TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.
HEADQUARTERS: P.O. BOX 33695 DENVER, COLORADO 80233-0695 303-452-6111

April 30, 2020

Mr. Zach Trujillo
Environmental Protection Specialist
Colorado Division of Reclamation, Mining & Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

RE: Colowyo Coal Company L.P.
Permit No. C-1981-019
Technical Revision No. 138
Gossard and Rail Loop Ponds

Dear Mr. Trujillo,

Tri-State Generation and Transmission Association Inc. (Tri-State), is the parent company to Axial Basin Coal Company, which is the general partner to Colowyo Coal Company L.P. (Colowyo). Therefore, Tri-State on behalf of Colowyo technical revision 138 (TR-138) to Permit No. C-1981-019. TR-138 proposes to remove the primary discharge structures from the Gossard and Rail Loop Ponds, and also provides a demonstration that both ponds can fully contain the 100-year 24-hour storm event.

Included in this technical revision are a revision application, a proposed public notice, and a change of index sheet to ease incorporation of this technical revision into the permit document. If you should have any additional questions or concerns, please feel free to contact Tony Tennyson at (970) 824-1232 at your convenience.

Sincerely,

DocuSigned by:
Daniel Casiraro
B70D69F114324DE...

Daniel J. Casiraro
Senior Manager
Environmental Services

DJC:TT:der

Enclosure

cc: Jennifer Maiolo (BLM-LSFO)
Chris Gilbreath (via email)
Tony Tennyson (via email)
Angela Aalbers (via email)
File: C. F. 1.1.2.127
G471-11.3(21)d

COLORADO DIVISION OF MINERALS AND GEOLOGY
1313 Sherman Street, Room 215, Denver, Colorado 80203, (303) 866-3567

APPLICATION FORM FOR A REVISION TO A COAL MINING AND RECLAMATION PERMIT

This form must be completed and submitted with all requests for minor revisions, as defined in Rule 1.04(73), technical revisions, as defined in Rule 1.04(136), and permit revisions, as defined in Rule 1.04(90). All revisions are to address the requirements of Rule 2.08.4. Three (3) copies of the revision, including maps, must be submitted in order for it to be complete.

All revisions are to be formatted so they can be inserted into the permit to replace the revised sections, maps, tables and/or figures, with a revised table of contents, if necessary. The revision submittal date should be printed in the lower right corner of each revision page. A cover letter to the revision should explain the nature of the revision and reference the specific permit sections being revised.

For federal mines, a copy of the revision application must be submitted to all agencies on the federal mailing list (except OSM) at the same time the application is submitted to the Division, and proof of distribution must be submitted to the Division along with the application. Copies of revision pages modified during the review process must be distributed in the same manner, along with proof of distribution. Proof of distribution must be submitted prior to implementation of the revision.

Permit No.: C - 1981 - 019　　Date: 4 / 29 / 20

Permittee: Colowyo Coal Company, L.P.

Street: 5731 State Highway 13

City: Meeker

State: CO　Zip Code: 81641 - ____

Brief Description of Revision: TR-138 proposes to make the Gossard and Rail Loop Ponds non-discharging structures.

Public Notice Attached: Yes ✔ No ___ *(Required for PRs and TRs)*

Bond Increase: Yes ___ No ✔　**Federal** ✔ **Non-Federal** ___ **Mine**

Proposed Change in:

Permit Area -
- **Disturbed** (+/-) __ __ 0 . 0 Acres
- **Permit** (+/-) __ __ 0 . 0 Acres
- **Affected** (+/-) __ __ 0 . 0 Acres

Surface Ownership -
- **Private Land** (+/-) __ __ 0 . 0 Acres
- **Federal Land** (+/-) __ __ 0 . 0 Acres
- **State Land** (+/-) __ __ 0 . 0 Acres

Mineral Ownership -
- **Mineral Private** (+/-) __ __ 0 . 0 Acres
- **Mineral State** (+/-) __ __ 0 . 0 Acres
- **Mineral Federal** (+/-) __ __ 0 . 0 Acres

CHANGE SHEET FOR PERMIT REVISIONS, TECHNICAL REVISION, AND MINOR REVISIONS

Mine Company Name: **Colowyo Coal Company**

Date: **April 29, 2020**

Permit Number: **C-1981-019**

Revision Description: **TR-138 Gossard & Rail Loop Ponds**

Volume Number	**Page, Map or other Permit Entry to be REMOVED**		**Page, Map or other Permit Entry to be ADDED**		**Description of Change**
1					No Change
2A					No Change
2B					No Change
2C					No Change
2D	Gossard Pond All Pages (70 pages)		Gossard Pond Narrative 2 pages, Figures 1 and 2, and SEDCAD Output 12 pages (16 pages total)		Gossard Pond demonstration has been updated.
2D	Rail Loop Pond All pages (70 pages)		Rail Loop Pond Narrative 1 page, Figures 1 and 2, and SEDCAD Output 10 pages (13 pages total)		Rail Loop Pond demonstration has been updated.
2E					No Change
3					No Change
4					No Change
4					No Change
5A					No Change
5B					No Change
6					No Change
7					No Change
8					No Change
9					No Change
10					No Change
12					No Change
13					No Change
14					No Change
15					No Change
16					No Change

CHANGE SHEET FOR PERMIT REVISIONS, TECHNICAL REVISION, AND MINOR REVISIONS

Mine Company Name: **Colowyo Coal Company**
Permit Number: **C-1981-019**

Date: **April 29, 2020**
Revision Description: **TR-138 Gossard & Rail Loop Ponds**

Volume Number	Page, Map or other Permit Entry to be REMOVED		Page, Map or other Permit Entry to be ADDED		Description of Change
17					No Change
18A					No Change
18B					No Change
18C					No Change
18D					No Change
19					No Change
20					No Change
21					No Change
22					No Change

Gossard Pond

This sediment control plan addresses the watershed tributary to the Gossard Pond. The Gossard Pond receives water from the Gossard Loadout area, including several subwatersheds including the coal stockpiles and coal preparation areas, and some direct inflow from water used during wash down of the Gossard crushing facility. The Gossard Pond is a non-discharging structure that is designed to contain the 100-year, 24-hour storm event as demonstrated herein.

Please see Volume 2D, Exhibit 7 for the methodologies and assumptions utilized in the Gossard Pond SEDCAD model and the basis for utilization of the curve numbers in the models. A curve number of 74 was selected for the majority of the contributing subwatersheds. This is believe to be a more representative curve number than a disturbed curve number of 85 since the Gossard Loadout area subwatershed are broken up including ever changing loose unconsolidated coal stockpiles due to the shipping of coal. The subwatershed and corresponding acreages used in this SEDCAD model are presented on Figure 1, and Figure 2 provides the as-built configuration of the Gossard Pond.

Colowyo washes down the Gossard primary crusher on an as-needed basis. The water that is used during wash down is routed down to two concrete structures that capture the coal fines, and once full of water, discharge the water from the concrete structures directly into the pond. SEDCAD does not have the ability to model this additional inflow directly; therefore, the methodology suggested by SEDCAD's primary author, Pam Schwab, is to model the impact of a constant inflow into the Gossard Pond through a dummy structure.

In the current version of SEDCAD, a fixed flow can only be inputted by inserting a "dummy" upstream pond with a watershed large enough to produce a "tank" flow, and then setting the output of the dummy reservoir as a constant "User Defined" outflow curve, independent of pool elevation in the dummy pond. A flow of 0.223 cfs (100 gpm) was conservatively utilized, which is a volume of water well in excess of any wash down inflows that may be encountered in the Gossard Pond. The synthesized 100 gpm inflow was then dropped directly into Gossard Pond in the SEDCAD model. Further, Colowyo does not wash down the Gossard primary crusher daily, so the 100 gpm is very conservative estimate compared to actual activities occurring.

SEDCAD also allows the user to override the customary starting pool. In this case for the 100 year storm event, the starting pool is assumed to be at 6,388, to account for the 100 gpm already being in the pond when the storm event would commence.

The volume of the pond was inputted into the SEDCAD model, along with its spillway details. The model watersheds were inputted as a series of sub-watersheds, each with its own acreage, its own flow response parameters (slope, distance, time of concentration), and the specific runoff curve numbers noted above. The 100 year, 24 hour storm was then applied to the composite watershed, and routed down to the sediment pond.

The results of the runoff calculations and synthesized constant inflow are presented in the attached SEDCAD model outputs. As noted, the peak elevation for this modeled storm event is

6,390.74’, two feet below the emergency spillway elevation of 6,392.7’. Thus, the Gossard Pond can fully contain the 100 year, 24 hour storm event without discharging.

Gossard Pond

100 Year 24 Hour Storm Event
Full Containment Demonstration
with 100 GPM Inflow

Tony Tennyson

Tri-State Generation & Transmission Association, Inc.
1100 West 116th Avenue
Westminster, CO 80234

Phone: (970) 824-1232
Email: ttennyson@tristategt.org

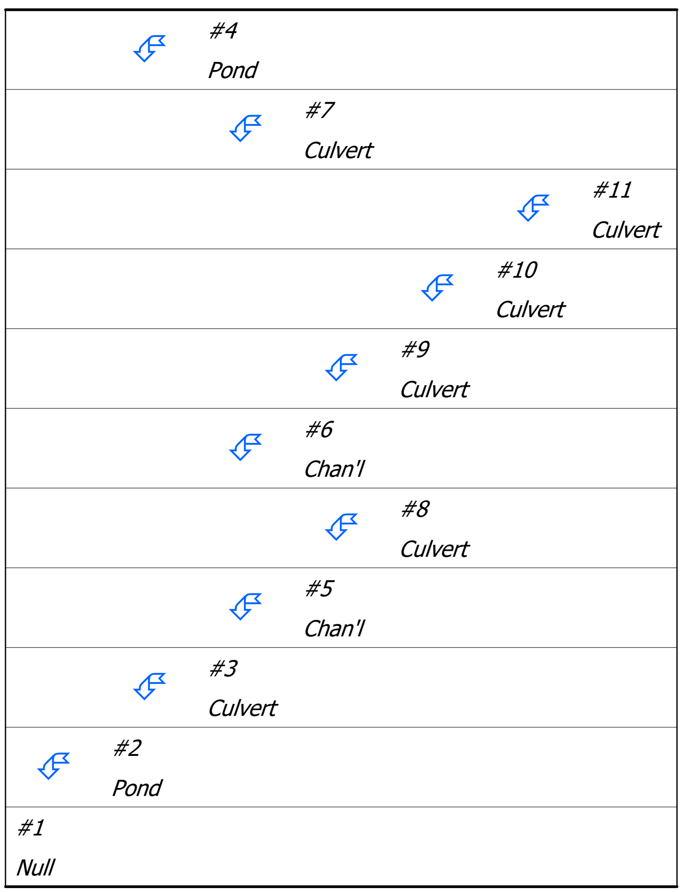
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	2.700 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Null Below Gossard Pond
Pond	#2	==>	#1	0.000	0.000	Gossard Pond
Culvert	#3	==>	#2	0.000	0.000	C-1 Culvert
Pond	#4	==>	#2	0.000	0.000	Simulated 100 gpm inflow
Channel	#5	==>	#3	0.000	0.000	GD-1 Ditch
Channel	#6	==>	#3	0.000	0.000	GD-2 Ditch
Culvert	#7	==>	#3	0.000	0.000	C-2 Culvert
Culvert	#8	==>	#5	0.000	0.000	C-3 Culvert
Culvert	#9	==>	#6	0.000	0.000	C-4 Culvert
Culvert	#10	==>	#9	0.000	0.000	C-5 Culvert
Culvert	#11	==>	#10	0.000	0.000	C-6 Culvert



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#4	In	8.000	8.000	6.68	0.48
	Out			0.22	0.48
#7		1.500	1.500	1.25	0.09
#11		0.700	0.700	0.58	0.04
#10		1.000	1.700	1.18	0.10
#9		7.200	8.900	7.19	0.54
#6		0.800	9.700	7.86	0.58
#8		7.200	7.200	6.01	0.43
#5		1.200	8.400	7.13	0.51
#3		0.000	19.600	16.24	1.19
#2	In	5.200	32.800	18.26	1.92
	Out			0.00	0.00
#1		0.000	32.800	0.00	0.00

Structure Detail:

Structure #4 (Pond)

Simulated 100 gpm inflow

Pond Inputs:

Initial Pool Elev:	90.01 ft
Initial Pool:	0.00 ac-ft

Pond Results:

Peak Elevation:	92.27 ft
Dewater Time:	0.67 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
90.00	0.050	0.000	0.000		
90.01	0.051	0.001	0.000		
91.00	0.110	0.078	0.223		
92.00	0.190	0.226	0.223		
92.27	0.205	0.286	0.223	16.00	Peak Stage
93.00	0.260	0.450	0.223		
94.00	0.350	0.754	0.223		
95.00	0.440	1.148	0.223		
96.00	0.540	1.638	0.223		
97.00	0.650	2.232	0.223		
98.00	0.760	2.936	0.223		
99.00	0.880	3.755	0.223		
100.00	1.200	4.791	0.223		
101.00	1.240	6.011	0.223		
102.00	1.400	7.330	0.223		
103.00	1.600	8.829	0.223		

Detailed Discharge Table

Elevation (ft)	User-input discharge (cfs)	Combined Total Discharge (cfs)
90.00	0.000	0.000
90.01	0.000	0.000
91.00	0.223	0.223
92.00	0.223	0.223
93.00	0.223	0.223
94.00	0.223	0.223
95.00	0.223	0.223
96.00	0.223	0.223
97.00	0.223	0.223
98.00	0.223	0.223
99.00	0.223	0.223
100.00	0.223	0.223
101.00	0.223	0.223
102.00	0.223	0.223
103.00	0.223	0.223

Structure #7 (Culvert)

C-2 Culvert

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
75.00	3.00	0.0150	1.00	0.00	0.90

Culvert Results:

Design Discharge = 1.25 cfs

Minimum pipe diameter: 1 - 8 inch pipe(s) required

Structure #11 (Culvert)

C-6 Culvert

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
50.00	1.50	0.0150	1.00	1.00	0.90

Culvert Results:

Design Discharge = 0.58 cfs

Minimum pipe diameter: 1 - 8 inch pipe(s) required

Structure #10 (Culvert)

C-5 Culvert

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
50.00	1.50	0.0150	1.00	0.00	0.90

Culvert Results:

Design Discharge = 1.18 cfs

Minimum pipe diameter: 1 - 8 inch pipe(s) required

Structure #9 (Culvert)

C-4 Culvert

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
100.00	1.00	0.0150	2.00	0.00	0.90

Culvert Results:

Design Discharge = 7.19 cfs

Minimum pipe diameter: 1 - 18 inch pipe(s) required

Structure #6 (Vegetated Channel)

GD-2 Ditch

Triangular Vegetated Channel Inputs:

Material: Shales and hardpans

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
2.0:1	2.0:1	4.5	D, B				6.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	7.86 cfs		7.86 cfs	
Depth:	1.02 ft		1.50 ft	
Top Width:	4.08 ft		6.01 ft	
Velocity:	3.78 fps		1.74 fps	
X-Section Area:	2.08 sq ft		4.52 sq ft	
Hydraulic Radius:	0.456 ft		0.672 ft	

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Froude Number:	0.93		0.35	
Roughness Coefficient:	0.0494		0.1392	

Structure #8 (Culvert)

C-3 Culvert

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
300.00	1.50	0.0150	2.00	0.00	0.90

Culvert Results:

Design Discharge = 6.01 cfs

Minimum pipe diameter: 1 - 15 inch pipe(s) required

Structure #5 (Vegetated Channel)

GD-1 Ditch

Trapezoidal Vegetated Channel Inputs:

Material: Smooth brome

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
7.00	2.0:1	2.0:1	6.0	D, B				6.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	7.13 cfs		7.13 cfs	
Depth:	0.34 ft		0.64 ft	
Top Width:	8.37 ft		9.56 ft	
Velocity:	2.70 fps		1.34 fps	
X-Section Area:	2.64 sq ft		5.31 sq ft	
Hydraulic Radius:	0.309 ft		0.538 ft	
Froude Number:	0.85		0.32	
Roughness Coefficient:	0.0616		0.1794	

Structure #3 (Culvert)

C-1 Culvert

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
100.00	1.50	0.0150	2.00	0.00	0.90

Culvert Results:

Design Discharge = 16.24 cfs

Minimum pipe diameter: 1 - 36 inch pipe(s) required

Structure #2 (Pond)

Gossard Pond

Pond Inputs:

Initial Pool Elev:	6,388.00 ft
Initial Pool:	1.79 ac-ft

Straight Pipe

Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Entrance Loss Coefficient	Tailwater Depth (ft)
30.00	200.00	4.00	0.0150	6,392.70	0.90	0.00

Pond Results:

Peak Elevation:	6,390.74 ft
Dewater Time:	0.00 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
6,384.00	0.195	0.000	0.000		
6,385.00	0.338	0.263	0.000		
6,386.00	0.458	0.660	0.000		
6,387.00	0.580	1.178	0.000		
6,388.00	0.638	1.786	0.000		
6,389.00	0.690	2.450	0.000		
6,390.00	0.724	3.157	0.000		
6,390.74	0.744	3.703	0.000	0.00	Peak Stage

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
6,391.00	0.752	3.895	0.000		
6,392.00	0.778	4.660	0.000		
6,392.70	0.797	5.211	0.000		Spillway #1
6,393.00	0.805	5.451	0.872		
6,394.00	0.831	6.269	7.760		
6,395.00	0.859	7.114	18.262		
6,396.00	0.887	7.987	29.895		
6,397.00	0.917	8.889	38.615		
6,398.00	0.949	9.822	45.680		
6,399.00	0.982	10.788	51.799		
6,400.00	1.061	11.809	57.269		

Detailed Discharge Table

Elevation (ft)	Straight Pipe (cfs)	Combined Total Discharge (cfs)
6,384.00	0.000	0.000
6,385.00	0.000	0.000
6,386.00	0.000	0.000
6,387.00	0.000	0.000
6,388.00	0.000	0.000
6,389.00	0.000	0.000
6,390.00	0.000	0.000
6,391.00	0.000	0.000
6,392.00	0.000	0.000
6,392.70	0.000	0.000
6,393.00	(3)>0.872	0.872
6,394.00	(3)>7.760	7.760
6,395.00	(3)>18.262	18.262
6,396.00	(5)>29.895	29.895
6,397.00	(5)>38.615	38.615
6,398.00	(5)>45.680	45.680
6,399.00	(5)>51.799	51.799
6,400.00	(5)>57.269	57.269

Structure #1 (Null)

Null Below Gossard Pond

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	8.000	0.000	0.000	0.000	74.000	M	6.68	0.482
	Σ	**8.000**						**6.68**	**0.482**
#7	1	1.500	0.069	0.004	0.430	74.000	M	1.25	0.090
	Σ	**1.500**						**1.25**	**0.090**
#11	1	0.700	0.024	0.027	0.227	74.000	M	0.58	0.042
	Σ	**0.700**						**0.58**	**0.042**
#10	1	1.000	0.062	0.180	0.156	74.000	M	0.83	0.060
	Σ	**1.700**						**1.18**	**0.102**
#9	1	7.200	0.112	0.028	0.395	74.000	M	6.01	0.434
	Σ	**8.900**						**7.19**	**0.536**
#6	1	0.800	0.001	0.000	0.000	74.000	M	0.67	0.048
	Σ	**9.700**						**7.86**	**0.584**
#8	1	0.600	0.046	0.000	0.000	74.000	M	0.50	0.036
	2	6.600	0.097	0.000	0.000	74.000	M	5.51	0.398
	Σ	**7.200**						**6.01**	**0.434**
#5	1	1.000	0.002	0.000	0.000	74.000	M	0.83	0.060
	2	0.200	0.033	0.000	0.000	85.000	M	0.28	0.018
	Σ	**8.400**						**7.13**	**0.512**
#3	Σ	**19.600**						**16.24**	**1.186**
#2	1	5.200	0.269	0.000	0.000	74.000	M	2.24	0.251
	Σ	**32.800**						**18.26**	**1.918**
#1	Σ	**32.800**						**0.00**	**0.000**

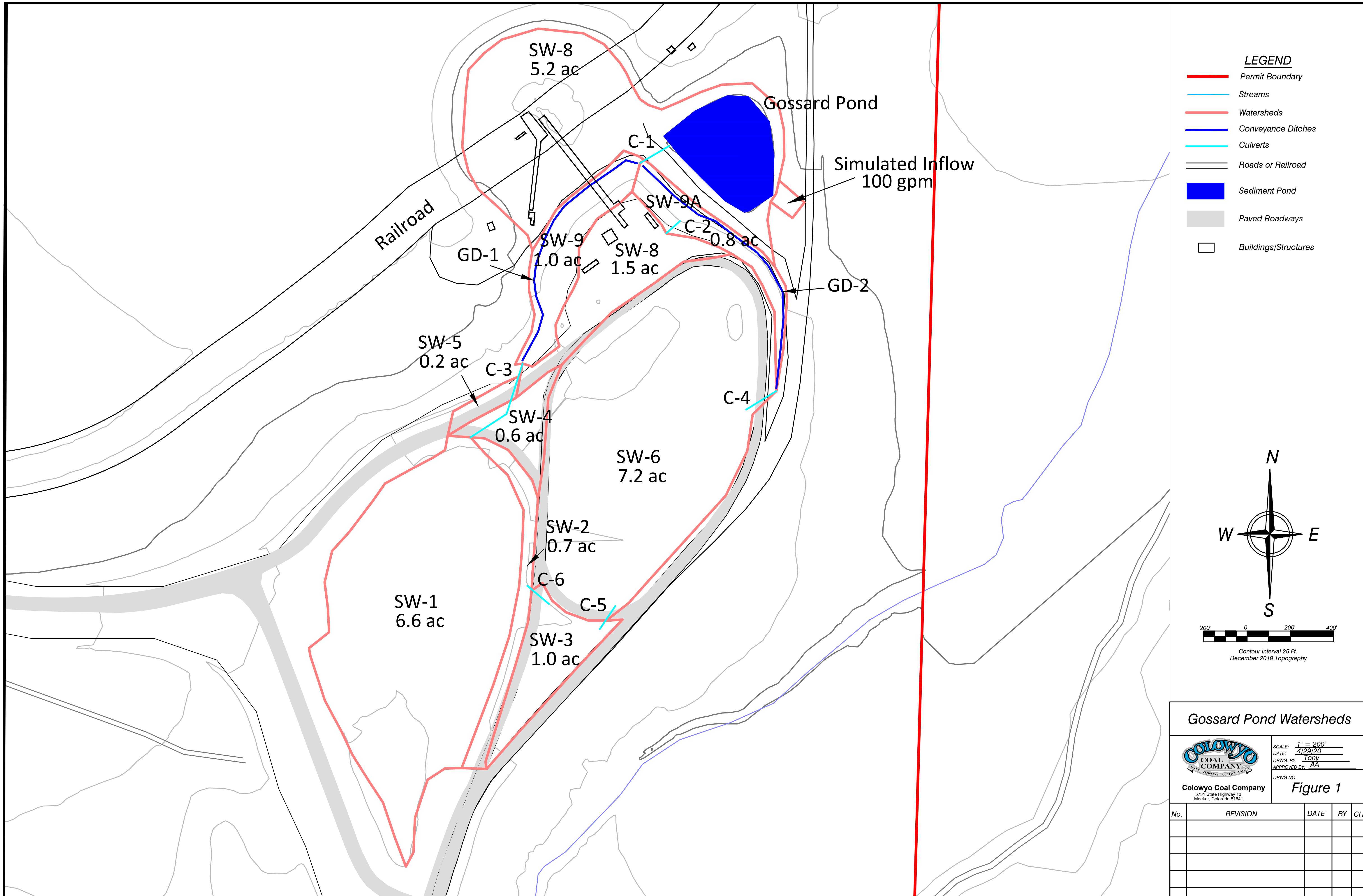
Subwatershed Time of Concentration Details:

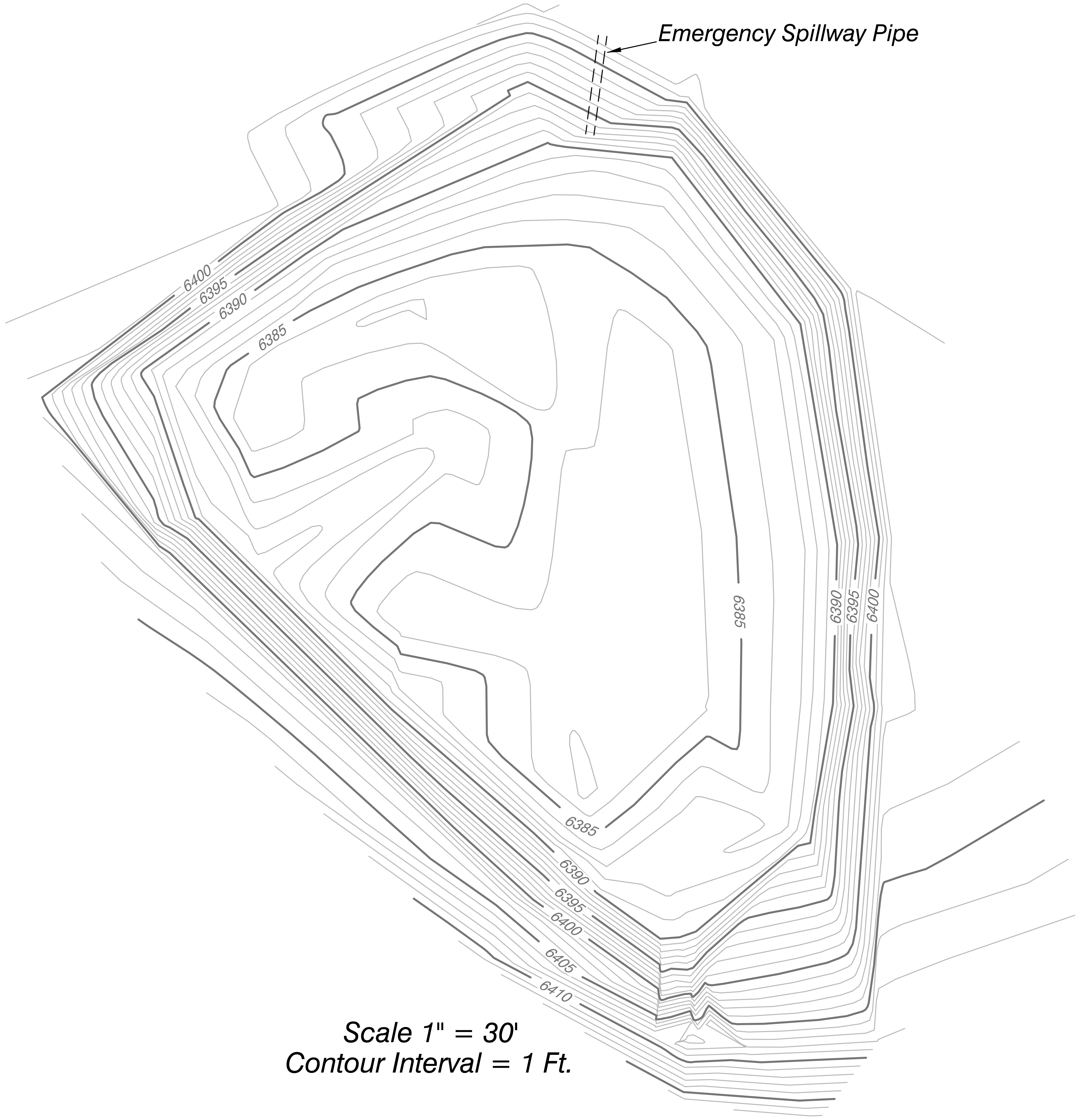
Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	1	5. Nearly bare and untilled, and alluvial valley fans	0.20	0.85	427.00	0.440	0.269
#2	**1**	**Time of Concentration:**					**0.269**
#5	1	3. Short grass pasture	58.00	37.70	65.00	6.090	0.002
#5	**1**	**Time of Concentration:**					**0.002**
#5	2	7. Paved area and small upland gullies	0.50	0.86	173.00	1.420	0.033

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#5	**2**	**Time of Concentration:**					**0.033**
#6	1	3. Short grass pasture	71.00	21.30	30.00	6.740	0.001
#6	**1**	**Time of Concentration:**					**0.001**
#7	1	5. Nearly bare and untilled, and alluvial valley fans	1.10	2.86	260.00	1.040	0.069
#7	**1**	**Time of Concentration:**					**0.069**
#8	1	5. Nearly bare and untilled, and alluvial valley fans	0.70	0.97	140.00	0.830	0.046
#8	**1**	**Time of Concentration:**					**0.046**
#8	2	5. Nearly bare and untilled, and alluvial valley fans	3.60	23.90	664.00	1.890	0.097
#8	**2**	**Time of Concentration:**					**0.097**
#9	1	5. Nearly bare and untilled, and alluvial valley fans	1.30	5.97	460.00	1.140	0.112
#9	**1**	**Time of Concentration:**					**0.112**
#10	1	5. Nearly bare and untilled, and alluvial valley fans	2.10	6.84	326.00	1.440	0.062
#10	**1**	**Time of Concentration:**					**0.062**
#11	1	5. Nearly bare and untilled, and alluvial valley fans	13.00	5.20	40.00	3.600	0.003
		8. Large gullies, diversions, and low flowing streams	1.00	2.35	236.00	3.000	0.021
#11	**1**	**Time of Concentration:**					**0.024**

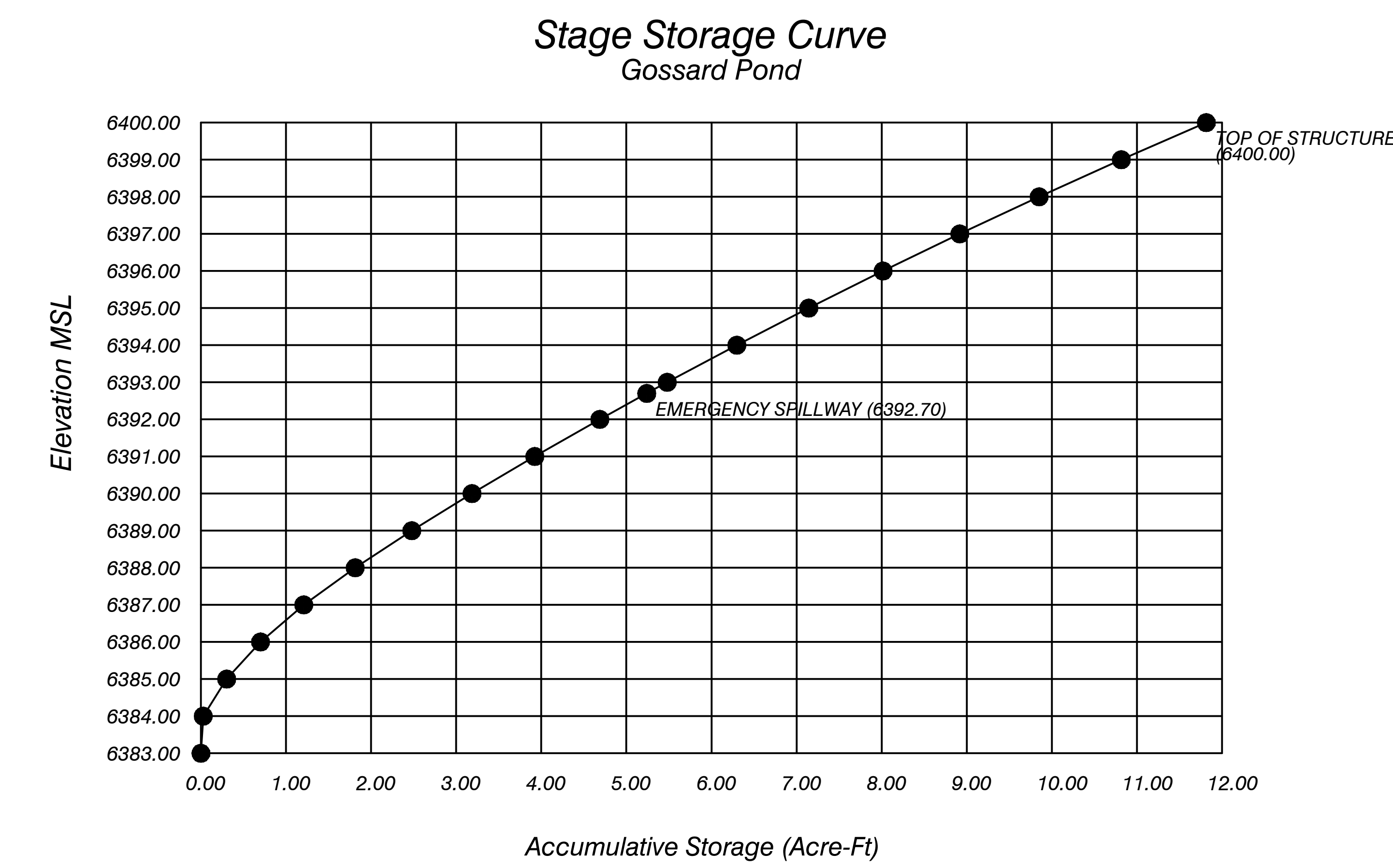
Subwatershed Muskingum Routing Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#7	1	8. Large gullies, diversions, and low flowing streams	12.00	22.20	185.00	10.390	0.004
#7	**1**	**Muskingum K:**					**0.004**
#9	1	8. Large gullies, diversions, and low flowing streams	4.50	29.70	660.00	6.360	0.028
#9	**1**	**Muskingum K:**					**0.028**
#10	1	5. Nearly bare and untilled, and alluvial valley fans	0.60	3.00	500.00	0.770	0.180
#10	**1**	**Muskingum K:**					**0.180**
#11	1	5. Nearly bare and untilled, and alluvial valley fans	2.00	2.80	140.00	1.410	0.027
#11	**1**	**Muskingum K:**					**0.027**


SW-8
5.2 ac
Gossard Pond
Railroad
C-1
Simulated Inflow
100 gpm
SW-9A
C-2
0.8 ac
SW-9
1.0 ac
SW-8
1.5 ac
GD-1
GD-2
SW-5
0.2 ac
C-3
C-4
SW-4
0.6 ac
SW-6
7.2 ac
SW-2
0.7 ac
C-6
C-5
SW-1
6.6 ac
SW-3
1.0 ac
LEGEND
Permit Boundary
Streams
Watersheds
Conveyance Ditches
Culverts
Roads or Railroad
Sediment Pond
Paved Roadways
Buildings/Structures
N
W
E
S
200'
0
200'
400'
Contour Interval 25 Ft.
December 2019 Topography
Gossard Pond Watersheds
COLOWYO COAL COMPANY
SAFETY - PEOPLE - PRODUCTION - ENERGY
Colowyo Coal Company
5731 State Highway 13
Meeker, Colorado 81641
SCALE: 1" = 200'
DATE: 4/29/20
DRWG. BY: Tony
APPROVED BY: AA
DRWG NO.
Figure 1
No.
REVISION
DATE
BY
CHK

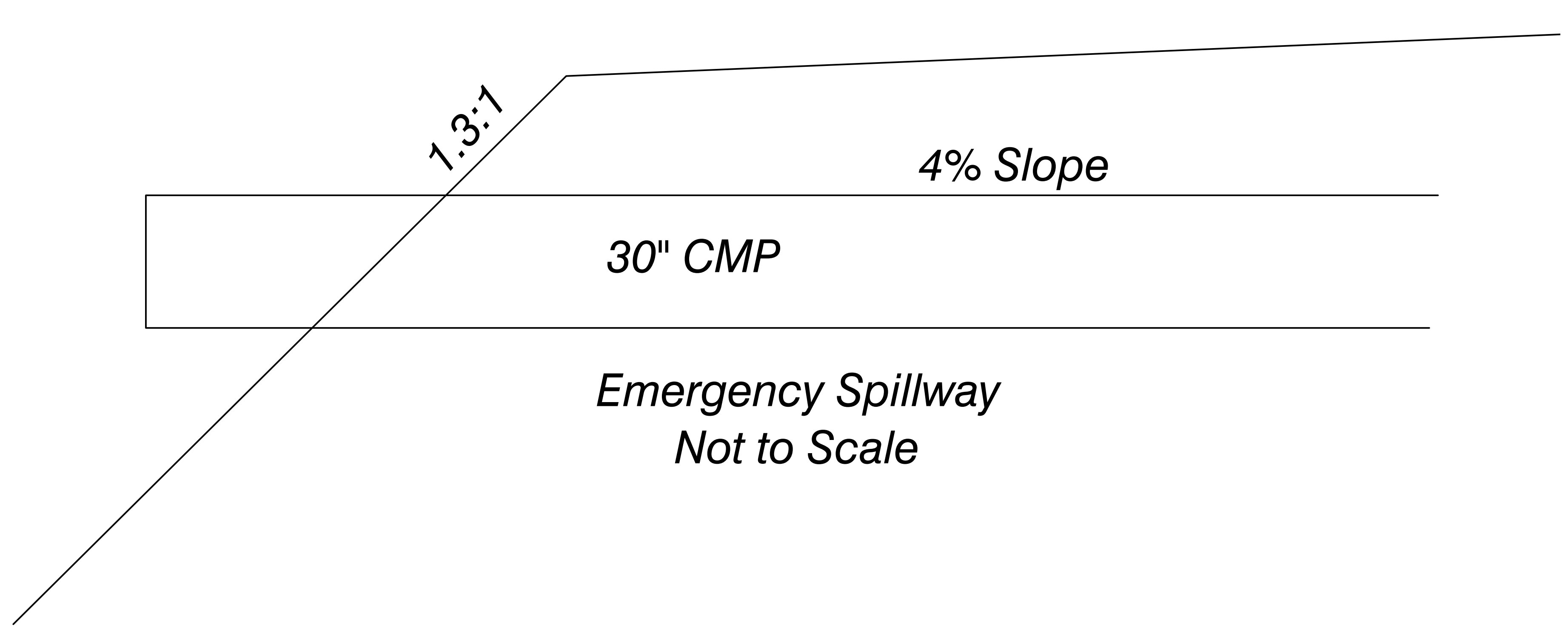


Scale 1" = 30'
Contour Interval = 1 Ft.

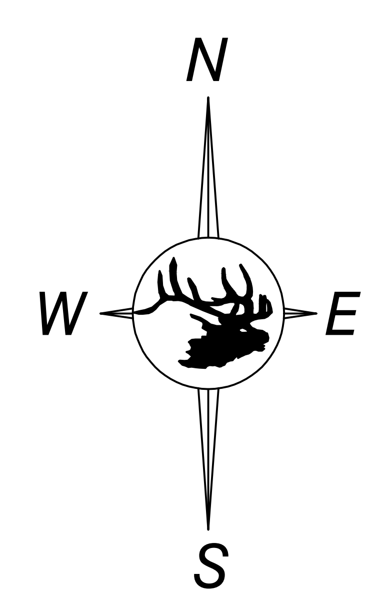


Storage Volume Computations

ELEV. (ft)	Width (ft)	LENGTH (ft)	AREA (ac)	AVG. AREA (ac)	INTERVAL (ft)	STORAGE (ac-ft)	ACC. STORAGE (ac-ft)	STAGE INTERVAL (ft)
6383.00	N/A	N/A	0.0000					
6384.00	N/A	N/A	0.0650	0.0325	1.00	0.0278	0.0278	1.00
6385.00	N/A	N/A	0.3368	0.2009	1.00	0.2746	0.3024	2.00
6386.00	N/A	N/A	0.4576	0.3972	1.00	0.3984	0.7008	3.00
6387.00	N/A	N/A	0.5553	0.5065	1.00	0.5084	1.2092	4.00
6388.00	N/A	N/A	0.6373	0.5963	1.00	0.6043	1.8135	5.00
6389.00	N/A	N/A	0.6895	0.6634	1.00	0.6649	2.4784	6.00
6390.00	N/A	N/A	0.7242	0.7068	1.00	0.7070	3.1854	7.00
6391.00	N/A	N/A	0.7516	0.7379	1.00	0.7380	3.9234	8.00
6392.00	N/A	N/A	0.7782	0.7649	1.00	0.7648	4.6882	9.00
6392.70	N/A	N/A	0.7970	0.7876	0.70	0.5513	5.2395	9.70
6393.00	N/A	N/A	0.8051	0.7916	0.30	0.2404	5.4799	10.00
6394.00	N/A	N/A	0.8314	0.8182	1.00	0.8182	6.2981	11.00
6395.00	N/A	N/A	0.8587	0.8450	1.00	0.8450	7.1431	12.00
6396.00	N/A	N/A	0.8870	0.8729	1.00	0.8728	8.0158	13.00
6397.00	N/A	N/A	0.9171	0.9021	1.00	0.9021	8.9179	14.00
6398.00	N/A	N/A	0.9487	0.9329	1.00	0.9329	9.8508	15.00
6399.00	N/A	N/A	0.9822	0.9654	1.00	0.9654	10.8161	16.00
6400.00	N/A	N/A	1.0139	0.9980	1.00	0.9986	11.8147	17.00



Emergency Spillway
Not to Scale



ENGINEERS CERTIFICATION

I, BRIAN W. COATES, hereby certify that this map has been reviewed by me and is true and correct to the best of my knowledge and information, relying on information supplied by experts employed by Colowyo Coal Company or qualified consultants working for Colowyo Coal Company, and that I am a Professional Engineer licensed in Colorado as required by the provisions of C.R.S. 12-25-101 through C.R.S. 12-25-119. IN WITNESS WHEREOF, I have hereunder set my hand and affixed my seal.

COLORADO LICENSED
BRIAN W. COATES
55154
4/29/20
PROFESSIONAL ENGINEER

Gossard Pond As-Built

COLOWYO COAL COMPANY
SAFETY · PEOPLE · PRODUCTION · ENERGY

Colowyo Coal Company
5731 State Highway 13
Meeker, Colorado 81641

SCALE: As Shown
DATE: 4/22/98
DRWG. BY: T.F.S. III
APPROVED BY: J.P.G/S.R.H.

DRWG NO.
Figure 2

No.	REVISION	DATE	BY	CHK
1	As-Built	9/21/99	JPG SRH	JPG SRH
TR-138	Removed Primary Spillways, Updated Entire As-Built Format Updated Stage Storage Curves, Revised Drawing Size	4/29/20	Tony	BC

Rail Loop Pond

This sediment control plan addresses the watershed tributary to the Rail Loop Pond. The Rail Loop Pond receives water from the Gossard Loadout area, including several subwatersheds including the train loading tunnel, roads, the Gossard Pond outslope, and some direct inflow from water used during wash down of the train loading tunnel. The Rail Loop Pond is a non-discharging structure that is designed to contain the 100-year, 24-hour storm event as demonstrated herein.

Please see Volume 2D, Exhibit 7 for the methodologies and assumptions utilized in the Rail Loop Pond SEDCAD model and the basis for utilization of the curve numbers in the models. The subwatershed and corresponding acreages used in this SEDCAD model are presented on Figure 1, and Figure 2 provides the as-built configuration of the Rail Loop Pond.

Colowyo washes down the train loading tunnel on an as-needed basis. The water that is used during wash down flows on the ground out of the tunnel and topographically it is routed to the Rail Loop Pond. SEDCAD does not have the ability to model this additional inflow directly; therefore, the methodology suggested by SEDCAD's primary author, Pam Schwab, is to model the impact of a constant inflow into the Rail Loop Pond through a dummy structure.

In the current version of SEDCAD, a fixed flow can only be inputted by inserting a "dummy" upstream pond with a watershed large enough to produce a "tank" flow, and then setting the output of the dummy reservoir as a constant "User Defined" outflow curve, independent of pool elevation in the dummy pond. A flow of 0.02 cfs (10 gpm) was conservatively utilized, which is a volume of water well in excess of any wash down inflows that may be encountered in the Rail Loop Pond. The synthesized 10 gpm inflow was then dropped directly into Rail Loop Pond in the SEDCAD model. Further, Colowyo does not wash down the train loading tunnel daily, so the 10 gpm is very conservative estimate compared to actual activities occurring.

SEDCAD also allows the user to override the customary starting pool. In this case for the 100 year storm event, the starting pool is assumed to be at 6,347, to account for the 10 gpm already being in the pond when the storm event would commence.

The volume of the pond was inputted into the SEDCAD model, along with its spillway details. The model watersheds were inputted as a series of sub-watersheds, each with its own acreage, its own flow response parameters (slope, distance, time of concentration), and the specific runoff curve numbers noted above. The 100 year, 24 hour storm was then applied to the composite watershed, and routed down to the sediment pond.

The results of the runoff calculations and synthesized constant inflow are presented in the attached SEDCAD model outputs. As noted, the peak elevation for this modeled storm event is 6,351’, two feet below the emergency spillway elevation of 6,353’. Thus, the Rail Loop Pond can fully contain the 100 year, 24 hour storm event without discharging.

Rail Loop Pond

100 Year 24 Hour Storm Event
Full Containment Demonstration
With 10 GPM Inflow

Tony Tennyson

Tri-Generation & Transmission Association, Inc.
1100 West 116th Avenue
Westminster, CO 80234

Phone: (970) 824-1232
Email: ttennyson@tristategt.org

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	2.700 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Null Below Rail Loop Pond
Pond	#2	==>	#1	0.000	0.000	Rail Loop Pond
Culvert	#3	==>	#2	0.000	0.000	Culvert
Channel	#4	==>	#3	0.000	0.000	East Ditch
Channel	#5	==>	#2	0.000	0.000	West Ditch
Pond	#7	==>	#2	0.000	0.000	Simulated 10 GPM Inflow

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#7	In	2.000	2.000	2.29	0.17
	Out			0.02	0.06
#5		1.000	1.000	1.42	0.11
#4		1.200	1.200	1.70	0.13
#3		0.000	1.200	1.70	0.13
#2	In	3.400	7.600	7.71	0.68
	Out			0.00	0.00
#1		0.000	7.600	0.00	0.00

Structure Detail:

Structure #7 (Pond)

Simulated 10 GPM Inflow

Pond Inputs:

Initial Pool Elev:	90.01 ft
Initial Pool:	0.00 ac-ft

Pond Results:

Peak Elevation:	91.50 ft
Dewater Time:	0.00 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
90.00	0.050	0.000	0.000		
90.01	0.051	0.001	0.000		
91.00	0.110	0.078	0.020		
91.50	0.155	0.152	0.020	0.00	Peak Stage
92.00	0.190	0.226	0.020		
93.00	0.260	0.450	0.020		
94.00	0.350	0.754	0.020		
95.00	0.440	1.148	0.020		
96.00	0.540	1.638	0.020		
97.00	0.650	2.232	0.020		
98.00	0.760	2.936	0.020		
99.00	0.880	3.755	0.020		
100.00	1.200	4.791	0.020		

Detailed Discharge Table

Elevation (ft)	User-input discharge (cfs)	Combined Total Discharge (cfs)
90.00	0.000	0.000
90.01	0.000	0.000
91.00	0.020	0.020
92.00	0.020	0.020
93.00	0.020	0.020
94.00	0.020	0.020
95.00	0.020	0.020
96.00	0.020	0.020
97.00	0.020	0.020
98.00	0.020	0.020
99.00	0.020	0.020
100.00	0.020	0.020

Structure #5 (Vegetated Channel)

West Ditch

Trapezoidal Vegetated Channel Inputs:

Material: Bermuda grass

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
10.00	2.0:1	2.0:1	2.0	D, B				8.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	1.42 cfs		1.42 cfs	
Depth:	0.21 ft		0.49 ft	
Top Width:	10.83 ft		11.98 ft	
Velocity:	0.66 fps		0.26 fps	
X-Section Area:	2.17 sq ft		5.43 sq ft	
Hydraulic Radius:	0.198 ft		0.445 ft	
Froude Number:	0.26		0.07	
Roughness Coefficient:	0.1088		0.4692	

Structure #4 (Erodible Channel)

East Ditch

Triangular Erodible Channel Inputs:

Material: Shales and hardpans

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
1.5:1	1.5:1	6.5	0.0250				6.0

Erodible Channel Results:

	w/o Freeboard	w/ Freeboard
Design Discharge:	1.70 cfs	
Depth:	0.47 ft	
Top Width:	1.42 ft	
Velocity:	5.13 fps	
X-Section Area:	0.33 sq ft	
Hydraulic Radius:	0.196 ft	
Froude Number:	1.86	

Structure #3 (Culvert)

Culvert

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
100.00	1.50	0.0150	2.00	0.00	0.90

Culvert Results:

Design Discharge = 1.70 cfs

Minimum pipe diameter: 1 - 10 inch pipe(s) required

Structure #2 (Pond)

Rail Loop Pond

Pond Inputs:

Initial Pool Elev:	6,347.00 ft
Initial Pool:	0.20 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
6,353.00	15.00	3.00:1	3.00:1	8.00

Pond Results:

Peak Elevation:	6,351.00 ft
Dewater Time:	0.00 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
6,345.00	0.070	0.000	0.000		
6,345.01	0.070	0.001	0.000		
6,346.00	0.100	0.084	0.000		
6,347.00	0.123	0.195	0.000		
6,348.00	0.145	0.329	0.000		
6,349.00	0.168	0.485	0.000		
6,350.00	0.195	0.667	0.000		
6,351.00	0.226	0.877	0.000		
6,351.00	0.242	0.877	0.000	0.00	Peak Stage
6,352.00	0.288	1.133	0.000		
6,353.00	0.360	1.457	0.000		Spillway #1
6,354.00	0.429	1.851	23.593		
6,355.00	0.500	2.315	92.291		

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
6,345.00	0.000	0.000
6,345.01	0.000	0.000
6,346.00	0.000	0.000
6,347.00	0.000	0.000
6,348.00	0.000	0.000
6,349.00	0.000	0.000
6,350.00	0.000	0.000
6,351.00	0.000	0.000
6,352.00	0.000	0.000
6,353.00	0.000	0.000
6,354.00	23.593	23.593
6,355.00	92.291	92.291

Structure #1 (Null)

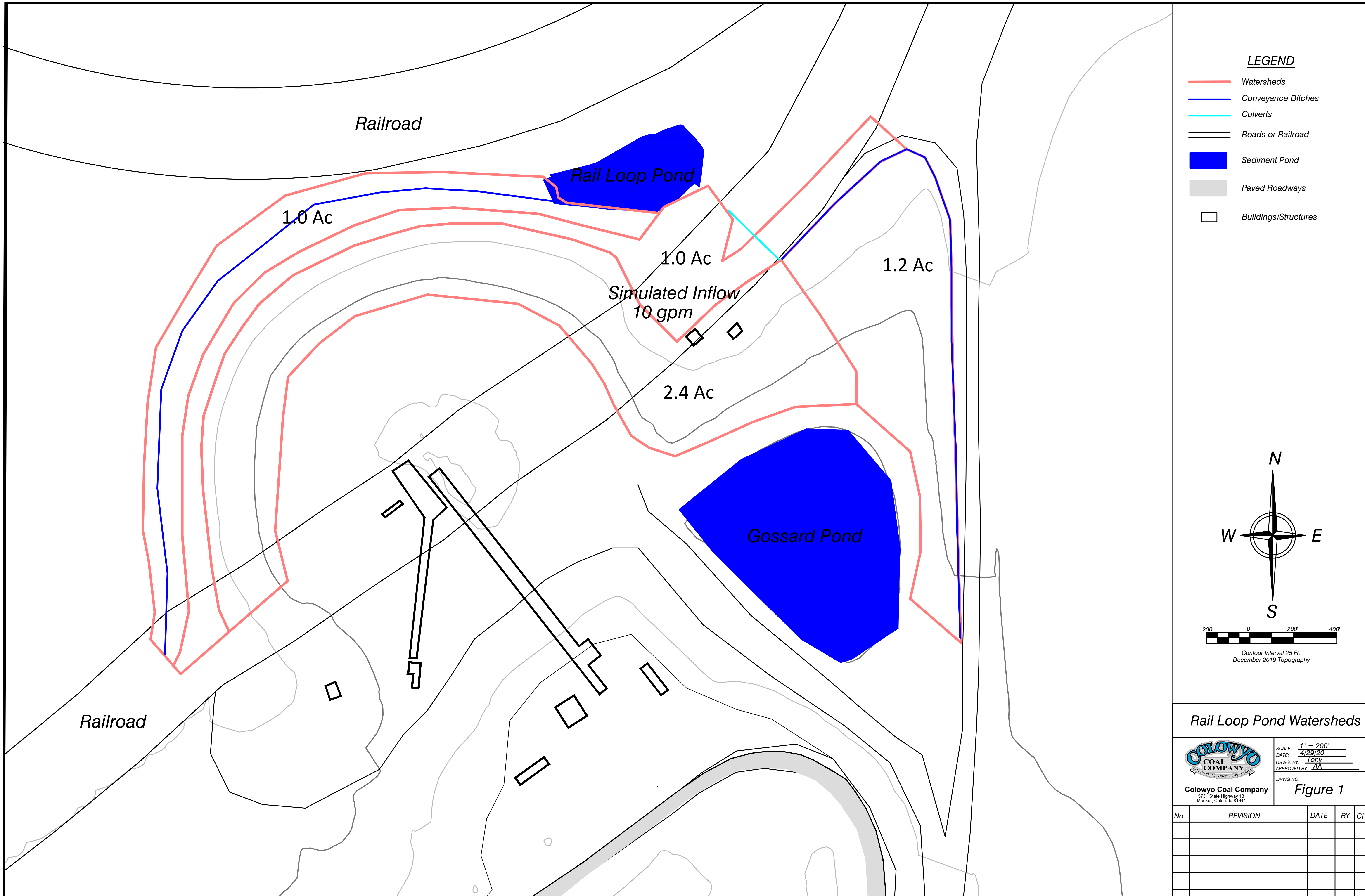
Null Below Rail Loop Pond

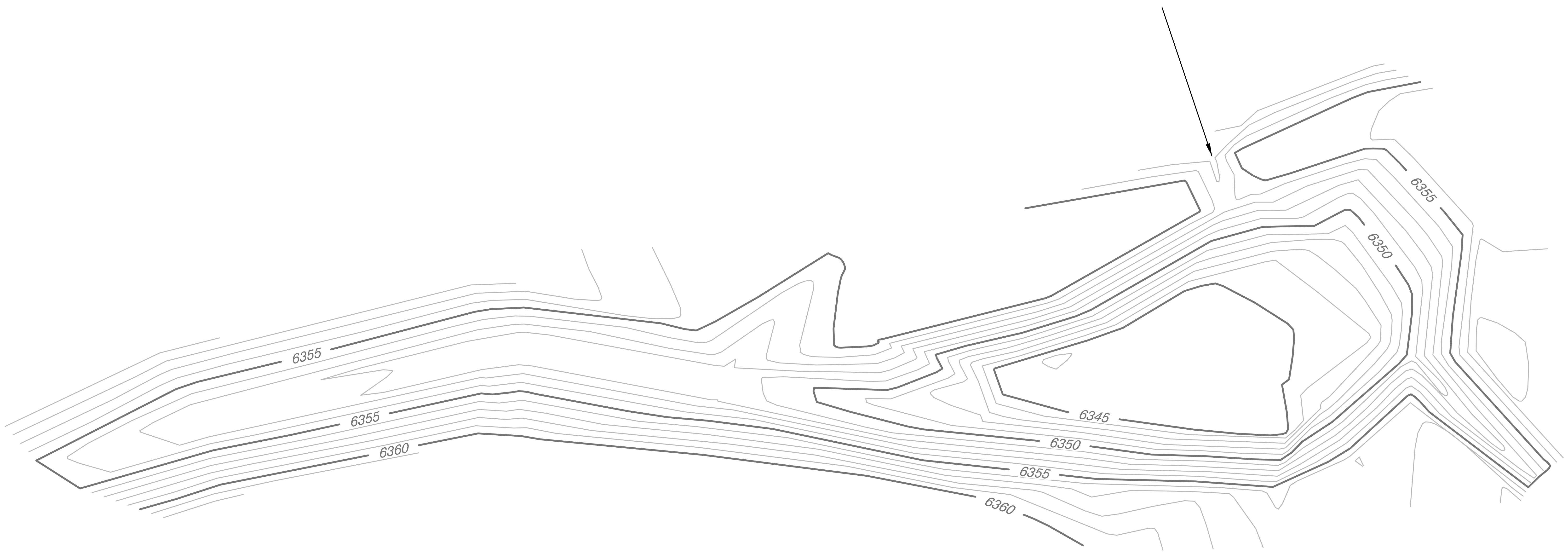
Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#7	1	2.000	0.003	0.000	0.000	80.000	S	2.29	0.171
	Σ	**2.000**						**2.29**	**0.171**
#5	1	1.000	0.121	0.000	0.000	85.000	F	1.42	0.111
	Σ	**1.000**						**1.42**	**0.111**
#4	1	1.200	0.039	0.000	0.000	85.000	F	1.70	0.133
	Σ	**1.200**						**1.70**	**0.133**
#3	Σ	**1.200**						**1.70**	**0.133**
#2	1	2.400	0.004	0.000	0.000	85.000	F	3.41	0.267
	2	1.000	0.156	0.000	0.000	85.000	F	1.23	0.107
	Σ	**7.600**						**7.71**	**0.682**
#1	Σ	**7.600**						**0.00**	**0.000**

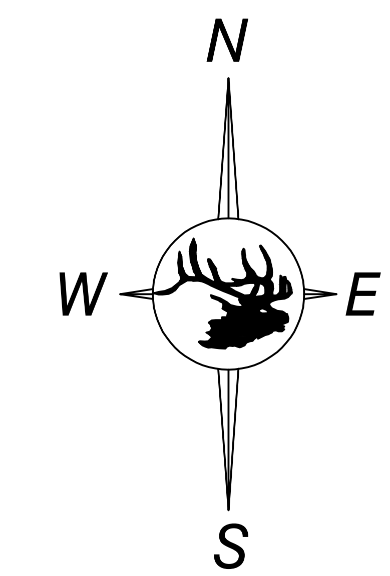
Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	1	3. Short grass pasture	47.00	42.30	90.00	5.480	0.004
#2	**1**	**Time of Concentration:**					**0.004**
#2	2	5. Nearly bare and untilled, and alluvial valley fans	0.80	4.00	500.00	0.890	0.156
#2	**2**	**Time of Concentration:**					**0.156**
#4	1	3. Short grass pasture	28.00	47.32	169.00	4.230	0.011
		8. Large gullies, diversions, and low flowing streams	6.50	50.50	777.00	7.640	0.028
#4	**1**	**Time of Concentration:**					**0.039**
#5	1	3. Short grass pasture	2.00	9.89	494.50	1.130	0.121
#5	**1**	**Time of Concentration:**					**0.121**
#7	1	3. Short grass pasture	1.00	0.09	10.00	0.800	0.003
#7	**1**	**Time of Concentration:**					**0.003**


Railroad
Rail Loop Pond
1.0 Ac
1.0 Ac
1.2 Ac
Simulated Inflow
10 gpm
2.4 Ac
Gossard Pond
Railroad
LEGEND
Watersheds
Conveyance Ditches
Culverts
Roads or Railroad
Sediment Pond
Paved Roadways
Buildings/Structures
N
W
E
S
200'
0
200'
400'
Contour Interval 25 Ft.
December 2019 Topography
Rail Loop Pond Watersheds
COLOWYO COAL COMPANY
SAFETY - PEOPLE - PRODUCTION - ENERGY
Colowyo Coal Company
5731 State Highway 13
Meeker, Colorado 81641
SCALE: 1" = 200'
DATE: 4/29/20
DRWG. BY: Tony
APPROVED BY: AA
DRWG NO.
Figure 1
No.
REVISION
DATE
BY
CHK



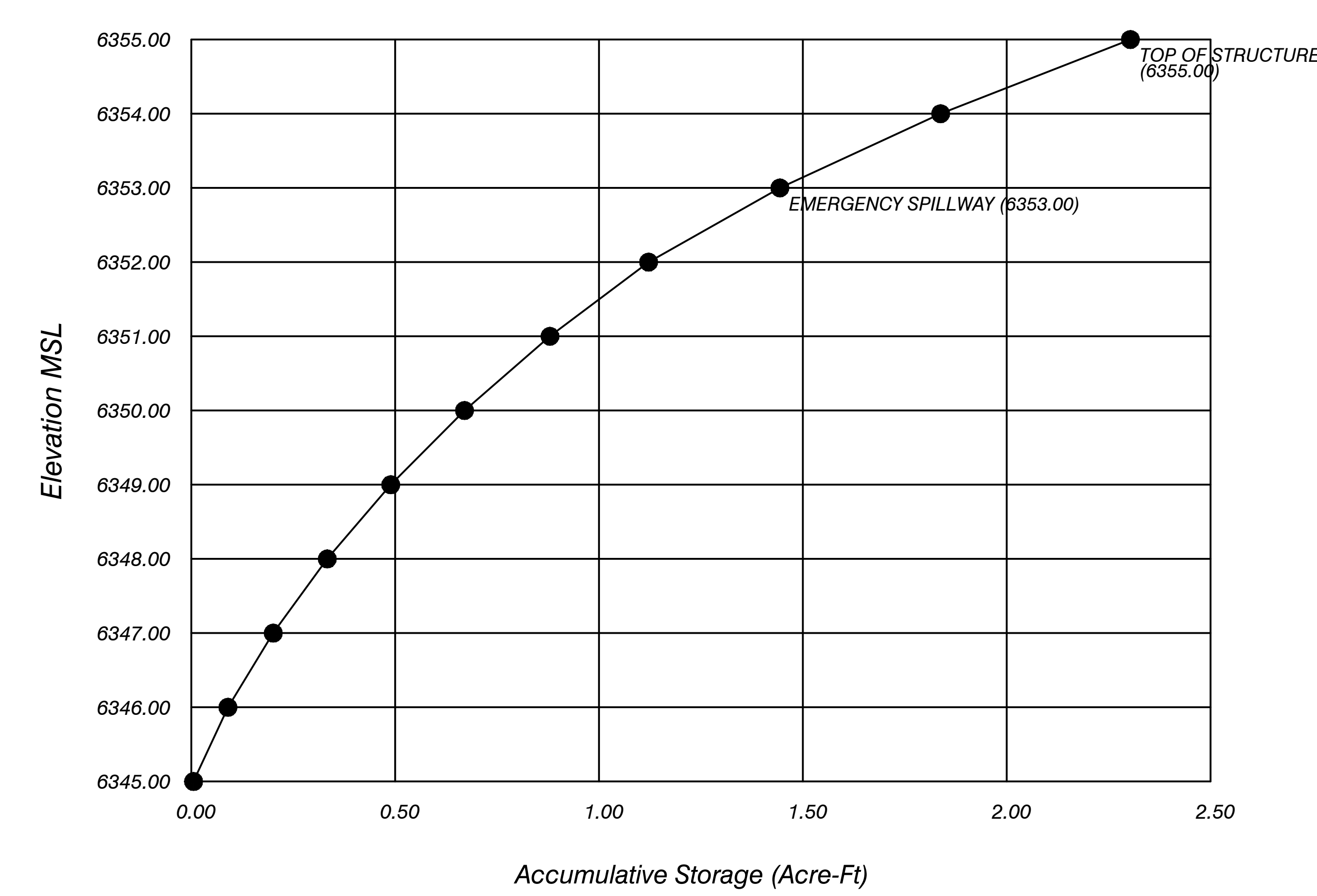
Scale 1" = 30'
Contour Interval = 1 Ft.



ENGINEERS CERTIFICATION

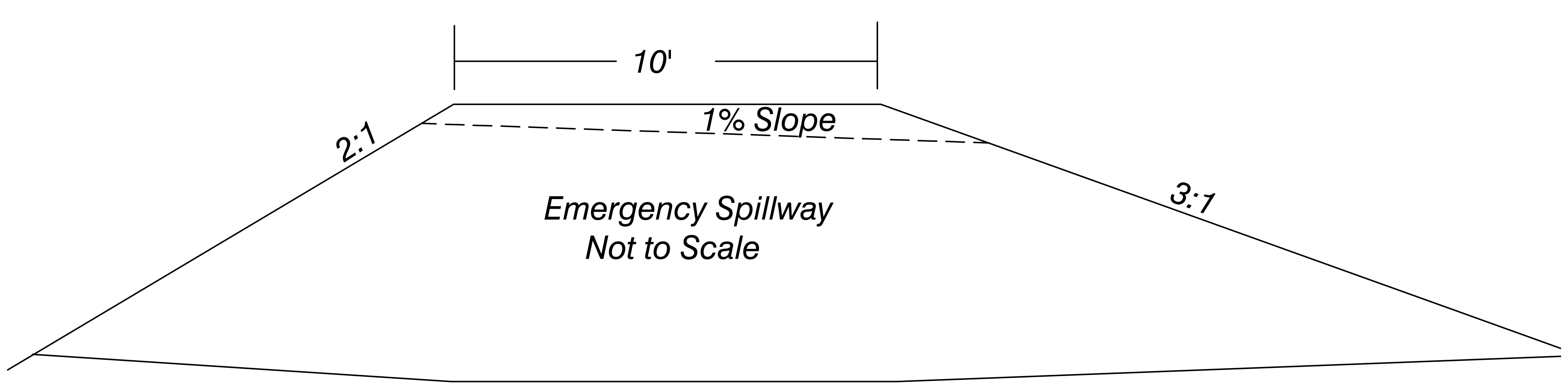
I, BRIAN W. COATES, hereby certify that this map has been reviewed by me and is true and correct to the best of my knowledge and information, relying on information supplied by experts employed by Colowyo Coal Company or qualified consultants working for Colowyo Coal Company, and that I am a Professional Engineer licensed in Colorado as required by the provisions of C.R.S. 12-25-101 through C.R.S. 12-25-119. IN WITNESS WHEREOF, I have hereunder set my hand and affixed my seal.

Stage Storage Curve
Rail Loop Pond



Storage Volume Computations

ELEV. (ft)	Width (ft)	LENGTH (ft)	AREA (ac)	AVG. AREA (ac)	INTERVAL (ft)	STORAGE (ac-ft)	ACC. STORAGE (ac-ft)	STAGE INTERVAL (ft)
6345.00	N/A	N/A	0.0141					
6346.00	N/A	N/A	0.0997	0.0569	1.00	0.0842	0.0901	1.00
6347.00	N/A	N/A	0.1224	0.1111	1.00	0.1112	0.2013	2.00
6348.00	N/A	N/A	0.1429	0.1327	1.00	0.1325	0.3338	3.00
6349.00	N/A	N/A	0.1670	0.1549	1.00	0.1558	0.4896	4.00
6350.00	N/A	N/A	0.1944	0.1807	1.00	0.1809	0.6706	5.00
6351.00	N/A	N/A	0.2243	0.2094	1.00	0.2094	0.8800	6.00
6352.00	N/A	N/A	0.2585	0.2414	1.00	0.2420	1.1220	7.00
6353.00	N/A	N/A	0.3553	0.3069	1.00	0.3221	1.4441	8.00
6354.00	N/A	N/A	0.4293	0.3923	1.00	0.3941	1.8382	9.00
6355.00	N/A	N/A	0.4996	0.4645	1.00	0.4655	2.3037	10.00



Rail Loop Pond As-Built

Colowyo Coal Company
5731 State Highway 13
Meeker, Colorado 81641

SCALE: As Shown
DATE: 4/22/98
DRWG. BY: T.F.S. III
APPROVED BY: J.P.G/S.R.H.
DRWG NO.
Figure 2

No.	REVISION	DATE	BY	CHK
1	As-Built	9/21/99	JPG SRH	JPG SRH
TR-138	Removed Primary Spillways, Updated Entire As-Built Format Updated Stage Storage Curves, Revised Paper Size	4/29/20	Tony	BC