Alton Coal Development, LLC
463 North 100 West, Suite 1
Cedar City, Utah 84720
Phone (435) 867-5311 Fax (435) 867-1192

October 9, 2017

Daron R. Haddock
Coal Program Manager
Oil, Gas & Mining
1594 West North Temple, Suite 1210
Salt Lake City, UT 84114-5801

Re: **Pond 7 Certification, Alton Coal Development, LLC, Coal Hollow Mine, Kane County, Utah, C/025/0005**

Dear Mr. Haddock:

Alton Coal Development, LLC (ACD) is submitting this amendment to document the construction and certification of Pond 7. Included in this submittal is the engineer's construction inspection certification and the certified as-built drawing for Pond 7. Also included in this submission are the revised Appendix 5-12 and Chapter 5 TOC for inclusion to the MRP.

Also, it appears that a prior MRP amendment submission related to Task ID #5409 was never finalized. ACD last submitted a response to deficiencies on 4/28/2017 but never received notification in return. As a result, the clean copies of As-built drawings for Ponds 5, 6 & T1 have not yet been posted. Please notify ACD if task #5409 has been completed and we will send all clean copies together with this same submission.

Changes to the MRP associated with this amendment have been uploaded to the DOGM's server for review. PDF versions of the drawings are not certified. Upon approval, 2 (two) clean hard copies of the text and certified drawings for insertion into the MRP will be submitted. Please do not hesitate to contact me if you have any questions 435-691-1551.

Very truly yours,

B. Kirk Nicholes
Environmental Specialist
Alton Coal Development

To Whom it May Concern:

I, Andrew R. Christensen, Registered Professional Engineer, State of Utah No. 10230818, have completed (at a minimum) weekly construction inspections on the Alton Coal Development, LLC (ACD), North Private Lease Sediment Pond 7 from the outset of construction on 9/12/2017. The as-constructed survey data and stage-volume information was completed on 9/29/2017. I have completed the as-constructed Pond 7 Drawing 5-69AB and certified it as of that date.

It is noted that Pond 7 has been approved under the UPDES Discharge Permit to accept both storm surface runoff and mine affected water. At the as-constructed dimensions, Pond 7 has the capacity to contain the required 7.11 acre-ft from the 10 year – 24 hour storm as well as a minimum 4.80 acre-ft of mine affected water above the calculated 3 year sediment level (shown in Appendix 5-12 of the ACD MRP) up to the point of discharge.

I hereby certify that the above noted inspections of Sediment Pond 7 were completed by me and finalized on the date specified below.

Andrew R. Christensen

September 29, 2017

PROFESSIONAL ENGINEER
10230818
ANDREW R.
CHRISTENSEN
STATE OF UTAH

APPLICATION FOR COAL PERMIT PROCESSING

Permit Change ☒ New Permit ☐ Renewal ☐ Exploration ☐ Bond Release ☐ Transfer ☐

Permittee: Alton Coal Development, LLC
Mine: Coal Hollow Mine **Permit Number:** C/025/0005
Title: Pond 7 As-built

Description, Include reason for application and timing required to implement:
Completion of Pond 7

Instructions: If you answer yes to any of the first eight questions, this application may require Public Notice publication.

☐ Yes ☒ No 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: _____ ☐ increase ☐ decrease.
☐ Yes ☒ No 2. Is the application submitted as a result of a Division Order? DO# _____
☐ Yes ☒ No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
☐ Yes ☒ No 4. Does the application include operations in hydrologic basins other than as currently approved?
☐ Yes ☒ No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
☐ Yes ☒ No 6. Does the application require or include public notice publication?
☐ Yes ☒ No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
☐ Yes ☒ No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
☐ Yes ☒ No 9. Is the application submitted as a result of a Violation? NOV # _____
☐ Yes ☒ No 10. Is the application submitted as a result of other laws or regulations or policies?
Explain: _____
☐ Yes ☒ No 11. Does the application affect the surface landowner or change the post mining land use?
☐ Yes ☒ No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
☐ Yes ☒ No 13. Does the application require or include collection and reporting of any baseline information?
☐ Yes ☒ No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
☐ Yes ☒ No 15. Does the application require or include soil removal, storage or placement?
☐ Yes ☒ No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
☒ Yes ☐ No 17. Does the application require or include construction, modification, or removal of surface facilities?
☒ Yes ☐ No 18. Does the application require or include water monitoring, sediment or drainage control measures?
☒ Yes ☐ No 19. Does the application require or include certified designs, maps or calculation?
☐ Yes ☒ No 20. Does the application require or include subsidence control or monitoring?
☐ Yes ☒ No 21. Have reclamation costs for bonding been provided?
☐ Yes ☒ No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
☐ Yes ☒ No 23. Does the application affect permits issued by other agencies or permits issued to other entities?
☐ Yes ☒ No 24. Does the application include confidential information and is it clearly marked and separated in the plan?

Please attach three (3) review copies of the application. If the mine is on or adjacent to Forest Service land please submit four (4) copies, thank you. (These numbers include a copy for the Price Field Office)

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

B. Kirk Nicholes	Environmental Specialist	10/05/2017	B. Kirk Nicholes
Print Name	Position	Date	Signature (Right-click above choose certify then have notary sign below)

Subscribed and sworn to before me this 5 day of October, 2017

Notary Public: Marty G. Nicholes, state of Utah.

My commission Expires: 9-11-2021
Commission Number: 696219
Address: 1670 E Millstone Cir
City: Enoch State: UT Zip: 84721

} ss:

MARTY G. NICHOLES
Notary Public, State of Utah
My Commission Expires
September 11, 2021
Commission # 696219

For Office Use Only:	Assigned Tracking Number:	Received by Oil, Gas & Mining

Form DOGM- C1 (Revised December 10, 2007)

APPLICATION FOR COAL PERMIT PROCESSING
Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permittee: Alton Coal Development, LLC
Mine: Coal Hollow Mine
Permit Number: C/025/0005
Title: Pond 7 As-built

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

			DESCRIPTION OF MAP, TEXT, OR MATERIAL TO BE CHANGED
☐ Add	☒ Replace	☐ Remove	Chapter 5, TOC
☐ Add	☒ Replace	☐ Remove	Chapter 5, Appendix 5-12
☒ Add	☐ Replace	☐ Remove	Chapter 5, Drawing 5-69AB
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	
☐ Add	☐ Replace	☐ Remove	

Any other specific or special instruction required for insertion of this proposal into the Mining and Reclamation Plan.	Received by Oil, Gas & Mining

TABLE OF CONTENTS

Chapter 5

R645-301-500

Engineering

510.	**INTRODUCTION**	5-1
511	General Requirements	5-1
511.100–300.	Contents	5-1
512	**CERTIFICATION**	5-1
512.100.	Cross Sections and Drawings	5-1
512.200.	Plans and Engineering Designs	5-1
512.210 –230.	Excess Spoil Disposal Areas, Durable Rock Fills and Coal Mine Waste	5-2
512.240.	Impoundments	5-2
512.250.	Primary Roads	5-2
512.260.	Variance From Approximate Original Contour	5-3
513.	**COMPLIANCE WITH MSHA REGULATIONS AND MSHA APPROVALS**	5-3
513.100.	Coal Processing Waste Dams and Embankments	5-3
513.200.	Impoundments and Sedimentation Ponds	5-3
513.300.	Disposal of Underground Development Waste, Coal Processing Waste and Excess Spoil in Underground Mine Workings	5-3
513.400.	Refuse Piles	5-3
513.500.	Capping, Sealing and Backfilling Openings to the Surface from the Underground	5-3
513.600.	Discharges into an Underground Mine	5-5
513.800.	Coal Mine Waste Fires	5-6
514.	**INSPECTIONS**	5-6
514.100-140.	Excess Spoil	5-6
514.200-250.	Refuse Piles	5-7
514.300.	Impoundments	5-7
514.310-313.	Certified Inspection	5-7
514.320.	Inspection Standard and Frequency	5-7
515	**REPORTING AND EMERGENCY PROCEDURES**	5-8
515.100.	Slides	5-8
515.200.	Impoundment Hazards	5-8
515.300-320.	Temporary Cessation	5-8
516	**PREVENTION OF SLIDES**	5-9

520	**OPERATION PLAN**	5-10
521	**GENERAL**	5-10
521.100.	Cross-Sections and Drawings	5-10
521.110.	Previously Mined Areas	5-10
521.120.	Existing Surface and Subsurface Facilities and Features	5-11
521.121.	Buildings	5-11
521.122.	Surface and Subsurface Man-Made Features	5-11
521.123.	Public Roads	5-11
521.124.	Existing areas of spoil, waste, coal development waste, and non-coal waste disposals, dams, embankments, other impoundments, and water treatment and air pollution control facilities	5-11
521.125.	Ponds and Other Impoundments	5-12
521.130.	Landowners and Right of Entry and Public Interest Drawings	5-12
521.132	Permit Boundary	5-12
521.133	Public Roads	5-12
521.133.2	Relocating a Public Road	5-13
521.140.	Mine Drawings and Permit Area Drawings	5-13
521.143.	Disposal of Excess Spoil	5-15
521.150.	Land Surface Configuration Drawings	5-20
521.160.	Drawings and Cross Sections of the Proposed Features for the Proposed Permit Area	5-21
521.170.	Transportation Facilities Drawings	5-23
521.180.	Support Facilities	5-26
521.200.	Signs and Markers Specifications	5-26
521.240.	Mine and Permit Identification Signs	5-26
521.250.	Perimeter Markers	5-27
521.260.	Buffer Zone Markers	5-27
521.270.	Topsoil Markers	5-27
522	**COAL RECOVERY**	5-27
523	**MINING METHODS**	5-30
524	**BLASTING AND EXPLOSIVES**	5-35
524.100	Blaster Certification	5-35
524.300-350	Preblasting Survey	5-36
524.400.	Blasting Schedule	5-37
524.410.	Unscheduled Blasts	5-38
524.420.	Timing of Blasting	5-38
524.450-453.	Blasting Schedule Publication and Distribution	5-38
524.460-465.	Blasting Schedule Contents	5-38
524.500-532.	Blasting and Warning Signs, Access Control	5-39
524.600-610.	Adverse Effects of Blasting	5-40
524.620.	Airblast Limits	5-40
524.630.	Monitoring	5-40
524.633.	Flyrock	5-41

524.640-622.	Ground Vibration	5-41
524.690.	Standards not Applicable	5-42
524.700.	Records of Blasting Operations	5-42
524.800.	Use of Explosives	5-43
525.	**SUBSIDENCE CONTROL PLAN**	5-43
526.	**MINING FACILITIES**	5-44
526.110-115.	Existing Structures	5-44
526.116.	Public Roads	5-44
526.116.1.	Operations Within 100 ft. of a Public Road	5-44
526.116.2.	Relocating a Public Road	5-45
526.200.	Utility Installation and Support Facilities	5-46
526.210.	Existing Utilities	5-46
526.220	Support Facilities	5-46
526.300	Water Pollution Control Facilities	5-49
526.400	Air Pollution Control Facilities	5-50
527.	**TRANSPORTATION FACILITIES**	5-50
527.100.	Classification of Roads	5-50
527.200.	Description of Roads	5-51
527.220.	Alteration or Relocation of Natural Drainage ways	5-55
527.230.	Road Maintenance	5-55
527.250.	Geotechnical Analysis	5-55
528.	**HANDLING AND DISPOSAL OF COAL, OVERBURDEN, EXCESS SPOIL, AND COAL MINE WASTE**	5-56
528.100.	Coal Removal, Handling, Storage, Cleaning, and Transportation Areas and Structures	5-56
528.200.	Overburden	5-56
528.300.	Spoil, Coal Processing Waste, Mine Development Waste, and Non-coal Waste Removal, Handling, Storage, Transportation, and Disposal Areas and Structures	5-59
528.310.	Excess Spoil	5-59
528.320.	Coal Mine Waste	5-63
528.322.	Refuse Piles	5-64
528.323.	Burning and Burned Waste Utilization	5-64
528.330.	Non-coal Mine Waste	5-64
528.350.	Acid-Forming and Toxic Materials	5-65
528.400.	Dams, Embankments and other Impoundments	5-65
529.	**MANAGEMENT OF MINE OPENINGS**	5-65
530.	**OPERATIONAL DESIGN CRITERIA AND PLANS**	5-67
531.	**GENERAL**	5-67

532.	**SEDIMENT CONTROL**	5-68
532.100	Disturbed Area	5-68
532.200	Backfill Stabilization	5-68
533-100-714.	**IMPOUNDMENTS**	5-69
534	**ROADS**	5-72
534.100-200.	Roads will be located, designed, constructed, reconstructed, used maintained, and reclaimed so as to:	5-72
534.300-340.	Primary Roads	5-74
535.	**SPOIL**	5-75
535.100.	Disposal of Excess Spoil	5-75
535.200.	Disposal of Excess Spoil: Valley Fills/Head-of-Hollow Fills	5-78
535.300.	Disposal of Excess Spoil: Durable Rock Fills	5-78
535.400.	Disposal of Excess Spoil: Preexisting Benches	5-79
536.	**COAL MINE WASTE**	5-79
537.	**REGRADED SLOPES**	5-79
540.	**RECLAMATION PLAN**	5-79
541.100-400.	General	5-79
542.	**NARRATIVE, DRAWINGS AND PLANS**	5-81
542.100–600.	Plan and Timetable	5-81
542.700.	Final Abandonment of Mine Openings	5-85
542.720.	Disposal of Excess Spoil	5-86
542.730.	Disposal of Coal Mine Waste	5-87
542.740.	Disposal of Non-coal Mine Wastes	5-87
542.800	Reclamation Cost	5-87
550.	**RECLAMATION DESIGN CRITERIA AND PLANS**	5-88
551	**SEALING AND CASING OF UNDERGROUND OPENINGS**	5-88
552	**PERMANENT FEATURES**	5-89
553	**BACKFILLING AND GRADING**	5-89
553.200	Spoil and Waste	5-95
553. 300	Covering of Exposed Coal Seams, and Acid and Toxic-Forming	5-95
553.400	Cut and Fill Terraces	5-95
533.500	Previously Mined Areas and Continuously Mined Areas	5-95
553.600	Highwall Management	5-95
553.700	Backfilling and Grading: Thin Overburden	5-96
553.800	Backfilling and Grading: Thick Overburden	5-96

APPENDICES

5-1	Geotechnical Analysis - Sediment Impoundments and Excess Spoil Structure
5-2	Sediment Impoundment and Diversion Structure Analysis
5-3	Robinson Creek Culvert and Diversion Analysis
5-4	Coal Hollow Mine Blasting Plan
5-5	Reclamation Slope Stability Evaluation/Analysis
5-6	Post-Mining Roads Backfill Analysis
5-7	Location of & Standards and Specifications for ASCAs and ASCMs in use at Coal Hollow Mine
5-8	Feasibility of Highwall Mining the Smirl Seam at the Alton Coal Development, LLC Coal Hollow Mine
5-9	Norwest Corporation Underground Letter Reports
5-10	Engineering Evaluation of Lower Robinson Creek Reconstruction
5-11	Geotechnical Analysis – Sediment Impoundments and Spoils Structures – North Private Lease
5-12	Hydrology and Runoff Control for the North Lease Area Coal Hollow Mine
5-12A	Hydrology and Runoff Control for Temporary Sediment Pond T1 North Lease Area Coal Hollow Mine
5-13	Evaluation of Pipeline from Pit 10 to Sediment Pond 3
5-14	Culvert Design for C-2 North Private Lease

DRAWINGS

General

5-1	Pre-mining Topography
5-2	Disturbance Sequence

Facilities (5-3 to 5-8C)

5-3	Facilities and Structures Layout
5-3A	Culverts
5-3B	Underground Facilities and Structures Layout
5-3C	Underground Facilities & Structures – Design Layout
5-3D	Underground Facilities & Structures - Watersheds
5-4	Loadout Elevation View 1
5-5	Loadout/Stockpile Elevation View 2
5-6	Office Elevation View
5-7	Maintenance Shop Elevation View
5-8	Wash Bay, Oil and Fuel Storage Elevation View
5-8A	Wash Bay Equipment Layout
5-8B	Facilities and Structural – Electrical
5-8C	Facilities and Structural – Water Plan

Coal Recovery (5-9 to 5-14)

5-9	Coal Extraction Overview
5-10	Coal Removal Sequence

5-11 Shallow Coal Recovery Cover Cross Section
5-12 Deep Coal Recovery Cross Section
5-13 Strip Ratio Isopach
5-14 Coal Thickness Isopach

Overburden Handling (5-15 to 5-19)
5-15 Overburden Isopach
5-16 Overburden Removal Sequence
5-17 Overburden Removal Ultimate Disturbance
5-18 Bond Sequence
5-19 Bond Polygons

Robinson Creek Temporary Diversion and Reconstruction (5-20 to 5-21)
5-20 Robinson Creek Temporary Diversion Plan View
5-20A Robinson Creek Reconstruction Plan View
5-21 Robinson Creek Temporary Diversion Cross Sections/Detail
5-21A Robinson Creek Reconstruction Design and Details

Transportation (5-22 to 5-24)
5-22 Primary Mine Haul Roads Plan View
5-22A Primary Roadways – Facilities Roadways
5-22B Primary Roadways – Facilities Roadways
5-22C Postmining Roadways – Roadway to Pugh Property
5-22D Postmining Roadways – Roadway to Water Well
5-22E Postmining Roadways – Route 136 Reconstruction Details Option B
5-22F Postmining Roadways – Route 136 Reconstruction Details
5-22G Postmining Roadways – Route 136 Reconstruction Details
5-22H Postmining Roadways – Route 136 Reconstruction Details Option A
5-22I Primary Roadways – Underground Access Road Plan & Profile
5-23 Primary Mine Haul Roads Cross Sections/Detail
5-24 Ancillary Roads Typical Cross Section

Sedimentation Diversions/Impoundments (5-25 to 5-34)
5-25 Diversion Ditch and Sediment Impoundment Plan View
5-26 Sediment Impoundment Watersheds
5-27 Diversion Ditch Watersheds
5-28 Sediment Impoundment 1 Details
5-28B Sediment Impoundment 1B Details
5-29 Sediment Impoundment 2 Details
5-30 Sediment Impoundment 3 Details
5-31 Sediment Impoundment 4 Details
5-32 Impoundment Spillway Detail
5-33 Diversion Ditch 1 Details
5-34 Diversion Ditch 2, 3 and 4 Details
5-34A Diversion Ditch 4-A and B-1T Details

Reclamation/Regrading (5-35 to 5-38)

5-35 Not Used
5-36 Not Used
5-37 Post Mining Topography
5-37A Post Mining Topography Cross Sections
5-38 Reclamation Sequence

Geotechnical (5-39)
5-39 Geotechnical Samples and Boring Locations
5-40 Dewatering Trench Details

Highwall Mining Details (5-41 to 5-44)
5-41 Typical Trench Detail for Highwall Mining
5-42 Typical Panel Detail 10 Holes per Panel for Under 100 feet Cover
5-43 Typical Panel Detail 10 Holes per Panel for Under 150 feet Cover
5-44 Typical Panel Detail 10 Holes per Panel for Over 150 feet Cover

General
5-45 North Area Pre-mining Topography
5-46 North Area Disturbance Sequence

Facilities (5-47 to 5-49)
5-47 Facilities and Structures Layout
5-48 Facilities and Structures Construction Sequence – Area 1
5-49 Facilities and Structures Construction Sequence – Area 2
5-50 Facilities and Structures Construction Sequence – Area 3
5-51A Temporary Spoil Stockpile Details
5-51B Topsoil Stockpile Details

Coal Recovery (5-50 to 5-53)
5-52 North Area Coal Extraction Overview
5-53 North Area Coal Removal Sequence
5-54 North Area Strip Ratio Isopach
5-55 North Area Coal Thickness Isopach

Overburden Handling (5-54 to 5-55)
5-56 North Area Overburden Isopach
5-57 North Area Overburden Removal Sequence

Transportation (5-56 to 5-62)
5-58 Primary Roads Northern Haul Road 1/2 Plan & Profile
5-59 Primary Roads Northern Haul Road 2/2 Plan & Profile
5-60 Primary Roads Southern Haul Road Plan & Profile
5-61 Postmining Roadways Route 136 Plan & Profile
5-62 Postmining Roadways Alton Coal Mine Road Plan & Profile
5-63 Postmining & Primary Roadways Typ. Sections & Details

5-64 Unused

Sedimentation Diversions/Impoundments (5-63 to 5-69)
5-65 North Area Diversion Ditch and Sediment Impoundment Plan View
5-66 North Area Sediment Control Area Watersheds
5-67 North Area Sediment Impoundment 5 Details
5-67AB North Area Sediment Impoundment 5 Details – As-Built
5-68 North Area Sediment Impoundment 6 Details
5-68AB North Area Sediment Impoundment 6 Details – As-Built
5-69 North Area Sediment Impoundment 7 Details
5-69AB North Area Sediment Impoundment 7 Details – As-Built
5-70 North Area Sediment Impoundment 8 Details
5-71 North Area Sediment Impoundment 9 Details
5-71A North Area Sediment Impoundment T1 Details
5-71A-AB North Area Sediment Impoundment T1 Details – As-Built
5-72 North Area Diversion Ditch Details DD-5 thru UD-14
5-73 North Area Diversion Ditch Details DD-16 thru DD-20

Reclamation/Regrading (5-71 to 5-73)
5-74 North Area Post Mining Topography
5-74A North Area Post Mining Topography - Area 1
5-74B North Area Post Mining Topography - Area 2
5-74C North Area Post Mining Topography - Area 3
5-75 North Area Post Mining Topography Cross Sections
5-76A North Area Earthworks Reclamation Sequence
5-76B North Area Facilities Reclamation Sequence
5-77 North Area Bond Polygons
5-78 North Area Geotechnical Samples and Boring Locations
5-79 Post-Mining Surface Hydrology

APPENDIX 5-12

HYDROLOGY AND RUNOFF CONTROL

NORTH LEASE AREA

COAL HOLLOW MINE

JANUARY 2016

(REVISED OCTOBER 5, 2017)

Hydrology and Runoff Control

For the

North Lease Area

Coal Hollow Mine

General

This appendix will analyze the watershed characteristics of the North Lease Area of the Coal Hollow Mine and provide sizing and design criteria for adequate runoff and sediment control.

Method

The watersheds for the Undisturbed, Disturbed and Alternate Sediment Control Areas are shown on Drawing 5-66. Watershed areas, hydraulic lengths and elevations were measured directly from this map. Calculations to determine flow characteristics and volumes were performed using the Office of Surface Mining "Storm Program 6.20", by Gary E. McIntosh. This program is based on the SCS TR-55 Method of Peak Flow Determination.

Parameters

The following are the categories analyzed in this appendix, along with the parameters used:

Rainfall – Designs are based on rainfall amounts taken directly from the NOAA Atlas 14, Vol. 1, Version 5, "Point Precipitation Frequency, Alton, Utah". Rainfall amounts used herein are:

2 year – 6 hour precipitation event - 0.96"

10 year - 6 hour precipitation event - 1.41"

25 year - 6 hour precipitation event - 1.72"

10 year - 24 hour precipitation event - 2.39"

Watersheds – Watershed areas, lengths and elevations were measured directly from Drawing 5-66. All undisturbed areas were assigned a runoff curve number (CN) of 63, mining areas to be reclaimed are assigned a CN of 75, and all remaining disturbed areas have a runoff curve number of 89, as used in the existing approved plan.

Watershed UA-4 – This is the largest undisturbed watershed draining to this site. The watershed boundary was established based on the minesite topographic map along with the USGS map of the area. Based on these maps, the drainage to the northeast of the boundary appears to be captured by the pond or depression areas south of the Knoll Spring area. The Alton Road also runs through this area and likely disrupts the natural drainage pattern further to the northeast.

Runoff Curve Numbers – As indicated above, 3 separate runoff curve numbers have been used in these calculations. The undisturbed CN of 63 is the same as previously used and approved for the minesite. The CN of 89 is also the same as previously approved, and is applied to those areas that will likely remain disturbed throughout the project. The intermediate runoff curve number of 75 has been used for all other areas to be mined and sequentially reclaimed per the approved mine plan. This number is considered conservative compared to the original approved plan, and is based on the following:

- Surface mining areas will be reclaimed and revegetated within specified approved time frames, which will minimize the area that will be disturbed at any one time;
- Runoff from the active mining area is typically controlled within the pit area, greatly reducing the actual amount reporting to the ponds during an event;
- Only areas which are necessary to the operation or active mining are disturbed. All other areas draining to the ponds are left undisturbed, with a much lower runoff potential, until pit construction is necessary;
- Past experience on the property has shown that revegetation of reclaimed sites has good success in one to two growing seasons, also reducing runoff and sediment loading to the ponds.

Sediment Ponds – Sediment Pond designs are based on regulatory requirements of containment for runoff from a 10 year/24 hour precipitation event of 2.39", plus 3 years of calculated runoff sediment storage. Pond outlets are sized to carry at least the peak flow from a 25 year/6 hour event.

Diversions – All diversions are conservatively sized to control runoff from a 10 year-6 hour event of 1.41". All diversions on the site are considered temporary and will be

removed upon completion of operations. Haul road ditch calculations and sizing are also included with the diversion calculations.

Culverts – There are 4 culverts planned for the North Lease Area, along the Southern Haul Road as shown on Drawing 5-47 and 5-60. The culvert C-1 to the west is sized for runoff from a 10 year – 24 hour event of 2.39", since it will be carrying runoff directly to Sediment Pond 6. The culvert designated C-2 will replace the existing county road culvert, and is sized to carry runoff from the undisturbed area above for a 100-year/24-hour event of 3.1". Details on this culvert design are shown on Appendix 5-13. The larger culvert at the Kanab Creek Crossing is to be determined and approved by the U.S. Army Corps of Engineers. Culvert C-4 will be installed prior to construction of the North Haul Road.

ASCA's – There is one ASCA (Alternate Sediment Control Area) proposed for this site. The runoff for this area is based on the 10 year-24 hour event of 2.39". Runoff from the ASCA will be treated by filtering with straw bales and/or silt fences prior to discharge.

General Notes

The west side of the property will be the first to be mined. The first items to be constructed will be culvert C-2 and ASCA-1. The Southern Haul Road will be extended to the west and Sediment Ponds 5 and 6 and contributing ditches will be constructed. Mining, backfilling and reclamation will take place sequentially, and as a result, not all areas shown as disturbed will be disturbed at any given time. As pits are mined out, they will be backfilled and reclaimed in accordance with the approved mine plan. It should be noted that the following tables and calculations in this appendix are based on "worst-case" conditions of entire contributing watersheds draining to ponds, ditches and/or culverts, even though the area will likely be in various stages of disturbance or reclamation at any given time. The east side of the property will not be disturbed until later in the mining cycle, after which time the proposed diversions and sediment ponds will be constructed.

Watersheds

Watershed parameters are summarized on Table 1. Peak flows and volumes are shown on Table 2.

Table 1

Watershed Characteristics

Watershed	Area (ac.)	Hyd. Length (ft.)	Elev. Chg. (ft.)	CN
UA-l	12.6	600	30	63
UA-2	92.1	3250	300	63
UA-3	13.9	2000	200	63
UA-4	254.9	6600	348	63
DA-1	82.3	3250	56	75
DA-2	25.2	3125	56	75
DA-3	28.4	1500	46	75
DA-4	23.6	1250	128	75
DA-5	11.6	1025	40	75
DA-6	24.0	1300	44	75
DA-7	18.8	1250	56	75
DA-8	2.2	700	48	89
ASCA-1	3.1	600	40	89
*SHR	0.6	600	30	89
**NHR	1.4	1500	44	89

* Southern Haul Road – Maximum flow section for road ditch sizing only.

**Northern Haul Road – Maximum flow section for road ditch sizing only.

Table 2

Runoff Calculations

Watershed	Flow (cfs) 10/6	25/6	10/24	Volume (ac. ft.) 10/24	Flows To:
UA-1	0.10	0.27	1.29	0.22	SP-7
UA-2	0.59	1.81	5.04	1.60	UD-18 / UD-19
UA-3	0.10	0.29	1.03	0.24	UD-15
UA-4	1.09	3.95	9.30	4.43	UD-14
DA-1	3.32	6.37	23.75	4.03	DD-13 / SP-7
DA-2	1.03	1.98	7.51	1.23	SP-7
DA-3	1.28	3.42	12.93	1.39	DD-17 / SP-8
DA-4	1.12	3.60	13.46	1.16	DD-16 / SP-9
DA-5	0.51	1.49	5.98	0.57	DD-11 / SP-7
DA-6	1.06	2.85	11.43	1.17	SP-6
DA-7	0.80	2.23	9.17	0.92	2/3 DD-5/1/3 DD-6/SP-5
DA-8	1.15	1.64	2.95	0.25	DD-12/SP-7
ASCA-1	1.60	2.28	4.11	0.35	1/2 DD-9/1/2 DD-10/C-2
SHR	0.29	-	-	-	Road Ditch
NHR	0.49	-	-	-	Road Ditch

Notes:

SP = Sediment Pond

SHR = Southern Haul Road

NHR = Northern Haul Road

Sediment Ponds

There are 5 proposed sediment control ponds on this site. Sediment Ponds 5, 6 and 7 will contain the designated runoff from the west side of the property. Any discharge from ~~this pond~~these ponds will go to the existing channels in accordance with the approved UPDES Permits. Sediment Pond 8 will contain runoff from the northeast side of the property. Overflow from this sediment pond will flow to Sediment Pond 9, which will also contain runoff from the southeast portion of the site. Any discharge from this pond will also flow to the main channel under an approved UPDES Permit.

All sediment ponds are sized to contain the runoff from a 10 year-24 hour precipitation event of 2.39", plus at least 3 years of calculated sediment storage. Each pond will also be equipped with a primary pipe spillway with oil skimmer and an open-channel emergency spillway, capable of passing the flow from a 25 year-6 hour event of 1.72", as required.

All sediment pond inlets and open-channel emergency spillways will be protected with adequately sized rip-rap placed over erosion control fabric. Sizes are shown on Table 3.

Sediment markers will be installed in each pond, showing the 60% cleanout and maximum sediment levels. All ponds are oversized and will be maintained to provide storage capacity for the required 10 year – 24 hour precipitation event, as required.

~~Alton Coal Development, LLC has applied for approval of new UPDES discharge points for Sediment Ponds 5 and 6; however, the approval is still pending. In the interim, Sediment Ponds 5 and 6 will be maintained as total containment structures. The ponds will be maintained with a minimum storage capacity of 110% of the 10-year / 24-hour event at all times until UPDES approval. The minimum storage capacity (maximum water and sediment level) will be clearly marked on the sediment markers to be installed in the ponds. When the ponds capture and contain a runoff event, and the minimum storage capacity is exceeded, water and/or sediment will be removed to restore the capacity within 24 hours. Until the UPDES Permit is approved, water will be removed by pumping into the water truck and hauled to the Coal Hollow Mine site where it will be discharged into an~~

~~approved sediment pond. Removed sediment will be placed on the spoils pile in accordance with the approved plan.~~

~~The minimum storage capacity for the 10-year / 24-hour runoff event for Sediment Pond 5 under this scenario is 1.01 ac. ft.. Based on the design drawing Storage Volume Table on Drawing 5-67 for Pond 5, this would be only slightly above the maximum sediment cleanout marker elevation of 6843.0; therefore, the minimum storage capacity of the pond will be maintained above that mark. The sediment marker will be clearly marked with the maximum water level, as well as the sediment levels. The actual final elevations will be determined by the as-constructed pond volumes.~~

~~The minimum storage capacity of Sediment Pond 6, is 1.29 ac. ft.. Based on the design drawing Storage Volume Table on Drawing 5-68 for Pond 6, this would be just above elevation 6863.0; therefore, the minimum storage capacity of the pond will be maintained above that point. The sediment marker will be clearly marked with the maximum water level as well as the sediment levels. The actual final elevations will be determined by the as-constructed pond volumes.~~

Sediment pond requirements and sizing is summarized on Table 3. Pond details and designs are shown on Drawings 5-67, 5-68, 5-69, 5-70 and 5-71.

Table 3

Sediment Pond Sizing

Sediment Pond No.	5	6	7	8	9
10yr/24hr Runoff (ac. ft.)	0.92	1.17	6.05	1.39	1.16
+ 3 Yrs. Sediment (ac. ft.)	0.36	0.26	1.06	0.27	1.57
Required Capacity (ac. ft.)	1.28	1.43	7.11	1.66	2.73
Proposed Capacity (ac. ft.)	1.56	3.14	19.26	7.47	3.41
25yr/6hr Peak Flow (cfs)	2.23	2.85	10.11	3.42	3.60
Principle Spillway Pipe	18”	18”	24”	18”	18”
Emergency Spillway Bottom	3’	3’	4’	3’	3’
Velocity (fps)	5.66	6.18	8.93	6.60	6.72
Depth of Flow (ft)	0.12	0.14	0.25	0.16	0.16
Rip-Rap (D50)	6”	6”	9”	6”	6”

Note: Emergency Spillways are based on 3H:1V slope with 2H:1V side slopes.

All rip-rap is underlain with erosion control fabric.

As-Constructed Sediment Ponds

As of the date of this report, Sediment Ponds 5, 6 and 7 have been constructed and certified by a Registered Professional Engineer. The as-constructed details for the ponds are shown on Drawings 5-67AB, 5-68AB and 5-69AB, respectively. Each of the ponds have been inspected by the engineer at the beginning, during and upon completion of construction. Final surveys of the ponds indicate that each has been constructed to the minimum design specifications, including inlets, outlets, spillways, erosion protection and capacity. The following differences were noted in the as-constructed verses proposed ponds:

- Rip-rap sizing is typically larger than the proposed minimum; however, all inlets and outlets are adequately protected.
- Some internal cut slopes are slightly steeper than the proposed 2H:1V. Since the ponds are mostly incised and the small embankments are sloped according to design, this should have no effect on the operation or stability of the ponds.
- The actual pond capacity of Pond 6 is slightly larger than design and that of Ponds 5 and 7 are slightly smaller than proposed; however, all ponds exceed the required volume for the 10-year / 24-hour precipitation event, in addition to the required sediment storage volume as shown on Table 3.

Diversions

All diversions (ditches) are sized to carry the runoff from a 10 year-6 hour precipitation event of 1.41". Diversions are considered temporary and will be removed when no longer required. Undisturbed area diversions are designated by a UD-n label and disturbed area ditches are designated by a DD-n label, as shown on Drawing 5-65.

Estimated flows to the diversions are taken from Table 2, "Runoff Calculations". Average slopes were taken from Drawings 5-72 and 5-73. All ditches are assumed to be constructed in a triangular shape with 2H:1V side slopes, unless otherwise noted; however, actual bottom width and slopes may vary as long as the required cross-sectional area is maintained. Minimum ditch depth and area is determined by the peak flow depth plus a minimum of 6" of freeboard. Proposed ditch depth is based on the expected maximum flow depth plus freeboard, increased to the nearest 1/2 foot. All ditches are assumed to have a Manning's No. (n) of 0.025 for unlined channels.

Haul road ditches are also included with the diversions. The calculations for the haul road runoff are based on the maximum expected flow from a 10 year – 6 hour storm routed through the maximum slope section of the road.

Outlets of all undisturbed diversion ditches will be protected from erosion by placing 6" D-50 rip-rap over erosion control fabric for a distance of at least 20' above the point of discharge. None of the disturbed area diversion ditches show erosive velocities above 5 fps; however, any ditches that exhibit excessive erosion will be repaired and those areas will be equipped with appropriate erosion protection. All sediment pond inlets and outlets will be rip-rapped for protection as shown on the sediment pond drawings 5-67, 5-68, 5-69, 5-70 and 5-71.

Table 4

Diversion Ditches

Diversion	Slope %	Flow cfs	Velocity fps	Flow Depth ft	Proposed Depth ft	Remarks
DD-5	5.21	0.60	3.50	0.29	1.00	2/3 DA-7
DD-6	6.22	0.20	2.85	0.19	1.00	1/3 DA-7
DD-7	4.84	0.28	2.82	0.22	1.00	1/4 DA-6
DD-8	5.16	0.28	2.89	0.22	1.00	1/4 DA-6
DD-9	8.42	0.80	4.51	0.30	1.00	1/2 ASCA-1
DD-10	2.67	0.80	2.93	0.37	1.00	1/2 ASCA-1
DD-11	6.07	0.51	3.56	0.27	1.00	DA-5
DD-12	7.00	1.15	4.61	0.35	1.00	DA-8
DD-13	2.04	3.32	3.78	0.66	1.50	DA-1
UD-14	1.28	1.09	2.40	0.48	1.00	UA-4
UD-15	7.35	0.10	2.55	0.14	1.00	UA-3
DD-16	2.15	4.54	4.17	0.74	1.50	DA-4+SP-8 Overflow
DD-17	2.12	1.28	3.02	0.46	1.00	DA-3
UD-18	12.06	0.20	3.65	0.17	1.00	1/3 UA-2
UD-19	1.99	0.59	2.43	0.35	1.00	UA-2
*SHR	5.00	0.29	3.04	0.31	1.00	Road Ditch
**NHR	2.93	0.49	2.84	0.42	1.00	Road Ditch

* Southern Haul Road – Maximum Road Ditch Flow

**Northern Haul Road – Maximum Road Ditch Flow

Culverts

There are 4 culverts proposed for this site, along the Southern Haul Road as shown on Drawing 5-47 and 5-60. Culvert C-1 to the west has been sized to carry the runoff from a 10- year/24 -hour precipitation event, since it is conveying runoff from the disturbed area directly to Sediment Pond 6.

The culvert designated C-2 is proposed to be a 36" cmp. It will be installed under the realigned county road and extended to the northeast beyond ASCA-1 and drainage area DA-8, where it will continue to carry runoff from the left fork and center drainage until Sediment Pond 7 is constructed. ASCA-1 will drain to culvert C-2 via a 12" culvert drop inlet protected by straw bales surrounding the inlet structure (see Appendix 5-13 for details). After Pond 7 is constructed, the primary and emergency spillways will flow to culvert C-2, along with runoff from ASCA-1. It should be noted that the sizing of culvert C-2 is based on a 100-year/24-hour precipitation event of 3.1" for the entire undisturbed drainage area, since it is passing beneath the county road.

The largest culvert (C-3) will provide a new Kanab Creek Crossing for the mining operation. It is to be located just north of the existing 144" culvert on the county road. The new culvert is also proposed to be 144" (12.00') in diameter; however, the final sizing and approval will be under the direction of the U.S. Army Corps of Engineers.

Culvert C-4 will be placed before construction of the North Haul Road. This culvert will be a 12" cmp and is sized to carry the runoff from a 10-yr. / 6-hr. storm, as required. It will carry the runoff from area DA-5 and will be placed in ditch DD-11 at the North Haul Road crossing.

Culvert sizing is based on the Haestad Methods, Flowmaster I, Version 3.43 Computer Program.

All culverts are considered temporary and will be removed upon final reclamation. The county road will be then be restored to its present location with the existing in-place culverts.

The following table will summarize the culvert sizing and requirements.

Table 5

Culverts

Culvert	Flow cfs	Velocity fps	Required Diam. Ft.	Proposed Diam. Ft.	Remarks
C-1	11.43	5.70	1.60	2.00	Flow from DA-6
C-2	35.14	9.20	2.21	3.00	See Appendix 5-13
C-3	TBD	TBD	TBD	12.00	Pending USACE Approval
C-4	0.51	3.97	0.40	1.00	Flow from DA-5

Notes:

1- Culvert C-1 is calculated with a 2.00% slope and a Manning's n of 0.020.

2- Culvert C-2 is calculated with a 3.39% slope and a Manning's n of 0.020.

3-Culvert C-3 sizing is to be determined by the U.S. Army Corps of Engineers. Final design to be submitted upon approval.

4-Culvert C-4 is calculated with a 6.07% slope and a Manning's n of 0.020.

ASCA's

There is one area in this proposed mining plan that will not drain to the sediment ponds due to topographic restrictions. It is therefore proposed to use alternate sediment control techniques to treat runoff from this area. The ASCA is on the south-central part of the property and is shown on Drawing 5-66. Runoff from this area is based on the 10 year-24 hour precipitation event of 2.39", and will be directed into various diversion ditches as shown on Drawing 5-65 and then into a catch basin and drop inlet structure protected by straw bales as shown in Appendix 5-13. Additional straw bale dikes will be placed at 50' intervals in the ditches draining to the drop inlet. The company will inspect the straw bales at least once per quarter and after every significant precipitation event (0.1" or larger). The bales will be replaced when sediment reaches a depth of one-half of the barrier height (approximately 14" for standard bales).

The Universal Soil Loss Equation (USLE) was used to estimate sediment yield from the ASCA, as well as all areas draining to sediment control structures. The results are shown in the section entitled Sediment Yield.

The USLE calculations show the ASCA has the potential of producing 28.14 tons of sediment per acre per year. This equates to a potential of 0.040 acre feet or 1742 cubic feet per year. As shown in Appendix 5-13, the drop inlet drain from this area will be surrounded by straw bales to trap sediment prior to discharge. Based on the catch basin detail, the proposed straw bale protection around the inlet will have an outside perimeter of approximately 44 '. Using a conservative estimate of an average 6.7% slope into the basin and a maximum sediment storage depth of 14" on the bales, calculations indicate a sediment storage capacity of approximately 447 cu. ft. before the bales need to be replaced. [(1.167' x 17.4'/2) x 44' = 447 cu. ft.] This indicates that the bale maintenance or replacement may need to be completed 3.9 times per year, or approximately once per quarter.

The above calculations are considered conservative due to the fact that although the diversion ditches flowing to the ASCA basin, DD-09 and DD-10 will also have straw bale check dams to reduce sediment to the ASCA, those potential reductions have not been included here. A typical straw bale check dam design for ditches is shown in Appendix 5-7.

Straw bales, as well as silt fences, wattles, etc., are considered temporary sediment control structures, and it is expected that they will require on-going maintenance and occasional replacement. None of the above are 100% effective for all particle sizes; however, as indicated in Table 7.12 – Trap efficiency, dam height, normal flow depth, and backwater for alternate filter check dam designs. , p. 560, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983, straw bales were shown to have a trap efficiency of 100% for particle sizes of 0.046 mm or larger for rectangular installations similar to that proposed for the ASCA.

The following Table 6 will summarize the ASCA characteristics and expected runoff amounts.

Table 6

Alternate Sediment Control Areas

ASCA	Area ac.	Runoff Volume ac. ft.	Peak Flow cfs	Diversion Ditch
ASCA-1	3.1	0.35	4.11	1/2 DD-9 / 1/2 DD-10

Note: All runoff is treated by filtering through straw bales and/or silt fences.

Sediment Yield

The Universal Soil Loss Equation (USLE) was used to estimate sediment yield from the all disturbed and undisturbed area draining to the sediment ponds and the Alternate Sediment Control Areas (ASCA's). All soil loss from these areas was assumed to be delivered to the respective sediment ponds or ASCA..

Erosion rate (A) in tons/acre/year is determined using the USLE as follows:

A = (R) (K) (LS) (CP) , where:

Variable R is the rainfall factor which can be estimated from R=27 times P to the 2.2 power, where P is the 2 year – 6 hour precipitation value. P for the Alton area is 0.96" ; therefore, the estimated value of R for this area is 24.68.

Variable K is the soil erodibility factor. For disturbed areas, the K value is conservatively estimated to be 0.5, and 0.35 for undisturbed areas.

Variable LS is the length-slope factor. This figure was determined by applying the slope length and percentage for each ASCA drainage area to the chart in Figure 5.15, p. 334, "Applied Hydrology and Sedimentology for Disturbed Areas", Barfield, Warner and Haan, 1983.

Variable CP is the control practice factor, which can be divided into a cover and a practice factor. For purposes of these calculations, the following CP values were used:

- Compacted Areas 1.20
- Mining / Reclaimed Areas 0.80
- Undisturbed Areas 0.38

The sediment volume is based on a density of 100 pounds per cubic foot of sediment.

The following Table is a summary of the sediment yield calculations.

Table 7

Sediment Yield Calculations

Drainage	R	K	Acres	Length	Slope (%)	LS	CP	*A	**Yield
ASCA-1	24.68	0.5	3.1	600’	6.7	1.90	1.20	28.14	0.040
UA-1	24.68	0.35	12.6	600’	5.0	1.30	0.38	4.27	0.025
DA-1	24.68	0.5	82.3	3250’	1.7	0.50	0.80	4.94	0.187
DA-2	24.68	0.5	25.2	3125’	1.8	0.52	0.80	5.13	0.059
DA-3	24.68	0.5	28.4	1500’	3.1	0.70	0.80	6.91	0.090
DA-4	24.68	0.5	23.6	1250’	10.2	4.90	0.80	48.37	0.524
DA-5	24.68	0.5	11.6	1025’	3.9	0.91	0.80	8.98	0.048
DA-6	24.68	0.5	24.0	1300’	3.4	0.80	0.80	7.90	0.087
DA-7	24.68	0.5	18.8	1250’	4.5	1.40	0.80	13.82	0.119
DA-8	24.68	0.5	2.2	700’	6.9	2.20	1.20	32.57	0.033

*A=Tons/Acre/Year

**Yield=Acre Ft./Year

Structure	Sediment (1 Year)	Sediment (3 Years)
	Acre Feet	Acre Feet
ASCA-1	0.040	0.120
Pond 5	0.119	0.357
Pond 6	0.087	0.261
Pond 7	0.352	1.056
Pond 8	0.090	0.270
Pond 9	0.524	1.572

Reclamation Hydrology

This section will detail the methods and calculations for the hydrologic controls proposed after reclamation.

General

As previously mentioned, all hydrologic controls installed for the operation of this site are considered temporary and will be removed upon reclamation. The one exception is a portion of the new culvert C-2 which was installed beneath the county road replacing the old existing culvert. The new portion beneath the county road will remain. Specifics on this culvert are shown in Appendix 5-13. As control structures are removed, drainage will be redirected into previously existing channels or re-established as needed based on the reclaimed topography. Reclaimed drainage channels are designated with a RC-n number and shown on Drawing 5-79 "Post-Mining Surface Hydrology". Typical reclaimed drainage channels are shown on Drawings 5-72 and 5-73. Flow characteristics and sizing are shown on the attached Table 8 "Reclaimed Channels".

Structures and Controls

As areas are no longer required for the operation, they will be regraded and reclaimed in accordance with the approved plan. At various stages of reclamation, certain hydrologic controls or structures will be removed. The following sections will describe final treatment of each of the control structures.

Culverts

There are 4 culverts associated with this site. All of the culverts will be removed, except for the newly installed portion of culvert C-2 beneath the county road, as describe below.

Culvert C-1 is a 24" cmp which carries runoff directly to Sediment Pond 6. This culvert will be removed during excavation of the Southern portion of Pit 4. The drainage through this area will be reclaimed to the minimum dimensions and slope shown on Table 8 of this appendix.

Culvert C-2 is a 36" cmp which will be installed beneath the existing county road, replacing the older in-place culvert. The new culvert extends into the property to the outlet of Sediment Pond 7 and also carries the runoff from ASCA-l. Approximately the upper 75' of this culvert will be removed after the removal of Sediment Pond 7 and the ASCA-1. The portion of the culvert beneath the county road to the drainage below will be fitted with an approved inlet structure and left in place as described in Appendix 5-13. The area where the culvert is removed will be regraded to drain to the remaining culvert section below.

Culvert C-3 is installed to provide a new Kanab Creek crossing for the mining operation. Although the final sizing and specifics are to be approved by the U.S. Army Corps of Engineers, it is expected that this will be a 144" (12.00') diameter cmp culvert. This culvert will be removed upon completion of reclamation of the mining property. The channel restoration will be in accordance with the USACE permit.

Culvert C-4 is a 12" cmp which carries runoff from area DA-5 beneath the North Haul Road. This culvert will be removed after the haul road is removed. The area where the culvert is removed will be regraded to drain to Sediment Pond 7, until it is also removed.

Sediment Ponds

There are 5 sediment ponds associated with this site. All ponds are considered temporary and will be removed upon final reclamation; however, ponds will remain in place until contributing reclaimed areas meet required revegetation standards as required. Prior to removal of any of the ponds, a double row of straw bales will be installed below the open-channel spillway to control sediment loading during the re-construction.

The sediment ponds are expected to be constructed in numerical order from Nos. 5 through 9. Sediment Pond 5 will likely also be the first to be removed as the disturbed area is reclaimed and revegetation standards are met. The small, pre-mining drainage through this area will be restored as shown on Drawing 5-78 and Table 8 of this appendix.

Sediment Pond 6 will also be removed when no longer required. The natural drainage through this area will also be restored as shown on the Drawing 5-79 and Table 8.

Sediment Pond 7 is the largest pond on the site, providing not only runoff storage capacity, but additional capacity for any water needing to be pumped from the mining operation. This pond will be removed when it is no longer required and the revegetation standards are met. The reclaimed pond area will be reshaped to drain to the existing culvert (remaining portion of C-2) below.

Sediment Pond 8 is in the northeastern portion of the site, and it is constructed in an erosional channel feature which flowed to Kanab Creek. This pond will be removed when no longer required. Although the erosional channel is not proposed to be restored upon reclamation, the area will be regraded to drain through the reclaimed pond site. A rip-rapped channel will capture runoff from the reclaimed pond area and route it to the Kanab Creek drainage as it was prior to mining.

Sediment Pond 9 is located in the southeast corner of the property, adjacent to Kanab Creek. This pond will also be removed when no longer required. The open-channel spillway of the pond feeds a rip-rapped channel which flows to Kanab Creek. The reclaimed pond area and drainage above will be sloped to drain to the pre-mining channel below, as shown on Drawing 5-79 and described in Table 8.

Diversions / Reclaimed Channels

All diversions are considered temporary and will be removed upon final reclamation. Small, reclaimed channels will be constructed in specific areas where sediment ponds or culverts are removed, and in areas where drainage is to be transferred from the reclaimed areas to the lower elevation Kanab Creek drainage. All reclaimed channels or transition structures are designated with a RC-n number and are shown on Drawing 5-79. The sizing and flow characteristics of each structure is shown on Table 8 of this appendix. Information specific to each of the reclaimed channels is provided below. It should be noted that all

reclaimed channels are sized to carry the runoff from a 10-year / 6-hour precipitation event of 1.41", as required by the regulations. The calculated flows for the channels were taken from Table 2 – "Runoff Calculations". With the exception of those channels where rip-rap is placed for erosion protection, a row of straw bales or a silt fence will be placed below the restored channel for added sediment control.

RC-1 – This channel will be constructed through the Sediment Pond 5 site after removal and regrading of the pond area. The drainage to the channel is from DA-7. The resultant flow velocity shown on Table 8 is less than 5 fps; therefore, the flow is not expected to be erosive and no rip-rap is proposed at this location.

RC-2 – This channel will be established in the area where Culvert C-l and Sediment Pond 6 are removed. The runoff is from watershed area DA-6. The resultant flow velocity is also less than 5 fps and considered non-erosive; therefore, no rip-rap protection is planned for this reclaimed channel.

RC-3 – This is the largest channel to be reconstructed at this site. It is expected to receive runoff from watersheds DA-1, DA-2, DA-5, UA-1 and UA-4. Because the channel is composed of a broad, steeper section draining to a much more gentle sloping section, as shown on Drawing 5-79, the channel calculations were performed on each area separately. The upper 300' of the channel is designated RC-3U on Table 8. Flows through this area are calculated to be 7.44 fps without rip-rap, and 5.78 fps with rip-rap. Based on the results, it is proposed to line this steep portion of the channel with a minimum of 6" D50 rip-rap for erosion protection. The rip-rap will be underlain by erosion control fabric. The approximately 600' of reclaimed channel below this area has a much gentler slope and is designated RC-3L on Table 8. The calculated flow velocity through this area is less than 5 fps, and is not considered to be erosive. No rip-rap is planned through this section.

RC-4 – This is a transition area where drainage from undisturbed diversion UD-4 dropped into an existing drainage to Kanab Creek. Upon removal of the undisturbed diversion, it is conservatively estimated that 1/3 of the UA-4 watershed could flow into this ditch. Although the calculations show the expected flow velocity to be less than 5 fps, it is proposed to place a minimum 6" D50 rip-rap over erosion control fabric through the transition area to further protect Kanab Creek.

RC-5 – This is also a transition area, where runoff will be transferred from the upper reclaimed area to an existing drainage to Kanab Creek below. The reclaimed channel will be placed in the Sediment Pond 8 area after removal and regrading of the pond site. The drainage to the channel will be from watersheds DA-3 and UA-2. The calculated flow velocity is slightly over 5 fps without rip-rap, but is reduced to 4.25 fps with erosion protection. This channel will also be placed with a minimum 6" D50 rip-rap over erosion control fabric.

RC-6 – This is a transition area which will carry runoff from the reclaimed site of Sediment Pond 9 to Kanab Creek below. The drainage will be from watershed areas DA-4 and UA-3. The calculated flow velocity is 5.02 fps without rip-rap and 3.90 fps with rip-rap; therefore, this area will also be protected with a minimum 6" D50 rip-rap and erosion control fabric.

Table 8

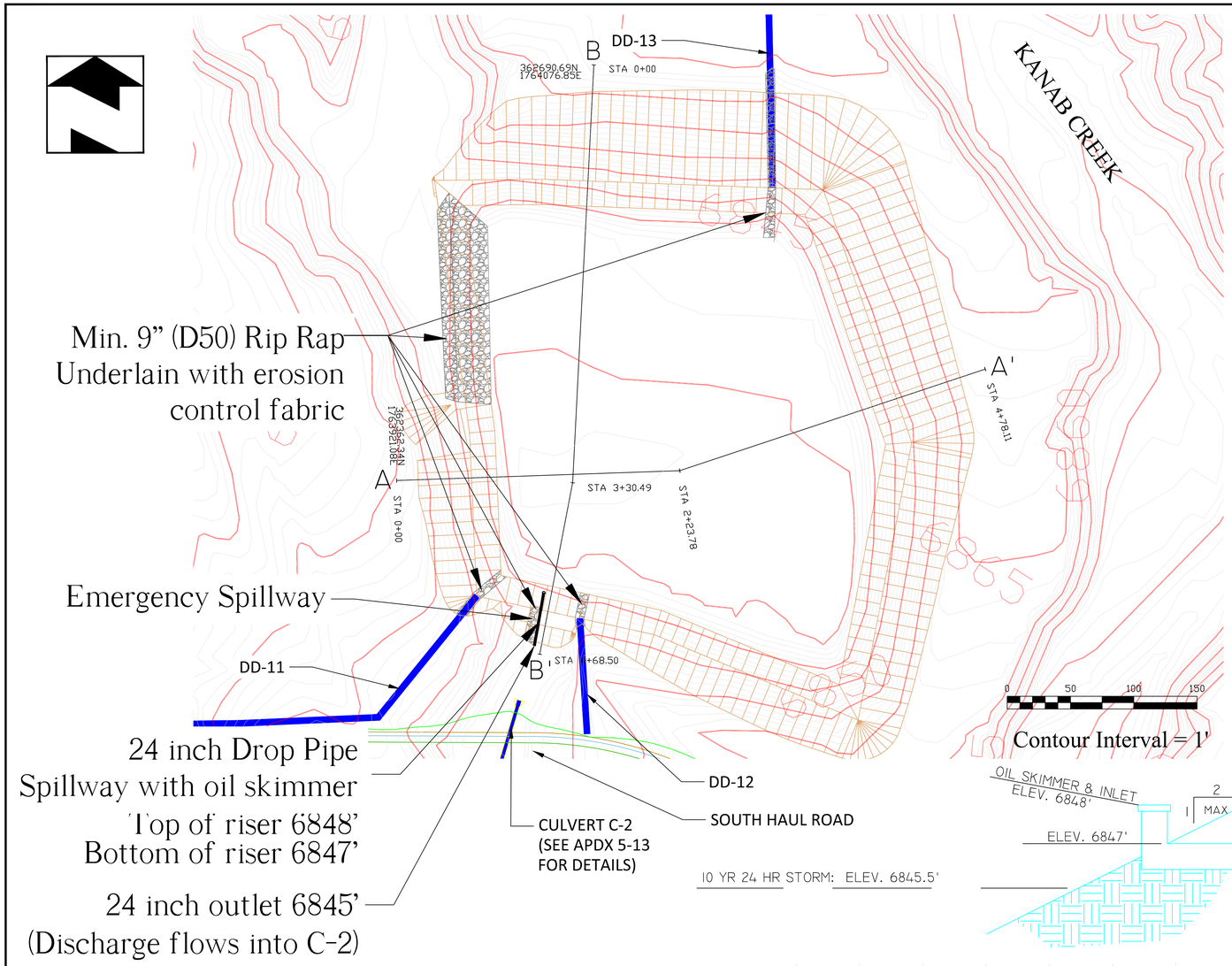
Reclaimed Channels

Channel	Slope %	Flow cfs	Velocity fps	Flow Depth ft	Proposed Depth ft	Remarks
RC-1	10.67	0.80	4.93	0.28	1.00	Unlined
RC-2	4.00	1.06	3.66	0.38	1.00	Unlined
RC-3U	8.30	6.05	5.78	0.72	2.00	Rip-Rapped
RC-3L	1.67	6.05	4.08	0.86	2.00	Unlined
RC-4	6.86	0.36	2.66	0.26	2.00	Rip-Rapped
RC-5	8.00	1.87	4.25	0.47	2.00	Rip-Rapped
RC-6	8.46	1.22	3.90	0.40	2.00	Rip-Rapped

Notes:

1 -Manning's n for unlined sections is 0.025.

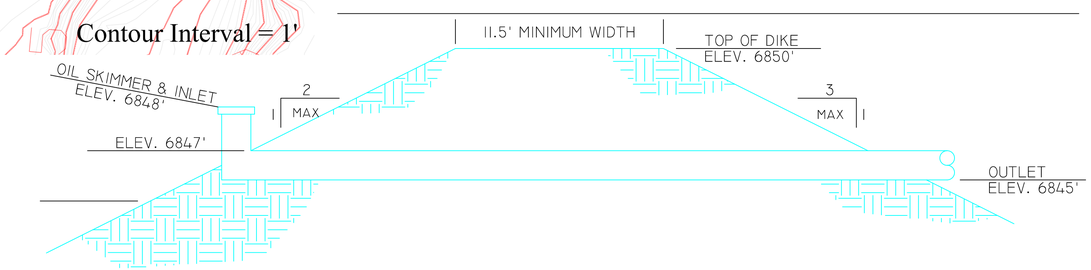
2- Manning's n for rip-rapped sections is 0.035.

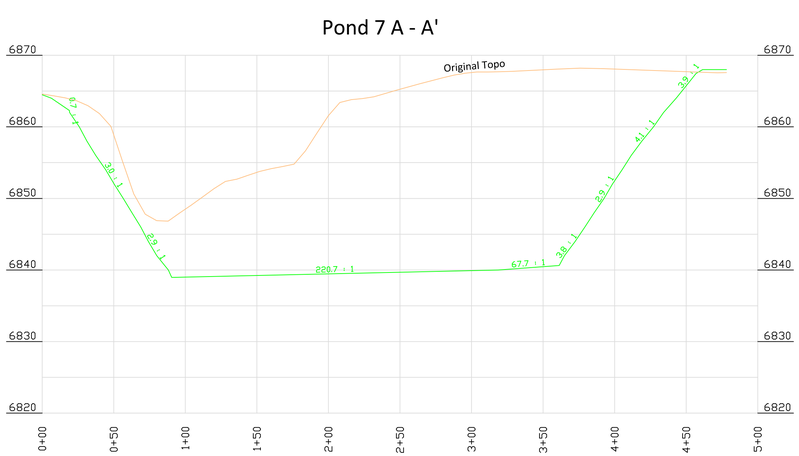


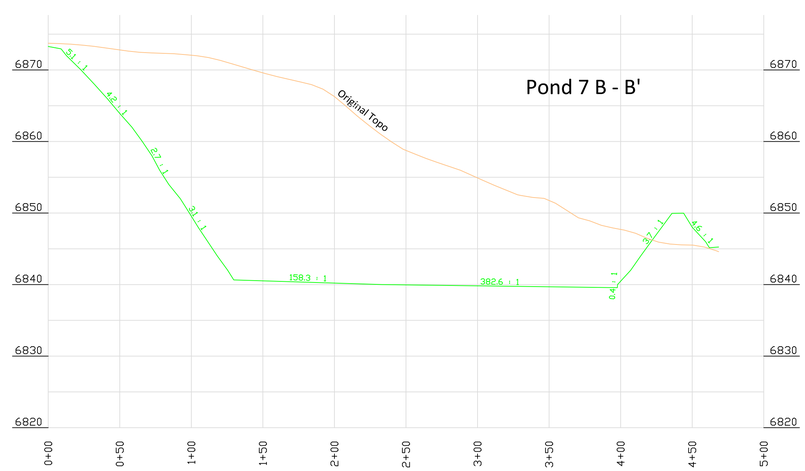
As Built Pond Storage Volumes

Sediment Control Structure No. 7

Water Elev (ft)	Area (Acres)	Average Area	Volume (Acre-Ft)	Accumulated Volume (Acre-Ft)	Stage
6839.00	0.121	-	-	-	Bottom Pond
6840.00	0.994	0.558	0.558	0.558	
6841.00	1.623	1.309	1.309	1.309	
6842.00	1.890	1.757	1.757	1.757	
6843.00	1.983	1.936	1.936	1.936	
6843.79	2.030	2.006	1.579	3.515	60% Sediment Cleanout
6844.00	2.077	2.053	0.437	3.953	
6844.91	2.122	2.100	1.904	5.857	Max Sediment Level
6845.00	2.168	2.145	0.200	6.056	
6846.00	2.258	2.213	2.213	8.269	
6847.00	2.349	2.303	2.303	10.573	
6848.00	2.443	2.396	2.396	12.968	Principle Spillway
6849.00	2.543	2.493	2.493	15.461	Emergency Spillway
6850.00	2.651	2.597	2.597	18.059	Top of Dike







Pond #7

Required Storage for 10 year, 24 hr event = 7.11 acre/ft

1"=10' X-Section Scale 1"=50'

New Coal Development
Coal Hollow Project
463 North 100 West, Suite 1
Cedar City, Utah 84720
Phone (435)867-5331
Fax (435)867-1192

PROFESSIONAL ENGINEER
102308 18
ANDREW R. CHRISTENSEN
STATE OF UTAH

SEDIMENT IMPOUNDMENT 7 AS-BUILT DETAILS

COAL HOLLOW PROJECT
ALTON, UTAH

DRAWING: 5-69AB

REVISIONS

DATE:	BY:

DRAWN BY: A. CHRISTENSEN	CHECKED BY: DG
DRAWING: 5-69AB	DATE: 9/29/17
	SCALE: 1" = 50'
JOB NUMBER: 1400	SHEET