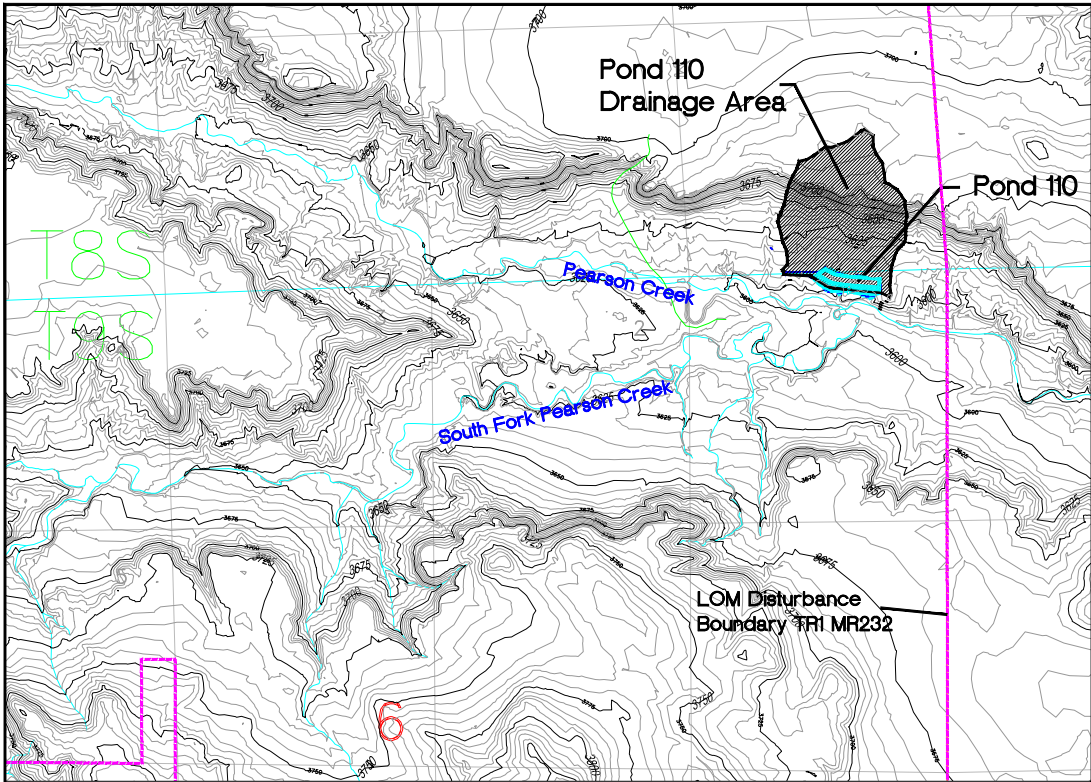
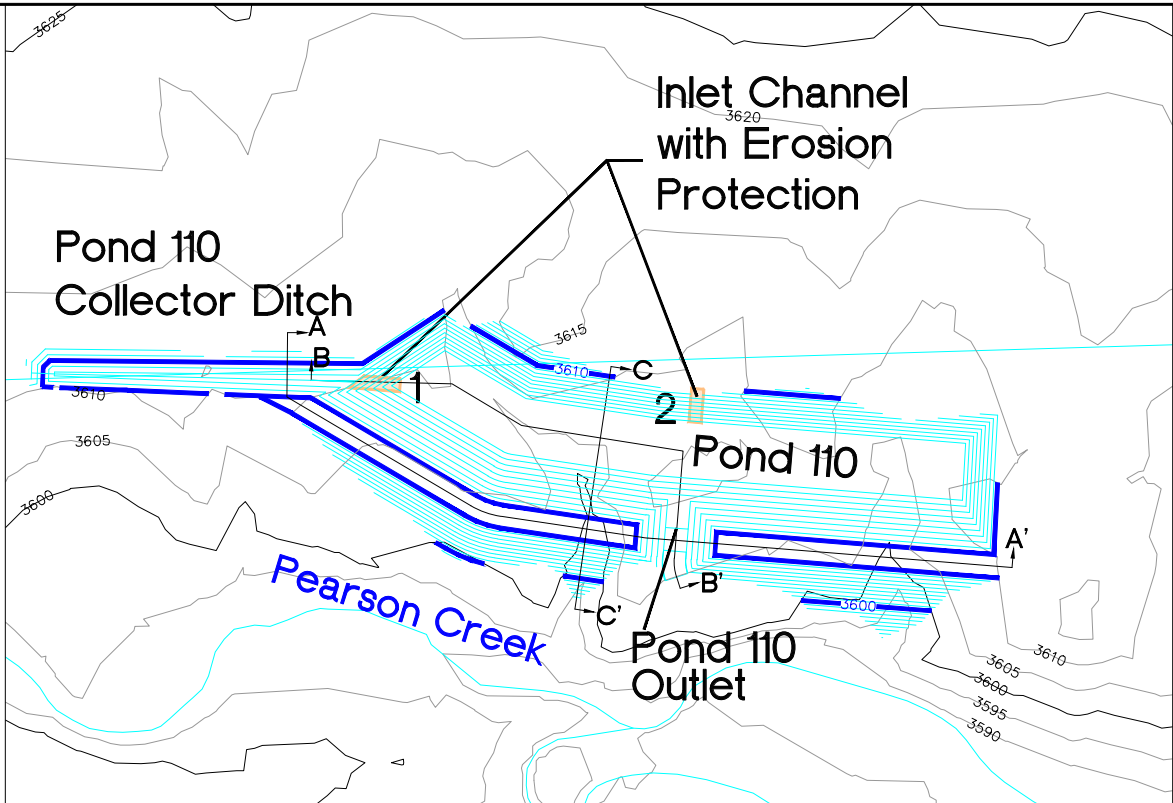




LOCATION MAP

SCALE: 1" = 1,000', C.I. = 5'
POND IS LOCATED IN NENE SECTION 6, T9S, R40E.



PLAN MAP

SCALE: 1" = 100', POND C.I. = 1', OUTER C.I. = 5'

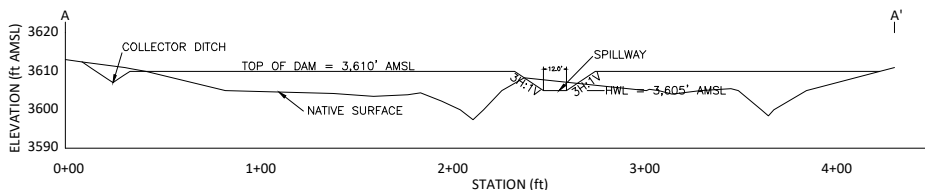
AREA-ELEVATION-CAPACITY TABLE				
ELEVATION (FT AMSL)	AREA (ACRES)	INCREMENTAL CAPACITY (ACRE-FEET)	CUMULATIVE CAPACITY (ACRE-FEET)	USE
3,601.00	0.20		0.00	INACTIVE CAPACITY VOLUME = 0.19 AC-FT. sediment storage
		0.19	0.19	
3,601.86	0.24		0.19	ACTIVE CAPACITY VOLUME = 0.93 AC-FT. 10-YEAR / 24-HOUR RUNOFF VOLUME = 0.85 AC-FT.
		0.03		
3,602.00	0.24		0.22	
		0.26		
3,603.00	0.28		0.48	
		0.30		
3,604.00	0.32		0.78	
		0.34		
3,605.00	0.36		1.12	
HIGH WATER LINE = 3,605.00 FT. AMSL, TOTAL CAPACITY = 1.12 AC-FT.				

POND 110 DRAINAGE AREA DATA

TOTAL DRAINAGE AREA	= 9.37 acres
LONGEST WATERCOURSE	= 858 ft
AVERAGE LAND SLOPE	= 18.22%
CURVE NUMBER	= 87 (Disturbed Mine Land)
SOILS	= Hydrologic Soils Group C
TIME OF CONCENTRATION	= 0.05 Hours
RUNOFF ESTIMATE TO POND 110	
RAINFALL DISTRIBUTION	= SCS TYPE II
PRECIPITATION (10YR-24HR)	= 2.19 in
PEAK Q (10YR-24HR)	= 14.58 cfs
VOLUME (10YR-24HR)	= 0.85 ac-ft
DESIGN METHOD	= SCS RUNOFF CURVE NUMBER METHOD AND SCS TRIANGULAR HYDROGRAPH METHOD (TRIHYPDRO)

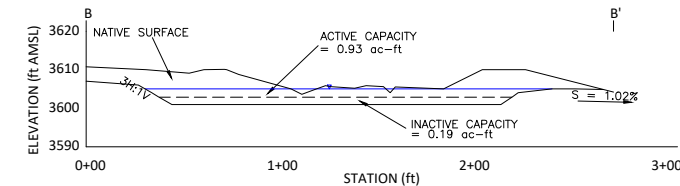
POND 110 DESIGN CAPACITY

SEDIMENT CAPACITY (0.02 ac-ft per acre)	= 0.19 ac-ft
10YR-24HR RUNOFF VOLUME	= 0.85 ac-ft
SURPLUS VOLUME	= 0.08 ac-ft
TOTAL DESIGN CAPACITY	= 1.12 ac-ft



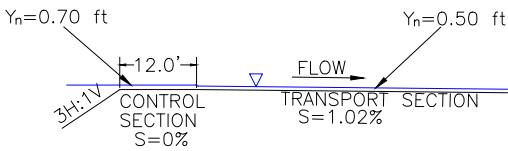
PROFILE A-A'

SCALE: H: 1" = 100'
V: 1" = 50'



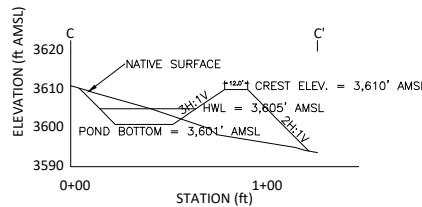
PROFILE B-B'

SCALE: H: 1" = 100'
V: 1" = 50'



EMERGENCY SPILLWAY DETAILS

NOT TO SCALE



PROFILE C-C'

SCALE: H: 1" = 100'
V: 1" = 50'

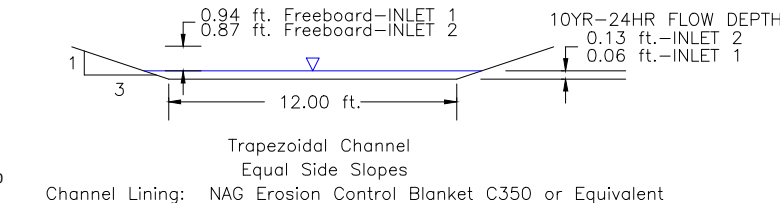
SPILLWAY TRANSPORT SECTION HYDRAULICS

$$Q_{25-24} = \frac{1.487}{n} AR^{2/3} S^{1/2}$$

$Q_{25-24} = 19.41 \text{ cfs}$	$A = 6.69 \text{ ft}^2$
$n = 0.03$	$WP = 15.14 \text{ ft}$
$S = 0.010 \text{ ft/ft}$	$R = 0.44 \text{ ft}$
$Z = 3H:1V$	$V = 2.90 \text{ ft/s}$
$b = 12 \text{ ft}$	$Y_n = 0.50 \text{ ft}$

SPILLWAY CONTROL SECTION HYDRAULICS

$Q = CLH^{3/2}$
$Q_{25-24} = 19.41 \text{ cfs}$
$C = 2.75$
$L = 12 \text{ ft}$
$H = 0.70 \text{ ft}$
$V = 2.31 \text{ ft/s}$



INLET CHANNEL AND EROSION PROTECTION

NOT TO SCALE

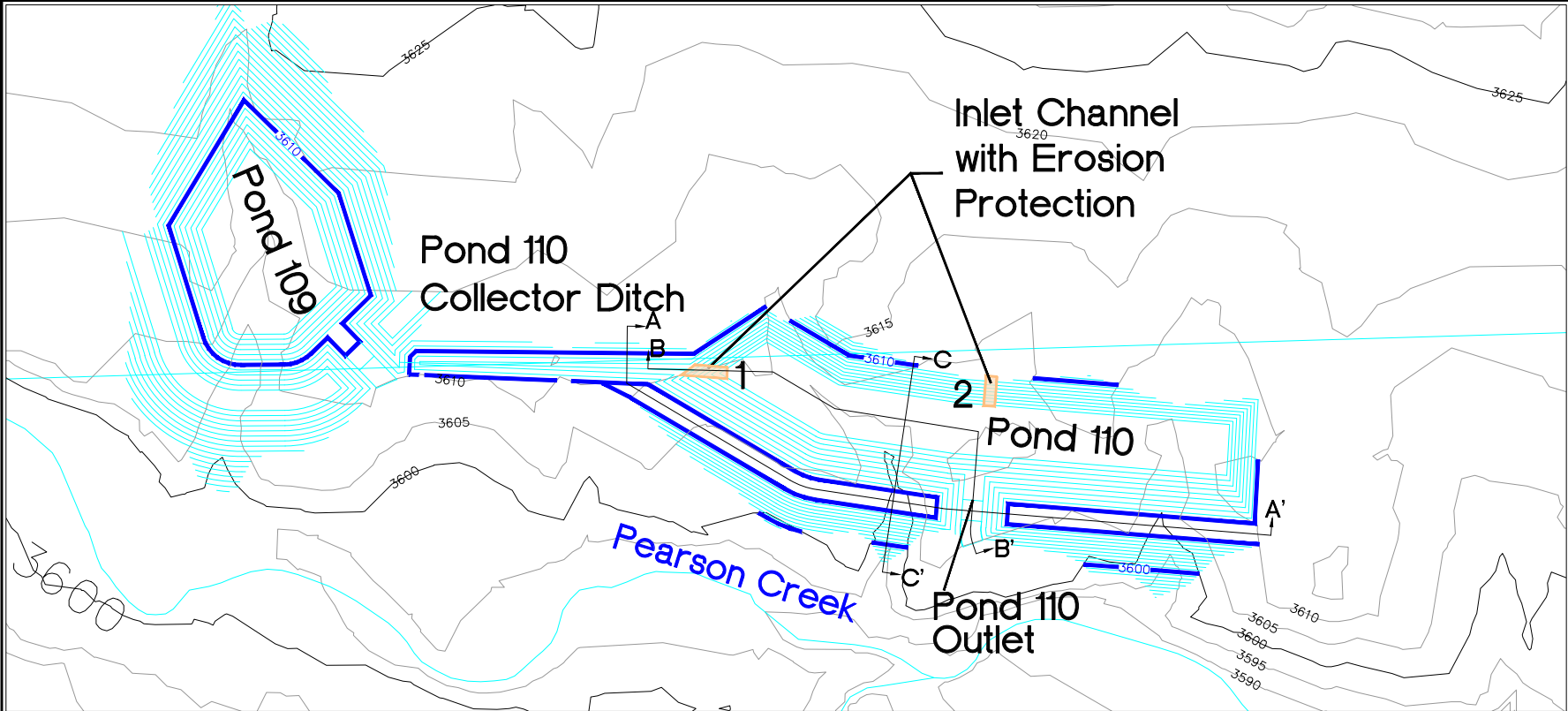
INLET CHANNEL 1 HYDRAULICS

CHANNEL TYPE	= TRAPEZOIDAL, EQUAL SIDE SLOPES	RETARDANCE CLASS	= C
BOTTOM WIDTH	= 12 ft	VEGETATION TYPE	= BUNCH TYPE
SIDE SLOPES	= 3H:1V	VEGETATION DENSITY	= FAIR (50-75%)
MAXIMUM SLOPE	= 33% (POND FACE SLOPE)	SOIL TYPE	= SILT LOAM
10YR-24HR PEAK FLOW	= 1.96 cfs	VELOCITY	= 2.84 ft/s
CHANNEL LINING	= N.A.G. C350 EROSION CONTROL BLANKET (PERMANENT) WITH VEGETATION	NORMAL DEPTH	= 0.06 ft
		MANNING'S N	= 0.044
		PERMISSABLE SHEAR STRESS	= 12.0 lbs/ft ²
		CALCULATED SHEAR STRESS	= 1.18 lbs/ft ²

INLET CHANNEL 2 HYDRAULICS

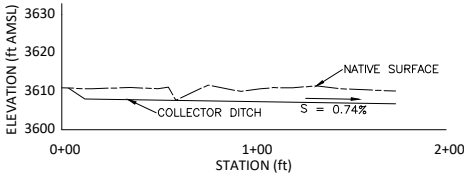
CHANNEL TYPE	= TRAPEZOIDAL, EQUAL SIDE SLOPES	RETARDANCE CLASS	= C
BOTTOM WIDTH	= 12 ft	VEGETATION TYPE	= BUNCH TYPE
SIDE SLOPES	= 3H:1V	VEGETATION DENSITY	= FAIR (50-75%)
MAXIMUM SLOPE	= 33% (POND FACE SLOPE)	SOIL TYPE	= SILT LOAM
10YR-24HR PEAK FLOW	= 11.67 cfs	VELOCITY	= 6.98 ft/s
CHANNEL LINING	= N.A.G. C350 EROSION CONTROL BLANKET (PERMANENT) WITH VEGETATION	NORMAL DEPTH	= 0.13 ft
		MANNING'S N	= 0.031
		PERMISSABLE SHEAR STRESS	= 12.0 lbs/ft ²
		CALCULATED SHEAR STRESS	= 2.80 lbs/ft ²

CLOUD PEAK ENERGY		SPRING CREEK MINE P.O. BOX 67, DECKER, MT 59025 PHONE: (406) 757-2581	
DATE	REVISION	Sediment Control Pond 110 Design	
BY			
DESIGN	ODL	DRAWN	ODL
SCALE	As Shown	CONTOUR INTERVAL	As Shown
DATE	01/06/2020	FILE NUMBER	Pond 110.dwg
SHEET	1	OF	2



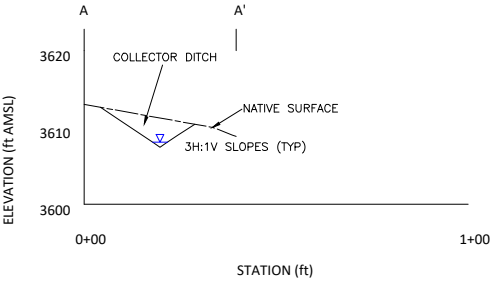
COLLECTOR DITCH PLAN VIEW

SCALE: 1" = 100', POND C.I. = 1', OUTER C.I. = 5'



POND 108 COLLECTOR DITCH PROFILE

SCALE: H: 1" = 100'
V: 1" = 50'



SECTION A-A\'

SCALE: H: 1" = 50'
V: 1" = 25'

POND 110 COLLECTOR DITCH

DRAINAGE AREA DATA

TOTAL DRAINAGE AREA	= 1.12 acres
LONGEST WATERCOURSE	= 715 ft
AVERAGE LAND SLOPE	= 18.61%
CURVE NUMBER	= 87 (Disturbed Mine Land)
SOILS	= Hydrologic Soils Group C
TIME OF CONCENTRATION	= 0.04 Hours

RUNOFF ESTIMATE TO POND 110

RAINFALL DISTRIBUTION	= SCS TYPE II
PRECIPITATION (10YR-24HR)	= 2.19 in
PEAK Q (10YR-24HR)	= 1.96 cfs
PEAK Q (25YR-24HR)	= 2.60 cfs
DESIGN METHOD	= SCS RUNOFF CURVE NUMBER METHOD AND SCS TRIANGULAR HYDROGRAPH METHOD (TRIHYDRO)

COLLECTOR DITCH HYDRAULICS

$$Q_{25-24} = \frac{1.487}{n} AR^{2/3} S^{1/2}$$

$$Q_{25-24} = 2.60 \text{ cfs} \quad A = 1.32 \text{ ft}^2$$

$$n = 0.03 \quad WP = 4.19 \text{ ft}$$

$$S = 0.007 \text{ ft/ft} \quad R = 0.31 \text{ ft}$$

$$Z = 3H:1V \quad V = 1.97 \text{ ft/s}$$

$$b = 0 \text{ ft} \quad Y_n = 0.66 \text{ ft}$$

SPRING CREEK MINE
P.O. BOX 67, DECKER, MT 59025
PHONE: (406) 757-2581

DATE	REVISION	Sediment Control Pond 110 Design							
BY									
DESIGN	ODL	DRAWN	ODL	DATE	01/06/2020	SHEET	2	OF	2
SCALE	As Shown	CONTOUR INTERVAL	As Shown	FILE NUMBER	Pond_110.dwg				

