

AS CONSTRUCTED LAYOUT DRAWING

2 of 2

CARRIZO NIOBRARA LLC
OHARE 1-29-11-57 FRESHWATER PIT

SW1/4 SW1/4 SECTION 29 T11N R57W
6th PM WELD COUNTY COLORADO

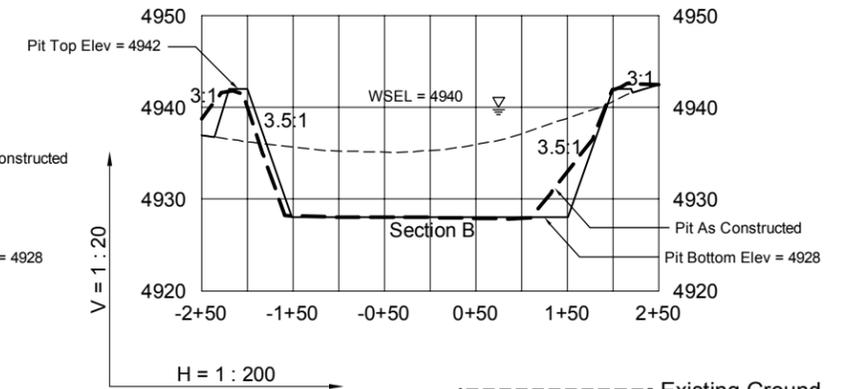
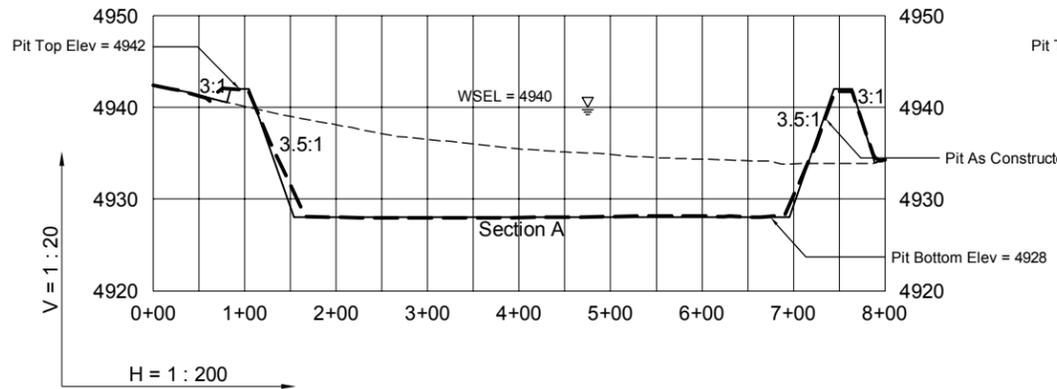
NOTES:

- The NRCS has identified the predominate soil type to be Kim-Mitchell complex for the upper 5' of the ground at and surrounding this reservoir location. The NRCS determination of this soil type for reservoir use as "very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.
- To overcome these limitations, the following parameters shall apply to the construction of the freshwater reservoir at this location:
 - Any rock that is found during earthwork operations shall be removed to 18" beyond final grade.
 - All earthwork cut slopes shall be scarified and recompact to 95% density and moisture content of 15% +/- 2% for a depth of 18" beyond final grade prior to placement of liner.
 - All earthwork embankment slopes shall be constructed in 12" maximum lifts and compacted to 95% density and moisture content of 15% +/- 2%.
 - POLY-FLEX linear low density polyethylene (LLDPE) geomembrane has been selected for the pond liner. All materials and workmanship shall comply with the manufacturer's specifications.
- Calculations for earthwork quantities were field adjusted for varying site conditions.
- Topsoil strip depth is anticipated to be 6" at all disturbed areas.
- Earthwork quantities were field adjusted for varying site conditions.
- Grades shown are to final surface of pond.

All surfaces to be lined shall be smooth and free of all foreign and organic material, sharp objects, or debris of any kind. The subgrade shall provide a firm, unyielding foundation with no sharp changes or abrupt breaks in grade. Standing water or excessive moisture shall not be allowed. The installer, on a daily basis, shall approve the surface on which the geomembrane will be installed.

The anchor trench shall be excavated to the line, grade, and width required by the manufacturer prior to liner system placement. The anchor trench shall be backfilled and compacted in accordance with the earthwork specifications provided above. If damage occurs to the liner, it shall be repaired prior to completing backfilling.

The geomembrane shall be covered as soon as possible. The covering operation shall not damage the geomembrane. The cover soil material shall be free of foreign and organic material, sharp objects, or debris of any kind, which could potentially damage the geomembrane. No construction equipment or machinery shall operate directly on the geomembrane. The Owner may change this at their discretion to a UV resistant liner however shall then also be responsible for any additional maintenance, repair and "hold-down" measures.

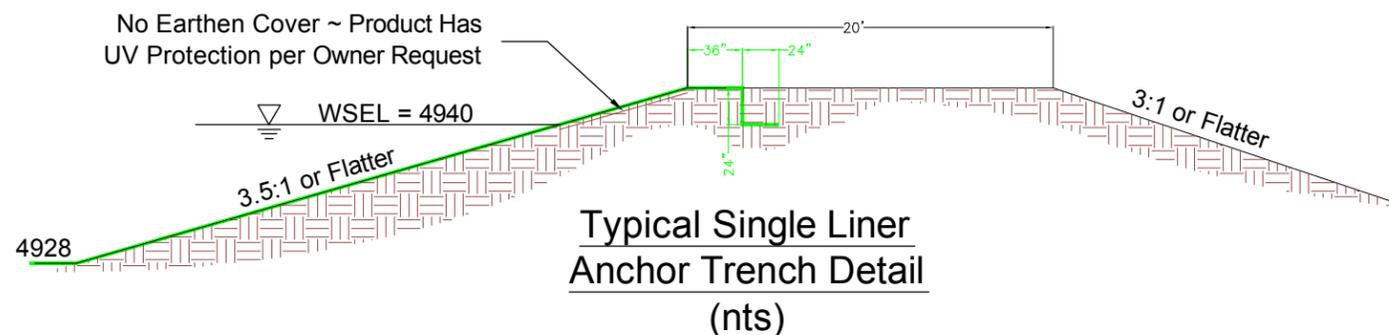


----- Existing Ground
----- Proposed Grade

Carrizo Oil and Gas, Inc. ~ Ohare Water Storage Facility Asbuilt Volume

Contour Elevation	Contour Area (sq. ft.)	Incremental Depth (ft.)	Incremental Volume (cu. ft.)	Cumulative Volume (cu. ft.)	Contour Area (ac.)	Incremental Volume (ac. ft.)	Cumulative Volume (ac-ft.)	Incremental Volume (bbl.)	Cumulative Volume (bbl.)	Depth from Bottom (ft.)
4926.57	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4,927	202.8	0.4	29.1	29.1	0.0	0.0	0.0	5.2	5.2	0.4
4,928	58397.1	1.0	20,680.3	20,709.3	1.3	0.5	0.5	3,683.3	3,688.5	1.4
4,929	149027.5	1.0	100,237.8	120,947.1	3.4	2.3	2.8	17,853.1	21,541.6	2.4
4,930	157766.6	1.0	153,376.3	274,323.5	3.6	3.5	6.3	27,317.5	48,859.1	3.4
4,931	166177.2	1.0	161,953.7	436,277.2	3.8	3.7	10.0	28,845.2	77,704.3	4.4
4,932	174587.3	1.0	170,364.9	606,642.1	4.0	3.9	13.9	30,343.3	108,047.6	5.4
4,933	182917.5	1.0	178,736.2	785,378.3	4.2	4.1	18.0	31,834.3	139,881.9	6.4
4,934	191191.3	1.0	187,039.2	972,417.5	4.4	4.3	22.3	33,313.1	173,195.0	7.4
4,935	199477.9	1.0	195,319.9	1,167,737.4	4.6	4.5	26.8	34,788.0	207,982.9	8.4
4,936	207673.2	1.0	203,561.8	1,371,299.2	4.8	4.7	31.5	36,255.9	244,238.8	9.4
4,937	215989.0	1.0	211,817.5	1,583,116.7	5.0	4.9	36.3	37,726.3	281,965.1	10.4
4,938	224457.2	1.0	220,209.5	1,803,326.2	5.2	5.1	41.4	39,221.0	321,186.1	11.4
4,939	233241.2	1.0	228,835.2	2,032,161.4	5.4	5.3	46.7	40,757.3	361,943.4	12.4
4,940	242228.5	1.0	237,720.7	2,269,882.0	5.6	5.5	52.1	42,339.9	404,283.3	13.4
4,941										
4,942										

2' Design Freeboard ~ Actual Freeboard above 4940 WSEL is 1.85' at lowest measured elevation of top of pit.
Design Volume from Elevation 4940 down to 4928 plus 2' sump is 2,088,501 cu. ft. = 47.95 ac. ft. = **371,977.9**



AS CONSTRUCTED ~ 11.20.14

Sorenson Engineering, Inc.



1169 Aspen Street Phone: 303-439-0381
Broomfield, Co 80020 Fax: 303-438-8681

