

KY Energy and Environment Cabinet
Section 401 Individual Permit
Application LRN-2021-00184

KDNR #918-0504 AM 04
Mosley Gap

*Prepared for:
Ferrosglobe USA Mining, LLC*

Prepared: March 6th, 2026

Prepared by:



Aquatic Resources
Management

2554 Palumbo Dr.
Lexington, KY 40509
(859) 388-9595



AQUATIC RESOURCES MANAGEMENT, LLC

6 May 2026

KY Energy and Environment Cabinet
Division of Mine Permits
300 Sower BLVD
Frankfort, KY 40601

Prepared on behalf of:
Ferroglabe USA Mining, LLC
332 W Cumberland Gap Pkwy
Suite 100
Corbin, KY 40741

RE: Clean Water Act Section 401 Individual Permit application for Ferroglabe
USA Mining, LLC LRN-2021-00184 DNR # 918-0504 AM-04

Dear Reviewer,

Please find enclosed one (1) copy of the Clean water Act Section 401
Individual Permit modification application for the above referenced
permit.

Should you require any additional information or need any clarification, please
feel free to contact me at nbaker@aquaticresources.us or 859-388-9595.

Respectfully Submitted,

Nick Baker
Senior Environmental Scientist/Vice President

**Commonwealth of Kentucky
Department for Natural Resources
Division of Mine Permits**

Application for Water Quality Certification for Surface Coal Mining Activities

The Clean Water Act Section 401 Water Quality Certification (WQC) program in Kentucky ensures that activities which may involve a discharge into waters of the Commonwealth which require federal permit or license are consistent with Kentucky's water quality standards in 401 KAR Chapter 9. The Energy and Environment Cabinet has authorized the Department for Natural Resources to issue water quality certifications related to surface coal mining operations. The project may not start until all necessary approvals are obtained. For questions concerning the WQC process, contact the WQC Coordinator at (502)-782-6549.

1. **Applicant Name:** Ferroglobe USA Mining, LLC
Mailing Address: 332 W Cumberland Gap Pkwy.
Corbin, KY 40701
Contact Person: Mike Sharp
Telephone No: (606) 523-6438
E Mail Address: msharp@ferroglobe.com

2. **Consultant Name & Address:** Nick Baker
2554 Palumbo Dr. Lexington, KY 40509

Telephone No. (859) 533-7541
E Mail Address: nbaker@aquaticresources.us

3. **Provide a brief description of the proposed activity and stream impact.**
Temporary impacts to 444 linear feet of intermittent stream for stormwater
control and treatment related to surface mining activities.

4. **Project Location Information:**

County Whitley; **USGS Quadrangle Name** Rockholds

Nearest Community & Road Intersection: Rockholds, Mosley Rd. and Eaton
Fk. Rd.

Longitude: 36.84429 **Latitude:** -84.01999 (Approximate center of the project area)

5. **List the names of all streams affected by the proposed project:**
UT To Eaton Fork

6. For each affected watershed provide the acreage above the toe of the lowest permanent structure.

107.1 Ac.

7. For each affected stream provide the linear feet of impact, whether the impact is temporary or permanent and indicate if the stream reach is classified as ephemeral, intermittent, or perennial.

444 linear feet of temporary intermittent impacts.

8. Provide the acreage of wetlands that would be impacted: 0

9. Beginning at the nearest intersection of two public roads, provide directions to the project site:

From the intersection of meadow Creek Rd and Mosley Rd drive north 0.2 miles and turn right on to Eaton Fork Rd. Drive approximately 1.5 miles on Eaton Fork Rd to the project entrance.

10. Has application been submitted to the U.S. Army Corps of Engineers for this project? Yes X No _____. If yes, indicate type of application:

NW 12 ____ NW 14 ____ NW 21 ____ NW 27 ____ NW 43 X ____
NW 50 ____ Individual _____

11. Provide the following permit numbers associated with this mining activity:
SMCRA Permit No. 918-0504 Am-04, KPDES No. KY0113140

12. The following attachments must be provided:

- a. A watershed map showing all ponds and hollowfills to scale with all intermittent, and perennial stream reaches clearly identified.
- b. A 7.5 minute topographic map delineating the proposed project area.
- c. A copy of the complete Compensatory Mitigation Plan

List all other plans and profiles included with this application:

I hereby request approval for construction across or along a stream as described in this application and supporting attachments. All of the information provided with this application is true and accurate to the best of my belief and knowledge.

Applicant's Signature:



, Date: 6/3/2026

If signed by applicant's agent, attach power of attorney

SUBMIT APPLICATION AND ATTACHMENTS TO:

**WQC COORDINATOR
DIVISION OF MINE PERMITS
300 SOWER BLVD.
FRANKFORT, KENTUCKY 40601**



KENTUCKY ENERGY &
ENVIRONMENT CABINET

Individual §401 Water Quality Certification Request Form

More information regarding federal regulation 40 CFR 121 and the nine components listed in this form may be viewed on the [U.S. EPA Overview of §401 Certification](#) webpage.

This form may be used to request §401 Water Quality Certification and submitted to the Division of Mine Permits and to the licensing or permitting Federal agency. For the U.S. Army Corps of Engineers contact information, please review the [District map](#).

Contact Thomas Barbour at Thomas.Barbour@ky.gov, or 502-782-6549 with any questions.

Component (1) - Identify the project proponent(s) (applicant) and a point of contact

Applicant Name: Ferroglobe USA Mining, LLC,

Phone No.: 606-523-9760

E-mail Address: msharp@ferroglobe.com

An [Application for Permit to Construct Across or Along A Stream and/or Water Quality Certification \(Form DOW 7116, July 2008\)](#) is required for Individual Water Quality Certification. Date submitted: 4/8/26

Component (2) - Identify the proposed project

Brief Description of the activity: Temporary impacts to Waters of the US related to coal mining activities.

Component (3) - Identify the applicable federal license or permit

- ☒ Nationwide Permit (NWP) Permit Number: 43 ☐ §404 Individual Permit ☐ §10 Individual Permit
- ☐ §10/ §404 Letter of Permission (LOP) ☐ §10/ §404 Regional General Permit Number: []
- ☐ Federal Energy Regulatory Commission ☐ TVA 26a Permit

Component (4) – Identify the location and nature of any potential discharge that may result from the proposed project and the location of receiving waters

4a. Linear feet of stream impacts: 444 Acreage of wetland impacts: 0.0

4b. Surface Water Body Name: Eaton Fork

4c. Latitude & Longitude (decimal degrees): 36.8394, -
84.0181

Component (5) – Include a description of any methods and means proposed to monitor the discharge and the equipment or measures planned to treat, control, or manage the discharge

5a. Brief description of best management practices (BMPs) to be implemented to minimize the impacts to surface waters, including sediment and erosion control measures.: BMP's are outlined in the attached 404 application

Component (6) - Include a list of all other federal, interstate, tribal, state, territorial, or local agency authorizations required for the proposed project, including all approvals or denials already received

Authorization/ Permit Name	Issuing Agency	Status (approved, denied, application submitted)
Stream Construction Permit	DOW	[]

Component (7) - Include documentation that a pre-filing meeting request was submitted to the certifying authority at least 30 days prior to submitting the certification request.

[This can include the email containing the *Application for Permit to Construct Across or Along A Stream and/or Water Quality Certification (Form DOW 7116, July 2008)*]

☒ Attached

Components (8) and (9) – ‘The project proponent hereby certifies that all information contained herein is true, accurate, and complete to the best of my knowledge and belief’; and ‘The project proponent hereby requests that the certifying authority review and take action on this CWA 401 certification request within the applicable reasonable period of time.’

Print Project Proponent Name (applicant): George Adams

Project Proponent Signature (applicant):

X 
George Adams
Plant Manager

Date: 4/8/26

Submit the completed form and attachments through email to Thomas.Barbour@ky.gov.



**KENTUCKY ENERGY &
ENVIRONMENT CABINET**

§401 Water Quality Certification Pre-Filing Meeting Request Form

Federal regulation 40 CFR 121.4 requires the applicant to submit a pre-filing meeting request before filing a *Certification Request*. More information may be viewed on the [U.S. EPA Overview of §401 Certification](#) webpage.

This form may be used to request the pre-filing meeting and submitted to the Division of Mine Permits. The information requested below will allow the Division of Mine Permits to provide guidance for filing a *§401 Water Quality Certification Request*.

Contact the Division of Mine Permits at Thomas.Barbour@ky.gov, or 502-782-6549 with any questions.

SECTION I – Applicant Information (property owner or easement holder)

Applicant Name: Ferroglobe USA Mining, LLC

E-mail Address: msharp@ferroglobe.com

The [Application for Permit to Construct Across or Along A Stream and/or Water Quality Certification \(Form DOW 7116, July 2008\)](#) is required for Individual Water Quality Certification.

☒ Attached

☐ Submitted

AI Number (leave blank if unknown):

Date: 12-17-24

SECTION II – Alternate Contact/ Consultant Information (Optional, a consultant is not required)

Alternate Name: Nick Baker

E-Mail Address: nbaker@aquaticresources.us

SECTION III – The federal license or permit(s) required for the activity (check all that apply)

- ☐ Section 404 Permit ☐ Section 10 Permit ☒ Nationwide Permit (NWP) No.: 43 ☐ LOP (Section 10/404)
- ☐ Section 10/404 Regional General Permit ☐ TVA 26a Permit ☐ Federal Energy Regulatory Commission

SECTION IV – Project Site Information

Site or Project Name: Mosley Gap

Latitude & Longitude (decimal degrees): 36.8394, -84.0181

4a. Water Resource proposed for alteration: ☒ Stream/River ☐ Wetland

4b. Name of Water Resource (access watermaps.ky.gov for more information): Eaton Fork

4c. Surface Water Resource Impacts (permanent and temporary):
Linear feet of stream/river: 444 Average stream/river width (feet): 3-4 Acreage of wetland: 0.00

4d. Has a Jurisdictional Determination been received from the U.S. Army Corps of Engineers? ☒ Yes ☐ No

4e. Are the streams and/or wetlands that will be impacted identified by the Division of Water as Outstanding State or National Resource Water, Cold Water Aquatic Habitat, or Exceptional Waters? (access watermaps.ky.gov and [Special Use Waters](#) for more information) ☐ Yes ☒ No

Form continues on the next page

SECTION V – Project Description (some items may not apply)		
5a.	Description of the proposed project, including but not limited to the size, depth, length of the project, types of materials proposed for use, and anticipated timeline for construction and operation.	☒ Attached
5b.	Table of impacts: If there are multiple discharge locations that are not continuous, please include a separate table or figure listing the coordinate location (in decimal degrees) of each surface water impact, linear feet/ acreage of impact, name of waterbody, and stream flow type (ephemeral, intermittent, perennial).	☒ Attached
5c.	Site plans and description of site development, including but not limited to maps of surface waters and proposed surface water impacts within the project area.	☒ Attached
5d.	Proposed temporary impacts to surface waters: linear feet of temporary stream impacts, acreage of temporary wetland impacts, and the proposed plans for restoration.	☒ Attached
5e.	Preliminary Jurisdictional Determination (PJD) and/or Approved Jurisdictional Determination (AJD) issued by the U.S. Army Corps of Engineers.	☒ Attached
5f.	Compensatory mitigation proposal or compensatory mitigation statement for impacts to surface waters.	☒ Attached
5g.	Description of best management practices (BMPs) to be implemented to minimize the impacts to surface waters, including sedimentation and erosion control measures.	☒ Attached
5h.	For dredge activities in Section 10 waters: Dredge methods, disposal areas, proposed volume of material to be extracted, record of the most recent mussel survey if available.	☐ Attached
5i.	Endangered Species Act (ESA) Section 7 consultation or concurrence documentation, biological surveys, and/or other pertinent information regarding the presence of federally threatened or endangered aquatic species.	☒ Attached
5j.	Other information pertinent to the project.	☒ Attached

Submit the completed form and attachments through email to Thomas.Barbour@ky.gov.

918-0504 AM-04 Compensatory Mitigation Plan

The stream ecosystem integrities for the unnamed tributaries containing the stormwater control pond impacts for which mitigation is being proposed for were evaluated using the Functional Capacity Index (FCI) Protocol to quantify the anticipated impacts and ensure no net loss of aquatic resources would occur. Overall, the anticipated temporary stream impacts would be compensated for by restoration efforts. Anticipated and prior impact losses include 444 linear feet of intermittent stream and 248.64 HGM's. It is anticipated that replacing and restoring the stream will occur by the applicant making watershed improvements after the impacts in unnamed tributaries to Eatin Fork, as seen on the attached Impacts and Mitigation mapping. HGM scores are expected to increase over 39.3% after 5 years; having an approximate total of 346.32 HGM's after mitigation efforts are complete. On-site stream mitigations will be provided in mitigation reaches.

Stream and Wetland Restoration Plan

Compensatory mitigation will be provided by the establishment and maintenance of the mitigation areas illustrated on location maps contained in the supporting information. The following provides a description of (1) mitigation construction specifications and projected time frames for the restored ephemeral channels, (2) criteria for determining mitigation success (3) a monitoring plan for mitigation efforts, (4) a maintenance and contingency plan should monitoring determine that the mitigation is not adequate and (5) a listing of responsible parties for mitigation and monitoring efforts.

Stream Restoration Construction

The following section describes the mitigation construction to be implemented to obtain a no net loss of stream values and functions. The best possible channel will be restored and created based on conditions in the areas at the time of mitigation efforts. Stream restoration and monitoring tasks will be performed by qualified personnel. All dimension and typical structure drawing for stream mitigation are contained in the additional

information section. After stream restoration efforts are complete the riparian vegetation will be planted beginning at the OHWM which will promote stability in the stream ecosystem as well as help reduce sedimentation. Hydro-mulch may also be used to promote the success of this process.

All work should be performed during low or, no flow conditions, and proceed in a downstream direction to avoid re-suspension of sediment into restored reaches.

A minimum riparian corridor of 50 feet (or until natural forest limits are encountered) will be established in all mitigation areas. The suggested tree species provided by the State Division of Water will be the guide for canopy coverage, with an emphasis on native species currently growing in the zones for re-vegetation efforts. Canopy coverage will be provided by the riparian corridor at the maturity of mitigation.

Stream Riparian Zone

The riparian zone plantings will aid in the reduction and prevention of the sedimentation of streams, provide nutrients for the stream system organisms, and provide cooler temperatures with canopy coverage. Hydro-mulch may be used and will also provide immediate erosion control. The riparian zone will extend 50 feet or until natural canopy is reached.

The stream riparian zone will be monitored and, if needed, managed to control the colonization of invasive exotic plant species (IES) in the area. Chemical herbicides, manual and mechanical labor, and prescribed burning are all effective methods on controlling the IES of the mined lands. The final vegetation community in the area should not be comprised of more than 5% of invasive species. All invasives will be removed from the riparian area during the monitoring assessment as needed.

Grasses, Trees, and Shrubs

The grasses to be used during re-vegetation will include temporary and permanent plantings. See the table below for a breakdown of the revegetation plan. The temporary

species will provide quick ground coverage and begin providing nitrogen back into the areas. Trees will be replanted based on what's available at the time of planting but is recommended to include those native to the area. A list of potential trees is included in the typical restoration design.

Proposed PMLU: FISH AND WILDLIFE HABITAT	Rate per Acre	Acreage
Permanent Grass:		
Timothy	2#	579.41
Tall Fescue	10#	579.41
Legumes:		
White Clover	2#	386.27
Red Clover	2#	386.27
Alsike	1#	386.27
Temporary Plants:		
Annual Rye Grasss	50#	386.27
Mulch:		
Paper/Wood	1500#	386.27

Shrubs will also be planted in the early successional phase of the forest reclamation project; providing food and cover for wildlife encourages a more rapid development of the functional and structural diversity of the ecosystem. A variety of native species can be used, including but not limited to: Black chokeberry (*Aronia melanocarpa*), Bristly locust (*Robinia hispida*), Ninebark (*Physocarpus opulifolius*), Red mulberry (*Morus rubra*) and Eastern Redbud (*Cercis Canadensis*). During the monitoring phase, a target planting/survival rate for trees will be 300 stems per acre with a minimum survival rate of 80% and shrubs of 100 stems per acre with a minimum survival rate of 80% will be the goal for the restoration.

Stream Monitoring and Management Program and Success Criteria

The monitoring and management plan will evaluate the success of the mitigation as described in the previous section as well as Table 1 and 2. It will include inspection and

grading of mitigation sites in the beginning of the following year after mitigation efforts are initially completed. Those items listed above will be examined and the results provided to the USACE/DMP in a timely manner, annual report, (before December 31 of the current monitoring year)) for a period extending through 5 years after the mitigation efforts commence. The reports will include photographs and assessment locations noted on site plan views and will follow the 2008 mitigation guidelines as well as those set forth by the USACE through regulatory guidance letter 08-03. Successes and/or failures of the mitigation effort will be noted and any maintenance efforts performed the previous year will be described. The reports will also include an assessment of the degree to which performance standards are being met and any proposed corrective actions. Stream restoration will be considered successful if the restored HGMs are likely to exceed the existing HGM score.

Table 1. Stream Restoration Reporting Parameter		
Parameter	Success	Method
Riparian Corridor	Riparian zone with a variety of species alive and healthy	Measure replanted width and estimated stem count
Specific Conductance	Report only for monitoring	Field Meter
Epifaunal Substrate	Minimum 40-70% favorable substrate	Habitat Assessment/Pebble Count
Embeddedness	Maximum 25-50% embeddedness	Habitat Assessment
Sediment Deposition	Little or no enlargement of islands or point bars and <40% of bottom affected by sediment deposition	Habitat Assessment/Pebble Count in Pools
Channel Flow Status	Maintain width/depth ratio	Habitat Assessment/Cross-sections
Channel Alteration	Maintain minimal channelization	Habitat Assessment
Frequency of Riffles	Maintain step-pool or riffle-pool sequences similar to approved plans	Habitat Assessment/Longitudinal Profile
Bank Stability	Banks stable	Habitat Assessment
Vegetative Protection	Approved width of riparian zone planted with minimum tree count 300 stems/ acres with 80% surviving and shrub count of 100 stems/acre with 80% surviving	Stem count survey

Stream Geomorphological, Hydrological, Habitat Performance Standards		
Performance Category and Criteria	As-Built	Year 1-5 Monitoring
Geomorphological		
Geometry	Within target range	<20% change from as-built
Vertical Stability	Report	BEHI Score of Low or Very Low
OHWB (RGL 05-05)	N/A	Present and continuous
Bed and Banks	Present	
Bankfull Events	2 within 5 years (intermittent streams)	
Hydrological		
Stream Flow Type	JD	Consistent with JD or increase
Habitat		
HGM	Report	Meet or exceed baseline by Year 5
Stream Vegetation Performance Standards and Success Criteria		
Planting Rate (Trees)	Minimum 300 native tree stems/acre – 80% survival	
Planting Rate (Shrubs)	Minimum 100 native shrub stems/acre – 80% survival	
Invasive/Exotic Species	≤ 5% invasive/exotic species present	
Wetland Performance Standards and Success Criteria		
Vegetation	Based on latest version of Regional Supplement	
Hydrology	Based on latest version of Regional Supplement	
Soils	Based on latest version of Regional Supplement	
Invasive/Exotic Species	≤ 5% invasive/exotic species present	

Table 2 Performance Standards

Contingency Plan

If the degree of success criteria for the mitigation effort is found to be inadequate, the permittee shall prepare an analysis of the causes of the failure and propose remedial action for approval. If compensatory mitigation cannot be successfully completed, an alternate plan will be provided to the appropriate district.

Alden Resources, LLC
Upper Cumberland River Watershed
Nationwide 49 Permit

Responsible Parties and Financial Assurances

Parties responsible for implementation of the stream restoration and mitigation efforts include:

(1) The Applicant: Alden Resources, LLC

332 West Cumberland Gap Parkway, Suite 100

Corbin, KY 40701

Responsible for overseeing consultants and providing financial assurances. At this time, no bonds other than that required by SMCRA are proposed or anticipated.

(2) Preparer of Environmental Information Document:

Aquatic Resource Management

2554 Palumbo Dr.

Lexington, KY 40509

Adverse Effects From Impoundments

In evaluating a project area containing aquatic resources, consideration must be given to avoiding impacts on these resources. If a site cannot be avoided, impacts must be minimized. Following minimization of impacts, the unavoidable impacts must be mitigated. Permits to discharge dredged or fill material into waters of the U.S will not be granted if it will cause or contribute to significant degradation of waters of the U.S.

In-stream ponds have been designed to control and treat higher runoff velocities and volumes. Pond designs allow retention of this increased runoff while allowing the pre-disturbance flow to be maintained. Specific design calculations are included in the SedCAD analysis included in this package. Those calculations allow for sediment removal within the pond as to meet effluent standards while maintaining pre-disturbance stream flows. The mining areas have been designed to minimize the amount of jurisdictional streams to be impacted by the proposed project. Stream impacts, to the extent practicable, were limited to areas where previous impacts had occurred. This has allowed only previously degraded streams to be impacted. No impacts to jurisdictional streams are proposed within the mining areas. Impacts are limited to pond construction to control and treat sediment runoff from the project area.

918-0504
AM-04
25 Year, 24 Hour Storm Event
Pre-Mining

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.030 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	OBP-43

#1 Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	106.620	106.620	222.58	19.45

Structure Detail:

Structure #1 (Null)

OBP-43

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)
#1	1	65.160	0.086	0.206	0.290	73.000	S	161.64	12.498
	2	25.540	0.020	0.186	0.259	73.000	S	63.36	4.899
	3	15.920	0.186	0.000	0.000	73.000	S	18.80	2.057
	Σ	106.620						222.58	19.453

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	31.67	95.00	300.00	1.420	0.058
		4. Cultivated, straight row	45.60	285.00	625.00	6.030	0.028
#1	1	Time of Concentration:					0.086
#1	2	3. Short grass pasture	30.00	96.00	320.00	4.380	0.020
#1	2	Time of Concentration:					0.020
#1	3	3. Short grass pasture	5.28	65.00	1,230.01	1.830	0.186
#1	3	Time of Concentration:					0.186

Subwatershed Muskingum Routing Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	30.00	96.00	320.00	4.380	0.020
		3. Short grass pasture	5.28	65.00	1,230.01	1.830	0.186
#1	1	Muskingum K:					0.206
#1	2	3. Short grass pasture	5.28	65.00	1,230.00	1.830	0.186
#1	2	Muskingum K:					0.186

918-0504
AM-04
25 Year, 24 Hour Storm Event
During Mining

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.030 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	OBP-43

#1 <i>Pond</i>

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	In	106.620	106.620	247.09	21.99
	Out			220.37	21.99

Structure Detail:***Structure #1 (Pond)****OBP-43*

Pond Inputs:

Initial Pool Elev:	8.70 ft
Initial Pool:	5.24 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
8.70	8.00	1.00:1	1.00:1	6.00

Pond Results:

Peak Elevation:	12.80 ft
Dewater Time:	0.68 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)
0.00	0.448	0.000	0.000	
0.50	0.465	0.228	0.000	
1.00	0.481	0.465	0.000	
1.50	0.499	0.710	0.000	
2.00	0.516	0.963	0.000	
2.50	0.534	1.226	0.000	
3.00	0.552	1.497	0.000	
3.50	0.570	1.778	0.000	
4.00	0.588	2.067	0.000	
4.50	0.606	2.366	0.000	
5.00	0.624	2.673	0.000	
5.50	0.643	2.990	0.000	
6.00	0.662	3.316	0.000	
6.50	0.681	3.652	0.000	
7.00	0.700	3.997	0.000	
7.50	0.719	4.352	0.000	
8.00	0.739	4.717	0.000	
8.50	0.759	5.091	0.000	
8.70	0.767	5.244	0.000	Spillway #1

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
9.00	0.779	5.475	4.510	4.30
9.50	0.799	5.870	12.026	8.65
10.00	0.820	6.275	28.182	2.20
10.50	0.840	6.690	49.998	0.55
11.00	0.861	7.115	76.888	0.25
11.50	0.882	7.551	109.159	0.15
12.00	0.903	7.997	146.929	0.10
12.50	0.924	8.454	190.348	0.05
12.80	0.937	8.739	220.369	0.10 Peak Stage
13.00	0.945	8.921	239.575	

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
0.00	0.000	0.000
0.50	0.000	0.000
1.00	0.000	0.000
1.50	0.000	0.000
2.00	0.000	0.000
2.50	0.000	0.000
3.00	0.000	0.000
3.50	0.000	0.000
4.00	0.000	0.000
4.50	0.000	0.000
5.00	0.000	0.000
5.50	0.000	0.000
6.00	0.000	0.000
6.50	0.000	0.000
7.00	0.000	0.000
7.50	0.000	0.000
8.00	0.000	0.000
8.50	0.000	0.000
8.70	0.000	0.000
9.00	4.510	4.510
9.50	12.026	12.026
10.00	28.182	28.182
10.50	49.998	49.998
11.00	76.888	76.888
11.50	109.159	109.159
12.00	146.929	146.929

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
12.50	190.348	190.348
13.00	239.575	239.575

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)
#1	1	65.160	0.086	0.202	0.301	73.000	S	161.64	12.498
	2	25.540	0.016	0.186	0.259	86.000	F	85.76	7.433
	3	15.920	0.186	0.000	0.000	73.000	S	18.80	2.057
	Σ	106.620						247.09	21.987

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	1. Forest with heavy ground litter	31.67	95.00	300.00	1.420	0.058
		4. Cultivated, straight row	45.60	285.00	625.00	6.030	0.028
#1	1	Time of Concentration:					0.086
#1	2	5. Nearly bare and untilled, and alluvial valley fans	30.00	96.00	320.00	5.470	0.016
#1	2	Time of Concentration:					0.016
#1	3	3. Short grass pasture	5.28	65.00	1,230.00	1.830	0.186
#1	3	Time of Concentration:					0.186

Subwatershed Muskingum Routing Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	30.00	96.00	320.00	5.470	0.016
		3. Short grass pasture	5.28	65.00	1,230.01	1.830	0.186
#1	1	Muskingum K:					0.202
#1	2	3. Short grass pasture	5.28	65.00	1,230.00	1.830	0.186
#1	2	Muskingum K:					0.186

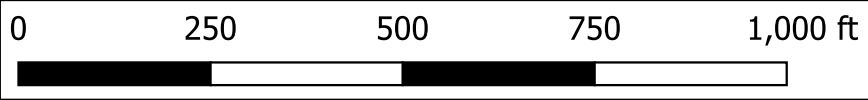
918-0504 AM-04 Impacts Aerial Map

 918-0504 AM-04 Permit Boundary

 Proposed Impact Streams

2022 KY Aerial Imagery

Label	lat	long	Pre-FCI	length	Pre-HGM	Post-FCI	Post-HGM
Int 01	36.83992	-84.01702	0.56	444	248.64	0.78	346.32



918-0504 AM-04 Impacts Topo
Map

Label	lat	long	Pre-FCI	length	Pre-HGM	Post-FCI	Post-HGM
Int 01	36.83992	-84.01702	0.56	444	248.64	0.78	346.32

 918-0504 AM-04 Permit Boundary
 Proposed Impact Streams
USGS Topographic Maps



0 250 500 750 1,000 ft



918-0504 AM-04 Mitigation Aerial Map

Label	lat	long	Pre-FCI	length	Pre-HGM	Post-FCI	Post-HGM
Int 01	36.83992	-84.01702	0.56	444	248.64	0.78	346.32

- 918-0504 AM-04 Permit Boundary
- Proposed Mitigation Streams
- 2022 KY Aerial Imagery



918-0504 AM-04 Mitigation Topo Map

 918-0504 AM-04 Permit Boundary

 Proposed Mitigation Streams

USGS Topographic Maps

Label	lat	long	Pre-FCI	length	Pre-HGM	Post-FCI	Post-HGM
Int 01	36.83992	-84.01702	0.56	444	248.64	0.78	346.32

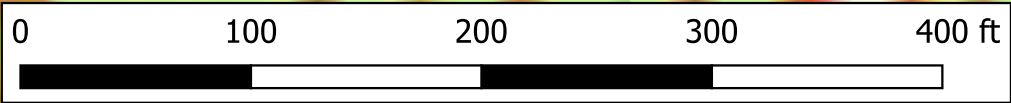


Exhibit 5-1

EXCAVATED SEDIMENT POND, DUGOUT TYPE

Structure Proportioning Computation Sheet

Pond Number **OBP-43**

15

165

SEDIMENT STORAGE REQUIREMENTS

Drainage Area = **106.62**
 Area Disturbed = **25.54**
 Sediment Volume = 0.125 Ac.Ft./Acre times disturbed area controlled by
 Pond Number **OBP-43** = **5.244**
 Sediment Pool Elevation = **8.7**
 Sediment Cleanout Volume = **3.119**
 Sediment Cleanout Stage = **5.7**

 Top of Pond **13** Ft
 = Sediment pool **8.7** Ft
 + ES Depth **4.3** Ft

SEDIMENT POND DIMENSIONS AND VOLUME DETERMINATION

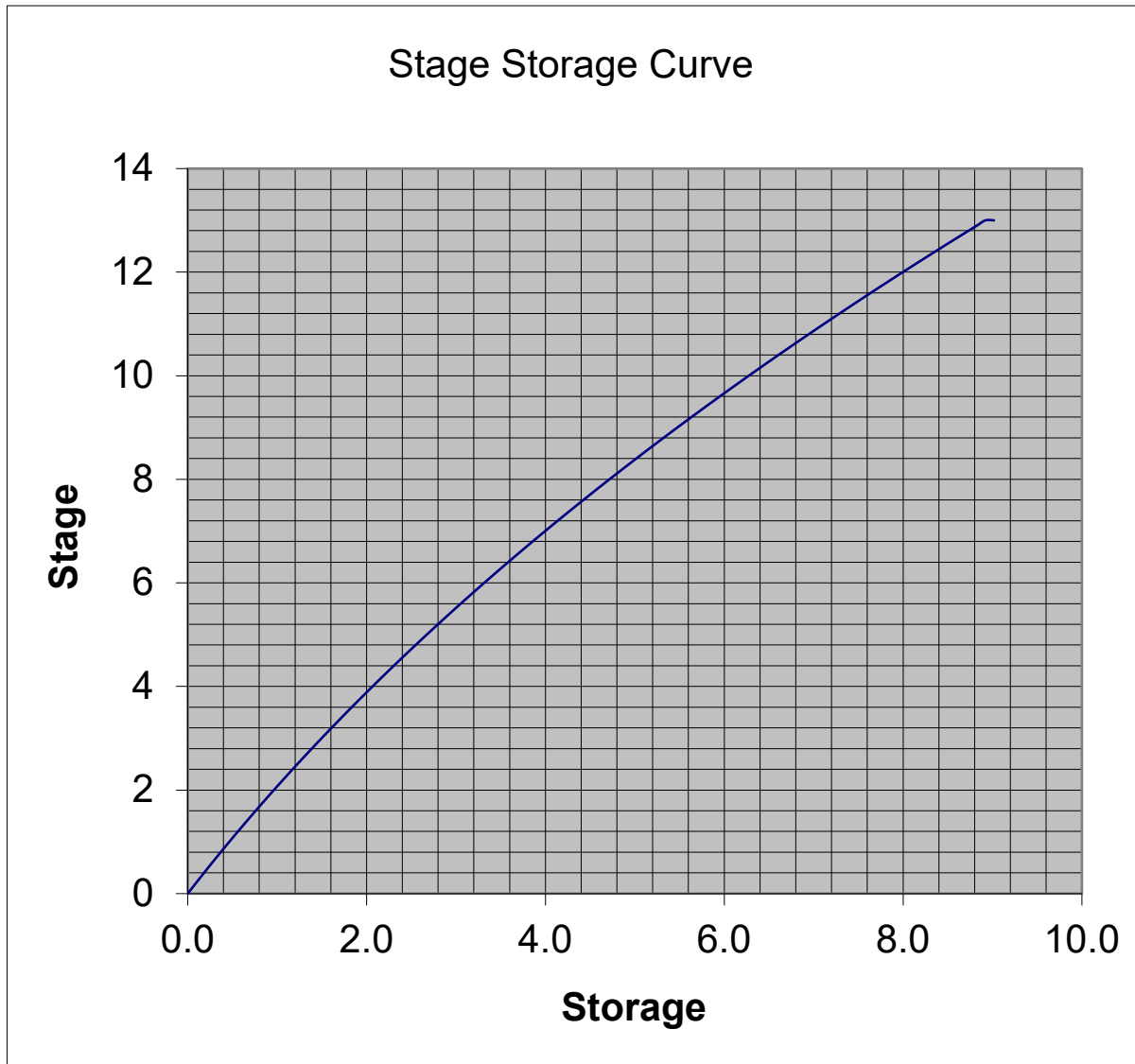
Bottom Length = **300** Ft
 Bottom Width = **65** Ft
 Water Depth = **8.7** Ft
 Side Slopes = **2** H:1V

 Volume = **228,416** Cubic Feet or
5.244 Acre-feet

The pond is regular shaped & the volumes are calculated using its geometric components.

This form is a facsimile of the West Virginia design form.

POND OBP-43



Feature	Stage	Volume
Bottom	0	0
Cleanout	5.7	3.119
Spillway	8.7	5.244
Top	13	9.015

Exhibit 2-7 *

SURFACE RUNOFF AND PEAK DISCHARGE COMPUTATION SHEET

Type of Structure: **Dugout**

Drainage Area: Number **OBP-43** Acres **106.62**

County: **Whitley** Date: **02/02/26**

Rainfall Frequency (years) **25** Rainfall (Inches): **5.03**

Ave Watershed Slope (%) **30**

Soil Group	Land use	CN	Area	Area X CN
C	Forest	73	65.16	4756.68
C	Mined	86	41.46	3565.56
C	Reclaimed	69	0	0
Totals			106.62	8322.24

Weighted Runoff CN = (Area X CN) / (Area) = **78.1**

q1 for CN = **75** from Ex. 2-4 **243.8** cfs

q2 for CN = **80** from Ex. 2-4 **314.0** cfs

The weighted discharge using straight line interpolation = **286.7** cfs

Slope correction factor for **30** % from Ex. 2.5 = **1.11**

Corrected Q (flow from CN's X Correction factor) = **318.2** cfs

The emergency spillway is designed using the Ky DSMRE's Figure 21 of TRM #13. The following are the ES specifications.

Bottom Width = **6** ft
 Sideslopes = **1** :1
 Depth = **4.3** ft
 Capacity = **251.5** cfs

* This form is a facsimile of the West Virginia design form.

COMPARISON OF PREMINING & DURING MINING DISCHARGE

(This method is presented in Haan & Barfield,

Soil Group	Land use	CN	Area	Area X CN
C	Forest	73	103.82	7578.86
C	Mined	86	2.8	240.8
C	Reclaimed	69	0	0
Totals			106.62	7819.66

$$\text{Weighted Runoff CN} = (\text{Area X CN}) / (\text{Area}) = \underline{\underline{73.3}}$$

$$q_1 \text{ for CN} = \underline{\underline{70}} \quad \text{from Ex. 2-4} \quad \underline{\underline{184.8}}$$

$$q_2 \text{ for CN} = \underline{\underline{75}} \quad \text{from Ex. 2-4} \quad \underline{\underline{243.8}}$$

$$\text{The weighted discharge using straight line interpolation} = \underline{\underline{224.2}}$$

$$\text{Slope correction factor for } \underline{\underline{30}} \% \text{ from Ex. 2.5} = \underline{\underline{1.11}}$$

$$\text{Corrected Premine Q (flow from CN's X Correction factor)} = \underline{\underline{248.9}}$$

$$Q_o \text{ (csm)} = 1494 \quad [\text{Corrected premine } q / (\text{Total acres} * 640 \text{ ac/sq mi})]$$

$$Q_i \text{ (csm)} = 1910 \quad [\text{Corrected during } q / (\text{Total acres} * 640 \text{ ac/sq mi})]$$

$$Q_o/Q_i = 0.78$$

From Haan & Barfield, Figure 4.19

$$V_s/V_r = 0.18$$

$$\text{Runoff (in)} = 2.74 \quad [\text{Runoff from during mining condition using standard SCS CN equation}]$$

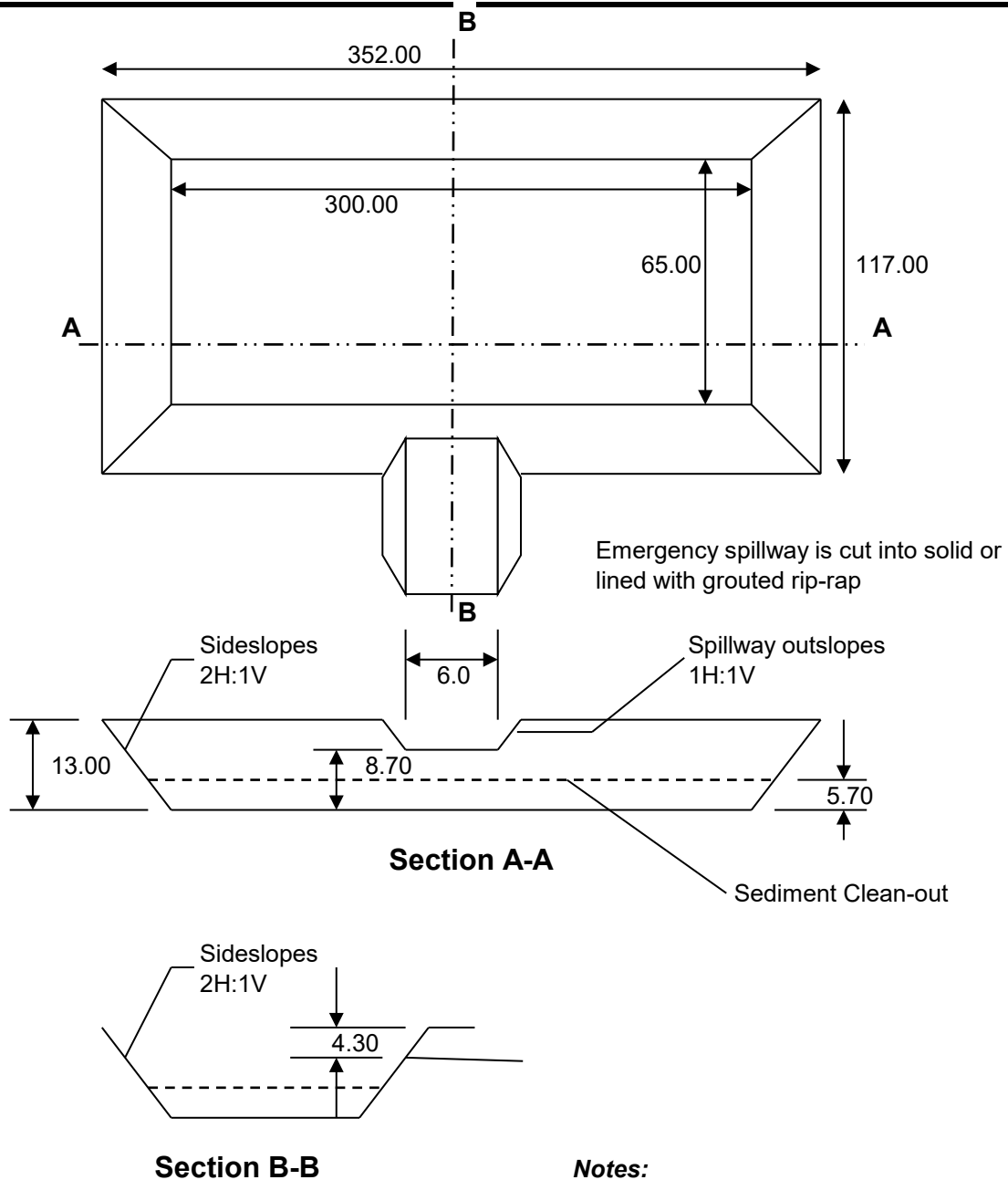
$$\begin{aligned} \text{Storage} &= V_s/V_r (\text{runoff})(\text{area})/12 \\ &= 4.37 \text{ ac-ft} \quad \text{Required to limit discharge to premine Q} \end{aligned}$$

$$\begin{aligned} \text{Provided} &= V_{\text{top}} - V_{\text{es}} \\ &= 3.772 \text{ ac-ft} \quad \text{From stage-storage curve} \end{aligned}$$

$$\text{Provided } V_s/V_r = 0.15$$

$$\text{Estimated } Q_o/Q_i = 0.90 \quad \text{From Haan & Barfield, Figure 4.19}$$

$$\text{During Mining Peak outflow} = \underline{\underline{286.6}} \text{ (cfs)}$$



I, _____
 _____,
 hereby certify, to the best of my knowledge
 and belief, in accordance with 405 KAR
 7:040, Section 9, that this document is
 correct as determined by accepted engineering
 practices and includes all the information
 required of it by KRS Chapter 350 and
 KAR Title 405.

Notes:

*No north arrow is provided on this
 drawing. The bench pond will be
 placed at the location shown on the
 MRP map such that the spillway is
 perpendicular through the berm.*

*The design specifies only the stage
 between various features of the pond.
 Due to several conditions, such as
 coal seam rolls, the designs are based
 on stages and not elevations, therefore
 no elevations are shown. Approximate
 elevations can be estimated from the MRP.*

PondOBP-43

Design

Not to Scale

STREAM AND
WETLAND RESTORATION
Mosley Gap 918-0504 AM 04

FOR

Ferroglobe USA Mining, LLC

332 W Cumberland Gap Pkwy, Corbin, KY 40701



Aquatic Resources
Management

2554 Palumbo Drive

Lexington, KY 40509

(859) 388-9595

November 10, 2025

General Notes

Tree & Shrub Planting

Geomorphology

This stream restoration project has two stream classifications (A4 & B4) utilized in the stream geomorphology natural channel design. Specifically this reach/type of stream will be constructed to meet the classification of the Stream Type. Final structure placement will be determined after the backfill configuration is complete. Log structures can be used in place of rock structures at any interval.

Stream Definitions & Characteristics

Stream orientation and geomorphology will always be constructed in the direction of looking downstream at all times unless other wise directed.

1. Bankfull Discharge: The discharge and corresponding stage at the incipient point of flooding begins.
2. Bankfull Width: the width of the channel is measured at this elevation. (See Typical)
3. Bankfull Mean Depth: The mean depth of flow at the Bankfull stage, determined by the cross-sectional area of the riffle or the pool. (See Typical)
4. Bankfull Max Depth: The max depth of flow at the Bankfull stage, determined by the cross-sectional area of the riffle or the pool. (See Typical)
5. Flood-prone area width: the width associated with a value of twice the Bankfull depth. it is the area including the flood plain of the stream.
6. Riffle: The shallow section of a stream that is characterized by increased velocities and gradients.
8. Step: The shallow section of a high gradient stream that is short in length and shallow in depth. Typically the steps are much more narrow than the pools found in a specific reach.
9. Pool: The deep section of a stream that is characterized by decreased velocities and gradient.
10. Low Flow Channel: A channel created to increase shear stress and enable flows in low periods to transport suspended sediment efficiently.
11. Thalweg: The lowest elevation found within the stream channel. This may be the basis for the stream stationing also.
12. Right Bank: Looking downstream the bank immediately to the right side.
13. Left Bank: Looking downstream the bank immediately to the left side.
14. Sinuosity: The ratio of stream length to down valley distance. Sinusity is the stream length X valley length
15. Cross-Vane: The objectives of this structures are to: (1) create in-stream cover/holding water; (2) take excess shear stress away from the "near bank" region and direct the water to the center of the stream to maintain lateral stability; (3) increase stream depth by decreasing width/depth ratio; (4) increase sediment transport capacity; (5) provide a natural sorting of gravel on the up-welling portion on the downstream side of structure for spawning; (6) create grade control to prevent down cutting. Structure Spacing will be determined upon final backfill slopes.
15. J-Hook: This structure is designed to re-direct velocity distribution and high velocity gradient in the near-bank region, stabilize stream banks, dissipate energy in deep, wide and long pools created below the structure, create holding cover for fish and spawning habitat in the tail-out of the structure.
16. Footer Rock: The rock place on the bottom of the structure underneath the surface rock. This rock shall be larger than surface rocks and flat (not rounded).
17. Surface Rock: This rock is placed on top of the footer rock. The rock shall be smaller than the footer rock and flat (not rounded).
18. Log Weir: This structure is designed to control grade and decrease velocity on the downstream side by creating a scour pool.

Trees and shrubs should be planted on 12' centers.
Trees and shrubs should be planted with their top major roots even with the soil line.
Trees and shrubs planted at the wrong depth do not develop well and may have shortened life spans. Excess soil should be removed before planting.
Planting will begin at the ordinary high water mark and extend 25' on each side of the restored stream.

The planting Hole:
Dig a pit at least twice the diameter of the root mass and deep enough to place the root flare even with or up to one inch higher than the soil line. Handle the tree or shrub by the root mass and not by the trunk. Ensure the root mass or container is on solid ground to prevent settling.

Backfill Soil:
Make sure the tree or shrub is straight before backfilling. Use the same soil that came out of the pit. Chop the soil and remove any stones or debris. Avoid potting soil, peat moss or other amendments. Fill the hole halfway, watering thoroughly as you go, then finish backfilling. Work the soil around the ball gently so that no air pockets are left. Firm the soil so the tree is vertical and adequately supported, but do not compact the soil.

Water:
Saturate the entire backfilled soil with water. A slow gently soaking is best. Add more soil if need to compensate for settling.

Stakes:
Stakes may be used to prevent shifting of the root mass. The tree or shrubs shall be allowed to sway six (6) to eight (8) inches. Drive the stakes near the tree or shrub, but not through the roots.

General Construction Sequence

Stream construction should proceed in an upstream to downstream manner to avoid disrupting restored sections. All substrate will be durable, non-toxic, non-acidic, and a minimum of six inched deep.
Whenever possible create the new stream channel via survey in the low/no flow periods or in a newly excavated channel. The dimension, pattern, and profile along with stream structures shall be in place prior to water flow in the newly created channel. If possible the channel should be allowed one (1) growing season prior to water flow.

1. Contractor shall locate and identify the thalweg/centerline via survey prior to excavation of stream channel.
2. Contractor shall identify and locate areas to be utilized as riffles, pools, and structures via survey prior to construction. (See Plan, Grading and Detail sheets)
- 3.Excavate the riffle Bankfull Channels as indicated on the profile and cross-section. (See Typical)
4. Excavate and place structures within the Bankfull Channel in the appropriate locations located by survey prior to construction. (See Plan View & Grading)
5. Excavate pools within the Bankfull Channel located via survey prior to construction. (See Profile and/or Plan View).
6. Construct the Flood-prone area width while grading the side slopes. (See Typical)
7. Prepare the side slopes for seeding and the riparian vegetation.
8. Seed the riparian area while planting the riparian trees and shrubs. (See Riparian Detail Sheet)

Aquatic Resources
Management

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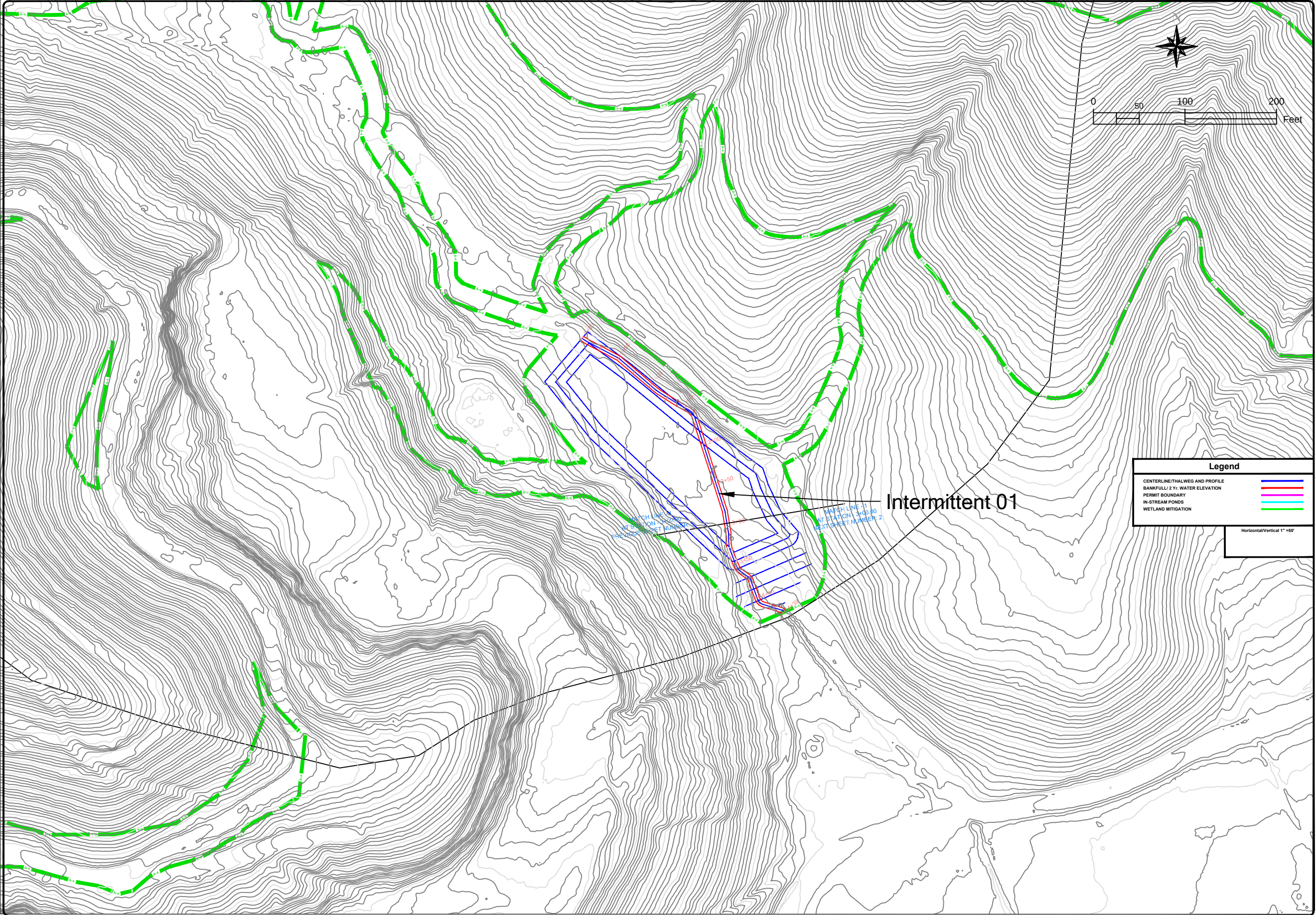
Mosley Gap
Stream and Wetland Restoration
for

Ferroglobe USA Mining, LLC
332 W Cumberland Gap Pkwy, Corbin, KY 40701

SCALE:		As Shown		DESIGNED BY:		DETAILED BY:		CHECKED BY:		DATE:		REVISIONS	
JOB #:	ING	DESIGNED BY:	ING	DETAILED BY:	ING	CHECKED BY:	ING	DATE:	11-10-25				

SHEET:

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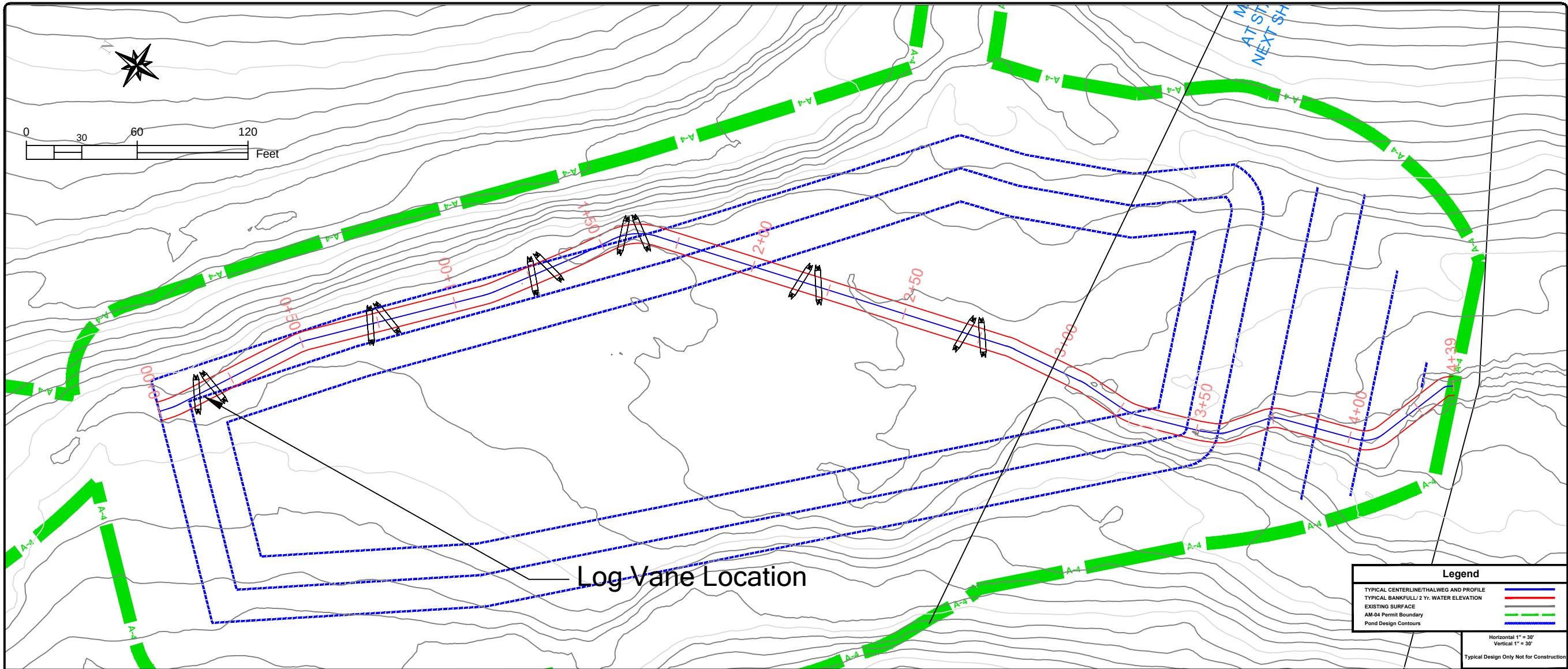




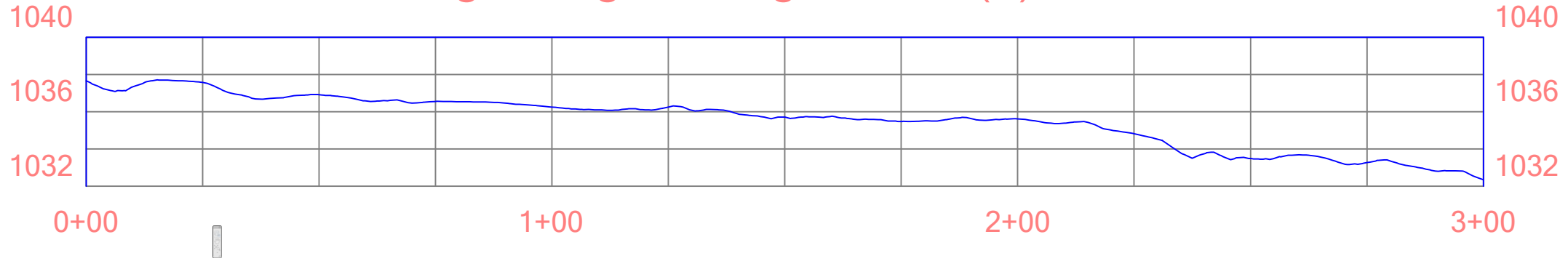
Aquatic Resources Management
2554 Palumbo Drive
Lexington, KY 40509
(859) 388-9595

Mosley Gap
Stream and Wetland Restoration
for
Ferroglobe USA Mining, LLC
332 W Cumberland Gap Pkwy Suite 100 Corbin, KY 40703

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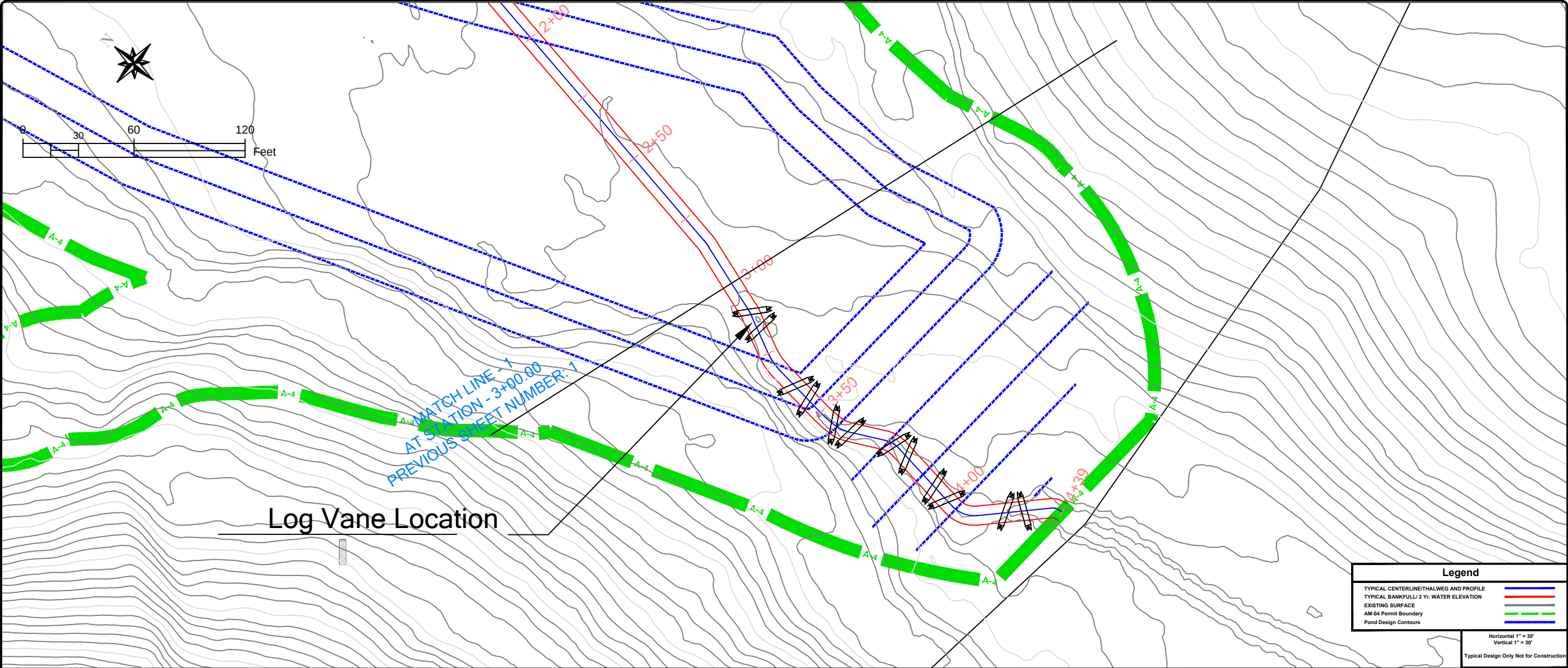
Existing-Designed Alignment - (1) PROFILE



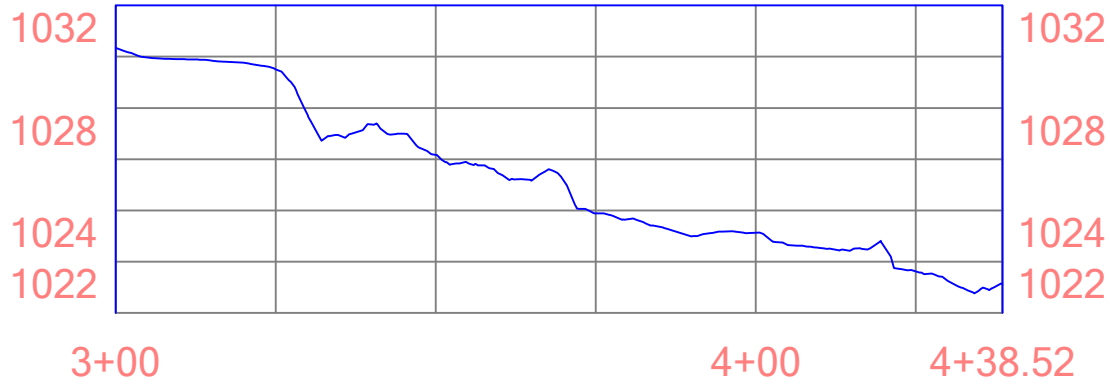
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DETAILED BY:	NKB				
CHECKED BY:					
DATE:	11-10-25				



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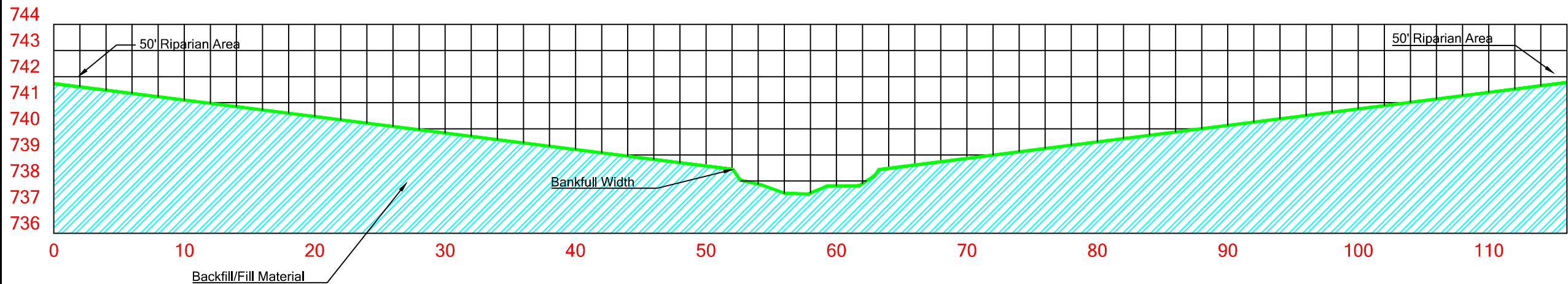
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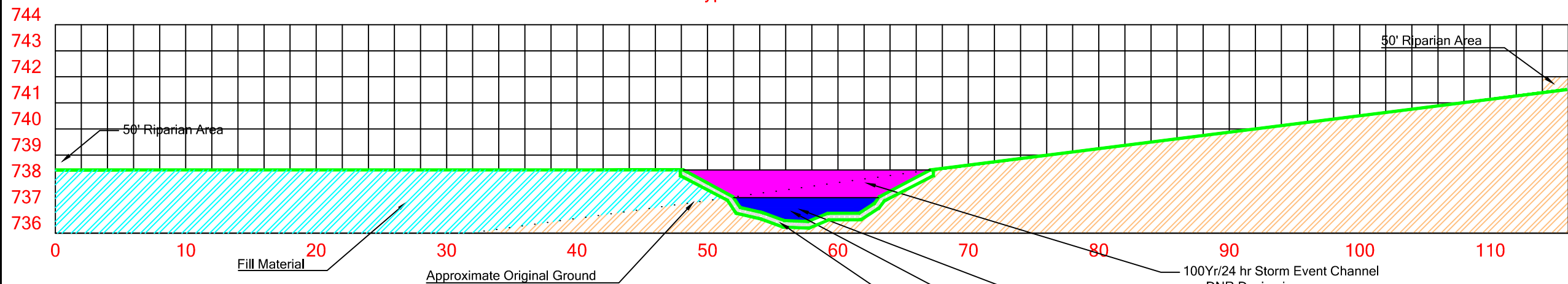
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		NO.	DATE	BY	REVISION
JOB #:	NKB				
DESIGNED BY:	NKB				
DETAILED BY:	NKB				
CHECKED BY:					
DATE:	11-10-25				

Typical Cross-Sections

Typical Restoration Cross Section



Typical Nested Channel



100Yr/24 hr Storm Event Channel
 per DNR Design in
 Att_30_4A_HF_1_Ditch_Design
 Channel per ACOE LRN 2007-01700
 (See Stream Channel Schedule for
 Channel Design Criteria)
 Structures Used for Energy Dissipating
 Structures Will Not Extend into 100 Yr/24
 Storm Channel
 Channel Lining Rip-Rapped or Cut in Solid.
 Rip-Rapped, the Underlying Material
 Compacted to Minimize Infiltration.

Table 5: Designed Restoration Parameters

Stream	Ac	Sq Mi	Abkf	Qbkf	Wbkf	dbkf
Int. 01	107.1	0.17	2.82	9.48	5.74	0.50
Construction of Streams will range +/-20%						

Actual Constructed Dimensions Can Vary by +/- 25%
Channel Slopes will be determined after final backfill and final structure placement and Riffle/Pool Spacing will be determined at that time.

100yr/24hr Channels are Minimum 5' wide and 3' deep, but can be constructed larger to accomodate specific storm events.

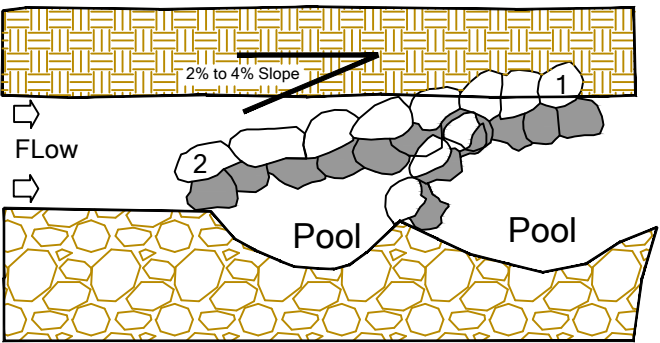
Cross-Sections Not to Scale

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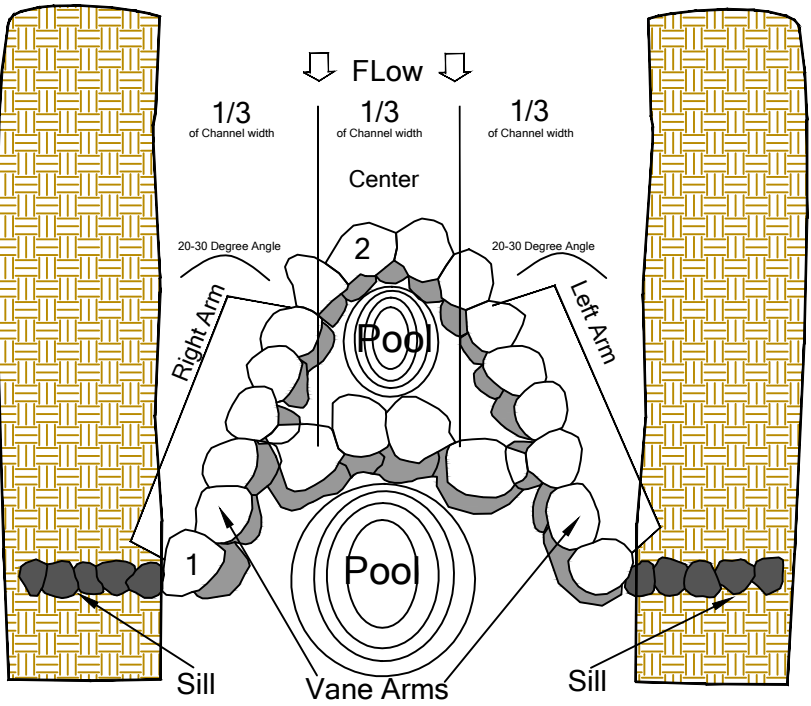
1. All structural material must be obtained prior to excavation of structure.
2. Contractor may, if the stream designer is not present, designate how the available material will be constructed prior to excavation.
3. The Footer Rock(s) in the middle 1/3 (center) of the channel shall be excavated and placed. Check to ensure spacing of Footer Rock(s) does not allow water to flow "under" or "between" the rocks.
4. The Footer Rock(s) of the Vane Arm furthest from the material shall be excavated and placed. Check to ensure arm "angle" and "slope" is within the specifications. Check to ensure spacing of Footer Rock(s) does not allow water to flow "under" or "between" the rocks.
5. The Footer Rock(s) for the Vane Arm closest to the material shall be excavated and placed. Check to ensure arm "angle" and "slope" is within the specifications. Check to ensure spacing of Footer Rock(s) does not allow water to flow "under" or "between" the rocks.
6. Place the Surface Rock(s) in the middle 1/3 (center) of the channel on top of the Footer Rock(s). Check to ensure there is no "pooling" of water behind the Surface Rock(s). Check to ensure spacing of Surface Rock(s) does not allow water to flow "under" or "between" Surface Rock(s). Check to ensure 1/4 of the Footer Rock(s) is exposed on the downstream end of the Surface Rock(s).
7. Place Surface Rock(s) on the Vane Arm Footer Rock(s) furthest from the material. Check to ensure spacing of Surface Rock(s) does not allow water to flow "under" or "between" Surface Rock(s). Check to ensure 1/4 of the Footer Rock is exposed on the downstream end of the Surface Rock(s). Surface Rock shall tie into the Bankfull elevation. Place sills into the Bankfull Bench and bury with channel material excavated from the pool.
8. Place Surface Rock(s) on the Vane Arm Footer closest to the material. Check to ensure spacing of Surface Rock(s) does not allow water to flow "under" or "between" Surface Rock(s). Check to ensure 1/4 of the Footer Rock is exposed on the downstream end of the Surface Rock(s). Surface Rock shall tie into the Bankfull elevation. Place sills into the Bankfull Bench and bury with channel material excavated from the pool.
9. Excavate the "pool" area to the specified depth. The deepest section of the pool shall be within the first 15% of the length of the Vane Arm and gradually rising in elevation to the end of the Vane arms. Utilize the excavated material to backfill each Vane arm. The material shall be placed evenly with the Surface Rock and the Bankfull elevation.
10. Contractor or stream designer (if present) shall check water surface elevation to ensure water will be "pooled" to the middle of the Surface Rock(s) located on the middle 1/3 of the channel.

Cross-Vane Details

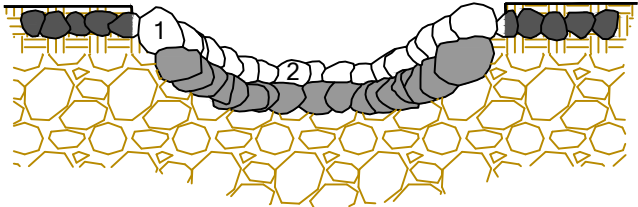
Profile View



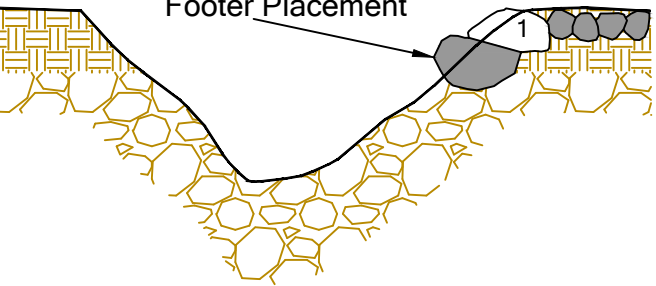
Plan View



Cross-Section
Cross-Vane



Cross-Section
Footer Placement



Typical Cross-Vane
Specifications and Sizing

Note: All sizes in Feet

Location:	See Plan View		
	Width=W	Thickness=T	Length=L
Center Footer Rock	Min	Max	Length of Center
	W/T/L 2.0/0.8/2.5	W/T/L 2.5/1.0/3.0	2.5
Center Surface Rock	Min	Max	Length of Center
	W/T/L 2.0/0.5/2.0	W/T/L 2.5/0.8/2.5	2.5
Left or Right Arm Footer Rock	Min	Max	Length of Arm
	W/T/L 2.0/0.8/2.5	W/T/L 2.5/1.0/3.0	3.5
Left or Right Arm Surface Rock	Min	Max	Length of Arm
	W/T/L 2.0/0.5/2.0	W/T/L 2.5/0.8/2.5	3.5
Left & Right Arm Sill	Min	Max	Length of Sill
	W/T/L 0.5/0.3/0.8	W/T/L 0.8/0.5/1.0	1.0
Left & Right Arm Slope	2% to 4%		

Aquatic Resources
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Mosley Gap
Stream and Wetland Restoration

for
Ferroglobe USA Mining, LLC
332 W Cumberland Gap Pkwy, Corbin, KY 40701

REVISIONS

SCALE: As Shown

JOB #: NGB

DESIGNED BY: NGB

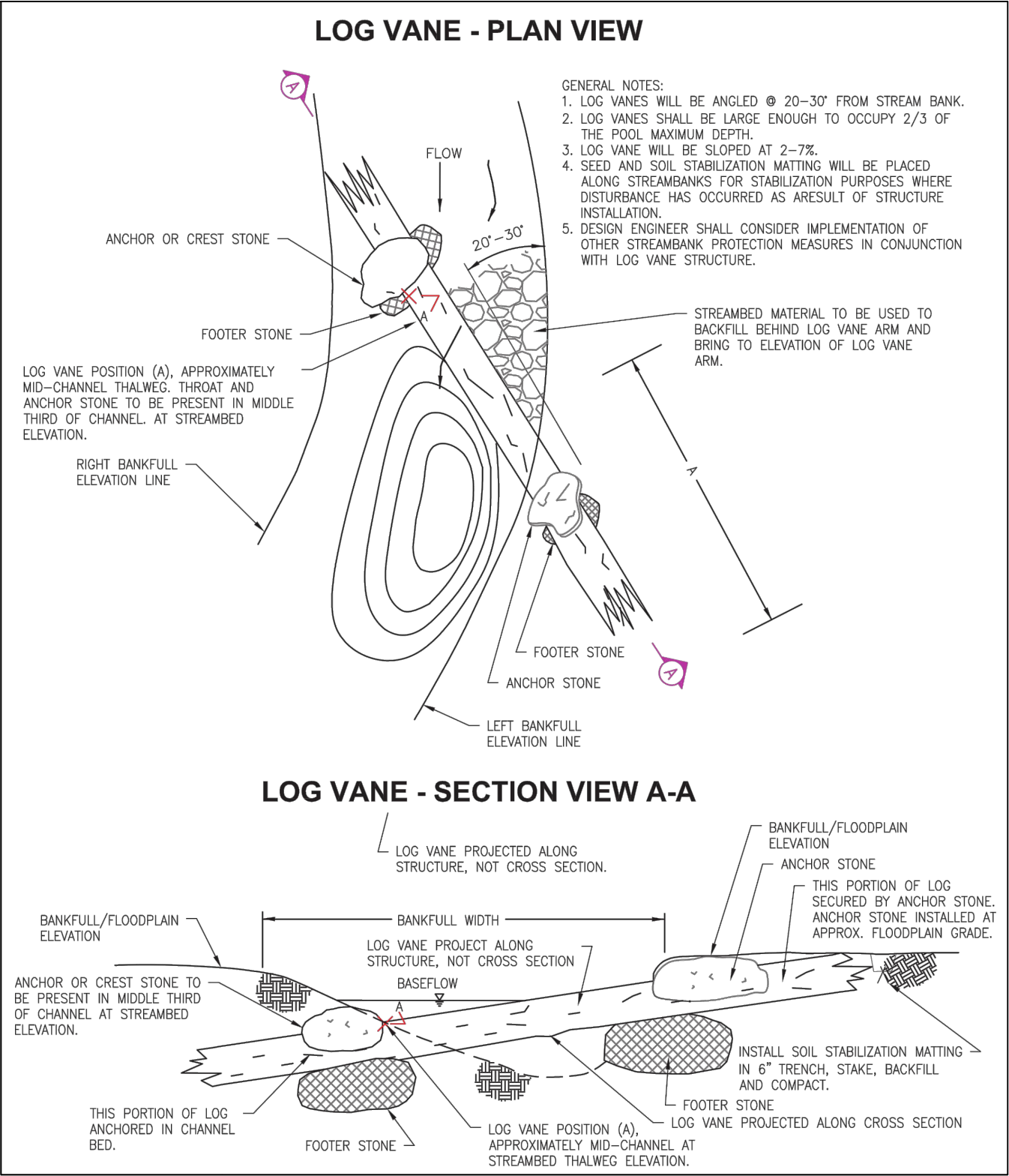
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CHECKED BY: NGB

DATE: 11-10-25

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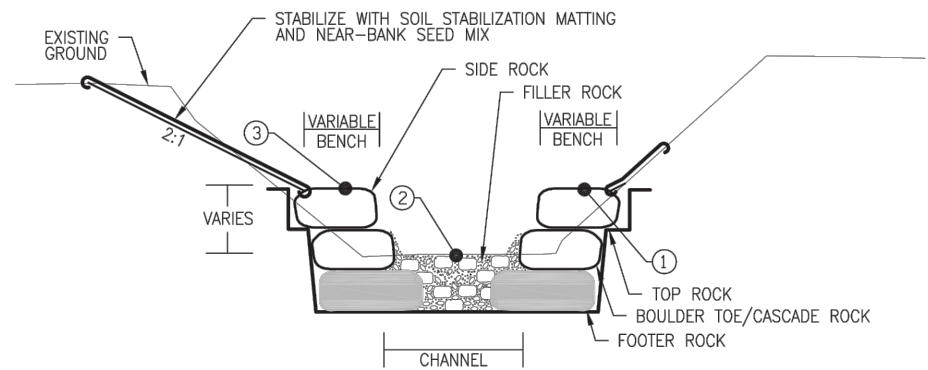


- GENERAL NOTES:
1. LOG VANES WILL BE ANGLED @ 20-30° FROM STREAM BANK.
 2. LOG VANES SHALL BE LARGE ENOUGH TO OCCUPY 2/3 OF THE POOL MAXIMUM DEPTH.
 3. LOG VANE WILL BE SLOPED AT 2-7%.
 4. SEED AND SOIL STABILIZATION MATTING WILL BE PLACED ALONG STREAMBANKS FOR STABILIZATION PURPOSES WHERE DISTURBANCE HAS OCCURRED AS A RESULT OF STRUCTURE INSTALLATION.
 5. DESIGN ENGINEER SHALL CONSIDER IMPLEMENTATION OF OTHER STREAMBANK PROTECTION MEASURES IN CONJUNCTION WITH LOG VANE STRUCTURE.

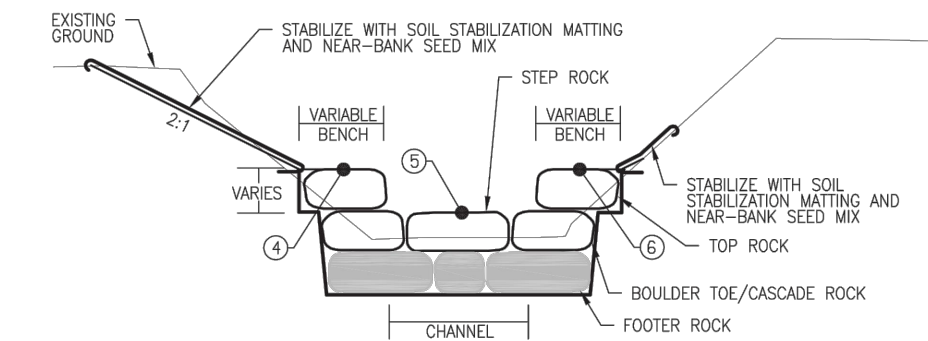


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CHECKED BY:	NG				
DATE:	11-10-25				

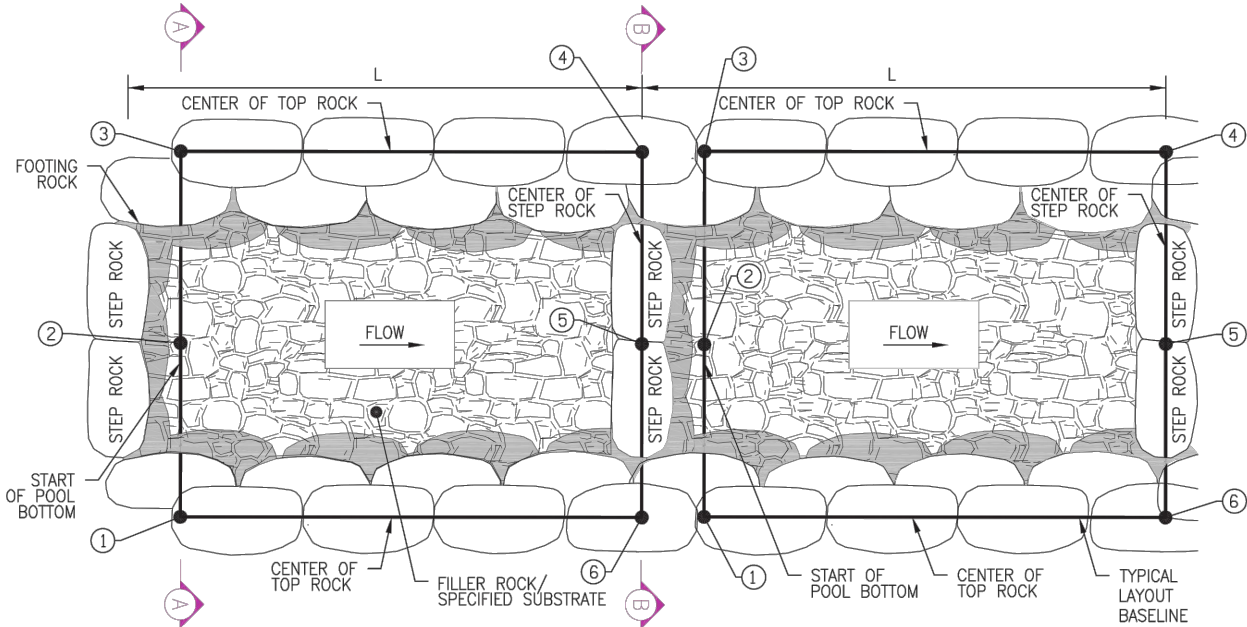
ROCK STEP POOL WITH BOULDER TOE - SECTION VIEW A-A



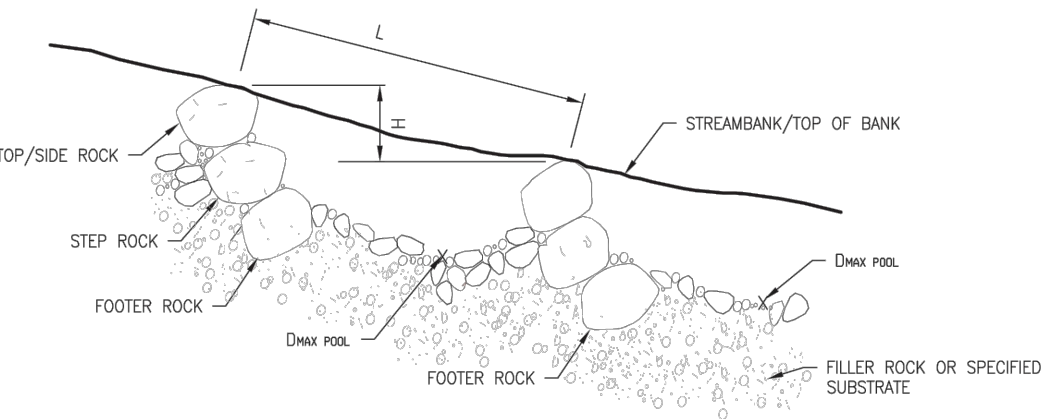
ROCK STEP POOL WITH BOULDER TOE - SECTION VIEW B-B



ROCK STEP POOL WITH BOULDER TOE - PLAN VIEW



ROCK STEP POOL WITH BOULDER TOE - PROFILE VIEW



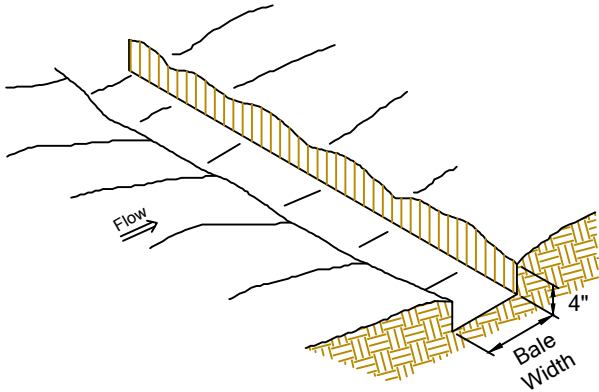
- GENERAL NOTES:
1. NO GAPS OR VOIDS WILL EXIST BETWEEN FOOTER, CASCADE, AND TOP ROCK.
 2. FOOTER, CASCADE AND SIDE ROCKS EXTEND ALONG STREAMBANK BETWEEN ROCK STEPS TO CREATE A BOULDER TOE WALL ALONG STREAMBANK.
 3. INSTALLATION OF GEOTEXTILE FABRIC MAY NEED TO BE CONSIDERED BASED UPON STREAM SLOPE, WET WEATHER CONDITIONS, AND OTHER ELEMENTS DETERMINED THROUGH SITE ASSESSMENT.



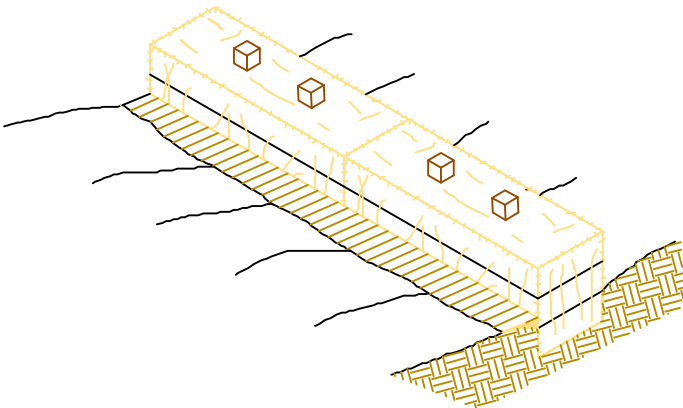
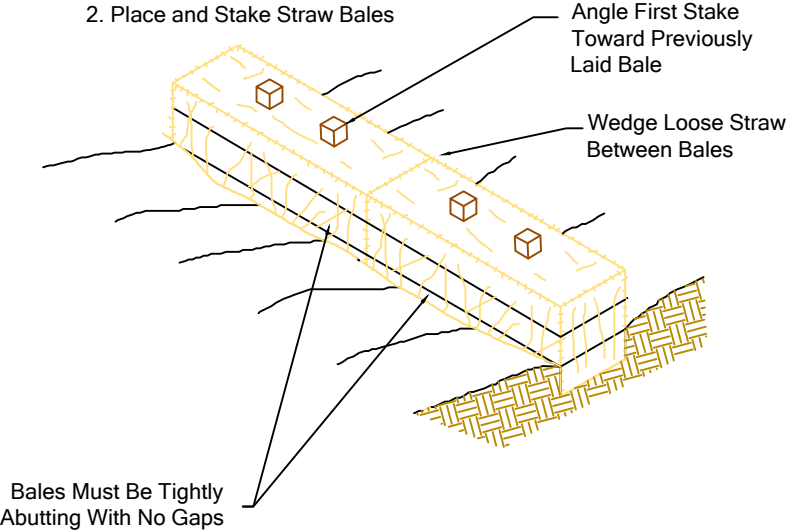
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As Shown		INB	INB	11-10-25		

Erosion Control

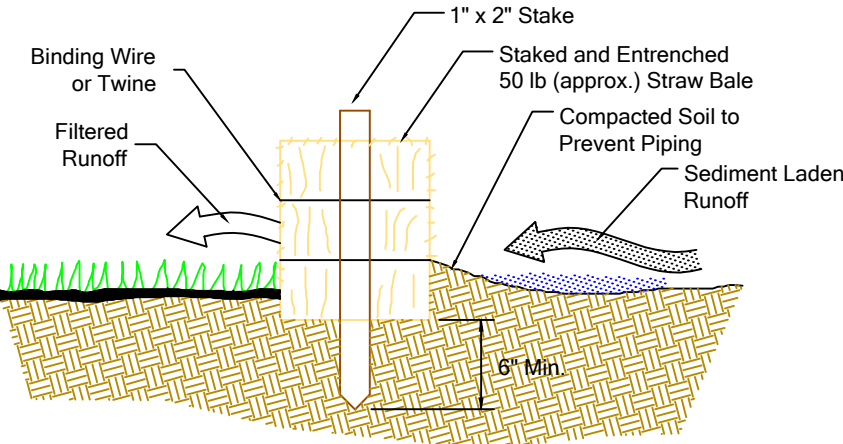
1. Excavate the Trench



2. Place and Stake Straw Bales



3. Backfill and Compact the Excavated Soil



Properly Installed Straw Bale

Aquatic Resources
Management
2554 Palumbo Drive
Lexington, KY 40509
(859) 388-9595



Mosley Gap
Stream and Wetland Restoration
for
Ferroglabe USA Mining, LLC
332 W Cumberland Gap Pkwy, Corbin, KY 40701

SCALE:	As Shown	REVISIONS			
		NO.	DESCRIPTION	DATE	BY
JOB #:					
DESIGNED BY:	NG				
DETAILED BY:	NG				
CHECKED BY:					
DATE:	11-10-25				

Typical Stream Riparian Area Tree and Shrub Species to be Planted

Common Name	Species Name	Canopy Location
Common Name	Species Name	Canopy Location
Pawpaw	<i>Asimina triloba</i>	Understory
Pepper Bush	<i>Lindera benzoin</i>	Understory
Umbrella Magnolia	<i>Magnolia tripetala</i>	Understory
Bitternut Hickory	<i>Carya cordiformis</i>	Understory
American Elm	<i>Ulmus americana</i>	Understory
Slippery Elm	<i>Ulmus rubra</i>	Understory
Cucumber tree	<i>Magnolia acuminata</i>	Understory
American Holly	<i>Ilex opaca</i>	Understory
American Hornbeam	<i>Carpinus caroliniana</i>	Midstory
Sourwood	<i>Oxydendron arboreum</i>	Midstory
Sweet Birch	<i>Betula lenta</i>	Midstory
Sandbar Willow	<i>Salix exigua</i>	Midstory
Shortleaf Pine	<i>Pinus echinata</i>	Midstory
Virginia Pine	<i>Pinus virginiana</i>	Midstory
American Beech	<i>Fagus Grandifolia</i>	Overstory
Red Maple	<i>Acer rubrum</i>	Overstory
Tuliptree	<i>Liriodendron tulipifera</i>	Overstory
Sugar Maple	<i>Aceae saccharum</i>	Overstory
Northern Red Oak	<i>Quercus rubra</i>	Overstory
Sweet Gum	<i>Liquidambar styraciflua</i>	Overstory
Sycamore	<i>Platanus occidentalis</i>	Overstory
Black Willow	<i>Salix nigra</i>	Overstory
White Oak	<i>Quercus alba</i>	Overstory
Black Locust	<i>Robinia pseudoacacia</i>	Overstory

Aquatic Resources
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Bare Root Tree Planting Specifications

Correct and Incorrect Planting Depths



CORRECT At the same depth or ½ inch deeper than the seedling grew at the nursery.



INCORRECT Too deep and roots are bent.



INCORRECT Too shallow and roots are exposed.

Mattock Planting



1. Insert the mattock, lift the handle, and pull up.

2. Place the seedling along the straight side at the correct depth.

3. Fill in and pack the soil to the bottom.

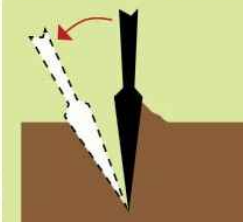


4. Finish filling in the soil and firm with your heel.

5. Firm around the seedling with your foot.

Dibble Planting

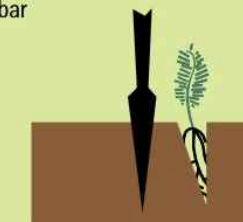
Planting or "dibble" bar



1. Insert the dibble as shown and pull it toward you.



2. Remove the dibble and place the seedling at the correct depth.



3. Insert the dibble 2 inches from the seedling toward you.



4. Pull the handle of the dibble toward you, firming the soil at the bottom of the roots.



5. Push the handle of the dibble away from you, firming the soil at the top of the roots.

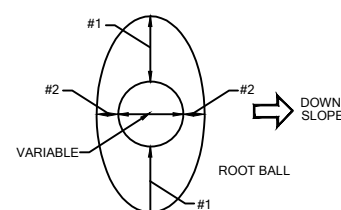
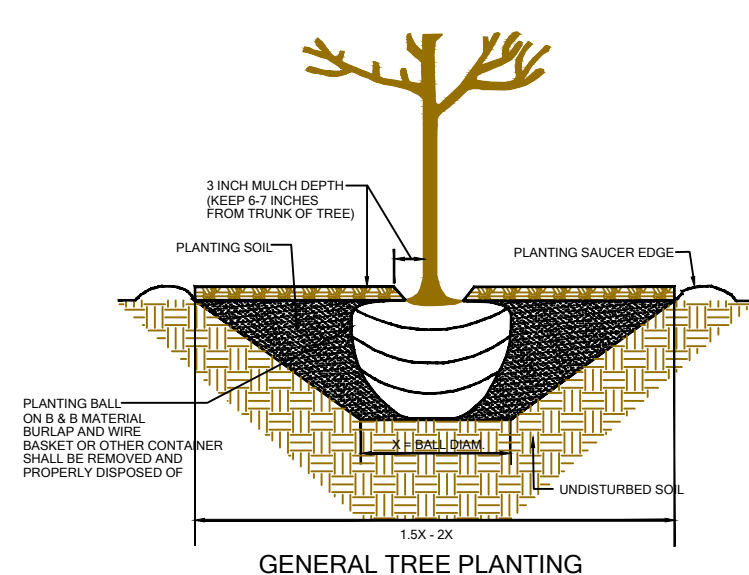


6. Firm the soil around the seedling with your foot.



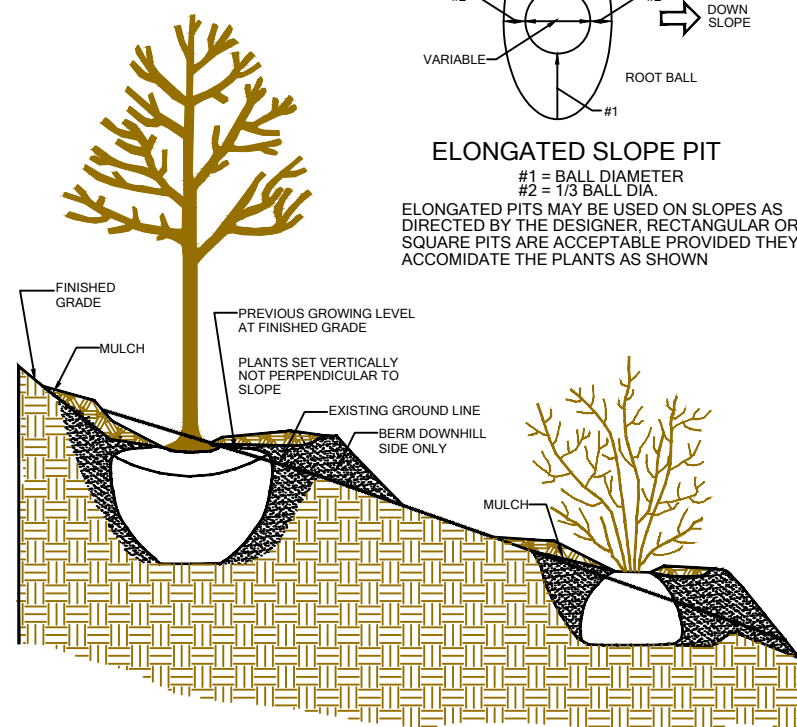
SCALE:		As Shown		REVISIONS	
JOB #:	DESIGNED BY:	INB	INB		
	DETAILED BY:	INB	INB		
	CHECKED BY:				
	DATE:	11-10-25			

Container Tree Planting Specifications



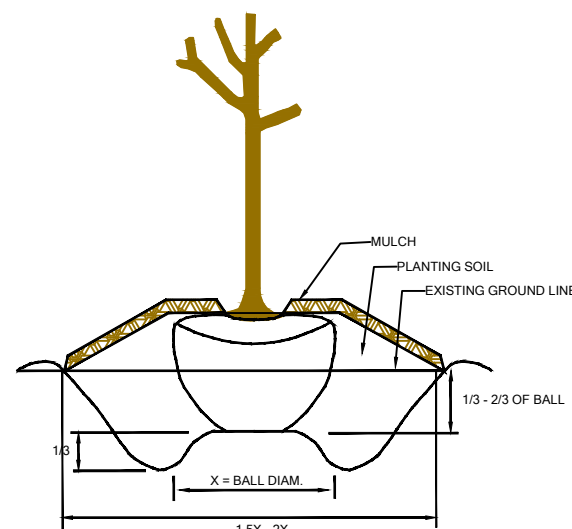
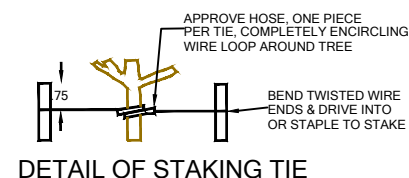
ELONGATED SLOPE PIT

#1 = BALL DIAMETER
#2 = 1/3 BALL DIA.
ELONGATED PITS MAY BE USED ON SLOPES AS
DIRECTED BY THE DESIGNER. RECTANGULAR OR
SQUARE PITS ARE ACCEPTABLE PROVIDED THEY
ACCOMMODATE THE PLANTS AS SHOWN

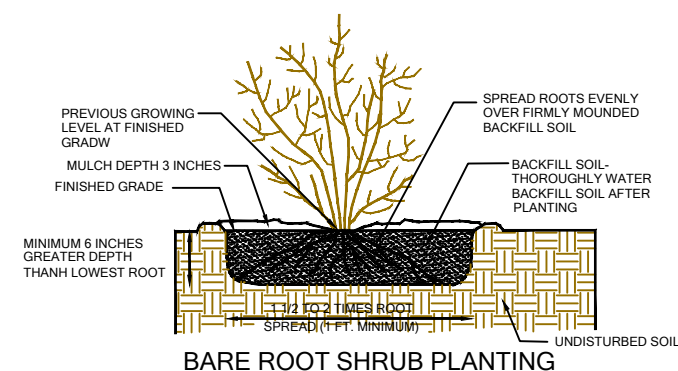
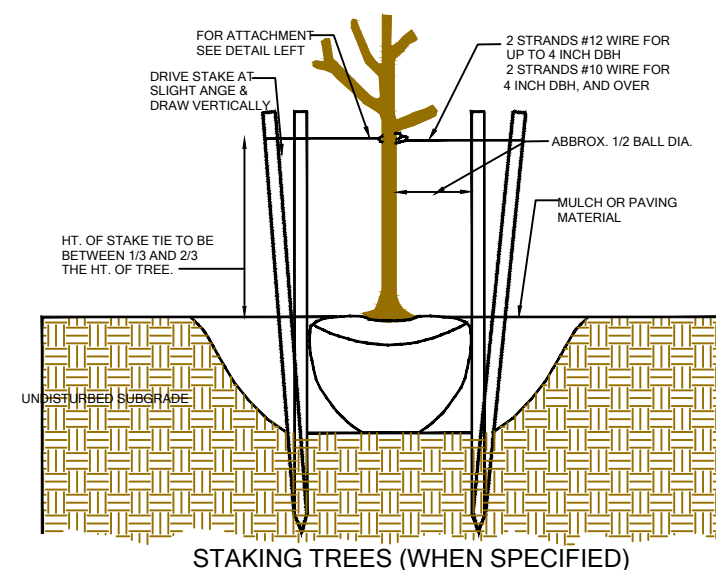


PLANT PLACEMENT ON SLOPE

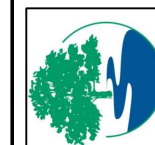
ALL PLANT MATERIALS



TREE PLANTING IN WET/HEAVY SOILS



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					As Shown	
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Typical Pavement Analysis

