipeline would continue to be utilized.
[4] Numerous existing pipelines in the RBU Project Area lie immediately adjacent to one another, and share portions of their existing ROWs. Surface-disturbing calculations assume that all existing ROWs would not be adequate to accommodate the burial of

To transport gas from newly constructed well locations where gas line infrastructure is not currently in place, construction and installation of approximately 15.7 miles of steel gas lines would be needed. These collection gas lines would be constructed of 4- to 12-inch outer diameter pipe. Each gas line would be welded at its associated well pad and would then be pulled down the well's proposed access road using a dozer or backhoe. Each gas line would then be buried adjacent to the access road within the proposed 75-foot-wide ROW[5]. All equipment used to install the pipe would use the access roads as a working surface. The gas lines would be installed to avoid interference with normal travel and maintenance of the roadway. If buried gas lines were to cross existing waters of the U.S., ACOE permits would be required.

2.2.6 PRODUCED WATER

Currently produced water and condensate is decanted into external steel tanks that are located on each existing well pad. Containment dikes constructed either of compacted subsoil, or metal barriers currently surround these facilities and can hold 110 percent of the capacity of the largest tank. Currently each tank is pumped periodically as needed, and water is transported to certified disposal sites or existing water injection wells located in the RBU Project Area (**Figure 1**).

As additional wells come online in the RBU Project Area, the amount of water produced from downhole formations would increase. To decrease the amount of truck traffic that would be needed to transport and dispose of such water, XTO proposes to install produced water lines from existing and proposed well pads to two existing (RBU 13-11F–EPA Permit Number UT20961-06292; RBU 16-19F–EPA Permit Number UT2721-03787) and one proposed (RBU 4-22F-EPA Permit Number UT21123-07612) water injection facilities (**Figure 3**). For existing wells, all proposed produced water line would be buried within the proposed 45-foot wide ROW. For proposed development that would entail new well pad and road construction, the produced water line would be buried adjacent to the proposed gas lines, within the 75-foot ROW[4].

2.2.7 COMPRESSOR STATION CONSTRUCTION

Currently there are eight existing compressor stations located in the RBU Project Area (**Figure 1**). Existing compressors currently operate with an estimated total of 15,000 horsepower. If the proposed wells are productive, natural gas would be transported from each wellhead via gathering gas lines to the existing compression and treatment facilities shown on **Figure 2**. To support the proposed development, one additional compressor station (Black Bridge) would be constructed and installed in Section 14, T10S, R20E, and all eight existing compressor stations would be expanded. This expansion and development would add an estimated 103,500 horsepower and 450 MMcfd of dehydration across the RBU Project Area. All expansion of existing compressor stations would occur on previously disturbed areas that currently house existing compressor facilities, and construction and development of the Black Bridge compressor would occur at the existing RBU 14-14F well pad. As these areas are not currently large enough to support the additional compression facilities, each of these areas would be expanded. Total surface disturbance associated with expansion and construction of additional compressors would be approximately 36 acres. Details regarding the expansion of each facility are displayed below in **Table 2-2**.

replacement gas pipeline. As such, calculations display the maximum amount of disturbance that could occur from installation of these pipelines. However, as portions of the existing ROWs may be able to accommodate replacement pipelines, actual surface disturbance would likely be less than estimates above.

[5] The 75-foot ROW is assumed for new road construction with adjacent natural gas and water pipelines.

Table 2-2. Surface Disturbance Associated with Expansion of Existing Compressor Facilities

Facility Name	Proposed Expansion (acres)
TAP-1	3.3
TAP-2	4.5
TAP-3	4.7
TAP-4	4.7
TAP-5	3.0
HCU	4.4
11-18	3.3
9-17E	3.3
14-14F	5.0
Total	**36.2**

2.2.8 WATER

Water required for the drilling and completion of the proposed gas wells would be hauled by truck from a combination of the permitted water sources described in **Table 2-3**.

Table 2-3. Water Sources Utilized for the Proposed Action

Water Right Number	Filing Date	Source	Location	Allowed Annual Withdrawal
43-10991	December 17, 1999	Underground Water Well	N 1,160 ft.; W 500 ft. from NE corner Section 9, T8S, R20E	183.9 acre-feet
49-1645	December 6, 2001	Underground Water Well	N 300 ft.; E 400 ft. from W ¼ Section 9, T8S, R20E	50 acre-feet
49-2262	May 25, 2007	Ponds	N 4,820 ft.; W 1,200 ft. and N 4,850 ft.; W 700 ft. from S ¼ Section 33, T8S, R20E	20 acre-feet
49-2158	April 8, 2003	Green River	S 570 ft.; W 3,150 ft. from NE corner Section 33, T8S, R20E	20 acre-feet
49-2189	October 6, 2004	Green River	S 570 ft.; W 3,150 ft. from NE corner Section 33, T8S, R20E	20 acre-feet
Tribal Resolution 06.183	August 15, 2006	Willow Creek	NE Section 22, T10S, R20E	Not Specified

The needed water volume depends on the depth of the well and any losses that might occur during drilling. Based on previous experience with wells drilled in the area, approximately 21,000 barrels (2.7 acre-feet) of water would be needed to drill and complete each well. As such, the drilling of all 484 proposed wells would consume about 10,164,000 barrels (1,307 acre-feet) of water over a period of 8 years. **Table 2-4** displays the estimated annual water consumption based on XTO's proposed drilling schedule.

Table 2-4. Estimated Annual Water Consumption for Drilling

Drilling Year	Estimated Number of Wells	Estimated Annual Water Use (acre-feet)
2008	46	124.2
2009	60	162.0
2010	93	251.1
2011	57	153.9
2012	66	178.2
2013	64	172.8
2014	61	164.7
2015	37	99.9
Total	**484**	**1,306.8**

In addition to water for drilling and completion, approximately 775 barrels (0.1 acre-feet) of water per well pad would be utilized for dust abatement each year. As such, water utilized for dust abatement for a maximum of 398 well pads and associated roads would be approximately 12,338,000 barrels (1,592 acre-feet) over a 40-year project life or approximately 40 acre-feet/year. Based upon these water use estimates, between 140 and 291 acre-feet of water per year would be used for drilling, completion, and dust abatement over the first 8 years of the project. Following drilling and completion activities, water usage would then be limited to 40 acre-feet per year for dust abatement for the remainder of the project life. All water depletions mentioned above would be consulted on with the USFWS to analyze the potential impacts to threatened and endangered fish species (see Section 4.2.3). While a portion of the water used for drilling and completion of wells would be recycled from other XTO wells (e.g., produced water), the majority of water used would be fresh water hauled to the wells from the sources listed in **Table 2-3** above.

2.2.9 DISTURBANCE SUMMARY

Surface-disturbing activities associated with previous oil and gas development (i.e., 324 vertical and 28 directional wells) in the RBU Project Area consists of the construction of 324 well pads, 108 miles of road, and 137 miles of pipeline ROW. These activities have disturbed approximately 1,461 acres in the RBU Project Area. **Figure 1** displays existing development (i.e., well pads, roads, pipeline, and compressors) in the RBU Project Area.

Table 2-5 summarizes initial surface disturbance estimates for the Proposed Action. In order to adequately consider all possible impacts of the Proposed Action, this EA assumes that all 484 proposed vertical and directional wells would be drilled. It also assumes that 74 new well pads and their associated access roads would be constructed and that 192 existing or proposed well pads would be expanded by 0.5 acre for each proposed directional well. The initial surface disturbances associated with the construction of the project components under the Proposed Action would result in approximately 1,103 acres of surface disturbance. Of this total, approximately 71 percent (786 acres) would be expansion of existing disturbance (i.e., existing well pad expansion, replacement of existing gas lines, expanded compressor stations). Based upon the estimated LOP, as well as the low reclamation potential of the area, all disturbances associated with the Proposed Action would be considered long-term. Long-term is defined as lasting the approximate 40-year life of the proposed project, and until reclamation efforts result in revegetation of disturbed areas. To assure surface reclamation would occur at the end of the productive LOP, XTO would maintain a reclamation bond with the appropriate SMA, which covers both well plugging and abandonment and surface reclamation. That bond would not be

released until reclamation is deemed successful, as determined by the AO of the appropriate SMA.

Table 2-5. Summary of Surface Disturbance (Acres) for the Proposed Action

Construction Activity	BLM	State	Tribal	Total
New Well Pad Construction (2.5 acres/well pad)	90	0	95	**185**
Existing Well Pad Expansion (0.5 acres/directional well)	151	10	49	**210**
Proposed Road, Gas Line, and Water Line Development (75-foot ROW)	68	0	77	**145**
Proposed Replacement of Existing Gas Line and Water Line (45-foot ROW)	407	20	100	**527**
Proposed Expansion of Existing Compressor Stations	36	0	0	**36**
Total	**752**	**30**	**321**	**1,103**

2.2.10 SOLID WASTE MANAGEMENT

Self-contained, chemical portable toilets would be provided for human waste disposal. Upon completion of operations, or as needed, the toilet holding tanks would be pumped and the contents disposed of in the nearest, approved, sewage disposal facility.

Garbage, trash, and other waste materials would be collected in portable, self-contained, fully-enclosed trash cages during operations. Accumulated trash would be disposed of at an authorized sanitary landfill. Trash would not be burned on location.

All debris and other waste materials not contained in the trash cage would be cleaned up and removed from the location promptly after removal of the completion rig (weather permitting).

2.2.11 SPILL PROCEDURES

As each new well is completed, XTO would update all existing Spill Prevention Control and Countermeasure (SPCC) plans for existing well pads in the RBU Project Area. New SPCC plans would be developed for all proposed well pads. If spills of condensate, produced water, or other fluids were to occur in reportable amounts, as defined in BLM Notice to Lessees (NTL) 3A, XTO or their contractors or sub-contractors would immediately contact the BLM and any other regulatory agencies (e.g., EPA National Response Center, State of Utah) as required by law or regulation. Strict cleanup efforts would be initiated immediately.

2.2.12 HAZARDOUS MATERIALS AND OTHER WASTES

Drilling fluids, including salts and chemicals, would be contained in the reserve pits. Upon termination of drilling and completion operations, the liquid contents of the reserve pits would be used at the next drill site or would be removed and disposed of at an approved waste disposal facility within 90 days, weather permitting, after drilling is terminated. Upon well completion, any hydrocarbons in the pit would be removed in accordance with 43 CFR 3162.7-1. Alternatively, produced water would be stored in leak-proof tanks and could potentially be used in the field for well drilling and completion, unless prohibited by the EPA. Produced water and other byproducts would not be applied to roads or well pads for control of dust or weeds. Liquid hydrocarbons produced during completion operations would be placed in test tanks on the well

locations, and subsequently trucked offsite and sold or disposed of at a permitted disposal facility. Any spills of gas, salt water, or other hazardous fluids would be immediately cleaned up and removed to an approved disposal site.

2.2.13 RECLAMATION

The heavy equipment contractor would be provided with approved copies of the Surface Use Plan and associated Standard Operating Procedures prior to construction and subsequent reclamation activities. To assure surface reclamation would occur on Federal leases at the end of the productive LOP, XTO would secure a reclamation bond with the BLM. Bonding is required for oil and gas lease operations in order to indemnify the U.S. government against losses from failure to meet royalty obligations, wells plugged improperly and abandoned on lease, and/or surface restoration and clean-up on abandoned operations (BLM and USFS 2007).

Construction Phase - Prior to construction of new well pads, roads and pipeline ROWs, or the expansion of existing well pads, the top 12 inches of topsoil material (if present) would be stripped and stockpiled for future reclamation efforts. Placement of the topsoil would be noted on the location plat attached to the site-specific APD. Topsoil would be stockpiled separately from subsoil materials. If previously utilized reserve pits have been reclaimed, topsoil salvaged from these areas would be removed and stockpiled separately near the reserve pit.

Production Phase - Upon well completion, the well locations and surrounding area(s) would be cleared of all unused tubing, materials, trash, and debris not required for production. In accordance with Onshore Order Number 1, the portion of the well pads not required for production, the reserve pits, and areas around pipelines would be reclaimed within six months of well completion, weather permitting, unless an agreement is made with the SMA (e.g., well pads from which multiple wells would be drilled). Reclamation activities would take no more than 30 days. Prior to backfilling the reserve pits, the fence surrounding the pits and all debris in the pits would be removed. Before any dirt work associated with reserve pit restoration takes place, the reserve pits would be as dry as possible. The pit liners would be folded into the pit prior to backfilling. After backfilling, salvaged topsoil (if any) would be placed on top of the backfill material. After the reserve pits have been reclaimed, no depressions in the soil covering the reserve pit would be allowed. The objective is to keep seasonal rainfall and runoff from standing or pooling over the reserve pit and seeping into the soil. Diversion ditches and water bars would be used to divert surface runoff from the reserve pit area, if needed.

After completion activities have been finalized for the last proposed well on the well pad, XTO would reduce the size of the well pad to the minimum surface area needed for production facilities and adequate room for trucks to turn around, while providing for reshaping and stabilization of cut and fill slopes.

Upon completion of backfilling and leveling, the stockpiled topsoil would be evenly spread over the portion of the well pads not required for production, the reserve pits, and access road cuts and shoulders. These disturbed areas would then be reseeded with the SMA-approved seed mixture. Reclamation would be deemed successful by the AO of the SMA.

Final Reclamation of Well Locations at the End of Project Life - For dry holes, final reclamation of well locations and roads would take place within 180 days after the well is drilled, plugged, and abandoned. Road reclamation would be coordinated with Uintah County. At the end of the productive lives of successful wells, all production equipment and surface pipeline would be

removed and the well locations, access roads, and other disturbed areas would be restored to their approximate original condition.

At final abandonment, all well casings would be cut off and capped according to SMA requirements as directed by the AO. The cap would be welded in place and the well location and identity would be permanently inscribed on the cap. The cap would also be constructed with a weep hole. If requested, GPS coordinates of the cap would be provided to the SMA.

Well locations, associated roads that would no longer be used, and other disturbed areas would be restored as near as practical to their original condition. All disturbed areas would be re-contoured to the approximate natural contours. Road reclamation would be coordinated with Uintah County.

2.2.14 MINERAL LEASES AND ASSOCIATED STIPULATIONS

The drilling described in the Proposed Action would occur on 41 mineral leases currently held by XTO (32 Federal, 6 State, and 3 Tribal). Of the Federal leases, only one was issued after FLPMA, but prior to approval of the ROD and Approved RMP (BLM 2008b). Therefore, most leases do not contain stipulations other than the standard lease terms at the time of issuance. One Federal lease, U-76500, contains a special notice pertaining to prevention of severe soil erosion, seasonal restrictions during antelope kidding season (May 15 through June 20), and protection of a plant species (*Schoenocrambe argillacea)* listed as threatened under the Endangered Species Act (ESA) of 1973, as amended. Although only one existing lease currently contains special stipulations, XTO has committed to several additional mitigation measures that are designed to reduce impacts to existing resources (see Section 2.2.16 – Applicant Committed Environmental Protection Measures).

XTO is responsible for ensuring that lease stipulations are followed during well development. The existing wells and proposed directional wells would be located on portions of the leases shown in **Table 2-6**.

Table 2-6. Mineral Leases in the RBU Project Area

Lease Number	Applicable Lands within RBU Project Area	Effective Date
ST OF UT ML-3393	N2NE Sec 16-10S-20E	09/15/50
ST OF UT ML-3393-A	NENW Sec 16-10S-20E	09/15/50
ST OF UT ML-3394	S2SW Sec 16-10S-20E	09/15/50
ST OF UT ML-3394-A	NWSW Sec 16-10S-20E	09/15/50
U-01470-A	N2SE, SWSE Sec 22-10S-20E	06/01/51
U-01470-A	SESE Sec 22-10S-20E SW, W2SE Sec 23-10S-20E	06/01/51
U-1790	NE/4 Sec 11-10S-20E	07/01/51
U-037164	Lots 1,2,S2NE,SE Sec 3-10S-20E	07/01/51
U-02896-A	Lot 3, SENW Sec 3-10S-20E	01/01/55
U-013765	Lots 1,2,3,SW,S2NE Sec 3-10S-19E Lot 9, S2SE Sec 9-10S-19E NWNE,S2NE,NW,S2 Sec 13-10S-19E	01/01/55
U-013766	All of Sections 15 & 23-10S-19E	01/01/55
U-013767	Lot 4, SWNW, SW Sec 3-10S-20E	01/01/55
U-013769	Lot 2, SENW, S2NE Sec 18-10S-20E	01/01/55
U-013769-A	Lots 1,2,3,4,E2W2, E2 Sec 19-10S-20E	01/01/55

Lease Number	Applicable Lands within RBU Project Area	Effective Date
U-013769-B	NENE Sec 17-10S-20E	01/01/55
U-013769-C	NWNE, S2NE, NW, S2 Sec 17-10S-20E	01/01/55
U-013792	Lot 1, S2NE Sec 4-10S-19E S2NE Sec 10-10S-19E All Sec 14-10S-19E NE,E2NW,NWNW,NESW,NWSE, E2SE Sec 22-10S-19E	01/01/55
U-013793	Lots 3,4, E2SW Sec 18-10S-20E	01/01/55
U-013793-A	All Sec 14-10S-20E N2 Sec 20-10S-20E N2 Sec 21-10S-20E NWNE,N2NW,SWNW Sec 23-10S-20E	01/01/55
U-013794	All Sec 24-10S-19E SE Sec 18-10S-20E	01/01/55
U-013766	E2 Sec 17-10S-19E All Sec 21-10S-19E	01/01/55
U-013792	SWNW, NWSW, S2SW, SWSE Sec 22-10S-19E	01/01/55
U-013793-A	SENW, S2NE, NENE Sec 23-10S-20E	01/01/55
ST OF UT ML-10716	Lots 1,2,3,4, S2N2, S2 Sec 2-10S-20E	11/04/55
U-017713	S2S2 Sec 34-9S-19E	04/01/56
ST OF UT ML-13214	All Sec 16-10S-19E	11/02/56
U-0147541	Lots 10, 11 Sec 33-9S-19E	12/01/56
U-0147541-A	SESE Sec 33-9S-19E	12/01/56
U-03505	S2NW Sec 3-10S-19E Lots 8,9,12,13,14 Sec 4-10S-19E Lots 5,6,7,8 Sec 9-10S-19E	06/01/57
U-03505-A	W2 Sec 17-10S-19E E2 Sec 20-10S-19E	06/01/57
U-03576	Lots 5,6,7,10,11 Sec 4-10S-19E	07/01/57
U-035316	Lot 4, SE Sec 3-10S-19E NW Sec 10-10S-19E	07/01/59
U-0143519	E2SW Sec 22-10S-20E	01/01/65
U-0143520-A	S2 Sec 20-10S-20E S2 Sec 21-10S-20E	01/01/65
U-0143521-A	E2NE, N2NW Sec 22-10S-20E	01/01/65
U-7206	E2, NW, E2SW Sec 10-10S-20E W2, W2SE Sec 11-10S-20E E2E2, NWNE, NENW, SWNW SW Sec 15-10S-20E NWNW, S2N2, NESW, SE Sec 16-10S-20E	02/01/69
U-10291	E2SE Sec 11-10S-20E	01/01/70
BIA 14-20-H62-2647	S2NW, W2SW Sec 22-10S-20E	02/10/71
BIA 14-20-H62-2645	W2SW Sec 10-10S-20E NWNW, SENW, SWNE Sec 15-10S-20E	02/10/97
BIA 14-20-H62-2646	W2SE Sec 15-10S-20E W2NE Sec 22-10S-20E	02/10/97

Lease Number	Applicable Lands within RBU Project Area	Effective Date
U-76500	E2SE Sec 23-10S-20E	07/01/97

2.2.15 APPLICANT-REQUIRED REGULATORY REQUIREMENTS

The following section discusses resource-specific environmental protection measures that would be implemented as required by statutory or regulatory requirements. Implementation of these required measures would help eliminate or minimize impacts to resources within the RBU Project Area.

2.2.15.1 Air Quality

- XTO would comply with all applicable local, State, and Federal air quality laws, statutes, regulations, standards, and implementation plans.
- As required by the U.S. EPA Region 8, XTO would obtain all necessary air quality permits to construct, test, and operate facilities.

2.2.15.2 Cultural Resources

- Prior to construction activities on previously undisturbed areas, a Class III inventory would be conducted. If sites are found, a Section 106 consultation of this inventory would occur with the Utah State Historic Preservation Officer (SHPO). If necessary consultation with the Native American Tribes having ties to the Uinta Basin would occur. On BLM-administered lands, consultation between the Vernal BLM and the Utah SHPO would provide specific mitigation as needed, including but not limited to avoidance, for any eligible sites which may be present in or near the project's footprint.
- If cultural resources are uncovered during surface-disturbing activities, XTO would suspend operations at the site and immediately contact the AO, who would arrange for a determination of eligibility in consultation with the SHPO, and, if necessary, recommend a recovery or avoidance plan.

2.2.15.3 Fish and Wildlife Including Special Status Fish and Wildlife Species

- As required by the ESA, no activities would be permitted in habitat for endangered or threatened fish and wildlife species that would jeopardize the continued existence of such species.
- As required by Onshore Order #1, XTO would remove any visible accumulation of oil from the reserve pit immediately upon release of drilling rig to prevent exposure of migratory birds and other wildlife to petroleum products.

2.2.15.4 Soil Resources

- During project construction, surface disturbance and placement of gas and water lines would be limited to the approved location and access routes.
- No oil, lubricants, or toxic substances would be drained onto the ground surface.

2.2.15.5 Vegetation Including Special Status Plant Species and Invasive or Noxious Weeds

- As required by the ESA, no activities would be permitted in habitat for endangered or threatened plant species that would jeopardize the continued existence of such species.
- As required by the Noxious Weed Act of 1974, as amended, and Executive Order 13112-1999, noxious weeds would be controlled in the RBU Project Area by XTO on all disturbances associated with their existing well pads and ROWs, as well as infestations that would occur as a result of the project.

2.2.15.6 Water Resources

- As required under 40 CFR 112.3(e), XTO would revise and update all existing SPCC plans for each well pad utilized for directional drilling under the Proposed Action. In addition, XTO would prepare SPCC plans for all new proposed well pads. In addition, XTO would maintain a copy of the newly created or revised SPCC plan at each facility, if the facility is normally attended at least 8 hours per day, or at the nearest field office if the facility is not so attended. XTO would also implement and adhere to SPCC plans in a manner such that any spill or accidental discharge of oil or condensate would be reported and remediated.

2.2.15.7 Health and Safety/Hazardous Materials

- XTO would institute a Hazard Communication Program for its employees and require the subcontractor to operate in accordance with Occupational Safety and Health Administration (OSHA) (29 CFR 1910.1200).
- As required by OSHA, XTO would place warning signs near hazardous areas and along roadways.
- In accordance with 29 CFR 1910.1200, a Material Safety Data Sheet for every chemical or hazardous material brought on-site would be kept on file in XTO's field office.
- XTO would transport and/or dispose of any hazardous wastes, as defined by the Resource Conservation and Recovery Act of 1976, as amended, in accordance with all applicable Federal, State, and local regulations.
- All storage tanks that contain produced water, or other fluids which may constitute a hazard to public health or safety, would be surrounded by a secondary means of containment for the entire contents of the tank, plus freeboard for precipitation, or to contain 110 percent of the capacity of the largest tank.
- Production facilities that have the potential to leak produced water, or other fluids which may constitute a hazard to public health or safety, would be placed within appropriate containment and/or diversionary structure to prevent spilled or leaking fluid from reaching groundwater or surface waters.
- Notice of any reportable spill or leakage, as defined in BLM NTL 3A, would be immediately reported by XTO to the AO of the appropriate SMA, as required by law. Oral notice would be given as soon as possible, but within no more than 24 hours, and those oral notices would be confirmed in writing within 72 hours of any such occurrence.

2.2.16 APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES

In addition to the environmental protection measures that are required by applicable regulatory authorities, the following applicant-committed environmental mitigation measures (ACEPMs) would be applied to all activities on Federal lands within the RBU Project Area. Implementation of these measures would be incorporated into the DR, which then authorizes the BLM to enforce these measures to help avoid or minimize impacts to the environment.

2.2.16.1 Air Quality

- All internal combustion equipment would be kept in good working order.
- XTO would apply water or other BLM-approved dust suppression at construction sites and on roads, as necessary, to abate fugitive dust.
- XTO would not allow any open burning of garbage or refuse at well sites or other facilities.

2.2.16.2 Cultural Resources

- A Class III inventory would be conducted in all areas proposed for surface disturbance. These surveys would be conducted on a site-specific basis prior to the initiation of construction activities. At each proposed well and compressor station location, a 10-acre square parcel would be defined, centered on the well pad center stake. The interior of the well location would be examined for cultural resources by an archaeologist walking parallel transects spaced no more than 10 meters (30 feet) apart. All access, gas line, and water line routes would be surveyed to a width of 60 meters (200 feet). All prehistoric and historic sites documented during the Class III inventory as eligible for listing on the National Register of Historic Places (NRHP), as well as areas identified as having a high probability of significant subsurface materials, would be avoided by development. Specifically, well pad locations and access/gas and water line routes would be altered or rerouted as necessary to avoid impacting NRHP-eligible sites. If avoidance is not feasible or does not provide the required protection, adverse effects would be mitigated (e.g., data recovery through excavation).
- XTO would inform their employees, contractors, and subcontractors about relevant Federal regulations intended to protect archaeological and cultural resources. All personnel would be informed that collecting artifacts is a violation of Federal law and that employees engaged in this activity would be subject to disciplinary action.

2.2.16.3 Vegetation Including Special Status Plant Species and Invasive or Noxious Weeds

- Removal and disturbance of vegetation would be kept to a minimum through construction site management (e.g., using previously disturbed areas and existing easements where feasible, placing pipelines adjacent to roads, limiting well pad expansion, etc.). In addition, all areas not utilized for the operational phase of the project would be reseeded.
- In an effort to ensure that project activities do not increase the existence of invasive or noxious weeds in the RBU Project Area, XTO would prepare a Weed Control Plan. Specific pieces of the plan would include:
    a. Conducting individual noxious weed inventories on a well-by-well basis prior to construction activities. The inventories would include examination of all proposed

surface disturbance (i.e., roads, pipeline, and well pads) associated with each well. The results of these inventories would include GPS locations indicating the type and size of each infestation. This data would be formulated into a report and submitted with the associated APD.

b. Preparation of a Pesticide Use Proposal.
c. Following the construction phase and drilling phase for each well, all disturbed surface would be monitored annually for the presence of noxious weeds. If monitoring shows increases in presence of noxious weeds, XTO would be responsible for treating these areas. Noxious plant control measures (mechanical, cultural, chemical) would be conducted before seed set annually. Monitoring and treatment would be conducted annually until reclamation and weed ratification was deemed successful by the AO of the appropriate SMA.
d. To prevent further spread of noxious weeds, all vehicles and equipment would be power washed to remove seed and plant materials before entering the RBU Project Area from outside of the Uinta Basin.

- Prior to any surface-disturbing activities in areas that contain suitable habitat for the Uinta Basin hookless cactus or clay-reed mustard, an SMA-approved botanist would survey the proposed development sites and the species-specific avoidance buffer (i.e., 100-feet for Uinta Basin hookless cactus; 300-feet for clay-reed mustard) prior to construction activities. These surveys would be conducted within the proper seasonal timeframe, as determined by the AO of the appropriate SMA and U.S. Fish and Wildlife Service (USFWS). If either of the species is present, XTO would implement appropriate avoidance or mitigation measures, including relocation of the proposed well expansion or pipeline and/or design modifications to limit the potential impacts to plants and habitats. Specific details regarding avoidance and mitigation measures are included in **Appendix D** – Conservation Measures for Special Status Plant Species.

2.2.16.4 Fish and Wildlife Including Special Status Wildlife Species

- To minimize wildlife mortality due to vehicle collisions, XTO would advise project personnel regarding appropriate speed limits in the RBU Project Area. The Utah Division of Wildlife Resources (UDWR) would be contacted regarding the presence of carrion within or along roadways.
- Employees and contractors would be educated about anti-poaching laws. If wildlife law violations are discovered, the offending employee would be subject to disciplinary action by XTO.
- To minimize impacts to pronghorn antelope, XTO would limit development within identified crucial pronghorn habitat during the kidding period of May 15 to June 20.
- Prior to any surface-disturbing activities between January 1 and September 31, a BLM-approved contractor would survey all areas within 1 mile of proposed surface disturbance for the presence of raptor nests. If occupied/active raptor nests are found, construction would not occur during the nesting season for that species within the species-specific buffer described in "Best Management Practices for Raptors and Their Associated Habitats in Utah." As specified in these "*Guidelines*", and as determined by the AO of the appropriate SMA, modifications of these spatial and seasonal buffers for BLM-authorized actions would be permitted, so long as protection of nesting raptors was ensured (see Appendix A of the ROD and Approved RMP) (BLM 2008b).

- To prevent the intake of fish from the Green River, XTO and/or their contractors would avoid pumping water from low flow environments (slow moving water, backwaters, eddies, or the mouth of tributaries), and would use a maximum of ¼-inch mesh screening on the pump intake while pumping water. If impinged fish are observed on the intake, XTO would immediately stop operations and contact the USFWS and UDWR.
- To prevent the potential contamination of fish habitat from spills of petroleum products, XTO would utilize closed-loop drilling techniques for all proposed wells located in the 100-year floodplain of Willow Creek and in all named drainages within five miles of the Green River.

2.2.16.5 Livestock Grazing

- XTO would repair or replace any fences, cattleguards, gates, drift fences, and natural barriers that are damaged as a result of the Proposed Action. Cattleguards or gates would be installed for livestock control on road ROWs when fences are crossed, and these structures would be maintained by XTO for the LOP.

2.2.16.6 Paleontological Resources

- Because of the potential for fossil resources to occur in the Uinta Formation in the RBU Project Area, paleontological surveys would be conducted by an SMA-approved paleontologist prior to any surface disturbance. If significant fossils are encountered during the survey, the paleontologist would assess and document the discovery, and either collect the fossils or recommend the area be avoided so as not to destroy the resource. The AO of the SMA would determine the need for further monitoring of the area or mitigation of the site during ground-disturbing activities.
- If fossils are encountered during excavation, construction would be suspended, and the AO of the SMA would be notified. Construction would not resume until the fossils are assessed by the AO of the SMA, and appropriate mitigation measures are developed and implemented.

2.2.16.7 Soil Resources

- Areas used for soil storage would be stripped of topsoil before soil placement.
- Appropriate erosion control and revegetation measures would be employed. In areas with unstable soils where seeding alone may not adequately control erosion, grading would be used to minimize slopes and water bars would be installed on disturbed slopes. Erosion control efforts would be monitored by XTO and, if necessary, modifications would be made to control erosion.

2.2.16.8 Water Resources

- XTO would inform their employees, contractors, and subcontractors of the potential impacts that can result from accidental spills, as well as the appropriate actions to take if a spill did occur.
- XTO would utilize closed-loop drilling techniques for all proposed wells located in the 100-year floodplain of Willow Creek and in all named drainages within five miles of the Green River.
- Newly constructed gas and water lines would be pressure tested to evaluate structural soundness and reduce the potential for leaks.

2.2.16.9 Visual Resources

- To reduce visual impacts to recreationists utilizing the Green River, low profile tanks would be used at all well pads located within ½-mile or line of sight (whichever is less) of the Green River.

2.2.16.10 Health and Safety/Hazardous Materials

- XTO would provide portable sanitation facilities at drill sites, place trash cages at each construction site to collect and store garbage and refuse, and ensure that all garbage and refuse is transported to a State-approved sanitary landfill for disposal.

2.3 ALTERNATIVE C – SURFACE GAS LINES

Under Alternative C, the amount of proposed infrastructure, construction methods, statutory and regulatory requirements, and applicant-committed mitigation would be identical to those described above under Alternative B – Proposed Action. The proposed ROW widths for road and pipeline installation under Alternative C would also be the same as the Proposed Action; however as all gas lines under Alternative C would be placed on the surface, the amount of surface disturbance would be decreased. Details regarding the decreased surface disturbance associated with Alternative C are described below.

2.3.1 NATURAL GAS AND WATER LINES

As mentioned in **Section 2.2.5**, as additional wells come on-line, capacities of existing 2- to 8-inch surface gas lines would start to maximize, and the amount of water produced from downhole formations would also increase. In order to manage this additional gas and water production, existing gas lines would need to be replaced with larger diameter gas lines and water lines would need to be installed. Depending on well production, individual replacement gas lines that would connect each well to the main gathering lines would be constructed of 4- to 12-inch outer diameter steel pipe. Under Alternative C, these replacement gas lines would be placed on the surface within the existing pipeline ROWs. As such, no new surface disturbance would occur. All water lines would be constructed of up to 12-inch diameter polyethylene pipe. To prevent freezing, all water lines would be buried adjacent to the existing pipeline ROWs. To accommodate burial of the water lines, an additional 20-foot ROW would be needed. Up to 120 miles of replacement water line would need to be laid within the RBU Project Area if all wells reach anticipated production levels. Surface disturbance associated with burying the proposed water lines would be approximately 229 acres.

To transport gas and produced water from newly constructed well locations where gas and water line infrastructure is not currently in place, construction and installation of approximately 15.7 miles of steel gas lines and polyethylene water lines would be needed. These collection pipelines would be constructed of 4- to 12-inch outer diameter pipe. All proposed gas lines would be welded at its associated well pad and would then be pulled down the well's proposed access road using a dozer or backhoe. To accommodate the proposed access road, gas lines and water lines, a 50-foot wide ROW would be needed. Each gas line would be laid on the surface adjacent to the existing access road within the proposed 50-foot wide ROW. All equipment used to install the pipe would use the access roads as a working surface. The pipelines would be installed to avoid interference with normal travel and maintenance of the roadway. To prevent freezing, all water line would be buried adjacent to the proposed gas line. Surface disturbance associated with

constructing the proposed access road and burying the proposed water lines would be approximately 85 acres.

2.3.2 SURFACE DISTURBANCE SUMMARY

Table 2-7 summarizes initial surface disturbance estimates for Alternative C. The initial surface disturbances associated with construction of components under Alternative C would result in approximately 745 acres of surface disturbance. In order to adequately consider all possible impacts of Alternative C, this EA assumes that all 484 proposed vertical and directional wells would be drilled. It is also assumes that 74 new well pads and their associated access roads would be constructed and that 192 existing or proposed well pads would be expanded by 0.5 acre for each proposed directional well. Under Alternative C, it is also assumed that disturbance associated with gas line construction would not disturb the entire ROW, as all gas lines would be placed on the surface.

Based upon the estimated LOP, as well as the reclamation potential of the area, all disturbances associated with Alternative C would be considered long-term. Long-term is defined as lasting the approximate 40-year life of the proposed project, and until reclamation efforts result in revegetation of disturbed areas. To assure surface reclamation would occur at the end of the productive LOP, XTO would maintain a reclamation bond with the AO of the appropriate SMA. The bond would cover both well plugging and abandonment and surface reclamation and would not be released until reclamation was deemed successful, as determined by the AO of the appropriate SMA.

Table 2-7. Summary of Surface Disturbance (Acres) for Alternative C

Construction Activity	BLM	State	Tribal	Total
New Well Pad Construction (2.5 acres/well pad)	90	0	95	185
Existing Well Pad Expansion (0.5 acres/directional well)	151	10	49	210
Proposed Road, Gas Line, and Water Line Development (75-foot ROW – 50-foot disturbance)	44	0	41	85
Proposed Replacement of Existing Gas Line and Water Line (45-foot ROW – 20-foot disturbance)	170	8	51	229
Proposed Expansion of Existing Compressor Stations	36	0	0	36
Total	**491**	**18**	**236**	**745**

2.4 COMPARISON OF ALTERNATIVES

Table 2-8 displays a quantitative comparison of the various development scenarios associated with Alternatives A thru C.

Table 2-8. Comparison of Surface Disturbance (Acres) for Alternatives A, B and C

Alternative	BLM	State	Tribal	Total
Alt. A	173	0	159	332
Alt. B	752	30	321	1,103
Alt. C	491	18	236	745

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

2.5.1 VERTICAL DRILLING TO ATTAIN 20-ACRE SPACING

An alternative was considered that proposed additional well pad and road development in order to attain 20-acre well spacing using vertical drilling. As directional drilling has been proven to be a viable technology for the region, and as the objective of minimizing surface disturbance could not be accomplished by utilizing vertical drilling, this alternative was eliminated.

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