

Illinois Environmental Protection Agency Information:

Is application to be used as an application for an NPDES and/or Subtitle D?

YES NO

NOTE: If this is an application for an NPDES permit, the Consolidated Permits Program, Application Form 2C (renewal), Form 2D (new), or Form 2E (sanitary) must be completed.

If YES, check the appropriate box below:

IEPA Subtitle D State Permit
 NPDES (New)
 NPDES (Renewal)
 NPDES (Modification)

I waive my right of the 90-day permit issuance deadline as required by Section 39(a)(4) of the Illinois Environmental Protection Act and 35 Ill. Adm. Code 309.225(c) of the Illinois Pollution Control Board Rules and Regulations.

Affidavits, Certifications, Insurance Certificates, Newspaper Notice, Financial Assurance. The applicant shall attach the appropriate affidavits required for the type of operations proposed, a draft public notice, and a valid certificate of insurance.

Check and attach the completed documents for the proposed operations, if applicable:

<input type="checkbox"/>	Underground Mining Affidavit
<input type="checkbox"/>	Planned Subsidence Mitigation Right of Entry Affidavit
<input type="checkbox"/>	Underground Slurry Disposal Affidavit
<input checked="" type="checkbox"/>	Public Land Survey Monuments Certification
<input checked="" type="checkbox"/>	Engineering Certification
<input checked="" type="checkbox"/>	Technical Data Information Sheet
<input type="checkbox"/>	Occupied Dwelling Buffer Zone Waiver

Complete below and attach the draft public notice for review. [1778.21].

The Daily Record, Lawrenceville, IL daily paper

Proof of general liability insurance from an authorized provider (licensed to write from the Illinois Department of Insurance), Performance bond

<input checked="" type="checkbox"/>	Certificate of Insurance [1778.18, 1817.121(c)(3)]
<input type="checkbox"/>	Evidence of required bond (Renewals only) 1774.15

I waive the time limits for the Department to make its final permit decision pursuant to 62 Ill. Adm. Code 1773.19(a)(2)

I, Rick Perry VP, under penalties
(Signature, Title)

of perjury, declare that I have examined this application, including the accompanying statements and documents, and that, to the best of my knowledge, it is true and correct. I also certify that all printed copies of this application provided to the Department and County Clerk(s) are identical. (Signer must be at least a Vice-President or duly authorized representative)

Dated: 4-16-2019

ENGINEERING CERTIFICATION

I hereby certify the engineering design used in preparation of this application, attachments, and supplements were done by me or under my direct supervision.

I certify that I am familiar with all of the plans, specifications, reports, and maps submitted as part of this application and that said information is accurate.

I certify to the best of my knowledge all such design is in accordance with all applicable local, state and federal laws, rules and regulations.

I further certify that all applicable maps and/or drawings have been individually sealed in accordance with the Professional Engineering Act, 225 ILCS 325/15.

INDIVIDUAL P.E. CERTIFICATION

"Butch" Wilford W. Cheatham

062-054894

Name

Illinois Registration Number (Seal)

HMG Engineers, Inc.

Firm

1032 N. 6th Street

Murphysboro, IL 62966

Address

618-684-9355

Phone Number



Expires 11-30-2019

Signature

Date

PROFESSIONAL DESIGN FIRM CERTIFICATION

Complete if applicable. If not, respond N/A.

As an employee of a Professional Design Firm as defined by the Illinois Department of Financial and Professional Regulation, I certify that the professional design firm is registered and in good standing with the Illinois Department of Financial and Professional Regulation.

Henry, Meisenheimer & Gende Inc. (HMG)

184000899

Professional Design Firm Name

Professional Design Firm Number

PUBLIC LAND SURVEY MONUMENTS CERTIFICATION

I hereby certify that the existence of Public Land Survey Monuments, as defined by 765 ILCS 220/3.03, has been researched as follows:

A search of the Public Records of the county or counties for the proposed permit area has been made for the existence of Public Land Survey monuments. Records showing the existence of Public Land Survey monuments within the proposed permit area were (_____ found, _____ not found). **No section corners or exterior quarter corners are located within the proposed permit area.**

 X A) A field search for existing monumentation in the proposed permit area was made and none was found.

_____ B) A field search for existing monumentation in the proposed permit area was made and the monuments found. Public Land Survey monuments have been identified by type and location on the Pre-mining Land Use Map and have been referenced to the State Plane Coordinate System. Pursuant to 62 Ill. Adm. Code 1816.11(g), a plan has been provided, in accordance with prudent surveying practices, to replace monumentation disturbed by the mining activities. The proposed plan is included as part of the Reclamation Plan under Part 11.1.3 of the permit application.

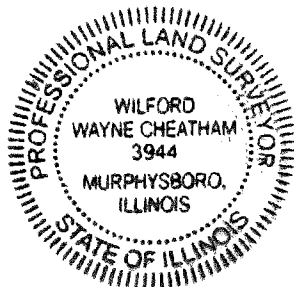
I further certify the information given above is true and correct to the best of my knowledge and belief.

 Brett Wilford W. Cheatham IPLS NO. 3944
Surveyor/Engineer

Address: 1032 N. 6th Street
 Murphysboro, IL 62966

Phone: 618-684-9355
Date: 04-30-19

SEAL:



Cover Sheet: Application for Coal Mining and Reclamation Operations

Applicant: Sunrise Coal, LLC
Name of Company, Corporation, Partnership or Individual. [1777.11]

AVS ID: (Optional) _____

Applicant is a: Corporation Partnership Sole Proprietor
 Association or other Business Entity [1778.13(a)]

Mine Name: Oaktown – Russellville Portal
Address/PO: 1183 Canvasback Drive
City: Terre Haute
State: Indiana
Zip Code: 47802
Email Address: _____
Phone Number: 812-299-2800
Fax Number: _____
Tax ID/FEIN: 37-1449270

Application Type: New MUF
 Existing Permit No(s). _____
 Sig. Rev No. _____ Renewal Transfer No. _____
 IBR SIBR
 IPR

Type of Operation: Surface Underground Carbon Recovery

Mine Safety Health Administration Information:

MSHA ID Number 1103257 [1778.13(d)(1)]
Date of Issuance 4/04/2013

List the Mine Safety and Health Administration (MSHA) number(s) for all mine associated structures that require MSHA approval. [1778.13(g)]

Structure Type	Structure Name	MSHA No.
Shaft Sinking	Man & Material Shaft	

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<input type="checkbox"/>	Underground Slurry Disposal Affidavit
<input checked="" type="checkbox"/>	Public Land Survey Monuments Certification
<input checked="" type="checkbox"/>	Engineering Certification
<input checked="" type="checkbox"/>	Technical Data Information Sheet
<input type="checkbox"/>	Occupied Dwelling Buffer Zone Waiver

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The Daily Record, Lawrenceville, IL daily paper

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<input checked="" type="checkbox"/>	Certificate of Insurance [1778.18, 1817.121(c)(3)]
<input type="checkbox"/>	Evidence of required bond (Renewals only) 1774.15

I waive the time limits for the Department to make its final permit decision pursuant to 62 Ill. Adm. Code 1773.19(a)(2)

I, _____, under penalties
(Signature, Title)

of perjury, declare that I have examined this application, including the accompanying statements and documents, and that, to the best of my knowledge, it is true and correct. I also certify that all printed copies of this application provided to the Department and County Clerk(s) are identical. **(Signer must be at least a Vice-President or duly authorized representative)**

Dated: _____

Description of Proposed Permitting Action:

Describe in sufficient detail the proposed activities. The information should summarize the requested permitting action to assist the Department in determining the scope and magnitude of the proposal.

Application to develop a mine portal and associated structures to access underground mining operation under Permit #452. The portal will consist of a vertical shaft to provide man and material access to the underground operations. Surface facilities will include in addition to the headframe and hoist system an office-bathhouse building, warehouse building, supply storage yard, parking area, soil stockpiles, rock dust bin with associated borehole, fuel tank with associated borehole, sedimentation pond, electrical transformers, power borehole and access road.

Application Part Inventory:

Application Part	Application Part Title	Indicate with an "X" all Parts modified with this submittal
1.0	Administrative Information	
1.1	General Information	X
1.2	Acreage and Timetable	X
1.3	Ownership and Control Information	X
1.4	Violation History	X
1.5	Property Ownership	X
2.0	Pre-Mining information	
2.1	Pre-Mining Land Use Information	X
2.2	Pre-Mining Soils Information	X
2.3	Areas Where Mining is Limited or Prohibited	X
2.4	Public Parks, Historic Properties	X
2.5	Valid Existing Rights (VER) - Good Faith/All Permits Standard	
2.6	Valid Existing Rights (VER) - Needed for and Adjacent Standard	
2.7	Valid Existing Rights (VER) - Standards for Mine Roads	
3.0	Mining Operations Plan	
3.1	General Description of Operations	X
3.2	Description of Mine Facilities	X
3.3	Signs and Markers	X
3.4	Soil and Overburden Handling and Protection	X
3.5	Lateral Support	
3.6	Surface Mining Near Underground Mining	
3.7	Existing Structures	
3.8	Transportation Facilities	X
3.9	Non-Coal Mine Waste Material	X
3.10	Coal Preparation	
3.11	Coal Processing Waste and Underground Development Waste	X
3.12	Coal Refuse Disposal Area	
3.13	Air Pollution Control Plan	X
3.14	Fire Control Plan	X
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4.1	Regional Characteristics	X
4.2	Hydrogeologic Information	X
4.3	Area Specific Characteristics	X
4.4	Ground Water Information	X
4.5	Ground Water Monitoring Program	X
4.6	Surface Water Information	X

4.7	NPDES Monitoring Program	X
4.8	Protection of Hydrologic Balance	X
4.9	Preventative and Remedial Measures Plan	X
4.10	Liners	
4.11	Coal Combustion Materials	X
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5.2	General Drainage Control Description	X
5.3	Conveyance Ditch Design	X
5.4	Impoundments	X
6.0	Streams	
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6.3	Stream Buffer Variance	X
6.4	Streams Outside Permit Boundary	
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7.2	Threatened and Endangered Species	X
7.3	General Fish and Wildlife Protection and Enhancement Measures	X
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8.1	High Capability Post-Mining Land Use	X
8.2	Pre-Mining Prime Farmland Soils	X
8.3	Prime Farmland Soil Handling	X
8.4	Prime Farmland Reclamation Plan and Map	X
9.0	Reclamation Plan	
9.1	Post-mining Land Uses	X
9.2	Backfilling and Grading	X
9.3	Shaft, Slope, and Borehole Sealing	X
9.4	Abandonment and Closure of Refuse Disposal Areas	
9.5	Bond Estimation	X
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10.3	Revegetation of Soil Stockpiles	X
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- 10.6 Fish and Wildlife Herbaceous Reclamation Plan
- 10.7 Fish and Wildlife Woody Reclamation Plan

- 10.8 Fish and Wildlife Wetland Reclamation Plan
- 10.9 Fish and Wildlife Water and/or Developed Water Resources Reclamation Plan
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- 10.11 Industrial/Commercial Reclamation Plan
- 10.12 Recreation Reclamation Plan
- 10.13 Habitat Diversification in Cropland

11.0 Blasting (N/A)

12.0 Shaft, Slope and Miscellaneous Borehole Construction

- 12.1 Shafts and/or Slopes
- 12.2 Miscellaneous Boreholes

Tables and Attachments

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CD

PDF Copy of Entire Submittal
CAD files to OMM

PART 1: Administrative Information

1.1 General Information.

1.1.1 Applicant: Sunrise Coal, LLC

Applicant is a: Corporation Partnership Sole Proprietor
 Association or other Business Entity [1778.13(a)]

Individual Contact: [1778.13(b)] Lawrence D. Martin, President
(Name and Title)

Address/PO Box: 1183 Canvasback Dr.
City: Terre Haute
State: IN
Zip Code: 47802
Email Address:
Phone Number: 812-299-2800
Fax Number:
Tax ID/FEIN No. 37-1449270

1.1.2 Resident Agent who will accept service of process for the applicant: [1778.13(b)]

Company: Davis & Delanois Law Office
Individual Contact: Jerry A. Davis
(Name and Title)

Address/PO Box: P.O. Box 344
City: Danville
State: IL
Zip Code: 61834
Email Address:
Phone Number: 217-446-5255
Fax Number:
Tax ID/FEIN No. 37-1354260

1.1.3 Who will be the operator at the permit site? [1778.13(b)]

Applicant Other/Contract operator

If the operator is not the applicant, then complete Table 1.3.1 for the company/entity.

1.1.4 Who will pay Abandoned Mine Land Reclamation fees? [1778.13(b)]

Applicant Other/Contract operator

1.2 Acreage and Timetable.

Pit or Portal No./Name	County	Sec(s)	Twp	Range	Total Acres
Oaktown-Russellville Portal	Lawrence	29	5N	10W	101.00
TOTAL:					101.00

Shadow Area	County	Sec(s)	Twp	Range	Total Acres
TOTAL:					0.00

1.2.1 Indicate type of disturbance from mining and acreage associated with each type. [1780.11/1784.11]

Type of Disturbance:	Acres
Surface Mined Area	0.00
Processing Areas & Support Facilities	21.14
Undisturbed Areas (optional)	79.86
TOTAL (must equal total acres being permitted)	101.00
Shadow Area	0.00

1.2.2 Indicate on the Pre-Mining Land Use Map where future permits for coal refuse piles, coal waste impoundments, or other surface facilities would be located. Provide a general statement that future facilities will be located X number of miles from the current permit. [1778.17(a); 1779.24(c)]

There are no future plans for coal refuse piles, coal waste impoundments or other surface facilities at this time.

1.3 Ownership and Control Information.

1.3.1 Complete Table 1.3.1 to identify all owners/controllers of the applicant. Separate sheet/table shall be provided for each entity or individual deemed to be an owner/controller of the applicant.

Ownership or control is evidenced by:

- Being a permittee of a surface coal mining operation; or
- Based on instruments of ownership or voting securities, owning of record in excess of fifty (50) percent of an entity; or
- Having any other relationship which gives one person authority directly or indirectly to determine the manner in which an applicant, an operator, or other entity conducts surface coal mining operations

The following relationships are presumed to constitute ownership or control unless a person can demonstrate that the person subject to the presumption does not in fact have the authority directly or indirectly to determine the manner in which the relevant surface coal mining operation is conducted.

- Being an officer or director of an entity; or
- Being the operator of a surface coal mining operation; or
- Having the ability to commit the financial or real property assets or working resources of an entity;
- Being a general partner in a partnership; or
- Based on the instruments of ownership or the voting securities of a corporate entity, owning of record ten (10) through fifty (50) percent of the entity; or
- Owning or controlling coal to be mined by another person under a lease, sublease or other contract and having the right to receive such coal after mining or having authority to determine the manner in which that person or another person conducts a surface coal mining operation.

[1773.5, 1778.13(c)(1) to (c)(3)]

1.3.2 Complete Table 1.3.2 for surface coal mining and reclamation operations, within the five (5) years preceding the date of the application for associated with: **[1778.13(c)(4)/1778.13(c)(5)]**

- Each Owner/Controller identified in Table 1.3.1
- The applicant.

1.4 Violation History.

1.4.1 Has the applicant, any subsidiary, affiliate, or persons controlled by or under common control with the applicant, had Federal, State, or Tribal coal mining permit suspended or revoked in the last five (5) years preceding the date of submission of the application? **[1778.14(a)(1)]**

Yes No

1.4.2 Has the applicant, any subsidiary, affiliate, or persons controlled by or under common control with the applicant, had forfeited a performance bond or similar security deposited in lieu of bond? **[1778.14(a)(2)]**

Yes No

If YES to either Questions 1.4.1 or 1.4.2, the applicant shall complete Table 1.4 for any permit/company associated with permit suspension, revocation or bond forfeiture. **[1778.14(a) and (b)]**

1.4.3 The applicant shall complete Table 1.4.3 for all violations received by the applicant or any one owning/controlling the applicant as provided in Table 1.3.1 during the three (3) year period preceding the application date. **[1778.14(c)]**

For any outstanding violation or violation under appeal listed in Table 1.4.3, the applicant shall provide supporting documentation showing good faith efforts for the violation from the issuing agency, or in the case of appeals provide documentation of current proceedings. **[1773.15(b), 1778.14(c)]**

NOTE: Provide as an Attachment to Part 1.4.3.

1.5 Property Ownership.

1.5.1 Complete Table 1.5.1 for (1) each legal or equitable owner of record, (2) each holder of leasehold interest, and (3) any purchaser of record under a real estate contract for the surface and mineral property within the proposed permit boundary. **[1778.13(e), 1778.15(a)]**

If the proposed permit is for a surface mine where the private mineral estate has been severed from the private surface estate, applicant must also provide the Department with:

- A copy of the written consent of the surface owner to the extraction of coal by surface mining methods; or
- A copy of the conveyance that expressly grants or reserves the right to extract the coal by surface mining methods; or
- If the conveyance does not expressly grant the right to extract the coal by surface mining methods, provide the Department with documentation that, under the applicable State law, the applicant has the legal authority to extract the coal by surface mining methods. **[1778.15(b)]**
- See Part 1.5.3, below, for additional requirements to uncontrolled properties.

NOTE: Provide as an Attachment to Part 1.5.1.

1.5.2 Complete Table 1.5.2 for any owner of record for property (surface and subsurface) contiguous to any part of the proposed permit boundary. **[1778.13(f)]**

Does the applicant have an interest in any lands, options or pending bids on interest for lands which are contiguous to the proposed permit area?

Yes No

If YES, the applicant shall indicate in Table 1.5.2 all lands, interest in lands, options, or pending bids on interests held or made by the applicant for lands contiguous to the area described in the permit application. **[1778.13(h)]**

Upon request by the applicant, this information may be held in confidence by the Department, if not on public file. Does the applicant wish any of the above information to be held confidential?

Yes No

If YES, the applicant shall identify which information is to be held confidential in its statement. **[1778.13(h)]**

1.5.3 Complete Table 1.5.3 for any owner of record for property (surface and subsurface) identified in Table 1.5.1 and shown on the Pre-Mining Land Use Map identified in 1.5.4, not owned by the applicant, identifying the documents and legal rights claimed to enter and mine.

All properties identified in Table 1.5.1 that the applicant does not have a legal right to enter and begin mining operations shall require submission of a Property Ownership Waiver form for each property identified for the application to be considered administratively complete [see [Operator Memorandum No. 2011-01](#)]

The applicant has options to purchase all properties within the proposed permit area. Prior to affecting any lands, the applicant will exercise those options and have ownership secured. See Attachment 1.5.3 for copies of these documents.

NOTE: Provide as an Attachment to Part 1.5.3.

1.5.4 Delineate all boundaries of lands and names of present owners of record of those lands, both surface and subsurface, included in or contiguous to the permit area on the Pre-Mining Land Use Map. The map shall also show lands within the permit area that are controlled properties (i.e. applicant is claiming legal right to enter and begin surface coal mining and reclamation operations) versus uncontrolled properties (i.e. applicant does not yet have the legal right of entry). **[1779.24(a) and (b)]**

Table 1.3.1 Ownership and Control

List of entities and individuals own/controlling company

Hallador Energy Company

Company/Individual	Tax ID/SSN (Optional)	Position/Title, Ownership Type	Extended Desc.	% Ownership	Begin Date	End Date
David Hardie		Director		6.1	7/17/1989	
David Hardie		Chairman of the Board		6.1	9/19/1989	1/24/2014
Steven Hardie		Director		5.2	7/27/1994	
Bryan Lawrence		Director		19.9	11/16/1995	
Sheldon Lubar		Director		0	7/27/2008	8/3/2018
David Lubar		Director		0	8/4/2018	
John Van Heuvelen		Director		N.A.	7/16/2009	5/17/2017
Victor Stabio		Director		0.9	3/22/1991	3/8/2018
Charles Wesley IV		Director		0	8/4/2018	
Victor Stabio		Chairman of the Board		0.9	1/24/2014	3/8/2018
Victor Stabio		Chief Executive Officer		0.9	3/22/2014	1/24/2017
Victor Stabio		Secretary		0.9	9/14/2009	6/1/2016
Victor Stabio		Assistant Secretary		0.9	6/1/2016	3/8/2016
Teressa Jones		Controller		N.A.	2/1991	5/31/2016
Teressa Jones		Assistant Secretary		N.A.	9/14/2009	5/31/2016
Teressa Jones		Secretary		N.A.	7/24/1994	9/14/2009
W. Anderson Bishop		Chief Financial Officer		N.A.	9/14/2009	3/31/2016
W. Anderson Bishop		Vice President		N.A.	7/1/2015	5/31/2016
W. Anderson Bishop		Treasurer		N.A.	12/23/2009	5/31/2016
Brent Bilsland		Director		3.4	9/14/2009	
Brent Bilsland		Chief Executive Officer		3.4	1/24/2014	
Brent Bilsland		President		3.4	9/17/2009	

Table 1.3.1 Ownership and Control

List of entities and individuals own/controlling company

Hallador Energy Company

Company/Individual	Tax ID/SSN (Optional)	Position/Title, Ownership Type	Extended Desc.	% Ownership	Begin Date	End Date
Lawrence Martin		Chief Financial Officer	Treasurer & Chief Accounting Officer	0.5	4/1/2016	
Lawrence Martin		Corporate Secretary		0.5	6/1/2016	

Table 1.3.1 Ownership and Control

List of entities and individuals own/controlling company

Sunrise Coal, LLC

Company/Individual	Tax ID/SSN (Optional)	Position/Title, Ownership Type	Extended Desc.	% Ownership	Begin Date	End Date
Hallador Energy Company	84-1014610	Ownership		100	9/16/2009	
Brent K. Bilsland		President		N/A	7/31/2006	11/3/2017
Brent K. Bilsland		Manager		N/A	7/31/2006	
Lawrence Martin		Chief Financial Officer		N/A	1/28/2008	11/3/2017
Lawrence Martin		President		N/A	11/3/2017	
Lawrence Martin		Secretary		N/A	6/1/2016	
Lawrence Martin		Manager		N/A	8/7/2017	
Heather L. Tryon		Chief Financial Officer		N/A	11/3/2017	
Victor Stabio		Secretary		N/A	7/31/2006	6/1/2016
Victor Stabio		Manager		N/A	7/31/2006	3/8/2018
David Hardie		Manager		N/A	7/31/2006	
Bryan Lawrence		Manager		N/A	7/31/2006	

Note: The beginning date shown above for Hallador Energy Company is the date Hallador Petroleum Company acquired ownership of all (100%) of the voting equity securities (membership interest) of Sunrise Coal, LLC. Hallador Petroleum Company subsequently changed its name to Hallador Energy Company effective 12/24/2009.

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**TABLE 1.4.3 Violations for
Applicant and Owners/Controllers of the Applicant**

Issuing Agency	State and Permit No. or MSHA Number	State Violation No. or MSHA Violation No.	Issue Date	Name of Company or Person to Whom Violation Issued	Description of the Violation	Date, Location and Type of Administrative or Judicial Proceeding	Violation Status	Abatement Actions
Indiana Department of Natural Resources Reclamation Division	S-370	N70125-S-370	1/25/2017	Ace in the Hole Mine	failure to republish and distribute annual blast schedule	None	Terminated 1/25/2017	published & distributed blast schedule
Indiana Department of Natural Resources Reclamation Division	S-370	N70501-S-370	5/1/2017	Ace in the Hole Mine	failure to submit NPDES monitoring report for sediment basin #004, Outfall #004 for March 2017	None	Terminated 5/15/2017	outfall #004 was not monitored during month of March 2017
Indiana Department of Natural Resources Reclamation Division	U-028	N60817-U-028	8/17/2016	Carlisle Mine	failure to achieve effluent limitations of pH in pond C	None	Terminated 10/6/2016	pond was pumped out to empty the pond
Indiana Department of Natural Resources Reclamation Division	U-028	N70315-U-028	3/17/2017	Carlisle Mine	failure to mine according to the approved plan as outlined in insignificant revision #89 and individual NPDES Permit IN0062791	None	Terminated 3/17/2017	company no longer pumped from Impoundment #2 into sediment pond #1. The electric pump was shut off.
Indiana Department of Natural Resources Reclamation Division	U-028	N70421-U-028	4/24/2017	Carlisle Mine	failure to control drainage according to approved plan	None	Terminated 5/4/2017	Company construction of berm along the rail road track ditch to prevent surface water from discharging to the south (leaving the property)
Indiana Department of Natural Resources Reclamation Division	U-028	N70524-U-028	5/25/2017	Carlisle Mine	failure to submit as-built certification of the impoundment	None	Terminated 7/7/2017	Company submitted and obtained approval for the as-built certification for the Carnahan Slurry Impoundment (Impoundment #2)
Indiana Department of Natural Resources Reclamation Division	U-028	N70721-U-028	7/21/2017	Carlisle Mine	failure to conduct underground within permitted shadow area	None	Terminated 11/22/2017	Company submitted and obtained approval of Incidental Boundary Revision #96 to areas mined outside of the approved shadow area
Indiana Department of Natural Resources Reclamation Division	U-031	N60223-U-031	2/24/2016	Oak Town #1 & #2	1) failure to limit mining activities to within the bonded and permitted area 2) failure to segregate topsoil prior to conducting mining related activities.	None	NOV's were Vacated 3/15/2016	No abatement action required
Indiana Department of Natural Resources Reclamation Division	U-031	N60817-U-031	8/17/2016	Oak Town #1 & #2	failure to achieve federal and state effluent limitations	None	Terminated 10/17/2016	Company installed water treatment system
Indiana Department of Natural Resources Reclamation Division	U-031	N61130-U-031	12/1/2016	Oak Town #1 & #2	failure to dispose of all coal mine wastes in accordance with the approved plan of fine refuse/slurry disposal	None	Terminated 6/19/2017	Company completed to clean-up of fine refuse material
Indiana Department of Natural Resources Reclamation Division	U-031	N70616-U-031	6/19/2017	Oak Town #1 & #2	failure to conduct surface activities and coal mining and reclamation operations and those activities necessary to facilitate mining only on those lands specifically bonded for Permit U-031	None	Terminated 7/27/2017	Company acquired approval for a permit and bonded access road and compressor building

**TABLE 1.4.3 Violations for
Applicant and Owners/Controllers of the Applicant**

Issuing Agency	State and Permit No. or MSHA Number	State Violation No. or MSHA Violation No.	Issue Date	Name of Company or Person to Whom Violation Issued	Description of the Violation	Date, Location and Type of Administrative or Judicial Proceeding	Violation Status	Abatement Actions
Indiana Department of Natural Resources Reclamation Division	U-031	N70915-U-031	9/15/2017	Oak Town #1 & #2	1) failure to conduct coal mining activities and reclamation operations and those activities necessary to facilitate mining only on those lands specifically permitted and bonded for Permit #U-031 2) failure to submit geotechnical data and the geochemical data as required by the permit and the subsidence control plan	None	1) Terminated 10/31/2017 2) Terminated 1/22/2018	1) Company submitted and obtained approval for Incidental Boundary Revision #60, along with performance bond. 2) Company submitted and obtained approval of non-significant revision #104.
Indiana Department of Natural Resources Reclamation Division	U-031	N80404-U-031	4/4/2018	Oak Town #1 & #2	1) failure to achieve federal and state water effluent limitations 2) failure to comply with the approved NPDES permit #ING04222	None	1) Terminated 4/16/2018 2) Terminated 5/18/2018	1) Company ceased discharge from sedimentation basin SP-1. Impoundment was treated. 2) Company submitted the additional water data as required by the violation.
Indiana Department of Natural Resources Reclamation Division	U-031	N80910-U-031	9/11/2018	Oak Town #1 & #2	failure to achieve federal and state water effluent standards for water quality associated with pH from water pollution treatment/control facility SP-3, outfall 003	None	Terminated 9/25/18	Company actively treating the impoundment to bring pH to acceptable level.
Indiana Department of Natural Resources Reclamation Division	U-025	N80626-U-025	6/28/2018	Prosperity Mine	failure to achieve federal and state water effluent limitations	None	Terminated 7/10/2018	Water discharge from sediment basin #1, outfall 001 meets effluent limits for pH

**1.5.1 Property Ownership
Within Permit Area**

Name	Address	Type of Holder: Legal/Equitable/Leaseholder/Purchaser	Surface or Mineral Property	Surface Acreage	Parcel ID	Map ID Reference
Jerry W. Weger	2935 East Kylie Court, Bloomfield, IN 47401	Legal	Surface & Mineral	19.50	04-29-400-004**	*
Dan E. & Marian Weger	19270 Hazel Dell Lane, Flat Rock, IL 62427	Legal	Surface & Mineral	20.26	04-29-400-005**	*
Joe A. Weger Estate & Jody R Andriano	18407 Taylor Road, Flat Rock, IL 62427	Legal	Surface & Mineral	19.26	04-29-400-006**	*
Dan, Marian, Jerry, Carolyn & Joe A Weger Estate & Jody R. Andriano	19270 Hazel Dell Lane, Flat Rock, IL 62427	Legal	Surface & Mineral	23.71	04-29-400-003**	*
Louis Vennard	19639 State Route 33, Flat Rock, IL 62427	Legal	Surface & Mineral	18.27	04-29-200-006**	*
Sunrise Coal, LLC	1183 E. Canvasback Drive, Terre Haute, IN 47802	Lease	Mineral		04-29-400-004	*
Sunrise Coal, LLC	1183 E. Canvasback Drive, Terre Haute, IN 47802	Lease	Mineral		04-29-400-005	*
Sunrise Coal, LLC	1183 E. Canvasback Drive, Terre Haute, IN 47802	Lease	Mineral		04-29-400-006	*
Sunrise Coal, LLC	1183 E. Canvasback Drive, Terre Haute, IN 47802	Lease	Mineral		04-29-400-003	*
Sunrise Coal, LLC	1183 E. Canvasback Drive, Terre Haute, IN 47802	Lease	Mineral		04-29-200-006	*

* county tax parcel id's utilized as Map ID Reference on Map 2 - Identification of Interests

**Applicant has leases and options to purchase these tracts.

1.5.2 Property Ownership Contiguous to the Permit Area

Name	Address	Options/Interests on Property	Surface or Mineral Property	Surface Acreage	Parcel ID	Map ID Reference
Joe A Weger Estate & Joshua A Weger	18407 Taylor Road, Flat Rock, IL 62427		Surface	20.00	04-29-300-004	*
Joe A Weger Estate & Joshua A Weger & Jody Andriano	18407 Taylor Road, Flat Rock, IL 62427		Surface	20.00	04-29-300-007	*
Dan E. & Marian Weger	19270 Hazel Dell Lane, Flat Rock, IL 62427		Surface	20.00	04-29-300-002	*
Dan E. & Marian Weger	19270 Hazel Dell Lane, Flat Rock, IL 62427		Surface	20.00	04-29-300-003	*
Dan E. & Marian Weger	19270 Hazel Dell Lane, Flat Rock, IL 62427		Surface	40.00	04-29-300-006	*
Wayne A & Marvis L Primus	19659 Russellville Lane, Lawrenceville, IL 62439		Surface	20.00	04-29-400-010	*
Wayne A & Marvis L Primus	19659 Russellville Lane, Lawrenceville, IL 62439		Surface	20.00	04-29-400-009	*
Wayne A & Marvis L Primus	19659 Russellville Lane, Lawrenceville, IL 62439		Surface	20.00	04-29-400-008	*
Wayne A & Marvis L Primus	19659 Russellville Lane, Lawrenceville, IL 62439		Surface	10.00	04-28-300-002	*
Wayne A & Marvis L Primus	19659 Russellville Lane, Lawrenceville, IL 62439		Surface	27.80	04-28-300-006	*
Wayne A & Marvis L Primus	19659 Russellville Lane, Lawrenceville, IL 62439		Surface	27.40	04-29-200-004	*
Louis Vennard	19639 State Route 33, Flat Rock, IL 62427		Surface	40.00	04-29-100-004	*
Louis Vennard	19639 State Route 33, Flat Rock, IL 62427		Surface	37.96	04-29-100-005	*
Louis H & Lynn S Vennard	19639 State Route 33, Flat Rock, IL 62427		Surface	3.41	04-29-100-006	*
Lewis E. Pritchard	113 Wilbur Street, Vincennes, IN 47591		Surface	0.25	04-29-400-002	*
Sabre Group LLC	P.O. Box 3074, Carboondale, IL 62902		Surface	0.75	04-29-400-001	*
Patricia M Strange	1706 Christy, Lawrenceville, IL 62439		Surface	20.00	04-32-100-001	*
Patricia M Strange	1706 Christy, Lawrenceville, IL 62439		Surface	40.00	04-29-300-005	*
Alan Gray Limited Partnership, II	420 Main Street - Suite 1404, Evansville, IN 47708		Surface	78.00	04-32-200-001	*
Alan Gray Limited Partnership, II	420 Main Street - Suite 1404, Evansville, IN 47708		Surface	78.00	04-32-200-002	*
Alan Gray Limited Partnership, II	420 Main Street - Suite 1404, Evansville, IN 47708		Surface	143.17	04-33-100-001	*
Kenneth R & Patricia Neighbors	R1 - Box 121, Flat Rock, IL 62427		Surface	2.22	04-32-100-006	*
Russell Ray & Christina Lousie Neighbors	500 Frontier Circle, Summersville, GA 30747		Surface	40.00	04-32-100-004	*
Purgatory Cellars, LLC	1111 Willis Avenue, Flat Rock, IL 62427		Surface	40.00	04-32-100-002	*
Purgatory Cellars, LLC	1111 Willis Avenue, Flat Rock, IL 62427		Surface	33.78	04-32-100-005	*
Purgatory Cellars, LLC	1111 Willis Avenue, Flat Rock, IL 62427		Surface	4.00	04-32-100-007	*
Lucinda M. Allee	19111 Hazel Dell Lane, Flat Rock, IL 62427		Surface	40.00	04-29-100-003	*
George E. Goodwin	c/o Neil Goodwin 33 Autumn Circle, Troy, IL 62294		Surface	40.00	04-28-300-005	*
Neil W. & Julia A Goodwin Trustees	33 Autumn Circle, Troy, IL 62294		Surface	8.08	04-28-300-007	*
Neil W. & Julia A Goodwin Trustees	33 Autumn Circle, Troy, IL 62294		Surface	40.00	04-28-300-005	*
Pauline& Paul R Snapp	431 Summerland Ct, Evansville, IN 47712		Surface	20.00	04-32-100-003	*
Pauline& Paul R Snapp	431 Summerland Ct, Evansville, IN 47712		Surface	20.00	04-29-300-001	*
Emma Lois Collins Trust	18314 Hazel Dell Lane, Flat Rock, IL 62427		Surface	40.00	04-29-100-001	*
Eric L & Katherine J Herman & Daniel J SR Herman	608 S Quail Run Rd, Vincennes, IN 47591		Surface	47.59	04-29-200-007	*
Charles & Nadine R Primus	15454 Lake Lawrence Rd, Lawrenceville, IL 62439		Surface	30.00	04-28-300-001	*
Charles & Nadine R Primus	15454 Lake Lawrence Rd, Lawrenceville, IL 62439		Surface	3.73	1921300001	*
Daniel J Sr & Mary Herman & Eric L Herman	4042 E St Rd 61, Vincennes, IN 47591		Surface	42.00	1920300005	*
Daniel J Sr & Mary Herman Trust	4042 E St Rd 61, Vincennes, IN 47591		Surface	66.74	1920400001	*
Daniel J Sr & Daniel J Jr Herman	4042 E St Rd 61, Vincennes, IN 47591		Surface	64.00	1920300004	*

* county tax parcel id's utilized as Map ID Reference on Map 2 - Identification of Interests

OPTION TO PURCHASE REAL ESTATE

This Option to Purchase Real Estate (the "Option Agreement") is entered into on this 4 day of October, 2018, by **Dan E. Weger and Marian Weger, as joint tenants with rights of survivorship**. ("the Owner"), whose address is _____, and **Sunrise Land Holdings, LLC** (the "Buyer"), the address of which is 1183 E. Canvasback Drive, Terre Haute, Indiana 47802.

1. Grant of Option. In consideration of the sum of _____ paid by the Buyer to the Owner (the "Option Payment"), the receipt whereof hereby is acknowledged, the Owner hereby grants to the Buyer the exclusive option to purchase (the "Option") 20 acres of real estate and all improvements thereon, (collectively, the "Real Estate") in Lawrence County, Illinois, which is more fully described in Exhibit A, attached hereto, upon the terms set forth in this Option Agreement.

2. Access to Real Estate. Pending Closing, the Owner may retain possession of the Real Estate, however the Buyer shall have the right to enter upon the Real Estate to investigate, explore, drill, and evaluate the feasibility of developing the Real Estate for mineral development and mining operations. If the Option is not exercised by the Buyer, or if the Buyer damages any of the Owner's growing crop, the Buyer shall compensate the Owner for any reasonable damages incurred to the Real Estate or the growing crop as a result of the Buyer's use of this right to enter. The amount of such crop damage shall be the market value for damaged crops on the date that the Owner is obligated, under contracts existing on the date of this Option, to deliver the crop or, if no such contract exists, on the then existing market value for such damaged crops, and based upon the yield data for the same type of crop on adjacent real estate, whether raised by the Owner or other farmers. The Buyer's right to enter hereunder shall terminate if the Option is not timely exercised. Otherwise, such right of entry shall extend to the date of Closing hereunder. The Owner shall maintain the Real Estate in the current state and shall keep all tax payments current.

3. Survey. Upon execution of this Option Agreement, the Buyer shall proceed to secure a survey (the "Survey") of the Real Estate to identify a more accurate legal description of the Real Estate. The costs of the Survey shall be borne by the Buyer. Within 10 days after completion of the Survey, an addendum to this Option Agreement shall be executed by the parties to incorporate such legal description.

4. Exercise. This Option Agreement is executed contemporaneously with Option Agreements between (a) the Buyer and Joe A. Weger and Jody Andriano, (b) the Buyer and Jerry W. Weger, and (c) the Buyer and Joe A. Weger, Jody R. Andriano, individually and as trustee of the Robin Michelle

Weger Supplemental Care Trust, Jerry W. Weger, and Dan E. Weger and Marian Weger, as joint tenants with rights of survivorship. All four Option Agreements are referred to collectively as the "Weger Options." The Option herein is exercisable only if all Weger Options are exercised and this Option is exercisable as to all, but not less than all, of the Real Estate.

5. Expiration Date. This Option shall expire at 11:59 p.m. on October 4, 2020, (the "Expiration Date").

6. Notices. Notices, demands, or other communications, including but not limited to notice by the Buyer of exercise of this Option, to be given or delivered under or by reason of the provisions of this Option shall be in writing and shall be deemed to have been given: (a) when delivered personally to the recipient; (b) when sent to the recipient by electronic mail (with receipt confirmed by a reply email) if during normal business hours of the recipient, otherwise on the next Business Day; or (c) one Business Day after the date when sent to the recipient by reputable express courier service (charges prepaid). Such notices, demands, and other communications shall be sent to the party to be notified at the addresses indicated below (with communications of an emergency nature also being made via telephonic and email notice):

TO THE OWNER:

Dan E. Weger and Marian Weger

Telephone

TO THE BUYER:

Sunrise Land Holdings, LLC
1183 Canvasback Drive
Terre Haute, Indiana 47802
Attn: President

Telephone: 812-299-2800

Email: LMartin@SunriseCoal.com

Any party may change the person to be notified and its address for the purposes of this section by giving the other party hereto written notice of the new person and/or new address in the manner set forth above.

Notice of exercise of the Option must be sent on or before the Expiration Date. The date of exercise shall be referred to as the "Exercise Date".

7. Option Price; Failure to Exercise Option. If the Buyer does not exercise the Option as herein provided, neither party shall have any further rights or claims against the other, and the Buyer shall have no further rights in and to the Real Estate.

8. Purchase Price.

A. If the Option is exercised on or before the Expiration Date, the total purchase price (the "Purchase Price") for the Real Estate shall be calculated by referring to the Survey and, using such Survey, multiplying [REDACTED] and adding to that result an amount equal to [REDACTED] multiplied by the number of acres indicated in the Survey that exceeds 12.3.

B. If the Option is exercised, the Purchase Price shall be paid by the Buyer to the Owner at Closing (as defined herein) in cash, wire transfer, or other immediately available funds. The Option Payment shall be credited against the payment due at Closing.

9. Owner's Representations. The Owner warrants (or if more than one Owner, the Owners jointly and severally warrant) that as of the execution date hereof the Real Estate is free and clear of any liens and/or encumbrances, except the lien for current real estate taxes and assessments not yet due and payable and a mortgage, the unpaid balance of which is, and at Closing shall be, less than the Purchase Price due to the Owner. The Owner further warrants that during the term of this Option Agreement, the Owner shall not cause any liens or encumbrances to attach to the Real Estate. Any such liens or encumbrances that attach to the Real Estate shall be removed promptly. The Owner further warrants that the Real Estate does not invoke the provisions of applicable Illinois property transfer laws, and otherwise is free from adverse environmental conditions or defects.

10. Closing Date. Consummation of the purchase and sale of the Real Estate (the "Closing") shall occur as soon as possible after the Exercise Date, and in any event no later than 90 days thereafter unless the parties otherwise agree in writing ("Closing Date").

11. Evidence of Title and Cure of Title Defects. The Buyer at any time may procure a Title Insurance Commitment (the "Title Commitment") on the Owner's behalf. Costs of the Title Commitment (and the title insurance premium, final title search, and costs of title insurance policy issuance) shall be borne by the Buyer. The Title Commitment shall be endorsed to reflect the legal description in the Survey, if a Survey has been secured.

Not later than 20 days after the Exercise Date, the Buyer shall inform the Owner of defects in the marketability of the Owner's title to the Real Estate and the Owner shall cause such objections and defects to be eliminated promptly and within a reasonable time after the designation of same to the Owner. Waiver by

the Buyer of any exception or requirement must be in writing. If any such objection or defect for any reason is not removed or eliminated, subject to the Owner's obligation set forth in the following paragraph, by the Owner prior to the Closing Date, the Buyer, at the Buyer's sole election, may rescind this Option Agreement and receive repayment of the Option Payment or waive any such objections or defects.

Notwithstanding the foregoing, if the Buyer's examination of the Title Insurance Commitment discloses defects in the Owner's title rendering such title unmerchantable, the Owner shall make a good faith effort upon reasonable diligence to cure such defects within a reasonable amount of time, and if such defects can be cured by the Owner, the Owner, at the Buyer's request, shall cause such cure to be made.

12. Purchase and Sale Contract. If this Option is exercised as herein provided, upon exercise this Option shall become an agreement for the purchase and sale of the Real Estate (the Option terms and/or the agreement terms for the purchase and sale shall be referred to collectively as the "Purchase Agreement") and the Owner and the Buyer respectively will perform the additional obligations and be bound by the additional conditions, restrictions, and requirements as are set forth in the Purchase Agreement in connection with the purchase and sale of the Real Estate, to-wit:

A. Purchase Price. The purchase price shall be the amount set forth in Paragraph 7 of this Option Agreement and shall be paid in the manner described in said Paragraph 7 of this Option Agreement.

B. Crops. If Closing occurs while a growing crop exists on the Real Estate, the Buyer shall have the option either to destroy a portion or all of the crop or to leave the crop undisturbed. The Owner shall have the right to enter upon the Real Estate after Closing to cultivate and harvest the undisturbed portion of the growing crop to the extent that such entry, cultivation, and harvest does not interfere with the Buyer's use of the Real Estate. The Buyer shall pay damages (the "Crop Damages") to the Owner for the value of any such destruction of crops growing on the Real Estate on the Exercise Date at the market value for such crop on the date that the Owner is obligated, under contracts existing on the Exercise Date, to deliver the crop or, if no such contract exists, on the then existing market value for such crop, and based upon the yield data for the same type of crop on adjacent real estate, whether raised by the Owner or other farmers.

C. Barrier Area and Roads. Reference is made to the depictions (the "Depictions") in two pages attached hereto collectively as "Exhibit B." Lands described in the Weger Options shall be used to the extent reasonably required to achieve the following goals:

i. Areas that will not be disturbed by Buyer's activities are identified in the Depiction by a red solid line boundary with red cross hatches, which shall remain wooded to leave a barrier between the Buyer's improvements and activities and the dwelling house of Joe A. Weger, and are described as follows. (All measurements that refer to a township road relate to the centerline of such road.)

A strip 150 feet wide adjacent to the east side of a line that begins at the intersection of Township Roads ("TR") 1950E and 1840N and runs northerly with the centerline of TR 1950E a distance of 620 feet.

Also, a strip 150 feet wide adjacent to the east side of a line that begins at the intersection of TRs 1950E and 1840N and runs southerly with the centerline of TR 1950E a distance of 450 feet.

Also, a strip 190 feet wide that begins 150 feet east of the intersection of TRs 1950E and 1840N and runs easterly with the centerline of TR 1840N a distance of 338 feet (488 feet from the intersection of said roads), such strip to be 40 feet on the south side and 150 feet on the north side of TR 1840N.

Provided, however, that the Buyer may use such non-disturbance area to the least extent required by utility service providers to install utility services for the Lessee's operations. Construction of such utility services shall be accomplished in a manner or manners as minimally invasive as reasonably possible, underground structures may be installed and trees and other growth may be removed to the extent required to accomplish such installation, and the area may be maintained, mowed, and landscaped by the Buyer.

ii. Road beds shall be stabilized initially with cement stabilizer to a depth of 12 inches and road surfaces applied at the Buyer's expense to approximately 2,580 feet of TR 1840N and 5,180 feet of TR 1950E as outlined in green color on page 1 of the Depictions. Such road surfaces shall be those approved by the requisite governmental bodies, but of not less quality than chip and seal. The parties understand that current government specifications require an initial triple coat of chip and seal (which is a primer of oil and a double chip and seal). Roads shall be resurfaced at the Buyer's expense every three years, or deteriorated segments more frequently as reasonably determined by the Lawrence County, Illinois, road engineer, during the Buyer's use of the Real Estate for the production of coal.

iii. Buyer's entrances on TR 1840N and TR 1950E will be located, at the Buyer's expense, out of the line of sight of Joe A. Weger's dwelling house as located on the date of this Option Agreement and the westernmost entrance on TR 1840N shall be no closer than 488 feet from the intersection of TRs 1950E and 1840N.

iv. The obligations in this subsection C shall survive Closing.

D. Taxes and Assessments. Real estate taxes and assessments for the year in which the Closing occurs (the "Closing Year") and due and payable in the following year shall be prorated between the Owner and the Buyer based upon the most recent assessment. The Owner shall pay that portion of such taxes and assessments as is represented by a fraction, the numerator of which is the number of days between January 1 of the Closing Year and the Closing Date and the denominator of which is 365. The balance of such taxes and assessments for the Closing Year and all subsequent taxes and assessments shall be paid by the Buyer. The real estate taxes and assessments for the year prior to the Closing that are due and payable during the Closing Year shall be paid by the Owner or deducted from the closing payment at the Buyer's direction.

The Buyer may, but shall not be required to, pay the real estate taxes and assessments that now are due and payable and that become due and payable hereafter, and deduct such amounts that are the obligation of the Owner from the amounts due the Owner at Closing.

E. Warranty Deed; Vendors' Affidavit. If the Title Insurance Commitment discloses that the Owner is the owner of a marketable record title in fee simple to the Real Estate, or the title of the Owner is perfected satisfactorily, or any defects or objections are waived by the Buyer, as provided above, the sale and conveyance shall be consummated on the Closing Date by the delivery to the Buyer of a Warranty Deed, in a form and substance acceptable to the Buyer, conveying title to the Real Estate to the Buyer in fee simple, free and clear of any and all liens and encumbrances except the lien for current real estate taxes and assessments and subject to all existing and recorded roadways, and all other documents and instruments required to vest marketable title in the Buyer. If requested by the Buyer, the Owner also shall execute and deliver to the Buyer a Vendors'; Affidavit dated as of the Closing Date.

F. Specific Performance. The Buyer shall be entitled to specific performance in the event of a breach by the Owner.

G. Failure to Close. If the Option is exercised and, through no fault of the Buyer, Closing does not take place within 90 days of the Exercise Date (or such other date as may be agreed upon by the parties in writing), the Buyer, in the Buyer's sole discretion, may elect to terminate

this Option Agreement and the Purchase Agreement and, in the event of such termination, the Owner shall be entitled to retain the Option Payment as the Owner's sole remedy.

13. Attorneys' Fees. If it becomes necessary for either party to this Option Agreement to enforce any term or provision hereof by any action in any court of competent jurisdiction, the prevailing party shall be entitled to recover reasonable attorneys' fees and expenses in addition to any other judgment rendered.

14. Binding Effect. This Option Agreement, and the terms and provisions hereof, shall be binding upon the parties hereto and their respective heirs, successors and assigns.

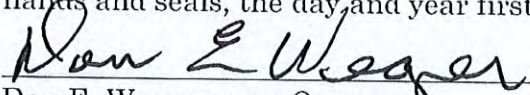
15. Permitting. During the term of this Option, the Owner shall execute all documents requested by the Buyer to comply with permitting and other regulatory requirements of the State of Illinois related to coal mining operations.

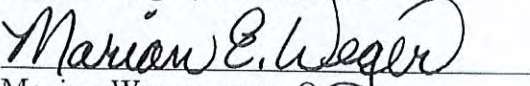
16. CRP. If the Real Estate is part of a USDA Conservation Reserve Program, the Buyer shall execute all documents required to assume the USDA CRP obligations and to enter CRP contracts with the USDA or, at the Buyer's expense, may terminate the CRP contracts.

17. Memorandum of Agreement. At the Buyer's discretion, this Option Agreement may not be recorded. In that event, the Owner and the Buyer shall execute and deliver a memorandum of this Option Agreement in proper form for the purpose of recording, but said memorandum of this Option Agreement shall not in any circumstance be deemed to modify or change any of the provisions of this Option Agreement, the provisions of which shall in all instances prevail.

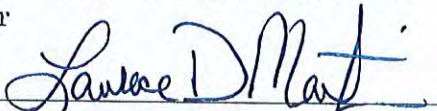
18. Execution. This Agreement may be executed in any number of separate counterparts, each of which may be executed by less than all the parties. All counterparts shall be considered collectively as one instrument as though all parties who executed any one of the counterparts executed the same document.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals, the day and year first above written.


Dan E. Weger, as an Owner

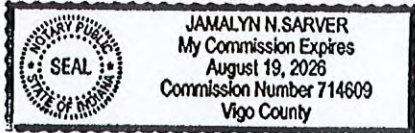

Marian Weger, as an Owner

Sunrise Land Holdings, LLC, as the
Buyer

By: 
Lawrence D. Martin, as Vice
President

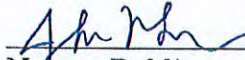
STATE OF INDIANA)
) SS:
COUNTY OF Knox)

Before me, a Notary Public in and for said County and State, this 4 day of October, 2018, personally appeared Dan E. Weger and Marian Weger, each of whom swore to the truth of the above representations and each of whom acknowledged the execution of the above and foregoing document to be his and her free and voluntary act and deed.



My Commission Expires:

AUGUST 19, 2026

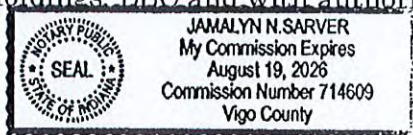


Notary Public
Printed: JAMALYN SARVER

County of Residence: VIGO

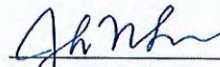
STATE OF INDIANA)
) SS:
COUNTY OF VIGO)

Before me, a Notary Public in and for said County and State, this 4 day of October, 2018, Lawrence D. Martin, personally known to me to be the Vice President of Sunrise Land Holdings, LLC, a limited liability company, and personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument on behalf of Sunrise Land Holdings, LLC and with authority of the governing body thereof.



My Commission Expires:

AUGUST 19, 2026



Notary Public
Printed: JAMALYN N. SARVER

County of Residence: VIGO

This Option to Purchase Real Estate was prepared on behalf of the Buyer by John Rowe, Attorney at Law, of The Rowe Law Firm, LLC, 1418 North 1000 West, Linton, Indiana 47441, and modified as a result of review on behalf of the Owner by Jeffrey B. Kolb, Attorney at Law, of Kolb Roellgen & Kirchoff, LLP, 801 Busseron Street, Vincennes, Indiana 47591.

EXHIBIT A

The following described real estate in Lawrence County, Illinois, to-wit:

All that part of the West Half of the Southeast Quarter of Section 29, Township 5 North, Range 10 West of the Second Principal Meridian lying South of the Public Road Running through the same except 20 acres of even width off the East side thereof and also except 20 acres of even width off the West side thereof, conveying hereby approximately 20 acres, more or less.

Hereby releasing and waiving all rights under and by virtue of the Homestead Exemption laws of the State of Illinois.

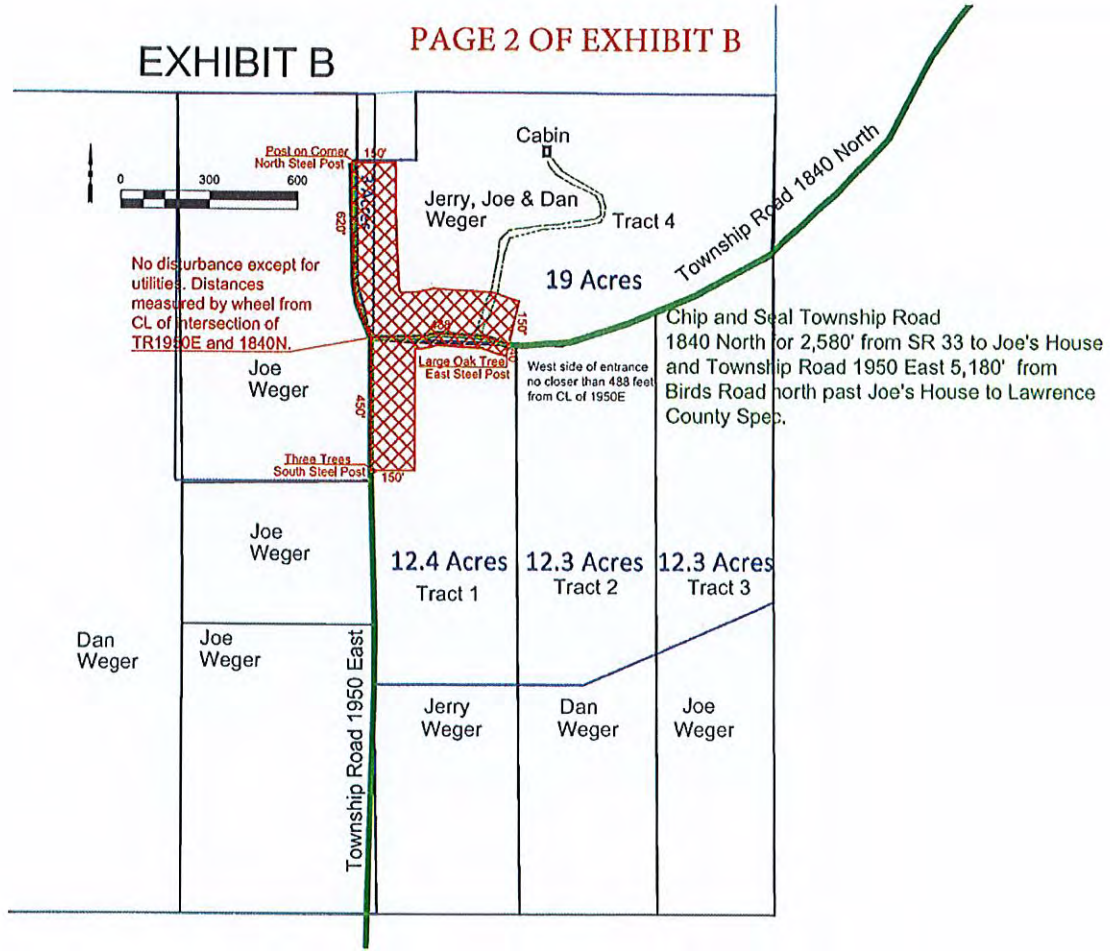
Excepting therefrom all coal, coalbed methane, coalmine methane, and all other materials associated with the coal, without regard to depth, underlying the surface of the above described real estate.

PAGE 1 OF EXHIBIT B



EXHIBIT B

PAGE 2 OF EXHIBIT B



OPTION TO PURCHASE REAL ESTATE

This Option to Purchase Real Estate (the "Option Agreement") is entered into on this 4 day of October, 2018, by Jerry W. Weger ("the Owner"), whose address is [REDACTED] and Sunrise Land Holdings, LLC ("the Buyer"), the address of which is 1183 E. Canvasback Drive, Terre Haute, Indiana 47802.

1. Grant of Option. In consideration of the sum of [REDACTED] paid by the Buyer to the Owner (the "Option Payment"), the receipt whereof hereby is acknowledged, the Owner hereby grants to the Buyer the exclusive option to purchase (the "Option") 20 acres of real estate and all improvements thereon (collectively, the "Real Estate") in Lawrence County, Illinois, which is more fully described in Exhibit A, attached hereto, upon the terms set forth in this Option Agreement.
2. Access to Real Estate. Pending Closing, the Owner may retain possession of the Real Estate, however the Buyer shall have the right to enter upon the Real Estate to investigate, explore, drill, and evaluate the feasibility of developing the Real Estate for mineral development and mining operations. If the Option is not exercised by the Buyer, or if the Buyer damages any of the Owner's growing crop, the Buyer shall compensate the Owner for any reasonable damages incurred to the Real Estate or the growing crop as a result of the Buyer's use of this right to enter. The amount of such crop damage shall be the market value for damaged crops on the date that the Owner is obligated, under contracts existing on the date of this Option, to deliver the crop or, if no such contract exists, on the then existing market value for such damaged crops, and based upon the yield data for the same type of crop on adjacent real estate, whether raised by the Owner or other farmers. The Buyer's right to enter hereunder shall terminate if the Option is not timely exercised. Otherwise, such right of entry shall extend to the date of Closing hereunder. The Owner shall maintain the Real Estate in the current state and shall keep all tax payments current.
3. Survey. Upon execution of this Option Agreement, the Buyer shall proceed to secure a survey (the "Survey") of the Real Estate to identify a more accurate legal description of the Real Estate. The costs of the Survey shall be borne by the Buyer. Within 10 days after completion of the Survey, an addendum to this Option Agreement shall be executed by the parties to incorporate such legal description.
4. Exercise. This Option Agreement is executed contemporaneously with Option Agreements between (a) the Buyer and Joe A. Weger and Jody Andriano, (b) the Buyer and Dan E. Weger and Marian Weger, as joint tenants with rights of survivorship, and (c) the Buyer and Joe A. Weger, Jody R. Andriano, individually and as trustee of the Robin Michelle Weger Supplemental

the Buyer of any exception or requirement must be in writing. If any such objection or defect for any reason is not removed or eliminated, subject to the Owner's obligation set forth in the following paragraph, by the Owner prior to the Closing Date, the Buyer, at the Buyer's sole election, may rescind this Option Agreement and receive repayment of the Option Payment or waive any such objections or defects.

Notwithstanding the foregoing, if the Buyer's examination of the Title Insurance Commitment discloses defects in the Owner's title rendering such title unmerchantable, the Owner shall make a good faith effort upon reasonable diligence to cure such defects within a reasonable amount of time, and if such defects can be cured by the Owner, the Owner, at the Buyer's request, shall cause such cure to be made.

12. Purchase and Sale Contract. If this Option is exercised as herein provided, upon exercise this Option shall become an agreement for the purchase and sale of the Real Estate (the Option terms and/or the agreement terms for the purchase and sale shall be referred to collectively as the "Purchase Agreement") and the Owner and the Buyer respectively will perform the additional obligations and be bound by the additional conditions, restrictions, and requirements as are set forth in the Purchase Agreement in connection with the purchase and sale of the Real Estate, to-wit:

A. Purchase Price. The purchase price shall be the amount set forth in Paragraph 7 of this Option Agreement and shall be paid in the manner described in said Paragraph 7 of this Option Agreement.

B. Crops. If Closing occurs while a growing crop exists on the Real Estate, the Buyer shall have the option either to destroy a portion or all of the crop or to leave the crop undisturbed. The Owner shall have the right to enter upon the Real Estate after Closing to cultivate and harvest the undisturbed portion of the growing crop to the extent that such entry, cultivation, and harvest does not interfere with the Buyer's use of the Real Estate. The Buyer shall pay damages (the "Crop Damages") to the Owner for the value of any such destruction of crops growing on the Real Estate on the Exercise Date at the market value for such crop on the date that the Owner is obligated, under contracts existing on the Exercise Date, to deliver the crop or, if no such contract exists, on the then existing market value for such crop, and based upon the yield data for the same type of crop on adjacent real estate, whether raised by the Owner or other farmers.

C. Barrier Area and Roads. Reference is made to the depictions (the "Depictions") in two pages attached hereto collectively as "Exhibit B." Lands described in the Weger Options shall be used to the extent reasonably required to achieve the following goals:

i. Areas that will not be disturbed by Buyer's activities are identified in the Depiction by a red solid line boundary with red cross hatches, which shall remain wooded to leave a barrier between the Buyer's improvements and activities and the dwelling house of Joe A. Weger, and are described as follows. (All measurements that refer to a township road relate to the centerline of such road.)

A strip 150 feet wide adjacent to the east side of a line that begins at the intersection of Township Roads ("TR") 1950E and 1840N and runs northerly with the centerline of TR 1950E a distance of 620 feet.

Also, a strip 150 feet wide adjacent to the east side of a line that begins at the intersection of TRs 1950E and 1840N and runs southerly with the centerline of TR 1950E a distance of 450 feet.

Also, a strip 190 feet wide that begins 150 feet east of the intersection of TRs 1950E and 1840N and runs easterly with the centerline of TR 1840N a distance of 338 feet (488 feet from the intersection of said roads), such strip to be 40 feet on the south side and 150 feet on the north side of TR 1840N.

Provided, however, that the Buyer may use such non-disturbance area to the least extent required by utility service providers to install utility services for the Lessee's operations. Construction of such utility services shall be accomplished in a manner or manners as minimally invasive as reasonably possible, underground structures may be installed and trees and other growth may be removed to the extent required to accomplish such installation, and the area may be maintained, mowed, and landscaped by the Buyer.

ii. Road beds shall be stabilized initially with cement stabilizer to a depth of 12 inches and road surfaces applied at the Buyer's expense to approximately 2,580 feet of TR 1840N and 5,180 feet of TR 1950E as outlined in green color on page 1 of the Depictions. Such road surfaces shall be those approved by the requisite governmental bodies, but of not less quality than chip and seal. The parties understand that current government specifications require an initial triple coat of chip and seal (which is a primer of oil and a double chip and seal). Roads shall be resurfaced at the Buyer's expense every three years, or deteriorated segments more frequently as reasonably determined by the Lawrence County, Illinois, road engineer, during the Buyer's use of the Real Estate for the production of coal.

iii. Buyer's entrances on TR 1840N and TR 1950E will be located, at the Buyer's expense, out of the line of sight of Joe A. Weger's dwelling house as located on the date of this Option Agreement and the westernmost entrance on TR 1840N shall be no closer than 488 feet from the intersection of TRs 1950E and 1840N.

iv. The obligations in this subsection C shall survive Closing.

D. Taxes and Assessments. Real estate taxes and assessments for the year in which the Closing occurs (the "Closing Year") and due and payable in the following year shall be prorated between the Owner and the Buyer based upon the most recent assessment. The Owner shall pay that portion of such taxes and assessments as is represented by a fraction, the numerator of which is the number of days between January 1 of the Closing Year and the Closing Date and the denominator of which is 365. The balance of such taxes and assessments for the Closing Year and all subsequent taxes and assessments shall be paid by the Buyer. The real estate taxes and assessments for the year prior to the Closing that are due and payable during the Closing Year shall be paid by the Owner or deducted from the closing payment at the Buyer's direction.

The Buyer may, but shall not be required to, pay the real estate taxes and assessments that now are due and payable and that become due and payable hereafter, and deduct such amounts that are the obligation of the Owner from the amounts due the Owner at Closing.

E. Warranty Deed; Vendor's Affidavit. If the Title Insurance Commitment discloses that the Owner is the owner of a marketable record title in fee simple to the Real Estate, or the title of the Owner is perfected satisfactorily, or any defects or objections are waived by the Buyer, as provided above, the sale and conveyance shall be consummated on the Closing Date by the delivery to the Buyer of a Warranty Deed, in a form and substance acceptable to the Buyer, conveying title to the Real Estate to the Buyer in fee simple, free and clear of any and all liens and encumbrances except the lien for current real estate taxes and assessments and subject to all existing and recorded roadways, and all other documents and instruments required to vest marketable title in the Buyer. If requested by the Buyer, the Owner also shall execute and deliver to the Buyer a Vendor's Affidavit dated as of the Closing Date.

F. Specific Performance. The Buyer shall be entitled to specific performance in the event of a breach by the Owner.

G. Failure to Close. If the Option is exercised and, through no fault of the Buyer, Closing does not take place within 90 days of the Exercise Date (or such other date as may be agreed upon by the parties in writing), the Buyer, in the Buyer's sole discretion, may elect to terminate

this Option Agreement and the Purchase Agreement and, in the event of such termination, the Owner shall be entitled to retain the Option Payment as the Owner's sole remedy.

13. Attorneys' Fees. If it becomes necessary for either party to this Option Agreement to enforce any term or provision hereof by any action in any court of competent jurisdiction, the prevailing party shall be entitled to recover reasonable attorneys' fees and expenses in addition to any other judgment rendered.

14. Binding Effect. This Option Agreement, and the terms and provisions hereof, shall be binding upon the parties hereto and their respective heirs, successors and assigns.

15. Permitting. During the term of this Option, the Owner shall execute all documents requested by the Buyer to comply with permitting and other regulatory requirements of the State of Illinois related to coal mining operations.

16. CRP. If the Real Estate is part of a USDA Conservation Reserve Program, the Buyer shall execute all documents required to assume the USDA CRP obligations and to enter CRP contracts with the USDA or, at the Buyer's expense, may terminate the CRP contracts.

17. Memorandum of Agreement. At the Buyer's discretion, this Option Agreement may not be recorded. In that event, the Owner and the Buyer shall execute and deliver a memorandum of this Option Agreement in proper form for the purpose of recording, but said memorandum of this Option Agreement shall not in any circumstance be deemed to modify or change any of the provisions of this Option Agreement, the provisions of which shall in all instances prevail.

[The remainder of this page intentionally is left blank.]

18. Execution. This Agreement may be executed in any number of separate counterparts, each of which may be executed by less than all the parties. All counterparts shall be considered collectively as one instrument as though all parties who executed any one of the counterparts executed the same document.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals, the day and year first above written.

Jerry W. Weger, as the Owner

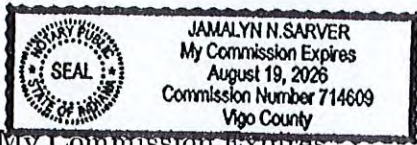
Sunrise Land Holdings, LLC, as the Buyer

By: Jerry A. Weger
Jerry A. Weger, as attorney-in-fact pursuant to a Power of Attorney dated 10/24/2014 and recorded 01/21/2015 @ 11:39 AM as Instrument No. 20150096699 in the office of the Recorder of Lawrence County, Illinois

By: Lawrence D. Martin
Lawrence D. Martin, as Vice President

STATE OF INDIANA)
) SS:
COUNTY OF Knox)

Before me, a Notary Public in and for said County and State, this 4 day of October, 2018, personally appeared Jerry A. Weger, as attorney-in-fact of Jerry W. Weger who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be his free and voluntary act and deed.



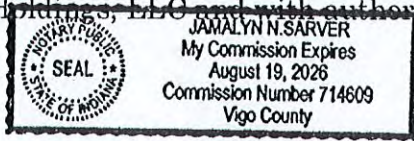
My Commission Expires: August 19, 2020

Jamalyn Sarver
Notary Public
Printed: JAMALYN SARVER

County of Residence: VIGO

STATE OF INDIANA)
) SS:
COUNTY OF VIGO)

Before me, a Notary Public in and for said County and State, this 4 day of October, 2018, Lawrence D. Martin, personally known to me to be the Vice President of Sunrise Land Holdings, LLC, a limited liability company, and personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument on behalf of Sunrise Land Holdings, LLC and with authority of the governing body thereof.



My Commission Expires:

AUGUST 19, 2026



Notary Public

Printed: JAMALYN N. SARVER

County of Residence: VIGO

This Option to Purchase Real Estate was prepared on behalf of the Buyer by John Rowe, Attorney at Law, of The Rowe Law Firm, LLC, 1418 North 1000 West, Linton, Indiana 47441, and modified as a result of review on behalf of the Owner by Jeffrey B. Kolb, Attorney at Law, of Kolb Roellgen & Kirchoff, LLP, 801 Busseron Street, Vincennes, Indiana 47591.

EXHIBIT A

The following described real estate in Lawrence County, Illinois, to-wit:

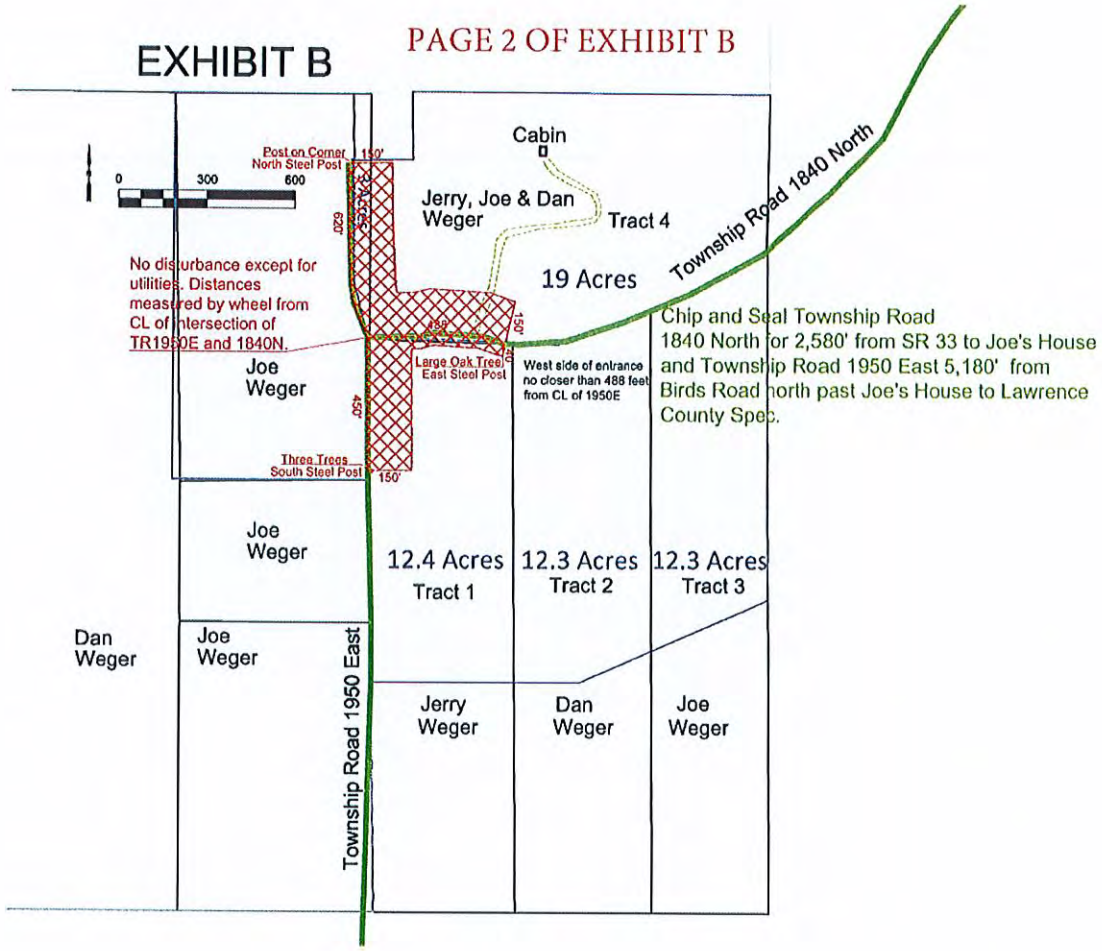
The West 20 acres of even width of all that part of the West Half of the Southeast Quarter of Section 29, Township 5 North, Range 10 West of the Second Principal Meridian lying South of the Public Road Running through the same.

Hereby releasing and waiving all rights under and by virtue of the Homestead Exemption laws of the State of Illinois.

Excepting therefrom all coal, coalbed methane, coalmine methane, and all other materials associated with the coal, without regard to depth, underlying the surface of the above described real estate.

EXHIBIT B

PAGE 2 OF EXHIBIT B



Chip and Seal Township Road 1840 North for 2,580' from SR 33 to Joe's House and Township Road 1950 East 5,180' from Birds Road north past Joe's House to Lawrence County Spec.

OPTION TO PURCHASE REAL ESTATE

This Option to Purchase Real Estate (the "Option Agreement") is entered into on this 4 day of October, 2018, by **Joe A. Weger, Jody R. Andriano**, (collectively, "the Owner") whose address is [REDACTED] and **Sunrise Land Holdings, LLC** ("the Buyer"), the address of which is 1183 E. Canvasback Drive, Terre Haute, Indiana 47802.

1. Grant of Option. In consideration of the sum of [REDACTED] paid by the Buyer to the Owner (the "Option Payment"), the receipt whereof hereby is acknowledged, the Owner hereby grants to the Buyer the exclusive option to purchase (the "Option") 20 acres of real estate and all improvements thereon (collectively, the "Real Estate") in Lawrence County, Illinois, which is more fully described in Exhibit A, attached hereto, upon the terms set forth in this Option Agreement.
2. Access to Real Estate. Pending Closing, the Owner may retain possession of the Real Estate, however the Buyer shall have the right to enter upon the Real Estate to investigate, explore, drill, and evaluate the feasibility of developing the Real Estate for mineral development and mining operations. If the Option is not exercised by the Buyer, or if the Buyer damages any of the Owner's growing crop, the Buyer shall compensate the Owner for any reasonable damages incurred to the Real Estate or the growing crop as a result of the Buyer's use of this right to enter. The amount of such crop damage shall be the market value for damaged crops on the date that the Owner is obligated, under contracts existing on the date of this Option, to deliver the crop or, if no such contract exists, on the then existing market value for such damaged crops, and based upon the yield data for the same type of crop on adjacent real estate, whether raised by the Owner or other farmers. The Buyer's right to enter hereunder shall terminate if the Option is not timely exercised. Otherwise, such right of entry shall extend to the date of Closing hereunder. The Owner shall maintain the Real Estate in the current state and shall keep all tax payments current.
3. Survey. Upon execution of this Option Agreement, the Buyer shall proceed to secure a survey (the "Survey") of the Real Estate to identify a more accurate legal description of the Real Estate. The costs of the Survey shall be borne by the Buyer. Within 10 days after completion of the Survey, an addendum to this Option Agreement shall be executed by the parties to incorporate such legal description.
4. Exercise. This Option Agreement is executed contemporaneously with Option Agreements between (a) the Buyer and Jerry W. Weger, (b) the Buyer, and Dan E. Weger and Marian Weger, as joint tenants with rights of survivorship, and (c) the Buyer and Joe A. Weger, Jody R. Andriano, individually

7. Option Price; Failure to Exercise Option. If the Buyer does not exercise the Option as herein provided, neither party shall have any further rights or claims against the other, and the Buyer shall have no further rights in and to the Real Estate.

8. Purchase Price.

A. If the Option is exercised on or before the Expiration Date, the total purchase price (the "Purchase Price") for the Real Estate shall be calculated by referring to the Survey and, using such Survey, multiplying 12.3 acres by [REDACTED] and adding to that result an amount equal to [REDACTED] multiplied by the number of acres indicated in the Survey that exceeds 12.3.

B. If the Option is exercised, the Purchase Price shall be paid by the Buyer to the Owner, or the Owner's designee, at Closing (as defined herein) in cash, wire transfer, or other immediately available funds. The Option Payment shall be credited against the payment due at Closing.

C. At Closing, the Purchase Price shall be paid to "Joe A. Weger and Jody Andriano", or their designee, and any division of such Purchase Price shall be made after Closing as Joe A. Weger and Jody Andriano may determine.

9. Owners' Representations. The Owner warrants (or if more than one Owner, the Owners jointly and severally warrant) that as of the execution date hereof the Real Estate is free and clear of any liens and/or encumbrances, except the lien for current real estate taxes and assessments not yet due and payable and a mortgage, the unpaid balance of which is, and at Closing shall be, less than the Purchase Price due to the Owner. The Owner further warrants that during the term of this Option Agreement, the Owner shall not cause any liens or encumbrances to attach to the Real Estate. Any such liens or encumbrances that attach to the Real Estate shall be removed promptly. The Owner further warrants that the Real Estate does not invoke the provisions of applicable Illinois property transfer laws, and otherwise is free from adverse environmental conditions or defects.

10. Closing Date. Consummation of the purchase and sale of the Real Estate (the "Closing") shall occur as soon as possible after the Exercise Date, and in any event no later than 90 days thereafter unless the parties otherwise agree in writing ("Closing Date").

11. Evidence of Title and Cure of Title Defects. The Buyer at any time may procure a Title Insurance Commitment (the "Title Commitment") on the Owner's behalf. Costs of the Title Commitment (and the title insurance premium, final title search, and costs of title insurance policy issuance) shall be

borne by the Buyer. The Title Commitment shall be endorsed to reflect the legal description in the Survey, if a Survey has been secured.

Not later than 20 days after the Exercise Date, the Buyer shall inform the Owner of defects in the marketability of the Owner's title to the Real Estate and the Owner shall cause such objections and defects to be eliminated promptly and within a reasonable time after the designation of same to the Owner. Waiver by the Buyer of any exception or requirement must be in writing. If any such objection or defect for any reason is not removed or eliminated, subject to the Owner's obligation set forth in the following paragraph, by the Owner prior to the Closing Date, the Buyer, at the Buyer's sole election, may rescind this Option Agreement and receive repayment of the Option Payment or waive any such objections or defects.

Notwithstanding the foregoing, if the Buyer's examination of the Title Insurance Commitment discloses defects in the Owner's title rendering such title unmerchantable, the Owner shall make a good faith effort upon reasonable diligence to cure such defects within a reasonable amount of time, and if such defects can be cured by the Owner, the Owner, at the Buyer's request, shall cause such cure to be made.

12. Purchase and Sale Contract. If this Option is exercised as herein provided, upon exercise this Option shall become an agreement for the purchase and sale of the Real Estate (the Option terms and/or the agreement terms for the purchase and sale shall be referred to collectively as the "Purchase Agreement") and the Owner and the Buyer respectively will perform the additional obligations and be bound by the additional conditions, restrictions, and requirements as are set forth in the Purchase Agreement in connection with the purchase and sale of the Real Estate, to-wit:

A. Purchase Price. The purchase price shall be the amount set forth in Paragraph 7 of this Option Agreement and shall be paid in the manner described in said Paragraph 7 of this Option Agreement.

B. Crops. If Closing occurs while a growing crop exists on the Real Estate, the Buyer shall have the option either to destroy a portion or all of the crop or to leave the crop undisturbed. The Owner shall have the right to enter upon the Real Estate after Closing to cultivate and harvest the undisturbed portion of the growing crop to the extent that such entry, cultivation, and harvest does not interfere with the Buyer's use of the Real Estate. The Buyer shall pay damages (the "Crop Damages") to the Owner for the value of any such destruction of crops growing on the Real Estate on the Exercise Date at the market value for such crop on the date that the Owner is obligated, under contracts existing on the Exercise Date, to deliver the crop or, if no such contract exists, on the then existing market value for such crop, and based upon the yield data for the same type of crop on adjacent real estate, whether raised by the Owner or other farmers.

C. Barrier Area and Roads. Reference is made to the depictions (the "Depictions") in two pages attached hereto collectively as "Exhibit B." Lands described in the Weger Options shall be used to the extent reasonably required to achieve the following goals:

i. Areas that will not be disturbed by Buyer's activities are identified in the Depiction by a red solid line boundary with red cross hatches, which shall remain wooded to leave a barrier between the Buyer's improvements and activities and the dwelling house of Joe A. Weger, and are described as follows. (All measurements that refer to a township road relate to the centerline of such road.)

A strip 150 feet wide adjacent to the east side of a line that begins at the intersection of Township Roads ("TR") 1950E and 1840N and runs northerly with the centerline of TR 1950E a distance of 620 feet.

Also, a strip 150 feet wide adjacent to the east side of a line that begins at the intersection of TRs 1950E and 1840N and runs southerly with the centerline of TR 1950E a distance of 450 feet.

Also, a strip 190 feet wide that begins 150 feet east of the intersection of TRs 1950E and 1840N and runs easterly with the centerline of TR 1840N a distance of 338 feet (488 feet from the intersection of said roads), such strip to be 40 feet on the south side and 150 feet on the north side of TR 1840N.

Provided, however, that the Buyer may use such non-disturbance area to the least extent required by utility service providers to install utility services for the Lessee's operations. Construction of such utility services shall be accomplished in a manner or manners as minimally invasive as reasonably possible, underground structures may be installed and trees and other growth may be removed to the extent required to accomplish such installation, and the area may be maintained, mowed, and landscaped by the Buyer.

ii. Road beds shall be stabilized initially with cement stabilizer to a depth of 12 inches and road surfaces applied at the Buyer's expense to approximately 2,580 feet of TR 1840N and 5,180 feet of TR 1950E as outlined in green color on page 1 of the Depictions. Such road surfaces shall be those approved by the requisite governmental bodies, but of not less quality than chip and seal. The parties understand that current government specifications require an initial triple coat of chip and seal (which is

a primer of oil and a double chip and seal). Roads shall be resurfaced at the Buyer's expense every three years, or deteriorated segments more frequently as reasonably determined by the Lawrence County, Illinois, road engineer, during the Buyer's use of the Real Estate for the production of coal.

iii. Buyer's entrances on TR 1840N and TR 1950E will be located, at the Buyer's expense, out of the line of sight of Joe A. Weger's dwelling house as located on the date of this Option Agreement and the westernmost entrance on TR 1840N shall be no closer than 488 feet from the intersection of TRs 1950E and 1840N.

iv. The obligations in this subsection C shall survive Closing.

D. Taxes and Assessments. Real estate taxes and assessments for the year in which the Closing occurs (the "Closing Year") and due and payable in the following year shall be prorated between the Owner and the Buyer based upon the most recent assessment. The Owner shall pay that portion of such taxes and assessments as is represented by a fraction, the numerator of which is the number of days between January 1 of the Closing Year and the Closing Date and the denominator of which is 365. The balance of such taxes and assessments for the Closing Year and all subsequent taxes and assessments shall be paid by the Buyer. The real estate taxes and assessments for the year prior to the Closing that are due and payable during the Closing Year shall be paid by the Owner or deducted from the closing payment at the Buyer's direction.

The Buyer may, but shall not be required to, pay the real estate taxes and assessments that now are due and payable and that become due and payable hereafter, and deduct such amounts that are the obligation of the Owner from the amounts due the Owner at Closing.

E. Warranty Deed; Vendors' Affidavit. If the Title Insurance Commitment discloses that the Owner is the owner of a marketable record title in fee simple to the Real Estate, or the title of the Owner is perfected satisfactorily, or any defects or objections are waived by the Buyer, as provided above, the sale and conveyance shall be consummated on the Closing Date by the delivery to the Buyer of a Warranty Deed, in a form and substance acceptable to the Buyer, conveying title to the Real Estate to the Buyer in fee simple, free and clear of any and all liens and encumbrances except the lien for current real estate taxes and assessments and subject to all existing and recorded roadways, and all other documents and instruments required to vest marketable title in the Buyer. If requested by the Buyer, the Owner also shall execute and deliver to the Buyer a Vendors' Affidavit dated as of the Closing Date.

F. Specific Performance. The Buyer shall be entitled to specific performance in the event of a breach by the Owner.

G. Failure to Close. If the Option is exercised and, through no fault of the Buyer, Closing does not take place within 90 days of the Exercise Date (or such other date as may be agreed upon by the parties in writing), the Buyer, in the Buyer's sole discretion, may elect to terminate this Option Agreement and the Purchase Agreement and, in the event of such termination, the Owner shall be entitled to retain the Option Payment as the Owner's sole remedy.

13. Attorneys' Fees. If it becomes necessary for either party to this Option Agreement to enforce any term or provision hereof by any action in any court of competent jurisdiction, the prevailing party shall be entitled to recover reasonable attorneys' fees and expenses in addition to any other judgment rendered.

14. Binding Effect. This Option Agreement, and the terms and provisions hereof, shall be binding upon the parties hereto and their respective heirs, successors and assigns.

15. Permitting. During the term of this Option, the Owner shall execute all documents requested by the Buyer to comply with permitting and other regulatory requirements of the State of Illinois related to coal mining operations.

16. CRP. If the Real Estate is part of a USDA Conservation Reserve Program, the Buyer shall execute all documents required to assume the USDA CRP obligations and to enter CRP contracts with the USDA or, at the Buyer's expense, may terminate the CRP contracts.

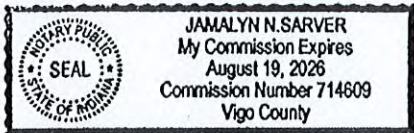
17. Memorandum of Agreement. At the Buyer's discretion, this Option Agreement may not be recorded. In that event, the Owner and the Buyer shall execute and deliver a memorandum of this Option Agreement in proper form for the purpose of recording, but said memorandum of this Option Agreement shall not in any circumstance be deemed to modify or change any of the provisions of this Option Agreement, the provisions of which shall in all instances prevail.

18. Execution. This Agreement may be executed in any number of separate counterparts, each of which may be executed by less than all the parties. All counterparts shall be considered collectively as one instrument as though all parties who executed any one of the counterparts executed the same document.

[Signatures appear on the immediately following page.]

STATE OF INDIANA)
) SS:
COUNTY OF VIGO)

Before me, a Notary Public in and for said County and State, this 4 day of October, 2018, Lawrence D. Martin, personally known to me to be the Vice President of Sunrise Land Holdings, LLC, a limited liability company, and personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument on behalf of Sunrise Land Holdings, LLC and with authority of the governing body thereof.



My Commission Expires:

AUGUST 19, 2026

J. N. Sarver
Notary Public
Printed: JAMALYN N. SARVER

County of Residence: VIGO

This Option to Purchase Real Estate was prepared on behalf of the Buyer by John Rowe, Attorney at Law, of The Rowe Law Firm, LLC, 1418 North 1000 West, Linton, Indiana 47441, and modified as a result of review on behalf of the Owner by Jeffrey B. Kolb, Attorney at Law, of Kolb Roellgen & Kirchoff, LLP, 801 Busseron Street, Vincennes, Indiana 47591.

EXHIBIT A

The following described real estate in Lawrence County, Illinois, to-wit:

The East 20 acres of even width of all that part of the West Half of the Southeast Quarter of Section 29, Township 5 North, Range 10 West of the Second Principal Meridian lying South of the Public Road Running through the same.

Hereby releasing and waiving all rights under and by virtue of the Homestead Exemption laws of the State of Illinois.

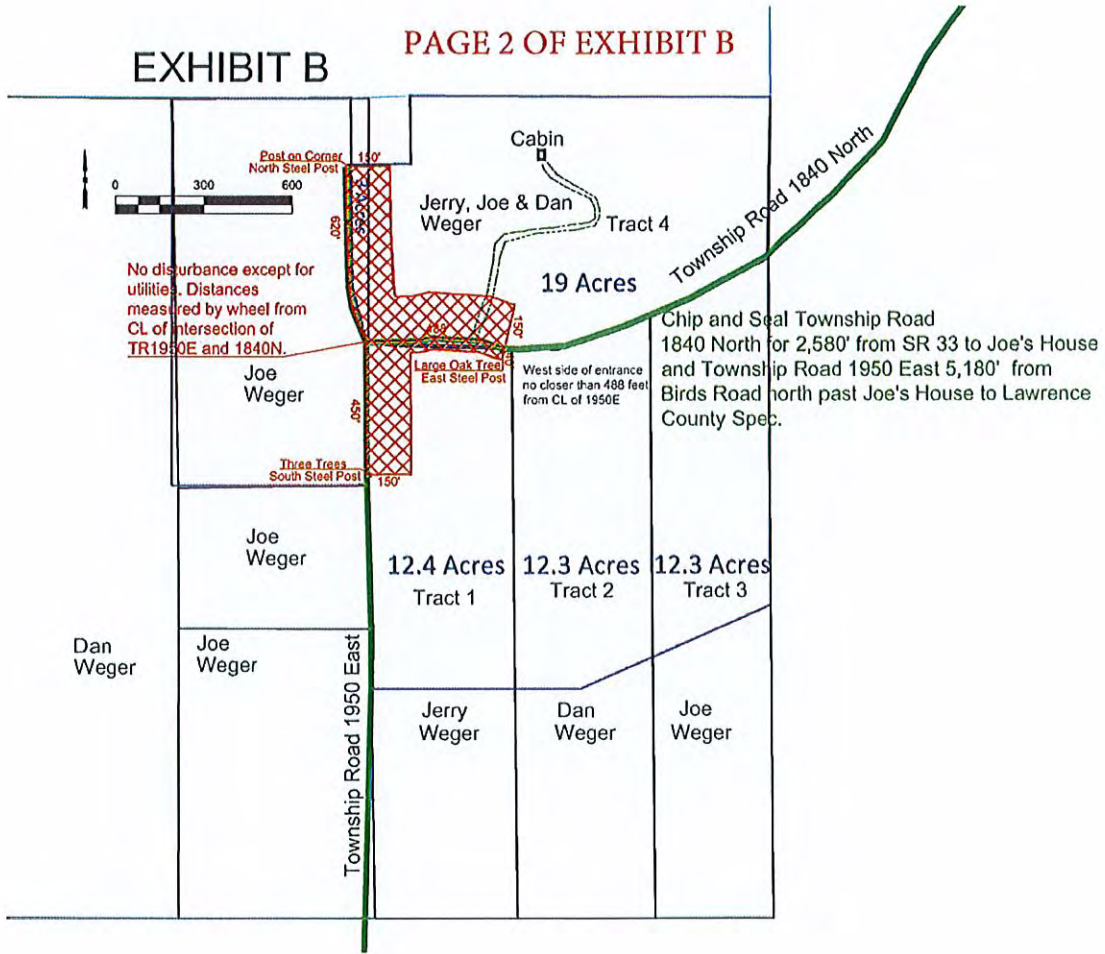
Excepting therefrom all coal, coalbed methane, coalmine methane, and all other materials associated with the coal, without regard to depth, underlying the surface of the above described real estate.

PAGE 1 OF EXHIBIT B



EXHIBIT B

PAGE 2 OF EXHIBIT B



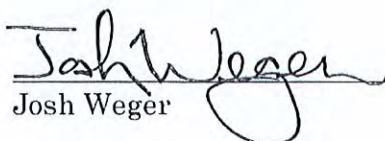
JOINDER

This Joinder is executed by the undersigned to establish that all conditions to sale appearing in a certain Quitclaim Deed from Joe A. Weger to Jody R. Andriano, individually, which Quitclaim Deed is dated April 1, 2014, and was recorded April 7, 2014, as Instrument No. 201400094738 in Record Vol. 986, page 126 in the office of the Recorder of Lawrence County, Illinois, have been fulfilled.

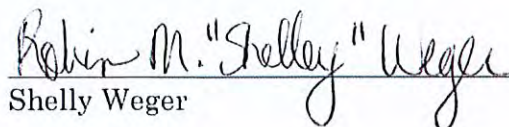
To that end, the undersigned acknowledge that:

1. this Joinder is part of the Option Agreement to which the Joinder is attached;
2. the undersigned are all of the siblings of Jody R. Andriano and the undersigned from time to time may be referred to herein as "the Siblings."
3. the Option Agreement constitutes a written agreement with a third party signed by all parties that identifies the third party, the real property to be sold, the price, and all conditions on payment or transfer;
4. a copy of the Option Agreement, which is the written and signed agreement referred to above, has been provided to the Siblings;
5. all of the Siblings waive the opportunity, and decline, to make an offer to purchase the real property described in Exhibit A for the same price and on similar terms and conditions as those set forth in the Option Agreement;
6. if the Option is exercised and the sale to Sunrise Land Holdings, LLC is consummated pursuant to the terms of the Option Agreement, the Siblings shall execute and deliver to Sunrise Land Holdings, LLC a recordable instrument affirming that such sale to Sunrise Land Holdings, LLC was consummated pursuant to the Option Agreement that has been provided to the Siblings; and
7. this Joinder is executed in multiple counterparts, one of which may be attached to a Memorandum of Option Agreement to be recorded.

Dated this 10th day of October, 2018.



Josh Weger



Shelly Weger

STATE OF Illinois)
) SS:
COUNTY OF Cook)

Before me, a Notary Public in and for said County and State, this 10th day of October, 2018, personally appeared Josh Weger, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be his free and voluntary act and deed.

My Commission Expires:

6/24/19

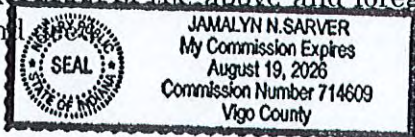
Dana M. Prasauskas
Notary Public
Printed: [Signature]

County of Residence: Cook

STATE OF Indiana)
) SS:
COUNTY OF Vanderburg)



Before me, a Notary Public in and for said County and State, this 12th day of October, 2018, personally appeared Shelly Weger, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be her free and voluntary act and deed.



My Commission Expires:

8/19/26

[Signature]
Notary Public
Printed: Jamalyn N. Sarver

County of Residence: Vigo

OPTION TO PURCHASE REAL ESTATE

This Option to Purchase Real Estate (the "Option Agreement") is entered into on this 4 day of October, 2018, by (A) **Joe A. Weger, Jody R. Andriano, and Jody R. Andriano, as trustee of the Robin Michelle Weger Supplemental Care Trust, as to an undivided one-third interest,** whose address is [REDACTED] (B) **Jerry W. Weger, as to an undivided one-third interest,** whose address is [REDACTED] and (C) **Dan E. Weger and Marian Weger, as joint tenants with rights of survivorship, as to an undivided one-third interest,** whose address is [REDACTED] and **Sunrise Land Holdings, LLC, (the "Buyer")** the address of which is 1183 E. Canvasback Drive, Terre Haute, Indiana 47802.

1. Grant of Option. In consideration of the sum of [REDACTED] paid by the Buyer to the Owner (the "Option Payment"), the receipt whereof hereby is acknowledged, the Owner hereby grants to the Buyer the exclusive option to purchase (the "Option") 22 acres of real estate and all improvements thereon, (collectively, the "Real Estate") in Lawrence County, Illinois, which is more fully described in Exhibit A, attached hereto, upon the terms set forth in this Option Agreement.

2. Access to Real Estate. Pending Closing, the Owner may retain possession of the Real Estate, however the Buyer shall have the right to enter upon the Real Estate to investigate, explore, drill, and evaluate the feasibility of developing the Real Estate for mineral development and mining operations. If the Option is not exercised by the Buyer, or if the Buyer damages any of the Owner's growing crop, the Buyer shall compensate the Owner for any reasonable damages incurred to the Real Estate or the growing crop as a result of the Buyer's use of this right to enter. The amount of such crop damage shall be the market value for damaged crops on the date that the Owner is obligated, under contracts existing on the date of this Option, to deliver the crop or, if no such contract exists, on the then existing market value for such damaged crops, and based upon the yield data for the same type of crop on adjacent real estate, whether raised by the Owner or other farmers. The Buyer's right to enter hereunder shall terminate if the Option is not timely exercised. Otherwise, such right of entry shall extend to the date of Closing hereunder. The Owner shall maintain the Real Estate in the current state and shall keep all tax payments current.

3. Survey. Upon execution of this Option Agreement, the Buyer shall proceed to secure a survey (the "Survey") of the Real Estate to identify a more accurate legal description of the Real Estate. The costs of the Survey shall be borne by the Buyer. Within 10 days after completion of the Survey, an

Jerry W. Weger

Telephone: [REDACTED]

TO THE BUYER:

Sunrise Land Holdings, LLC
1183 Canvasback Drive
Terre Haute, Indiana 47802
Attn: President

Telephone: 812-299-2800

Email: LMartin@SunriseCoal.com

Any party may change the person to be notified and its address for the purposes of this section by giving the other party hereto written notice of the new person and/or new address in the manner set forth above.

Notice of exercise of the Option must be sent on or before the Expiration Date. The date of exercise shall be referred to as the "Exercise Date".

7. Option Price; Failure to Exercise Option. If the Buyer does not exercise the Option as herein provided, neither party shall have any further rights or claims against the other, and the Buyer shall have no further rights in and to the Real Estate.

8. Purchase Price.

A. If the Option is exercised on or before the Expiration Date, the total purchase price (the "Purchase Price") for the Real Estate shall be calculated by referring to the Survey and, using such Survey, multiplying 19.00 acres [REDACTED] and adding to that result an amount equal to [REDACTED] multiplied by the number of acres indicated in the Survey that exceeds 19.00.

B. If the Option is exercised, the Purchase Price shall be paid by the Buyer to the Owner at Closing (as defined herein) in cash, wire transfer, or other immediately available funds. The Option Payment shall be credited against the payment due at Closing.

9. Owner's Representations. The Owner warrants (or if more than one Owner, the Owners jointly and severally warrant) that as of the execution date hereof the Real Estate is free and clear of any liens and/or encumbrances, except the lien for current real estate taxes and assessments not yet due and payable and a mortgage, the unpaid balance of which is, and at Closing shall be, less than the Purchase Price due to the Owner. The Owner further warrants that during the term of this Option Agreement, the Owner shall not cause any liens or encumbrances to attach to the Real Estate. Any such liens or encumbrances that attach to the Real Estate shall be removed promptly. The Owner further warrants that the Real Estate does not invoke the provisions of applicable Illinois property transfer laws, and otherwise is free from adverse environmental conditions or defects.

10. Closing Date. Consummation of the purchase and sale of the Real Estate (the "Closing") shall occur as soon as possible after the Exercise Date, and in any event no later than 90 days thereafter unless the parties otherwise agree in writing ("Closing Date").

11. Evidence of Title and Cure of Title Defects. The Buyer at any time may procure a Title Insurance Commitment (the "Title Commitment") on the Owner's behalf. Costs of the Title Commitment (and the title insurance premium, final title search, and costs of title insurance policy issuance) shall be borne by the Buyer. The Title Commitment shall be endorsed to reflect the legal description in the Survey.

Not later than 20 days after the Exercise Date, the Buyer shall inform the Owner of defects in the marketability of the Owner's title to the Real Estate and the Owner shall cause such objections and defects to be eliminated promptly and within a reasonable time after the designation of same to the Owner. Waiver by the Buyer of any exception or requirement must be in writing. If any such objection or defect for any reason is not removed or eliminated, subject to the Owner's obligation set forth in the following paragraph, by the Owner prior to the Closing Date, the Buyer, at the Buyer's sole election, may rescind this Option Agreement and receive repayment of the Option Payment or waive any such objections or defects.

Notwithstanding the foregoing, if the Buyer's examination of the Title Insurance Commitment discloses defects in the Owner's title rendering such title unmerchantable, the Owner shall make a good faith effort upon reasonable diligence to cure such defects within a reasonable amount of time, and if such defects can be cured by the Owner, the Owner, at the Buyer's request, shall cause such cure to be made.

12. Purchase and Sale Contract. If this Option is exercised as herein provided, upon exercise this Option shall become an agreement for the purchase and sale of the Real Estate (the Option terms and/or the agreement terms for the purchase and sale shall be referred to collectively as the "Purchase Agreement") and the Owner and the Buyer respectively will perform the additional

obligations and be bound by the additional conditions, restrictions, and requirements as are set forth in the Purchase Agreement in connection with the purchase and sale of the Real Estate, to-wit:

A. Purchase Price. The purchase price shall be the amount set forth in Paragraph 7 of this Option Agreement and shall be paid in the manner described in said Paragraph 7 of this Option Agreement.

B. Crops. If Closing occurs while a growing crop exists on the Real Estate, the Buyer shall have the option either to destroy a portion or all of the crop or to leave the crop undisturbed. The Owner shall have the right to enter upon the Real Estate after Closing to cultivate and harvest the undisturbed portion of the growing crop to the extent that such entry, cultivation, and harvest does not interfere with the Buyer's use of the Real Estate. The Buyer shall pay damages (the "Crop Damages") to the Owner for the value of any such destruction of crops growing on the Real Estate on the Exercise Date at the market value for such crop on the date that the Owner is obligated, under contracts existing on the Exercise Date, to deliver the crop or, if no such contract exists, on the then existing market value for such crop, and based upon the yield data for the same type of crop on adjacent real estate, whether raised by the Owner or other farmers.

C. Barrier Area and Roads. Reference is made to the depictions (the "Depictions") in two pages attached hereto collectively as "Exhibit B." Lands described in the Weger Options shall be used to the extent reasonably required to achieve the following goals:

i. Areas that will not be disturbed by Buyer's activities are identified in the Depiction by a red solid line boundary with red cross hatches, which shall remain wooded to leave a barrier between the Buyer's improvements and activities and the dwelling house of Joe A. Weger, and are described as follows. (All measurements that refer to a township road relate to the centerline of such road.)

A strip 150 feet wide adjacent to the east side of a line that begins at the intersection of Township Roads ("TR") 1950E and 1840N and runs northerly with the centerline of TR 1950E a distance of 620 feet.

Also, a strip 150 feet wide adjacent to the east side of a line that begins at the intersection of TRs 1950E and 1840N and runs southerly with the centerline of TR 1950E a distance of 450 feet.

Also, a strip 190 feet wide that begins 150 feet east of the intersection of TRs 1950E and 1840N and runs easterly with the centerline of TR 1840N a distance of 338 feet (488 feet from the intersection of said roads), such strip to be 40 feet on the south side and 150 feet on the north side of TR 1840N.

Provided, however, that the Buyer may use such non-disturbance area to the least extent required by utility service providers to install utility services for the Lessee's operations. Construction of such utility services shall be accomplished in a manner or manners as minimally invasive as reasonably possible, underground structures may be installed and trees and other growth may be removed to the extent required to accomplish such installation, and the area may be maintained, mowed, and landscaped by the Buyer.

ii. Road beds shall be stabilized initially with cement stabilizer to a depth of 12 inches and road surfaces applied at the Buyer's expense to approximately 2,580 feet of TR 1840N and 5,180 feet of TR 1950E as outlined in green color on page 1 of the Depictions. Such road surfaces shall be those approved by the requisite governmental bodies, but of not less quality than chip and seal. The parties understand that current government specifications require an initial triple coat of chip and seal (which is a primer of oil and a double chip and seal). Roads shall be resurfaced at the Buyer's expense every three years, or deteriorated segments more frequently as reasonably determined by the Lawrence County, Illinois, road engineer, during the Buyer's use of the Real Estate for the production of coal.

iii. Buyer's entrances on TR 1840N and TR 1950E will be located, at the Buyer's expense, out of the line of sight of Joe A. Weger's dwelling house as located on the date of this Option Agreement and the westernmost entrance on TR 1840N shall be no closer than 488 feet from the intersection of TRs 1950E and 1840N.

iv. The obligations in this subsection C shall survive Closing.

D. Taxes and Assessments. Real estate taxes and assessments for the year in which the Closing occurs (the "Closing Year") and due and payable in the following year shall be prorated between the Owner and the Buyer based upon the most recent assessment. The Owner shall pay that portion of such taxes and assessments as is represented by a fraction, the numerator of which is the number of days between January 1 of the Closing Year and the Closing Date and the denominator of which is 365. The balance of such taxes and assessments for the Closing Year and all

subsequent taxes and assessments shall be paid by the Buyer. The real estate taxes and assessments for the year prior to the Closing that are due and payable during the Closing Year shall be paid by the Owner or deducted from the closing payment at the Buyer's direction.

The Buyer may, but shall not be required to, pay the real estate taxes and assessments that now are due and payable and that become due and payable hereafter, and deduct such amounts that are the obligation of the Owner from the amounts due the Owner at Closing.

E. Possession. Possession of the Real Estate and all improvements thereon shall be delivered to the Buyer not more than 30 days after Closing.

F. Warranty Deed; Vendors' Affidavit. If the Title Insurance Commitment discloses that the Owner is the owner of a marketable record title in fee simple to the Real Estate, or the title of the Owner is perfected satisfactorily, or any defects or objections are waived by the Buyer, as provided above, the sale and conveyance shall be consummated on the Closing Date by the delivery to the Buyer of a Warranty Deed, in a form and substance acceptable to the Buyer, conveying title to the Real Estate to the Buyer in fee simple, free and clear of any and all liens and encumbrances except the lien for current real estate taxes and assessments and subject to all existing and recorded roadways, and all other documents and instruments required to vest marketable title in the Buyer. If requested by the Buyer, the Owner also shall execute and deliver to the Buyer a Vendors' Affidavit dated as of the Closing Date.

G. Right of First Refusal. At Closing, the Owner and the Buyer shall enter into a Right of First Refusal, pursuant to which, if the Buyer seeks to sell the Real Estate, the Buyer grants to the Owner the opportunity to meet or exceed the price offered to the Buyer. The form and the terms of the Right of First Refusal are those set forth in Exhibit C, attached hereto. In all events, the Right of First Refusal shall be exercisable by the Owner at the earlier of the occurrence of the events set forth in Section 4 of such Right of First Refusal and the Right of First Refusal shall terminate automatically at the earlier of (1) exercise of the Right of First Refusal, (2) declination of exercise of the Right of First Refusal, (3) 99 years from the date of execution of the Right of First Refusal, (4) the parties' termination of the Right of First Refusal, or (5) the death of the last of the children of Jerry W. Weger, Joe A. Weger, and Dan E. Weger.

The Buyer's title shall be subject to all liens granted to Buyer's lender.

H. Specific Performance. The Buyer shall be entitled to specific performance in the event of a breach by the Owner.

I. Failure to Close. If the Option is exercised and, through no fault of the Buyer, Closing does not take place within 90 days of the Exercise Date (or such other date as may be agreed upon by the parties in writing), the Buyer, in the Buyer's sole discretion, may elect to terminate this Option Agreement and the Purchase Agreement and, in the event of such termination, the Owner shall be entitled to retain the Option Payment as the Owner's sole remedy.

13. Attorneys' Fees. If it becomes necessary for either party to this Option Agreement to enforce any term or provision hereof by any action in any court of competent jurisdiction, the prevailing party shall be entitled to recover reasonable attorneys' fees and expenses in addition to any other judgment rendered.

14. Binding Effect. This Option Agreement, and the terms and provisions hereof, shall be binding upon the parties hereto and their respective heirs, successors and assigns.

15. Permitting. During the term of this Option, the Owner shall execute all documents requested by the Buyer to comply with permitting and other regulatory requirements of the State of Illinois related to coal mining operations.

16. CRP. If the Real Estate is part of a USDA Conservation Reserve Program, the Buyer shall execute all documents required to assume the USDA CRP obligations and to enter CRP contracts with the USDA or, at the Buyer's expense, may terminate the CRP contracts.

17. Memorandum of Agreement. At the Buyer's discretion, this Option Agreement may not be recorded. In that event, the Owner and the Buyer shall execute and deliver a memorandum of this Option Agreement in proper form for the purpose of recording, but said memorandum of this Option Agreement shall not in any circumstance be deemed to modify or change any of the provisions of this Option Agreement, the provisions of which shall in all instances prevail.

[The remainder of this page intentionally is left blank.]

18. Execution. This Agreement may be executed in any number of separate counterparts, each of which may be executed by less than all the parties. All counterparts shall be considered collectively as one instrument as though all parties who executed any one of the counterparts executed the same document.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals, the day and year first above written.

Joe A. Weger
Joe A. Weger, as an Owner

Sunrise Land Holdings, LLC, as the Buyer

Jody R. Andriano
Jody R. Andriano, as an Owner

By: Lawrence D. Martin
Lawrence D. Martin, as Vice President

Jody R. Andriano, trustee
Jody R. Andriano, as trustee of the Robin Michelle Weger Supplemental Care Trust, as an Owner

Jerry W. Weger, as an Owner

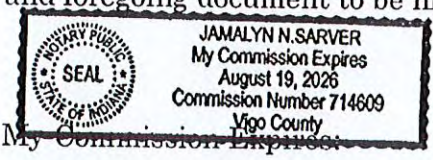
Dan E. Weger
Dan E. Weger

By: Jerry A. Weger
Jerry A. Weger, as attorney-in-fact pursuant to a Power of Attorney dated 10/24/2014 and recorded 01/21/2015 at 11:39am as Instrument No. 201500096699 in the office of the Recorder of Lawrence County, Illinois

Marian E. Weger
Marian Weger

STATE OF INDIANA)
) SS:
COUNTY OF KNOX)

Before me, a Notary Public in and for said County and State, this 4 day of October, 2018, personally appeared Joe A. Weger, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be his free and voluntary act and deed.

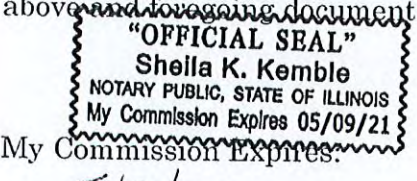


AUGUST 19, 2026

J. Sarver
Notary Public
Printed: JAMALYN N. SARVER
County of Residence: VIGO

STATE OF INDIANA ILLINOIS)
) SS:
COUNTY OF KANKAKEE)

Before me, a Notary Public in and for said County and State, this 10th day of October, 2018, personally appeared Jody R. Andriano, individually and as trustee of the Robin Michelle Weger Supplemental Care Trust, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be her free and voluntary act and deed.

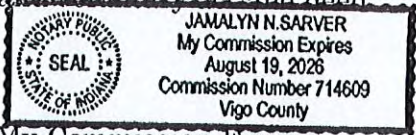


5/9/21

Sheila Kemble
Notary Public
Printed: Sheila Kemble
County of Residence: WI

STATE OF INDIANA)
) SS:
COUNTY OF Knob)

Before me, a Notary Public in and for said County and State, this 4 day of October, 2018, personally appeared Jerry A. Weger, as attorney-in-fact of Jerry W. Weger, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be his free and voluntary act and deed.



My Commission Expires:

August 19, 2026

A handwritten signature in blue ink, appearing to read 'J. Sarver', written over a horizontal line.

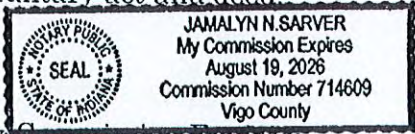
Notary Public

Printed: JAMALYN N. SARVER

County of Residence: VIGO

STATE OF INDIANA)
) SS:
COUNTY OF Knob)

Before me, a Notary Public in and for said County and State, this 4 day of October, 2018, personally appeared Dan E. Weger and Marian Weger, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be his and her free and voluntary act and deed.



My Commission Expires:

August 19, 2026

A handwritten signature in blue ink, appearing to read 'J. Sarver', written over a horizontal line.

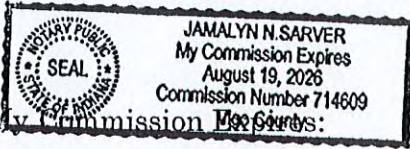
Notary Public

Printed: JAMALYN N. SARVER

County of Residence: VIGO

STATE OF INDIANA)
) SS:
COUNTY OF VIGO)

Before me, a Notary Public in and for said County and State, this 4 day of October, 2018, Lawrence D. Martin, personally known to me to be the Vice President of Sunrise Land Holdings, LLC, a limited liability company, and personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument on behalf of Sunrise Land Holdings, LLC and with authority of the governing body thereof.



My Commission Expires: August 19, 2026

J. N. Sarver
Notary Public
Printed: JAMALYN N. SARVER

County of Residence: VIGO

This Option to Purchase Real Estate was prepared on behalf of the Buyer by John Rowe, Attorney at Law, of The Rowe Law Firm, LLC, 1418 North 1000 West, Linton, Indiana 47441, and modified as a result of review on behalf of the Owner by Jeffrey B. Kolb, Attorney at Law, of Kolb Roellgen & Kirchoff, LLP, 801 Busseron Street, Vincennes, Indiana 47591.

EXHIBIT A

The following described real estate in Lawrence County, Illinois, to-wit:

TRACT I

All that part of the West Half of the Southeast Quarter of Section 29, Township 5 North, Range 10 West of the Second Principal Meridian in Lawrence County, Illinois, lying North of the Public Road running through the same, such parcel containing 19 acres, more or less.

TRACT II

The East Half of the Northeast Quarter of the Southwest Quarter of Section 29, Township 5 North, Range 10 West, except that part lying South and West of the of the Public Road Running through the same, containing 3.00 acres, more or less.

Hereby releasing and waiving all rights under and by virtue of the Homestead Exemption laws of the State of Illinois as to both Tracts I and II.

Excepting therefrom all coal, coalbed methane, coalmine methane, and all other materials associated with the coal, without regard to depth, underlying the surface of the above described Tracts I and II.

PAGE 1 OF EXHIBIT B



EXHIBIT B

PAGE 2 OF EXHIBIT B

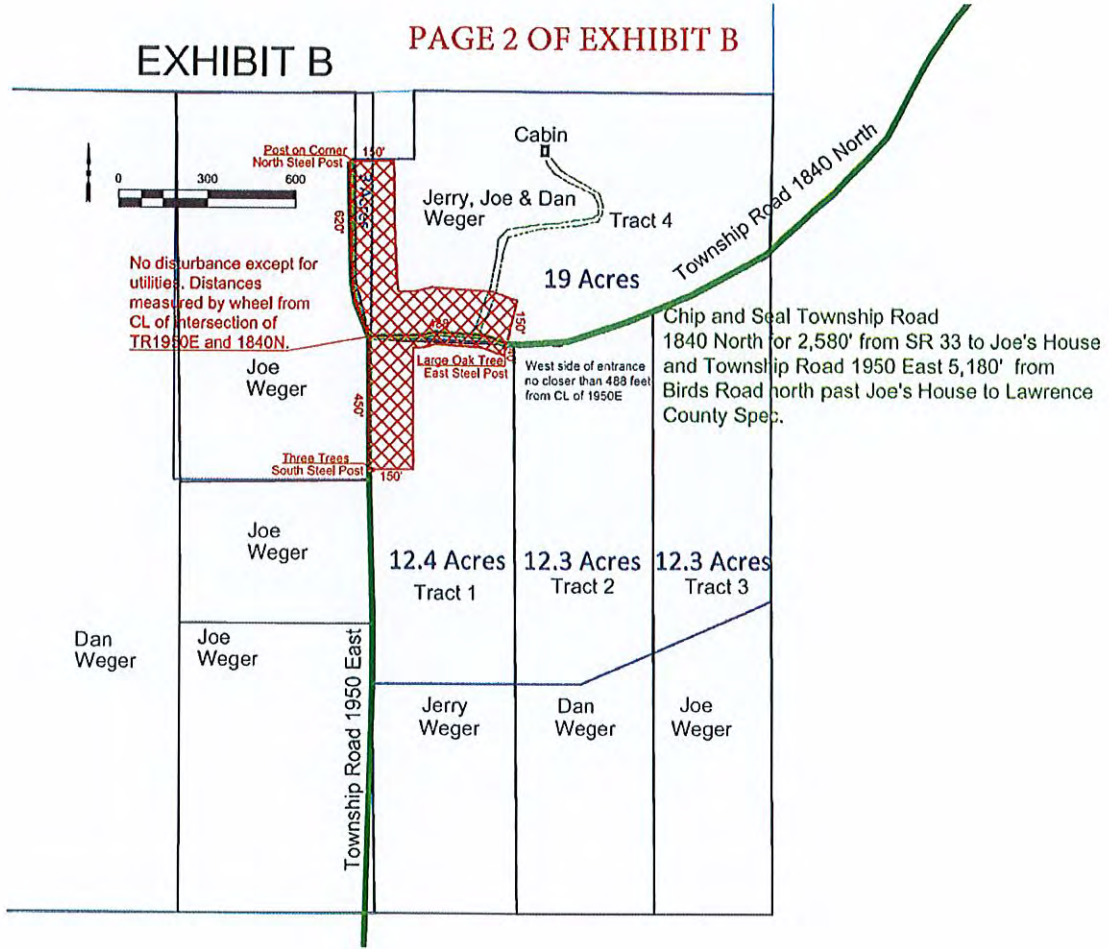


EXHIBIT C

This instrument was prepared by:

John Rowe
THE ROWE LAW FIRM, LLC
1418 N 1000 W
Linton, Indiana 47441
(Tel: 812.847.4751)

Please return recorded document to:

Mr. Roy Dressler
Leasing Manager
SUNRISE LAND HOLDINGS, LLC
1183 East Canvasback Drive
Terre Haute, Indiana 47802
(Tel: 812.299.2800)

The Lawrence County, Illinois is
requested to cross-reference Instrument
No. _____ in Record
Vol. _____, page _____.

RIGHT OF FIRST REFUSAL

This Right of First Refusal, made and entered into on this _____ day of _____, 20____, between **Sunrise Land Holdings, LLC** ("the Seller") and **Joe A. Weger, Jerry W. Weger, and Dan E. Weger and Marian Weger**, (collectively, the "Buyer"), WITNESSETH THAT, in consideration of \$10.00 paid by the Buyer to the Seller and in further consideration of the mutual covenants and conditions hereinafter contained, the parties agree as follows:

1. The Seller grants, bargains, and sells to the Buyer the right of first refusal to purchase (the "Right") 22 acres of real estate and all improvements thereon (collectively, the "Real Estate") in Lawrence County, Illinois, which is more fully described in Exhibit A to Right of First Refusal, attached hereto, upon the terms and conditions set forth in this agreement.

2. This Right of First Refusal shall terminate automatically at the earlier of (1) exercise of the Right of First Refusal, (2) declination of exercise of the Right of First Refusal, (3) 99 years from the date of execution of the Right of First Refusal, (4) the parties' termination of the Right of First Refusal, or (5) the death of the last of the children of Joe A. Weger, Jerry W. Weger, and Dan E. Weger and Marian Weger.

3. The Right may be exercised as to all, but not less than all, of the Real Estate.

4. The Right may be exercised at the earlier of (a) 20 years from the date hereof or (b) the occurrence of an event set forth in Sections 5 or 6, below. Exercise of the Right under (a) of this Section 4 shall follow the procedure set forth in Section 6, below.

5. Should the Seller desire to sell or otherwise convey or encumber the Real Estate and the Seller has a bona fide purchaser, the Buyer shall be notified of such desire and of the amount and terms of the offer made by the bona fide purchaser. Such notice shall be given as set forth in Section 6, below.

a. The Buyer shall have the right to purchase the Real Estate for the amount and upon the terms of the offer.

b. Should the Buyer desire to so purchase the Real Estate, the Buyer shall notify the Seller of such desire within 15 days from the date the amount and terms of the offer were communicated to the Buyer.

c. Should the Buyer refuse to purchase the Real Estate for the amount and upon the terms of the offer, the Seller shall have the right to sell or otherwise convey or encumber the Real Estate free of the Right and the Right shall terminate.

6. Should the Seller intend to sell or otherwise convey or encumber the Real Estate and if the Seller does not have a bona fide purchaser, the Buyer shall be notified of such intent. Such notice shall be given as set forth in Section 6, below.

a. Within 15 days from the date the Buyer receives such notice, the Seller shall select one certified real estate appraiser and the Buyer shall select one certified real estate appraiser.

b. Within 10 days after the selection of such real estate appraisers, such appraisers shall agree upon and select a third certified real estate appraiser.

c. The real estate appraisers shall view and examine the Real Estate, determine the fair market value thereof, and communicate such value to the parties within 20 days from the date of selection of the third appraiser.

d. Within 15 days after the Buyer is notified of such value, the Buyer shall inform the Seller of the Buyer's decision to purchase or not to purchase the Real Estate at such value.

e. Should the Buyer refuse to purchase the Real Estate at such value, the Seller shall have the right to sell or otherwise convey or encumber the Real Estate free of the Right and the Right shall terminate.

7. If the Buyer notifies the Seller that the Buyer will purchase the Real Estate, the transaction shall be completed in the following manner:

a. The purchase price shall be paid in cash at the time of closing.

b. Closing shall be held as soon as reasonably possible after the closing requirements have been met, but in no event more than 30 days after those requirements have been met.

c. Prior to closing, the Seller shall furnish the Buyer, at the Seller's expense, a commitment to issue an owner's title insurance policy in an amount not less than the purchase price, agreeing to insure in the Buyer, marketable title to the Real Estate, subject only to rights-of-way, easements, public ways, leases, restrictions, reservations, covenants, rights of persons in possession, outstanding mineral interests, land use restrictions imposed by governmental authorities, all observable matters, and all matters of record, if any there be.

d. The Seller shall pay the real estate taxes and assessments prorated to the date of closing.

e. Possession of the Real Estate shall be delivered to the Buyer at closing, subject to the matters set forth in subparagraph c, above.

8. Notices, demands, or other communications to be given or delivered under or by reason of the provisions of this Right shall be in writing and shall be deemed to have been given: (a) when delivered personally to the recipient; (b) when sent to the recipient by electronic mail (with receipt confirmed by a reply email) if during normal business hours of the recipient, otherwise on the next Business Day; or (c) one Business Day after the date when sent to the recipient by reputable express courier service (charges prepaid). Such notices, demands, and other communications shall be sent to the party to be notified at the addresses indicated below (with communications of an emergency nature also being made via telephonic and email notice):

9. The Right shall constitute a covenant running with the land and shall be binding upon and inure to the benefit of the respective heirs, successors, and assigns of the parties hereto.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals the day and date first above written.

Joe A. Weger, as a Buyer

Sunrise Land Holdings, LLC, as the
Seller

Dan E. Weger, as a Buyer,

By: _____
Lawrence D. Martin, as Vice
President

Marian Weger, as a Buyer

Jerry W. Weger, as a Buyer

By: _____
Jerry A. Weger, as attorney-
in-fact pursuant to a Power of
Attorney dated _____
and recorded _____
as Instrument No. _____
in the office of the Recorder of
Lawrence County, Illinois

STATE OF INDIANA)
) SS:
COUNTY OF _____)

Before me, a Notary Public in and for said County and State, this _____ day of _____, 20____, personally appeared Joe A. Weger, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be his free and voluntary act and deed.

My Commission Expires:

Notary Public

Printed: _____

County of Residence: _____

STATE OF INDIANA)
) SS:
COUNTY OF _____)

Before me, a Notary Public in and for said County and State, this _____ day of _____, 20____, personally appeared Dan E. Weger and Marian Weger, each of whom swore to the truth of the above representations and each of whom acknowledged the execution of the above and foregoing document to be his and her free and voluntary act and deed.

My Commission Expires:

Notary Public

Printed: _____

County of Residence: _____

STATE OF INDIANA)
) SS:
COUNTY OF _____)

Before me, a Notary Public in and for said County and State, this _____ day of _____, 20____, personally appeared Jerry A. Weger, as attorney-in-fact of Jerry W. Weger, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be his free and voluntary act and deed.

My Commission Expires:

Notary Public
Printed: _____

County of Residence: _____

STATE OF INDIANA)
) SS:
COUNTY OF VIGO)

Before me, a Notary Public in and for said County and State, this _____ day of _____, 20____, Lawrence D. Martin, personally known to me to be the Vice President of Sunrise Land Holdings, LLC, a limited liability company, and personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument on behalf of Sunrise Land Holdings, LLC and with authority of the governing body thereof.

My Commission Expires:

Notary Public
Printed: _____

County of Residence: _____

This Right of First Refusal was prepared on behalf of the Seller by John Rowe, Attorney at Law, of The Rowe Law Firm, LLC, 1418 North 1000 West, Linton, Indiana 47441.

EXHIBIT A TO RIGHT OF FIRST REFUSAL

The following described real estate in Lawrence County, Illinois, to-wit:

TRACT I

All that part of the West Half of the Southeast Quarter of Section 29, Township 5 North, Range 10 West of the Second Principal Meridian in Lawrence County, Illinois, lying North of the Public Road running through the same, such parcel containing 19 acres, more or less.

TRACT II

The East Half of the Northeast Quarter of the Southwest Quarter of Section 29, Township 5 North, Range 10 West, except that part lying South and West of the of the Public Road Running through the same, containing 3.00 acres, more or less.

Hereby releasing and waiving all rights under and by virtue of the Homestead Exemption laws of the State of Illinois as to both Tracts I and II.

Excepting therefrom all coal, coalbed methane, coalmine methane, and all other materials associated with the coal, without regard to depth, underlying the surface of the above described Tracts I and II.

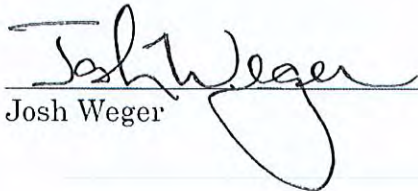
JOINDER

This Joinder is executed by the undersigned to establish that all conditions to sale appearing in a certain Quitclaim Deed from Joe A. Weger to Jody R. Andriano, individually and as trustee of the Robin Michelle Weger Supplemental Care Trust, which Quitclaim Deed is dated April 1, 2014, and was recorded April 7, 2014, as Instrument No. 201400094739 in Record Vol 986, page 129 in the office of the Recorder of Lawrence County, Illinois, have been fulfilled.

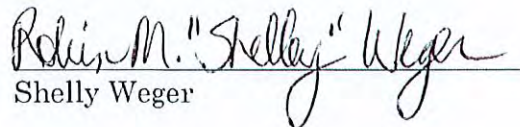
To that end, the undersigned acknowledge that:

1. this Joinder is part of the Option Agreement to which the Joinder is attached;
2. the undersigned are all of the siblings of Jody R. Andriano and the undersigned from time to time may be referred to herein as "the Siblings."
3. the Option Agreement constitutes a written agreement with a third party signed by all parties that identifies the third party, the real property to be sold, the price, and all conditions on payment or transfer;
4. a copy of the Option Agreement, which is the written and signed agreement referred to above, has been provided to the Siblings;
5. all of the Siblings waive the opportunity, and decline, to make an offer to purchase the real property described in Exhibit A for the same price and on similar terms and conditions as those set forth in the Option Agreement;
6. if the Option is exercised and the sale to Sunrise Land Holdings, LLC is consummated pursuant to the terms of the Option Agreement, the Siblings shall execute and deliver to Sunrise Land Holdings, LLC a recordable instrument affirming that such sale to Sunrise Land Holdings, LLC was consummated pursuant to the Option Agreement that has been provided to the Siblings; and
7. this Joinder is executed in multiple counterparts, one of which may be attached to a Memorandum of Option Agreement to be recorded.

Dated this 10th day of October, 2018.



Josh Weger



Shelly Weger

STATE OF Illinois)
) SS:
COUNTY OF Cook)

Before me, a Notary Public in and for said County and State, this 10th day of October, 2018, personally appeared Josh Weger, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be his free and voluntary act and deed.

My Commission Expires:

6/24/19

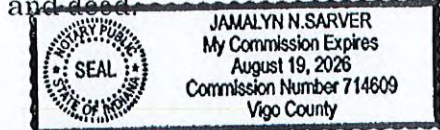
Dana M. Prasauskas
Notary Public
Printed: Dana M. Prasauskas

County of Residence: Cook

STATE OF Indiana)
) SS:
COUNTY OF Vanderburg)



Before me, a Notary Public in and for said County and State, this 12th day of October, 2026, personally appeared Shelly Weger, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be her free and voluntary act and deed.



My Commission Expires:

August 19, 2026

Jamalyn N. Sarver
Notary Public
Printed: Jamalyn N. Sarver

County of Residence: Vigo

201800103701
Filed for Record in
LAWRENCE COUNTY ILLINOIS
WILL C. GIBSON, COUNTY CLERK
02-13-2018 At 01:31 PM.
MEMORANDUM 60.00
OR Book 1114 Page 175 - 178
RHSP FUND 9.00

This instrument was prepared by:
John Rowe
THE ROWE LAW FIRM, LLC
1418 N 1000 W
Linton, Indiana 47441
(Tel: 812.847.4751)

Please return recorded document to:
Mr. Roy Dressler
Leasing Manager
SUNRISE LAND HOLDINGS, LLC
1183 East Canvasback Drive
Terre Haute, Indiana 47802
(Tel: 812.299.2800)

MEMORANDUM OF OPTION TO PURCHASE REAL ESTATE

This Memorandum of Option to Purchase Real Estate (herein "Purchase Memorandum") is made this 29th day of January, 2018, between **Louis Vennard**, an adult, of _____ ("Owner") and **Sunrise Land Holdings, LLC**, the address of which is 1183 E. Canvasback Drive, Terre Haute, Indiana 47802 ("Buyer").

A. RECITALS

1. Owner is the owner of the real property located in Lawrence County, Illinois, described in Exhibit A attached hereto and by this reference incorporated herein (the "Parent Tract"), together with all easements, rights and appurtenances thereto, that for the purposes of this Purchase Memorandum and the option referred to herein contains 80 acres, more or less.

2. Buyer seeks the opportunity to acquire from Owner up to 20 acres of the Parent Tract (such acreage up to, but not exceeding 20 acres being referred to herein from time to time as the "Real Estate").

3. Owner and Buyer have agreed on the terms by which Owner grants to Buyer an option to purchase the Real Estate and have reduced those terms to writing in an Option to Purchase Real Estate (the "Purchase Option") dated the same date as this Purchase Memorandum and now wish to place a notice on the public records of the existence of the Purchase Option.

B. TERMS

Now, therefore, in consideration of the mutual covenants and conditions hereinafter set out and that are set out in the Option to Purchase Real Estate, referred to above, between Owner and Buyer, which is dated as of January 29th, 2018:

Book 1114 Page 175

1. All terms defined in the Recitals, above, are incorporated herein by reference as though fully set forth herein.

2. For and in consideration of the sum of _____ and other valuable considerations, the receipt and sufficiency of which hereby are acknowledged, and in consideration of the agreements to be performed by the parties as provided in the Purchase Option, Owner grants to Buyer the exclusive option to purchase (the "Purchase Option") up to 20 acres of real estate and all improvements thereon in Lawrence County, Illinois, located within the Parent Tract.

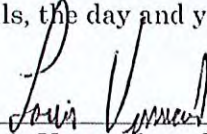
3. All terms and provisions of the Purchase Option are incorporated herein by reference. Any provision contained in the Purchase Option shall supersede any conflicting provision in this Purchase Memorandum.

4. Buyer must conduct drilling, testing, engineering, permitting, and other activities upon the Parent Tract to determine the location of the Real Estate and the amount of acreage in the Parent Tract (but not to exceed 20 acres) that Buyer may acquire pursuant to the Purchase Option. Therefore, the parties have identified the Parent Tract as being subject to the Purchase Option, however Buyer shall have only the right to exercise the option as to not more than 20 acres, and Buyer is granted the opportunity to identify the location and amount of land within the Parent Tract that may be acquired.

5. The Purchase Option shall expire at 11:59 p.m. on December 31, 2020 (the "Expiration Date"); provided, however, that the Expiration Date may be extended to 11:59 p.m. on December 31, 2021, upon payment by Buyer to Owner of an additional amount set forth in the Purchase Option any time prior to 11:59 p.m. on December 31, 2020, and if extended, 11:59 p.m. on December 31, 2021, shall become and shall be referred to as the "Expiration Date".

6. The Purchase Option and this Purchase Memorandum are binding upon and inure to the benefit of the respective heirs, successors, and assigns of the parties.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals, the day and year first above written.



Louis Vennard, as Owner

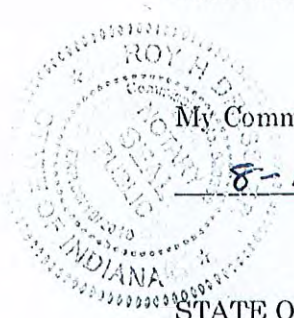
Sunrise Land Holdings, LLC, as Buyer

By: 

Lawrence D. Martin, as President

STATE OF ~~ILLINOIS~~ Indiana)
) SS:
COUNTY OF Knox)

Before me, a Notary Public in and for said County and State, this 24th day of January, 2018, personally appeared Louis Vennard, who swore to the truth of the above representations and who acknowledged the execution of the above and foregoing document to be his free and voluntary act and deed.



My Commission Expires:
8-19-2018

RH
Notary Public
Printed: Roy Dressler

STATE OF INDIANA)
) SS:
COUNTY OF VIGO)

Before me, a Notary Public in and for said County and State, this 29th day of January, 2018, Lawrence D. Martin, personally known to me to be the President of Sunrise Land Holdings, LLC, a limited liability company, and personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person and acknowledged that he signed and delivered the said instrument on behalf of Sunrise Land Holdings, LLC and with authority of the governing body thereof.



My Commission Expires:
8-19-2018

RH
Notary Public
Printed: Roy Dressler
County of Residence: Clay

EXHIBIT A

The following described real estate in Lawrence County, Illinois, to-wit:

The West Half of the Northeast Quarter of Section 29, Township 5 North,
Range 10 West of the Second Principal Meridian.

Excepting all coal, coalbed methane, oil, gas, all hydrocarbons, whether in
solid, liquid, or gaseous form, metalliferous and nonmetalliferous ores,
and all other minerals and mineral substances, without regard to whether
such substance is associated with another substance and without regard
to depth or formation in which such mineral or substance is located.

Book 1114 Page 178

Sunrise Land Holdings, LLC
1183 E. Cambridge Drive
Attn: Daryl McCleary
Terre Haute, In 47802

PART 2: Pre-Mining Information

2.1 Pre-Mining Land Use Information.

2.1.1 Pre-Mining Land Use and Capability Acreages. Complete Table 2.1.1: Pre-Mining Land Use Capability giving the acreage and capability of each land use within the proposed permit area, employing only land use categories of 62 Ill. Adm. Code 1701.5, the “fish and wildlife” land use category must be subdivided as required by [Operator Memorandum 2015-01](#). Use only these land uses for completing the land use maps.

The information shall be broken down with a separate table for each landowner. In addition, the applicant shall complete Table 2.1.1 - Grand Total: Pre-Mining Land Use Capability Summary. This table is a compilation of all Pre-Mining Land Use Capability tables filled out for each individual land owner.

For IBR applications, complete Table 2.1.1: Pre-Mining Land Use Capability for each landowner and update Table 2.1.1 - Grand Total: Pre-Mining Land Use Capability Summary. **[1780.23/1784.15]**

Note: other agencies, such as USACE, may define land uses differently.

Pre mining land use and capabilities are found in Part 2 tables.

2.1.2 Provide slope measurements to represent existing land surface configuration of proposed permit area. A soils map of medium intensity prepared to NRCS specifications or a contoured aerial photo may be submitted to meet this requirement. **[1779.24/1783.24(1)]**

Check here if using one of the above maps or photos.

Does the Soils Map submitted with the application meet the requirements to provide slope measurements?

YES NO

If NO, provide a contoured aerial photo for the proposed boundary.

2.1.3 For any proposed surface coal mining and reclamation operation, has previous mining activity including active, inactive or abandoned underground mine workings along with any mine opening to the surface occurred within the permit and/or adjacent area? **[1816.133/1817.133]**

YES NO

If YES, complete Table 2.1.3: Previous Mining Activity - Surface Permit Areas and delineate the areas disturbed by previous mining activities, including active, inactive or abandoned underground mine work along with any mine opening to the surface on the Pre-Mining Land Use Map. In addition, the map shall identify areas where surface coal mining operations were conducted prior to August 3, 1977; after August 3, 1977 and prior to May 3, 1978; after May 3, 1978 and prior to February 1, 1983; and any permanent regulatory program permit issued after February 1, 1983. **[1777.14(b); 1779.25(a)(8)/1783.25(a)(8)]**

2.1.3.1 Identify the land uses preceding any type of mining, if known.
[1780.23(a)(1)/1784.15(a)(1)]

2.1.4 Is any of the permit area subject to local or county zoning?

YES NO

If YES, provide a description of the existing land uses and land classifications under local law, if any, for the proposed permit and adjacent areas.

2.1.5 Provide the location of surface and subsurface man-made features within, passing through, or passing over the proposed permit area on the Pre-Mining Land Use Map. Such features should include, but are not limited to, major electric transmission lines, pipelines, agricultural drainage tile fields, gas and oil wells, and water wells. For gas, oil, and water wells provide the depth, if available, of the well in Table 2.1.5: Oil and Gas Well Information. [1779.24(e)/1783.24(e)]

There is an electrical power line traversing the undeveloped land north of Road 1840N which is shown on the pre-mining land use map.

2.1.6 If any of the land uses changed within the last five (5) years, indicate the acreage and changes of land uses. [1780.23(a)(1)/1784.15(a)(1)]

N/A

2.2 Pre-Mining Soils Information. The applicant is strongly recommended to use the [USDA Web Soil Survey](#). The web soil survey has the ability to create a Custom Soil Survey report for the application area which will generate many of the information requirements for pre-mining soils and prime farmland restoration plans which may reference this report. Please note there are extra soil data tables, including Land Classification, Non-irrigated Capability Class, and Vegetation Productivity, and the data from the Soil Property and Qualities tab which must specifically be extracted when creating a custom report.

NOTE: The acreage of the Area of Interest must agree with the permit acreage. This report may be referenced in responding to portions of the required soil information.

2.2.1 The narrative of land capability and productivity shall employ the USDA National Resources Conservation Service's Land-Capability Classification (Agriculture Handbook No. 210) in conjunction with the soil information provided under the published soil survey when completing Part 2.2.9. Optimum levels management productivity information may be found in [Bulletin 811](#). [1779.21/1783.21].

NOTE: This Bulletin has periodic updates in a supplemental table.

See the soils information in Attachment 2.2.0.a.

2.2.2 A Soils Map shall be provided as required by Part 2.2. The scale of the Soil Map scale must be the same scale as the Pre-Mining Land Use Map and Post-Mining Land Use/Capability Reclamation Map, unless otherwise approved by the Department. Does the submitted Soils Map represent a map developed by the National Resources Conservation Service (NRCS)? [1779.21/1783.21]

YES NO

If YES, complete the following:

2.2.2.1 Has the NRCS soil map been modified in any way except by a change in scale?

YES NO

If YES, explain the nature of the changes.

--

2.2.3 For surface mines, delineate on the Soils Map, the area which will incur actual mining (removal of overburden and/or deposition of overburden for the extraction of coal). Identify any areas proposed to remain undisturbed. [1780.14]

For underground mines, identify any areas proposed to remain undisturbed. [1784.23]

See Operations Map. All areas outside of identified operations will remain undisturbed.

2.2.4 Are any of the identified map units correlated as prime farmland by NRCS criteria?

YES NO

If YES, explain and provide documentation to meet the requirements of 62 Ill. Adm. Code 1785.17 or 1823.11, if a request for grandfathering, negative determination or underground mine exemption is sought. If prime farmlands exist which will not meet the exemption criteria described above, a prime farmlands restoration plan must be provided in Parts 8.2 through 8.4. [1785.17(b)/1823.11]

--

2.2.5 Indicate the average topsoil thickness of each of the Soil Map units to be affected. Locate on Soils Map the test holes for soil horizon thickness sampling. Provide the average and methodology for determining the average pre-mining topsoil thickness in inches for: [1779.21/1783.21]

- Non-cropland capability	4.4	inches
- High capability		inches
- Prime Farmland	6.7	inches

2.2.6 List the soil types and acreages of areas that will require the B and/or portions of the C horizon to be removed and replaced in order to establish the root medium necessary to achieve soil productivity consistent with the proposed post-mining land use. Alternatively, a narrative description explaining why specific soil type acres information for reclamation plan achievement is not necessary may be provided. [1780.18(b)(4)/1784.13(b)(4)]

The men/materials shaft and sedimentation ponds are the only areas that will require subsoil. All other areas will need topsoil replacement only. The sediment pond is 0.9 acres in soils type 184B and 8071+. The shaft is 0.006 acres in soil type 131E2.

2.2.7 Are selected overburden materials proposed to be used in lieu of or as a supplement to the A-horizon?

YES NO

If YES, provide the appropriate information required by 62 Ill. Adm. Code 1779.21(b) or 1783.21(b).

Also, identify the source of the substitute materials and the topsoil to be substituted away from (not removed) on a separate soils map, labeled Topsoil Substitution Map and/or describe the area in narrative form. [1780.14/1784.23]

2.2.8 Explain why the proposed plan will provide the best available material of equal or better quality than present topsoil or surface existing material. [1816.22(b)/1817.22(b)]. This section must be addressed when affecting previously disturbed areas if the surface soil is not to be salvaged. If topsoil substitutes or supplements are proposed, a demonstration of their suitability shall be required based on analysis of thickness of soil horizons, total depth, texture, percent coarse fragments, pH, and aerial extent of the different kinds of soils. The Department shall require other chemical and physical analyses, field-site trials, or greenhouse tests if determined to be necessary or desirable to demonstrate the stability of the topsoil substitutes or supplements. [1780.18(b)(4)/1784.13(b)(4); 1779.21/1783.21]

2.2.9 Complete Table 2.2.9: Soils Information Chart acreage for each of the map units (soil type and slope classification) of prime farmland, high capability (include grandfathered and negatively determined prime farmland) and non-cropland capability land with respect to areas within the permit area. All soils previously disturbed by home sites, farmsteads, roads, etc., shall be tabulated as non-cropland capability and need not undergo a negative determination. The Soil Information Chart must be broken out by land owner, if there is more than one. [1779.21(a)/1783.21(a); 1785.17]

See table 2.2.9.

Optional-addition: If applicable, quantify map units acreage values on Table 2.2.9: Soils Information Chart for areas which will not be disturbed. [1779.21(a)/1783.21(a)]

2.3 Areas Where Mining is Limited or Prohibited.

Complete Table 2.3: Areas Prohibiting or Limiting Mining Operations for each structure (occupied dwelling, public building, school, church, community/institutional building, public park, cemeteries, public road) identified in question 2.3.2 through 2.3.9 with respect to areas where mining is prohibited. Indicate if the buffer zone will be in effect or if a waiver is obtained. [1761.11(c)(d)(e)(f)(g)]

2.3.1 Does the proposed permit area include areas designated unsuitable for surface coal mining and reclamation operations, or under study for designation in an administrative proceedings as unsuitable for surface coal mining and reclamation operations? [1773.15(c)(3)]

YES NO

If YES, identify these areas on the Pre-Mining Land Use and Operations Map.

2.3.2 Does the proposed permit area include lands within boundaries of the National Park System, National Wildlife Refuge System, the National System of Trails, the National Wilderness Preservation System, the Wild and Scenic Rivers System, and National Recreation Areas, etc.? **[1761.11(a)]**

YES NO

If YES, identify these areas on the Pre-Mining Land Use and Operations Map.

2.3.3 Does the proposed permit area include lands within the boundaries of any national forest? **[1761.11(b)]**

YES NO

If YES, identify these areas on the Pre-Mining Land Use and Operations Map.

2.3.4 Are there any publicly owned parks or any places included in the National Register of Historic Places on or within 1,000 feet of the proposed permit area? **[1761.11(c)]**

YES NO

If YES, identify these areas on the Pre-Mining Land Use and Operations Map.

2.3.5 Does the operations plan propose any surface coal mining operations within 100 feet measured horizontally of the outside right-of-way line of any public road? **[1761.11(d)]**

YES NO

If YES, complete the following:

2.3.5.1 Describe the measures to be used to insure that the interest of the affected public and landowners will be protected. **[1761.11(d)(2)(B)]**

The permittee will coordinate with the local road authority to ensure that any safety measures proposed by the road authority are considered.

2.3.5.2 In the public notice of the application required in the Cover Sheet, identify the public road(s), describe the activities to be conducted within 100 feet of the road(s), and indicate the opportunity for a public hearing on this matter. **[1761.11(d)(2)(A)]**

See draft public notice.

2.3.6 Does the proposed permit area include any public roads which are to be removed, relocated or closed? **[1761.14]**

YES NO

If YES, complete the following:

2.3.6.1 Submit the necessary approvals of the authority with jurisdiction over the public road. **[1761.14(b)(2)]**

2.3.6.2 If a public road is to be replaced or re-located within the permit area, provide evidence that a bond has or will be posted with the authority with jurisdiction over the public road. If such bond has not been nor will be posted, address road replacement costs in Table 9.5.1.14: Public Road Replacement.

2.3.6.3 Describe the measures to be used to insure that the interest of the affected public and landowners will be protected. [1761.14(b)(5)]

2.3.6.4 As required in the Cover Sheet, the public notice shall identify the public road(s) to be removed, relocated or closed, and indicate the opportunity for a public hearing on this matter. [1761.14(b)(3) and (4)]

2.3.7 Does the operations plan propose any surface coal mining operations within 300 feet measured horizontally from any occupied dwelling other than a haul road or access road which connects with an existing public road on the side of the public road opposite the dwelling? [1761.11(e)]

YES NO

If YES, include a waiver from the owner of the dwelling meeting the following requirements: [1761.15]

- The waiver shall be by lease, deed, or other conveyance from the owner of the dwelling. The waiver must clarify that the owner and signator had the legal right to deny mining and knowingly waived that right.
- Provide proof that the waiver has been properly filed in public property records pursuant to State laws.

If NO, and occupied dwellings are located either within the permit boundary or within 300 feet of the permit boundary but no disturbance is proposed within 300 feet, then indicate 300 foot buffer markers around all applicable occupied dwellings on the Operations Map

NOTE: If a valid waiver was obtained before August 3, 1977 from the owner of an occupied dwelling to conduct operations within 300 feet of the dwelling, a new waiver need not be obtained. [1761.15(c)]

See Operations Map. The two occupied dwelling buffer zones will be clearly marked in the field with metal T posts.

2.3.8 Does the operations plan propose any surface coal mining operations within 300 feet measured horizontally of any public building, school, church, community or institutional building or public park? [1761.11(f)]

YES NO

2.3.9 Are there any public or private cemeteries or Indian burial grounds or other areas where human bodies are interred located in or within one hundred (100) feet of the proposed permit area? [1761.11(g)]

YES NO

If YES, locate on the Pre-Mining Land Use, Operations and Post-Mining Land Use/Capability Reclamation Plan Maps the boundaries of the above-referenced areas and indicate a 100 foot buffer zone around the cemetery or burial ground. [1779.24(j)/1783.24(j)]

2.3.10 Are valid existing rights claimed for any part of the permit area? [1761.5; 1761.16]

YES NO

If YES, complete Part 2.6 or 2.7 to substantiate the claim.

2.4 Public Parks, Historic Properties.

See Cultural Resources report in Attachment 2.4.

2.4.1 Provide a description of the historic properties (archeological sites and/or historic standing structures) listed or potentially eligible for listing on the National Register of Historic Places and any known archeological features within the proposed permit and adjacent areas. The description of the historic properties occurring within the permit area and adjacent areas shall be based upon available data. If studies have been completed and submitted for review prior to this application, attach a copy of the results of that review. For significant revisions other than shadow area revisions, attach a copy of the IHPA review. Also, with regard to historic properties, provide the anticipated start date when the area is to be affected. [1779.12/1783.12]

2.4.2 If investigations are underway or under review, reference the current status. [1779.12(b)/1783.12(b)]

NOTE: Studies which are submitted to the Department shall be submitted as a separate document (3 hard copies, plus one on disk in pdf format or other format as directed by the Department)

2.4.3 If historic properties are to be avoided, provide a map showing their location in lieu of either a Phase I evaluation or a Phase II evaluation. A qualified archaeologist shall create the map and identifying field markings to be employed to ensure the site(s) will not be disturbed by surface coal mining and reclamation operations. The map is to be submitted in duplicate in separate cover from the rest of the application and labeled Historic Properties Protection Map. The Department will hold the map as a confidential document. If a revision proposes a disturbance not previously identified, identify its location to any avoidance area. [1773.13(d)(3)].

2.4.4 Provide a plan for publicly owned park(s), or place(s) listed on the [National Register of Historic Places](#), that may be adversely affected by the proposed operation describing the measures to be employed: [1780.31/1784.17]

- To prevent adverse impacts caused by surface mining related activities including, but not limited to, loss or destruction of historic properties; or

- If valid existing rights exist or joint agency approval is to be obtained under 62 Ill. Adm. Code 1761.17(d), to minimize adverse impacts. If valid existing rights are to be claimed, complete Sections 2.5 or 2.6 of this application, whichever is applicable.

2.5 Valid Existing Rights (VER) Good Faith/All Permits Standard. [1761.16(b)(2)] N/A

The applicant must provide a property rights demonstration under 62 Ill. Adm. Code 1761.5(a) if the applicant’s request for VER is based upon the good faith/all permits standard in Section 1761.5(b)(1). This demonstration must include the following items: **[1761.16(b)]**

2.5.1 A legal description of the land to which the request pertains.

2.5.2 Complete documentation of the character and extent of the current interests in the surface and mineral estates of the land to which the request pertains.

2.5.3 A complete chain of title for the surface and mineral estates of the land to which the request pertains.

2.5.4 A description of the nature and effect of each title instrument that forms the basis for the request, including any provision pertaining to the type of method of mining or mining-related surface disturbances and facilities.

2.5.5 A description of the type and extent of surface coal mining operations that the applicant or permittee claims the right to conduct, including the method of mining and mining-related surface activities and facilities, and an explanation of how those operations would be consistent with State property law.

2.5.6 Complete documentation of the nature and ownership, as of the date that the land came under the protection of 62 Ill. Adm. Code 1761.11, of all property rights for the surface and mineral estates of the land to which the request pertains.

2.5.7 Names and addresses of the current owners of the surface and mineral estates of the land to which the request pertains.

2.5.8 If the coal interests have been severed from other property interests, documentation that the owners of other property interests in the land to which the request pertains have been notified and provided a minimum of 14 days to comment on the validity of the applicant or permittee’s property rights claims.

[Empty text box]

2.5.9 Provide any comments received in response to the notification provided under Part 2.5.8. above.

[Empty text box]

2.5.10 Approval and issuance dates and identification numbers for any permits, licenses, and authorizations that the applicant, permittee or a predecessor in interest obtained before the land came under the protection of 62 Ill. Adm. Code 1761.11.

[Empty text box]

2.5.11 Application dates and identification numbers for any permits, licenses, and authorizations for which the applicant, permittee or a predecessor in interest submitted an application before the land came under the protection of 62 Ill. Adm. Code 1761.11.

[Empty text box]

2.5.12 An explanation of any other good faith effort that the applicant, permittee or a predecessor in interest made to obtain the necessary permits, licenses, and authorizations as of the date that the land came under the protection of 62 Ill. Adm. Code 1761.11.

[Empty text box]

2.6 Valid Existing Rights (VER) Needed for and Adjacent Standard. [1761.16(b)(3)] N/A

The applicant must provide a property rights demonstration under 62 Ill. Adm. Code 1761.5(a) if the applicant’s request for VER is based upon the needs for and adjacent standard in Section 1761.5(b)(1). This demonstration must include the following items: **[1761.16(b)]**

2.6.1 A legal description of the land to which the request pertains.

[Empty text box]

2.6.2 Complete documentation of the character and extent of the current interests in the surface and mineral estates of the land to which the request pertains.

[Empty text box]

2.6.3 A complete chain of title for the surface and mineral estates of the land to which the request pertains.

[Empty text box]

2.6.4 A description of the nature and effect of each title instrument that forms the basis for the request, including any provision pertaining to the type of method of mining or mining-related surface disturbances and facilities.

[Empty text box]

2.6.5 A description of the type and extent of surface coal mining operations that the applicant or permittee claims the right to conduct, including the method of mining and mining-related surface activities and facilities, and an explanation of how those operations would be consistent with State property law.

2.6.6 Complete documentation of the nature and ownership, as of the date that the land came under the protection of 62 Ill. Adm. Code 1761.11, of all property rights for the surface and mineral estates of the land to which the request pertains.

2.6.7 Names and addresses of the current owners of the surface and mineral estates of the land to which the request pertains.

2.6.8 If the coal interests have been severed from other property interests, documentation that the owners of other property interests in the land to which the request pertains have been notified and provided a minimum of 14 days to comment on the validity of the applicant or permittee's property rights claims.

2.6.9 Provide any comments received in response to the notification provided under Part 2.6.8 above.

2.6.10 Explain how and why the land is needed for and immediately adjacent to the operation upon which the request is based. This explanation shall include a demonstration that prohibiting expansion of the operation onto that land would unfairly impact the viability of the operation as originally planned before the land came under the protection of 62 Ill. Adm. Code 1761.11.

2.7 Valid Existing Rights (VER) Standards for Mine Roads. [1761.16(b)(4)] N/A

If the request relies upon one of the standards for roads in 62 Ill. Adm. Code 1761.5(c)(1) through (c)(4), satisfactory documentation of one or more of the following must be submitted showing that: **[1761.5(c)]**

2.7.1 The road existed when the land upon which it is located came under the protection of 62 Ill. Adm. Code 1761.11, and the applicant has a legal right to use the road for surface coal mining operations.

2.7.2 A properly recorded right of way or easement for a road in that location existed when the land came under the protection of 62 Ill. Adm. Code 1761.11, and, under the document creating the right-of-way or easement, and under any subsequent conveyances, the applicant has a legal right to use or construct a road across that right of way or easement to conduct surface coal mining operations.

2.7.3 A valid permit for use or construction of a road in that location for surface coal mining operations existed when the land came under the protection of 62 Ill. Adm. Code 1761.11.

2.7.4 Valid existing rights exist under 62 Ill. Adm. Code 1761.5(a) and (b).

Table 2.1.1
Pre-Mining Land Use Capability

Revised 1/9/2019

Land Owner: *Jody Andriana & Joe Weger*

DISTURB CATEGORY	LAND CAPABILITY	PRE-MINE LAND USE ACREAGE														Subtotal	
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads	Cemetery		
Mining Area	Prime	0.59															
	Neg. Det.																
	High Cap.																
	Limited Capability	0.14															
	Subtotal	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unaffected (Optional)	Prime	12.47															
	Neg. Det.										5.76						
	High Cap.																
	Limited Capability	0.30															
	Subtotal	12.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.76	0.00	0.00	0.00	0.00	0.00	0.00
Total Area	Prime	13.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.06
	Neg. Det.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.76	0.00	0.00	0.00	0.00	0.00	5.76
	High Cap.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Limited Capability	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44
	Subtotal	13.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.76	0.00	0.00	0.00	0.00	0.00	19.26

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

Table 2.1.1
Pre-Mining Land Use Capability

Revised 1/9/2019

Land Owner: *Marian & Dan Weger*

DISTURB CATEGORY	LAND CAPABILITY	PRE-MINE LAND USE ACREAGE														Subtotal	
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads	Cemetery		
Mining Area	Prime	5.30															
	Neg. Det.																
	High Cap.																
	Limited Capa	0.17															
	Subtotal	5.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.47
Unaffected (Optional)	Prime	12.88															
	Neg. Det.										1.76						
	High Cap.																
	Limited Capability										0.15						
	Subtotal	12.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.91		0.00	0.00	0.00	0.00	14.79
Total Area	Prime	18.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.18
	Neg. Det.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.76	0.00	0.00	0.00	0.00	0.00	1.76
	High Cap.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Limited Capa	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.32
	Subtotal	18.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.91		0.00	0.00	0.00	0.00	20.26

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

Table 2.1.1
Pre-Mining Land Use Capability

Revised 1/9/2019

Land Owner: *Jerry Weger*

DISTURB CATEGORY	LAND CAPABILITY	PRE-MINE LAND USE ACREAGE														Subtotal	
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads	Cemetery		
Mining Area	Prime	13.33															13.33
	Neg. Det.	0.07															0.07
	High Cap.																0.00
	Limited Capability	1.54															1.54
	Subtotal	14.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.94
Unaffected (Optional)	Prime	1.43															1.43
	Neg. Det.	0.50									0.80						1.30
	High Cap.																0.00
	Limited Capability	0.29									1.54						1.83
	Subtotal	2.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.34	0.00	0.00	0.00	0.00	0.00	4.56
Total Area	Prime	14.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.76
	Neg. Det.	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.00	1.37
	High Cap.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Limited Capability	1.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.54	0.00	0.00	0.00	0.00	0.00	3.37
	Subtotal	17.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.34	0.00	0.00	0.00	0.00	0.00	19.50

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

Table 2.1.1
Pre-Mining Land Use Capability

Revised 1/9/2019

Land Owner: *Joe, Jerry, Dan Weger*

DISTURB CATEGORY	LAND CAPABILITY	PRE-MINE LAND USE ACREAGE														Subtotal
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads	Cemetery	
Mining Area	Prime															
	Neg. Det.															
	High Cap.															
	Limited Capability															
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unaffected (Optional)	Prime															
	Neg. Det.		1.03								8.53					
	High Cap.															
	Limited Capability										14.15					
	Subtotal	0.00	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.68	0.00	0.00	0.00	0.00	23.71
Total Area	Prime	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Neg. Det.	0.00	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.53	0.00	0.00	0.00	0.00	9.56
	High Cap.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Limited Ca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.15	0.00	0.00	0.00	0.00	14.15
	Subtotal	0.00	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.68	0.00	0.00	0.00	0.00	23.71

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

Table 2.1.1
Pre-Mining Land Use Capability

Revised 1/9/2019

Land Owner: *Vennard*

DISTURB CATEGORY	LAND CAPABILITY	PRE-MINE LAND USE ACREAGE														Subtotal
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads	Cemetery	
Mining Area	Prime															0.00
	Neg. Det.															0.00
	High Cap.															0.00
	Limited Capability															0.00
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unaffected (Optional)	Prime	3.58														3.58
	Neg. Det.										0.50					0.50
	High Cap.															0.00
	Limited Capability	6.18									8.01					14.19
	Subtotal	9.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.51	0.00	0.00	0.00	0.00	18.27
Total Area	Prime	3.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.58
	Neg. Det.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.50
	High Cap.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Limited Capability	6.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.01	0.00	0.00	0.00	0.00	14.19
	Subtotal	9.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.51	0.00	0.00	0.00	0.00	18.27

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

**Table 2.1.1 - Grand Total
Pre-Mining Land Use Capability Summary**

NOTE: This table must reflect the summary of all individual Pre-mining Land Use Capability tables

Revised 1/9/2019

DISTURB CATEGORY	LAND CAPABILITY	PRE-MINE LAND USE ACREAGE														Subtotal
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads	Cemetery	
Mining Area	Prime	19.22														19.22
	Neg. Det.	0.07														0.07
	High Cap.															0.00
	Limited Capability	1.85														1.85
	Subtotal	21.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.14
Unaffected (Optional)	Prime	30.36														30.36
	Neg. Det.	0.50	1.03								17.35					18.88
	High Cap.															0.00
	Limited Capability	6.77									23.85					30.62
	Subtotal	37.63	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.20	0.00	0.00	0.00	0.00	79.86
Total Area	Prime	49.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49.58
	Neg. Det.	0.57	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.35	0.00	0.00	0.00	0.00	18.95
	High Cap.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Limited Capability	8.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.85	0.00	0.00	0.00	0.00	32.47
	Subtotal	58.77	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.20	0.00	0.00	0.00	0.00	101.00

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Lawrence County, Illinois**

Sunrise Coal



January 28, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

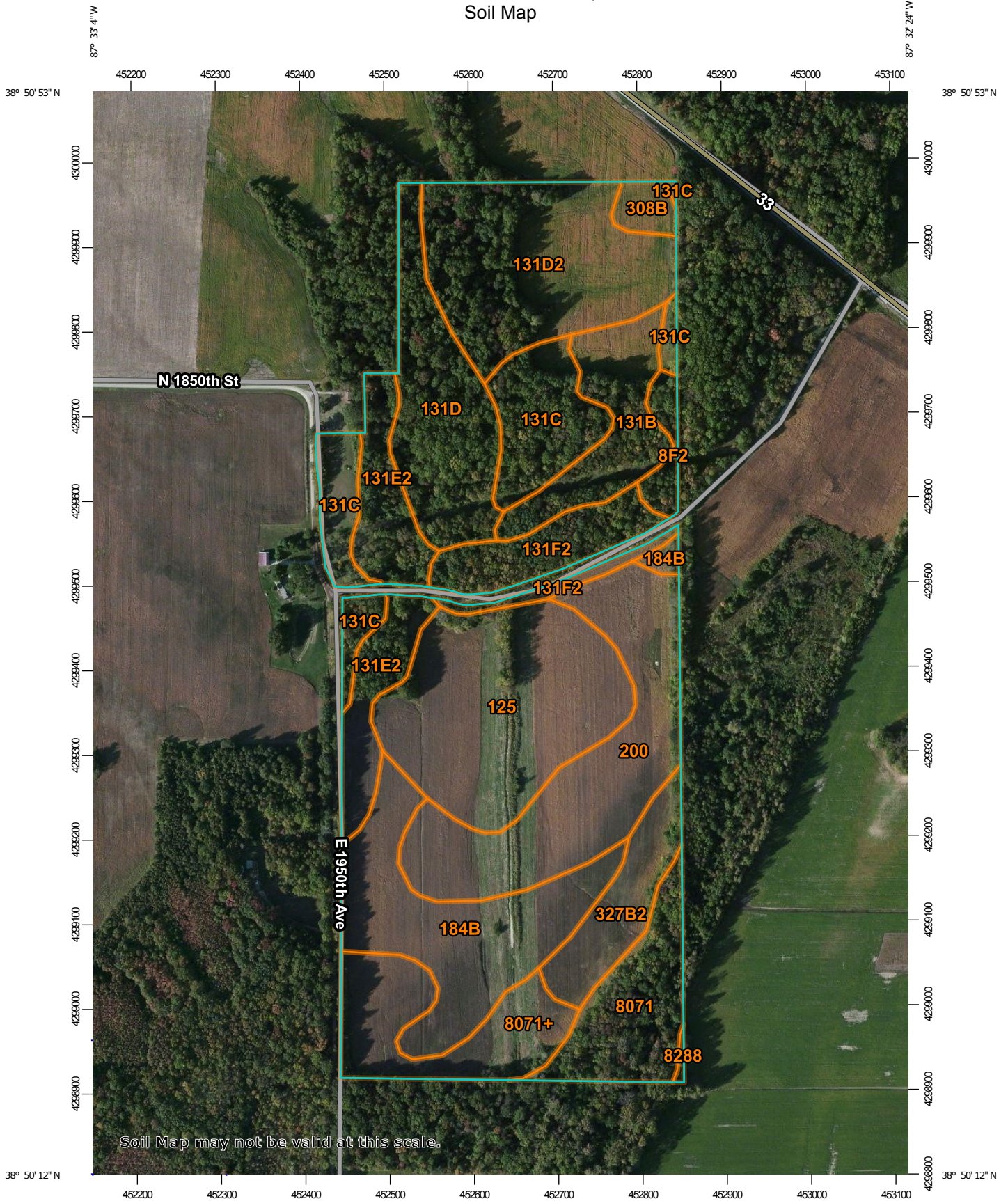
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:6,240 if printed on A portrait (8.5" x 11") sheet.


0 50 100 200 300 Meters

0 300 600 1200 1800 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84


MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:42,200.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lawrence County, Illinois
 Survey Area Data: Version 12, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 27, 2011—Oct 5, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8F2	Hickory silt loam, 18 to 35 percent slopes, eroded	1.2	1.2%
125	Selma loam	14.1	14.0%
131B	Alvin fine sandy loam, 2 to 4 percent slopes	5.4	5.3%
131C	Alvin fine sandy loam, 4 to 7 percent slopes	7.9	7.8%
131D	Alvin fine sandy loam, 7 to 12 percent slopes	8.1	8.0%
131D2	Alvin fine sandy loam, 7 to 12 percent slopes, eroded	12.3	12.1%
131E2	Alvin fine sandy loam, 12 to 18 percent slopes, eroded	6.8	6.7%
131F2	Alvin fine sandy loam, 18 to 30 percent slopes, eroded	4.6	4.6%
184B	Roby fine sandy loam, 2 to 4 percent slopes	11.1	10.9%
200	Orio sandy loam	12.4	12.3%
308B	Alford silt loam, 2 to 5 percent slopes	1.0	1.0%
327B2	Fox loam, 2 to 4 percent slopes, eroded	4.1	4.0%
8071	Darwin silty clay, occasionally flooded	5.6	5.6%
8071+	Darwin silt loam, overwash, occasionally flooded	6.5	6.4%
8288	Petrolia silty clay loam, occasionally flooded	0.1	0.1%
Totals for Area of Interest		101.1	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class.

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Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The

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pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lawrence County, Illinois

8F2—Hickory silt loam, 18 to 35 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2w1yw
Elevation: 330 to 820 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 165 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Hickory and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hickory

Setting

Landform: Ground moraines
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Illinois till

Typical profile

Ap - 0 to 6 inches: silt loam
Bt1 - 6 to 20 inches: clay loam
Bt2 - 20 to 53 inches: clay loam
BC - 53 to 58 inches: clay loam
C - 58 to 60 inches: loam

Properties and qualities

Slope: 18 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Marseilles

Percent of map unit: 3 percent
Landform: Ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Atlas

Percent of map unit: 3 percent
Landform: Ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Rozetta

Percent of map unit: 2 percent
Landform: Ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wakeland

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ava

Percent of map unit: 1 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluvium
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

125—Selma loam

Map Unit Setting

National map unit symbol: 5xst
Elevation: 680 to 1,020 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 45 to 54 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Selma and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Selma

Setting

Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Outwash

Typical profile

H1 - 0 to 16 inches: loam
H2 - 16 to 45 inches: sandy clay loam
H3 - 45 to 60 inches: stratified sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Calcium carbonate, maximum in profile: 20 percent
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

131B—Alvin fine sandy loam, 2 to 4 percent slopes

Map Unit Setting

National map unit symbol: 5xsy
Elevation: 340 to 1,350 feet
Mean annual precipitation: 27 to 45 inches
Mean annual air temperature: 43 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Alvin and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alvin

Setting

Landform: Stream terraces
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Wind or water deposited sands

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 11 inches: very fine sandy loam
H3 - 11 to 25 inches: very fine sandy loam
H4 - 25 to 60 inches: loamy fine sand

Properties and qualities

Slope: 2 to 4 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

131C—Alvin fine sandy loam, 4 to 7 percent slopes

Map Unit Setting

National map unit symbol: 5xsz
Elevation: 340 to 1,350 feet
Mean annual precipitation: 27 to 45 inches
Mean annual air temperature: 43 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Alvin and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alvin

Setting

Landform: Ridges on stream terraces
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Wind or water deposited sands

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 11 inches: very fine sandy loam
H3 - 11 to 25 inches: very fine sandy loam
H4 - 25 to 60 inches: loamy fine sand

Properties and qualities

Slope: 4 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

131D—Alvin fine sandy loam, 7 to 12 percent slopes

Map Unit Setting

National map unit symbol: 5xt1
Elevation: 340 to 1,350 feet
Mean annual precipitation: 27 to 45 inches
Mean annual air temperature: 43 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Alvin and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alvin

Setting

Landform: Ridges on stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind or water deposited sands

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 11 inches: very fine sandy loam
H3 - 11 to 25 inches: very fine sandy loam
H4 - 25 to 60 inches: loamy fine sand

Properties and qualities

Slope: 7 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

131D2—Alvin fine sandy loam, 7 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 5xt2
Elevation: 340 to 1,350 feet
Mean annual precipitation: 27 to 45 inches
Mean annual air temperature: 43 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Alvin, eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alvin, Eroded

Setting

Landform: Ridges on stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind or water deposited sands

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 11 inches: very fine sandy loam
H3 - 11 to 25 inches: very fine sandy loam
H4 - 25 to 60 inches: loamy fine sand

Properties and qualities

Slope: 7 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

131E2—Alvin fine sandy loam, 12 to 18 percent slopes, eroded

Map Unit Setting

National map unit symbol: 5xt3
Elevation: 340 to 1,350 feet
Mean annual precipitation: 27 to 45 inches
Mean annual air temperature: 43 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Alvin, eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alvin, Eroded

Setting

Landform: Ridges on stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind or water deposited sands

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 11 inches: very fine sandy loam
H3 - 11 to 25 inches: very fine sandy loam
H4 - 25 to 60 inches: loamy fine sand

Properties and qualities

Slope: 12 to 18 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

131F2—Alvin fine sandy loam, 18 to 30 percent slopes, eroded

Map Unit Setting

National map unit symbol: 5xt4
Elevation: 340 to 1,350 feet
Mean annual precipitation: 27 to 45 inches
Mean annual air temperature: 43 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Alvin, eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alvin, Eroded

Setting

Landform: Ridges on stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind or water deposited sands

Typical profile

H1 - 0 to 8 inches: fine sandy loam
H2 - 8 to 11 inches: very fine sandy loam
H3 - 11 to 25 inches: very fine sandy loam
H4 - 25 to 60 inches: loamy fine sand

Properties and qualities

Slope: 18 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

184B—Roby fine sandy loam, 2 to 4 percent slopes

Map Unit Setting

National map unit symbol: 5xvn
Elevation: 340 to 800 feet
Mean annual precipitation: 35 to 46 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Roby and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Roby

Setting

Landform: Stream terraces
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Stratified water-laid sediments

Typical profile

H1 - 0 to 6 inches: fine sandy loam
H2 - 6 to 15 inches: loamy fine sand
H3 - 15 to 32 inches: fine sandy loam
H4 - 32 to 60 inches: stratified gravelly sand to loam

Properties and qualities

Slope: 2 to 4 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

200—Orio sandy loam

Map Unit Setting

National map unit symbol: 5xvr
Elevation: 500 to 750 feet
Mean annual precipitation: 35 to 42 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Orio and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orio

Setting

Landform: Depressions on stream terraces
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Stratified loamy and sandy outwash

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 18 inches: loam
H3 - 18 to 35 inches: sandy clay loam
H4 - 35 to 41 inches: sandy loam
H5 - 41 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

308B—Alford silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2x065
Elevation: 330 to 820 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 52 to 59 degrees F
Frost-free period: 170 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Alford and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alford

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over gritty loess

Typical profile

Ap - 0 to 11 inches: silt loam
Bt1 - 11 to 28 inches: silty clay loam
Bt2 - 28 to 76 inches: silt loam
2BC - 76 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Hosmer

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Iva

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

327B2—Fox loam, 2 to 4 percent slopes, eroded

Map Unit Setting

National map unit symbol: 5xwm
Elevation: 580 to 1,300 feet
Mean annual precipitation: 27 to 44 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 125 to 190 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Fox and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fox

Setting

Landform: Stream terraces
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous sandy outwash

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 22 inches: silt loam
H3 - 22 to 34 inches: loam
H4 - 34 to 60 inches: sand

Properties and qualities

Slope: 2 to 4 percent

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Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 45 percent
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

8071—Darwin silty clay, occasionally flooded

Map Unit Setting

National map unit symbol: 5xxw
Elevation: 340 to 700 feet
Mean annual precipitation: 34 to 48 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Darwin and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Darwin

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 14 inches: silty clay
H2 - 14 to 46 inches: silty clay
H3 - 46 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

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Depth to water table: About 0 inches
Frequency of flooding: Occasional
Frequency of ponding: Occasional
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Hydric soil rating: Yes

8071+—Darwin silt loam, overwash, occasionally flooded

Map Unit Setting

National map unit symbol: 5xxx
Elevation: 340 to 700 feet
Mean annual precipitation: 34 to 48 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Darwin, overwash, occasionally flooded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Darwin, Overwash, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 46 inches: silty clay
H3 - 46 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Occasional
Frequency of ponding: Occasional
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Hydric soil rating: Yes

8288—Petrolia silty clay loam, occasionally flooded

Map Unit Setting

National map unit symbol: 5xy4
Elevation: 340 to 500 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 180 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Petrolia and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Petrolia

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 8 inches: silty clay loam
H2 - 8 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Occasional
Frequency of ponding: Occasional
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

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- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

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United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

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Table 2.2.9
Soils Information Chart

Revised 1/9/2019

SURFACE OWNER	SOIL IDENTIFICATION					MINING OR DISTURBANCE AREA				UNAFFECTED (OPTIONAL)				TOTALS [acres]
						Prime Soils		NonPrime Soils		Prime Soils		NonPrime Soils		
	Soil Map Symbol	Soil Name	Slope [%]	Capability Class	Productivity Index (optimum)*	Prime Farmland [acres]	Neg Det PFL [acres]	High Capability [acres]	Limited Capability [acres]	Prime Farmland [acres]	Neg Det PFL [acres]	High Capability [acres]	Limited Capability [acres]	
Jody Andriana & Joe Weger	8288	Petrolia	0-2	3w	117	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.11
	327B2	Fox	2-4	2e	109	0.00	0.00	0.00	0.00	3.26	0.38	0.00	0.00	3.64
	184B	Roby	2-4	2e	111	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.24
	200	Orio	0-2	2w	110	0.40	0.00	0.00	0.00	6.73	0.42	0.00	0.00	7.55
	125	Selma	0-2	2w	129	0.19	0.00	0.00	0.00	1.92	0.00	0.00	0.00	2.11
	131F2	Alvin	18-30	6e	111	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.30	0.44
	8071	Darwin	0-2	3w	111	0.00	0.00	0.00	0.00	0.32	4.85	0.00	0.00	5.17
Jerry Weger	131F2	Alvin	18-30	6e	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06
	131C	Alvin	4-7	3e	111	0.02	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.84
	131E2	Alvin	12-18	4e	111	0.00	0.01	0.00	1.54	0.00	0.00	0.00	1.77	3.32
	125	Selma	0-2	2w	129	2.93	0.06	0.00	0.00	0.53	0.26	0.00	0.00	3.78
	200	Orio	0-2	2w	110	1.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64
	184B	Roby	2-4	2e	111	6.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.03
	8071+	Darwin	0-2	3w	111	2.71	0.00	0.00	0.00	0.90	0.22	0.00	0.00	3.83
Marian & Dan Weger	131F2	Alvin	18-30	6e	111	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.15	0.32
	200	Orio	0-2	2w	110	0.68	0.00	0.00	0.00	2.80	0.00	0.00	0.00	3.48
	125	Selma	0-2	2w	129	3.13	0.00	0.00	0.00	4.65	0.71	0.00	0.00	8.49
	184B	Roby	2-4	2e	111	1.17	0.00	0.00	0.00	2.85	0.00	0.00	0.00	4.02
	327B2	Fox	2-4	2e	109	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.69
	8071+	Darwin	0-2	3w	111	0.32	0.00	0.00	0.00	1.87	0.53	0.00	0.00	2.72
	8071	Darwin	0-2	3w	111	0.00	0.00	0.00	0.00	0.02	0.52	0.00	0.00	0.54
Joe, Jerry, Dan Weger	131C	Alvin	4-7	3e	111	0.00	0.00	0.00	0.00	0.00	5.76	0.00	0.00	5.76
	131E2	Alvin	12-18	4e	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.55	3.55
	131D	Alvin	7-12	3e	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.67	5.67
	131F2	Alvin	18-30	6e	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.74	3.74
	131B	Alvin	2-4	2e	111	0.00	0.00	0.00	0.00	0.00	3.80	0.00	0.00	3.80
	8F2	Hickory	18-35	6e	104	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	1.17
	131D2	Alvin	7-12	3e	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02
Vennard	131D	Alvin	7-12	3e	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.40	2.40
	131D2	Alvin	7-12	3e	111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.76	11.76
	308B	Alford	2-5	2e	121	0.00	0.00	0.00	0.00	1.02	0.00	0.00	0.00	1.02
	131C	Alvin	4-7	3e	111	0.00	0.00	0.00	0.00	0.93	0.50	0.00	0.00	1.43
	131B	Alvin	2-4	2e	111	0.00	0.00	0.00	0.00	1.63	0.00	0.00	0.00	1.63
	8F2	Hickory	18-35	6e	104	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
														0.00
					TOTALS:	19.22	0.07	0.00	1.85	30.36	18.88	0.00	30.62	101.00

* Bulletin 811 (adjusted for slope and erosion)

Information required under 1785.17, 1823,1779.21 and/or 1783.21

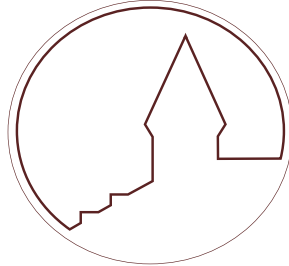
NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

Illinois Archaeological Survey Short Report

Phase I Cultural Resources Survey and Assessment of
the Oaktown 2 Illinois Portal 2 for Sunrise Coal, LLC Near
Russellville, Lawrence County, Illinois

Prepared for
Sunrise Coal, LLC
Carlisle, Indiana

Prepared by
American Resources Group, Ltd.
Carbondale, Illinois



Principal Investigator
Steve Titus

Author
Daniel Blodgett

ARCHAEOLOGICAL SURVEY SHORT REPORT
Illinois Historic Preservation Agency
1 Old State Capitol Plaza, Springfield, Illinois 62701-1507
(217) 782-4836

Reviewer:
Date:
Accept: Reject:

IHPA Log Number:

LOCATIONAL INFORMATION AND SURVEY CONDITIONS:

County: Lawrence **Quadrangle:** Russellville, Illinois, - Indiana 7.5'

Project Type/Title: Phase I Cultural Resources Survey and Assessment of the Oaktown 2 Illinois Portal 2 for Sunrise Coal, LLC, Near Russellville, Lawrence County, Illinois (ARG CRM 2043).

Funding and/or Permitting Federal/State Agencies: IDNR

Legal Location: SW¼, SE¼, S½, NW¼, SE¼; NE¼, NW¼, SE¼

Section: 29 **Township:** 5N **Range:** 10W

UTM Coordinates:

Center Point of Project Area: **UTM North:** 4299192 **UTM East:** 452635

Northeast Corner of Project Area: **UTM North:** 4299569 **UTM East:** 452840

Location: The project area is located southeast of the intersection of CR 1840 N and CR 1950 E; approximately 1.5 miles northwest of Russellville, IL.

Project Description: Phase I archaeological survey of a proposed portal location for Sunrise Coal, LLC.

Topography: The project area is situated on a terrace at the base of the bluffs overlooking the flood plain of the Wabash River to the east.

Elevation (AMSL): 420-450 feet amsl

Soils: Muren-Alford and Lawson Beaucoup (University of Illinois 1966)

Drainage: The project area is drained by an unnamed, intermittent tributary of the Wabash River.

Land Use/Ground Cover (include % visibility): The project area consisted of a recently disced agricultural field that was covered in stubble providing 70-90 percent surface visibility.

Survey Limitations: None

ARCHAEOLOGICAL AND HISTORICAL INFORMATION:

Historic Plats/Atlases/Sources: Illinois Inventory of Archaeological Sites; IHPA HARGIS database; 1862 GLO Plat Map of Township 5 North, Range 10 West (Illinois State Archives) (Attachment B, Figure B-1);

1875 Atlas of Lawrence County, Illinois (W. R. Brink) (Attachment B, Figure B-2);

1876 Atlas of the State of Illinois (Warner and Beers) (Attachment B, Figure B-3);

1906 Lawrence County, Illinois (H. H. Knipe, editor) (Attachment B, Figure B-4);

1909 Revised Map of Lawrence County, Illinois (Standard Map Company) (Attachment B, Figure B-5),

1917 Birds, Illinois, 15 minute topographic map (Attachment B, Figure B-6);

1920? Plat Book of Lawrence County, Illinois (Standard Map Company) (Attachment B, Figure B-7);

1937? Lawrence County, Illinois (W. W. Hixson) (Attachment B, Figure B-8);

1951 Farm Plat Book and Business Guide, Lawrence County, Illinois (Rockford Map Publishers) (Attachment B, Figure B-9)

Previously Reported Sites: Within project area: None. Within 1-mile of project area: 11LW20, 11LW47, 11LW63/11CW77, 11LW68, 11LW69, 11LW71, 11LW72, 11LW182, 11LW183, 11LW184, 11LW186, 11LW187, 11LW188, 11LW189, 11LW190, 11LW191, 11LW192, 11LW193, 11LW194, 11LW195,

11LW196, 11LW197, 11LW198,

Previous Surveys: Within project area: None. Within 1-mile of project area: 3356 (Anslinger 1988)

Regional Archaeologist Contacted: None, consulted the Illinois Inventory of Archaeological Sites

Investigation Techniques: Systematic surface survey was conducted throughout the project area by walking transects spaced at 5-m intervals. Additionally, three deep tests were placed at strategic locations within the project area to test for buried cultural surfaces. These deep tests were excavated to depths of 55-130 cm below surface using handheld augers.

Time Expended: 32 hours

Sites/Find Spots Located: 11LW376

Cultural Material: 11LW376: one biface preform, one unspecified biface fragment, one informal flake tool, four tertiary flakes, and five angular chert fragments

Curated At: Illinois State Museum (ISM)

Collection Techniques: All cultural materials identified during this investigation were collected.

Area Surveyed (acres and square meters): 49.63 acres; 200,845.48 square meters

RESULTS OF INVESTIGATIONS AND RECOMMENDATIONS: (check one)

- Phase I archaeological reconnaissance has located no archaeological material; project clearance is recommended.
- Phase I archaeological reconnaissance has located archaeological materials; site(s) does(do) not meet requirements for National Register eligibility; project clearance is recommended.
- Phase I archaeological reconnaissance has located archaeological materials; site(s) may meet requirements for National Register eligibility; further testing is recommended.
- Phase II archaeological investigation has indicated that site(s) does(do) not meet requirements for National Register eligibility; project clearance is recommended.
- Phase II archaeological investigation has indicated that site(s) meet requirements for National Register eligibility; formal report is pending and a determination of eligibility is recommended.

Comments: One archaeological site (11LW376) was recorded in the course of the current investigation. This site is evaluated as not eligible for NRHP listing. It is recommended that the proposed undertaking be allowed to proceed as planned.

ARCHAEOLOGICAL CONTRACTOR INFORMATION:

Archaeological Contractor: American Resources Group, Ltd.
Address/Phone: 127 North Washington Street
 Carbondale, Illinois 62901-1507 / (618) 529-2741
Surveyor(s): Jeff Myers and Loy Addington **Survey Date(s):** November 6 and 7, 2018
Report Completed by: Daniel Blodgett **Date:** November 21, 2018
Submitted by (signature and title):

Steve Potos, Principal Investigator

ATTACHMENT CHECK LIST: (#1 through #4 are mandatory)

- x1) Relevant portion of USGS 7.5' topographic quadrangle map(s) showing project location and any recorded site;**
- x2) Project map(s) depicting survey limits and, when applicable, approximate site limits and concentrations of cultural materials;**
- x3) Site form(s): (two copies of each form);**
- x4) All relevant project correspondence;**
- x5) Additional information sheets as necessary.**

Address of Owner/Agent/Agency To Whom SHPO Comment Should Be Mailed To:

Sunrise Coal, LLC

1466 E. SR 58

Carlisle, IN 47838

Contact Person: Tommy Sutton**Telephone Number:** (812)-745-2920

American Resources Group Ltd.

127 North Washington Street

Carbondale, Illinois 62901

Contact Person: Mr. Steve Titus**Telephone Number:** (618) 529-2741**REVIEWERS COMMENTS:**

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Attachment A

Project Maps

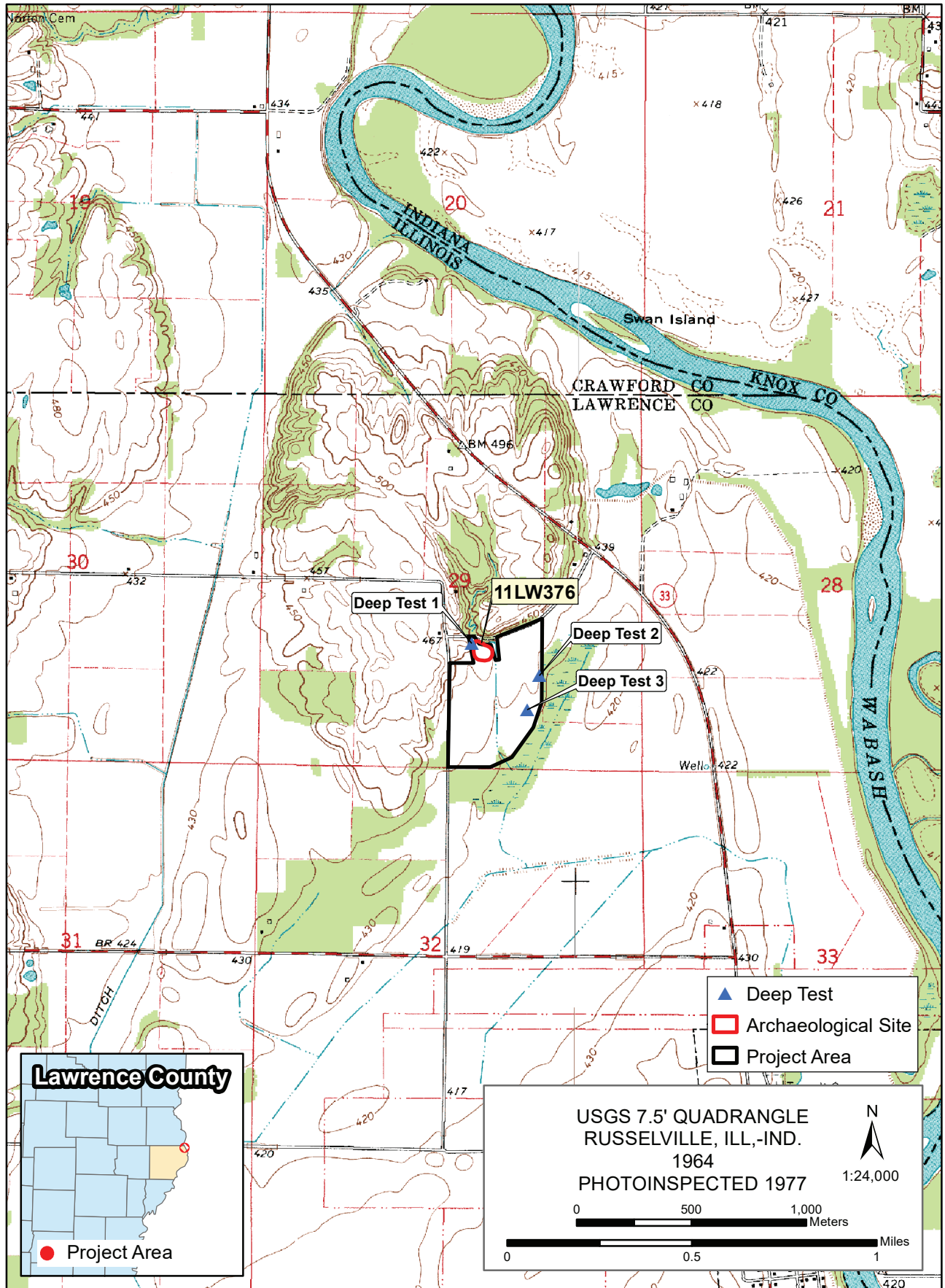


Figure A-1. Topographic location of the project area, Lawrence County, Illinois (USGS 1964).

11LW376

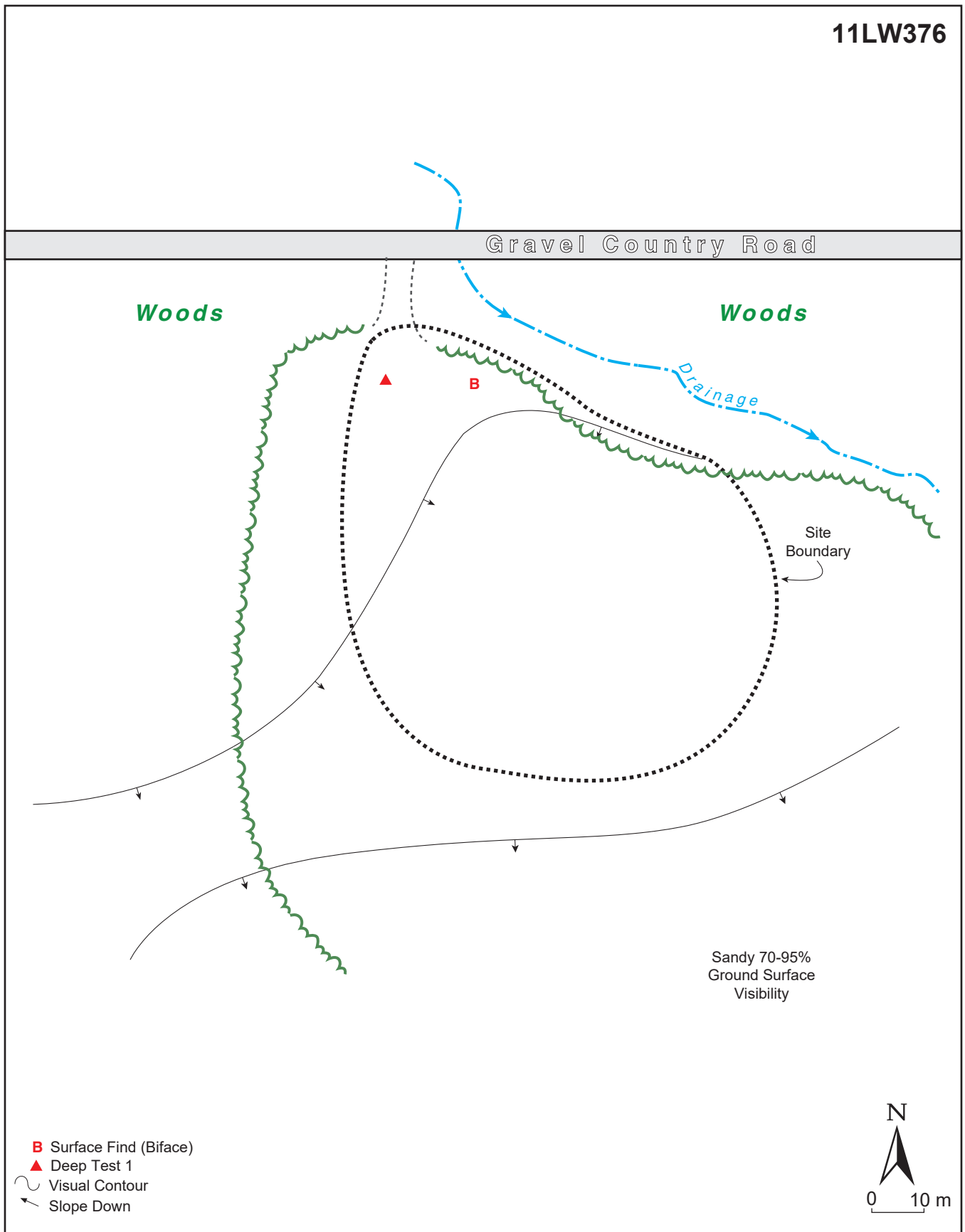


Figure A-2. Site map, 11LW376.

Attachment B

Historic Maps

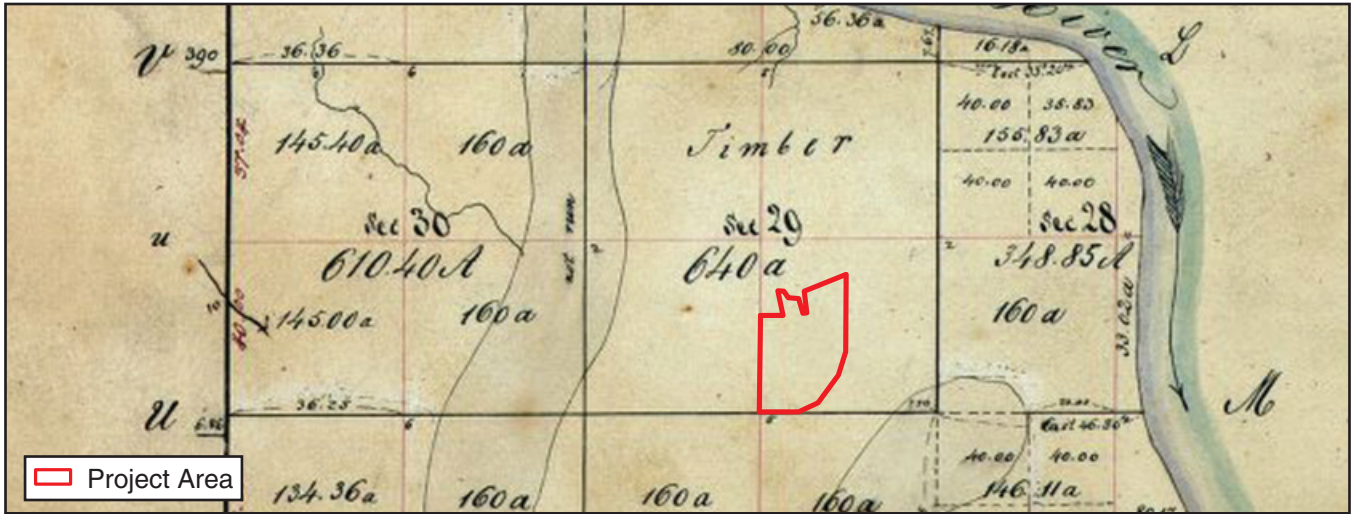


Figure B-1. Portion of the 1862 GLO Plat Map of Township 5 North, Range 10 West (Illinois State Archives 2018).



Figure B-2. Portion of the 1875 Atlas of Lawrence County, Illinois illustrating the project area (W. R. Brink & Co. 1875)

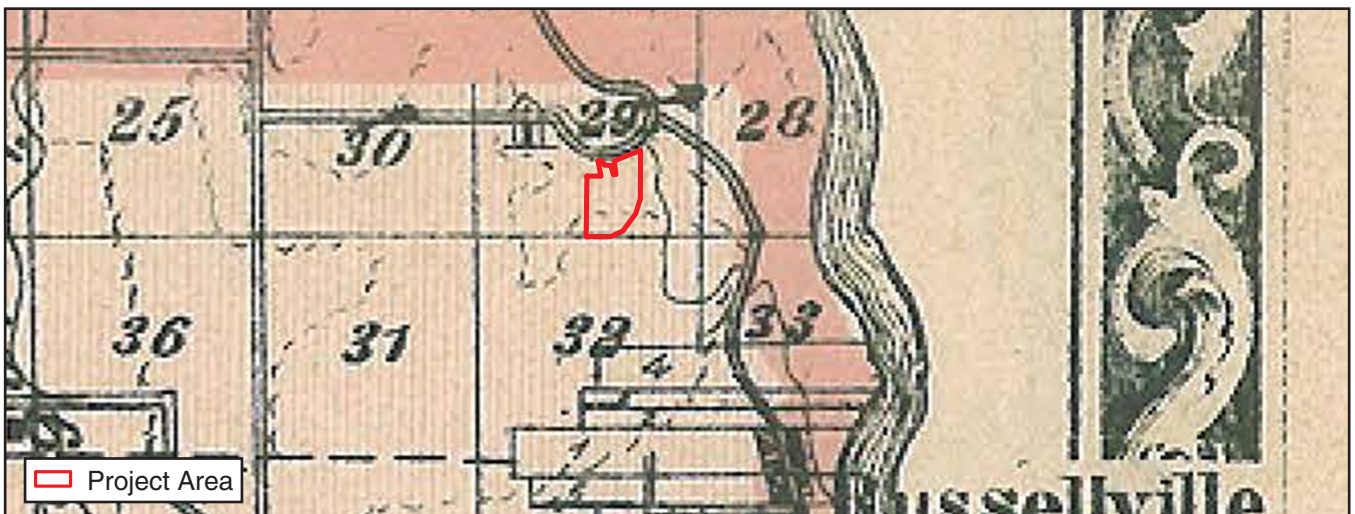


Figure B-3. Portion of the 1876 Atlas of the State of Illinois illustrating the project area (Warner and Beers 1876).

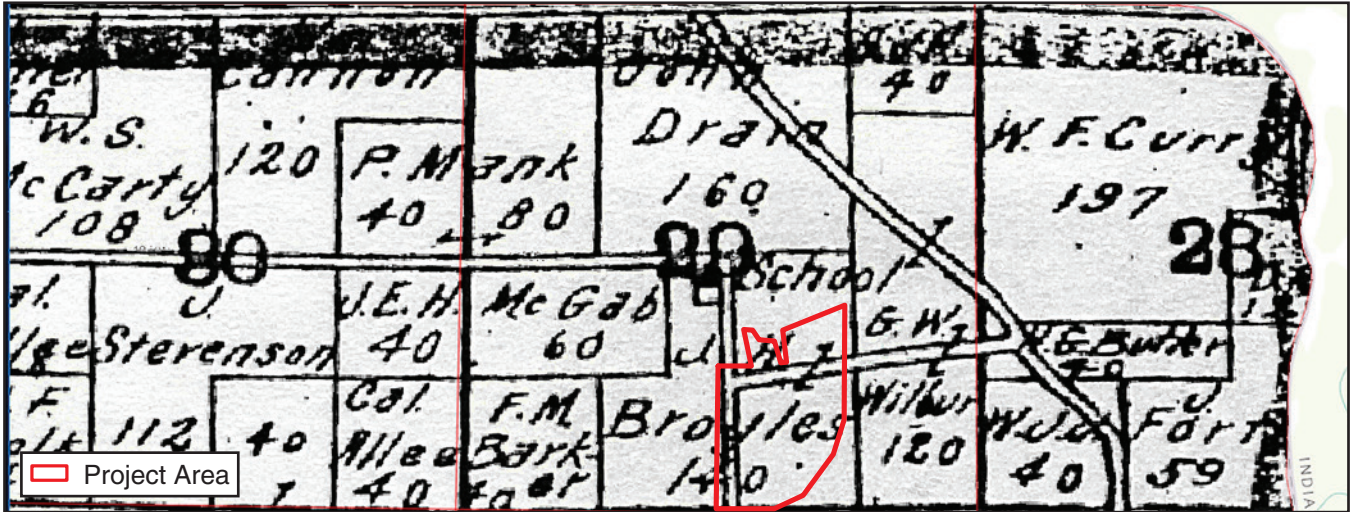


Figure B-4. Portion of the 1906 Lawrence County, Illinois map illustrating the project area (Knipe 1906).

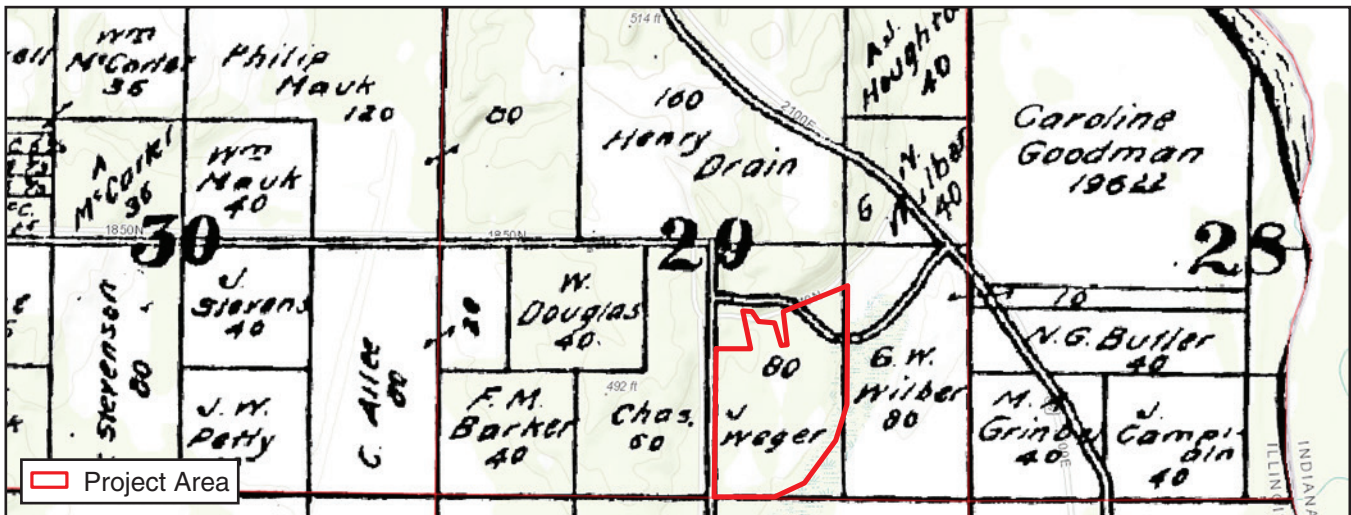


Figure B-5. Portion of the 1909 Revised Map of Lawrence County, Illinois illustrating the project area (Standard Map Company 1909).

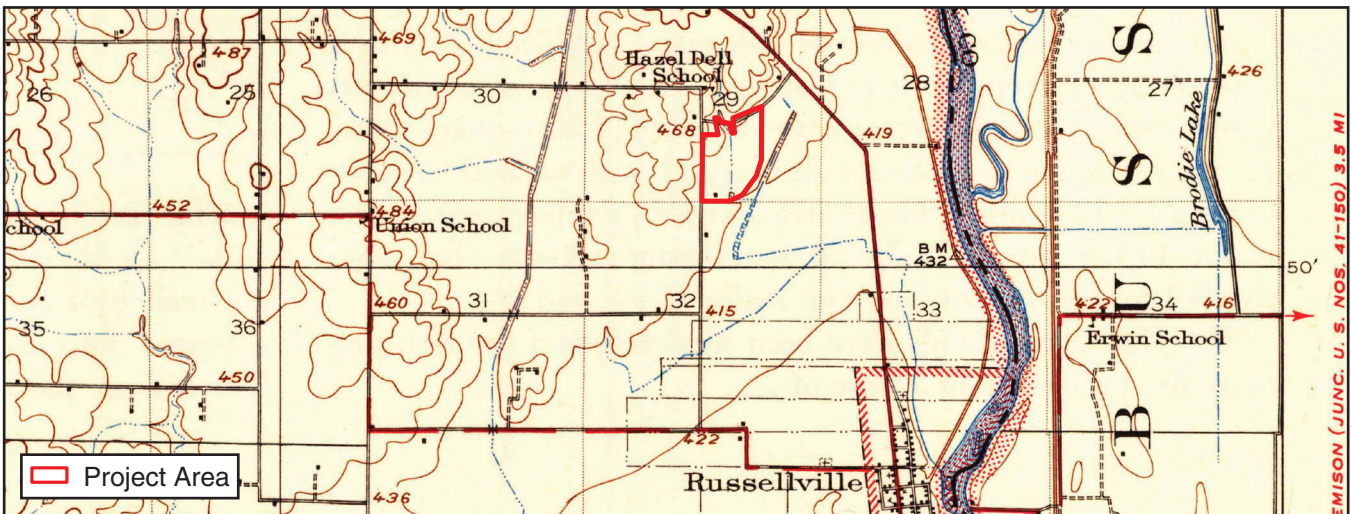


Figure B-6. Portion of the Birds, Illinois, USGS 15' series topographic quadrangle illustrating the project area (USGS 1917).

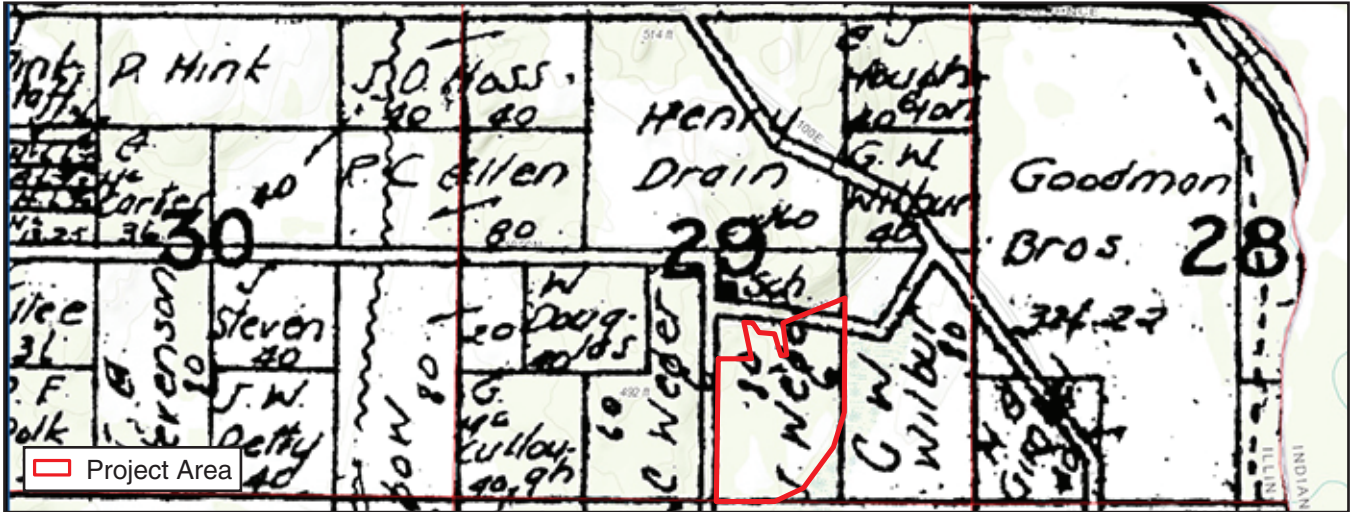


Figure B-7. Portion of the 1920? Plat Book of Lawrence County, Illinois illustrating the project area (Standard Map Company 1920?).

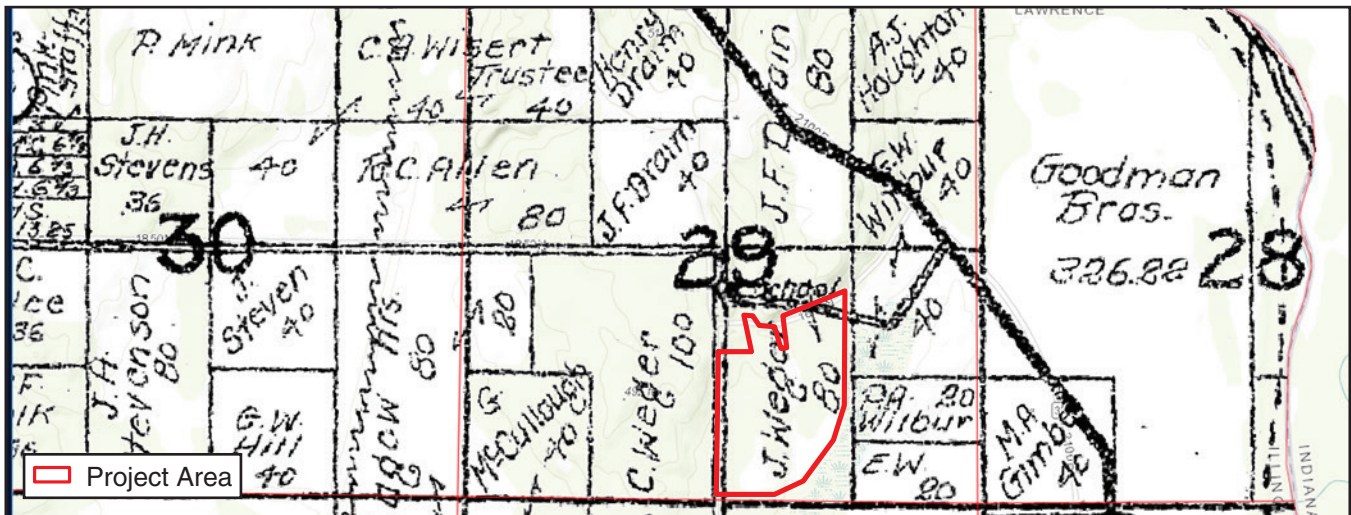


Figure B-8. Portion of the 1937? Lawrence County, Illinois map illustrating the project area (W. W. Hixson & Co. 1937?).

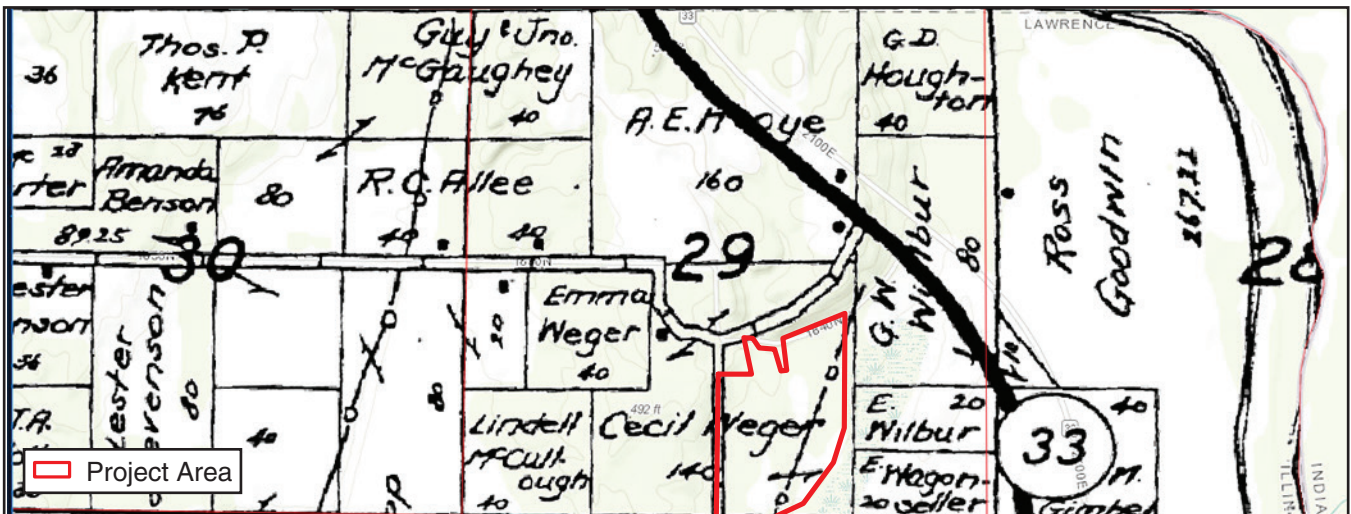


Figure B-9. Portion of the 1951 Farm Plat Book and Business Guide, Lawrence County, Illinois illustrating the project area (Rockford Map Publishers 1951).

Attachment C

Results

American Resources Group recently completed an intensive, Phase I cultural resources survey of a proposed portal location for Sunrise Coal, LLC. The project area consists of a 49.63 acre property located approximately 2.41 km (1.5 miles) northwest of Russellville, Lawrence County, Illinois (Attachment A, Figure A-1). The survey was conducted by a two-person field crew on November 6 and 7, 2018.

A pre-field records check conducted prior to the initiation of the field work revealed that no surveys had been conducted, nor had any sites been recorded, within the project area. The records check did show, however, that one previous survey had been conducted, and 23 sites had been previously recorded, within a mile of the project area.

The results of the pre-field records and literature review suggested that prehistoric site density was apt to be high within the project area. This determination is based on the local topography and the project area's close proximity to several prehistoric sites including two (11LW20 and 11LW47) that date to the Mississippian period and have associated mounds. Neither of these sites has been evaluated for NRHP eligibility, but if they are still present they would qualify for NRHP listing. One of these sites (11LW47) is situated on the bluff edge approximately 45 m west of the current project limits.

The results of the pre-field records and literature review also suggested that historic site density was apt to be low. The pre-field review of historic maps indicated there is a single structure plotted within the southern portion of the project area on the 1917 historic plat map. None of the other historic maps indicated structures within the project area (Attachment B, Figures B-1–B-9).

At the time of investigation, the project area consisted of a recently disced agricultural field covered in stubble providing 70-90 percent surface visibility. Systematic surface survey was conducted throughout the project area by walking transects spaced at 5-m intervals. Additionally, three deep tests were placed at strategic locations within the project area to test for buried cultural surfaces. These deep tests were excavated to depths of 55-130 cm below surface using handheld augers. A detailed description of the soil profile observed in each of the deep tests is presented in Table C-1 below.

One cultural property (11LW376), a prehistoric lithic scatter, was recorded during the current survey. This cultural property is described below. Deep testing of the project area failed to identify any buried cultural surfaces. Although the 1917 historic plat map indicates a structure within the southern portion of the project area, no evidence of such a structure was identified. The structure has likely been completely destroyed by ongoing agricultural activities. The results of the present survey indicate the proposed undertaking will not have an adverse effect on significant cultural resources. It is recommended that the proposed undertaking be allowed to proceed as planned without any additional cultural resources investigations.

Site 11LW376

Field Number: 2043-1

Site Type: Lithic Scatter

Component: Prehistoric Unknown

Site Location: SW $\frac{1}{4}$, NW $\frac{1}{4}$, SE $\frac{1}{4}$, Section 29, Township 5 North, Range 10 West, Lawrence County, Illinois

UTM at Main Datum (NAD 83): 4299461N 452535E, Zone 16S

Approximate Site Area: 5,157 m²

Topographic Location: Terrace

Elevation: 134 m (440 feet) amsl

Soil Type: Selma loam; Alvin fine sandy loam, 12 to 18 percent slopes, eroded

Nearest Water: Unnamed, intermittent tributary of the Wabash River; adjacent

Survey Method: Systematic surface survey at 5- m intervals and deep auger testing.

Site Condition: The site has likely been impacted by agricultural activities.

Potential Impact: The site will be impacted by the proposed undertaking.

NRHP Evaluation: Not eligible

Site Description

Site 11LW376 is a small, low density lithic scatter located south of CR 1840 N approximately 2.85 km (1.77 miles) northwest of Russellville, Illinois. The site is situated on a terrace at the base of the bluffs overlooking the flood plain of the Wabash River to the east. (Attachment A, Figure A-1).

At the time of survey, the site area consisted of a recently disced agricultural field that was covered in stubble providing 70-90 percent surface visibility (Attachment D, Figure D-1). The site was identified through systematic surface survey conducted at 5-m intervals. Additionally, a deep test was excavated along the western edge of the site to test for buried cultural surfaces. The deep test was excavated to a depth of 130 cm bs using a handheld auger and failed to identify any buried cultural surfaces.

The soil profile observed in the deep test exhibited a 15 cm thick brown (10YR 4/3) sandy loam Ap horizon (plow zone) on top of a brown (10YR 4/3) mottled sandy loam BE horizon that extends to 26 cm bs. Below this were multiple Bt horizons extending to the bottom of the test at 130 cm bs. The Bt1 horizon was a band of very dark grayish brown (10YR 3/2) sandy loam that was present from 26 to 28 cm bs, while the Bt2 horizon consisted of dark yellowish brown (10YR 4/4) sandy loam that was present from 28 to 76 cm bs. The Bt3 horizon was present from 76 to 110 cm bs and consisted of brown (10YR 4/3) fine sand, while the Bt4 horizon was present from 110-130 cm bs and consisted of very dark gray (10YR 3/1) sand (Table C-1).

Artifacts. Twelve prehistoric artifacts were recovered at site 11LW376 during the systematic surface survey of the project area. These artifacts, all lithics, consist of a biface preform, an unspecified biface fragment, an informal flake tool, four tertiary flakes, and five angular fragments (Table C-2). No diagnostic artifacts were recovered from the site.

Interpretation. Site 11LW376 is interpreted as a small, low density lithic scatter with a prehistoric unknown temporal affiliation.

Evaluation and Recommendation. Based on the paucity of artifacts and the compromised depositional integrity of site 11LW376 due to plowing, the site is unlikely to yield new information that would be important to the understanding of the prehistory of the region. Therefore, site 11LW376 is evaluated as not eligible for listing to the NRHP and no further work is recommended.

Table C-1. Deep Test Data

Deep Test #	UTM Coordinates	Soil Horizon and Level	Depth (cm bs)	Soil Description	Excavation Level Contents	Comments
1	4299461 N, 452535 E	Ap horizon; Level 1	0–15	Brown (10YR 4/3) sandy loam	Culturally sterile	Located along field edge in northwest portion of project area.
		BE horizon; Level 2	15–26	Brown (10YR 4/3) sandy loam with mottles	Culturally sterile	
		Bt1 horizon; Level 3	26–28	Very dark grayish brown (10YR 3/2) sandy loam	Culturally sterile	
		Bt2 horizon; Level 4	28–76	Dark yellowish brown (10YR 4/4) sandy loam	Culturally sterile	
		Bt3 horizon; Level 5	76–110	Brown (10YR 4/3) fine sand	Culturally sterile	
		Bt4 horizon; Level 6	110–130	Very dark gray (10YR 3/1) sand	Culturally sterile	
2	4299322 N, 452829 E	Ap horizon; Level 1	0–20	Very dark gray (10YR 3/1) clay loam	Culturally sterile	Located on slight rise along the edge of a slough.
		A horizon; Level 2	20–39	Dark brown (10YR 3/3) clay loam	Culturally sterile	
		Bt horizon; Level 3	39–55	Very dark grayish brown (10YR 3/2) clay loam	Culturally sterile	
3	4069288 N, 293269 E	Ap horizon; Level 1	0–13	Dark brown (10YR 3/3) clay loam	Culturally sterile	Located on slight rise along eastern edge of project area.
		Bt horizon; Level 2	13–66	Dark yellowish brown (10YR 3/6) sandy clay loam	Culturally sterile	

Table C-2. Prehistoric Artifact Inventory, Site 11LW376.

Chert Type Count & Weight	Attica		Glacially Deposited Burlington		Glacial Till		Wyandotte		Total	
	#	Wt.	#	Wt.	#	Wt.	#	Wt.	#	Wt.
Hunting & General Utility Tools										
Informal Flake Tools					1	9.1			1	9.1
Unspecified Bifaces							1	22.9	1	22.9
Total by Count & Weight					1	9.1	1	22.9	2	32.0
Frequency					50%	28.4%	50%	71.6%	100%	100%
Stone Tool Production & Maintenance Debris										
Preforms	1	66.3							1	66.3
Debitage										
<i>Tertiary Flakes</i>	1	6.8	3	4.6					4	11.4
<i>Angular Fragments</i>	1	25.2	4	20.0					5	45.2
Total by Count & Weight	3	98.3	7	24.6					10	122.9
Frequency	30%	80%	70%	20%					100%	100%
Overall Total	3	98.3	7	24.6	1	9.1	1	22.9	12	154.9
Overall Frequency	25%	63.4%	58.4%	15.9%	8.3%	5.9%	8.3%	14.8%	100%	100%

Key: # = Count; Wt. = Weight in Grams

Attachment D

Project Photographs



Figure D-1. Agricultural field containing site 11LW376, view to southeast.

Attachment E

References Cited

Anslinger, C. Michael

- 1989 *Archaeological Records Review, Reconnaissance, and Recommendations, Proposed Pipeline Crossing of Wabash River, Oaktown-Lawrenceville System, Knox County, Indiana and Crawford County, Illinois*. Archaeological Survey Short Report, Illinois Cultural Resources Management Report Archive Document No. 3356. Indian State University Anthropology Laboratory, Terre Haute, Indiana.

Illinois Inventory of Archaeological Sites (IIAS)

- 2018 Electronic document, <http://geoserver.dnr.illinois.gov/archaeologyviewer/>, accessed November 14, 2018.

Illinois State Archives

- 2018 1862 GLO Township Plat, Township 5 North, Range 10 West. In Illinois Secretary of State, Federal Township Plats of Illinois website <http://landplats.ilsos.net/>

Knipe, H. H. (editor)

- 1906 *Lawrence County, Illinois*. Robinson, Illinois.

Rockford Map Publishers

- 1951 *Farm Plat Book and Business Guide, Lawrence County, Illinois*. Rockford, Illinois.

Standard Map Company

- 1909 *Revised Map of Lawrence County, Illinois*. Robinson, Illinois.

- 1920? *Plat Book of Lawrence County, Illinois*. Rockford, Illinois (?).

United States Geological Survey (USGS)

- 1917 Birds, Illinois, 15 minute topographic map.

- 1964 Russellville, Illinois-Indiana, 7.5 minute topographic map. Photoinspected 1977.

University of Illinois

- 1966 *General Soil Map of Illinois*. Agricultural Experiment Station, University of Illinois, Urbana. In cooperation with U.S. Department of Agriculture, Soil Conservation Service.

Warner and Beers

- 1876 *Atlas of the State of Illinois*. Warner and Beers, Chicago, Illinois.

W. R. Brink & Co.

- 1875 *Atlas of Lawrence County, Illinois*. W. R. Brink and Company, Philadelphia, Pennsylvania.

W. W. Hixson & Co.

- 1937? *Lawrence County, Illinois*. W.W. Hixson and Company, Rockford, Illinois

Attachment F

Site Form

Illinois Archaeological Site Recording Form

County Lawrence

Site Name

Field Number 2043-1

State Site Number 376

7.5 min Quadrangle Russelville

Recorded 2018.11.20

LEGAL DESCRIPTION (to quarter quarter quarter section)

Align SE 1/4s SWNWSE

Sec: 29 Twp: 5 N Rng: 10 W

Align 1/4s

Sec: 0 Twp: 0 Rng: 0

Align 1/4s

Sec: 0 Twp: 0 Rng: 0

Align 1/4s

Sec: 0 Twp: 0 Rng: 0

U.T.M. Coordinates for site center: (to be provided by ISM)

U.T.M. Zone: 16 East U.T.M. 452584 North U.T.M. 4299221 NAD27

Ownership Private Public

ENVIRONMENT

Topography Terrace

Elevation(meters AMSL) 134

Nearest Water Supply Intermittent stream

Drainage Basin Wabash 1

Soil Associations Lawson-Sawmill-Darwin

Description The site is situated on a terrace at the base of the bluffs overlooking the flood plain of the Wabash River to the east

SURVEY

Project Name 2043 Sunrise Coal

Site Area (square meters) 5104

Ground Cover Bare Stubble

Surface Visibility (%) 80

Survey Methods Pedestrian

Auger

Site Type Other

 Standing Structure

SITE CONDITION

Extent of Damage Unknown

Main Cause of Damage Agriculture

MATERIAL OBSERVED

Number of Prehistoric Artifacts (count or estimate) 12

Number of Historic Artifacts (count or estimate) 0

 Prehistoric Diagnostic Artifacts Historic Diagnostic Artifacts Prehistoric Surface Features Historic Surface Features

Description 1 preform, 4 flakes, and 7 angular chert fragments

TEMPORAL AFFILIATION (check all that apply)

 Prehistoric Unknown Late Archaic Mississippian Colonial (1673-1780) Paleoindian Woodland Upper Mississippian Pioneer (1781-1840) Archaic Early Woodland Protohistoric Frontier (1841-1870) Early Archaic Middle Woodland Historic Native American Early Industrial (1871-1900) Middle Archaic Late Woodland Historic (generic) Urban Industrial (1901-1945) Post-War (1946-present)

Description Only non-diagnostic prehistoric lithics were recovered during this survey.

Surveyor Myers/Addington

Institution ARG

Survey Date 11/6/2018

Curation Facility ISM

Site Report By Daniel Blodgett

Institution ARG

Date 11/13/2018

IHPA Log No.

IHPA 1st Sur Doc No.

Compliance Status

 NRHP Listing

05/01/2019

PART 3: Mining Operations Plan

3.1 General Description of Operations. Operations are planned to be carried out in excess of 20 years.

3.1.1 Describe the type of operation (surface, underground or carbon recovery) and method of mining procedures (surface, room and pillar or longwall). [1780.11(a)/1784.11(a)]

The proposed permit consists of a portal facility only including a man and materials shaft, office/bathroom building, warehouse and supply facility, parking area, fuel drop hole, rockdust hole, and access roadways. Mining of the area is under Illinois Permit Number 452, Oaktown Mine.

3.1.2 Describe the major equipment to be employed and how such equipment will be used in the different aspects of the mining operation. [1780.11(a)/1784.11(a)]

The major equipment to be employed in development and operation of the site will consist of excavators, loaders, trucks, dozers, scrapers, cranes and hoisting equipment.

Scrapers or loader with trucks will be utilized to remove topsoil material from the disturbed areas of the permit.

Excavators will be utilized to construct and maintain the sediment basin and drainage ditches.

Dozers will be used during the construction phase as well as operational phases. Dozers will be utilized in construction and maintenance of the access road, parking lot, topsoil stockpile and earth work activities.

Cranes will be utilized during construction of the site as well Forklifts in daily handling of supplies throughout the life of the operation.

Compactor or Sheep-foot roller will be on site during construction of the site.

Hoisting equipment will be utilized throughout the daily operation to transport workers, supplies and equipment to the underground operations.

3.1.3 Provide an estimation of the anticipated annual coal production and anticipated total coal production by tonnage once the mine is at full operational capacity. Define the annual progression of mining on the Operations Map. For underground mines, show annual progression of surface disturbance for support facilities. [1780.11(a)/1784.11(a)]

Not applicable.

3.2 Description of Mine Facilities. Provide a narrative that explains the construction, modification, use maintenance and removal of the following structures and facilities as applicable to the proposed operations. If not applicable to this permitting action, indicate such. [1780.11(b)/1784.11(b)].

3.2.1 Dams, Embankments, and other impoundments. List all such structures, their use, maintenance practices and whether they will be retained permanently or removed as applicable. Please note that an impoundment includes incised structures. [1780.11(b)/1784.11(b)]

This permit area will include a sediment control pond which will include some limited embankment and impoundment. Details of this facility can be found in Part 5 of this application. This proposed sediment control pond will be completely reclaimed after cessation of active use.

3.2.2 Coal storage, coal preparation and cleaning facilities, loading and transportation areas. [1780.11(b)/1784.11(b)]

Not applicable.

3.2.3 Water treatment facilities including but not limited to, sediment ponds, chemical treatment of discharge, and any special water treatment facilities beyond sediment ponds. [1780.11(b)/1784.11(b)]

Water treatment facilities will include the aforementioned sediment control pond and a discharge from the wastewater treatment facility which will treat wastewater from the office and shower buildings. Discharge from the wastewater facility will be directed to the proposed sediment control pond.

3.2.4 Air pollution control facilities [1780.11(b)/1784.11(b)]

Not applicable.

3.2.5 Buried Pipelines. Are pipelines proposed to be buried within the permit boundary? [1816.133/1817.133]

YES NO

If YES, locate pipeline corridors on the operations map. Provide a description of the pipeline operation including but not limited to: the material to be transported, the type, diameter and wall thickness of the pipe and the depth of burial to the top of pipe. Indicate whether the pipe is to be removed when no longer needed. It is recommended that pipeline burials follow the Illinois Department of Agriculture guidelines if they are intended to be left in place permanently. IDOA guidelines for different types of pipelines may be found at:

<https://www2.illinois.gov/sites/agr/Resources/LandWater/Documents/pipelinestandardspolicies.pdf#search=pipeline>
<https://www2.illinois.gov/sites/agr/Resources/LandWater/Documents/waterandsewerlines.pdf>

Pipeline use will include the piping to the wastewater treatment plant and discharge piping from the plant to the sediment control pond. All materials and construction methods will be in accordance with the Standard Specifications for Water and Sewer Construction in Illinois, latest edition. Minimum pipe diameter will be six (6) inch and minimum depth of bury will be 30 inches to the top of the pipe.

3.3 Signs and Markers. All signs and markers required to be posted shall be easily seen and read, uniform in design and made of durable material. Signs and markers shall also be maintained and retained in place throughout the life of specific mining activity. Boundary or buffer markers shall be spaced to be visible from one to another. Describe the signs and markers in terms of material type, color, and wording to be used for the following boundary(s) and/or protected feature(s). If not applicable to this permitting action, indicate as such. [1816.11(a)/1817.11(a)].

3.3.1 Permit Perimeter markers (Include incremental bond areas, unaffected areas, uncontrolled properties, pending archeological areas, and areas of lateral support) [1816.11(d)/1817.11(d)]

The permit boundary will be marked with a combination of orange flagging and/or orange paint placed on posts or other permanent objects at intervals along the perimeter, which will allow for clear designation.

3.3.2 Stockpile Markers [1816.11(f)/1817.11(f)]

Topsoil and subsoil stockpiles will be marked with identifying signs.

3.3.3 Stream buffer zones [1816.57(b)/1817.57(b)]

Not applicable. No perennial or intermittent streams are within the proposed permit area.

3.3.4 Prohibited or limited areas identified on Table 2.3: Areas Prohibiting or Limiting Mining Operations [1816/1817.11(d)]

Limiting areas include the required standoff of 100 feet from the right of way line for public roads. The 300 feet buffer from an occupied dwelling shall be marked with a combination of red flagging or red paint placed on posts or other permanent object. The interval between these markers shall be visible from one to the other.

3.4 Soil and Overburden Handling and Protection.

3.4.1 Describe how each type of overburden (soil horizons, glacial drift and consolidated material) will be handled with regards to different types of mining equipment. [1780.18(b)(7)/1784.13(b)(7)]

The area to be disturbed by the proposed construction will be cleared of trees and shrubs by bull dozers, endloaders or backhoes where necessary to facilitate the removal and recovery of the soils required for project. Topsoil and subsoil so removed will be hauled to the appropriate stockpile areas by truck, dumped, and placed in stockpile configuration by the endloaders or bulldozers. Material will be stored in segregated storage piles, appropriately identified by a sign, and protected by re-vegetation and mulched if necessary.

3.4.2 If toxic materials have been identified as occurring in the overburden, describe how these materials will be segregated and handled to insure proper disposal. This includes, shaft and slope cuttings, excavation of incised portions of ponds, ditches, stream diversions or refuse disposal areas. [1780.11(b)/1784.11(b); 1780.18(b)(7)/1784.13(b)(7)]

With regard to the shaft construction, only the surface soil materials will be removed and stored on site. By utilizing the raised boring construction technique, all rock material will be removed from below and stowed in old workings areas which will preclude any possibility of encountering possible toxic materials. Material removed from the small boreholes will be removed from the site and hauled to the Mine's coal processing waste areas. Using the above techniques, there should be no probability of potentially toxic material handling issues.

3.4.3 Locate all soil horizon storage areas and/or root medium stock piles on the Operations Map and describe measures to be employed to prevent or minimize exposure of soil stockpiles to excessive water and wind erosion, unnecessary compaction and contamination by undesirable materials. [1780.11(b)(2)/1784.11(b)(2); 1780.14(b)(5)/1784.23(b)(5)]

Topsoil and subsoil will be stockpiled and graded to traversable slopes; vegetation will be accomplished by seeding with grasses and/or legumes and mulched if necessary to attain vegetative cover sufficient to prevent wind and water erosion. Appropriate signs will be placed to identify the soil type in the stockpile. The topsoil stockpiles will be placed a sufficient distance from active roads or other sources of contamination to minimize the potential for contamination of stockpiled soils.

The soil stockpiles generally will be established by truck haulage or tractor pans and shaped with small dozers to minimize compaction during the construction of the stockpile. Once the soil stockpile is shaped and re-vegetated, only the equipment necessary for the maintenance of the soil stockpile will be allowed on the pile until soil is taken from the stockpile for final placement and reclamation. From time to time certain stockpiles may have material added or taken for reclamation; in each case the pile will be timely reshaped and re-vegetated and mulched if necessary.

See Mining Operations Map for location of all soil horizon storage areas and root medium stock piles.

3.4.4 Describe methods and treatment measures to be used on exposed areas where topsoil has been removed to prevent excess air and water pollution. [1816.95/1817.95]

All surface water runoff from disturbed areas including areas where topsoil has been removed will pass through an approved sediment control structure and meet NPDES effluent limitations at discharge. Fugitive dust from trafficked areas where topsoil has been removed will be controlled by applying water, if necessary.

3.5 Lateral Support. For excavations locate all areas on the Operations Map where lateral support removal will approach the minimum distance allowed. State the minimum width of lateral support to be left in appropriate areas, including adjacent landowners, road right-of-way's, pipelines and power line easements. Account for highwall sloping when such slopes are to be incorporated into the proposed reclamation plan. [1816.99]

Not applicable. Lateral support removal will not be used in the proposed permit area.

3.6 Surface Mining Near Underground Mining. If surface mining activities are to be conducted within 500 feet of an underground mine describe the measures to be employed to comply with the requirements of 62 Ill. Adm. Code 1780.27 and 1816.79

Not applicable.

3.7 Existing Structures. The definition of an "existing structure" is a structure used in connection with surface coal mining and reclamation operations for which construction began prior to June 1, 1982. Are existing structures proposed to be used in connection with or to facilitate the surface coal mining and reclamation operations?

[1701.APP.A]

YES NO

If YES, complete the following:

3.7.1 Use of Existing Structures. Provide a list of all of the existing structures to be used [1780.12/1784.12]

3.7.2 Provide the location of all existing structures on the Operations Map and provide the following information for each existing structure to be used: **[1780.12(a)/1784.12(a)]**

- Plans of the structure detailing its current, pre-mining condition.
- Approximate dates, beginning and completion for construction of the structure.
- A showing that the structure meets the performance standards of 62 Ill. Adm. Code 1810 through 1828. The showing shall include monitoring data or other substantiating evidence.

3.7.3 Modification or Reconstruction of Existing Structures. Provide a plan for each existing structure to be modified or reconstructed for use in connection, or to facilitate coal mining and reclamation operations. The plan shall include the following information: **[1780.12(b)/1784.12(b)]**

- Design specifications for reconstruction or modification of the structure to meet the design and performance standards of 62 Ill. Adm. Code 1810 through 1828,
- A schedule for reconstruction or modification of the structure showing dates for beginning and completing interim steps as well as final reconstruction,
- Provisions for monitoring the structure during and after modification to ensure that the performance standards of 62 Ill. Adm. Code 1810 through 1828 are met, and
- A showing that the risk of harm to the environment or to public health or safety is not significant during the period of modification or reconstruction.

3.8 Transportation Facilities.

3.8.1 Which, if any of the following facilities, are to be constructed, used, modified or maintained within the proposed permit area?

- Roads
- Conveyors
- Rail Systems

3.8.2 For all roads proposed, indicate the classification of each as either Primary or Ancillary in accordance with 62 Ill. Adm. Code 1816.150/1817.150 below: **[1816.150(a)/1817.150(a)]**

Road Identification	Road Classification (Primary or Ancillary)
Access Roadways (all)	Primary

3.8.3 For each transportation facility, provide a detailed description of their design, construction and maintenance that includes the following information: **[1780.37/1784.24]**

3.8.3.1 A general description of each road, conveyor, or rail system to be constructed, used, or maintained within the proposed permit area. [1780.37(a)(6)/1784.24(a)(6)]

Access roadways will be constructed to maximum 30 foot width, aggregate base and surface material.

3.8.3.2 Specifications for each road width, existing grade line, proposed road gradient, road surface, road cut, fill embankment, culvert, bridge, drainage ditch, and drainage structure. Provide information as Attachment 3.8.3.2. [1780.37(a)(1)/1784.24(a)(1)]

See Attachment 3.8.3.2.

3.8.3.3 Provide a report of appropriate geotechnical analysis, where the Department's approval is required for alternative specifications, or for steep cut slopes. This report shall be included as Attachment 3.8.3.3. [1780.37(a)(2)/1784.24(a)(2); 1816.150/1817.150]

Not applicable.

3.8.3.4 A description of measures to be taken to obtain the Department's approval for alteration or relocation of a natural drainageway. [1780.37(a)(3)/1784.24(a)(3); 1816.150/1817.150]

Not applicable.

3.8.3.5 A description of measures, other than use of a rock headwall, to be taken to protect the inlet end of a ditch relief culvert. [1780.37(a)(4)/1784.24(a)(4); 1816/1817.150]

Rock headwalls will be utilized where necessary to control erosion at culvert outlets.

3.8.3.6 The drawings and specifications for each proposed ford of a perennial or intermittent stream that is used as a temporary route. [1780.37(a)(5)/1784.24(a)(5); 1816.151(c)(2)/1817.151(c)(2)]

Not applicable.

3.8.3.7 A description of the plans to remove and reclaim each road that will not be retained under an approved post-mining land use, and the schedule for this removal and reclamation. [1780.37(a)(7)/1784.24(a)(7)]

Road removal will occur as part of the final reclamation process. Road material will be removed and salvaged for reuse elsewhere. Road area will then be reclaimed in accordance with the final reclamation plan utilized subsoil and topsoil from stockpiled material.

3.8.3.8 A discussion of the removal/construction/or relocation of powerlines related to transportation facilities and structures associated with roads. [1780.11(b)(3)/1784.11(b)(3)]

All powerlines and associated structure will be removed from the site at time of final reclamation.

3.8.4 Primary Roads. If any roads identified in Part 3.8.2 are classified as primary, provide the design criteria and construction procedures used for each primary road proposed. Design calculations and/or drawings shall be included as attachments to this part. [1816.151/1817.151]

Roads to be constructed within the proposed permit area will consist of access roads as indicated on the Operations Plan. See Operations Map and Attachment 3.8.3.2 for details including road

typical sections, profiles, and drainage details.

3.8.5 Are any roads constructed to facilitate surface coal mining operations proposed to be permanent?
[1816.150(b)/1817.150(b)]

YES NO

If YES, locate on the Post-Mining Land Use/Capability Reclamation Map and include appropriate discussion on how modifications will be accomplished, including the removal and disposition of any excess road material.

3.9 Non-Coal Mine Waste Material.

3.9.1 Identify all non-coal waste material to be disposed within the permit area, including but not limited to, grease, lubricants, paints, flammable liquids, garbage, tires, abandoned mining machinery, lumber and other hazardous and/or combustible materials generated during coal mining operations.
[1780/1784.11(b)(4)]

Non-coal waste material will not be disposed within the proposed permit area.

3.9.2 Describe how each non-coal waste will be stored on site, disposed on site or removed from the site. Also, describe the measures to be employed to ensure that all debris, acid-forming and toxic-forming materials, and materials constituting a fire hazard are disposed in a safe manner. Indicate on the Operations Map the location of each non-coal waste storage area. [1780.14(b)(5)/1784.23(b)(5); 1816.89/1817.89].

All such waste will be stored on-site in suitable containers and removed from the site on a frequent basis by a waste hauler licensed for the particular type of waste being removed.

3.10 Coal Preparation.

3.10.1 Will processing of coal take place within the proposed permit area? [1780.11(b)(3)/1784.11(b)(3)]

YES NO

If YES, locate processing facilities on the Operations Map and give a general description of the coal processing operation at this facility. [1780.14(b)(4)/1784.23(b)(4)].

If NO, and coal preparation plants are not located within the permit area, the applicant shall explain where coal processing would occur. The applicant is required to possess or obtain a separate permit for coal preparation plants that are not located within the proposed permit area. [1785.21; 1827]

3.10.2 Will in-situ processing activities be conducted? [1785.22]

YES NO

If YES, provide information to assure compliance with 62 Ill. Adm. Code 1785.22 and 1828. [1785.22; 1828]

3.10.3 Provide an annual estimation of the volume of both coarse and fine coal waste streams generated. [1780/1784.11(b)(4)]

3.10.4 Describe the processing water (fresh water/make-up water) and slurry line circuitry. Incorporate flow diagrams as necessary. Provide locations of all processing water transport lines and slurry transport lines on the Operations Map. [1780.11(b)/1784.11(b)]

3.10.5 What safeguards are provided to prevent the discharge of slurry fines and untreated slurry water during emergency situations (e.g. power outages, mechanical equipment breakdown, plant shutdowns, etc.)? Indicate where the slurry would go by gravity flow in the event of an emergency discharge, and the environmental impact this would have [1780.21(h)/1784.14(g)]

3.11 Coal Processing Waste and Underground Development Waste.

3.11.1 Will coal processing waste and/or underground development waste be disposed of within the proposed permit area?

YES NO

If NO, explain how coal processing waste and underground development waste will be handled and disposed?

With regard to the shaft construction, only the surface soil materials will be removed and stored on site. By utilizing the raised boring construction technique, all rock material will be removed from below and stowed in old workings areas which will preclude any possibility of encountering possible toxic materials. Material removed from the small boreholes will be removed from the site and hauled to the Mine's coal processing waste areas. Using the above techniques, there should be no probability of potentially toxic material handling issues.

If YES, complete Table 3.11.1: List of Coal Waste Materials to be Disposed within the Permit Area providing analytical data to describe the nature of all coal processing waste and underground development waste material that will be disposed within the proposed permit area.

Note: If this is a new facility and no processed refuse has been generated, provide an estimated analysis in the table and a discussion of the basis for the assumptions in the space below. Also, please note the Department will require submittal of actual analytical results of the refuse material within 60 days after the preparation facility is operational.

Table 3.11.1: List of Coal Waste Materials to be Disposed within the Permit Area

Type of material includes but is not limited to *Coarse Coal Refuse Filter Cake, Fine Coal Refuse (Slurry), immediate floor and roof rock potentially removed and not sent to the preparation plant with coal.*

Type of Material	Source Mine Permit and Preparation Plant	Potential Acidities	Net Neutralization Potential

3.11.2 Is Disposal of Coal Waste in Underground Workings proposed in this application?

YES NO

If YES, complete and include Part 14: Disposal of Coal Waste in Underground Workings

3.12 Coal Refuse Disposal Area. Is the construction or modification of a Coal Refuse Disposal Area proposed in this application?

YES NO

If YES, complete the following

3.12.1 Complete Table 3.12.1: List of Coal Refuse Disposal Areas to be Constructed or Modified for each Coal Refuse Disposal Area to be constructed or modified with this application.

Table 3.12.1 List of Coal Refuse Disposal Areas to be Constructed or Modified.

Name of Facility			
*Type of Facility (Coal Refuse Pile, Coal Slurry Waste Impoundment)			
Latitude (DD)			
Longitude (DD)			
Approx. Start of Construction (month/yr)			
Estimated Lifespan			
Coarse refuse			
Slurry			
Surface Acreage footprint			
Total Coarse Coal Refuse Storage Volume (cubic yards)			
Total Fine Coal Refuse Storage Volume (cubic yards)			
*Dam Class			

(According to TR-60, if applicable)			
*Hazard Classification (According to MSHA determination, if applicable)			
Associated NPDES Permit			

3.12.2 Design and Construction Details of Coal Refuse Disposal Areas. Coal mine waste shall be disposed of in compliance with requirements of 62 Ill. Adm. Code 1816.81/1817.81 through 1816.84/1817.84.

3.12.2.1 Provide location and describe refuse disposal capacity requirements, facility configuration/staging and scheduling in a detailed construction plan. The plan shall include: acreage of disposal and borrow areas associated with the coal waste disposal area, engineering calculations, cross sections, maps, drawings and design certification for each proposed structure. [1780.14(b)(8)/1784.23(b)(7); 1816/1817.81(c)]

3.12.2.2 Provide measures to be taken to: control surface drainage, provide surface area stabilization and minimize erosion of the coarse refuse disposal facility and of areas that receive runoff from the coarse refuse disposal facility. Include detail engineering design of all proposed surface drainage control structures. [1816/1816.81(a)(1); 1816/1817.83(a); 1816.84/1817.84(d)]

3.12.2.3 Provide measures that will be taken to ensure mass stability and prevent mass movement of the structure during and after construction. [1816/1817.49(a)(4); 1816.81(a)(2)/1817.81(a)(2)]

3.12.2.4 Provide all necessary on-site investigations results, test borings, and laboratory results of foundation material and coal waste that was used to determine the design requirements for the foundation stability of the coarse refuse disposal area and/or structure as Attachment 3.12.2.4. [1816/1817.49(a)(6); 1816/1817.81(d)]

3.12.2.5 For coal processing waste dams and embankments meeting the Mine Safety and Health Administration (MSHA) size criteria, each design and operations plan shall comply with the requirements of MSHA 30 CFR 77.216-1 and 77.216-2.

3.12.2.5.1 Is the applicant proposing to construct or modify a coal waste disposal structure that impounds water and/or slurry to an elevation of five (5) feet or more above the upstream toe of the structure and can have a storage volume of 20 acre-feet or more?

YES NO

3.12.2.5.2 Is the applicant proposing to construct or modify a coal waste disposal structure that impounds water and/or slurry to an elevation of twenty (20) feet or more above the upstream toe of the structure?

YES NO

If the answer to either above is YES, the applicant shall provide in this application the plan submitted to the District Manager of the Mine Safety and Health Administration (MSHA) under 77.216 insofar as the MSHA informational design standard requirements are duplicative of the Department's requirements. [1816/1817.49(a)(2)].

3.12.3 Operation and Maintenance of Coal Refuse Disposal Areas.

3.12.3.1 Describe measures to be taken to safely operate the coal refuse disposal area including but not limited to: Scope and frequency of inspections, maintenance of embankments and liners, controls to ensure compaction standards and maintenance of runoff conveyance and discharge structures [1816/1817.81(a)(4)]

3.12.3.2 For all coal waste disposal areas explain measures to be taken to ensure that final disposal facility is suitable for reclamation. [1816/1817.81(a)(3)]

3.12.3.3 Provide the emergency guidelines that will be followed in the case that a potential hazard develops associated with the coarse refuse disposal area(s) being discussed. [1816/1817.81(e)]

3.13 Air Pollution Control Plan.

3.13.1 Provide a plan detailing fugitive dust control practices to be employed during proposed surface coal mining and reclamation operations. [1780.15/1784.26; 1816.150(b)(1)/1817.150(b)(1)]

Considering the proposed permit is for very limited activity, the only likely source of fugitive dust will be from light vehicle traffic on road and parking lot surfaces caused by employees reporting to and departing from the portal area. Should excessive dust be caused by this activity, the Permittee will take appropriate steps to control dust such as application of a binding agent or bituminous surface treatment for surfaces.

3.13.2 Provide a description of the steps to be taken to comply with the requirements of the Clean Air Act (42 U.S.C. 7401 et seq.), and other applicable air and water quality laws and regulations and health and safety standards. [1780.18(b)(9)/1784.13(b)(9)]

See above response for measures to be used for compliance with the referenced laws and regulations.

3.14 Fire Control Plan.

3.14.1 Concerning non-coal mine waste, all debris, acid-forming and toxic-forming materials, and materials constituting a fire hazard, provide a description of contingency plans which have been developed to preclude sustained combustion of such materials. [1780.18(b)(7)/1784.13(b)(7)].

All such waste will be stored on-site in suitable containers and removed from the site on a frequent basis by a waste hauler licensed for the particular type of waste being removed.

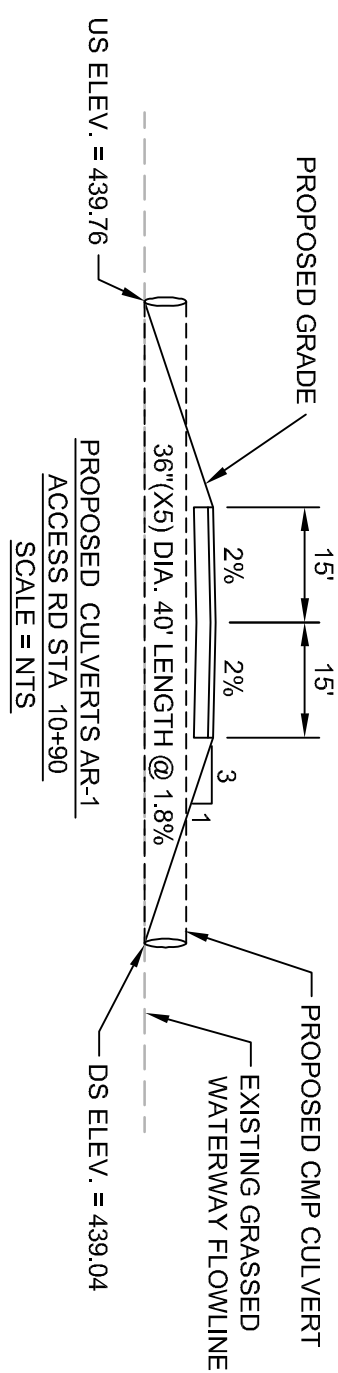
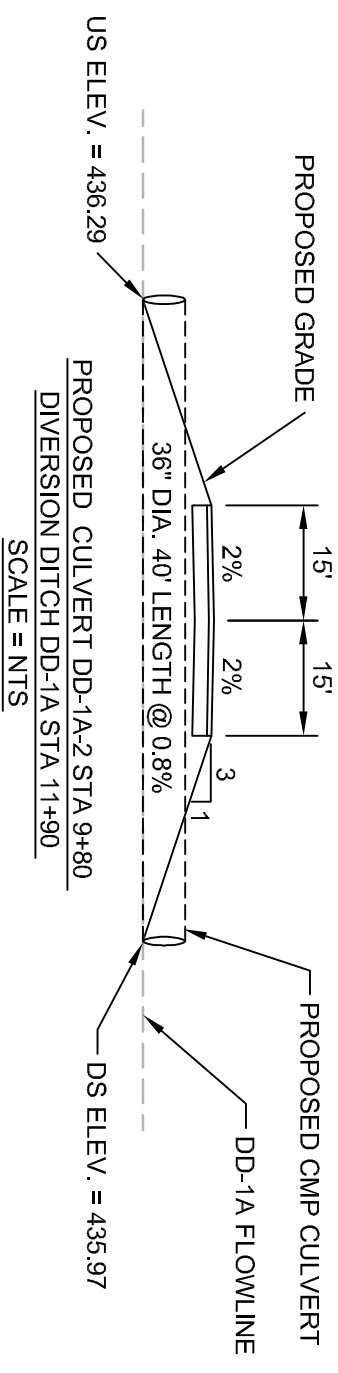
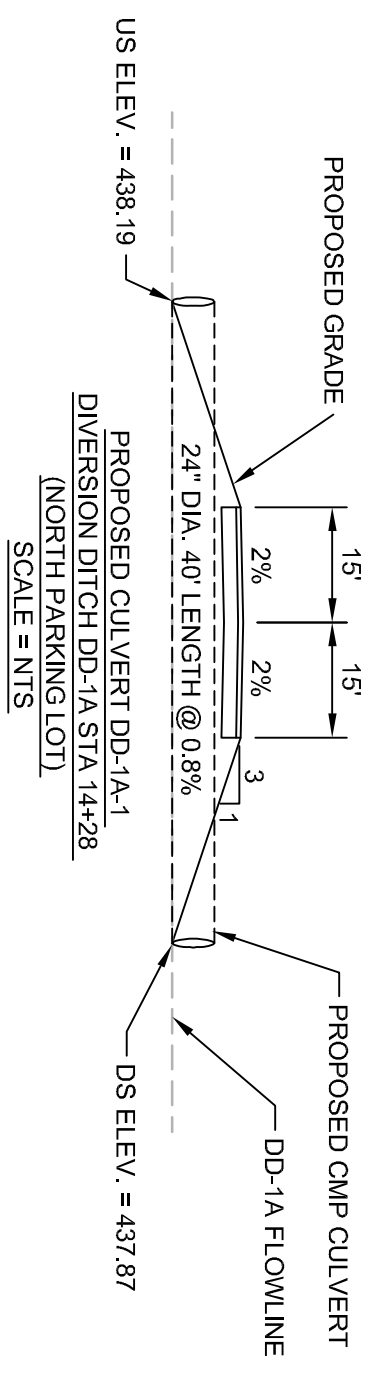
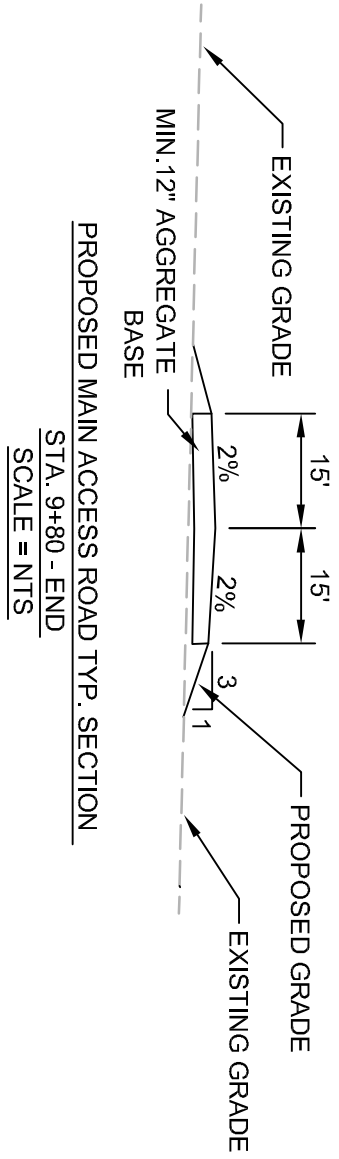
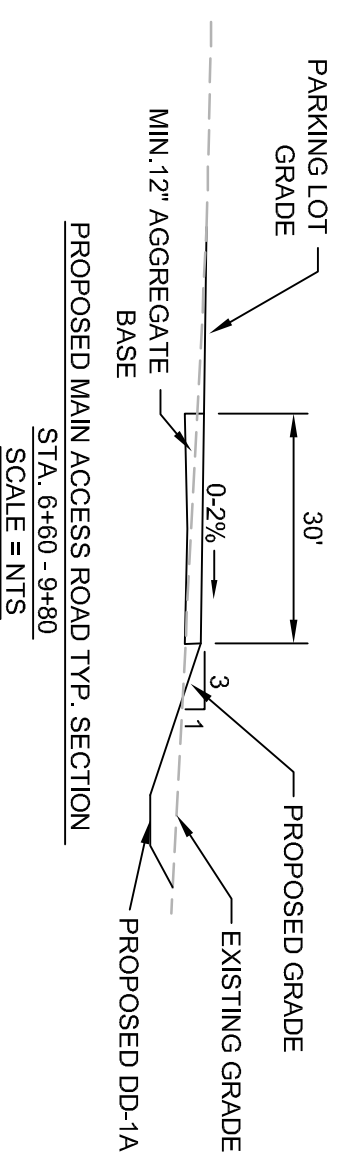
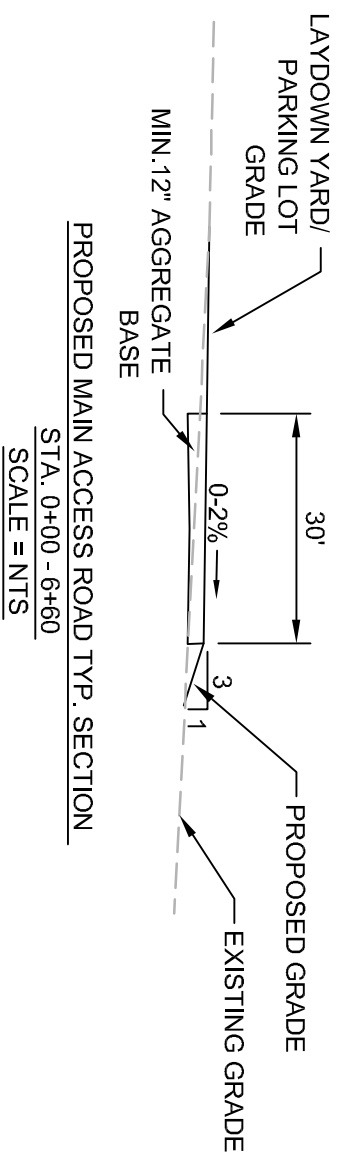
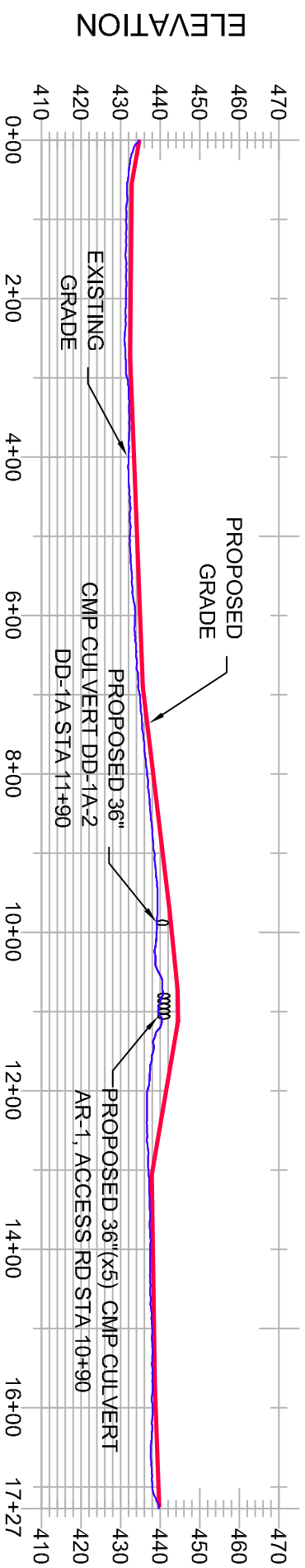
3.14.2 Provide a plan detailing how coal mine waste fires shall be extinguished. [1816.87/1817.87]

Should a waste fire occur, the elimination of such fire will be done in accordance with MSHA Part 77 training. The extinguishing of such fire would be done only by personnel trained to do so using appropriate equipment and materials to extinguish the fire considering the nature of the fuel causing such fire and conditions present. All mobile equipment at the site will be equipped with either fire suppression equipment or portable fire extinguishers. Further, firefighting equipment will be located and maintained at appropriate places at all mine installations where the possibility of fire exists.

3.14.3 Provide a plan detailing how coal stockpile fires shall be extinguished. [225 ILCS 720/4.08]

Not applicable. No coal stockpiles will be present.

Alignment: Main Access Rd
 H Scale: 1" = 200.00'
 V Scale: 1" = 40.00'



REVISIONS	
REV 1	
REV 2	
PLOT DATE	
DWG FILE	

ACCESS RD PROFILES & CULVERT DETAILS

SUNRISE COAL, LLC
 RUSSELLVILLE PORTAL PERMIT
 RUSSELLVILLE, IL

HMG ENGINEERS, INC.
 1032 N. SIXTH ST.
 MURPHYSBORO, IL 62966
 618-684-9355 WWW.HMGENGINEERS.COM



SURVEY	
DESIGN	BWC/TJK
DRAWN	TJK
CHECKED	BWC
DATE	1-30-19
ATTACHMENT ACCESS ROAD & CULVERT DETAILS 383.2	
JOB NO. 7849	

PART 4: Hydrologic and Geologic Information

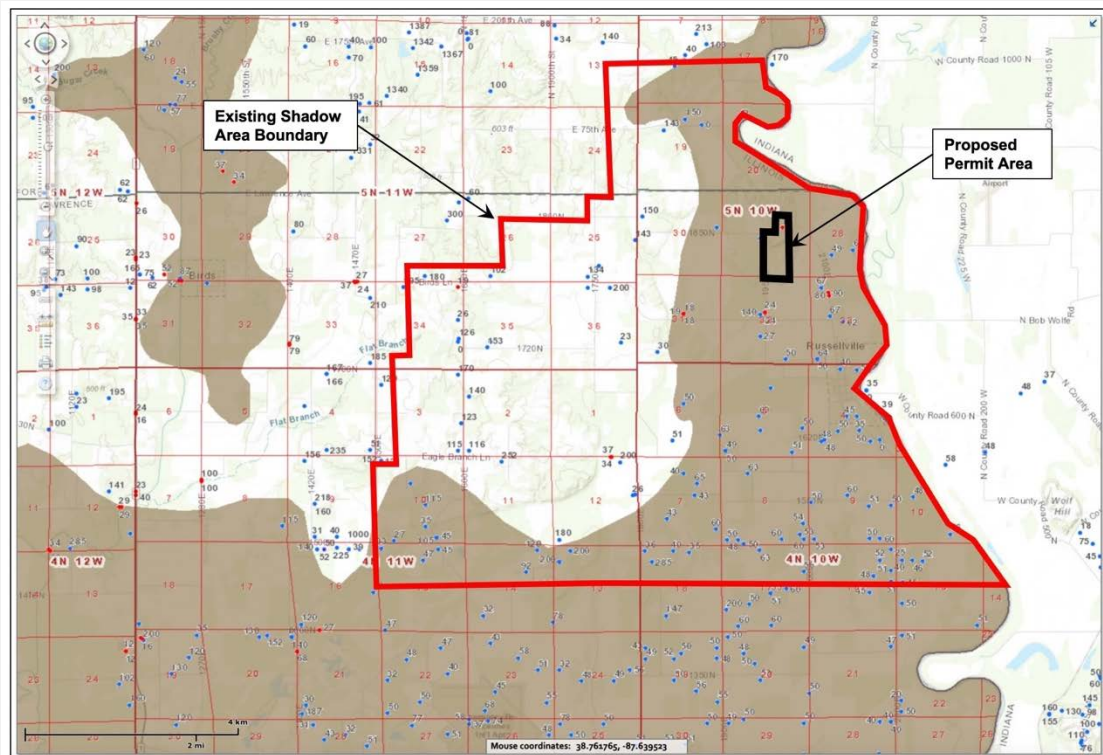
4.1 Regional Characteristics. As described in Illinois [State Geological Survey Circulars](#) 192, 198, 207, 212, 222, 225, 232, 248, Coop 1, etc., other sources or personal knowledge, provide the following required hydrogeologic information. All materials utilized in the preparation of this Part shall be clearly identified and a bibliography provided at the end of this Part. [1780.22(b)/1784.22(b); 1779.25(a)(6)/1783.25(a)(6)]

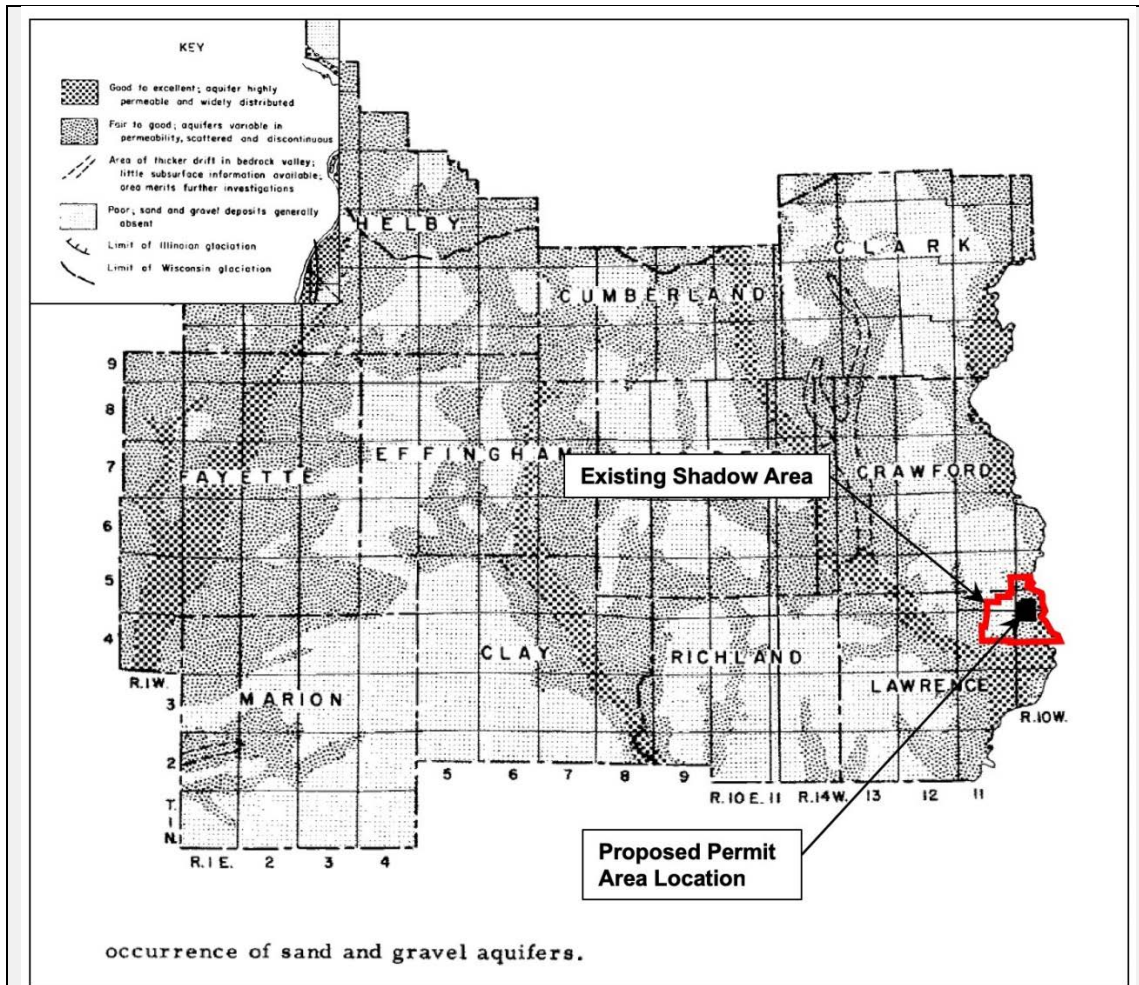
The required regional hydrogeologic information is provided in the sections below.

4.1.1 Describe/discuss the major and minor unconsolidated aquifers of the permit area, shadow area for underground proposals (if applicable), and their respective adjacent areas.

Major unconsolidated aquifers – Major unconsolidated aquifers consist of unnamed Henry Formation and Cahokia Alluvium sand and gravel aquifers within the Embarras and Wabash River Valleys and the limited Henry Formation beneath the Brushy Creek Valley. These aquifers extend from near-surface to a maximum depth up to 150 feet.

Minor unconsolidated aquifers - Minor unconsolidated deposits consist of low-permeability silty to sandy glacial till with discontinuous sand layers suitable only for use as a domestic supply. See exhibits from ISGS ILWater and ISGS C225 (Groundwater Geology in South-Central Illinois) below.





Source: ISGS Circular 225; Sand and Gravel Aquifers

4.1.2 Describe/ discuss the generalized water yield, supply, existing use and potential use of the major and minor unconsolidated aquifers.

The Hardinville Water Company obtains water from two community water supply wells completed in sand and gravel deposits. IEPA records indicate both wells are finished 40 feet deep. These wells provide 560,000 gallons per day to 1,157 services or a population of 23,990.

The City of Lawrenceville, located approximately 12 miles southwest of the proposed permit area, obtains potable water from four community water supply wells that are completed in sand and gravel outwash at a depth of 80-100 feet in the Embarras River Valley. According to City of Lawrenceville personnel, these wells are operated at a nominal rate of 500 gpm, with a maximum capacity estimated at 800 gpm. Exhibit 3 depicts the extent of the unconsolidated aquifers in the general area. Based on Illinois EPA and ISGS well records, along with interviews of community water system personnel, the approximately 90 residents of Russellville, an unincorporated village on the Wabash River, obtain water from domestic wells.

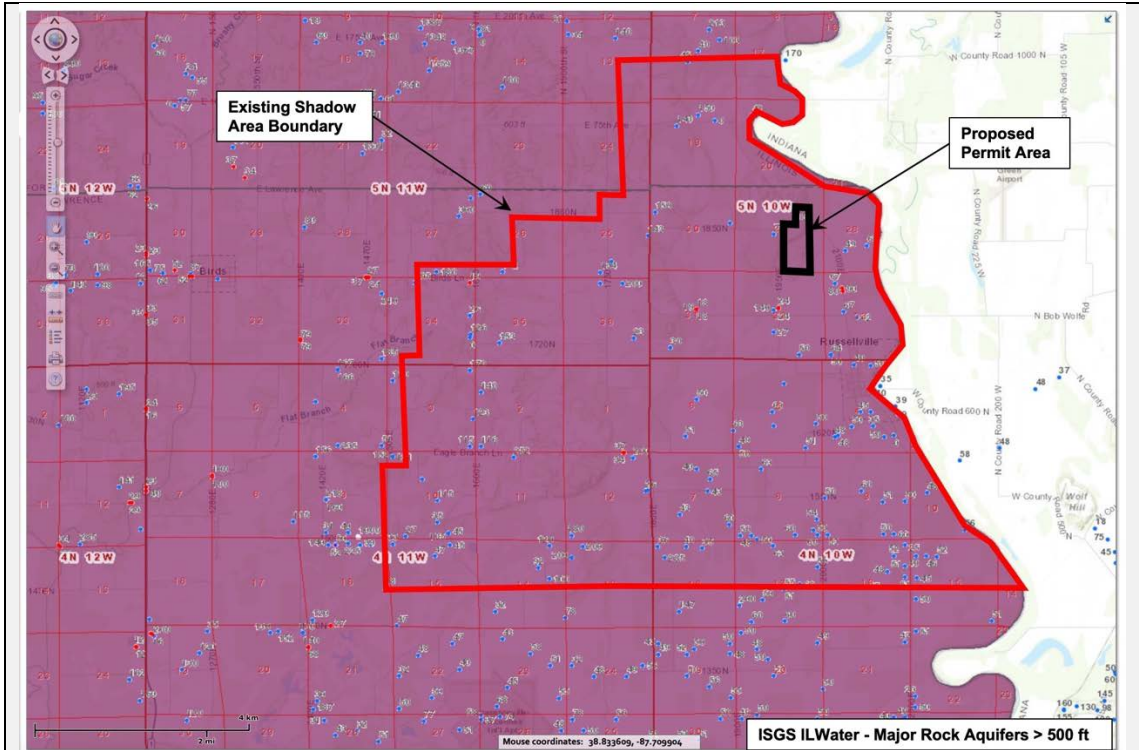
Lacustrine deposits of the Equality Formation, deposited primarily as silt and clay in pro-glacial Wisconsinan lakes can be found near the Village of Birds in near-surface soil northwest of the project area. These silt and clay deposits are generally non-water bearing and overlie sand and gravel glacial outwash of the Henry Formation, which range in thickness of approximately 40 feet. However, two former community water supply wells for the Village of Birds, were completed to a depth of 84 and 87 feet in the underlying glacial outwash, and had a capacity up to 140 gpm of groundwater. Illinois Environmental Protection Agency (Illinois EPA) well location records indicate that these wells are inactive. Wisconsinan loess in the northwestern portion of the project area overlies sub-glacial silty and sandy till of the Vandalia Member of the Glasford Formation, deposited during the Illinoian Glacial Stage. The Vandalia Member is up to approximately 35 feet thick in the upland areas between the Embarras and Wabash River Valleys but is either eroded or absent elsewhere in the general area.

4.1.3 Describe/discuss the major and minor consolidated aquifers in the permit area, shadow area for underground proposals (if applicable), and their respective adjacent areas.

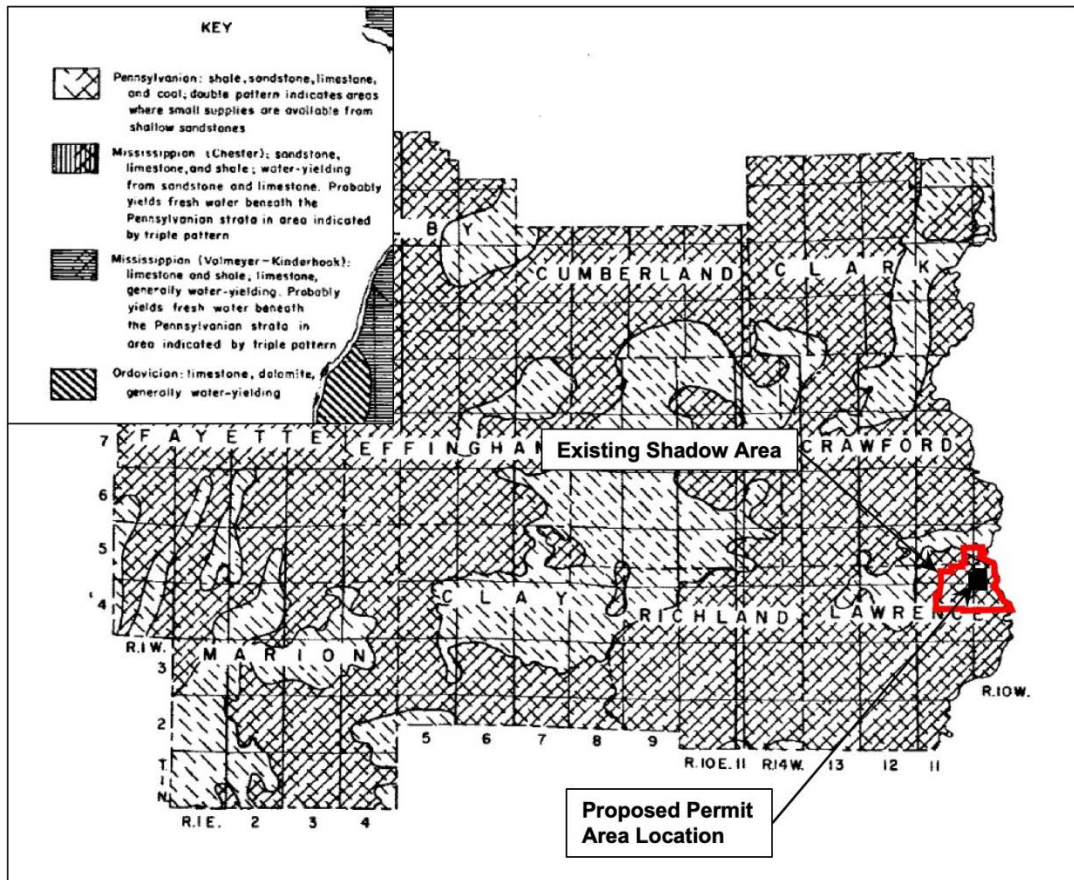
Major Consolidated Aquifers: According to ISGS Circular 225, there are no major consolidated bedrock aquifers in the permit area less than 500 feet in depth from the surface. Groundwater found in the deeper strata is generally not suitable for potable use due to high mineralization.

Minor Consolidated Aquifers: Minor consolidated bedrock aquifers are present in Pennsylvanian sandstones located from 100 to 300 feet below the surface and have been a limited source of water for small domestic and farm supply wells throughout Lawrence County, with the exception of the north-central part.

See exhibits from ISGS ILWater and ISGS C225 (Groundwater Geology in South-Central Illinois) below.



Source: ISGS ILWater; Major Rock Aquifers > 500 feet



Source: ISGS Circular 225; Occurrence of Sand and Gravel Aquifers

4.1.4 Describe/discuss the generalized water yield, supply, existing use and potential use of the major and minor consolidated aquifers. [1780.22(b)(1)/1784.22(b)(1)]

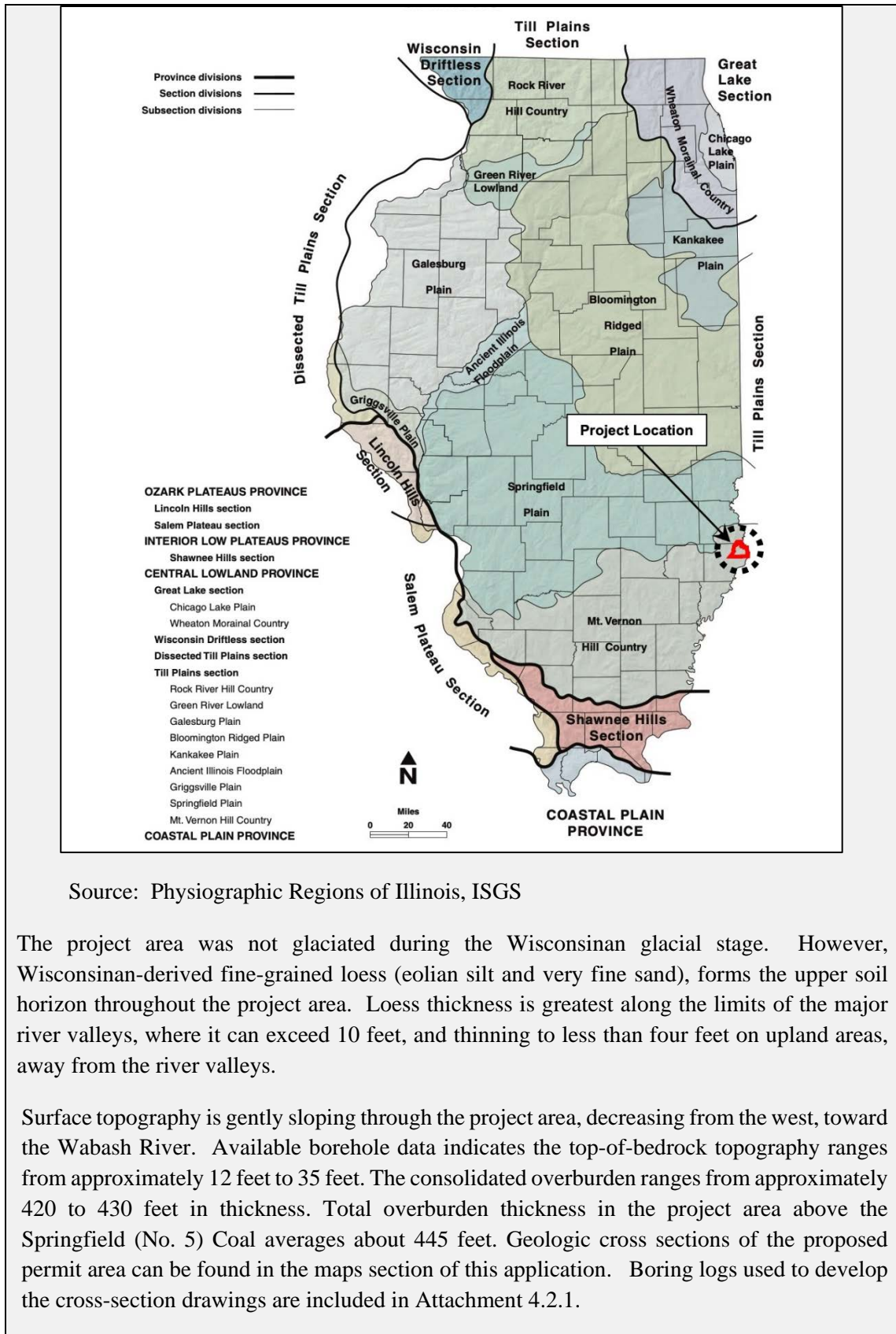
The Geologic Map of Illinois indicates that the upper bedrock in the project area consists of Pennsylvanian Bond, Modesto and Mattoon Formations. Drilling completed pursuant to the existing shadow area and proposed permit area indicates that the Pennsylvanian strata through the project area consists of interbedded shale and sandstone, with thin beds of coal and limestone. Sandstone layers in the borings vary from a few feet to over 50 feet in thickness, with one sandstone layer being 163 feet in thickness. However, while the limestone and coal layers can be correlated between borings, the sandstone does not correlate, indicating that the sandstone layers are extensive, but not continuous throughout the general area.

Well location records indicate that no community or non-community water supply wells are completed within the sandstone layers, but several small yield domestic wells are completed in sandstone layers. Illinois State Geologic Survey (ISGS) well records indicate that yields for these domestic wells are limited to below 10 gpm, suggesting that the yields are limited by cementation of the sandstone. Therefore, the potable use of groundwater in the Pennsylvanian sandstone layers is limited to domestic supplies. Well records also indicate that the maximum depth of potable water supply wells (excluding borings completed for coal and oil exploration) completed in the project area is 300 feet.

4.2 Hydrogeologic Information.

4.2.1 Within the permit area, shadow area (if applicable), and their respective adjacent areas, assess the geologic setting, including a description of the landscape and terrain, stratigraphy, and the groundwater regime including water table depths and aquifer characteristics; using material available from sources, including, but not limited to, the Illinois State Surveys, the Illinois Environmental Protection Agency, other State and Federal organizations, water well drilling logs, and previous investigations. [1780.21/1784.14; 1780.22(b)/1784.14(b); 1779.25/1783.25]

The proposed permit area and surrounding area (“project area”) is located within the Mount Vernon Hill Country of the Till Plains Section of the Central Lowlands Physiographic Province. The Mount Vernon Hill Country, which extends throughout Crawford and Lawrence Counties, consists of glacial till, outwash and Eolian (windblown) sediments deposited by the Illinoian and Wisconsinan glacial stages during the Pleistocene Epoch of the Quaternary Period. The location of the project area is shown in the exhibit below.



Source: Physiographic Regions of Illinois, ISGS

The project area was not glaciated during the Wisconsin glacial stage. However, Wisconsin-derived fine-grained loess (eolian silt and very fine sand), forms the upper soil horizon throughout the project area. Loess thickness is greatest along the limits of the major river valleys, where it can exceed 10 feet, and thinning to less than four feet on upland areas, away from the river valleys.

Surface topography is gently sloping through the project area, decreasing from the west, toward the Wabash River. Available borehole data indicates the top-of-bedrock topography ranges from approximately 12 feet to 35 feet. The consolidated overburden ranges from approximately 420 to 430 feet in thickness. Total overburden thickness in the project area above the Springfield (No. 5) Coal averages about 445 feet. Geologic cross sections of the proposed permit area can be found in the maps section of this application. Boring logs used to develop the cross-section drawings are included in Attachment 4.2.1.

The bedrock surface is covered by varying thickness of glacial deposits from the Quaternary period. Sediments of the Illinoian Glacial Stage overly bedrock throughout 90 percent of Illinois. The glacial limit of the Wisconsinan Glacial Stage lies approximately 40 miles north of the proposed permit area. However, outwash sediments derived from Wisconsinan deposits are extensive along valley trains extending out from the limit of Wisconsinan glaciations. Thin, but widespread, deposits of Wisconsinan loess also overlie Illinoian sediments.

The near-surface bedrock system at the proposed mine portal site consists of the Bond and Mattoon Formations of the Pennsylvanian System. Bedrock is comprised primarily of shale and sandstone, which make up 90 to 95 percent of the formation while less than 2 percent is comprised of coal, underclay and limestone. The Pennsylvanian System is the youngest large bedrock system in the Illinois Basin. Within the Pennsylvanian System is the Carbondale Formation, which contains four major coal members. These coals, which include the Springfield (No. 5) Coal, make up 92 percent of the coal in the Pennsylvanian System. Broad lateral changes exist within the Pennsylvanian rocks, where uplifts and subsidence resulted in the differential deposition and erosion of strata.

The proposed permit area is situated east of the LaSalle Anticline Belt and south of the Marshall-Sidell Syncline. No significant faults are present in the area of the proposed mine portal. The Springfield (No. 5) Coal seam lies at approximate elevation +10 feet (msl) at the permit area location. Floor material (underclay) can be expected to consist primarily of clay and claystone, typically ranging from 1.5 to 10 feet thick. Discontinuous shale and sandstone units typically underlie the underclay floor.

4.2.2 Within the permit area, shadow area (if applicable), and their respective adjacent areas, assess and include a general description of the hydrogeologic characteristics such as: the vertical and lateral extent of the uppermost aquifer; the hydraulic conductivities of the uppermost aquifer and all other aquifers that may be impacted by the proposed mining operation; the direction and rate* of groundwater flow; structural characteristics and distribution of underlying strata including bedrock; chemical and physical properties including, but not limited to, lithology, mineralogy, and hydraulic characteristics of underlying strata including those below the uppermost aquifer. Methods to accumulate this information may include, but are not limited to literature, borehole logs, geophysical methods, aerial photography and test pits.

[1780.21(b)/1784.14(b);1770.25/1783.25]

**NOTE: The rate of groundwater flow may be determined via pump tests or based on an estimation using the calculated hydraulic conductivity.*

Lacustrine deposits of the Equality Formation that were deposited primarily as silt and clay in pro-glacial Wisconsinan lakes can be found in near-surface soil northwest of the proposed permit area, near the Village of Birds. Lacustrine deposits in that area overlie sand and gravel glacial outwash of the Henry Formation, up to approximately 40 feet thick, which partially fills a bedrock valley associated with Brushy Creek. Lacustrine deposits are generally not water-bearing. However, two former community water supply wells for the Village of Birds, completed to a depth of 84 and 87 feet in the underlying glacial outwash, had reported capacity

up to 140 gpm of groundwater. Illinois Environmental Protection Agency (Illinois EPA) well location records¹ indicate that these wells are presently inactive.

Wisconsinan loess located northwest of the proposed permit area overlies sub-glacial silty and sandy till of the Vandalia Member of the Glasford Formation, deposited during the Illinoian Glacial Stage. The Vandalia Member is up to approximately 35 feet thick in the upland areas between the Embarras and Wabash River Valleys but is either eroded or absent elsewhere in the project general area. The Vandalia Till is dissected by the Embarras River, south of the project general area, and Wabash River, which forms the east boundary of the project area. Thick sand, silt and clay deposits of the Cahokia Alluvium, overlying outwash sand and gravel deposits of the Henry Formation, are present along these river systems. The combined thickness of these deposits increases from less than 50 feet to the south boundary of the project area to over 100 feet within the central portion of the Embarras and Wabash River Valleys, a few miles south of the proposed permit area and in the eastern half of the existing shadow area.

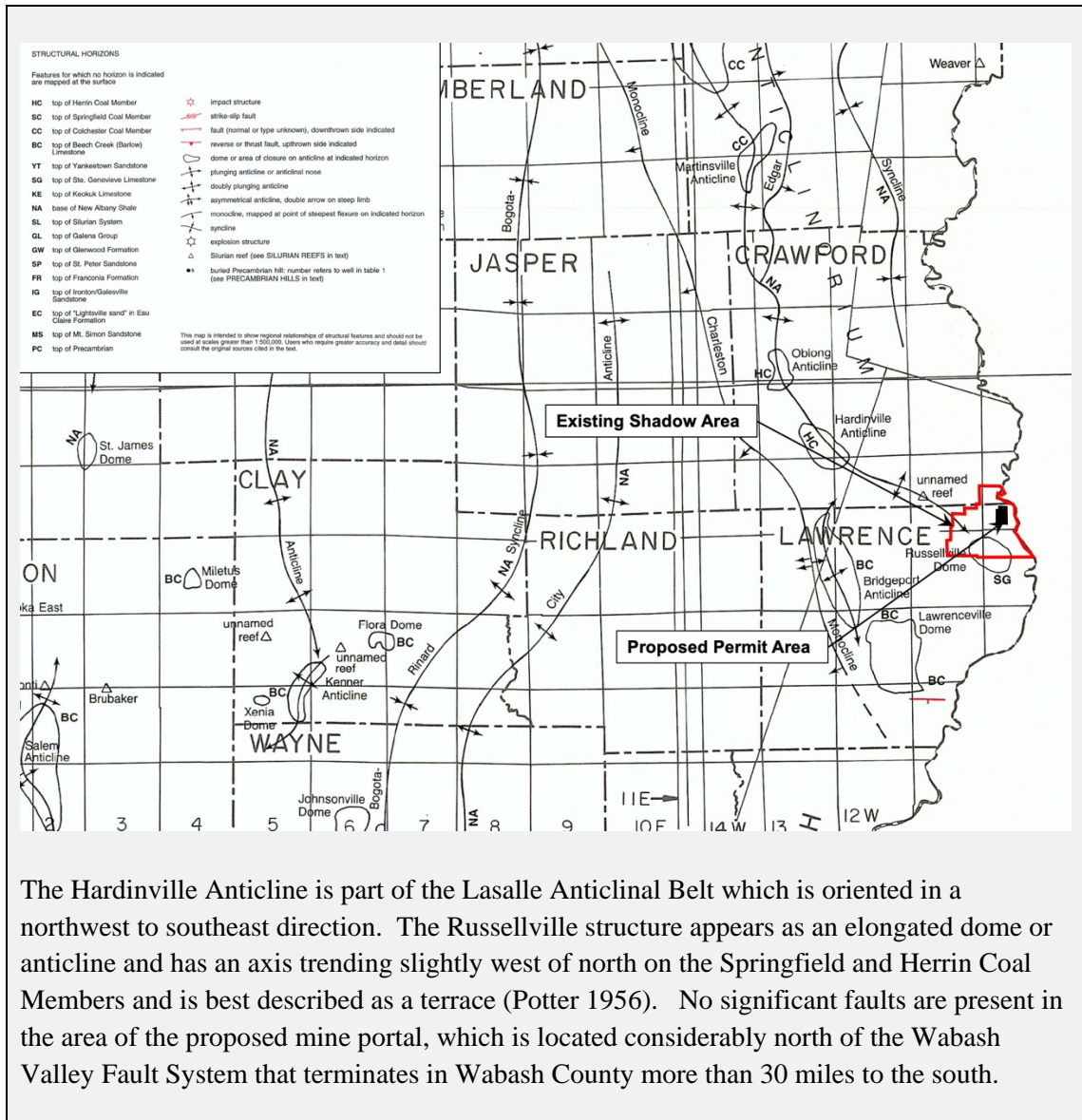
Principal unconsolidated aquifers consist of unnamed Henry Formation and Cahokia Alluvium sand and gravel aquifers within the Embarras and Wabash River Valleys and the limited Henry Formation beneath the Brushy Creek Valley. These aquifers extend from near-surface to a maximum depth up to 150 feet and generally flow in an easterly to southeasterly direction according to available static water level elevations. The City of Lawrenceville obtains potable water from four community water supply wells completed in sand and gravel outwash at a depth of 80-100 feet in the Embarras River Valley, approximately 12 miles southwest of the proposed permit area. According to City of Lawrenceville personnel, these wells are operated at a nominal rate of 500 gpm, with a maximum capacity estimated at 800 gpm.

Other than the above aquifers, unconsolidated deposits consist of low-permeability silty to sandy glacial till with discontinuous sand layers suitable only for use as a domestic supply. Based on Illinois EPA and ISGS well records, and interviews of community water system personnel, potable water supplies within the proposed permit area are obtained from domestic wells, including the approximately 90 residents of Russellville, an unincorporated village on the Wabash River.

4.2.3 Within the permit area, shadow area (if applicable), and their respective adjacent areas, identify unusual or unpredicted geologic features, where present, including: fault zones, fracture traces, facies changes, solution channels, buried stream deposits, cross cutting structures and other geologic features that may affect the ability of the operator to monitor the groundwater or predict the impact of the facility on groundwater. [1780.21/1784.14; 1780.22(b)/1784.14(b); 1779.25/1783.25]

The major structural features that affect formations within southeastern Crawford County and northeastern Lawrence County are the Hardinville Anticline to the northwest of the proposed permit area and terminates in northeastern Lawrence County with an elongated uplift known as the Russellville Dome, which is located southwest of the proposed permit area. See the Geologic Features Map below.

¹ Source Water Assessment Program (SWAP) Database, Illinois EPA, Bureau of Water, Division of Public Water Supply, data as of December 15, 2015.



The Hardinville Anticline is part of the Lasalle Anticlinal Belt which is oriented in a northwest to southeast direction. The Russellville structure appears as an elongated dome or anticline and has an axis trending slightly west of north on the Springfield and Herrin Coal Members and is best described as a terrace (Potter 1956). No significant faults are present in the area of the proposed mine portal, which is located considerably north of the Wabash Valley Fault System that terminates in Wabash County more than 30 miles to the south.

4.3 Area Specific Characteristics.

4.3.1 Provide a description of the areal and structural geology of the permit area, shadow area (if applicable), and their respective adjacent areas for the deeper of either the stratum immediately below the lowest coal seam to be mined, or any aquifer below the lowest coal seam to be mined which may be adversely impacted by mining. Provide logs showing the lithologic characteristics including physical properties and thickness of each stratum and the location of groundwater that could potentially be affected if encountered. Provide location and elevations of test borings or core samplings on the Hydrogeologic Map. [1780.22(b)(1) & (b)(2)(A)/1784.22(b)(1) & (b)(2)(A)]

Lithologic logs must be detailed enough to determine the physical characteristics of both the unconsolidated and consolidated materials present.

Provide a minimum of two geologic cross-sections, perpendicular to each other, for the proposed permit area and a minimum of two geologic cross-sections, perpendicular to each other, for the proposed shadow area, if applicable. [1779.25/1783.25]

At a minimum, the cross-sections should depict any water-bearing zones/formations, any local and/or regional aquifers, any impermeable zones/formations, and both the unconsolidated and consolidated formations. The core logs shall clearly identify and name the coal seams (both intended to be mined, unmined and spoiled). [1779.25/1783/25]

See Map 5 Hydrogeologic Map for the location of the bore holes and also refer to Map 8 for the geologic cross sections.

4.3.2 Within the permit area and its adjacent area, characterize potential pathways for contaminant migration below and around sediment ponds, disposal areas, coal storage piles and connecting ditches by identifying zones of potentially high hydraulic conductivity using correlation of stratigraphic units between borings; where applicable, information on geologic materials sorting, grain size distribution, cementation, hydraulic conductivity and the presence or absence of any confining layers shall be discussed.

[1780.21(c)(d)(e) & (f)/1784.14(c)(d) & (e)]

No coal or potentially toxic forming material will be stored on the permit area which will eliminate the possibility of contaminants being a concern on this area.

4.3.3 Provide chemical analyses of all strata, including the coal seam(s) (both intended to be mined, undisturbed or spoiled) through either the strata immediately below the lowest coal seam to be mined or any aquifer below the lowest coal seam to be mined which may be adversely impacted by mining. The analyses shall identify those strata that may contain acid or toxic-forming or alkalinity-producing materials and determine their content and the net-neutralization potential on a weighted basis. [1780.22(b)(2)(B) & (c)/1784.22(b)(2)(B) & (c)]

For carbon recovery operations, total sulfur and pyritic sulfur analyses must be performed on the materials to be recovered.

For waste disposal operations, chemical analysis of the fine and coarse refuse waste streams shall be provided, including the identification of acid or toxic-forming or alkalinity-producing materials and determine the content and the net-neutralization potential on a weighted basis.

Not applicable. No coal will be mined nor will coal refuse be stored on the proposed permit area.

4.3.4 Provide coal seam(s) name and number and an analysis of the coal seam(s) as to total sulfur and pyritic sulfur. Show all coal crop lines (where applicable) and the strike and dip of the coal to be mined on the Hydrogeologic Map. [1780.22(b)(2)/1784.22(b)(2) & (b)(3); 1779.25(a)(3) & (a)(4)/1783.25(a)(3) & (a)(4)]

No coal is to be mined in conjunction with this proposed permit. The proposed shaft and boreholes are associated with access to the Illinois 5 seam.

4.3.5 Identify the general land uses of the watersheds upstream of the proposed permit area and any potential pollution sources which could significantly affect the surface and groundwater quality at the proposed permit area. If none exist, note here. [1780.21(i)(1)/1784.14(h)(1)]

The small area (<10 acres) that are up gradient of the proposed permit area are in cropland and forest. No pollution sources are known to be present in this area.

4.3.6 Complete Table 4.3.6, providing names, addresses, and sources of all public water supplies within ten miles of the proposed permit boundaries. [1779.24(g)/1783.24(g); 1780.21/1784.14]

See Table 4.3.7.

4.3.7 Discuss the possible effects that this mining operation will have on the above-listed public water supplies and explain what precautions will be taken to prevent an adverse impact from occurring. [1780.21(h)/1784.14(h)]

All shafts and boreholes will be lined or cased which will prevent any possible exchange of materials within these openings and groundwater wells.

4.3.8 Do surface or groundwater discharges into underground mines exist? [1780.21(b)/1784.14(b)]

YES NO

If YES, locate on the Hydrogeologic Map and discuss here.

4.3.9 Do Public Water Supply intakes for current users of surface water flowing into, out of, and/or within the area defined in Part 4.3.6 above exist? [1779.24(g)/1783.24(g)]

YES NO

If YES, locate on the Hydrogeologic Map and discuss here.

4.4 Groundwater Information.

4.4.1 On the Hydrogeologic Map, provide the location and ownership of existing wells, including private water supplies and private water wells within ½ mile of the proposed permit area and shadow area (for mines with underground extraction), springs, and other groundwater resources in or within ½ mile of the proposed permit area, shadow area (if applicable), and their respective adjacent areas. If any of the existing wells are to be employed for monitoring, designate on Hydrogeologic Map and complete Table 4.4.2. [1780.21(b)(1)/1784.14(b)(1); 1780.21(h)/1784.14(g)]

4.4.1.1 Provide results of a Groundwater User's Survey which includes, well identification, location relative to permit, shadow and/or adjacent areas, construction details, water bearing strata well is screened in, total depth, usage and public water availability in Table 4.4.1.

4.4.1.2 Provide a discussion of the Groundwater User's Survey, discussing the existing and potential use of the water-bearing strata identified in 4.4.1.1 above. This information and the information required by Part 4.4.1.1 above shall be cross-referenced with the information depicted on the map required in Part 4.4.1 above.

4.4.1.3 Provide a discussion for any groundwater users downgradient, as determined through groundwater elevation, of the proposed permit area that details factors and protective measures in place to ensure these groundwater resources are not adversely impacted.

See Map 5 Hydrogeologic Map for the location of existing wells within ½ mile of the proposed permit area and Table 4.4.1 for results of the Groundwater Users Survey. As described above in 4.3.7, no groundwater impacts are expected.

Table 4.4.1 indicates the three private wells located within ½ mile of the proposed permit area. As previously discussed, the use of linings and casings will preclude any possible contamination of well supplies.

4.4.2 Provide a description of seasonal groundwater quality, including the following constituents (at a minimum), for each source of groundwater in the identified areas:

For Surface Mining: Within the permit area and its adjacent area: pH, total dissolved solids, hardness, alkalinity, acidity, sulfate, total and dissolved iron, total and dissolved manganese, and chloride. Please provide in Table 4.4.2. [1780.21(b)(1)(A)]

Groundwater well installation and monitoring are not proposed for this proposed permit area. The installation will consist only of a mine access shaft and boreholes for power, rock dust, and fuel. All openings, including the shaft and all boreholes will be cased with steel with the annulus area between the casing and native material filled with concrete material. This will preclude any contact with the surrounding groundwater. Further, no coal, coal refuse, or other potential contaminants will be stored on the surface which will further assure against possible groundwater contamination.

For Underground Mining: Within the permit area and its adjacent area: pH, total dissolved solids, hardness, alkalinity, acidity, sulfate, total and dissolved iron, total and dissolved manganese, and chloride. Please provide in Table 4.4.2. [1784.14(b)(1)(A)(i)]

For an underground mine, within the shadow area (if applicable) and its adjacent area: pH, total dissolved solids, total iron, and total manganese. [1784.14(b)(1)(A)(ii)]

Groundwater well installation and monitoring are not proposed for this proposed permit area. The installation will consist only of a mine access shaft and boreholes for power, rock dust, and fuel. All openings, including the shaft and all boreholes will be cased with steel with the annulus area between the casing and native material filled with concrete

material. This will preclude any contact with the surrounding groundwater. Further, no coal, coal refuse, or other potential contaminants will be stored on the surface which will further assure against possible groundwater contamination.

4.4.3 Provide a description of seasonal groundwater quantity in the proposed permit, shadow and adjacent areas, including, at a minimum:

4.4.3.1 the appropriate rates of discharge or usage;

4.4.3.2 the elevation of the potentiometric surface of the coal to be mined;

4.4.3.3 the elevation of the potentiometric surface in each water-bearing stratum above the coal to be mined AND in each water-bearing stratum below the coal to be mined which may be potentially impacted. At a minimum, a potentiometric map must be provided for the uppermost aquifer, and any aquifer which may be potentially impacted by the proposed operation(s).

A general description may be given for water bearing strata with no collected data. If no known water-bearing strata that could be impacted, exist above or below the coal seam to be mined or if the coal seam is not water-bearing, state as such. **[1780.21(b)(1)(B)/1784.14(b)(1)(B)]**

A static water level map of the proposed permit area is included for use in stream classification. The potentiometric surface indicate on this map was derived from the previous shadow area permit for this area.

4.5 Groundwater Monitoring Program. [1780.21(i)/1784.14(h)]

4.5.1. Describe in detail a proposed monitoring plan based upon the PHC that will measure the amount and duration of any changes to the groundwater system resulting from the mining operation.

The proposed groundwater monitoring plan shall describe how the collected groundwater monitoring data will be used to determine if impacts are occurring and what steps will be taken by the operator.

Provide a Sampling and Analysis Plan (SAP) that includes the methods/steps of well sampling, well analysis and data reporting as an attachment to this application part.

Parameters to be monitored are given in Table 4.5.1 Monitoring shall be on a quarterly basis **unless otherwise approved by the Department**, with reports due within one month of the end of each quarter as follows:

Scheduled Period	From – To	Report Due
1 st Quarter	Jan. 1 – Mar. 31	May 1
2 nd Quarter	Apr. 1 – Jun. 30	Aug 1
3 rd Quarter	Jul. 1 – Sept. 30	Nov 1
4 th Quarter	Oct. 1 – Dec. 31	Feb 1

Where approved, annual monitoring shall be conducted during the 2nd quarter only; semi-annual monitoring shall occur during the 2nd and 4th quarters only.

NOTE: At a minimum, background data collection shall occur on a bi-monthly (every two months) basis over the course of one year (12 consecutive months). Groundwater monitoring shall continue throughout the permitting process at the same frequency at which background data collection occurred.

Groundwater well installation and monitoring are not proposed for this proposed permit area. The installation will consist only of a mine access shaft and boreholes for power, rock dust, and fuel. All openings, including the shaft and all boreholes will be cased with steel with the annulus area between the casing and native material filled with concrete material. This will preclude any contact with the surrounding groundwater. Further, no coal, coal refuse, or other potential contaminants will be stored on the surface which will further assure against possible groundwater contamination.

4.5.2 Provide a comprehensive list of ALL existing, proposed and plugged/destroyed/damaged groundwater monitoring wells for the entire facility. Complete Table 4.5.2. **[1816.41(c)/1817.41(c)]**

Not applicable. Please see the response to 4.5.1 above.

4.5.3 Provide a detailed geologic boring log, well construction diagram and completion information for all existing groundwater monitoring wells and/or a diagram of each proposed well. All wells shall be surveyed (top of casing, ground elevation and location), shall have unique nomenclature and be clearly identified on the Hydrogeologic Map as existing, proposed, abandoned, etc. **[1780.22(c)/1784.22(c)]**

NOTE: The Department has created a [well construction diagram](#) for use. See [Operator Memorandum 2017-01](#).

When wells are no longer needed, the applicant shall request to properly plug and abandon the well. Upon receiving approval to drop the well from the Mine's groundwater monitoring program, the well shall be sealed and the Department's [plugging affidavit](#) shall be provided within sixty (60) of the date of approval.

NOTE: See [Operator Memorandum 2015-02](#).

Not applicable. Please see the response to 4.5.1 above.

4.5.4 Provide the groundwater flow direction based upon the site-specific groundwater monitoring wells installed for this application. Hydraulic conductivity data shall be provided in its entirety, for each well. The field methodology of the aquifer testing shall be clearly explained (e.g., rising head vs. falling head slug testing; pump testing or constant-head testing). The results of the aquifer testing shall be included in this section and shall be discussed/explained, including any discrepant information. Groundwater flow direction may also be shown on the Potentiometric Map required in Part 4.4.3 above. **[1780.21(b)(1)(B)/1784.14(b)(1)(B)]**

Groundwater well installation and monitoring are not proposed for this proposed permit area. The installation will consist only of a mine access shaft and boreholes for power, rock dust, and fuel. All openings, including the shaft and all boreholes will be cased with steel with the annulus area between the casing and native material filled with concrete material. This will preclude any contact with the surrounding groundwater. Further, no coal, coal refuse, or other potential contaminants will be stored on the surface which will further assure against possible groundwater contamination. However, available well records indicate that

groundwater in the unconsolidated aquifer is generally flowing to the east and southeast towards the Wabash River.

4.5.5 Discuss any reported problems of maintenance with groundwater quantity and quality which have occurred at the private wells and springs identified in 4.4.1 above or in the installed groundwater monitoring wells noted in 4.5 above. [1780.21(h)/1784.14(g)]

No information concerning maintenance problems, or ground water quantity and quality is known to have been reported.

4.5.6 Will this operation have any discharges to, or pump water from, abandoned underground mines?

YES NO

If YES, submit a detailed discussion of the quality and quantity of the extracted water and a detailed plan to discharge water into the abandoned mine workings. [1816.41(i)/1817/41(h)]

4.6 Surface Water Information.

4.6.1 Provide the name, location, ownership, and description of all surface water bodies, lakes, streams, impoundments, and springs within and adjacent to the proposed permit area(s). The adjacent area shall be one-half mile from the proposed permit area. Provide the location of any discharge or drainage into any surface water bodies listed above on the Hydrogeologic Map. Complete Table 4.6.1. [1780.21(b)(2)/1784.14(b)(2); 1779.24(g)/1783.24(g); 1779.25(a)(7)/1783.25(a)(7)]

The location of all surface water bodies, lakes, streams, and impoundments within the existing shadow and proposed permit area is shown on the Hydrogeologic Map. If known, the names of the water bodies and streams are also shown on the maps. However, most of the streams and impoundments are unnamed. Ownership of the water bodies are also shown on the Surface Ownership Map.

4.6.2 Provide for surface water bodies identified in 4.6.1. above, information on surface water quality and quantity sufficient to demonstrate seasonal variation and water usage. Surface water bodies that may be impacted by the proposed mining operation shall be clearly identified in the narrative and on the Hydrogeologic Map. Complete Table 4.6.2. [1780.21(b)(2)/1784.14(b)(2)]

The only such water body to be impacted by the proposed permit area is the unnamed stream that will serve as the receiving stream for the sediment control pond. Water quality of this stream is included within Table 4.6.3.

4.6.3 Surface Water Monitoring Program. [1780.21(j)/1784.14(i)]

Describe in detail a proposed monitoring plan based upon the PHC that will measure the amount and duration of any changes to the surface water system resulting from the mining operation. Table 4.6.3.1 shall

be filled out with all current and proposed surface water monitoring points. For surface mines, upstream and downstream quality and quantity monitoring will be required throughout the life of the mine. Parameters to be monitored are given in Table 4.6.3.4 Surface water monitoring shall be on a quarterly basis with reports due within one month of the end of each quarter as follows:

Scheduled Period	From - To	Report Due
1 st Quarter	Jan. 1 – Mar. 31	May 1
2 nd Quarter	Apr. 1 – Jun. 30	Aug 1
3 rd Quarter	Jul. 1 – Sept. 30	Nov 1
4 th Quarter	Oct. 1 – Dec. 31	Feb 1

Provide a Sampling and Analysis Plan (SAP) that includes the methods/steps of in-stream sampling, data analysis and data reporting as an attachment to this application part.

Where approved, annual monitoring shall be conducted during the 2nd quarter only; semi-annual monitoring shall occur during the 2nd and 4th quarters only.

NOTE: At a minimum, background data collection shall occur on a bi-monthly (every two months) basis over the course of one year (12 consecutive months). Surface water monitoring shall continue throughout the permitting process at the same frequency background data collection occurred.

See included Table 4.6.3.

4.6.3.1 Water quality descriptions shall include, at a minimum, baseline information as follows [1780.21(b)(2)(A)/1784.14(b)(2)(A)]:

pH, total dissolved solids, total suspended solids, alkalinity, acidity, sulfate, total iron, total manganese, and chloride. Complete Table 4.6.3

See included Table 4.6.3.

4.6.3.2 Water quantity description shall include base information on seasonal flow rates. [1780.21(b)(2)(B)/1784.14(b)(2)(B)]

No surface water samples shall be collected from pooled (non-flowing) water. When no-flow conditions are observed, the applicant shall note the no-flow and include the “no-flow” notation on reports submitted to the Department.

See included Table 4.6.3

4.6.3.3 The proposed surface monitoring plan shall describe how the collected surface monitoring data will be used to determine if impacts are occurring and what steps will be taken by the operator. [1780.21(j)(2)/1784.14(i)(2)]

Surface water monitoring and reporting will be done in accordance with applicable regulations and requirements of the permitting authorities, including the IEPA and the expected NPDES permit. Data and trend analysis as required within those permits and regulations will be adhered to. Should data and trend analysis indicate negative impacts to receiving streams, an immediate consultation with the appropriate regulatory authorities will held with appropriate remedial action to be determined.

4.6.3.4 At a minimum, surface water shall be sampled/analyzed for: pH, total dissolved solids, total suspended solids, alkalinity, acid, sulfate, iron, manganese and flow (cfs).
[1780.21(j)/1784.14(i)]

See included Table 4.6.3.

4.6.4 Locate all surface water monitoring points on the Hydrogeologic Map and fill out Table 4.6.3.
[1779.25(a)(2)/1783.25(a)(2)]

See referenced Map and Table, included herein.

4.6.5 For carbon recovery operations surface water quality of the existing discharge point or of the impounded water if no discharge point exists shall be provided, utilizing the parameters in Part 4.6.3.1 above. [1780.21(b)(2)/1784.14(b)(2)]

Not applicable for this application

4.7 NPDES Monitoring Program. [1780.21(j)(2)(B)/1784.14(i)(2)(B)]

4.7.1 Has an NPDES permit been applied for?

YES NO

4.7.2 Has an NPDES permit been obtained?

YES NO

If YES, give the permit number, the date issued, the expiration date, and the number of discharge points monitored. If additional discharge points are proposed by this application, list discharge numbers. Locate on the Hydrogeologic Map and number all discharge points of the proposed permit area. Complete Schedule A for all existing and proposed NPDES Outfalls for the facility. Provide the longitude and latitude coordinates, in decimal degrees, for each outfall. [1779.25(a)(2)/1783.25(a)(2)]

Permit application is pending.

4.7.3 In accordance with 35 Ill. Adm. Code 406.101(b), is the applicant requesting that monitoring and reporting be on the basis of grab samples?

YES NO

If NO, explain.

4.7.4 Are NPDES reports to be submitted to satisfy the reporting requirements? [1780.21(j)/1784.14(i)]

YES NO

If YES, provide the NPDES monitoring program including sampling method, sampling frequency and parameters to be analyzed. If not, submit a proposed monitoring and reporting program. Discharge information sheet is given in Schedule A and /or form 2C or 2D. Schedule A should be completed for all

proposed and existing discharge points. An estimate of the expected discharge concentration for each listed parameter must be indicated (or marked n/a) and a basis for that estimation provided.

Monitoring for compliance with the NPDES effluent limits will be conducted in accordance with the sampling frequency specified in the final permit document. The NPDES monitoring program will include the collection and analysis of grab samples from all permitted discharge locations at least monthly or at the frequency specified in the approved permit. NPDES permits for coal mining operations generally require the collection of a minimum of nine (9) samples during a calendar quarter when the pond is discharging. Grab samples will be collected and preserved in accordance with IEPA standards and delivered to the laboratory for analysis. Water quality parameters specified for the various discharge locations will be analyzed and the results recorded. Quarterly water quality reports will be prepared and submitted to the Department within one month of the end of each calendar quarter in accordance with the prescribed reporting period. Refer to Schedule A for expected discharge concentrations. See Sampling and Analysis Plan, Att. 4.5.1.

4.7.5 Give a brief description of the surface water sampling and flow measurement equipment which will be used to monitor the discharges. [1780.21(j)(2)(B)/1784.14(i)(2)(B)]

Water samples will be of the grab type. Discharge rates will be estimated from observations of flow depth and velocity at the discharge tubes, outflow channels, or other structures at the time of sampling. Experienced personnel using standard industry practices will collect samples in polyethylene containers. The float method will be used in determining the stream discharge rates. Sampling procedures include dipping a sample from the flow without touching the stream bottom. Samples are collected into appropriate containers, adding preservatives where required. The samples are stored in a cooler as soon as possible at a temperature of approximately 2° C. Samples are either shipped to the lab, or are picked up at our office by the lab, and are processed and analyzed by accepted methods. Surface water discharge from sediment ponds shall be sampled and tested as required by the N.P.D.E.S. Permit. Samples shall be grab samples of approximately one-gallon quantity. Each sample shall be tested for all elements required by the N.P.D.E.S. Permit. Written reports will be submitted to the IEPA and IDNR/OMM quarterly. Samples shall be obtained at the location shown on the Mining Operations Map. The pH of the discharge shall be field tested weekly and at other times when changed conditions may exist. The discharge flow shall be estimated on orifice flow conditions of the principal spillway.

4.7.6 Is this proposed mining area covered by existing Illinois EPA (IEPA) Subtitle D permits? [1780.21(j)(2)(B)/1784.14(i)(2)(B)]

YES NO

If YES,

4.7.6.1 List the permit number(s).

4.7.6.2 Do the proposed mining boundaries exactly coincide with IEPA permitted boundaries?

YES NO

If NO, delineate the IEPA Subtitle D permitted boundaries on the Hydrogeologic map.
[1779.24(1)/1783.24(1)]



- FOR IEPA PURPOSES ONLY -
- IN COMPLIANCE WITH A JOINT NPDES/SMCRA PERMIT APPLICATION -

4.7.7 To allow the IEPA to complete the necessary Antidegradation Analysis required for public notice of the NDPEs Permit for this proposed operation, provide, as an attachment to this application, the following:

4.7.7.1 A detailed discharge alternative analysis which discusses alternatives to the outfall proposed in this application.

See Antidegradation Analysis, Attachment 4.7.7.1.

4.7.7.2 A detailed treatment alternative analysis which includes at a minimum, a discussion of each of the following:

- Filtration
- Reverse Osmosis
- Bioremediation
- Coagulation (chemical) Precipitation
- Ion Exchange
- Cost Effective Sulfate Removal (CESR) Process
- Supervac [35 Ill. Adm. Code 302.105]

See Antidegradation Analysis, Attachment 4.7.7.1.

- FOR IEPA PURPOSES ONLY -
- IN COMPLIANCE WITH A JOINT NPDES/SMCRA PERMIT APPLICATION -

4.7.8 To demonstrate that dissolved contaminants are minimized in runoff from the proposed refuse disposal area, Best Management Practices (BMP's) as specified in the June 2007 SIU Study, "[Identification and Assessment of Best Management Practices in Illinois Mining Operations to Minimize Sulfate and Chloride Discharges](#)" shall be implemented. Identify and discuss each BMP to be implemented from the cited study in an attachment to this application. [35 Ill. Adm. Code 406.204, 406.205, 406.206, 406.207 and 406.208]

See Antidegradation Analysis, Attachment 4.7.7.1.

4.8 Protection of Hydrologic Balance. The delineation of the Cumulative Impact Area (CIA) for groundwater and surface water shall be included in the Probable Hydrologic Consequences (PHC). The surface and groundwater CIA(s) shall be depicted on a CIA map(s). The applicant shall describe the rationale for selecting the surface and groundwater CIA(s), concentrating on the relationship between the surface and groundwater regimes. The CIA discussion must also include consideration of aquifers in use by area residents, public water supplies, and proximity of existing mining areas which can increase impacts on the surface and groundwater areas of influence. A discussion of historic mining areas may be included where known existing water quality issues exist.

The applicant shall provide a narrative determination of the PHC of the operations on the proposed permit, shadow area and adjacent areas with respect to the hydrologic regime and water quality and quantity in surface and

groundwater systems under all seasonal conditions based on the baseline information provided in Sections 4.4, 4.5 (Groundwater) and 4.6, 4.7 (Surface Water). [1780.21(f)(1)/1784.14(e)(1)]

No groundwater CIA is included, as no groundwater impacts are projected from this operation.

The surface water cumulative impact area (SCIA) for the proposed project includes all land within the existing permit area as well as the receiving stream. This is appropriate since all off-permit surface water is excluded from the mining area and all surface drainage within the permit areas is contained on the site and treated in accordance with the surface drainage control plan as detailed in this application. The estimated size of the SCIA is 161 acres.

The determination of PHC shall include findings on the following:

4.8.1 Will the proposed coal mining and reclamation operations have adverse impacts to the hydrologic balance? [1780.21(f)(3)(A)/1784.14(e)(3)(A)]

YES NO

Explain:

The proposed project will include a man-shaft portal location northwest of the Town of Russellville. The proposed permit area will be approximately 101 acres, with approximately 14 of those acres being for minor non-coal surface disturbance. The remaining acreage will be Undisturbed Mine Management area. The site will include a man-shaft hoist to transport men and supplies to underground mine workings, an office/bathhouse building, a warehouse and supply laydown yard, as well as a parking area. There will also be a fuel drop and rock dust hole which will be drilled to the underground mine. One sediment basin will need to be designed which will collect all surface non-coal contact storm water for release into a nearby stream. Therefore, there will be no anticipated impacts to the hydrologic balance.

4.8.2 Are acid forming or toxic forming materials (AFM) present that could result in contamination of surface and/or groundwater supplies? This shall include the handling and placement of AFM in the overburden during mining and reclamation of for surface mining and during construction of all shaft and slopes for underground mining. [1780.21(f)(3)(B)/1784.14(e)(3)(B)]

YES NO

Explain:

This proposed permit is for a mine access portal and no coal contact or mining related materials will be brought to the surface.

4.8.3 Will the proposed surface coal mining and reclamation operations result in contamination, diminution or interruption of an underground or surface source of water within the proposed permit, shadow or adjacent areas which is used for legitimate purposes? [1780.21(f)(3)(C)/1784.14(e)(3)(D)]

YES NO

Explain:

No adverse impacts to underground or surface water are anticipated. There will be no disturbance to the ground surface caused by the proposed mine access portal as described above.

4.8.4 Explain what impact(s) to surface water and groundwater the proposed coal mining and reclamation operations may have on, including but not limited to, the following parameters:

- Sediment yield from the disturbed area; [1780.21(f)(3)(D)(i)/1784.14(e)(3)(C)(i)]
- Acidity; [1780.21(f)(3)(D)(ii)/1784.14(e)(3)(C)(ii)]
- Total suspended solids; [1780.21(f)(3)(D)(ii)/1784.14(e)(3)(C)(ii)]
- Total dissolved solids; [1780.21(f)(3)(D)(ii)/1784.14(e)(3)(C)(ii)]
- Flooding or stream flow alterations; [1780.21(f)(3)(D)(iii)/1784.14(e)(3)(C)(iii)]
- Availability of surface and groundwater. [1780.21(f)(3)(D)(iv)/1784.14(e)(3)(C)(iv)]

No adverse impacts to underground or surface water are anticipated. There will be no disturbance to the ground surface caused by the proposed mine access portal as described above.

4.8.5 If this application is for a Significant Permit Revision, the applicant shall describe any relevant updates to the PHC originally provided under Part 4.8. [1774.13]

This application is for a new permit not a revision of an existing permit

4.8.6 If the PHC determination indicates that the proposed mining operation may proximately result in the contamination, diminution, or interruption of an underground or surface water source within the proposed permit area, shadow area or adjacent areas used for domestic, agricultural, industrial or other legitimate use, the application shall provide information on water availability and alternative water sources. The alternative water source information shall address the suitability of the alternative water source for existing pre-mining and approved post-mining land uses. [1780.21(e)/1784.14(b)(3)]

NOTE: Provide a narrative summary of Parts 4.8.1 through 4.8.6 utilizing the data and information provided and gathered for Part 4 of this application. [1780.21/1784.14]

Should the proposed mine access portal result in a substantial case of contamination, diminution, or interruption of a surface water or groundwater source within or directly contiguous to the proposed permit area, the applicant will develop or utilize an alternative water source as replacement for the disrupted source, including providing an interim source between water loss and replacement. Alternative sources of water include but are not limited to the following: 1) surface water impoundments, 2) local municipal or rural water supplies, 3) drilling replacement well(s) to formations exhibiting hydraulic characteristics suitable for water withdrawal and use, 4) treatment of water to attain usable quality, 5) haulage of water, etc.

4.9 Preventative and Remedial Measures Plan. For proposed surface mining, provide a plan, as an attachment to this application, including maps and descriptions, for meeting the relevant requirements of Sections 1816.41 through 1816.43. Discussion of preventative and remedial measures shall be included. [1780.21(h)]

For proposed underground mining, provide a plan, including maps and descriptions, for meeting the relevant requirements of Sections 1817.41 through 1817.43. Discussion of preventative and remedial measures shall be included. [1784.14(g)]

Each plan shall address the following:

- The specific local hydrologic conditions
- The steps to be taken during mining and reclamation through final bond release to minimize disturbance to the hydrologic balance within the permit and adjacent areas
- The steps to be taken to prevent material damage outside the permit area
- The steps to be taken to meet the applicable Federal and State water quality laws and regulations
- The steps to be taken to protect the rights of present water users and replacement, if necessary
- The measures to prevent acid or toxic drainage
- The measures to prevent additional contributions of suspended solids to stream flow to the extent possible using the best technology currently available
- The measures to be taken to provide for water treatment facilities when necessary
- The measures to be taken to provide to control drainage
- The measures to be taken to restore approximate pre-mining recharge capacity
- The measures to be taken to address any potential adverse hydrologic consequences identified in the PHC determination.

There will be no surface mining nor underground mining within the proposed surface portal area. As a result, there are no expected impacts to any groundwater or surface water sources.

4.10 Liners. Construction details and specifications, as well as a Quality Assurance/Quality Control (QA/QC) Plan for the proposed compacted clay liners shall be provided, as an attachment to this application, if a compacted clay liner is proposed for this operation. The QA/QC Plan should include, at a minimum:

- The loose soil thickness of each lift
- The methodology for replacing soft areas encountered during construction
- Frequency of permeability testing, and
- Means of protecting the constructed liner from damage.
- The location of all compacted clay liners throughout the proposed permit area.

If a geosynthetic liner is proposed in lieu of a compacted clay liner, provide an appropriate, relevant QA/QC Plan to ensure proper installation and maintenance of the geosynthetic liner is achieved. [1816.41/1817.41]

Not applicable to this application

4.11 Coal Combustion Materials. Provide a discussion of any existing or proposed operation to disposal of Coal Combustion Waste (CCW) or to beneficially use Coal Combustion By-products (CCB) within the proposed permit area as described in this application. Include a discussion of how the CCW/CCB materials may interact and/or impact the groundwater and surface waters in and around the proposed permit, shadow (if applicable) and adjacent areas. A surface water and groundwater monitoring plan shall also be provided. [[415 ILCS 5/3.135](#); [415 ILCS 5/3.140](#)]

NOTE: Also, see Part 15 of this application.

There will be no coal combustion materials within the proposed permit area. As a result, there are no expected impacts to any groundwater or surface water resources.

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	FEET							
	CUT	REC	FROM	TO	THICK			
			0.00	5.00	5.00	Sandy Clay		
			5.00	10.00	5.00	Sand		
			10.00	35.00	25.00	Sandy Clay		
			35.00	40.00	5.00	Sandstone Brown		
			40.00	63.00	23.00	Sandstone		
			63.00	65.00	2.00	Coal		
			65.00	92.00	27.00	Sandy Shale		
			92.00	93.00	1.00	Limestone		
			93.00	128.00	35.00	Sandy Shale		
			128.00	131.00	3.00	Coal		
			131.00	160.00	29.00	Sandy Shale		
			160.00	163.00	3.00	Sandstone Brown		
			163.00	165.00	2.00	Sandy Shale		
			165.00	210.00	45.00	Sandstone		
			210.00	215.00	5.00	Shale		
			215.00	231.00	16.00	Sandstone		
			231.00	235.00	4.00	Limestone		
			235.00	236.00	1.00	Sandy Shale		
			236.00	242.00	6.00	Rainbow Shale		
			242.00	247.00	5.00	Sandy Shale		
			247.00	251.00	4.00	Limestone		
			251.00	273.00	22.00	Sandy Shale		
			273.00	275.00	2.00	Coal		
			275.00	280.00	5.00	Sandy Shale		
			280.00	285.00	5.00	Sandstone		
			285.00	290.00	5.00	Shale		
			290.00	300.00	10.00	Sandstone		
			300.00	310.00	10.00	Sandy Shale		
			310.00	318.00	8.00	Sandstone		
			318.00	332.00	14.00	Sandy Shale		
			332.00	335.00	3.00	Coal VII		
			335.00	350.00	15.00	Shale		
			350.00	365.00	15.00	Sandstone		
			365.00	377.00	12.00	Med. Shale		
			377.00	379.00	2.00	Coal VI		
			379.00	380.00	1.00	Black Shale		
			380.00	383.00	3.00	Black Shale w\Coal		
			383.00	390.00	7.00	Shale		
			390.00	400.00	10.00	Sandstone w\Shale Layers		

HYDROLOGICAL DATA:

DEPTH OF WATER:

DRILL HOLE DATA	RU-194C 05/10/29	LOCATION	Vennard	E-LOGGED:	No
DATE DRILLED:		SECTION:	29	GEO HOLE:	
DATE COMPLETED:	3/7/2018	COUNTY:	Lawrence		
DRILLER:	Luke	STATE:	IL		
HELPER:	Matt	TOWNSHIP:	NE Russell		
TOTAL DEPTH:	477.35'	RANGE:	10W		
CORE SIZE:	3"	QUAD:	Russellville		
CASING DEPTH:	40.0 FT.	NORTHING:	490708.21	Surface	
# OF CEMENT BAGS:	Truck	EASTING:	368622.58	486.3'	
NOTES:		NOTES:			

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	CUT	REC	FEET FROM	TO	THICK			
1.00			0.00	30.00	30.00	Sand		
			30.00	35.00	5.00	Clay		
			35.00	37.00	2.00	Shale		
			37.00	55.00	18.00	Sandstone Brown		
			55.00	124.00	69.00	Shale		
			124.00	127.00	3.00	Coal		
			127.00	135.00	8.00	Shale		
			135.00	155.00	20.00	Sandy Shale		
			155.00	160.00	5.00	Sandstone		
			160.00	170.00	10.00	Med. Shale		
			170.00	221.00	51.00	Sandstone		
			221.00	223.00	2.00	Limestone		
			223.00	228.00	5.00	Sandy Shale		
			228.00	235.00	7.00	Rainbow Shale		
			235.00	240.00	5.00	Sandy Shale		
			240.00	245.00	5.00	Limestone		
			245.00	269.00	24.00	Shale		
			269.00	271.00	2.00	Coal		
			271.00	280.00	9.00	Sandy Shale		
			280.00	320.00	40.00	Sandstone		
			320.00	327.00	7.00	Shale		
			327.00	330.00	3.00	Coal 7		
			330.00	345.00	15.00	Sandy Shale		
			345.00	360.00	15.00	Sandstone		
			360.00	370.00	10.00	Dark Shale		
			370.00	374.00	4.00	Coal 6		
			374.00	376.00	2.00	Shale Parting		
			376.00	380.00	4.00	Coal Shale		
			380.00	381.00	1.00	Shale		
			381.00	382.00	1.00	Limestone		
			382.00	390.00	8.00	Shale		
			390.00	412.00	22.00	Sandstone		
			412.00	428.00	16.00	medium SHALE		
		428.00	431.00	3.00	Coal 5a			
		431.00	436.00	5.00	Shale/Sandstone Streaks			
		436.00			Start Core			
	20.00	18.50	436.00	442.30	6.30	Sandstone		
			442.30	445.30	3.00	Dark Shale		
			445.30	451.90	6.60	Dark Shale with nodules		
			451.90	452.60	0.70	Fossil Limestone		
HYDROLOGICAL DATA:						DEPTH OF WATER:		
DRILL HOLE DATA	RU-195C 05/10/29			LOCATION	Vennard		E-LOGGED:	No
DATE DRILLED:				SECTION:	29		GEO HOLE:	
DATE COMPLETED:	3/8/2018			COUNTY:	Lawrence			
DRILLER:	Luke			STATE:	IL			
HELPER:	Matt			TOWNSHIP:	NE Russell			
TOTAL DEPTH:				RANGE:	10W			
CORE SIZE:	3"			QUAD:	Russellville			
CASING DEPTH:	40.0 FT.			NORTHING:	490262.56		Surface	
# OF CEMENT BAGS:	Truck			EASTING:	368548.18		482'	
NOTES:				NOTES:				

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE		FEET			DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	CUT	REC	FROM	TO	THICK			
2.00	17.70	19.20	452.60	453.10	0.50	Dark Shale		
			453.10	454.50	1.40	Limestone		
			454.50	456.20	1.70	Black Shale		
			456.20	457.30	1.10	Gray Shale		
			457.30	457.40	0.10	Coal V		
			457.40	457.50	0.10	Black Shale		
			457.50	462.80	5.30	Coal V		
			462.80	465.50	2.70	Shale		
			465.50	473.70	8.20	Sandstone		
			473.70	473.70	0.00	TD		

HYDROLOGICAL DATA:

DEPTH OF WATER:

DRILL HOLE DATA	RU-195C 05/10/29	LOCATION	Vennard	E-LOGGED:	No
DATE DRILLED:		SECTION:	29	GEO HOLE:	
DATE COMPLETED:	3/8/2018	COUNTY:	Lawrence		
DRILLER:	Luke	STATE:	IL		
HELPER:	Matt	TOWNSHIP:	NE Russell		
TOTAL DEPTH:		RANGE:	10W		
CORE SIZE:	3"	QUAD:	Russellville		
CASING DEPTH:	40.0 FT.	NORTHING:	490262.56	Surface	
# OF CEMENT BAGS:	Truck	EASTING:	368548.18	482'	
NOTES:		NOTES:			

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	CUT	REC	FROM	TO	THICK			
			0.00	6.00	6.00	Clay		
			6.00	40.00	34.00	Sand		
			40.00	53.00	13.00	Clay		
			53.00	106.00	53.00	Shale		
			106.00	140.00	34.00	Sandy Shale		
			140.00	142.00	2.00	Coal		
			142.00	155.00	13.00	Sandy Shale		
			155.00	175.00	20.00	Sandstone		
			175.00	180.00	5.00	Sandy Shale		
			180.00	240.00	60.00	Sandstone		
			240.00	241.00	1.00	Limestone		
			241.00	256.00	15.00	Rainbow Shale		
			256.00	260.00	4.00	Limestone		
			260.00	265.00	5.00	Sandy Shale		
			265.00	279.00	14.00	Sandstone		
			279.00	283.00	4.00	Shale		
			283.00	285.00	2.00	Coal		
			285.00	327.00	42.00	Sandy Shale		
			327.00	342.00	15.00	Sandy Shale		
			342.00	345.00	3.00	Coal 7		
			345.00	365.00	20.00	Sandy Shale		
			365.00	378.00	13.00	Sandstone		
			378.00	390.00	12.00	Shale medium		
			390.00	394.00	4.00	Coal 6		
			394.00	396.00	2.00	Shale Parting		
			396.00	400.00	4.00	Coal Shale		
			400.00	403.00	3.00	Limestone		
			403.00	409.00	6.00	Sandy Shale		
			409.00	419.00	10.00	Sandstone		
			419.00	444.00	25.00	Shale medium		
			444.00	446.00	2.00	Coal 5a		
RUN			446.00	452.00	6.00	Shale		
1.00	19.90	19.90	452.00			Start Core		
			452.00	456.00	4.00	Sandstone		
			456.00	460.30	4.30	Dark Shale		
			460.30	465.20	4.90	Dark Shale with nodules		
			465.20	466.20	1.00	Fossil Limestone		
			466.20	466.90	0.70	Black Shale		
			466.90	468.90	2.00	Limestone		
			468.90	471.90	3.00	Black Shale		
HYDROLOGICAL DATA:							DEPTH OF WATER:	
DRILL HOLE DATA			RU-196C 05/10/29		LOCATION		Vennard	
DATE DRILLED:					SECTION:		29	
DATE COMPLETED:			3/9/2018		COUNTY:		Lawrence	
DRILLER:			Luke		STATE:		IL	
HELPER:			Matt		TOWNSHIP:		NE Russell	
TOTAL DEPTH:					RANGE:		10W	
CORE SIZE:			3"		QUAD:		Russellville	
CASING DEPTH:			42.0 FT.		NORTHING:		490838.15 Surface	
# OF CEMENT BAGS:			Truck		EASTING:		368913.39 500.7	
NOTES:					NOTES:			
E-LOGGED:							No	
GEO HOLE:								

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
		FEET						
CUT	REC	FROM	TO	THICK				
		0.00	5.00	5.00	Sand			
		5.00	10.00	5.00	Sand/Gravel			
		10.00	14.00	4.00	Clay			
		14.00	15.00	1.00	Gr. Shale			
		15.00	35.00	20.00	Sandstone			
		35.00	44.00	9.00	Gr. Shale			
		44.00	65.00	21.00	Med. Gr. Shale			
		65.00	68.00	3.00	Gr. Sandy Shale			
		68.00	85.00	17.00	Gr. Sandstone (Fine Grain)			
		85.00	93.00	8.00	Gr. Sandy Shale			
		93.00	100.00	7.00	Med. Gr. Shale			
		100.00	103.00	3.00	Coal/Blk. Shale Mix.			
		103.00	110.00	7.00	Gr. Shale			
		110.00	120.00	10.00	Sandstone			
		120.00	140.00	20.00	Gr. Shale			
		140.00	145.00	5.00	Sandstone (Hard)			
		145.00	190.00	45.00	Sandstone			
		190.00	195.00	5.00	Gr. Shale			
		195.00	205.00	10.00	Sandstone			
		205.00	209.00	4.00	Limestone			
		209.00	224.00	15.00	Gr. Shale			
		224.00	225.00	1.00	Limestone			
		225.00	228.00	3.00	Gr. Shale			
		228.00	230.00	2.00	Limestone (Brown)			
		230.00	235.00	5.00	Gr. Sandy Shale			
		235.00	240.00	5.00	Sandstone			
		240.00	250.00	10.00	Med. Gr. Shale			
		250.00	251.00	1.00	Coal			
		251.00	265.00	14.00	Gr. Sandy Shale			
		265.00	295.00	30.00	Sandstone			
		295.00	310.00	15.00	Med. Gr. Shale			
		310.00	313.00	3.00	Coal VII			
		313.00	317.00	4.00	Gr. Shale			
		317.00	359.00	42.00	Sandstone (Coarse Grain) (Wet)			
		359.00	362.00	3.00	Blk. Shale			
		362.00	366.00	4.00	Coal VI			
		366.00	367.00	1.00	Gr. Shale			
		367.00	371.00	4.00	Coal VI/Blk. Shale Mix.			
		371.00	375.00	4.00	Gr. Shale			
		375.00	380.00	5.00	Gr. Sandy Shale			
HYDROLOGICAL DATA:						DEPTH OF WATER:		
DRILL HOLE DATA	RU-219C 05/10/29		LOCATION	Weger		E-LOGGED:	No	
DATE DRILLED:	8/7/2018		SECTION:	29		GEO HOLE:		
DATE COMPLETED:	8/9/2018		COUNTY:	Lawrence				
DRILLER:	Chuck		STATE:	ILL.				
HELPER:	Luke		TOWNSHIP:	Russell				
TOTAL DEPTH:	460.51 ft.		RANGE:	10W				
CORE SIZE:	3"		QUAD:	Russellville				
CASING DEPTH:	15.0 ft.		NORTHING:	489184.32	Surface	1309419.55		
# OF CEMENT BAGS:	Truck		EASTING:	367967.81	450.1	2820714.9		
NOTES:			NOTES:			450.1		

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE		FEET			DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	CUT	REC	FROM	TO	THICK			
1.00			380.00	385.00	5.00	Sandstone		
			385.00	395.00	10.00	Gr. Sandy Shale		
			395.00	400.00	5.00	Med. Gr. Shale		
			400.00	421.00	21.00	DK. Gr. Shale		
			421.00	422.00	1.00	Coal Va		
			422.00			START CORING		
	19.80	18.36	422.00	423.34	1.34	Coal Va		
			423.34	424.91	1.57	Med. Gr. Sandy Shale, Lt. Gr. Sandstone Strks., Good Lamination, Medium Bedding, Moderately Hard		
			424.91	426.35	1.44	Lt. Gr. Sandstone (Med. Grain), Thick Bedding, Moderately Hard		
			426.35	429.59	3.24	Lt. Gr. Sandstone (Med. Grain), DK. Gr. Shale Strks., Thick Bedding, Moderately Hard		
			429.59	433.01	3.42	Med. Gr. Silty Shale, Lt. Br. Siderite Nods., Thick Bedding, Moderately Hard		
			433.01	438.08	5.07	DK. Gr. Silty Shale, Siderite Nods., Thick Bedding, Moderately Hard		
			438.08	439.12	1.04	DK. Gr. Fossil Shale, Highly Fossiliferous, Massive Bedding, Hard		
			439.12	440.36	1.24	Limestone, White, Massive Bedding, Very Hard		
			440.36	441.80	1.44	Coreloss (In Coal Va and Blk. Shale @ Bottom of Run)		
2.00			441.80			START CORING		
	18.00	18.71	441.80	444.68	2.88	Blk. Silty Shale, Medium Bedding, Moderately Hard		
			444.68	449.83	5.15	Coal V		
			449.83	451.67	1.84	Lt. Gr. Sandy Underclay, DK. Limestone Nods., Thick Bedding, Medium Hard		
			451.67	460.51	8.84	Lt. Gr. Sandy Shale, DK. Limestone Nods., Thick Bedding, Moderately Hard		
			460.51			T.D. (Recovered .71' Blk. Shale from 1st Run.)		
						Bot. of Coal V: +.27'		

HYDROLOGICAL DATA:			DEPTH OF WATER:			
DRILL HOLE DATA	RU-219C 05/10/29	LOCATION	Weger		E-LOGGED:	No
DATE DRILLED:	8/7/2018	SECTION:	29		GEO HOLE:	
DATE COMPLETED:	8/9/2018	COUNTY:	Lawrence			
DRILLER:	Chuck	STATE:	ILL.			
HELPER:	Luke	TOWNSHIP:	Russell			
TOTAL DEPTH:	460.51 ft.	RANGE:	10W			
CORE SIZE:	3"	QUAD:	Russellville			
CASING DEPTH:	15.0 ft.	NORTHING:	489184.32	Surface	1309419.55	
# OF CEMENT BAGS:	Truck	EASTING:	367967.81	450.1	2820714.9	
NOTES:		NOTES:			450.1	

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	FEET							
	CUT	REC	FROM	TO	THICK			
			0.00	3.00	3.00	Topsoil		
			3.00	5.00	2.00	Clay		
			5.00	7.00	2.00	Clay/Gravel		
			7.00	15.00	8.00	Sandstone (Brown)		
			15.00	20.00	5.00	Gr. Shale		
			20.00	21.00	1.00	Coal		
			21.00	35.00	14.00	DK. Gr. Shale		
			35.00	45.00	10.00	Gr. Shale		
			45.00	60.00	15.00	Med. Gr. Shale		
			60.00	87.00	27.00	Sandstone		
			87.00	90.00	3.00	Coal/Shale Mix.		
			90.00	115.00	25.00	Gr. Shale		
			115.00	160.00	45.00	Sandstone		
			160.00	165.00	5.00	Gr. Shale		
			165.00	190.00	25.00	Sandstone		
			190.00	195.00	5.00	Limestone		
			195.00	209.00	14.00	Gr. Shale		
			209.00	211.00	2.00	Limestone		
			211.00	215.00	4.00	Gr. Shale		
			215.00	220.00	5.00	Sandstone		
			220.00	235.00	15.00	Gr. Shale		
			235.00	238.00	3.00	Coal/Shale Mix.		
			238.00	243.00	5.00	Gr. Shale		
			243.00	280.00	37.00	Sandstone		
			280.00	295.00	15.00	Gr. Shale		
			295.00	297.00	2.00	Coal VII		
			297.00	320.00	23.00	Gr. Shale		
			320.00	357.00	37.00	Sandstone		
			357.00	361.00	4.00	DK. Gr. Shale		
			361.00	365.00	4.00	Coal VI		
			365.00	375.00	10.00	Gr. Shale		
			375.00	397.00	22.00	Sandstone		
			397.00	402.00	5.00	Med. Gr. Shale		
			402.00	414.00	12.00	DK. Gr. Shale		
			414.00	416.00	2.00	Coal Va		
			416.00			START CORING		
RUNS 1 & 2	40.00	40.65	416.00	416.39	0.39	Med. Gr. Silty Shale, Medium Bedding, Medium Hard		
			416.39	419.47	3.08	Med. Gr. Sandy Shale, Lt. Gr. Thin Sandstone Strks., Thin Bedding, Moderately Hard		
HYDROLOGICAL DATA:						DEPTH OF WATER:		
DRILL HOLE DATA	RU-220C 05/10/29		LOCATION	Dan Weger		E-LOGGED:	No	
DATE DRILLED:	8/12/2018		SECTION:	29		GEO HOLE:		
DATE COMPLETED:	8/13/2018		COUNTY:	Lawrence				
DRILLER:	Chuck		STATE:	ILL.				
HELPER:	Luke		TOWNSHIP:	Russell				
TOTAL DEPTH:	456.65 ft.		RANGE:	10W				
CORE SIZE:	3"		QUAD:	Russellville				
CASING DEPTH:	16.0 ft.		NORTHING:	488272.30	Surface	1308507.53		
# OF CEMENT BAGS:	Truck		EASTING:	368127.06	434.8	2820874.24		
NOTES:			NOTES:			434.8		

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	FEET							
	CUT	REC	FROM	TO	THICK			
			419.47	422.25	2.78	Lt. Gr. Sandstone (Coarse Grain), Thick Bedding, Moderately Hard		
			422.25	424.64	2.39	Lt. Gr. Sandstone, DK. Gr. Shale Strks., Medium Bedding, Moderately Hard		
			424.64	426.91	2.27	Med. Gr. Silty Shale, Siderite Nods., Thick Bedding, Moderately Hard		
			426.91	435.74	8.83	DK. Gr. Silty Shale, Siderite Nods., Thick Bedding, Moderately Hard		
			435.74	436.23	0.49	DK. Gr. Fossil Shale, Lightly Fossiliferous, Medium Bedding, Hard		
			436.23	437.74	1.51	Blk. Limestone, Highly Fossiliferous, Massive Bedding, Hard		
			437.74	438.80	1.06	DK. Gr. Silty Shale, Lightly Fossiliferous, Medium Bedding, Moderately Hard		
			438.80	439.34	0.54	Limestone, White, Massive Bedding, Very Hard		
			439.34	442.66	3.32	Blk. Silty Shale, Medium Bedding, Moderately Hard		
			442.66	448.67	6.01	Coal V		
			448.67	452.41	3.74	Lt. Gr. Sandy Underclay, Carbonaceous in Bedding Planes, Medium Bedding, Medium Hard		
			452.41	456.65	4.24	Lt. Gr. Sandy Shale, Medium to Thick Bedding, Moderately Hard		
			456.65			T.D.		
						Bot. of Coal V: -13.87'		
HYDROLOGICAL DATA:						DEPTH OF WATER:		
DRILL HOLE DATA	RU-220C 05/10/29		LOCATION	Dan Weger		E-LOGGED:	No	
DATE DRILLED:	8/12/2018		SECTION:	29		GEO HOLE:		
DATE COMPLETED:	8/13/2018		COUNTY:	Lawrence				
DRILLER:	Chuck		STATE:	ILL.				
HELPER:	Luke		TOWNSHIP:	Russell				
TOTAL DEPTH:	456.65 ft.		RANGE:	10W				
CORE SIZE:	3"		QUAD:	Russellville				
CASING DEPTH:	16.0 ft.		NORTHING:	488272.30	Surface	1308507.53		
# OF CEMENT BAGS:	Truck		EASTING:	368127.06	434.8	2820874.24		
NOTES:			NOTES:			434.8		

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	FEET							
	CUT	REC	FROM	TO	THICK			
			0.00	13.00	13.00	Clay		
			13.00	16.00	3.00	Sand/Gravel		
			16.00	20.00	4.00	DK. Gr. Shale		
			20.00	42.00	22.00	Gr. Shale		
			42.00	45.00	3.00	Sandstone		
			45.00	73.00	28.00	Gr. Shale		
			73.00	80.00	7.00	Sandstone		
			80.00	100.00	20.00	Gr. Shale		
			100.00	103.00	3.00	Sandstone		
			103.00	115.00	12.00	Gr. Shale		
			115.00	193.00	78.00	Sandstone		
			193.00	197.00	4.00	Limestone		
			197.00	211.00	14.00	Gr. Shale		
			211.00	214.00	3.00	Limestone		
			214.00	240.00	26.00	Gr. Shale		
			240.00	241.00	1.00	Coal		
			241.00	247.00	6.00	Gr. Shale		
			247.00	295.00	48.00	Sandstone		
			295.00	298.00	3.00	Coal VII		
			298.00	301.00	3.00	Gr. Shale		
			301.00	341.00	40.00	Sandstone		
			341.00	348.00	7.00	DK. Gr. Shale		
			348.00	352.00	4.00	Coal VI		
			352.00	354.00	2.00	Gr. Shale		
			354.00	356.00	2.00	Coal VI/Shale Mix.		
			356.00	370.00	14.00	Gr. Sandy Shale		
			370.00	380.00	10.00	Sandstone		
			380.00	391.00	11.00	Gr. Sandy Shale		
			391.00	394.00	3.00	Med. Gr. Shale		
			394.00	408.00	14.00	DK. Gr. Shale		
			408.00	410.00	2.00	Coal Va		
			410.00	412.00	2.00	Gr. Shale		
			412.00	415.00	3.00	Sandstone		
RUNS			415.00			START CORING		
1.00	15.19	15.19	415.00	416.12	1.12	Lt. Gr. Sandstone, DK. Gr. Shale Layers, Thick Bedding, Moderately Hard		
			416.12	417.20	1.08	Lt. Gr. Sandy Shale, Thick Bedding, Moderately Hard		
			417.20	418.94	1.74	Med. Gr. Sandy Shale, Siderite Nods., Thick Bedding, Moderately Hard		
HYDROLOGICAL DATA:						DEPTH OF WATER:		
DRILL HOLE DATA	RU-221C 05/10/29		LOCATION	Dan Weger		E-LOGGED:	No	
DATE DRILLED:	8/23/2018		SECTION:	29		GEO HOLE:		
DATE COMPLETED:	8/24/2018		COUNTY:	Lawrence				
DRILLER:	Chuck		STATE:	ILL.				
HELPER:	Luke		TOWNSHIP:	Russell				
TOTAL DEPTH:	448.28 ft.		RANGE:	10W				
CORE SIZE:	3"		QUAD:	Russellville				
CASING DEPTH:	20.0 ft.		NORTHING:	488853.40	Surface	792929.407		
# OF CEMENT BAGS:	Truck		EASTING:	368198.45	432.4	1208486.83		
NOTES:			NOTES:			432.4		

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE		FEET			DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	CUT	REC	FROM	TO	THICK			
2.00			418.94	425.75	6.81	DK. Gr. Silty Shale, Siderite Nods., Thick Bedding, Moderately Hard		
			425.75	426.06	0.31	DK. Gr. Fossil Shale, Highly Fossiliferous, Thick Bedding, Hard		
			426.06	427.50	1.44	Limestone, White, Massive Bedding, Very Hard		
			427.50	427.72	0.22	DK. Gr. Fossil Shale, Highly Fossiliferous, Thick Bedding, Hard		
			427.72	429.68	1.96	Blk. Silty Shale, Medium Bedding, Moderately Hard		
			429.68	430.19	0.51	Coal V		
			430.19			START CORING		
	18.09	18.09	430.19	434.91	4.72	Coal V		
			434.91	448.28	13.37	Lt. Gr. Sandy Shale, Occ. DK. Limestone Nods., Thick Bedding, Moderately Hard		
			448.28			T.D.		
						Bot. of Coal V: -2.51'		

HYDROLOGICAL DATA:			DEPTH OF WATER:			
DRILL HOLE DATA	RU-221C 05/10/29	LOCATION	Dan Weger		E-LOGGED:	No
DATE DRILLED:	8/23/2018	SECTION:	29		GEO HOLE:	
DATE COMPLETED:	8/24/2018	COUNTY:	Lawrence			
DRILLER:	Chuck	STATE:	ILL.			
HELPER:	Luke	TOWNSHIP:	Russell			
TOTAL DEPTH:	448.28 ft.	RANGE:	10W			
CORE SIZE:	3"	QUAD:	Russellville			
CASING DEPTH:	20.0 ft.	NORTHING:	488853.40	Surface	792929.407	
# OF CEMENT BAGS:	Truck	EASTING:	368198.45	432.4	1208486.83	
NOTES:		NOTES:			432.4	

SUNRISE COAL DRILL LOG					RIG:	L & J Exploratory	
RUN #	CORE				DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
FEET							
CUT	REC	FROM	TO	THICK			
		0.00	9.00	9.00	Clay		
		9.00	10.00	1.00	Br. Sandstone		
		10.00	11.00	1.00	DK. Gr. Shale		
		11.00	40.00	29.00	Gr. Shale		
		40.00	41.00	1.00	Limestone		
		41.00	70.00	29.00	Gr. Shale		
		70.00	75.00	5.00	Gr. Sandy Shale		
		75.00	79.00	4.00	Sandstone		
		79.00	81.00	2.00	DK. Gr. Shale		
		81.00	95.00	14.00	Gr. Sandy Shale		
		95.00	181.00	86.00	Sandstone		
		181.00	183.00	2.00	Limestone		
		183.00	184.00	1.00	Gr. Shale		
		184.00	188.00	4.00	Limestone		
		188.00	200.00	12.00	Gr. Shale		
		200.00	206.00	6.00	Limestone		
		206.00	213.00	7.00	Gr. Shale		
		213.00	213.50	0.50	Limestone		
		213.50	215.00	1.50	Gr. Sandy Shale		
		215.00	218.00	3.00	Sandstone		
		218.00	225.00	7.00	Gr. Shale		
		225.00	240.00	15.00	Med. Gr. Shale		
		240.00	242.00	2.00	Gr. Sandy Shale		
		242.00	255.00	13.00	Sandstone		
		255.00	259.00	4.00	Gr. Shale		
		259.00	280.00	21.00	Sandstone		
		280.00	288.00	8.00	Gr. Sandy Shale		
		288.00	292.00	4.00	Coal VII		
		292.00	295.00	3.00	Gr. Shale		
		295.00	336.00	41.00	Sandstone		
		336.00	342.00	6.00	DK. Gr. Shale		
		342.00	345.00	3.00	Coal VI		
		345.00	347.00	2.00	Gr. Shale		
		347.00	351.00	4.00	Coal VI		
		351.00	355.00	4.00	Gr. Shale		
		355.00	358.00	3.00	Limestone		
		358.00	360.00	2.00	Gr. Sandy Shale		
		360.00	380.00	20.00	Sandstone		
		380.00	404.00	24.00	DK. Gr. Shale		
		404.00	406.00	2.00	Coal Va		
		406.00			START CORING		
HYDROLOGICAL DATA:					DEPTH OF WATER:		
DRILL HOLE DATA	RU-223C 05/10/29		LOCATION	Joe Weger		E-LOGGED:	No
DATE DRILLED:	8/28/2018		SECTION:	29		GEO HOLE:	
DATE COMPLETED:	8/29/2018		COUNTY:	Lawrence			
DRILLER:	Chuck		STATE:	ILL.			
HELPER:	Matt		TOWNSHIP:	Russell 5N			
TOTAL DEPTH:	458.38 ft.		RANGE:	10W			
CORE SIZE:	3"		QUAD:	Russellville			
CASING DEPTH:	10.0 ft.		NORTHING:	489288.10	Surface	793374.18	
# OF CEMENT BAGS:	Truck		EASTING:	368935.93	433.2	1209218.3	
NOTES:			NOTES:			433.2	

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.
	FEET							
	CUT	REC	FROM	TO	THICK			
1.00	19.62	19.62	406.00	407.13	1.13	Coal Va		
			407.13	410.94	3.81	DK. Gr. Sandy Shale, Lt. Gr. Sandstone Strks., Medium Bedding, Moderately Hard		
			410.94	416.79	5.85	Lt. Gr. Sandstone, DK. Gr. Shale Strks., Medium Bedding, Moderately Hard		
			416.79	419.95	3.16	Med. Gr. Sandy Shale, Occ. Sandstone Strks., Thick Bedding, Moderately Hard		
			419.95	425.62	5.67	DK. Gr. Silty Shale, Siderite Nods., Thick Bedding, Moderately Hard		
			425.62			START CORING		
2.00	17.76	17.76	425.62	425.91	0.29	DK. Gr. Silty Shale, Siderite Nods., Thick Bedding, Moderately Hard		
			425.91	426.80	0.89	Med. Gr. Fossil Shale (Highly Fossiliferous), Massive Bedding, Hard		
			426.80	429.83	3.03	DK. Gr. Fossil Shale (Lightly Fossiliferous), Massive Bedding, Hard		
			429.83	432.00	2.17	Limestone, White, Massive Bedding, Very Hard		
			432.00	436.24	4.24	Blk. Silty Shale, Thick Bedding, Moderately Hard		
			436.24	443.38	7.14	Coal V		
			443.38			START CORING		
3.00	15.00	1.31	443.38	444.69	1.31	Lt. Gr. Sandy Shale, DK. Limestone Nods., Medium Bedding, Moderately Hard		
			444.69	458.38	13.69	Coreloss (lost almost all of floor on 3rd run)		
			458.38			T.D.		
						Bot. of Coal V: -10.18		

HYDROLOGICAL DATA:		DEPTH OF WATER:	
DRILL HOLE DATA	RU-223C 05/10/29	LOCATION	Joe Weger
DATE DRILLED:	8/28/2018	SECTION:	29
DATE COMPLETED:	8/29/2018	COUNTY:	Lawrence
DRILLER:	Chuck	STATE:	ILL.
HELPER:	Matt	TOWNSHIP:	Russell 5N
TOTAL DEPTH:	458.38 ft.	RANGE:	10W
CORE SIZE:	3"	QUAD:	Russellville
CASING DEPTH:	10.0 ft.	NORTHING:	489288.10 Surface
# OF CEMENT BAGS:	Truck	EASTING:	368935.93 433.2
NOTES:		NOTES:	

E-LOGGED: No
 GEO HOLE: _____
 793374.18
 1209218.32
 433.2

SUNRISE COAL DRILL LOG

RIG: L & J Exploratory

RUN #	CORE					DESCRIPTION OF ROCK NOTE	CORE DESC.	CORE GRAPH.		
	FEET									
	CUT	REC	FROM	TO	THICK					
			410.43	416.14	5.71	DK. Gr. Shale, Siderite Nods., Thick Bedding, Moderately Hard				
			416.14	416.88	0.74	DK. Gr. Fossil Shale, Highly Fossiliferous, Massive Bedding, Hard				
			416.88	418.16	1.28	Limestone, White, Fossiliferous, Massive Bedding, Very Hard				
			418.16	419.88	1.72	Blk. Silty Shale, Medium Bedding, Moderately Hard				
			419.88	420.59	0.71	Calcureous Intrusion, Fossiliferous, Massive Bedding, Very Hard				
			420.59	421.35	0.76	Med. Gr. Silty Shale, Thick Bedding, Moderately Hard				
			421.35	422.03	0.68	Coal V				
			422.03	423.00	0.97	Coreloss (Possibly in Coal V, Running Elog to Verify)				
			423.00			START CORING				
2.00	19.50	19.89	423.00	426.90	3.90	Coal V				
			426.90	430.22	3.32	Lt. Gr. Sandy Underclay, DK. Limestone Nods., Thick Bedding, Medium Hard				
			430.22	442.89	12.67	Lt. Gr. Sandstone, Occ. DK. Limestone Nods., Thick Bedding, Moderately Hard				
			442.89			T.D.				
						Bot. of Coal V: +7.2'				
<table border="0" style="width:100%"> <tr> <td style="width:50%">HYDROLOGICAL DATA:</td> <td style="width:50%">DEPTH OF WATER:</td> </tr> </table>							HYDROLOGICAL DATA:	DEPTH OF WATER:		
HYDROLOGICAL DATA:	DEPTH OF WATER:									
DRILL HOLE DATA			RU-224C	05/10/29	LOCATION		Joe Weger	E-LOGGED:	Yes	
DATE DRILLED:			8/30/2018		SECTION:		29	GEO HOLE:		
DATE COMPLETED:			8/31/2018		COUNTY:		Lawrence			
DRILLER:			Chuck		STATE:		ILL.			
HELPER:			Matt		TOWNSHIP:		Russell 5N			
TOTAL DEPTH:			442.89 ft.		RANGE:		10W			
CORE SIZE:			3"		QUAD:		Russellville			
CASING DEPTH:			5.0 ft.		NORTHING:		488595.84	Surface	792682.08	
# OF CEMENT BAGS:			Truck		EASTING:		368945.28	434.1	1209237.15	
NOTES:					NOTES:				434.1	

SUNRISE COAL DRILL LOG					RIG: L & J Exploratory		
RUN #	CORE		DESCRIPTION OF ROCK NOTE			CORE DESC.	CORE GRAPH.
FEET							
CUT	REC	FROM	TO	THICK			
		0.00	8.00	8.00	Sand/Gravel		
		8.00	12.00	4.00	Clay		
		12.00	25.00	13.00	Gr. Shale		
		25.00	72.00	47.00	Gr. Sandy Shale		
		72.00	75.00	3.00	Limestone		
		75.00	82.00	7.00	Med. Gr. Sandy Shale		
		82.00	85.00	3.00	Blk. Shale		
		85.00	90.00	5.00	Gr. Shale (Soft)		
		90.00	98.00	8.00	Gr. Shale		
		98.00	100.00	2.00	Gr. Sandy Shale (Limey)		
		100.00	105.00	5.00	Gr. Sandy Shale		
		105.00	139.00	34.00	Sandstone		
		139.00	141.00	2.00	Sandstone (Hard)		
		141.00	189.00	48.00	Sandstone		
		189.00	194.00	5.00	Limestone		
		194.00	209.00	15.00	Gr. Shale		
		209.00	212.00	3.00	Limestone		
		212.00	218.00	6.00	Gr. Shale		
		218.00	230.00	12.00	Sandstone		
		230.00	236.00	6.00	Gr. Shale		
		236.00	238.00	2.00	Coal		
		238.00	250.00	12.00	Gr. Sandy Shale		
		250.00	290.00	40.00	Sandstone		
		290.00	297.00	7.00	Med. Gr. Shale		
		297.00	301.00	4.00	Coal VII		
		301.00	308.00	7.00	Gr. Shale		
		308.00	340.00	32.00	Sandstone		
		340.00	348.00	8.00	DK. Gr. Shale		
		348.00	352.00	4.00	Coal VI		
		352.00	354.00	2.00	Gr. Shale		
		354.00	358.00	4.00	Coal VI		
		358.00	360.00	2.00	Gr. Shale		
		360.00	365.00	5.00	Sandstone		
		365.00	375.00	10.00	Gr. Shale/Sandstone Strks.		
		375.00	380.00	5.00	Sandstone		
		380.00	408.00	28.00	Gr. Shale		
		408.00	411.00	3.00	Coal Va		
		411.00	416.00	5.00	Sandstone		
		416.00			START CORING		
1.00	20.00	19.75	416.00	417.11	1.11	Lt. Gr. Sandstone (Med. Grain), Medium Bedding, Moderately Hard	
HYDROLOGICAL DATA:				DEPTH OF WATER:			
DRILL HOLE DATA		RU-225C 05/10/29		LOCATION		Joe Weger	
DATE DRILLED:		9/4/2018		SECTION:		29	
DATE COMPLETED:		9/5/2018		COUNTY:		Lawrence	
DRILLER: Luke				STATE:		ILL.	
HELPER: Matt				TOWNSHIP:		Russell 5N	
TOTAL DEPTH:		456.25 ft.		RANGE:		10W	
CORE SIZE:		3"		QUAD:		Russellville	
CASING DEPTH:		15.0 ft.		NORTHING:		487833.29 Surface	
# OF CEMENT BAGS:		Truck		EASTING:		368664.41 423.8	
NOTES:				NOTES:		791915.72 1208966.7 423.8	

**Surface Water
Sampling and Analysis Plan
Sunrise Coal, LLC
Oaktown Mine Illinois Portal
Lawrence County, Illinois**

January 2019

Prepared for:
Sunrise Coal, LLC

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ATTACHMENTS

- A. Surface Water Monitoring Parameters

I. SURFACE WATER SAMPLING PROCEDURES

The sampling plan for surface water monitoring at the proposed mine site has been described below. This sampling plan addresses procedures and techniques for sample collection, preservation and shipment; chain-of-custody control; and proper field documentation. The procedures set forth in this plan are widely recognized as industry standards and when applicable, have been referenced to published documents. Sampling and analysis are to be completed in general accordance with the USGS National Field Manual for the Collection of Water Quality Data, dated 2008.

A. Sampling Schedule

Whenever possible, surface water samples should be collected at the designated sampling locations during and/or following a rainfall event that is greater than 0.1 inches in magnitude or equivalent snow melt, and across at least 12 hours from the previously measurable (greater than 0.1 inch rainfall or equivalent snow melt) storm event.

B. Initial Documentation

The number of samples to be collected and analyzed shall be determined prior to mobilization to the site. Sampling equipment should be inspected to insure serviceability and cleanliness. Upon arrival at each sampling location, the flow condition of the stream and/or sampling point should be observed and recorded. Specific items to observe should include physical conditions at the sampling location; detection of any physical activity or disturbance of the stream, or water body; evidence of any visible contamination; flow conditions within the stream or water body, and precipitation conditions at least 72 hours prior to the sampling event.

C. Flow Measurements

At the time of sampling, a reasonable attempt should be made to measure the flow of water at the sampling location, and the storm duration and total precipitation quantity causing the flow. Flow measurement may be based on a generalized cross section of the stream at the sampling location, and time measurement of water passage at the sample location.

D. Sample Collection

Sample collection is to be completed with proper sampling equipment. Non-isokinetic sampling methods are to be used at both flowing-water and still-water sites. Generally, open mouth bottle samplers will be utilized for sampling purposes, however thief samplers or bailers may be used during high flow conditions and/or for still-water sampling. Discrete sampling methods are to be followed, including lowering the sampler to a specified depth and collecting a sample by first opening, then closing the sampler. This process is to be completed in a manner which allows collection of a representative stream sample which is not impacted as a result of sampling efforts (e.g., solids suspension resulting from stream disturbance during sampling). For discharges from holding ponds or other impoundments with a retention period greater than 24 hours, or from still water locations, a minimum of one grab sample may be taken and analyzed. For all other flowing-water discharges, a grab sample should be taken during the first thirty minutes of the discharge and a minimum of three sample aliquots taken in each hour of the discharge for the entire discharge or the first three hours of the discharge, with each aliquot being separated by a minimum period of fifteen minutes. The grab sample taken during the initial thirty minutes of discharge shall be analyzed separately and the remaining sample aliquots may be combined to form a single sample for analysis.

E. Sample Preservation and Shipment

Since many different analyses may be required, various types of containers and preservatives may be necessary. The appropriate containers and preservatives shall be supplied by the contract laboratory for each sampling point and each sampling event. Plastic or glass containers shall be utilized for sample

shipment and storage. All samples except those collected for the analysis of constituents listed below shall be field filtered through a 0.45 micron filter. Samples to be analyzed for the following constituents are not to be field filtered (Note that constituents presented in Attachment B do not require to be field filtered).

- Alkalinity/Acidity
- Total suspended solids/Total dissolved solids
- Volatile organics
- Oil and grease
- Total organic halogen
- Total heavy metals
- PH, specific conductance
- Hardness

If applicable, chemical preservatives are to be added immediately after the sample has been obtained. After sample collection and chemical preservation has been completed, the sample is to be placed in an insulated container and stored at low temperatures (4° C). All samples shall be restricted from sunlight and extreme temperatures during shipment to the laboratory. Shipment to the laboratory should be completed the day of sampling or the following day. The holding times used should be in accordance with those recommended in "Methods for Chemical Analysis of Water and Wastes," EMSL-EPA, March 1983.

F. Chain of Custody

At the time of sample collection, at least two chain-of-custody records shall be completed. Generally chain-of-custody documents are provided by the testing laboratory. The individual completing sample collection shall complete the forms and sign as the initial custodian of the samples. Upon delivery to the contract laboratory, the recipient of the samples shall sign as the subsequent custodian. One Signed form is to be retained by the individual completing the sampling, while the other form is to remain with the sample and is to be retained by the laboratory. If the contract laboratory subcontracts work, a copy of the chain-of-custody record shall be made and retained by the primary laboratory. The original signature form shall remain with the samples being transferred.

All sampling procedures, measurements and observations are to be recorded on field information logs or chain-of-custody forms as appropriate. These documents are to be transferred to the laboratory with delivery of the samples.

II. LABORATORY PROCEDURES

Laboratory procedures to be followed have been generally addressed below. The laboratory(ies) to be used for sample analysis is to be certified by the IEPA. Detailed discussions of the laboratory procedures and protocol have not been addressed herein since certification from regulatory agencies generally assures the complete and proper operation of the laboratory and laboratory procedures.

A. Analytical Procedures

Constituents to be analyzed will be specified by the site manager. Analysis, analytical results, and quality criteria are to be based on guidelines from the following authoritative sources:

1. "Methods of Chemical Analysis of Water and Wastes," EMSL-EPA, March 1987.
2. "Standard Method for the Examination of Water and Wastewater," American Public Health Association, American Waterworks Association, Water Pollution Control Federation, 16th Edition, 1985.

3. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," USEPA, SW-846, (Revised 1984).

Other references required by the site manager, IDNR, or IEPA may be specified for future testing. It is the responsibility of the contract laboratory to remain up to date and knowledgeable of changes in laboratory procedures and policies.

B. Laboratory Records and Reporting

The contract laboratory is to maintain complete records which, at a minimum, outline sample preparation, analysis conditions, QA/QC information, test results, batch and test method identification, and completed calculations or computer printouts. Records may be kept on suitable forms prepared by the laboratory. All records are to be kept for a minimum of one year or longer if requested by the site manager. After analytical results have been checked, formal laboratory report sheets are to be prepared. The formal report sheets are to be signed by an appropriate representative of the contract laboratory. The original report sheets and chemical analysis forms are to be submitted to the site manager by the required deadline. It shall be the ultimate responsibility of the laboratory to ensure that report forms are submitted by the required deadline. If it is anticipated that the deadline cannot be met, the site manager shall be contacted immediately.

Laboratory personnel shall insure that laboratory data is assessed for precision, accuracy and completeness. This assessment should be completed in accordance with guidelines presented in Standard Methods for the Examination of Water and Wastewater," 16th Edition, 1985 or other recognized publications.

Attachment A

Surface Water Monitoring Parameters for Initial 12 Months (Background Sampling Period)

pH Lab
pH Field
Acidity
Alkalinity
Hardness, Total
Iron, Total
Manganese, Total
Total Suspended Solids
Total Dissolved Solids
Sulfate
Chloride
Flow estimate

Following collection of the samples during the twelve month background monitoring period, sampling shall be reduced to quarterly and the parameters monitored shall be reduced to include those constituents listed in in the NPDES permit and 62 ILL. Adm. Code 1780.21(h).

**TABLE 4.6.1
Surface Water Bodies List**

WATER BODY ID	WATER BODY TYPE	OWNER	LOCATION (ADDRESS OR LAT/LONG)	LOCATION RELATIVE TO PERMIT AREA
P01	Pond	04-28-300-001, 04-29-200-007	38.848632, -87.539127	Within 1/2 Mile of Permit Area
P02	Pond	04-32-100-001	38.836665, -87.554536	Within 1/2 Mile of Permit Area
P03	Pond	04-32-100-001	38.836495, -87.555437	Within 1/2 Mile of Permit Area

Water Body ID will match to Table 4.6.2

Water Body Type: Lake, Pond, Stream, River, Spring, Impoundment

Location Relative to Permit Area: Within Permit Area Boundaries; Within Shadow Area; Within 1/2 Mile Boundary of Permit Area; Within 1/2 Mile of Shadow Area

TABLE 4.6.3
Stream Sampling Points Summary

Stream Sample ID: SW 1 - U.S. Existing or Proposed (circle)

GPS Location (decimal degrees): Lat 38.8489, Lon 89.5461

Stream/River Name: Unnamed

	Date	Date	Date	Date	Date	Date
	11/28/2018	12/17/2018	1/14/2019	2/11/2019	3/11/2019	4/1/2019
Hardness	n/a	n/a	n/a	n/a	n/a	n/a
pH	7.21	7.12	7.40	7.09	7.51	7.61
Total Suspended Solids	<10	<10	<10	<10	<10	<10
Total Dissolved Solids	500	120	620	130	480	500
Alkalinity	230	193	206	93.1	192	192
Acidity	<10	<10	<10	<10	<10	<10
Sulfate	13.0	5.0	9.0	<4	4.0	5.0
Iron (Total)	0.39	0.22	0.30	0.54	0.18	0.34
Manganese (Total)	0.11	0.055	0.036	0.054	0.037	0.041
Chloride (Total)	<6	<6	59.0	136	27.5	45.5
Flow Rate (cfs)	0.028	0.067	0.042	0.139	0.042	0.035

All parameters reported in mg/L, unless otherwise specified.

NOTE: USE ONE TABLE PER SAMPLE POINT; EXPAND TABLE AS NECESSARY TO ACCOMMODATE ALL DATA
If Stream/River is unnamed, provide name of stream/river the segment is tributary to.
PRINT TABLE IN LANDSCAPE

Table modified 3/14/2018

TABLE 4.6.3
Stream Sampling Points Summary

Stream Sample ID: SW-2 D.S. Existing or Proposed (circle)

GPS Location (decimal degrees): Lat 38.8372, Lon 87.5444

Stream/River Name: Unnamed, tributary to Wabash River

	Date	Date	Date	Date	Date	Date
	11/28/2018	12/17/2018	1/14/2019	2/11/2019	3/11/2019	4/1/2019
Hardness	n/a	n/a	n/a	n/a	n/a	n/a
pH	7.36	7.30	7.72	7.16	7.58	7.44
Total Suspended Solids	<10	<10	<10	24.7	10.1	<10
Total Dissolved Solids	310	440	360	340	450	210
Alkalinity	177	202	137	39.5	159	112
Acidity	<10	<10	<10	<10	<10	<10
Sulfate	7.0	6.0	7.0	<4	4.0	6.0
Iron (Total)	0.51	0.43	0.18	0.7	0.64	1.43
Manganese (Total)	0.10	0.07	<.01	0.04	0.16	0.06
Chloride (Total)	8.5	7.5	12.5	17.5	24.5	<6
Flow Rate (cfs)	0.375	1.333	0.250	0.833	0.463	0.259

All parameters reported in mg/L, unless otherwise specified.

NOTE: USE ONE TABLE PER SAMPLE POINT; EXPAND TABLE AS NECESSARY TO ACCOMMODATE ALL DATA
If Stream/River is unnamed, provide name of stream/river the segment is tributary to.
PRINT TABLE IN LANDSCAPE

Table modified 3/14/2018

TABLE 4.6.3.4
Surface Water Monitoring Parameter List

NAME	ABBREVIATION
Chloride	Cl
Iron	Fe
Manganese	Mn
Sulfate	SO4
Total Dissolved Solids	TDS
Total Suspended Solids	TSS
pH	
Acidity	
Alkalinity	
Hardness	
Flow Rate (cfs)	

Attachment 4.7.7.1

Oaktown Mine Illinois Portal

Analysis of Alternatives to Proposed Sediment Pond Discharge

The site drainage plan for the proposed Illinois Portal consists of surface water collection ditches that collect stormwater runoff from the mine area for conveyance of this runoff to the proposed sediment control pond. The pond will utilize a water discharge structure that will discharge excess runoff water to the receiving stream after runoff water has been detained for a time sufficient for solids removal by sedimentation.

The operator of the proposed Illinois Portal plans to use sedimentation ponds as the method for treating collected stormwater at the site. The use of sedimentation ponds is standard practice in the mining industry for treating stormwater at mine surface operations. It is the most cost efficient and cost effective method for reducing pollutant load in stormwater from disturbed areas. All stormwater discharged from the affected area of the proposed permit area will pass through the sedimentation pond. Sedimentation ponds control the release of stormwater by retaining the influent drainage and detaining the drainage for a sufficient amount of time for the majority of the sediment to settle out in the pond and not be part of the discharged effluent water.

This assessment includes consideration of the following alternatives to the construction and operation of the single pond proposed within this application: no mining; no discharge of stormwater from the site; reduction in the number of outfall points; and alternative on-site treatment technologies. The options were examined to determine whether there are measures other than what has been proposed by Sunrise Coal that are technically feasible and economically reasonable which would result in less of a load increase, no load increase or minimal environmental degradation.

ALTERNATIVE NO. 1

Do Not Construct

Presently, and for the foreseeable future, coal is essential to the generation of electricity in midwestern states and the country. The need for low cost electricity in today's economy is essential to allow continued prosperity and economic stability. The coal industry is crucial to the economic health of the midwest and the country. Hundreds of millions of dollars are generated for the people of the midwest through direct mining jobs, taxes and support industry jobs.

Should the proposed portal construction not occur, mining of the remaining coal on the Illinois side of the Wabash River will be stopped with no additional mining. This would result in the following estimated economic losses:

- Loss of approximately 100 direct jobs with a payroll of approximately \$8.0 million annually. Many of these employees would be long term miners and are not

currently trained for other employment. In addition to the direct employees, approximately 50 additional persons such as truck drivers, engineers, and support personnel are employed full time through operation of the mine. It is further estimated that an additional 300 persons are employed in support, service and supply industries because of the mine. The Oaktown Mine deals with at least 50 different vendors for supplies and equipment for the operation. At least \$25 million is contributed to the local economy by this mine through payroll and spending. The mining industry is vitally important to the local economy of Lawrence County and the surrounding counties as well as to the region and state.

- Approximately 30 percent of the electricity produced in the U.S. and the midwest comes from coal-fired plants. During high use periods, this percentage of power generation can approach 50 percent. It is, therefore, vital to the local, state and national economy that available high quality coal be mined to maintain a continuous supply of fuel to the coal-fired plants. Economic losses will occur if sufficient electricity is not provided to energy consumers.
- The loss in tax revenue to the States, both direct and indirect, would be significant, particularly when a replacement industry is unknown.

In addition, Oaktown Mine has significant resources invested in the acquisition of land, coal reserves, permitting expenses, mining equipment, and etc. in this project. The economic loss to the company should no mining at the site occur would be substantial because of the significant investment in land, coal reserves, permitting expenses, and mining equipment made by the company using a business plan dependent on maximizing recovery of the coal reserve.

Considering the above economic considerations and the importance of coal to our society, the “Do Not Mine” alternative is not considered a reasonable alternative.

ALTERNATIVE NO. 2

No Discharge of Stormwater

Sedimentation ponds used to treat surface runoff from mine operational facilities are, essentially, “no discharge” facilities except for the periods during which sufficient precipitation has fallen to generate surface runoff.

Considering that the area of the proposed Illinois Portal receives in excess of 40 inches of precipitation as an annual average, total containment of all storm water is not considered feasible. Occasional discharges from sedimentation pond facilities is in accordance with applicable regulation in the State of Illinois so long as the quality of discharged water remains within the water quality parameters required. While it is considered beyond the scope of this permit application, it is likely that a case could be made that the total contaminants to be released from the proposed mine site and sediment control ponds will be reduced from the pre-mining discharges from an agricultural land use.

In summary, the total elimination of storm water discharges from the proposed sedimentation pond is not an available option.

ALTERNATIVE NO. 3

Reduce The Number of Outfalls

Considering that this proposed permit includes only one discharge point, a reduction of the number of discharge points is not a consideration.

ALTERNATIVE NO. 4

Use Alternative Sediment Control and Treatment Devices

It is well documented that alternatives to the use of sediment control ponds do exist. Such alternatives can include chemical soil stabilizers, erosion control blankets, geotextile filter bags, fiber rolls, silt fencing, straw mulch, straw bale dikes, and temporary seeding. Some of these alternative measures may be used in areas of the proposed permit area that cannot practically be directed to a planned sediment control pond. The use of sediment ponds such as those planned for the permit area are well suited to achieve the necessary water quality from mine operation and mine disturbance areas. With several decades of proven reliability, well designed sediment control ponds have proved to be standard practice within the industry.

With due consideration of the above, the use of alternative sediment control measures is considered practical and cost effective for the surface runoff from the relatively small portions of the permit area that cannot practically be directed to a sediment control pond. However, the use of these practices to eliminate the proposed sediment control ponds is not considered feasible.

ALTERNATIVE NO. 5

Collect and Treat Surface Water Runoff in Accordance With the Proposed Permit Application

As referenced in Alternative #4 above, the use of well-designed and well maintained sediment control ponds has proven very effective in the treatment of surface runoff from Illinois mine operations. By placement of such ponds in the down-gradient portions of the permit area, collection ditches should be very effective in collecting and conveying surface runoff to the respective treatment ponds. The relatively small areas that cannot practically be directed to such ponds can be effectively managed through the use of alternative sediment control measures until such time as permanent vegetative cover can be established on these areas.

This will allow the recovery of the energy represented by the coal to be mined at this site with the accompanying benefits to society in the way of energy independence, security, and economic development and improvement. This can be done in an environmentally sound manner, with no serious impairment to the quality of the ecosystem of the surrounding or downstream areas.

On this basis, Alternative #5 is presented as the most cost-effective and practical alternative to the effective treatment of surface water runoff from the proposed mine operation.

ALTERNATIVE TREATMENT TECHNOLOGIES

The following have been presented as possible alternatives to the use of sediment control ponds and are addressed below.

A. Filtration

Filtration is a water treatment process by which discharge water is passed through a physical barrier which removes particulate matter from the water stream. Filtration of mine drainage would involve disturbing a large area of land to install an elaborate filtration system. Dissolved solids are not filtered and removed by this technology and only a portion of suspended solids are removed, leaving an effluent that may not be in compliance with applicable regulations. It is also considerably more expensive to operate a full-scale filtration system than the sediment pond proposed for this facility. Filtration systems generate a sludge that must then be disposed of as a solid or hazardous waste in a landfill which is also expensive. Another impracticality associated with filtration is that a relatively steady flow of water is required into the system. This is not the case for storm water runoff from mining operations.

Therefore, filtration is a technology that is not considered feasible for the proposed facility because: 1) filtration does not remove dissolved solids and filters only a portion of suspended material, 2) filtration would be much more expensive and sedimentation ponds both in initial cost and long-term maintenance and operation, 3) filtration processes require a steady stream of water for treatment which is not the case in treating storm water runoff, 4) a large area of land would be required for such a facility, and 5) maintenance and supervision of the filtration and sludge disposal operation would be burdensome and would increase production costs.

B. Reverse Osmosis

In reverse osmosis, water for treatment is pumped through a closed membrane system at extremely high pressures. These membranes allow purified water to pass through while trapping contaminating ions which produces a reject

stream on the exterior of the membrane. It is then necessary to treat the reject stream with a chemical for coagulation and then permanently dispose of the precipitate in a sanitary landfill.

Several problems are present with this system as it would be applied to treatment of storm water discharges from the proposed site. These include the requirement for extremely high electrical energy and large amounts of water which would result in an enlarged carbon footprint. The source water for the system is likely to require pretreatment to prevent biological growth and mineral precipitation. The precipitate from the reject stream would require landfill disposal. Maintenance and operation of such a facility would require an extreme amount of supervision, maintenance and technical personnel to handle the facility and the disposal of precipitate.

Reverse osmosis has been designed and used primarily in the production of potable water from sea water, and is therefore intended for the removal of materials with very small particle size. Stormwater runoff from a mining operation will contain particle sizes that are wide ranging in size. Such particle size distribution is considered likely to foul the membranes in RO systems, thus rendering them ineffective.

Considering the above, reverse osmosis technology is not considered feasible or applicable to the proposed operation.

C. Bioremediation

Bioremediation is the use of treatment wetlands to create anaerobic and aerobic environments to remove sulfates, some metals, and other contaminants. If used to treat storm water discharge from a mining operation, water would have to be pumped into the wetland in a controlled flow rate and allowed to slowly travel through the system to achieve treatment. Anaerobic bacteria would be expected to remove sulfates by converting sulfates to sulfides. Under aerobic conditions, plant life would serve to remove certain metals through plant uptake.

Constructed wetlands have proven to be effective for the referenced treatment with several limitations. These limitations include 1) low and consistent rates of inflow, 2) reduced or stoppage of winter condition inflow due to reduced biological activity of the sulfate reducing bacteria and aerobic plant life, 3) eventual sludge accumulation requiring dredging and wetland reconstruction, and 4) release of hydrogen sulfide and other digestive gases into the atmosphere from sulfate digestion processes. Another serious limiting factor to the use of wetlands in mine storm water runoff treatment would be the enormous amount of land required to construct a wetland of sufficient size for the flow rates to be expected from such an operation.

Considering the above limitations, treatment wetlands are not considered a feasible alternative to the use of sediment ponds at the subject operation.

D. Coagulation (chemical) Precipitation

This process consists of the addition of alkaline chemicals to acid mine effluent to induce metals to precipitate and to reduce acidity. Chemicals typically used include hydrated lime, limestone, soda ash, caustic soda and ammonia. Variables that are considered in the design and application of such a system include the level of acidity, suspended solids, iron and manganese concentrations, and flow rates. No source of acidity is expected to occur from the proposed operation.

Concerns with the use of chemical precipitation at the proposed facility include 1) worker safety regarding the chemicals to be used, 2) treatment cost, 3) process operation and maintenance, 4) disposal of precipitate sludge in a landfill possibly considered a hazardous substance, 5) necessity of such treatment considering that acid water is not considered a factor for the proposed operation, 6) susceptibility to system malfunction due to high volume flows from storm events, 7) improbability of actual improvement in overall water quality when compared to the use of sedimentation ponds.

Considering the above, the use of this technology is considered inappropriate at the proposed Illinois Portal.

E. Ion Exchange

Ion exchange removes unwanted ions, generally metals, by passing the effluent stream through a resin designed specifically for the individual ion to be removed. These processes are designed for very specific removal applications, usually low flow regimes such as softening of hard water (calcium and magnesium removal) for human consumption purposes or for metal removal in industrial plating processes. For ion exchange to be successful, input water that is relatively free of suspended solids is essential to avoid fouling of the resin. Ion exchange is just that – it involves “swapping” one ion for ions considered less objectionable. For example, ion exchange as it relates to water softening involves removal of calcium and magnesium ions and replacing them with sodium ions. This results in an output stream that is not reduced in the amount of chemical components.

Additional operational considerations with ion exchange include large amounts of water needed for regeneration of the resins and disposal of brine that is produced in the process. Further, the processes require large amounts of water and energy for operation.

Considering the above, ion exchange technology is not feasible, nor applicable for use at the proposed Illinois Portal.

F. Cost Effective Sulfate Removal (CESR) Process

CESR is a proprietary technology developed to improve sulfate removing technology.

It is a four step process as follows: Step one includes the addition of hydrated lime to the feed water to precipitate gypsum; the non-hazardous gypsum sludge is removed by dewatering and filtration. Step two involves additional liming to raise the pH to 10.5 and results in the precipitation of dissolved metals as metal hydroxides which is also removed by dewatering and filtration. Step 3 involves additional liming to increase pH to 11.5 and the addition of a proprietary reagent to precipitate ettringite. Step four involves reducing the pH with CO₂ to meet local discharge criteria. This step also involves clarification with accompanying sludge removal from the clarifier.

With additional consideration to the extreme complexity and unproven theory aspect of this technology, it is considered impractical for use at this site 1) each precipitation step is time consuming and would require the use of large amounts of land 2) infrastructure costs, including the installations of tanks and storage handling equipment is high, 3) this proprietary technology is still being developed and is cost-prohibitive at this time, 4) this technology is plagued by severe scaling and precipitation of minerals, 5) the very large amounts of resultant sludge would need to be disposed of as solid or hazardous waste, 6) the water treated in this system has a high specific conductivity and a high concentration of total dissolved solids 7) there is a high supervision and maintenance requirement to use this technology, and 8) there is no known source of sulfates to be associated with this operation.

G. Supervac

Supervac is a technology to handle solid wastes and sludge that result from other water treatment technologies. This technology would be appropriate only in conjunction with another water treatment technology. This technology would not be feasible for use at the proposed site because it is not a stand-alone water treatment technology.

SCHEDULE A

DISCHARGE NO.	001	002	003	004	005	006	007	008	009	010	011	012	013	014
LATITUDE COORDINATES*	38.838													
LONGITUDE COORDINATES*	-87.5462													
QUARTER SECTION	SW of SE													
SECTION	29													
TOWNSHIP	5N													
RANGE	10 W of 2nd PM													
COUNTY	Lawrence													
RECEIVING STREAM	Unnamed													
TRIBUTARY TO:	Wabash River													
TRIBUTARY TO:	Ohio River													
TRIBUTARY TO:	Miss. River													
AVERAGE FLOW (GPD) - if discharge does not result from precipitation	5,000													
MAX FLOW (GPD) - if discharge does not result from precipitation	7,500													
SOURCE OF DISCHARGE - (e.g., Pit Pumpage, Processing Plant Circuit, Underground Mine Pumpage, Surface Runoff, etc.)	Precip, waste water plant													
SAMPLING METHOD (24 HR Composite, Grab, Estimate, etc.)	Grab													
ACIDITY (MG/L)	20													
ALKALINITY (MG/L)	150													
LEAD (MG/L)	**													
IRON (MG/L)	0.5													
MANGANESE (MG/L)	0.2													
pH (RANGE)	6-9													
ZINC (MG/L)	**													
FLUORIDE (MG/L)	**													
TOTAL SUSPENDED SOLIDS (MG/L)	35-70													
SULFATE (MG/L)	100													
TOTAL DISSOLVED SOLIDS (MG/L)	750													
CHLORIDE (MG/L)	50													

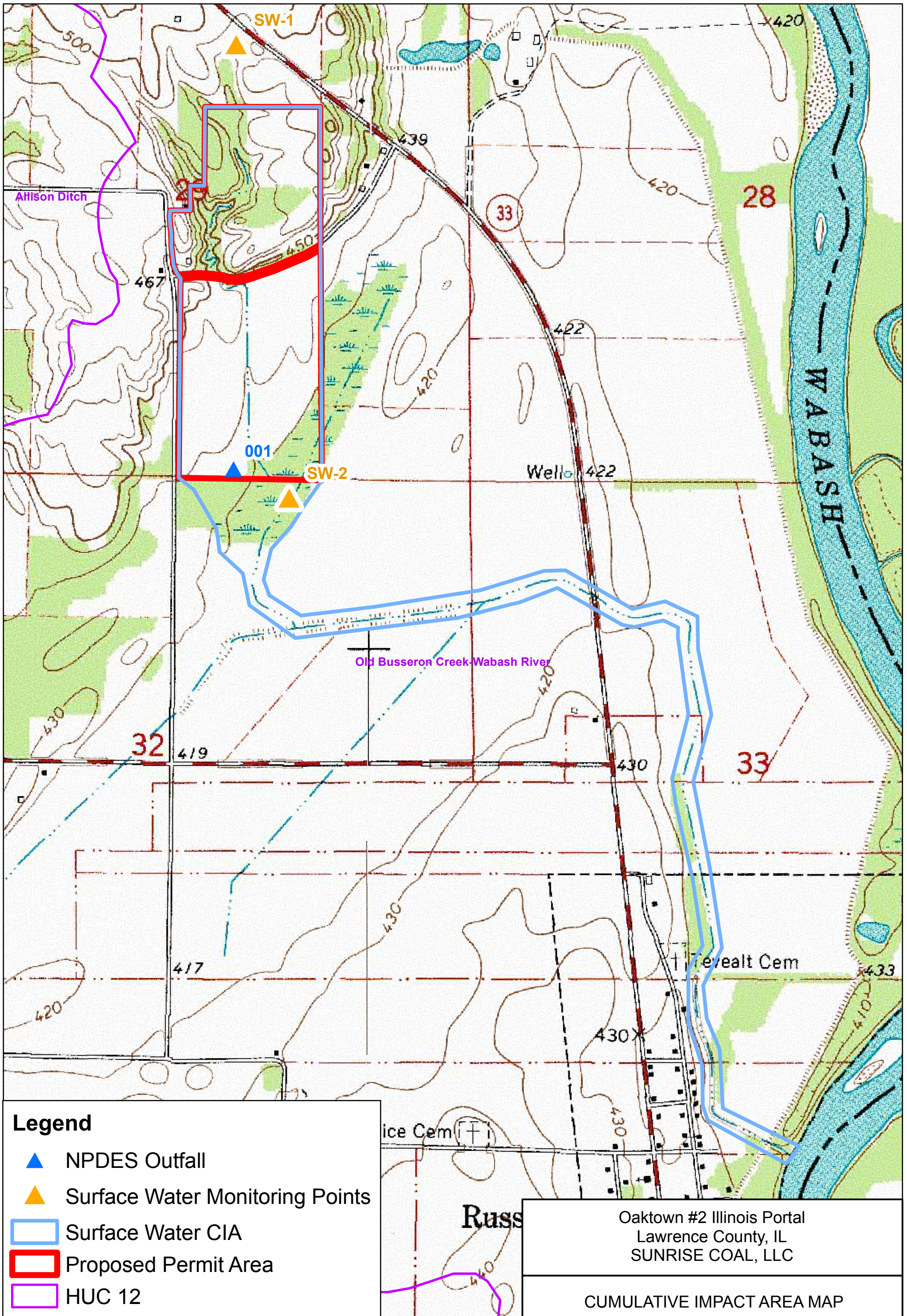
* In Decimal Degrees

** Data not available

If application is for NPDES Permit, USEPA Form 2C or 2D may also be required.

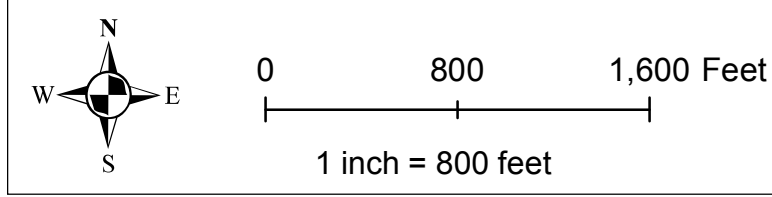
Discharge No. should correspond with NPDES discharge number and shall be shown on the mine operations map and hydrogeologic map.

Table modified 3/14/2018



Legend

- ▲ NPDES Outfall
- ▲ Surface Water Monitoring Points
- Surface Water CIA
- Proposed Permit Area
- HUC 12



Oaktown #2 Illinois Portal Lawrence County, IL SUNRISE COAL, LLC	
CUMULATIVE IMPACT AREA MAP	
HMG HMG Engineers, Inc. 1032 N. 6th Street Murphysboro, IL 62966	Date: 1/31/2019 Attachment 4.8

PART 5: Drainage Control

5.1 Pre-mining Drainage Patterns Mapping. On the Existing Streams Location and Watershed Map, show the pre-mining drainage patterns of all areas to be affected by the mining and reclamation activities within the permit boundary and properties adjacent to the permit boundary. The map shall include, at minimum, adequate contour mapping, a delineation of the watershed boundaries both within and adjacent to the permit boundary, and shall depict the size of each watershed. [1780.14/1784.23]

5.2 General Drainage Control Description.

5.2.1 Will all surface drainage from the affected mining area be collected and treated prior to leaving the permit area? [1816.46(b)(2)/1817.46(b)(2)] ***Some drainage from the access road will not drain to sediment pond, and this area is exempt according to above regulation. Best management practices will be used for this area.**

YES NO

If NO, delineate the areas where an exemption is being requested on the Operations Map. Describe each location concerning the size of the disturbed area and the type of disturbances. Describe alternate sediment control measures to be utilized if proposed. Demonstrate that siltation structures and alternate sediment control measures (if not proposed) are not necessary for drainage from the disturbed areas to meet effluent limitations and water quality standards. [1816.46(e)/1817.46(e)]

5.2.2 Will any surface drainage from unaffected areas be intercepted and diverted around the affected mining area. [1816/1817.43(a)]

YES NO

If NO, explain why this is not necessary.

No proposed diversion ditches are to intercept drainage from unaffected areas to divert around the affected mining area. The unaffected area north of County Road 1840N, the unaffected area south of County Road 1840 west (and including) the grass waterway, and the area south of County Road 1840 north of the affected area currently and will continue to drain around the affected area. All areas whether affected or unaffected within the proposed permit area reporting to the proposed collector ditches will report through Basin 001.

If YES, based on the definitions of “perennial” and “intermittent” streams as outlined in [62 Ill. Adm. Code 1701.Appendix A](#), does the Applicant propose to divert a perennial or intermittent stream?

YES NO

If YES, also complete the appropriate items of Part 6.0: Streams.

5.2.3 Describe the timing in which all construction of the sediment ponds and surface drainage control structures will be completed. Include a discussion of the vegetation stabilization of these structures. [1816.46(b)(3)/1817.46(b)(3); 1816.49(a)(7)/1817.49(a)(7)]

Sediment control structures will be constructed as the first step in developing individual mining areas. The initial construction sequence will involve building the sediment basins and the building the collection ditch diversions routed to the receiving sediment control structures. The structures will then be seeded in accordance with the following:

100 lb/ac	Winter Wheat
10 lb/ac	Orchard Grass
5 lb/ac	Red Clover
5 lb/ac	Alfalfa
5 lb/ac	Kentucky Bluegrass

This purpose of vegetating sediment ponds is to control erosion and ensure stability of the structures, integral functions of the sediment control system. Vegetation should be selected on the basis demonstrations of ensuring that functionality. To do otherwise is to compromise the sediment control system by encouraging scouring of ditches, creating need for costly ditch repairs, prematurely reaching sediment storage capacity in sediment ponds, and creating unnecessary and costly sediment pond maintenance issues. Structural stability is paramount. It is therefore imperative that species be selected on their demonstrated function in regard to sediment control and ensuring structural stability. The above list meets those criteria. That is not to say the proposed species have no value to wildlife. These species are recommended by the USDA as wildlife habitat for their Conservation Reserve Program. So there is wildlife habitat value from this list in addition to the sediment control and structural stability functions. This justification allows for the use of these species according to Section 1816.111(a)(2).

5.3 Conveyance Ditch Design.

5.3.1 Does the Applicant propose to construct or modify any conveyance ditch that collects surface water drainage from affected mining areas and direct it to sediment ponds/treatment facilities?

[1816/1817.45(b)(3)]

YES NO

Does the Applicant propose to construct or modify any conveyance ditch that intercepts surface drainage from unaffected areas and direct it around the affected mining area? [1816/1817.45(b)(4)]

YES NO

If either answer above is YES, complete Table 5.3.1: Conveyance Ditch Design Summary and complete the remaining questions through Part 5.3.4. Refer to Technical Guidance Document 2 for clarification.

5.3.1.1 Provide detailed design and construction calculations for the ditches listed in Table 5.3.1 as Attachment 5.3.1.1. [1816.43/1817.43]

Refer to Attachment 5.3.1, Table 5.3.1 for design summary information on all proposed temporary diversions. No permanent diversions are proposed.

5.3.1.2 For all ditches listed in Table 5.3.1, indicate the location of each on the Operations Map in relation to the proposed mining operations. Include the drainage area reporting to each segment of conveyance ditch on the Surface Drainage Control Plan Map and/or indicate the drawing(s) that provide the information required and provide a specific reference in the area below.

[1780.14(b)(6)/1784.23(b)(6)]

Refer to Surface Drainage Control Plan (Map 7) for location of conveyance ditch. Refer to Attachment 5.4.1.2 for SEDCAD 25yr-6hr modeling (included with Basin 001 model). Design information included in Table 5.3.1 for Ditch DD-1A & Ditch DD-1B delineates parameters generated as part of the 25yr-6hr SEDCAD modeling of sediment basin 001.

5.3.1.3 Provide typical cross-sections for each ditch listed in Table 5.3.1 depicting the bottom width, side slopes, depth based on the appropriate precipitation event, and freeboard depth. (Indicate the drawing(s) that provide the information required and provide a specific reference in the area below.) [1780.14(b)(6)/1784.23(b)(6)]

Refer to Attachment 5.3.1 for cross section design drawing of Ditch DD-1A & Ditch DD-1B.

5.3.1.4 Provide profiles for each ditch listed in Table 5.3.1 depicting the flow line slope and the depth based on the appropriate precipitation event. (Indicate the drawing(s) that provide the information required and provide a specific reference in the area below.)

[1780.14(b)(6)/1784.23(b)(6)]

Refer to Attachment 5.3.1 for profile drawing of Ditch DD-1A & Ditch DD-1B.

5.3.1.5 Based on calculated flows, define areas that require supplemental erosion control such as rip rap or dry dams on the Surface Drainage Control Plan Map. Provide details and calculations on the design of additional erosion control features to be employed during the operational life of the ditches. [1780.14(b)(6)/1784.23(b)(6)]

No supplemental erosion control measures are proposed at this time.

5.3.1.6 Describe measures to ensure proper maintenance of diversion ditches, such as methods and frequency of cleaning of ditches that may receive excessive sediments and special equipment to be used for ditches designed with liners. [1816.43(a)(2)(c)/1817.43(a)(2)(c)]

No special equipment is required to clean sediment from Ditch DD-1A & Ditch DD-1B constructed. Transport of excessive sediment to the ditch from the surrounding operation is not anticipated.

5.3.1.7 Provide details of the proposed erosion and sediment control measures to be employed during the construction of the proposed conveyance ditches. [1816.43(a)(2)/1817.43(a)(2)]

Silt fence will be properly installed downstream of the ditch and berms prior to beginning construction. Silt fencing will be maintained until adequate vegetation is established to control erosion.

5.3.2 Are culvert(s) being proposed within the permit area including but not limited to ditches, stream crossings and/or transportation facilities.

YES NO

If YES, complete Table 5.3.2: Culvert Design Summary and the following:

5.3.2.1 Provide design calculations for each culvert as Attachment 5.3.2.1. [1816/1817.43(b)(3); 1816/1817.43(c)(3); 1816/1817.151(d)(1)]

Refer to Attachment 5.3.2.1, Attachment 5.4.1.2, & Table 5.3.2 for culvert design information and SEDCAD modeling.

5.3.2.2 Provide a profile for each culvert, depicting appropriate design information including but not limited to length, diameter, slope, inlet and outlet elevations, maximum headwater depth and elevation of roadway or rail crossing. (Indicate the drawing(s) that provide the information required and provide a specific reference in the area below) [1780/1784.29]

Refer to Attachment 3.8.3.2 for profile & cross section drawing of the proposed access road culverts.

5.3.2.3 For culverts being proposed beneath transportation facilities (road/railway), provide measures to be implemented to insure structural capacity under live loads. [1816/1817.151(d)(4)]

Culvert placed under roads will be installed on a stable compacted base and backfilled and covered with granular material. The culvert will then be capped off with a minimum of 2 ft. of rock.

5.4 Impoundments. This section refers to modifications or design plans for all impoundments including sediment ponds, freshwater lakes, recirculation lakes (both incised and above grade) other than those covered under Part 3.12 “Coal Refuse Disposal Area”. These structures are considered “impoundments” as defined in [62 Ill. Adm. Code 1701.Appendix A](#). Refer to Technical Guidance Document 2 for clarification.

5.4.1 Impoundment Design.

5.4.1.1 For all proposed impoundments, complete the Impoundment Design Table 5.4.1: Impoundment Design. [1816.46(c)/1817.46(c)]

See Table 5.4.1.

5.4.1.2 Discuss the design basis for the impoundment calculations. Submit calculations used in spillway designs and determination of inflow volume and pond volume as Attachment 5.4.1.2.

Refer to Attachment 5.4.1.2, SEDCAD modeling for Basin 001.

5.4.1.3 Provide construction and maintenance details of dams, spillways, seepage control measures, and erosion control measures for inlets and outlets. Employ maps and cross sections where necessary. [1816.45/1817.45; 1816.46/1817.46; 1816.49/1817.49]

Refer to Attachment 5.4.1.2 for a map and cross sections of the impoundment and discharge structure.

5.4.1.4 Submit a typical cross section of the embankment(s), details of the principal and emergency spillways and a plan view of each pond at an appropriate scale showing pond bottom contours and points of inflow. (Indicate the drawing(s) that provide the information required and

provide a specific reference in the area below) [1816.45/1817.45; 1816.46/1817.46; 1816.49/1817.49]

Refer to Attachment 5.4.1.2

5.4.1.5 If underground mining has or will occur beneath or adjacent to the proposed impoundment, the plan shall incorporate a technical discussion, survey and evaluation of the potential effect subsidence of the surface and subsurface strata would have on the structure. [1780.25(a)(1)(D)/1784.16(a)(1)(D)]

No planned subsidence for the existing room and pillar mine beneath Basin 001.

5.4.1.6 Explain what criteria will be used to monitor and determine periodic and/or timely removal of sediments from sediment ponds, to maintain storage volume capacity. If sediment removal becomes necessary to maintain necessary pond treatment volume, explain how the sediment will be removed, where it will be disposed of, and what protective measures will be used to ensure the integrity of clay and/or geosynthetic liners, if applicable. [1816.46(c)(1)(C)(vi)/1817.46(c)(1)(C)(vi)]

If sediment removal is necessary, the sediments will be tested to determine physical and chemical characteristics. In the event the material is not suitable as rooting media or substitute topsoil materials, it will be disposed of in the nearest active pit or made part of the spoil material in the closest mining area.

5.4.1.7 Will pH adjustment be necessary on any of the impoundments in order to meet the applicable State and Federal Standards? [1780.21(h); 1784.14(g)]

YES NO

If YES, discuss in detail, along with detailed basis of design. The basis should include a detailed description of the proposed treatment facilities, process flow diagrams, and design calculations. [1780.21(h)/1784.14(g)]

5.4.2 Impoundments Regulated by MSHA.

Are any of the impoundments proposed to be modified or constructed in Part 5.4.1 capable of impounding water or sediment to an elevation of five feet or more above the upstream toe of the structure and can have a storage volume of 20 acre-feet or more?

YES NO

Are any of the impoundments proposed to be modified or constructed in Part 5.4.1 capable of impounding water or sediment to an elevation of twenty feet or more above the upstream toe of the structure?

YES NO

If the answer to either above is YES, for each structure meeting or exceeding the size or other criteria of MSHA, 30 CFR 77.216(a), include the following additional information [1780.25(a)(2)/1784.16(a)(2)]:

5.4.2.1 The plan required to be submitted to the District Manager of the Mine Safety and Health Administration (MSHA) under 30 CFR 77.216 shall also be submitted to the Department as part of the permit application insofar as the MSHA informational design standard requirements are duplicative of the requirements of 62 Ill. Adm. Code 1780.25/1784.22. This plan shall be included as Attachment 5.4.2.1. [1816/1817.49(a)(2)]

5.4.2.2 Any certification issued by MSHA with respect to the design plan shall be included as Attachment 5.4.2.2. [1816/1817.49(a)(2)]

5.4.2.3 Provide a geotechnical analysis for stability design and construction specification requirements for the structure as Attachment 5.4.2.3. Include a description of each engineering design assumption and calculation with discussion of each alternative considered in selection design parameters and construction methods. [1780.25(f); 1784.16(f)]

5.4.2.4 Describe the operation and maintenance procedures that will be used to ensure the stability of each structure. Include all monitoring instrumentation to be used. [1780.25(a)(2)(C); 1784.16(a)(2)(C)]

5.4.3 Impoundment Reclamation.

For permanent impoundments, including sedimentation ponds, provide the following information:

5.4.3.1 Describe the proposed reclamation plans for each structure, including a time table and plans for removal and disposal of material. [1780.25(a)(2)(D); 1784.16(a)(2)(D)]

Basin 001 will be reclaimed to pre-mine land use after the portal site has been reclaimed.

For permanent impoundments, including sedimentation ponds, provide the following information:

5.4.3.2 Provide sufficient design data and calculations to substantiate that the design is in accordance with [NRCS Engineering Standard 378 “Ponds”](#) or [NRCS Technical Release #60 “Earth Dams and Reservoirs”](#). This information shall be included as Attachment 5.4.3.2. [1816/1817.49(b)(2)]

Not Applicable

5.4.3.3 Based on the location of the pond relative to existing or proposed surface mining disturbances, and the projected post mining reclamation and post mining land uses, provide an evaluation of the anticipated water quality to assure it will be suitable for the intended use. [1816.49(b)(2)/1817.49(b)(2)]

Not Applicable

5.4.3.4 Describe the relationship of the impoundment to the post-mining land use. [1816.49(b)(6)/1817.49(b)(6)]

Not Applicable

5.4.3.5 Describe methods of dropping surface runoff over excavated impoundment side slopes. Discuss design criteria to be employed for down drain structures and perimeter diversions. [1816.49(b)(7)/1817.49(b)(7)]

Not Applicable

5.4.3.6 Plans of access roads and other use related facilities. [1816.49(b)(4)/1817.49(b)(4)]

Not Applicable

Sunrise Coal, LLC
Oaktown Mine
Basin 1 - Illinois

10 yr 24 hr Storm

BWC

HMG Engineers, Inc.
1032 N. 6th Street
Murphysboro, IL 62966

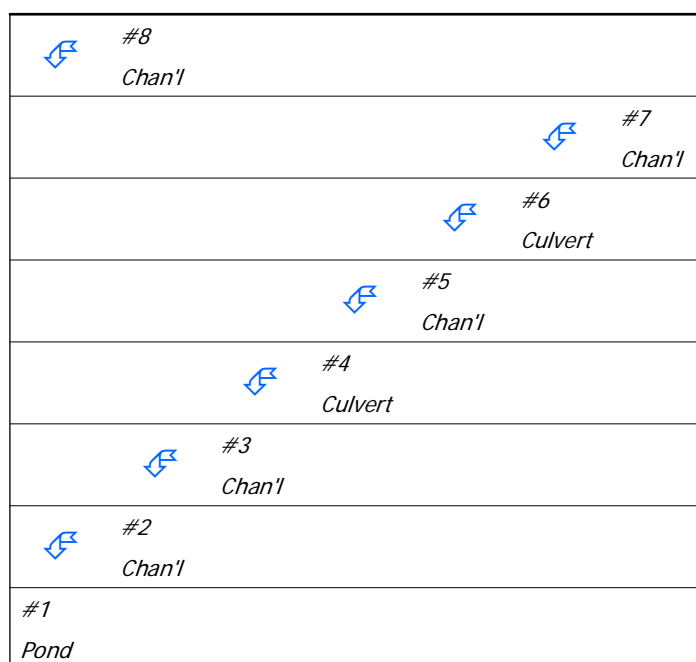
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.620 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 1
Channel	#2	==>	#1	0.240	0.153	DD-1A Sta 0+00 to Sta 6+50
Channel	#3	==>	#2	0.076	0.263	DD-1A Sta 6+50 to Sta 11+70
Culvert	#4	==>	#3	0.000	0.000	Culvert Sta 11+90
Channel	#5	==>	#4	0.041	0.220	DD-1A Sta 12+10 to Sta 14+08
Culvert	#6	==>	#5	0.000	0.000	Culvert Sta 14+28
Channel	#7	==>	#6	0.003	0.220	DD-1A Sta 14+48 to End
Channel	#8	==>	#1	0.076	0.163	DD-1B Sta 0+00 to End



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	6. Grassed waterway	0.25	1.62	650.00	0.75	0.240
#2	Muskingum K:					0.240
#3	6. Grassed waterway	1.60	8.32	520.00	1.89	0.076
#3	Muskingum K:					0.076
#5	6. Grassed waterway	0.80	1.58	198.00	1.34	0.041
#5	Muskingum K:					0.041
#7	6. Grassed waterway	0.80	0.15	19.00	1.34	0.003

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#7	Muskingum K:					0.003
#8	6. Grassed waterway	0.30	0.67	225.00	0.82	0.076
#8	Muskingum K:					0.076

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#8	2.900	2.900	5.13	0.49
#7	4.100	4.100	11.91	1.00
#6	0.000	4.100	11.91	1.00
#5	2.200	6.300	19.05	1.64
#4	0.000	6.300	19.05	1.64
#3	1.900	8.200	25.40	2.23
#2	7.300	15.500	48.20	4.30
#1 In	5.000	23.400	60.30	5.93
Out			49.17	5.93

Structure Detail:

Structure #8 (Vegetated Channel)

DD-1B Sta 0+00 to End

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

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)
4.00	3.0:1	3.0:1	0.3	D, B	0.50			5.0

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:	5.13 cfs		5.13 cfs	
Depth:	0.91 ft	1.41 ft	1.74 ft	2.24 ft
Top Width:	9.44 ft	12.44 ft	14.42 ft	17.42 ft
Velocity:	0.84 fps		0.32 fps	
X-Section Area:	6.10 sq ft		16.00 sq ft	
Hydraulic Radius:	0.626 ft		1.068 ft	
Froude Number:	0.18		0.05	
Roughness Coefficient:	0.0709		0.2658	

Structure #7 (Vegetated Channel)

DD-1A Sta 14+48 to End

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

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)
4.00	3.0:1	3.0:1	0.8	D, B	0.50			5.0

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:	11.91 cfs		11.91 cfs	
Depth:	0.96 ft	1.46 ft	1.65 ft	2.15 ft
Top Width:	9.74 ft	12.74 ft	13.89 ft	16.89 ft
Velocity:	1.81 fps		0.81 fps	
X-Section Area:	6.58 sq ft		14.74 sq ft	
Hydraulic Radius:	0.654 ft		1.022 ft	
Froude Number:	0.39		0.14	
Roughness Coefficient:	0.0554		0.1672	

Structure #6 (Culvert)

Culvert Sta 14+28

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
40.00	0.80	0.0240	3.00	0.00	0.90

Culvert Results:

Design Discharge = 11.91 cfs

Minimum pipe diameter: 1 - 21 inch pipe(s) required

Structure #5 (Vegetated Channel)

DD-1A Sta 12+10 to Sta 14+08

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

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)
4.00	3.0:1	3.0:1	0.8	D, B	0.50			5.0

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:	19.05 cfs		19.05 cfs	
Depth:	1.15 ft	1.65 ft	1.87 ft	2.37 ft
Top Width:	10.88 ft	13.88 ft	15.24 ft	18.24 ft
Velocity:	2.23 fps		1.06 fps	

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
X-Section Area:	8.53 sq ft		18.02 sq ft	
Hydraulic Radius:	0.758 ft		1.137 ft	
Froude Number:	0.44		0.17	
Roughness Coefficient:	0.0496		0.1372	

Structure #4 (Culvert)

Culvert Sta 11+90

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
40.00	0.80	0.0240	3.00	0.00	0.90

Culvert Results:

Design Discharge = 19.05 cfs

Minimum pipe diameter: 1 - 30 inch pipe(s) required

Structure #3 (Vegetated Channel)

DD-1A Sta 6+50 to Sta 11+70

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

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)
4.00	3.0:1	3.0:1	1.6	D, B	0.50			5.0

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:	25.40 cfs		25.40 cfs	
Depth:	1.06 ft	1.56 ft	1.66 ft	2.16 ft
Top Width:	10.35 ft	13.35 ft	13.95 ft	16.95 ft
Velocity:	3.35 fps		1.71 fps	
X-Section Area:	7.59 sq ft		14.89 sq ft	
Hydraulic Radius:	0.710 ft		1.028 ft	
Froude Number:	0.69		0.29	
Roughness Coefficient:	0.0448		0.1125	

Structure #2 (Vegetated Channel)

DD-1A Sta 0+00 to Sta 6+50

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

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)
8.00	3.0:1	3.0:1	0.3	D, B	0.50			5.0

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:	48.20 cfs		48.20 cfs	
Depth:	1.82 ft	2.32 ft	2.86 ft	3.36 ft
Top Width:	18.94 ft	21.94 ft	25.19 ft	28.19 ft
Velocity:	1.96 fps		1.01 fps	
X-Section Area:	24.57 sq ft		47.54 sq ft	
Hydraulic Radius:	1.258 ft		1.820 ft	
Froude Number:	0.30		0.13	
Roughness Coefficient:	0.0443		0.1095	

Structure #1 (Pond)

Basin 1

Pond Inputs:

Initial Pool Elev:	426.00 ft
Initial Pool:	4.98 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
426.00	30.00	3.00:1	3.00:1	10.00

Pond Results:

Peak Elevation:	427.40 ft
Dewater Time:	0.58 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)
416.00	0.367	0.000	0.000	
416.50	0.379	0.187	0.000	
417.00	0.391	0.379	0.000	
417.50	0.404	0.578	0.000	
418.00	0.416	0.783	0.000	
418.50	0.429	0.994	0.000	
419.00	0.441	1.211	0.000	
419.50	0.454	1.435	0.000	
420.00	0.468	1.666	0.000	
420.50	0.481	1.903	0.000	
421.00	0.495	2.147	0.000	
421.50	0.508	2.398	0.000	
422.00	0.522	2.655	0.000	
422.50	0.536	2.920	0.000	
423.00	0.551	3.192	0.000	
423.50	0.565	3.471	0.000	
424.00	0.580	3.757	0.000	
424.50	0.595	4.051	0.000	
425.00	0.610	4.352	0.000	
425.50	0.625	4.661	0.000	
426.00	0.641	4.978	0.000	Spillway #1
426.50	0.664	5.304	12.076	12.95
427.00	0.687	5.641	24.153	0.55
427.40	0.706	5.917	49.170	0.30 Peak Stage
427.50	0.710	5.991	55.789	
428.00	0.734	6.352	94.578	
428.50	0.759	6.725	147.167	
429.00	0.784	7.111	214.862	

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
416.00	0.000	0.000
416.50	0.000	0.000
417.00	0.000	0.000
417.50	0.000	0.000
418.00	0.000	0.000

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
418.50	0.000	0.000
419.00	0.000	0.000
419.50	0.000	0.000
420.00	0.000	0.000
420.50	0.000	0.000
421.00	0.000	0.000
421.50	0.000	0.000
422.00	0.000	0.000
422.50	0.000	0.000
423.00	0.000	0.000
423.50	0.000	0.000
424.00	0.000	0.000
424.50	0.000	0.000
425.00	0.000	0.000
425.50	0.000	0.000
426.00	0.000	0.000
426.50	12.076	12.076
427.00	24.153	24.153
427.50	55.789	55.789
428.00	94.578	94.578
428.50	147.167	147.167
429.00	214.862	214.862

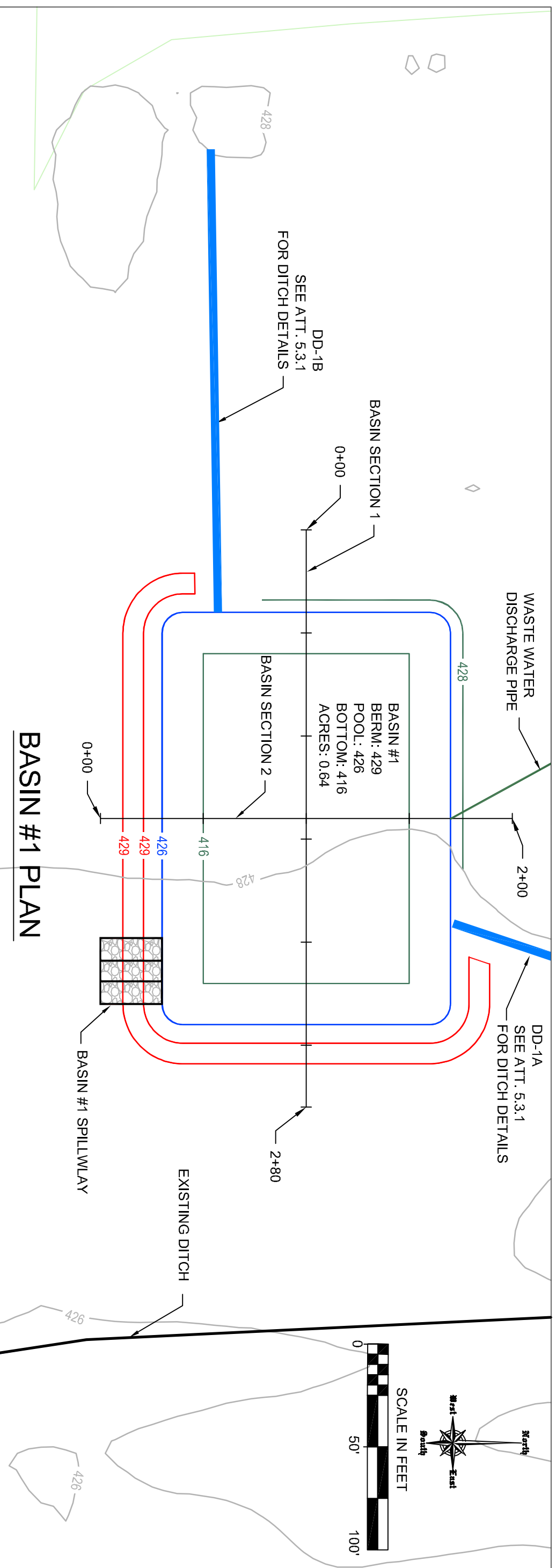
Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#8	1	2.900	0.132	0.000	0.000	79.000	M	5.13	0.486
	Σ	2.900						5.13	0.486
#7	1	4.100	0.112	0.000	0.000	84.000	M	11.91	0.998
	Σ	4.100						11.91	0.998
#6	Σ	4.100						11.91	0.998
#5	1	2.200	0.057	0.000	0.000	90.000	M	7.14	0.643
	Σ	6.300						19.05	1.641
#4	Σ	6.300						19.05	1.641
#3	1	1.900	0.035	0.000	0.000	92.000	M	6.35	0.588
	Σ	8.200						25.40	2.229
#2	1	7.300	0.089	0.000	0.000	89.000	M	23.32	2.072
	Σ	15.500						48.20	4.302
#1	1	5.000	0.104	0.000	0.000	82.000	M	13.88	1.141
	Σ	23.400						60.30	5.929

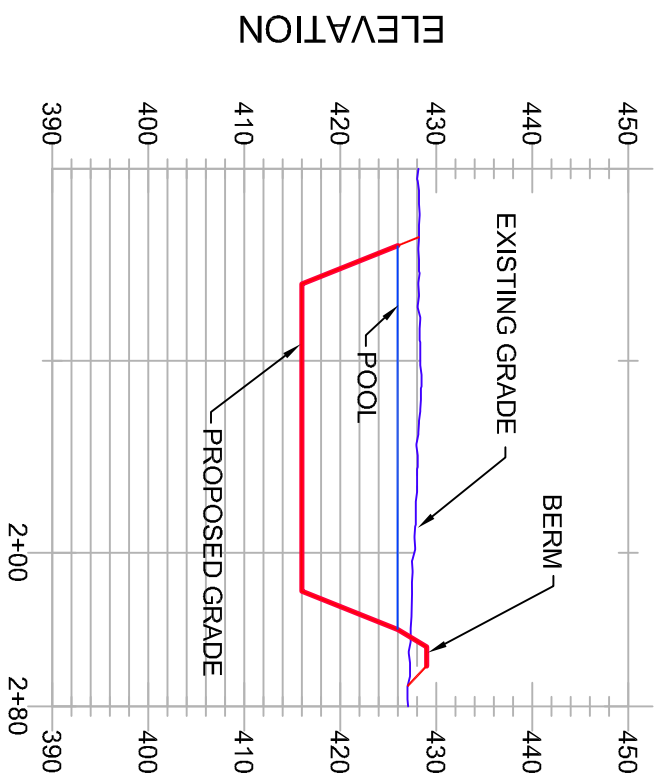
Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	7. Paved area and small upland gullies	3.30	9.89	300.00	3.650	0.022
		8. Large gullies, diversions, and low flowing streams	0.37	2.00	542.00	1.820	0.082
#1	1	Time of Concentration:					0.104
#2	1	7. Paved area and small upland gullies	2.00	10.40	520.00	2.840	0.050
		8. Large gullies, diversions, and low flowing streams	0.81	3.10	385.00	2.690	0.039
#2	1	Time of Concentration:					0.089
#3	1	7. Paved area and small upland gullies	1.11	3.00	270.00	2.120	0.035
#3	1	Time of Concentration:					0.035
#5	1	3. Short grass pasture	6.10	18.29	300.00	1.970	0.042
		8. Large gullies, diversions, and low flowing streams	2.10	5.00	238.00	4.340	0.015
#5	1	Time of Concentration:					0.057

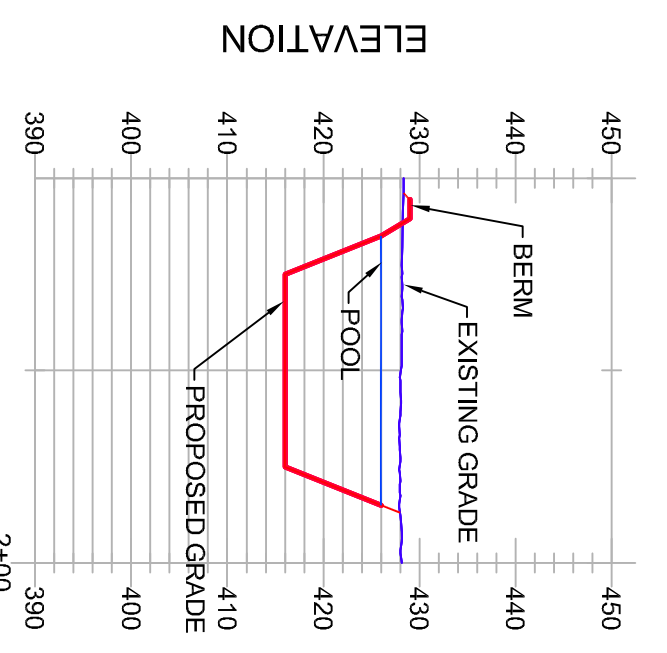
Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#7	1	1. Forest with heavy ground litter	5.02	10.40	207.00	0.560	0.102
		8. Large gullies, diversions, and low flowing streams	4.42	10.60	240.00	6.300	0.010
#7	1	Time of Concentration:					0.112
#8	1	3. Short grass pasture	2.13	6.40	300.00	1.160	0.071
		8. Large gullies, diversions, and low flowing streams	0.20	0.60	298.00	1.340	0.061
#8	1	Time of Concentration:					0.132



BASIN #1 SECTION 1
H Scale: 1" = 100.00'
V Scale: 1" = 20.00'

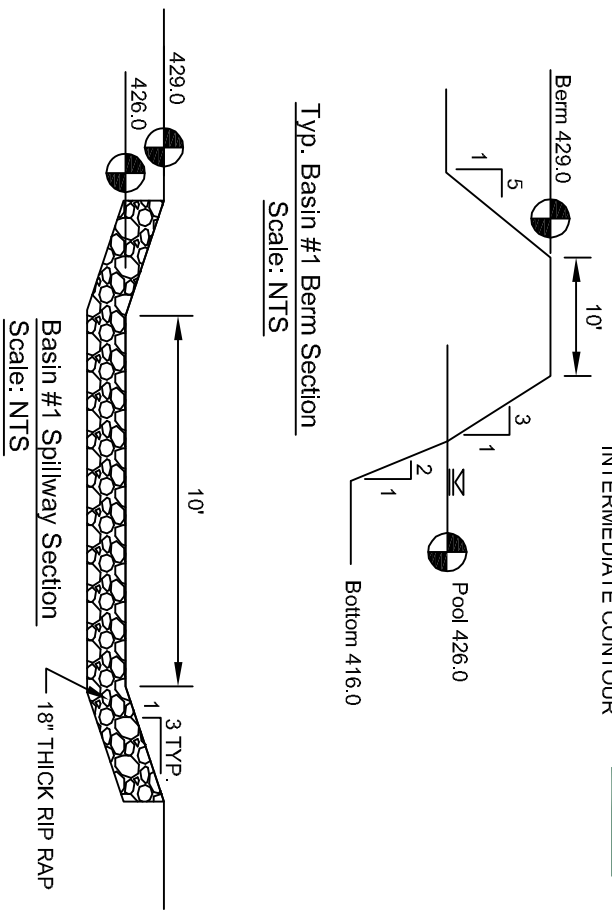


BASIN #1 SECTION 2
H Scale: 1" = 100.00'
V Scale: 1" = 20.00'



LEGEND

- EXISTING CONTOUR (2)
- BERM CONTOUR
- POOL CONTOUR
- INTERMEDIATE CONTOUR



*Note: This pond is not intended to qualify as an MSHA nor and Office of Water Resources structure.

REVISIONS	
REV 1	
REV 2	
PLOT DATE	
DWG FILE	

BASIN #1 PLAN & CROSS SECTIONS

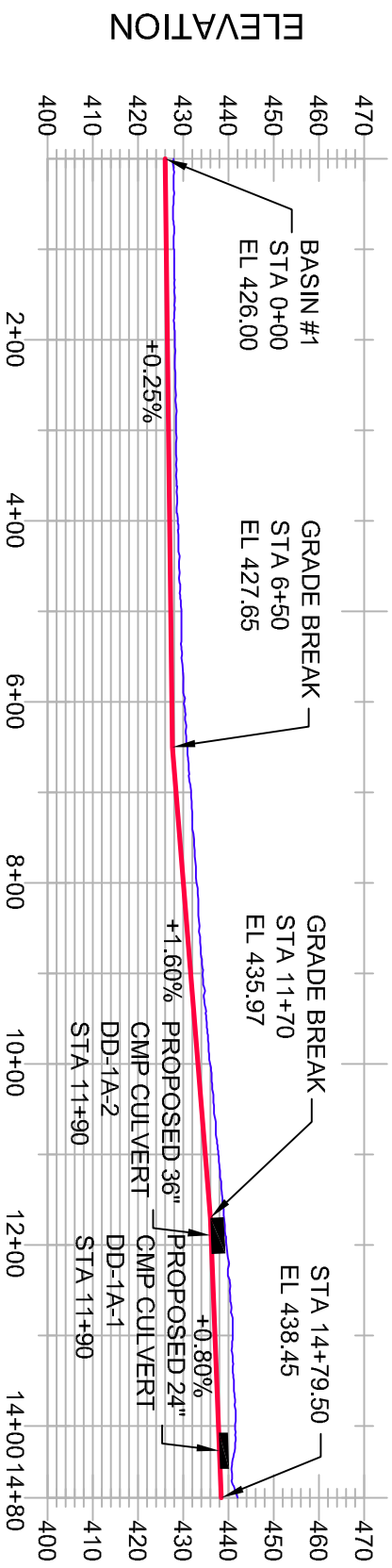
SUNRISE COAL, LLC
RUSSELLVILLE PORTAL PERMIT
RUSSELLVILLE, IL

HMG ENGINEERS, INC.
1032 N. SIXTH ST.
MURPHYSBORO, IL 62966
618-684-9355 WWW.HMGENGINEERS.COM

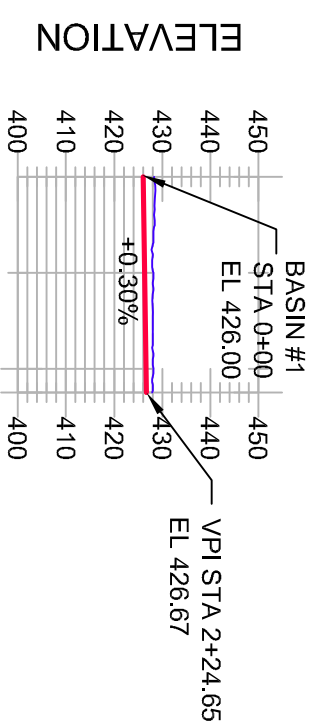


SURVEY	BWC/TJK
DESIGN	TJK
DRAWN	BWC
CHECKED	BWC
DATE	1-30-19
ATTACHMENT	5414
	BASIN #1
	PLAN
JOB NO.	7849

STATION

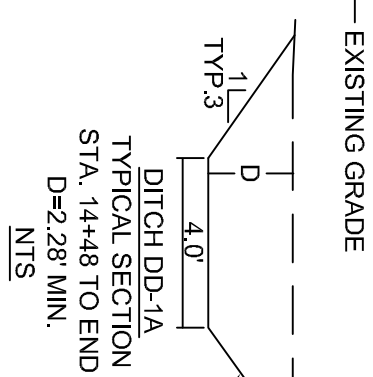
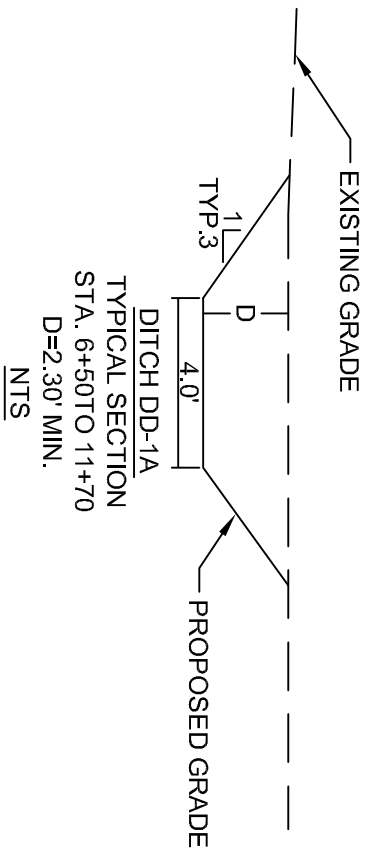
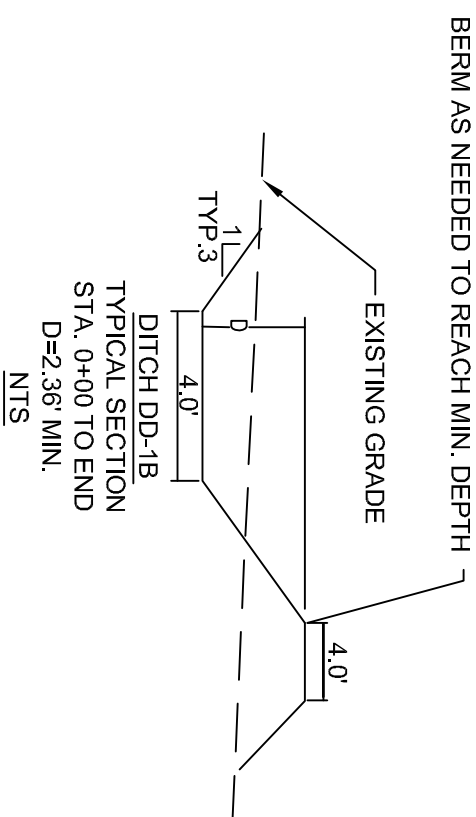
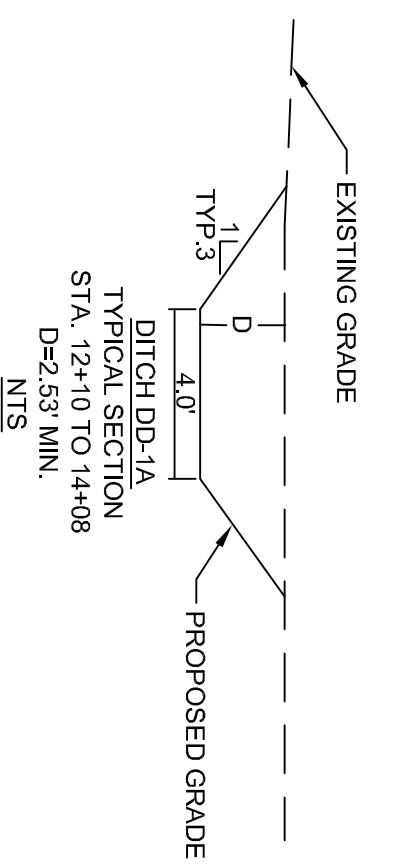
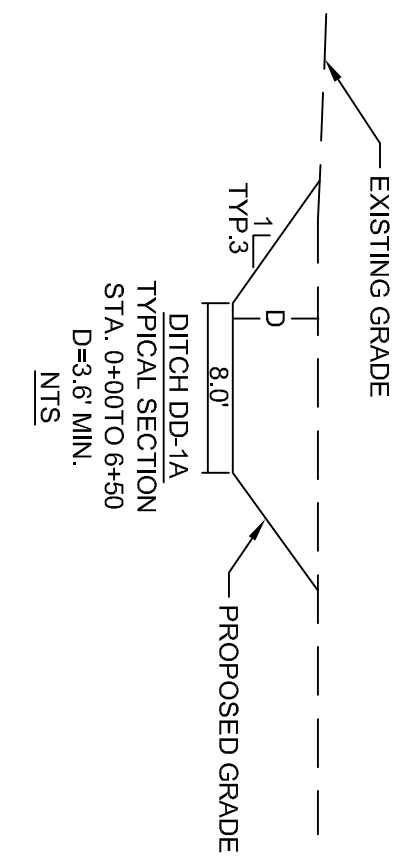


Alignment: Diversion Ditch DD-1A
 H Scale: 1" = 200.00'
 V Scale: 1" = 40.00'



Alignment: Diversion Ditch DD-1B
 H Scale: 1" = 200.00'
 V Scale: 1" = 40.00'

DITCH DD-1A & DD-1B PROFILES



NOTE: SEE ATTACHMENT 5.4.2 FOR DITCH DESIGN (SEDCAD)
 NOTE: SEE ATTACHMENT 3.8.3.2 FOR CULVERT DETAILS

REVISIONS	
REV 1	
REV 2	
PLOT DATE	
DWG FILE	

DIVERSION DITCH PROFILES & DETAILS

SUNRISE COAL, LLC
 RUSSELLVILLE PORTAL PERMIT
 RUSSELLVILLE, IL

HMG ENGINEERS, INC.
 1032 N. SIXTH ST.
 MURPHYSBORO, IL 62966
 618-684-9355 WWW.HMGENGINEERS.COM



SURVEY	BWC/TJK
DESIGN	BWC/TJK
DRAWN	TJK
CHECKED	BWC
DATE	1-30-19
ATTACHMENT	531
DIVERSION/DITCH	DETAILS
JOB NO.	7849



Project: Sunrise Coal, LLC - Oaktown Mine Computed: BWC Date: 1/31/2019
 Subject: Drainage Notes Checked: Date:
 Task: Access Road Culvert Sta 10+90 Page: 1 of: 1
 Job #: 7849 Co: Lawrence

1 Determination of curve number for Access Road Culvert Sta 10+90. Upstream approximately 750 feet a 60" corrugated metal pipe crosses under County Road 1840 N. (Field measurement of 64" diameter)

Runoff curve numbers (CN)

Cover description	CN	Soil Type	Culvert Area
Row crops - SR (Good)	85	C	55.7
Woods (Fair)	73	C	42.0
Grass (Fair)	79	C	1.9
Roads, Parking Lots, Buildings	98	C	1.7
Residential (20% impervious)	79	C	5.7
			107.0
Weighted CN			80.1
Use CN			81

5-36" Culverts for a Total Flow of 190.13 cfs

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
40.00	1.80	0.0240	4.00	0.00	0.90

Culvert Results:

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

Detailed Performance Curves

Design Discharge = 38.03 cfs

Maximum Headwater = 4.00 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (30 in)	Discharge (cfs) (36 in)	Discharge (cfs) (42 in)
0.40	1.33	1.59	1.86
0.80	3.75	4.50	5.24
1.20	6.88	8.26	9.63
1.60	10.59	12.71	14.83
2.00	14.81	17.77	20.73
2.40	19.46	23.36	27.25
2.80	22.29	29.43	34.34
3.20	25.93	35.96	41.95
3.60	32.76	38.13	50.06
4.00	35.70	47.70	58.63
4.40	38.34	52.64	65.63
4.80	40.83	57.14	72.28
5.20	43.16	61.26	78.36
5.60	45.38	64.80	84.01
6.00	47.49	68.15	89.30

Sunrise Coal, LLC
Oaktown Mine
Access Road Culvert Sta 10+90

10 yr 24 hr Storm

BWC

HMG Engineers, Inc.
1032 N. 6th Street
Murphysboro, IL 62966

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.620 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Access Road Culvert Sta 10+90

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	107.000	107.000	190.13	19.00

Structure Detail:

Structure #1 (Null)

Access Road Culvert Sta 10+90

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	107.000	0.224	0.000	0.000	81.000	M	190.13	18.999
Σ		107.000						190.13	18.999

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	4. Cultivated, straight row	1.90	5.70	300.00	1.230	0.067
		8. Large gullies, diversions, and low flowing streams	3.31	40.90	1,235.00	5.450	0.062
		9. Small streams flowing bankfull	0.79	21.80	2,756.00	8.000	0.095
#1	1	Time of Concentration:					0.224

Sunrise Coal, LLC
Oaktown Mine
Basin 1 - Illinois

25 yr 6 hr Storm

BWC

HMG Engineers, Inc.
1032 N. 6th Street
Murphysboro, IL 62966

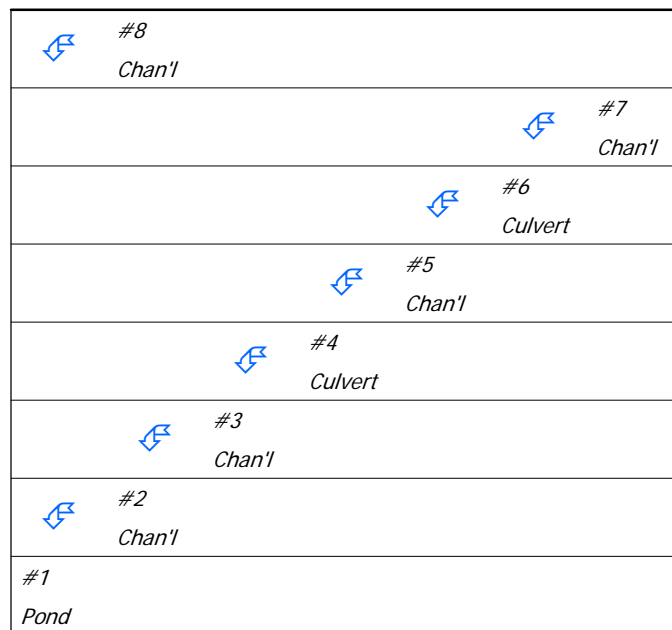
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 6 hr
Rainfall Depth:	4.340 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Pond	#1	==>	End	0.000	0.000	Basin 1
Channel	#2	==>	#1	0.240	0.153	DD-1A Sta 0+00 to Sta 6+50
Channel	#3	==>	#2	0.076	0.263	DD-1A Sta 6+50 to Sta 11+70
Culvert	#4	==>	#3	0.000	0.000	Culvert Sta 11+90
Channel	#5	==>	#4	0.041	0.220	DD-1A Sta 12+10 to Sta 14+08
Culvert	#6	==>	#5	0.000	0.000	Culvert Sta 14+28
Channel	#7	==>	#6	0.003	0.220	DD-1A Sta 14+48 to End
Channel	#8	==>	#1	0.076	0.163	DD-1B Sta 0+00 to End



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	6. Grassed waterway	0.25	1.62	650.00	0.75	0.240
#2	Muskingum K:					0.240
#3	6. Grassed waterway	1.60	8.32	520.00	1.89	0.076
#3	Muskingum K:					0.076
#5	6. Grassed waterway	0.80	1.58	198.00	1.34	0.041
#5	Muskingum K:					0.041
#7	6. Grassed waterway	0.80	0.15	19.00	1.34	0.003
#7	Muskingum K:					0.003
#8	6. Grassed waterway	0.30	0.67	225.00	0.82	0.076
#8	Muskingum K:					0.076

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#8	2.900	2.900	6.64	0.44
#7	4.100	4.100	15.94	0.91
#6	0.000	4.100	15.94	0.91
#5	2.200	6.300	25.46	1.50
#4	0.000	6.300	25.46	1.50
#3	1.900	8.200	33.92	2.05
#2	7.300	15.500	64.10	3.95
#1 In			76.90	5.43
Out	5.000	23.400	64.32	5.43

Structure Detail:

Structure #8 (Vegetated Channel)

DD-1B Sta 0+00 to End

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

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)
4.00	3.0:1	3.0:1	0.3	D, B	0.50			5.0

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:	6.64 cfs		6.64 cfs	
Depth:	1.00 ft	1.50 ft	1.86 ft	2.36 ft
Top Width:	10.02 ft	13.02 ft	15.18 ft	18.18 ft
Velocity:	0.95 fps		0.37 fps	
X-Section Area:	7.03 sq ft		17.88 sq ft	
Hydraulic Radius:	0.680 ft		1.132 ft	
Froude Number:	0.20		0.06	
Roughness Coefficient:	0.0667		0.2384	

Structure #7 (Vegetated Channel)

DD-1A Sta 14+48 to End

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

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)
4.00	3.0:1	3.0:1	0.8	D, B	0.50			5.0

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:	15.94 cfs		15.94 cfs	
Depth:	1.07 ft	1.57 ft	1.78 ft	2.28 ft
Top Width:	10.43 ft	13.43 ft	14.70 ft	17.70 ft

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Velocity:	2.06 fps		0.96 fps	
X-Section Area:	7.73 sq ft		16.68 sq ft	
Hydraulic Radius:	0.717 ft		1.092 ft	
Froude Number:	0.42		0.16	
Roughness Coefficient:	0.0517		0.1479	

Structure #6 (Culvert)

Culvert Sta 14+28

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
40.00	0.80	0.0240	3.00	0.00	0.90

Culvert Results:

Design Discharge = 15.94 cfs

Minimum pipe diameter: 1 - 24 inch pipe(s) required

Structure #5 (Vegetated Channel)

DD-1A Sta 12+10 to Sta 14+08

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

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)
4.00	3.0:1	3.0:1	0.8	D, B	0.50			5.0

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:	25.46 cfs		25.46 cfs	
Depth:	1.28 ft	1.78 ft	2.03 ft	2.53 ft
Top Width:	11.69 ft	14.69 ft	16.15 ft	19.15 ft
Velocity:	2.53 fps		1.25 fps	
X-Section Area:	10.06 sq ft		20.40 sq ft	
Hydraulic Radius:	0.831 ft		1.214 ft	
Froude Number:	0.48		0.20	
Roughness Coefficient:	0.0465		0.1215	

Structure #4 (Culvert)

Culvert Sta 11+90

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
40.00	0.80	0.0240	3.00	0.00	0.90

Culvert Results:

Design Discharge = 25.46 cfs

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

Structure #3 (Vegetated Channel)

DD-1A Sta 6+50 to Sta 11+70

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

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)
4.00	3.0:1	3.0:1	1.6	D, B	0.50			5.0

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:	33.92 cfs		33.92 cfs	
Depth:	1.18 ft	1.68 ft	1.80 ft	2.30 ft
Top Width:	11.09 ft	14.09 ft	14.78 ft	17.78 ft
Velocity:	3.80 fps		2.01 fps	
X-Section Area:	8.92 sq ft		16.86 sq ft	
Hydraulic Radius:	0.777 ft		1.098 ft	
Froude Number:	0.75		0.33	
Roughness Coefficient:	0.0419		0.0996	

Structure #2 (Vegetated Channel)

DD-1A Sta 0+00 to Sta 6+50

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

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)
8.00	3.0:1	3.0:1	0.3	D, B	0.50			5.0

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:	64.10 cfs		64.10 cfs	
Depth:	2.04 ft	2.54 ft	3.10 ft	3.60 ft
Top Width:	20.23 ft	23.23 ft	26.61 ft	29.61 ft
Velocity:	2.23 fps		1.19 fps	
X-Section Area:	28.79 sq ft		53.66 sq ft	
Hydraulic Radius:	1.378 ft		1.943 ft	
Froude Number:	0.33		0.15	
Roughness Coefficient:	0.0414		0.0971	

Structure #1 (Pond)

Basin 1

Pond Inputs:

Initial Pool Elev:	426.00 ft
Initial Pool:	4.98 ac-ft

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
426.00	30.00	3.00:1	3.00:1	10.00

Pond Results:

Peak Elevation:	427.61 ft
Dewater Time:	0.22 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)
416.00	0.367	0.000	0.000	
416.50	0.379	0.187	0.000	
417.00	0.391	0.379	0.000	
417.50	0.404	0.578	0.000	
418.00	0.416	0.783	0.000	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)
418.50	0.429	0.994	0.000	
419.00	0.441	1.211	0.000	
419.50	0.454	1.435	0.000	
420.00	0.468	1.666	0.000	
420.50	0.481	1.903	0.000	
421.00	0.495	2.147	0.000	
421.50	0.508	2.398	0.000	
422.00	0.522	2.655	0.000	
422.50	0.536	2.920	0.000	
423.00	0.551	3.192	0.000	
423.50	0.565	3.471	0.000	
424.00	0.580	3.757	0.000	
424.50	0.595	4.051	0.000	
425.00	0.610	4.352	0.000	
425.50	0.625	4.661	0.000	
426.00	0.641	4.978	0.000	Spillway #1
426.50	0.664	5.304	12.076	4.20
427.00	0.687	5.641	24.153	0.65
427.50	0.710	5.991	55.789	0.30
427.61	0.716	6.070	64.318	0.10 Peak Stage
428.00	0.734	6.352	94.578	
428.50	0.759	6.725	147.167	
429.00	0.784	7.111	214.862	

Detailed Discharge Table

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
416.00	0.000	0.000
416.50	0.000	0.000
417.00	0.000	0.000
417.50	0.000	0.000
418.00	0.000	0.000
418.50	0.000	0.000
419.00	0.000	0.000
419.50	0.000	0.000
420.00	0.000	0.000
420.50	0.000	0.000
421.00	0.000	0.000
421.50	0.000	0.000
422.00	0.000	0.000

Elevation (ft)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
422.50	0.000	0.000
423.00	0.000	0.000
423.50	0.000	0.000
424.00	0.000	0.000
424.50	0.000	0.000
425.00	0.000	0.000
425.50	0.000	0.000
426.00	0.000	0.000
426.50	12.076	12.076
427.00	24.153	24.153
427.50	55.789	55.789
428.00	94.578	94.578
428.50	147.167	147.167
429.00	214.862	214.862

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)
#8	1	2.900	0.132	0.000	0.000	79.000	M	6.64	0.440
	Σ	2.900						6.64	0.440
#7	1	4.100	0.112	0.000	0.000	84.000	M	15.94	0.910
	Σ	4.100						15.94	0.910
#6	Σ	4.100						15.94	0.910
#5	1	2.200	0.057	0.000	0.000	90.000	M	9.52	0.593
	Σ	6.300						25.46	1.503
#4	Σ	6.300						25.46	1.503
#3	1	1.900	0.035	0.000	0.000	92.000	M	8.45	0.544
	Σ	8.200						33.92	2.047
#2	1	7.300	0.089	0.000	0.000	89.000	M	31.12	1.907
	Σ	15.500						64.10	3.954
#1	1	5.000	0.104	0.000	0.000	82.000	M	18.61	1.037
	Σ	23.400						76.90	5.431

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	7. Paved area and small upland gullies	3.30	9.89	300.00	3.650	0.022
		8. Large gullies, diversions, and low flowing streams	0.37	2.00	542.00	1.820	0.082
#1	1	Time of Concentration:					0.104
#2	1	7. Paved area and small upland gullies	2.00	10.40	520.00	2.840	0.050
		8. Large gullies, diversions, and low flowing streams	0.81	3.10	385.00	2.690	0.039
#2	1	Time of Concentration:					0.089
#3	1	7. Paved area and small upland gullies	1.11	3.00	270.00	2.120	0.035
#3	1	Time of Concentration:					0.035
#5	1	3. Short grass pasture	6.10	18.29	300.00	1.970	0.042
		8. Large gullies, diversions, and low flowing streams	2.10	5.00	238.00	4.340	0.015
#5	1	Time of Concentration:					0.057
#7	1	1. Forest with heavy ground litter	5.02	10.40	207.00	0.560	0.102

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	4.42	10.60	240.00	6.300	0.010
#7	1	Time of Concentration:					0.112
#8	1	3. Short grass pasture	2.13	6.40	300.00	1.160	0.071
		8. Large gullies, diversions, and low flowing streams	0.20	0.60	298.00	1.340	0.061
#8	1	Time of Concentration:					0.132



Project: Sunrise Coal, LLC - Oaktown Mine Computed: BWC Date: 1/30/2019
 Subject: Drainage Notes Checked: Date:
 Task: Basin 1 Design Page: 1 of: 1
 Job #: 7849 Co: Lawrence

1 Design sedimentation ponds for Mine Facility permitted area
 Check SEDCAD Design Storm for 10yr 24hr - use 10hr/24hr x (SEDCAD Runoff Volume) ac-ft + 0.1 ac-ft x (disturbed area) ac = ac-ft
 Rainfall Depth (Table 13 - Bulletin 70) = **4.62 inches**

Runoff curve numbers (CN)

Premine	CN	Soil Type	Direct Area	DD-1A Area 1	DD-1A Area 2	DD-1A Area 3	DD-1A Area 4	DD-1B Area	Total
Row crops - SR (Good)	85	C							
Woods (Fair)	73	C		2.4	0.2				
Grass (Fair)	79	C	4.2		0.7	0.6	3.7	2.9	
Roads, Parking Lots, Buildings	98	C	0.8	1.7	1.3	1.3	3.6		
Residential (20% impervious)	79	C							
			5.0	4.1	2.2	1.9	7.3	2.9	23.4
Weighted CN			82.0	83.4	89.7	92.0	88.4	79.0	
Use CN			82	84	90	92	89	79	

DD-1A Area 1 is the estimated drainage area reporting to DD-1A Sta 14+28 Culvert (DD-1A-1).
 DD-1A Area 2 is the estimated drainage area in addition to Area 1 that is reporting to DD-1A Sta 11+90 Culvert (DD-1A-2).
 DD-1A Area 3 is the estimated drainage area in addition to Area 1 & 2 that is reporting to DD-1A Ditch Sta 6+50 to 11+70.
 DD-1A Area 4 is the estimated drainage area in addition to Area 1, 2, & 3 that is reporting to DD-1A Sta 0+00 to 6+50.

Estimate Drainage Area (from Vigo flow topo) = **23.5** ac
 Estimate Disturbed Area reporting to this pond = **23.5** ac-ft x 0.1 ac-ft = 2.35 ac-ft
 Runoff Volume (from SEDCAD) = **5.93** ac-ft x 10 hr/ 24 hr = 2.471 ac-ft
 Total Pond Volume Required = **4.821** ac-ft

Slope of banks (bottom to spillway) = 2 :1
 Slope of banks (spillway to top) = 3 :1
 Depth (bottom to spillway) = **10** ft
 Freeboard = **3** ft
 Top of dam elevation = **429**
 Top width = **158** ft x **158** ft = 158 ft
 Top length = **218** ft x **218** ft = 218 ft
 Top area = 34444 sf = 0.791 ac
 Spillway elevation = 426
 Top water width = 140 ft
 Top water length = 200 ft
 Top water area = 28000 sf = 0.643 ac
 Pond bottom elevation = 416
 Bottom width = 100 ft
 Bottom length = 160 ft
 Bottom area = 16000 sf = 0.367 ac
 Pond Volume (bottom to spillway) = 216000 cf = 4.959 ac-ft

Check SEDCAD Design Storm for 25yr 6hr - make sure freeboard height is 1' minimum for this storm
 Rainfall Depth (Table 13 - Bulletin 70) = **4.34 inches** 25yr 6hr **5.03 inches** 50yr 6hr

25yr 6hr Storm for Temporary Impoundments

Peak elevation (from SEDCAD) = **427.61** ft Freeboard remaining = 1.39 ft

50yr 6hr Storm for Permanent Impoundments

Peak elevation (from SEDCAD) = ft Freeboard remaining = ft

PART 6: Streams

The design and construction of all stream channel diversions of perennial and intermittent streams shall be sealed by a qualified registered professional engineer as meeting the performance standards of this Section.

[1780.16(a)(2)(B)/1784.21(a)(2)(B); 1816.97(f)/1817.97(f); 1816.43(a)(3)/1817.43(a)(3)]

6.1 Disturbance Information. Are surface coal mining operations and/or reclamation activities (including road crossings) or permit boundaries proposed within 100 feet of any stream (ephemeral, intermittent, or perennial)?

[1816.57/1817.57]

YES NO

If YES,

- For any stream(s) located outside the proposed permit boundary where disturbance within 100 feet. is proposed go to Part 6.3; and
- For any stream(s) located outside the proposed permit boundary where NO disturbance within 100 feet. will occur go to Part 6.9; and
- For any stream(s) located within the proposed permit boundary where disturbance within 100 feet. is proposed go to Part 6.2.

If NO, go to Part 6.9.

6.2 Stream Information. Provide a Stream Delineation Report and/or Wetland Delineation Report as Attachment 6.2. Information contained in the report(s) shall meet the requirements found at **1780.14/1784.23; 1780.29/1784.29; 1816.43/1817.43 and 1816.97/1817.97.**

See Table 6.2 Summary of Stream Data.

6.2.1 Stream Classification. Provide the total number of each type of stream or stream segment or channel reach located within the proposed permit area and continue to Part 6.3.

Ephemeral Intermittent Perennial

6.3 Stream Buffer Variance. Is a stream buffer variance requested? [1816.57/1817.57]

YES NO

Note, in certain scenarios both YES and NO may be applicable.

If YES,

- For stream(s) located outside the proposed permit boundary go to Part 6.4
- For stream(s) located inside the proposed permit boundary go to Part 6.5.

If NO, provide a justification that each disturbed stream is ephemeral based on both parts of the definition of ephemeral stream found at Section 1701.5 Appendix A. Refer to [Operator Memorandum No. 2017-06](#) for guidance regarding ephemeral stream justification. Briefly describe the disposition of the ephemeral stream(s) during operations and post-mining. Nomenclature of ephemeral streams must be consistent with maps and reports. No further information is required in Part 6 of the application if all streams are ephemeral. [1816.57/1817.57; 1701.5 Appendix A; 1777.13]

Streams 2, 3, 4, 6, 7, 8, and 9 (located on Map 10) are located in the not to be disturbed area of the proposed permit. The only streams for which disturbance will occur within 100 feet are Streams 1 and 5. See Streams Map for locations. The north access road will cross Stream 1. Drainage area to Stream 1 is 0.16 sq miles. Two piezometers were installed adjacent to this stream. Water elevations for March and April (i.e. the wettest months) show groundwater elevations below the channel bottom. These elevations indicate that there is no contribution of groundwater to stream flow (see Table 6.2.1).

The discharge structure for the sedimentation pond will involve disturbance within 100 feet of Stream 5. Drainage area to Stream 5 is 0.04 square miles (See Table 6.2.1). Stream 5 is a first order stream, receiving surface contributions only from localized agricultural runoff. This small ditch was constructed to control field runoff and has no riffles, pools, or meanders. No head cuts are present.

6.4 Streams Outside Permit Boundary. For each intermittent and/or perennial stream located outside the permit boundary where a stream buffer variance is requested, provide the name of the stream and describe how the stream channel and its associated riparian vegetation will be restored and how the proposed operations will not adversely affect water quality and quantity. No further information is required in Part 6 of the application for streams outside the proposed permit boundary where buffer zone exemptions are requested. [1816.57/1817.57]

6.5 Existing Streams Locations. Provide the Existing Streams Location and Watershed Map meeting the specifications found in the General Mapping Requirements of the Instructions. Additionally, for each intermittent and/or perennial stream located inside the permit boundary where a stream buffer variance is requested, provide the name of the stream and describe how the stream channel and its associated riparian vegetation will be restored and how the proposed operations will not adversely affect water quality and quantity. [1780.14/1784.23; 1780.29/1784.29; 1816.43/1817.43; 1816.57/1817.57; 1816.97/1817.97]

- For Temporary Stream Diversions complete Part 6.6.
- For Permanent Stream Diversions, Restorations and Relocations complete Part 6.7.
- For culverts and crossings of non-diverted, temporary, or permanent stream channels complete Part 6.8.

6.6 Temporary Stream Diversions. Temporary diversions shall be removed promptly when no longer needed to achieve the purpose for which they were authorized. [1816.43/1817.43]

6.6.1 Temporary Stream Diversion Construction Narrative. For each temporary diversion proposed, discuss the proposed construction practices including the following information: [1780.29/1784.29]; [1816.43/1817.43; [Memorandum No. 2005-04](#)]

6.6.1.1 Estimated diversion construction beginning and ending dates.

6.6.1.2 Erosion control practices during construction to reduce addition of suspended solids to streamflow outside the permit area.

6.6.1.3 Estimated date when erosion control and vegetation will be sufficiently established to allow diversion of water through the temporary channel.

6.6.1.4 Indicate the timing and method of contacting the Department for approval upon stabilization of the stream channel. Department approval is required before water may be diverted through the temporary stream channel.

6.6.1.5 If a sediment pond exemption was requested for diversion channel spoil in Part 5.2.1, then describe methods to prevent channel spoil from impacting the surrounding area and include a discussion of the disposition of channel spoil. If a sediment pond exemption was not requested for diversion channel spoil in Part 5.2.1, then indicate N/A. [1816.46(e)/1817.46(e)]

6.6.1.6 Outline a reporting schedule to be submitted to the Department during construction and submit a report to the Department within 30 days after completion of the temporary diversion that has been sealed by a qualified registered professional engineer.

6.6.1.7 Discuss how the activity will comply with the [Section 404 of the Federal Water Pollution Control Act of 1972](#), as amended, and all local ordinances. [Ill. Rev. Stat. 1991, ch. 19, pars. 52-79; 615 ILCS 5; 30 U.S.C. 1344]

6.6.2 Temporary Stream Diversion Locations. Provide a Stream Diversion Map meeting the specifications found in the General Mapping Requirements of the Instructions or reference the Surface Drainage Control Plan Map. [1780.14/1784.23; 1780.29/1784.29; 1816.43/1817.43]

6.6.3 Temporary Stream Diversion Plan-Profile and Cross-Section. For each temporary stream diversion proposed, provide drawings depicting the following information: [1780.14/1784.23; 1780.29/1784.29; 1816.43/1817.43]

6.6.3.1 Cross-sections showing the limits and configuration of the proposed activities, dimensions, channel linings, normal water surfaces, side slopes and inflection points (cut and fill, curves, and straight sections).

6.6.3.2 A profile of the temporary stream diversion depicting the flow line slope and the water level for the 10-year 6-hour storm event.

6.6.3.3 Detailed channel sizing calculations demonstrating the temporary diversion channel is adequate to convey the 10-year 6-hour storm event. The calculations shall include run-off volumes from the drainage area.

6.6.4 Post-Diversion Reclamation. Describe the reclamation of temporary stream diversions after flow has been diverted to the restored or relocated stream channel, provide the following information:
[1816.43(a)(3)/1817.43(a)(3)]

6.6.4.1 Describe the timing of removal of each temporary stream diversion when the diversion is no longer needed to achieve the purpose for which they were authorized.

6.6.4.2 Discuss any necessary modification or removal of downstream water treatment facilities that were protected by the temporary diversion to prevent overtopping or failure of such facilities.

6.7 Permanent Stream Diversion. The following requirements for a permanent stream diversion must be met:
[1816.43/1817.43]

6.7.1 Classification. The following information in Part 6.8 contains construction and restoration plan information for (indicate the number of each type):

Permanent Restored Stream(s) Permanent Relocated Stream(s)

6.7.2 Permanent Stream Channel Construction Narrative. For each permanent diversion or permanent restored stream proposed, discuss the proposed construction practices including the following information:
[1780.29/1784.29; 1816.43/1817.43; [Operator Memorandum No. 2005-04](#)]

6.7.2.1 Estimated permanent channel construction beginning and end dates.

6.7.2.2 Erosion control practices during construction to reduce addition of suspended solids to streamflow outside the permit area.

6.7.2.3 Estimated date when erosion control and vegetation will be sufficiently established to allow diversion of water through the permanent channel.

6.7.2.4 Indicate the timing and method of contacting the Department for approval upon stabilization of the stream channel. Department approval is required before water may be diverted through the permanent stream channel.

6.7.2.5 Is a Sediment Pond Exemption requested for diversion channel spoil.
[1816.46(e)/1817.46(e)]

YES NO

If NO, explain why an exemption is not required.

If YES, describe methods to prevent diversion channel spoil from impacting surrounding area, including disposition of channel spoil.

[Empty text box]

6.7.2.6 Discuss how the activity will comply with the [Rivers, Lakes, and Streams Act, Section 404 of the Federal Water Pollution Control Act of 1972](#), as amended, and all local ordinances. [III. Rev. Stat. 1991, ch. 19, pars. 52-79; 615 ILCS 5; 30 U.S.C. 1344]

[Empty text box]

6.7.2.7 Outline a reporting schedule to be submitted to the department during construction and submit a report to the Department within 30 days after completion of the permanent stream channel that has been sealed by a qualified registered professional engineer.

[Empty text box]

6.7.3 Permanent Stream Diversion Locations. Provide a Stream Diversion Map meeting the specifications found in the General Mapping Requirements of the Instructions or reference the Surface Drainage Control Plan Map. [1780.14/1784.23; 1780.29/1784.29; 1816.43/1817.43]

[Empty text box]

6.7.4 Permanent Stream Channel Plan-Profile and Cross-Section. Permanent stream channels shall approximate the original pre-mining stream characteristics. For each permanent stream channel proposed, provide drawings depicting the following information: [1780.14/1784.23; 1780.29/1784.29; 1816.43/1817.43]

6.7.4.1 A profile depicting bed slopes, pool-riffle ratios, and normal water surfaces.

[Empty text box]

6.7.4.2 Plans and drawings for boulder deflectors, check dams, and other instream habitat structures.

[Empty text box]

6.7.4.3 Cross-sections showing the limits and configuration of the proposed activities, dimensions, channel linings, normal water surfaces, side slopes and inflection points (cut and fill, curves, and straight sections).

[Empty text box]

6.7.4.4 Include a calculated flow rate (cfs) and velocity (ft/sec) at representative locations for low flow and normal flow and the 100-year flood condition that will allow a freeboard of no less than 0.3 feet.

[Empty text box]

6.7.4.5 Channel sizing calculations to demonstrate that the proposed stream channel and surrounding flood plain are adequate to convey the 100-year, 6-hour storm event. The calculations shall include run-off volumes from the drainage area.

[Empty text box]

6.7.5 Permanent Stream Channel Reclamation. Describe the reclamation of permanent stream channels, provide the following: [1780.18(b)(5)/1784.13(b)(5); 1816.14/1817.43; 1816.116/1817.116; 1816.97/1817.97]

If all responses to this part are the same as Forest or Fish and Wildlife - Woody post-mining land use information provided in Part 10, indicate such in the space below.

6.7.5.1 Describe proposed soil preparation and a soil testing plan related to reclamation and revegetation procedures. [1780.18(b)(5)(G)/1784.13(b)(5)(G)]

6.7.5.2 Describe the methods for the use of temporary seeding/mulching to control erosion, discuss the species, seeding rate by species per acre, and mulching methods and type of mulch. [1816.111(c)/1817.111(c); 1816.114/0817.114]

6.7.5.3 Describe the timing and methods proposed to transition from the temporary vegetation to the permanent vegetative cover. [1816.111(c)/1817.111(c)]

6.7.5.4 Provide a permanent species list that will achieve the designated post-mining land use that is diverse, permanent, composed of species native to the area, capable of controlling erosion, compatible with the approved post-mining land use, and capable of self-regeneration.. If non-native species are proposed to achieve the post-mining land use, provide adequate justification that the species are desirable and necessary to achieve the approved post-mining land use. Describe seeding rate by species per acre, methods of planting and seeding, mulching and fertilizer plan and rates. [1780.18(b)(5)/1784.13(b)(5); 1816.111 (a) and (b)/1817.111 (a) and (b); 1816.97(g)/1817.97(g)]

6.7.5.5 If a bat Protection and Enhancement Plan (PEP) is part of the application, the applicant shall ensure consistency between this part and the bat PEP. Describe measures taken to ensure consistency.

6.7.5.6 Describe a periodic measurement plan of the vegetation that will be used to identify if remedial actions are necessary to achieve the approved species and / or post-mining land use vegetation success standards during the applicable period of liability. Refer to [Operator Memorandum No. 2017-02](#) for additional information regarding tree and shrub planting maintenance. Information provided shall also describe a remedial action plan to achieve the approved vegetative species, invasive species management, or post-mining land use success. Remedial actions required may include but are not limited to mowing, burning, undesirable invasive species control, irrigation and pest and disease control. [1816.116(b)(1)/1817.116(b)(1); 1816.111(a) and (b)/1817.111(a) and (b)]

6.8 Culverts and Crossing of Non-Diverted, Temporary, and/or Permanent Stream Channels. Where a bridge, road, culvert or other crossing is proposed for any streams, provide the following information: [1780.37/1784.24]

NOTE: For design specification requirements, see Part 5.3.2.

6.8.1 Name of stream(s) with nomenclature consistent with names used in maps and reports.

6.8.2 Description of construction methods and sequence including water handling during construction and erosion/sediment control measures for each crossing.

6.8.3 Describe how the original stream channel(s) and associated riparian vegetation will be restored.

6.9 Stream Buffer Zone. Discuss how the designated 100 ft. stream buffer zone will be marked for any intermittent and/or perennial stream that will not be disturbed by surface mining activities. Clearly indicate the 100-ft. stream buffer zone on all appropriate maps in the General Mapping Requirements of the Instructions and Part 3.3. If no streams are located within the proposed permit boundary or within 100 ft. of the proposed permit boundary indicate N/A. [1816.57(b)/1817.57(b) and 1816.11/1817.11]

Attachment 6.2.1 Stream Classification											
Stream ID	Drainage Area (sq miles)	Lowest Surface Elevation	Classification	Proposed Disturbance	Disturbance within 100 feet	BFW (ft)	BFD (ft)	FPW (ft)	TW (ft)	TD (ft)	RBP Habitat Score
S1 - Upland Woods	0.08	444.3	ephemeral	none	no	Wood: 7.6	Wood: 1.4	Wood: 10.4	Wood: 16.1	Wood: 3.2	Wood: 100
S1 - Lowland Woods	0.16	442.2	ephemeral	none	no	Wood: 7.6	Wood: 1.4	Wood: 10.4	Wood: 16.1	Wood: 3.2	Wood: 100
S1 - Herbaceous	0.27	422.8	ephemeral	Road Crossing	yes	Herb: 4.8	Herb: 0.2	Herb: 36.7	Herb: 63.0	Herb: 3.0	Herb: 102
S2	0.01	457.2	ephemeral	none	no	5.0	0.1	11.0	40.0	12.0	105
S3	0.03	450.4	ephemeral	none	no	3.0	0.1	4.0	16.0	7.0	117
S4	0.04	444.9	ephemeral	none	no	2.7	0.4	12.9	22.7	18.0	109
S5	0.04	423.4	ephemeral	sed pond discharge	yes	2.9	0.2	5.1	12.6	2.2	111
S6	0.03	428.8	ephemeral	none	no	3.7	0.7	5.9	7.2	1.5	129
S7	0.27	416.8	ephemeral	none	no	12.0	0.2	16.0	60.0	6.0	120
S8	0.01	417.7	ephemeral	none	no	6.3	1.9	11.9	14.5	5.5	88
S9	0.2	462.6	ephemeral	none	no	6.2	0.8	11.9	23.2	6.0	129

BFW= Bankfull Width, BFD= Bankfull Depth, FPW= Floodprone Width, TW= Terrace Width, TD= Terrace Depth

Piezometer Data for S1								
GW Well #1	Water Elevation	Top of Bank	Ditch Bottom		GW Well #2	Water Elevation	Top of Bank	Ditch Bottom
		439.04	437.16				431.79	431.54
3/28/2019	436.55				3/28/2019	429.65		
4/6/2019	436.65				4/6/2019	430.05		



S1 herbaceous looking upstream



S1 herbaceous looking downstream



S1 wooded looking upstream



S1 wooded looking downstream



S2 looking upstream



S2 looking downstream



S3 looking upstream



S3 looking downstream



S4 looking upstream



S4 looking downstream



S5 looking upstream



S5 looking downstream



S6 looking upstream



S6 looking downstream



S7 looking upstream



S7 looking downstream



S8 looking upstream



S8 looking downstream



S9 looking upstream



S9 looking downstream

Attachment 6.2.1 Stream Classification											
Stream ID	Drainage Area (sq miles)	Lowest Surface Elevation	Classification	Proposed Disturbance	Disturbance within 100 feet	BFW (ft)	BFD (ft)	FPW (ft)	TW (ft)	TD (ft)	RBP Habitat Score
S1 - Upland Woods	0.08	444.3	ephemeral	none	no	Wood: 7.6	Wood: 1.4	Wood: 10.4	Wood: 16.1	Wood: 3.2	Wood: 100
S1 - Lowland Woods	0.16	442.2	ephemeral	none	no	Wood: 7.6	Wood: 1.4	Wood: 10.4	Wood: 16.1	Wood: 3.2	Wood: 100
S1 - Herbaceous	0.27	422.8	ephemeral	Road Crossing	yes	Herb: 4.8	Herb: 0.2	Herb: 36.7	Herb: 63.0	Herb: 3.0	Herb: 102
S2	0.01	457.2	ephemeral	none	no	5.0	0.1	11.0	40.0	12.0	105
S3	0.03	450.4	ephemeral	none	no	3.0	0.1	4.0	16.0	7.0	117
S4	0.04	444.9	ephemeral	none	no	2.7	0.4	12.9	22.7	18.0	109
S5	0.04	423.4	ephemeral	sed pond discharge	yes	2.9	0.2	5.1	12.6	2.2	111
S6	0.03	428.8	ephemeral	none	no	3.7	0.7	5.9	7.2	1.5	129
S7	0.27	416.8	ephemeral	none	no	12.0	0.2	16.0	60.0	6.0	120
S8	0.01	417.7	ephemeral	none	no	6.3	1.9	11.9	14.5	5.5	88
S9	0.2	462.6	ephemeral	none	no	6.2	0.8	11.9	23.2	6.0	129

BFW= Bankfull Width, BFD= Bankfull Depth, FPW= Floodprone Width, TW= Terrace Width, TD= Terrace Depth

Piezometer Data for S1								
GW Well #1	Water Elevation	Top of Bank	Ditch Bottom		GW Well #2	Water Elevation	Top of Bank	Ditch Bottom
		439.04	437.16				431.79	431.54
3/28/2019	436.55				3/28/2019	429.65		
4/6/2019	436.65				4/6/2019	430.05		



S1 herbaceous looking upstream



S1 herbaceous looking downstream



S1 wooded looking upstream



S1 wooded looking downstream



S2 looking upstream



S2 looking downstream



S3 looking upstream



S3 looking downstream



S4 looking upstream



S4 looking downstream



S5 looking upstream



S5 looking downstream



S6 looking upstream



S6 looking downstream



S7 looking upstream



S7 looking downstream



S8 looking upstream



S8 looking downstream



S9 looking upstream



S9 looking downstream

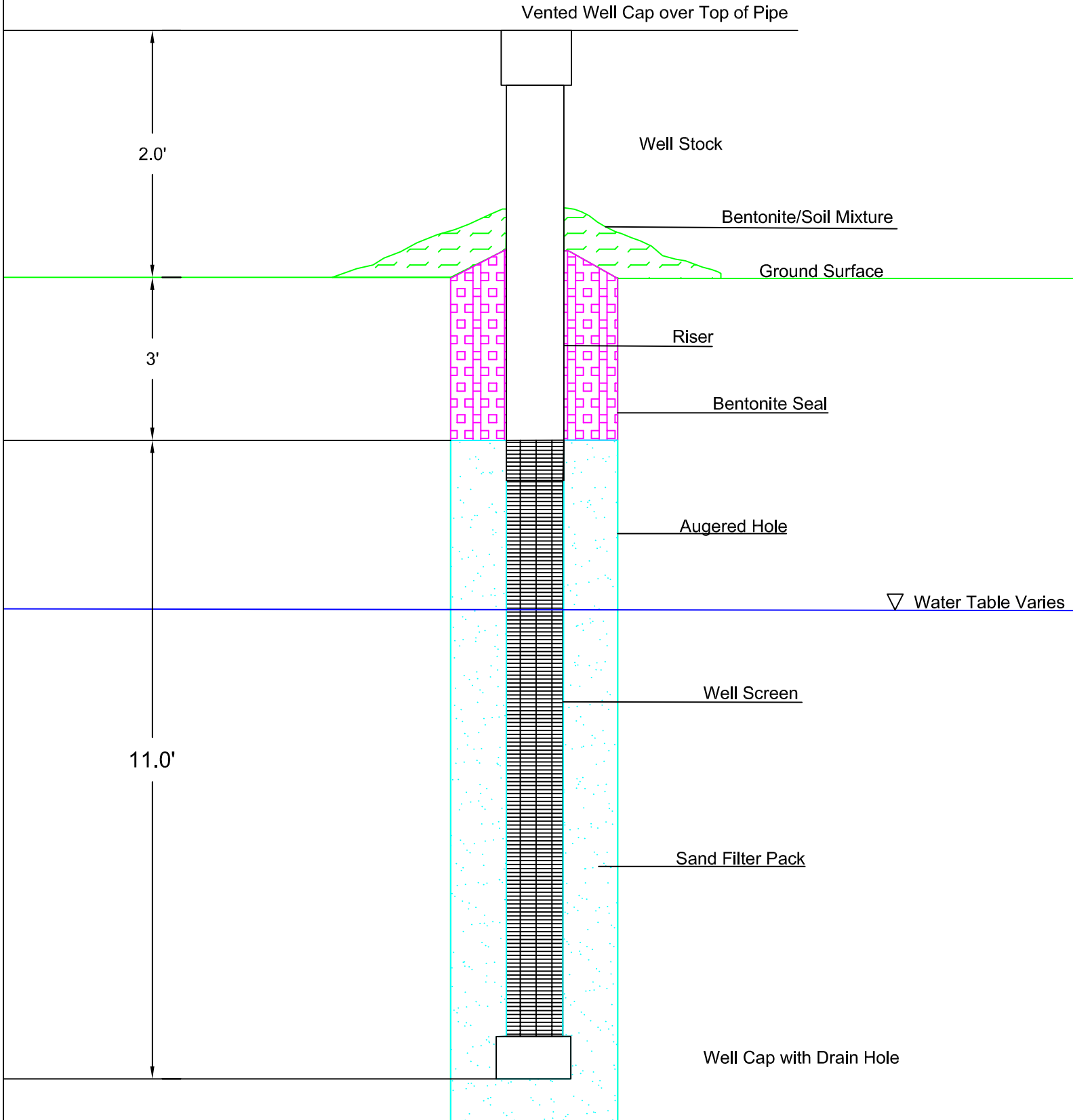
SUNRISE COAL LLC. OAKTOWN FUELS NO. 2 MINE
PIEZOMETER P-1 WELL INSTALLED MARCH 26, 2019
LAWRENCE COUNTY, ILLINOIS

ATT. 6.2.1

LATITUDE 38.841620°

LONGITUDE -87.546006°

ELEVATION AT TOP OF PIPE = 439.8' TOTAL PIPE DEPTH = 16.0'



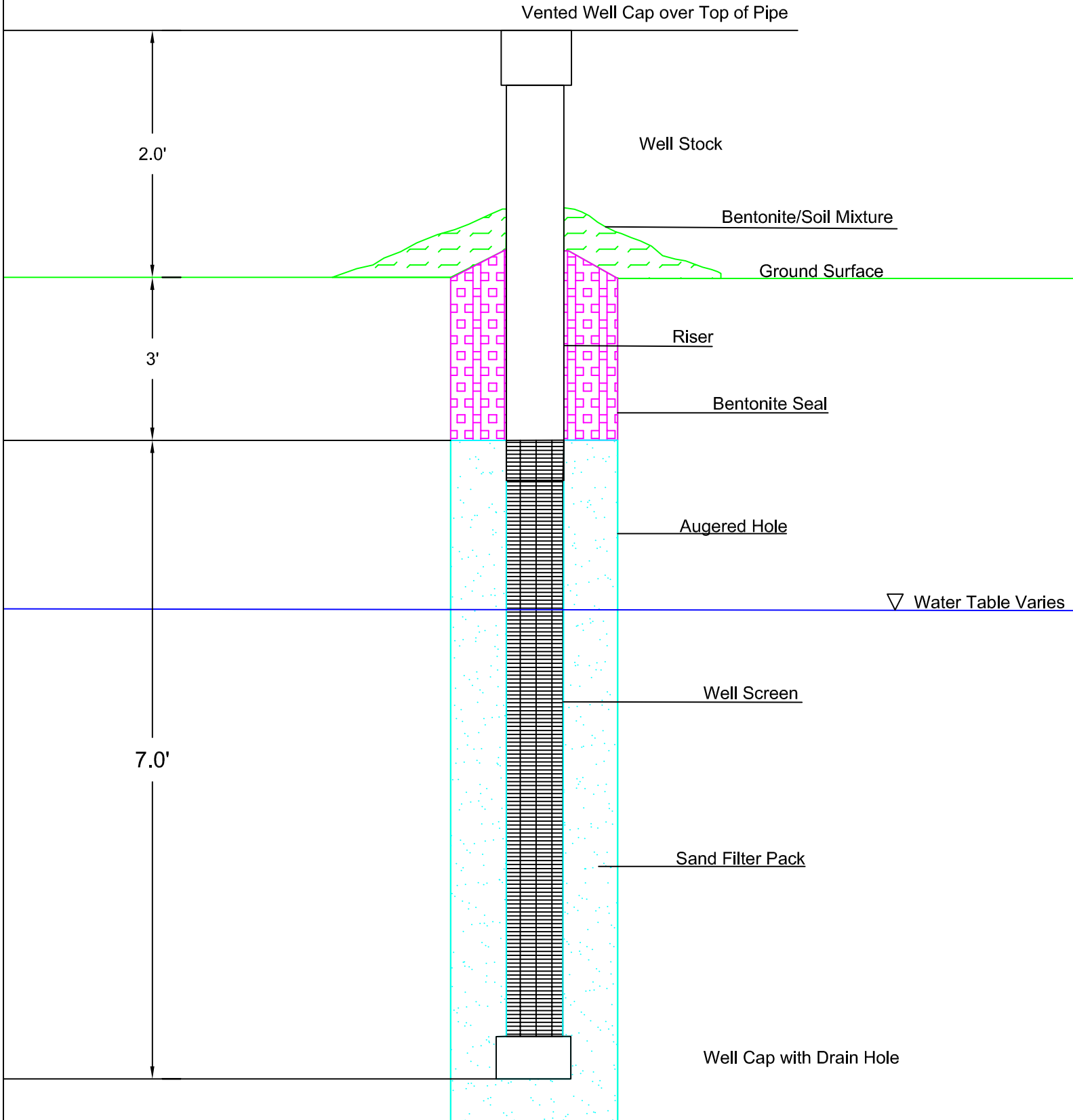
SUNRISE COAL LLC. OAKTOWN FUELS NO. 2 MINE
PIEZOMETER P-2 WELL INSTALLED MARCH 26, 2019
LAWRENCE COUNTY, ILLINOIS

ATT. 6.2.1

LATITUDE 38.840132°

LONGITUDE -87.546074°

ELEVATION AT TOP OF PIPE = 431.9' TOTAL PIPE DEPTH = 12.0'



PART 7: Fish and Wildlife

7.1 Pre-Mining Fish and Wildlife Resources. Each application shall include fish and wildlife resource information for the permit and adjacent area. Prior to initiating fish and wildlife resource information studies, the applicant shall contact the Department to determine what fish and wildlife resources information will be required. If the applicant has not contacted the Department as described above, an explanation shall be supplied in the space below. [1780.16(a)/1784.21(a); 1780.16(a)(1)(A)/1784.21(a)(1)(A)]

The Department of Natural Resources was contacted to determine the status of threatened and endangered species in the permit area and adjacent area. The Department advised to review T&E species within Lawrence and Crawford Counties. The Department provided locations of T&E species for these counties.

7.1.1 Vegetation Map. Provide a Vegetation Map meeting the requirements found in General Mapping Requirements of the Instructions. [1779.19/1783.19; 1779.24(l)/1783.24(l); 1780.16(a)(2)(B) & (C)/1784.21(a)(2)(B)&(C)]

See Vegetation Map.

7.1.2 Habitat Descriptions. Provide a description of the habitat types for each listed pre-mining land use category, excluding cropland, within the proposed permit area. Include information for areas categorized as Residential, Industrial/Commercial, Recreational, and Undeveloped that contain trees or other potential habitats of high value for fish and wildlife. Include specific information on pre-mining woody and herbaceous vegetation species. In addition, provide a general description of the habitat found in the adjacent half mile area, specifically addressing any potential habitats of high value. [1784.15(a)(1)/1780.23(a)(1); 1779.19(a)/1783.19(a); [Operator Memorandum 2015-01](#)]

All the area north of Road 1840 N is dominated by upland trees. Dominant species include Sweetgum, American elm, Chinkapin oak, Osage Orange, Red maple, Sycamore, and Pin oak. Undersitory species include Japanese honeysuckle, bush honeysuckly, blackberry, small hickories, and mutiflora rose. South of Road 1840N, just SE of the intersection of 1840N and 1950E, the upland trees extend into this area with the same species noted.

The corridor of trees surrounding Stream 1 south of Road 1840N are dominated by Sweetgum, American elm, and Chinkapin oak with understory species noted as Japanese honeysuckle, multiflora rose, bush honeysuckle, and osage orange.

The lowland woods in the SE corner of the permit area is dominated by American elm, Red maple, and Pin oak with a sparse understory of Virginia wild rye.

7.1.2.1 For wetland resources located within the proposed permit area, discuss how these areas will be avoided or replaced, and enhanced where applicable and provide general information on the steps taken to comply with the Section 404 of the Clean Water Act. If no wetland resources exists within the proposed permit area pre-mining, indicate N/A. [1780.18(b)(9)/1784.13(b)(9); 1816.97(f)/1817.97(f)]

Three wetlands were identified in the permit area, all south of Road 1840N. Wetlands A and B are located in the wooded tract in the SE corner of the permit area. Dominant vegetation includes American elm, Red maple, Pin oak, and Virginia wild rye. Wetland C is located in the SW permit corner and is dominated

by Red maple, pin oak, and Virginia wild rye. See attachment 7.1.2.1 Wetland Delineation Forms. All three of these wetlands will be avoided and not disturbed; therefore no 404 permit will be required with respect to these wetlands. A 404 permit will be pursued relative to the road crossing of Stream 1.

7.1.3 Other Site Specific Habitats of High Value. Address any habitats of unusually high value for fish and wildlife located within the proposed permit and adjacent half mile area. The following information is required: [1780.16(a)(2)(B)/1784.21(a)(2)(B); 1816.97(f)/1817.97(f)]

7.1.3.1 Stream Habitat Characterization. For each intermittent and perennial stream discussed in Part 6, provide a description of the riparian vegetation (if this information is found in Attachment 6.2, referencing that material is acceptable) and a narrative discussing any critical habitat for threatened and endangered aquatic species. Provide a general discussion on how stream habitat will be avoided or replaced, and enhanced where practicable. Provide general information on the steps taken to comply with Section 404 of the Clean Water Act regarding streams and associated riparian areas. If no intermittent or perennial streams were identified in Part 6 indicate N/A. [1780.16(a)(2)(B)/1784.21(A)(2)(B); 1816.97(f)/1817.97(f); (1780.18(b)(9)/1784.13(b)(9))]

There are no streams which meet the OMM definition of intermittent or perennial.

7.1.3.2 Shelter, Protection, and Reproductive Areas. Discuss areas within the proposed permit and adjacent half mile area such as cliffs supporting raptors, caves, migration routes and wintering areas and measures to protect these areas and enhance where practicable. If none of these areas exist indicate N/A. [1780.16(a)(2)(B)/1784.21(a)(2)(B); 1816.97(f)/1817.97(f)]

N/A

7.1.3.3 Agency Consultation. Discuss any additional habitats of high value identified through other agency consultations as requiring protection by applicable state and federal laws, this may include a larger adjacent area as defined by consultation. If no other habitats of high value were identified through consultation indicate N/A. [1780.16(a)(2)(C)/1784.21(a)(2)(C); 1780.16(a)(1)(B)(iii)/1784.21(a)(1)(B)(iii)]

N/A

7.2 Threatened and Endangered Species. Information required in this section will ensure that the proposed operations adhere to the [Endangered Species Act of 1973](#), as amended, the [Migratory Bird Treaty Act](#), as amended, the [Bald and Golden Eagle Protection Act](#), as amended and other applicable state and federal laws. [1773.12; 1780.16/1784.21; 1816.97/1817.97]

7.2.1 T&E Species List. Provide a complete threatened and endangered species list for both state and federally listed species that are known to occur within the county(ies) of the proposed permit area and half a mile adjacent to the proposed boundary. Applicants should be aware that the adjacent area may be expanded based on the nature of the listed species in the area and/or as defined by consultation. This information may be provided in Attachment 7.2.1. [1780.16(a)(1)(B)/1784.21(a)(1)(B); 1780.16(a)(2)(A)/1784.21(a)(2)(A); 1816.97(b)/1817.97(b)]

See Threatened and Endangered Species Review in Attachment 7.2.1.

7.2.1.1 Likely to Occur Determination. For each threatened and endangered species listed in part 7.2.1 provide a determination based on species habitat requirements regarding the likelihood that the species may occur within the proposed permit and, if applicable, the adjacent half mile area. In addition, provide the rationale justifying the determination. If an attachment is provided, it should be titled Attachment 7.2.1.1. If multiple attachments are necessary they should be titled Attachment 7.2.1.1 - 1 of 2 etc. [1780.16(a)(1)(B)/1784.21(a)(1)(B), 1780.16(a)(2)(A)/1784.21(a)(2)(A); 1816.97(b)/1817.97(b)]

See Attachment 7.2.1, Table 2.

7.2.1.2 Format and Contents. The information presented shall be current, clear and concise, filed in the format required by the Department, and contain explicit citations. **Where required by the Department,** relevant portions of the referenced materials shall be presented by photocopying or abstracting. If references to previously approved permits are made, the relevant portions of the permits must be supplied in accordance with [Operator Memorandum No. 90-08](#) or an explanation shall be provided below why this information is not provided. This information may be supplied as Attachment 7.2.1.3 if necessary. [1777.11(a) and (b)]

See Attachment 7.2.1, Table 2.

7.2.1.3 Agency Consultation. Discuss any additional species identified through other agency consultations as requiring protection by applicable state and federal laws. If no other species information is required indicate N/A. [1780.16(a)(2)(C)/1784.21(a)(2)(C); 1780.16(a)(1)(b)(iii)/1784.21(a)(1)(b)(iii)]

N/A

7.2.2 T&E Species Protection and Enhancement Plans.

7.2.2.1 Do any trees exist within the proposed permit area? [1780.16(b)/1784.21(b)]

- YES NO

If YES, the applicant shall:

- Provide a Protection and Enhancement Plan and an Incidental Take Authorization request as Attachment 7.2.2 for the Indiana bat meeting the specifications of the “[Range-wide Indiana Bat Protection and Enhancement Plan Guidelines](#)” (revised 2013) developed by the U.S. Fish and Wildlife Service and the Office of Surface Mining, or justify why a Protection and Enhancement Plan and Incidental Take authorization request are not required under those guidelines, and;
- Discuss whether or not the project is consistent with the northern long-eared bat [Final 4\(d\) Rule for Federal Actions \(January 2016\)](#), and if not then provide a Protection and Enhancement Plan and Incidental Take Authorization request consistent with the 2013 Indiana bat guidelines referenced above. This information may be provided in Attachment 7.2.2.

If NO, provide a statement regarding the absence of trees below. If the proposed permit area contains trees but these trees will remain unaffected throughout the life of the permit, this information may be relayed in the space below.

Trees are present in the permit area. See Vegetation Map. A small area of 0.52 acres of trees will be disturbed east of Road 1950E. There are no trees 5 inch dbh or greater in this 0.52 acres which have exfoliating bark, nor are there any snags. The nearest occurrence of a NLEB is 7.6 miles, according to the IDNR data base. The 4(d) NLEB information is also included in Attachment 7.2.2 Bat Information. Therefore no bat PEP is required.

7.2.2.2 Provide Protection and Enhancement Plans for any additional state or federally listed species that are likely to occur within the proposed permit and adjacent half mile area in Attachment 7.2.2.2. For any additional federally listed threatened or endangered species that are likely to occur in the permit area, provide an Incidental Take Authorization request with the Protection and Enhancement Plan. Indicate N/A if this information is not applicable.

See Attachment 7.2.2.2, Barn Owl Protection and Enhancement Plan.

7.2.2.3 If an applicant is in possession of any current [Incidental Take Authorizations](#) for state listed threatened or endangered species obtained through the Illinois Department of Natural Resources Office of Resource Conservation, list those species in the space below, otherwise indicate N/A.

N/A

7.2.3 Eagles. The applicant shall ensure that mining activity will be conducted in a manner that will not result in the taking of a Bald or Golden Eagle, or any other raptor protected under the Bald Eagle Protection Act, and their nests or eggs. “Take” includes the disturbance of protected eagles to the degree that it substantially interferes with breeding, feeding, or sheltering behavior or results in injury. **[1816.97(c) and (d)/1817.97(c) and (d)]**

7.2.3.1 Provide current and accurate information on distances to known Bald Eagle nests within the proposed permit boundary and within a one mile radius. If none exist, then this should be specifically stated. If nests exist within a one mile radius, a Protection and Enhancement Plan must be supplied. Information should also include any species protected under the Bald Eagle Protection Act as amended and may be provided in Attachment 7.2.3.

The following resource is suggested:

[National Bald Eagle Management Guidelines USFWS](#)

According to information supplied by the Illinois Department of Natural Resources, there are no known bald eagle nests within one mile of the permit area.

7.2.4 Reporting of Threatened and Endangered and Other Identified Protected Species. Describe the steps and timeframe for reporting to the Department any state or federally listed species or other protected species **as identified through agency consultation**, should the operator become aware of the species

existence within the proposed permit area. This may include, but not be limited to bald eagle nest reporting in the permit area or applicable adjacent area. [1780.16(a)(2)(C)/1784.21(a)(2)(C); 1816.97(b)/1817.97(b)]

Upon becoming aware of an occurrence of any state or federally listed threatened or endangered species within the permit area, the permittee will contact the OMM site inspector according to the specifications of Section 1817.97(b).

7.3 General Fish and Wildlife Protection and Enhancement Measures. The applicant shall, to the extent possible and with the best technology currently available, minimize disturbances and adverse impacts on fish and wildlife and related environmental values and achieve enhancement of these resources where practicable. [1780.16(b)/1784.21(b)]; [1816.97(a)/1817.97(a)]

7.3.1 Protection Measures. Provide information on measures using the best technology currently available how the applicant will protect fish and wildlife and related environmental values. The following information is required: [1780.16(b)(3)/1784.21(b)(3); 1816.97(e)/1817.97(e)]

7.3.1.1 Electric Powerlines. If powerlines are proposed to be relocated or constructed at any point during operations, then discuss the measures to ensure electric powerlines are designed and constructed to minimize electrocution hazards and other hazards as identified by agency consultation (potentially including collisions with powerlines) to ensure that the Endangered Species Act, the Bald Eagle Protection Act, and the Migratory Bird Treaty Act have been considered and addressed where applicable. This information may be provided in Attachment 7.3.1.1 if necessary. [1773.12; 1780.16(b)/1784.21(b); 1816.97(e)(1)/1817.97(e)(1)]

The following are suggested resources:

[“Suggested Practices for Avian Protection from Powerlines: The State of the Art in 2006”](#)

[“Reducing Avian Collisions with Power Lines: The State of the Art in 2012”](#)

Any powerlines to be constructed will comply with “Suggested Practices for Avian Protection from Powerlines: The State of the Art in 2006” with respect to minimizing electrocution hazards to raptors.

7.3.1.2 Haul and Access Roads. Describe how access and haul roads will be located and operated to avoid or minimize impacts on species protected under the Endangered Species Act, Migratory Bird Treaty Act, and the Bald Eagle Protection Act, or discuss why these protection measures are not applicable. [1780.16(b)(3)(A)/1784.21(b)(3)(A); 1816.97(e)(2)/1817.97(e)(2)]

Roads are proposed on lands currently in or supporting crop production. No wooded land in the permit area is proposed to be disturbed for access roads.

7.3.1.3 Fences and Overland Conveyers. Describe how fences and overland conveyers and other potential barriers will be designed and constructed to allow passage of large mammals, or discuss why these protection measures are not applicable. [1780.16(b)(3)(A)/1784.21(b)(3)(A); 1816.97(e)(3)/1817.97(e)(3)]

No fences or overland conveyers are proposed.

7.3.1.4 Exclusion from Ponds. Provide information on whether or not ponds on site will contain hazardous concentrations of toxic-forming materials and if so, then describe how control measures, management techniques, and monitoring methods will be used to ensure how wildlife protected under the Endangered Species Act, Migratory Bird Treaty Act, and the Bald Eagle

Protection Act are excluded from these areas. [1780.16(b)(3)(A)/1784.21(b)(3)(A);
1816.97(e)(4)/1817.97(e)(4)]

The sedimentation pond will not contain hazardous concentrations of toxic forming materials; therefore no exclusion measures are proposed.

7.3.2 Enhancement Measures. Provide a detailed description of enhancement measures that will be used during the reclamation and post-mining phases of operations to develop aquatic and terrestrial habitats. Measures may include but are not limited to: restoration of streams and wetlands, retention of ponds, establishment of wildlife food and cover, addition of perches or nest boxes, habitat diversification of croplands, and any other management strategies designed to enhance wildlife habitat.

[1780.16(b)(3)(b)/1784.21(b)(3)(b)]

Land uses will be restored to pre-mining land uses. One barn owl nest box will be erected in the permit area.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Sunrise City/County: Lawrence Co. Sampling Date: 12/19/18
 Applicant/Owner: Sunrise Coal State: IL Sampling Point: A
 Investigator(s): William O'Leary Section, Township, Range: 29, 5N, 10W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): _____ Slope
 (%): 0-2 Lat: 38.83870 Long: -87.54380 Datum: WGS84
 Soil Map Unit Name: 8071 NWI classification: PFO1Ad

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____ Are
 Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks:	

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Ulmus Americana</u> (American Elm)	30	yes	FACW	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. <u>Acer rubrum</u> (Red Maple)	30	yes	FAC	
3. <u>Quercus palustris</u> (Pin Oak)	30	yes	FACW	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
90 = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum	(Plot size: _____)			
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum	(Plot size: _____)			
1. <u>Elymus virginicus</u> (Virginia wildrye)	10	yes	FACW	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
10 = Total Cover				
Woody Vine Stratum	(Plot size: _____)			
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				

Remarks: (Include photo numbers here or on a separate sheet.)

Photos 222, 223





WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Sunrise City/County: Lawrence Co. Sampling Date: 12/19/18
 Applicant/Owner: Sunrise Coal State: IL Sampling Point: B
 Investigator(s): William O'Leary Section, Township, Range: 29, 5N, 10W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): _____ Slope
 (%): 0-2 Lat: 38.83946 Long: -87.54311 Datum: WGS84
 Soil Map Unit Name: 8071 NWI classification: PFO1Ad

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____ Are
 Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks:	

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Ulmus Americana</u> (American Elm)	30	yes	FACW	
2. <u>Acer rubrum</u> (Red Maple)	30	yes	FAC	
3. <u>Quercus palustris</u> (Pin Oak)	30	yes	FACW	
4. _____				
5. _____				
	90	= Total Cover		
<u>Sapling/Shrub Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
		= Total Cover		
<u>Herb Stratum</u> (Plot size: _____)				
1. <u>Elymus virginicus</u> (Virginia wildrye)	10	yes	FACW	
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
	10	= Total Cover		
<u>Woody Vine Stratum</u> (Plot size: _____)				
1. _____				
2. _____				
		= Total Cover		

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
 Total Number of Dominant Species Across All Strata: 4 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by: _____
 OBL species _____ x 1 = _____ FACW
 species _____ x 2 = _____ FAC
 species _____ x 3 = _____ FACU
 species _____ x 4 = _____ UPL
 species _____ x 5 = _____
 Column Totals: _____ (A) _____ (B)
 Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
 Dominance Test is >50%
 Prevalence Index is ≤3.0¹
 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
--

Remarks: (Include photo numbers here or on a separate sheet.)

Photos 224, 225





WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Sunrise City/County: Lawrence Co. Sampling Date: 12/19/18
 Applicant/Owner: Sunrise Coal State: IL Sampling Point: C
 Investigator(s): William O'Leary Section, Township, Range: 29, 5N, 10W
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): _____ Slope
 (%): 0-2 Lat: 38.83798 Long: -87.54771 Datum: WGS84
 Soil Map Unit Name: 8071+ NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____ Are
 Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks:	

VEGETATION – Use scientific names of plants.

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
2. <u>Acer rubrum</u> (Red Maple)	50	yes	FAC	Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. <u>Quercus palustris</u> (Pin Oak)	10	no	FACW	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____	_____	_____	_____	Prevalence Index worksheet:
5. _____	_____	_____	_____	
60 = Total Cover				Prevalence Index = B/A = _____
<u>Sapling/Shrub Stratum</u> (Plot size: _____)	_____	_____	_____	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
10 = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
<u>Herb Stratum</u> (Plot size: _____)	_____	_____	_____	
1. <u>Elymus virginicus</u> (Virginia wildrye)	10	yes	FACW	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
10 = Total Cover				
<u>Woody Vine Stratum</u> (Plot size: _____)	_____	_____	_____	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				

Remarks: (Include photo numbers here or on a separate sheet.)

Photos 217, 231





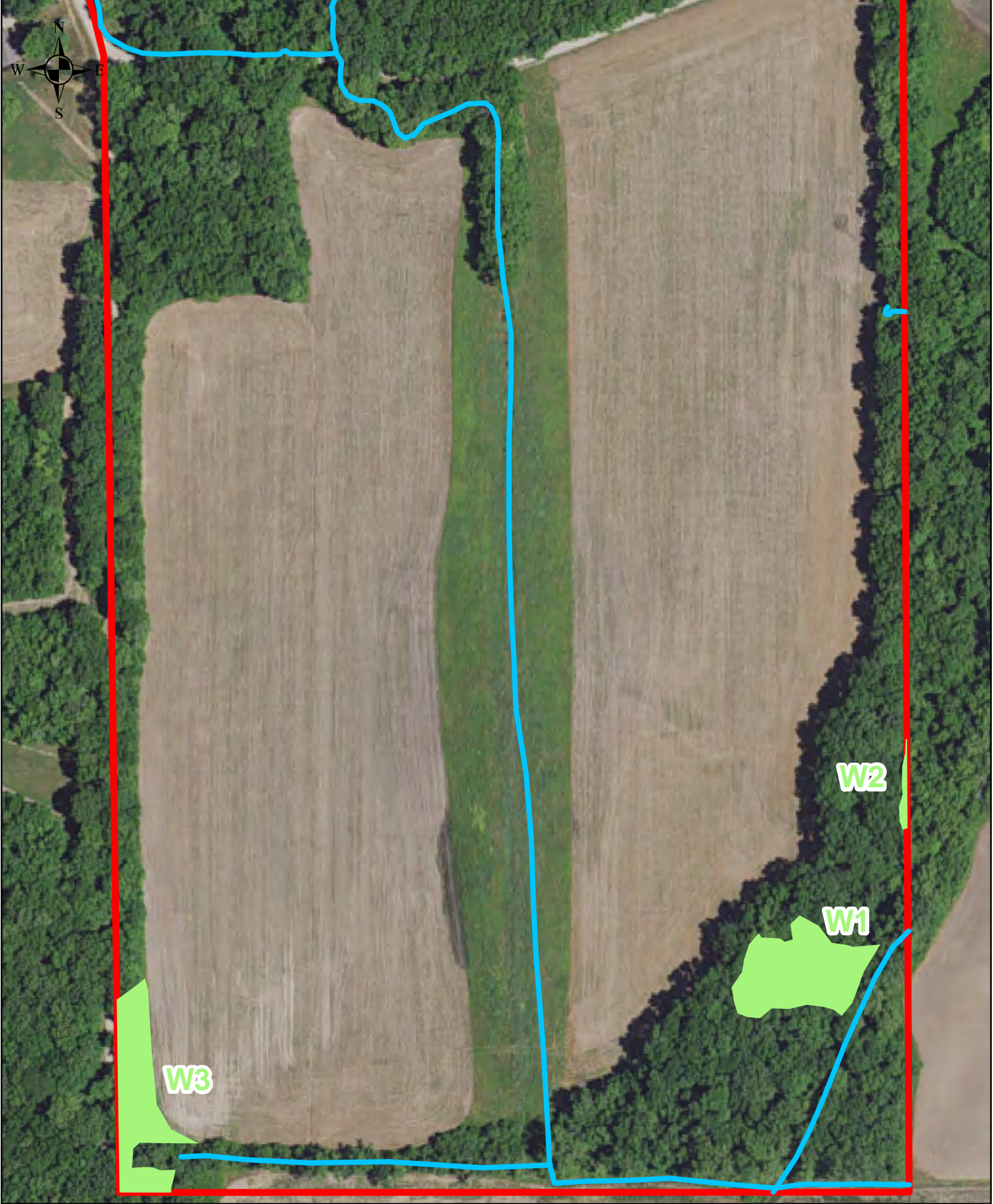


Figure 1. Jurisdictional features of southern half.

0 200 400 Feet

HMG
Engineers • Surveyors

Site Specific Resource Information
and
Threatened and Endangered Species Review

Sunrise Coal, LLC, Oaktown Mine

Lawrence County, IL

Prepared for:

Sunrise Coal, LLC

Prepared by:

Anthony J. Kitchen, M.S.

and

William O'Leary, M.S.



1032 N. 6th Street
Murphysboro, Illinois 62966

December 2018

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EXECUTIVE SUMMARY

Sunrise Coal, LLC (Sunrise) requested that HMG Engineering, Inc. (HMG) conduct a threatened and endangered species review for an area in which Sunrise plans to seek a SMCRA permit through the Illinois Department of Natural Resources Office of Mines and Minerals (Department). In accordance with Section 1780.16(a)(2)(A), this review assessed the likelihood of listed species occurring in or adjacent to the proposed permit area. For those species deemed “likely to occur”, site specific resource information and protection and enhancement plans are included. The Indiana and Northern long-eared bats have been handled in a separate report since specific guidelines have been developed for those species. Forty-three species were assessed (excluding the Indiana and northern long eared bats), including 14 plant species and 29 animal species. Of these 14 plant species, none were found to be “likely to occur” in the permit area or adjacent area. One animal species (barn owl) was found to be “likely to occur” on the proposed permit area and adjacent area.

INTRODUCTION

Sunrise has proposed to develop a satellite portal to support expanding operations at an existing underground mine in Lawrence County northwest of Russellville, Illinois (Figure 1). The proposed mine permit area is approximately 101 acres. The Illinois Department of Natural Resources Office of Mines and Minerals (Department) requires permit applicants to examine the probability of occurrence of all threatened and endangered (T&E) species that are known to occur in the project county and surrounding counties, in this case Lawrence and Crawford (Figure 2). A review of the county T&E lists identified 43 species (excluding the Indiana bat and Northern long-eared bat) that the Illinois Endangered Species Protection Board shows as known to occur in this two county assessment area. Pursuant to Sections 1780.16(a)(2)(A) and 1780.16(b)(2), the Department requests that the applicant provide a discussion regarding the likelihood that the listed T&E species occur on or adjacent to the proposed mine permit area.

Sunrise obtained assistance from HMG to document the habitat and land use conditions on the proposed mine permit area and determine the likelihood of occurrence of the 43 listed species on the mine permit area and adjacent areas. The following report summarizes this information.

QUALIFICATIONS

The field work was carried out and this report written by Senior Environmental Scientist/Mining Specialist, William O’Leary with assistance from Environmental Scientist Anthony Kitchen. Mr. O’Leary has a Bachelor’s degree in Biology and Environmental Biology from Indiana State University and a Master’s degree from Southern Illinois University in Zoology (specializing in Wildlife Ecology). Mr. O’Leary is a retired State of Illinois Wildlife and Wetlands Specialist and has 38 years of experience with mining related wildlife issues. Mr. Kitchen holds Bachelor’s degrees in Environmental Science as well as Geography from the University of Wisconsin and a Master’s degree from East Carolina University in Biology (specializing in Organismal Biology and Ecology).

PROJECT LOCATION

The proposed mine permit area is located in Lawrence County, Illinois, northwest of Russellville, IL (Figure 1). In particular, the permit area is located in Sections 29 and 32, T5N, R10W, in Lawrence County.

AGENCY CONSULTATION

This report will be reviewed by the Illinois Department of Natural Resources, Office of Mines and Minerals and Office of Realty and Environmental Planning. The report may also be reviewed by the U.S. Fish and Wildlife Service. Response to review comments will be formulated as those comments are received.

METHODS

HMG, Engineers, Inc. utilized GIS to examine aerial photographs, soils data, and land cover data within and adjacent to the mine permit area. Furthermore, the site was visited to document characteristics of habitats within the proposed permit area. The field visit was conducted on December 19 and 20, 2018.

Table 1 identifies the T&E species that occur in Lawrence and Crawford counties. The counties of known occurrences are shown along with the distance from the proposed permit area to the nearest known occurrence. Habitat requirements of each species were investigated and are described below. A brief description of the habitat is presented in Table 2, along with the finding of “likely to occur” or not with respect to the proposed permit area and adjacent area. Where a

positive “likely to occur” finding was made that determination is highlighted in yellow. Based on a review of each species’ habitat requirements and habitats present on the proposed permit area, a determination was made as to the likelihood of occurrence of each species on, and adjacent to, the mine permit area. Distance to known populations and watershed separations were also considered. A number of species were found to occur along the Wabash River in Lawrence and Crawford Counties. Those species only occurring upstream of Russellville were regarded as having a watershed separation from the proposed permit area and adjacent area, which was one criterion used in swaying a decision towards “not likely to occur”. Some species associated with the Wabash River downstream of Russellville, although not separated by watershed, were considered too far downstream to be in the adjacent area. Another group of species occurs in the Embarras River system in central Lawrence County. Again, watershed separation and distance leaned towards a “not likely to occur” determination for those species. For species receiving a “likely to occur” finding, site specific resource information and protection and enhancement plans are provided. Figures 5 and 6 address site specific resource location information.

SITE SPECIFIC RESOURCE INFORMATION

The proposed mine permit area is approximately 101 acres. The land uses identified for the mine permit application included cropland, and undeveloped. Cropland areas are dominated by corn and soy beans planted in rotation. Woody vegetation is dominated by northern red oak, white oak, pin oak, American elm, sycamore, hickory, and osage orange. Woodland understory is dominated by multiflora rose and blackberry. See pre-mining section of the permit application for exact figures for pre-mining land uses.

Wetlands and streams were identified in the proposed permit area and assessed in the field. Refer to stream and wetland information in Attachments 6.2.1 and 7.1.2.1 for these features.

The proposed permit area is located in the northeast corner of Lawrence County. The site is west of the Wabash River.

Description of Mining Operations

The mining operations to be conducted include development of a remote shaft site over the shadow area for a mine whose main facilities are located in Indiana, east of the Wabash River. The site will include two entrance roads, internal facility access roads, a warehouse, laydown yard,

parking for 240 vehicles, a bathhouse, a hoist, a rock dust facility, Transformer, and fuel drop. An affected area runoff collection system will be installed including a collection ditch and sedimentation pond.

Impacts of Mining to Vegetation

Most of the currently proposed development will take place in areas currently in agricultural production. Also the northern access road will cross an existing grassed waterway. Trees will be cleared along the east side of the local road from the western entrance road to the bath house and parking area.

SPECIES INVESTIGATIONS AND SITE SPECIFIC RESOURCE INFORMATION

Plants

Arkansas sedge (*Carex arkansana*)

Arkansas sedge is found in moist prairies and moist forest openings (FNA no date). Within the two county assessment area, the species is known only from a single site in Lawrence County, 10 miles SW of the proposed permit area. Given the distance to a known population and watershed separation, Arkansas sedge is not likely to be included in the proposed permit area or adjacent area.

Bloodleaf (*Iresine rhizomatosa*)

According to Herkert and Ebinger (2002), this species reaches its northern limit in the floodplain forests of the Ohio and Wabash Rivers. The species inhabits wet woodlands, and is known to occur at three sites in the two county assessment area. Two of these sites are along the Wabash River in Lawrence County and one is in Crawford County. The nearest site is 9 miles south of the proposed permit area. Given the distance to a known population, bloodleaf is not likely to occur on or adjacent to the proposed permit area.

Drooping sedge (*Carex prasina*)

Drooping sedge prefers wet ground in forested areas. Within the two county assessment area, the species is known only from a single site in west-central Lawrence County, in the Embarras River watershed. The site is located 17 miles southwest of the proposed permit area. Given the distance to a known population and watershed separation, drooping sedge is not likely to occur on or adjacent to the proposed permit area.

Grass-leaved lily (*Stenanthium gramineum*)

The grass leaved lily occurs in moist woods, often along streams (Mohlenbrock 1986). The lily is known from a single location in Lawrence County, located 12 miles southwest of the proposed permit area, in the Embarras River watershed. Given the distance to a known site and watershed separation, the grass-leaved lily is not likely to occur on or adjacent to the proposed permit area.

Halbred-leaved tearthumb (*Polygonum arifolium*)

According to Herkert and Ebinger (2002), this species is known from only a few scattered disjunctive sites in Illinois. It inhabits moist woods and stream edges. Within the two county assessment area, the species is known only from 2 sites in western Lawrence County. One site is privately owned, the other is in a forested seep springs in a state park. Both sites are west of Embarras River in the Muddy Creek watershed of that river. The closest site is 16 miles west of the proposed permit area. Given the distances to a known sites and watershed separation, the species is not likely to occur in or adjacent to the proposed permit area.

Large Sedge (*Carex gigantean*)

This sedge prefers forested wetlands, open swamps, and wet forest openings (Hill 2006). Within the two county assessment area, the species is known only from one location in Lawrence County, in the Embarras River watershed. This site is located 14 miles west of the proposed permit area. Given this distance and watershed separation, this species is not likely to occur on or adjacent to the proposed permit area.

Leatherflower (*Clematis viorna*)

Leatherflower prefers habitat along streams in floodplain forest communities. The species is known from two locations in the two county assessment area, one in central Lawrence County and one in southern Crawford County. The closest site is 10 miles southwest of the proposed permit area along the Embarras River. Given this distance and watershed separation, leatherflower is not likely to occur on or adjacent to the proposed permit area.

Prairie rose gentian (*Sabatia campestris*)

According to Herkert and Ebinger (2002), this species inhabits mesic prairies. Within the two county assessment area, it occurs only at a single site in Lawrence County. The site is 13 miles to the west. Given this distance to a known population and lack of habitat in or adjacent to

the proposed permit area, this species is not likely to occur on or adjacent to the proposed permit area.

Royal catchfly (*Silene regia*)

According to Herkert and Ebinger (2002), this species inhabits dry-mesic barrens and prairies. Within the two county assessment area, the species is known from 4 sites in Lawrence County. The nearest location is 4 miles to the southwest. The habitat description does not occur on or adjacent to the proposed permit area. Given the distance to a known population and lack of habitat, this species is not likely to occur on or adjacent to the proposed permit area.

Running pine (*Lycopodium clavatum*)

According to Mohlenbrock (1986), this species inhabits north facing slopes, sandy soils below sandstone outcrops, and seepage stream banks. Within the two county assessment area, the species is known from a single location in Lawrence County. The site is 17 miles to the southwest in the Embarras River watershed. Given this distance to a known occurrence and watershed separation, this species is not likely to occur in the proposed permit area or adjacent area.

Sedge (*Carex bromoides*)

This sedge prefers swamps and moist wooded habitat. The species is known from two locations in the two county assessment area. Both sites are in Lawrence County with the closest one being 11 miles southwest of the proposed permit area in the Embarras River watershed. Given this distance to the nearest known population and watershed separation, this sedge species is not likely to occur on or adjacent to the proposed permit area.

Storax (*Styrax americana*)

Storax prefers moist soil habitat. The species is known from three locations within the two county assessment area, two in Lawrence County and one in southern Crawford County. The closest site is 12 miles west of the proposed permit area in the Embarras River watershed. Given the distances to known locations and watershed separation, storax is not likely to occur on or adjacent to the proposed permit area.

Tube beard tongue (*Penstemon tubaeiflorus*)

According to Mohlenbrock (1986), this species inhabits prairies and dry woods. Within the two county assessment area, it occurs at two sites in Lawrence County, both in the Embarras

River watershed. The closest site is 10 miles to the southwest. Given the distance to a known location and watershed separation, the species is not likely to occur in or adjacent to the proposed permit area.

Winged sedge (*Carex alata*)

According to Herkert and Ebinger (2002), this species prefers swamps and floodplains forests. Within the two county assessment area, it is known from a single location in the Embarras River watershed in southern Lawrence County. This site is 13 miles south of the proposed permit area. Given the distance to a known location and watershed separation, winged sedge is not likely to occur on or adjacent to the proposed permit area.

Invertebrates

Ebonyshell (*Fusconaia ebena*)

The ebonyshell is found in large rivers and prefers sand and gravel habitats. Within the two county assessment area, it occurs at 3 sites along the Wabash River. One site is 20 miles upriver of the confluence of the Wabash with permit area drainage. The two downstream locations are 9.5 and 12.5 miles downstream of the confluence. Dilution effect would make any runoff from the mine site insignificant at these distances. The habitat type required by the ebonyshell is not present on or adjacent to the proposed permit area and known sites are separated by watershed separation or so far downstream such that dilution would make any potential impact insignificant. As a result, the ebonyshell is not likely to occur on or adjacent to the proposed permit area.

Elephant-ear (*Elliptio crassidens*)

Elephant-ear prefers large rivers in mud, sand, and gravel. The species is known from two sites in Lawrence County in the Wabash River, adjacent to Vincennes, 12 and 15 miles downstream of the permit site. The habitat type does not occur on or adjacent to the proposed permit area and known locations are very far downstream. Therefore, this mussel is not likely to occur on or adjacent to the proposed permit area.

Shawnee rocksnail (*Lithasia obovata*)

The Shawnee rocksnail is found in the Ohio River and its larger tributaries in Pennsylvania, Ohio, Indiana, Illinois, Kentucky, and Tennessee (Burch 1989 in NatureServe 2009). The streams

on the proposed mine permit area and adjacent area do not represent this habitat. Within the two county assessment area, the species is known from one site along the Embarras River in central Lawrence County. The site is 10 miles southwest of the proposed permit area. Given the lack of habitat in or adjacent to the proposed permit area, and watershed separation from the known population, the Shawnee rocksnail is not likely to occur on or adjacent to the proposed permit area.

Sheepnose (*Plethobasus cyphus*)

The sheepnose is known from the Wabash, Ohio, Mississippi, and Illinois River systems. The Illinois Endangered Species Protection Board describes its habitat as found in current, on mud or gravel bottoms at water depths of a few centimeters to 2 meters (Nyböer et al. 2006). Most populations are small and isolated. Increased siltation and domestic, industrial, and agricultural pollution are listed as primary threats to the species. In the assessment area, the species is known from a single location in Lawrence County, 4 miles to the southeast (4.7 stream miles downstream) on the Wabash River. Given the distance to the known population and dilution impacts from the Wabash watershed, the species is not likely to occur in or adjacent to the proposed permit area.

Amphibians

Four-toed salamander (*Hemidactylium scutatum*)

The four-toed salamander is reported to occur in Illinois in 7 disjunctive populations. Habitat is described as boggy woodland ponds, sphagnum areas adjacent to woodlands, and spring-fed headwaters of small woodland streams. Adults are terrestrial while larvae are aquatic (Nyböer et al. 2006). Within the two county assessment area, the species is known only from a single location in Lawrence County. The site is 17 miles to the southwest in the Embarras River watershed. Given the distance to a known population and watershed separation, this species is not likely to occur in the proposed permit area or adjacent area.

Mudpuppy (*Necturus maculosus*)

The mudpuppy lives in lakes, ponds, rivers, and large creeks, where it is more abundant in clear waters (INHS). Within the two county assessment area, it is known from only a single location on the western border of Crawford County. This site is 24 miles away from the proposed permit area in the North Fork of the Embarras River. Given this distance to a known population, and watershed separation, this species is not likely to occur in or adjacent to the proposed permit area.

Silvery salamander (*Ambystoma platineum*)

The silvery salamander inhabits wooded uplands. It was reported to occur only in Middle Fork Woods Nature Preserve in Vermillion County (Herkert and Ebinger 2002) where it also inhabits adjacent ravines. However, within the two county assessment area there is one known location in Crawford County. This site is located 19 miles northwest of the proposed permit area in the Hutson Creek watershed, which drains into the Wabash River 31 river miles upstream of the confluence with permit area drainage. Given the distance to a known population, and watershed separation, this species is not likely to occur in or adjacent to the proposed permit area.

Reptiles

Eastern ribbon snake (*Thamnophis sauritus*)

Eastern ribbon snakes prefer wet meadows and fields, along lakes, ponds, streams, and marshes. There are 4 known locations of the eastern ribbon snake within the two review counties. One known location is in Crawford County and three are in Lawrence County. Three are in the Embarras River watershed. The fourth is near the mouth of the Embarras in an area that drains directly to the Wabash River. The closest known location is 10 miles to the southwest in Lawrence County in the Embarras River watershed. Given this distance to a known population and watershed separation, this species is not likely to occur on or adjacent to the proposed permit area.

Ornate box turtle (*Terrapene ornata*)

The ornate box turtle inhabits sand prairies of central and northern Illinois and open fields in former prairie. Within the two county assessment area, it is known from only a single location in western Lawrence County. The site is located 18 miles southwest of the proposed permit area in the Embarras watershed. Given this distance to a known population, and lack of suitable habitat, this species is not likely to occur on or adjacent to the proposed permit area.

Smooth softshell (*Apalone mutica*)

The smooth softshell is a turtle occurring in the central United States including the Ohio, Mississippi, and Missouri river basins. The turtle is also found in streams draining to the Gulf of Mexico, from extreme western Florida to eastern Texas (Conant and Collins 1991). The Illinois Natural Heritage Database documents recent (post-2000) records from Calhoun, Cass, Cumberland, Fulton, Jackson, Lawrence, Mason, Menard, Peoria, Pike and Sangamon Counties (Mankowski 2010). Additionally, recent studies have recorded the species in Hancock and

Alexander and Union Counties, respectively (Anderson et al. 2002, Barko and Briggler 2006). Phillips et al. (1999) report this species from 34 counties primarily along the border and larger interior rivers in Illinois prior to 1999, with 30 counties known for only pre-1980 records. The smooth softshell is predominantly a river turtle, it inhabits rivers and large streams with sand substrate, bars, and banks (Phillips et al. 1999). Within the two county assessment area, the species is known from two locations, one in Lawrence County and one in Crawford County, both along the Embarras River. This closest site is 11 miles from the proposed permit area. Given this distance and watershed separation, the smooth softshell is not likely to occur on or adjacent to the proposed mine permit area.

Fish

American eel (*Anguilla rostrata*)

The American eel is the only species of freshwater eel indigenous to North America. The species breeds and hatches in the Sargasso Sea in the Mid-Atlantic Ocean. Juveniles eventually drift to the Atlantic coast of the U.S. From there they migrate to the rivers, streams, and ponds or the continental U.S., among other places. Threats are thought to include detrimental habitat modifications associated with dams and overharvest (USFWS 2011). Within the two county assessment area, the species is known from five locations, all on the Wabash River. Three are in Lawrence County and two in Crawford County. The Crawford County sites are located 31 and 20 river miles upstream of the confluence with the permit area drainage. The Lawrence county sites are located 3.2 and 25 stream/river miles downstream of the proposed permit area. The habitat type required by the American eel is not present on or adjacent to the proposed permit area. Due to lack of suitable habitat, watershed separation, distances to known sites, and dilution effects of the large Wabash River watershed, the species is not likely to occur in or adjacent to the proposed permit area.

Bigeye chub (*Hybopsis amblops*)

The Bigeye chub lives in rocky pools with current, usually occurring near riffles and vegetation (Nyböer et al. 2006). This habitat is not found in or adjacent to the proposed permit area. Within the two county assessment area, the species is known from 5 locations, all located in Crawford County. Four sites are associated with Sugar Creek and its watershed, which drains into

the Wabash River 17 river miles upstream of permit area drainage confluence. One site is in the Wabash River 15 miles upriver of the permit area drainage confluence. The nearest site is located 9 miles to the north of the proposed permit area. Given the lack of suitable habitat, distances to known sites, and watershed separation, the species is not likely to occur in or adjacent to the proposed permit area.

Crystal darter (*Crystallaria asprella*)

The Crystal darter is found in small, moderate, and swift rivers in the drainage basins of the Mississippi and Ohio Rivers. Within the two county assessment area, the species is known from a single location in Lawrence County along the Wabash River at Vincennes. This site is located 15 stream/river miles downstream of the proposed permit area. Given this distance and dilution effect of the large Wabash river watershed, crystal darter is not likely to occur in or adjacent to the proposed permit area.

Eastern sand darter (*Ammocrypta pellucidum*)

In Illinois this species is confined to the Vermillion, Embarras, and Little Wabash River systems, according to Nybøer et al. (2006). Their habitat is described as sandy runs of small to medium rivers with high water quality and water depth of 60 cm or more (Nybøer et al. 2006). Within the two county assessment area, the species occurs in both Lawrence and Crawford Counties along the Embarras River. The closest site is located 11 miles west of the proposed permit area. Given lack of habitat and watershed separation from known populations, the eastern sand darter is not likely to occur in the proposed permit area or adjacent area.

Gravel chub (*Erimystax x-punctatus*)

The gravel chub occurs in the Ohio and Mississippi River basins as far down as Arkansas. In Illinois the species was once widespread but has recently drastically declined. Habitat is described as small rivers in deep riffles and channels of moderate to very fast current over gravel or sand and gravel (Nybøer et al. 2006). In the two county assessment area, the species is known from a single site on the Wabash River in southern Lawrence County. The site is located 22 stream/river miles downstream of the proposed permit area. Given lack of habitat and the dilution effect of the large Wabash River watershed, this species is not likely to occur in or adjacent to the proposed permit area.

Iowa darter (*Etheostoma exile*)

According to Nybøer et al. (2006), in Illinois the Iowa darter is known from glacial lakes in northeastern Illinois, a few streams in northern Illinois, and a small stream in Vermillion County. It prefers well-vegetated lakes, sloughs, and streams with quiet pools over a mud or clay bottom with detritus and brush (Page and Burr 1991). This habitat is not found in or adjacent to the proposed permit area. Within the two county assessment area, it is known from a single location in northern Crawford County in Hutson Creek, which drains into the Wabash River 31 river miles upstream of the confluence of the permit area drainage. Given the lack of suitable habitat and distance to known location, the Iowa darter is not likely to be in or adjacent to the proposed permit area.

Northern brook lamprey (*Ichthyomyzon fossor*)

According to Nybøer et al. (2006), the northern brook lamprey was restricted to the Kankakee River in Illinois. It occurs in clean, clear gravel riffles and runs of small rivers. This habitat requirement is not present in or adjacent to the proposed permit area. Within the two county assessment area, it is known from a single location on the Wabash River, near Merom, in Crawford County. This site is 25 river miles upstream of the confluence with the proposed permit area drainage. Given the lack of suitable habitat and watershed separation, the northern brook lamprey is not likely to be in or adjacent to the proposed permit area.

Red spotted sunfish (*Lepomis miniatus*)

The red spotted sunfish ranges from the Illinois River, south through the Mississippi River, and along the Gulf Coast from Alabama to Texas. Red spotted sunfish are found in rivers, reservoirs, swamps and oxbow lakes. Within the two county assessment area, the species is known from a single location in Lawrence County. The site is 13 miles to the southwest in the Embarras River system. Due to the distance to a known population, lack of habitat, and watershed separation, the red spotted sunfish is not likely to occur on or adjacent to the proposed mine permit area.

River Chub (*Nocomis micropogon*)

The river chub occurs in the Ohio River valley from New York to Illinois. Its habitat is described as rocky runs and flowing pools of small to medium rivers (Nybøer et al. 2006). The species is extremely rare in Illinois. The river chub is known from a single location in the two county assessment area. This is in northern Lawrence County along the Wabash River. The site is less than a mile to the east of the proposed permit area. However, the site is located upstream of

the confluence of the permit's drainage area and the Wabash River in Russellville, Illinois. Therefore, given the lack of habitat in the permit area, and watershed separation, the river chub is not likely to occur on or adjacent to the proposed permit area.

Birds

Barn owl (*Tyto alba*)

The barn owl is one of the most widespread vertebrate species, occurring on every continent except Antarctica (WDNR 2006). In southern Illinois, the barn owl is considered a rare year-round resident. Barn owls inhabit open areas, including agricultural fields, grasslands and marshes. Their diet is dominated by voles and other small mammals (WDNR 2006). Barn owls nest and roost in a variety of places including hollows or natural cavities in trees, manmade structures, caves, and cliffs. There are agricultural fields, associated grassed waterways and ditches, and upland and lowland woods present on the proposed mine permit area or adjacent area that provide suitable foraging habitat for the barn owl. The barn owl is known to occur at two locations in Lawrence County. Given the widespread use of agricultural, wooded, and wetland areas by this species, they are likely to utilize habitats on or adjacent to the proposed permit area. A protection and enhancement plan for the barn owl is included.

Black-billed cuckoo (*Coccyzus erythrophthalmus*)

The black billed cuckoo is described as utilizing a variety of woodland habitats, but is strongly associated with woodland edges where it nests low to the ground. Little information could be found specific to Illinois and the reason for its listing is unclear. The only occurrence in the two county assessment area is in northern Lawrence County in the Embarras River system, 12 miles to the west. Although potential habitat may be present in and adjacent to the proposed permit area, the distance to the only known occurrence in the assessment area makes it unlikely to occur in the proposed permit area or adjacent area.

Black-crowned night heron (*Nycticorax nycticorax*)

The black-crowned night heron breeds from Washington, Saskatchewan, Minnesota, and New Brunswick south to southern South America (Nyböer et al. 2006). It occurs in Illinois as a rare summer resident (Bohlen 1989). It usually nests in a variety of bottomland forest trees or herbaceous marsh vegetation. Within the two county assessment area, it is known from only one location in

Lawrence County, along the Embarras River. This site is 11 miles southwest of the proposed permit area. Given the distance to a known location and watershed separation, the Black-crowned night heron is not likely to occur on or adjacent to the proposed permit area.

Cerulean warbler (*Dendroica cerulean*)

The cerulean warbler's breeding range is located throughout the Mississippi and Ohio River Valleys. In Illinois, the warbler has been found in 39 counties scattered throughout the state. The cerulean warbler typically nests in mature deciduous forests. They have been observed in upland and lowland sites during breeding season, but prefer floodplain sites. Part of the permit area is in the floodplain of the Wabash River. The species is rarely associated with forest tracts of less than 200 acres and are most common in forest tracts of greater than 1,000 acres (Nyböer et al. 2006). Within the two county assessment area, the species is known from two sites, both in Lawrence County in the Embarras River system. The closest site is located 12 miles to the west. Given the large forest tracts preferred by this species and distance to known habitat, the species is unlikely to occur in the proposed permit area or adjacent area.

Common gallinule (*Gallinula galeata*)

The common gallinule is an uncommon migrant and local summer resident in northern Illinois. It is occasionally seen migrating in southern Illinois and may be a summer resident (IDNR). It frequents marshy areas and lakes in which it feeds. This habitat type is not found on or adjacent to the proposed permit area. Within the two county assessment area, the species is known from only one location in Lawrence County, in the Embarras River system. The site is located 9 miles south of the proposed permit area. Given the distance to a known location and lack of suitable habitat, the common gallinule is not likely to occur on or adjacent to the proposed permit area.

Least bittern (*Ixobrychus exilis*)

The least bittern breeds from southeastern Canada through the U.S. and Mexico to Costa Rica. In Illinois, it inhabits shallow freshwater lakes and marshes with dense, tall growths of aquatic or semiaquatic vegetation (Nyböer 2006). Within the two county assessment area, it is known from two locations in Lawrence County, both in the Embarras River watershed. The nearest site is located 9 miles south of the proposed permit area. Given the lack of suitable habitat and distance to known occurrences, the least bittern is not likely in or adjacent to the proposed permit area.

Loggerhead shrike (*Lanius ludovicianus*)

In southern Illinois, the loggerhead shrike is considered a fairly common year-round resident (Robinson 1997). Shrike habitat includes open lands with short vegetation such as pastures with fence rows, mowed roadsides, agricultural fields, riparian areas, and open woodlands (Yosef 1996). These types of habitat are very limited in and adjacent to the proposed permit area. The shrike is known from Lawrence County in the Embarras River and Raccoon Creek watersheds. It is known from Crawford County along the Wabash River. The closest record is 16 miles to the west in Lawrence County. Given the distance to a known location and minimal habitat, the loggerhead shrike is not likely to occur on or adjacent to the proposed permit area.

Upland sandpiper (*Bartramia longicauda*)

Upland sandpipers prefer tall grass meadows and sedge prairie habitats. This habitat type does not occur on or adjacent to the permit area. In the assessment area, the species is known from a single location in Lawrence County 6 miles to the southwest in the Embarras River system. Due to lack of habitat and distance to a known occurrence, this species is not likely to occur on or adjacent to the proposed permit area.

Wilson's phalarope (*Phalaropus tricolor*)

Wilson's phalarope is described by Nybøer et al. (2006) as breeding from southwestern and south central Canada to the central and western U.S., and wintering in South America. Although historically known to nest in prairie wetlands in Illinois, recent nesting is rare, although the species has been observed during the nesting season in several locations in Illinois. Nesting habitat is described as wetlands with open water, emergent vegetation, and open shoreline, but can include wet meadows, upland grasslands, and road rights of ways. Within the two county assessment area, the species is known from a single location in Lawrence County 10 miles south of the proposed permit area. The type of habitat in this area does not occur in or adjacent to the proposed permit area. Although some wetlands do occur in the proposed permit area and adjacent area, the type of wetlands preferred by this species do not. Given this lack of habitat and watershed separation from the known site, the species is not likely to occur in the proposed permit area or adjacent area.

Yellow-crowned Night-Heron (*Nyctanassa violacea*)

The yellow crowned night heron breeds from Connecticut to Florida and west to Texas.

It is also found along the Mississippi River and its larger tributaries and locally in Ohio, Wisconsin, Minnesota and Michigan (Nyboer et al. 2004). In Illinois it is considered an uncommon migrant and summer resident (Bohlen 1989). The yellow-crowned night heron utilizes swamps and forested wetlands as well as forested uplands near lakes, rivers, and creeks (Watts 1995). Within the assessment area, the heron is known from two locations in Lawrence County, both in the Embarras River system. The closest site is 9 miles to the southwest. Given the distance to a known location and watershed separation, the Yellow-crowned night-heron is not likely to occur on or adjacent to the proposed permit area.

Mammals

Indiana Bat (*Myotis sodalis*) and Northern long-eared bat (*Myotis septentrionalis*)

A separate report has been prepared to address the Indiana bat and northern long-eared bat occurrence and protection on and adjacent to the proposed permit area according to Federal protocols.

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Appendix A

The Illinois Department of Natural Resources Office of Mines and Minerals requested supplemental information regarding three federally listed species: Fat Pocketbook (*Potamilus capax*), Rabbitsfoot (*Quadrula cylidrica cylindrica*), and Eastern Prairie Fringed Orchid (*Platanthera leucopliaea*). According to the Illinois Endangered Species Protection Board, these species do not occur within Lawrence or Crawford counties. Therefore, these three species are unlikely to occur within or adjacent to the proposed permit area.

Table 1. Threatened and Endangered Species known to occur in Lawrence and Crawford counties, Illinois

Common Name	Scientific Name	Species Category	Sub Category	Protection Level	Shortest distance to known population (miles)
Arkansas Sedge	<i>Carex arkansana</i>	Plant	vascular plant	E	10
Bloodleaf	<i>Iresine rhizomatosa</i>			E	9
Drooping Sedge	<i>Carex prasina</i>			T	17
Grass-leaved Lily	<i>Stenanthium gramineum</i>			T	12
Halberd-leaved Tearthumb	<i>Tracaulon arifolium</i>			E	16
Large Sedge	<i>Carex gigantea</i>			E	14
Leatherflower	<i>Clematis viorna</i>			E	10
Prairie Rose Gentian	<i>Sabatia campestris</i>			E	13
Royal Catchfly	<i>Silene regia</i>			E	4
Running Pine	<i>Lycopodium clavatum</i>			E	17
Sedge	<i>Carex bromoides</i>			T	11
Storax	<i>Styrax americana</i>			T	12
Tube Beard Tongue	<i>Penstemon tubaeflorus</i>			E	10
Winged Sedge	<i>Carex alata</i>			E	13
Ebonysnail	<i>Fusconia ebena</i>	Invertebrate Animal	mussell	E	8
Elephant-ear	<i>Elliptio crassidens</i>			E	8
Sheepnose	<i>Plethobasus cyphus</i>			E	4
Shawnee Rocksnail	<i>Lithasia obovata</i>		snail	E	10
American Eel	<i>Anguilla rostrata</i>	Vertebrate Animal	fish	T	3
Bigeye Chub	<i>Hybopsis amblops</i>			E	9
Crystal Darter	<i>Crystallaria asprella</i>			T	11
Eastern Sand Darter	<i>Ammocrypta pellucidum</i>			T	11
Gravel Chub	<i>Erimystax x-punctatus</i>			T	16
Iowa Darter	<i>Etheostoma exile</i>			T	17
Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>			E	15
Redspotted Sunfish	<i>Lepomis miniatus</i>			E	13
River Chub	<i>Nocomis micropogon</i>			E	1
Four-toed Salamander	<i>Hemidactylium scutatum</i>			T	17
Mudpuppy	<i>Necturus maculosus</i>			T	24
Silvery Salamander	<i>Ambystoma platineum</i>			E	19
Eastern Ribbon Snake	<i>Thamnophis sauritus</i>			T	10
Ornate Box Turtle	<i>Terrapene ornata</i>			T	18
Smooth Softshell	<i>Apalone mutica</i>		E	11	
Barn Owl	<i>Tyto alba</i>		T	11	
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>		T	12	
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>		E	11	
Cerulean Warbler	<i>Dendroica cerulea</i>		T	12	
Common Gallinule	<i>Gallinula galeata</i>		E	9	
Least Bittern	<i>Ixobrychus exilis</i>		T	9	
Loggerhead Shrike	<i>Lanius ludovicianus</i>		E	16	
Upland Sandpiper	<i>Bartramia longicauda</i>		E	6	
Wilson's Phalarope	<i>Phalaropus tricolor</i>		E	10	
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>		E	9	
Indiana Bat	<i>Myotis sodalis</i>		E	8	
Northern Long-eared Bat	<i>Myotis septentrionalis</i>		T	7	

Table 2. Likelihood of occurrence of threatened and endangered species known to occur in Lawrence and Crawford counties, Illinois.

Common Name	Scientific Name	Species Category	Sub Category	Shortest distance to known population (miles)	Habitat description	Potential habitat present in or adjacent to permit area	Likely to Occur in proposed permit area	Likely to Occur in adjacent area
Arkansas Sedge	<i>Carex arkansana</i>	Plant	vascular plant	10	moist prairies and forest openings	yes	no	no
Bloodleaf	<i>Iresine rhizomatosa</i>			9	wet woodlands	yes	no	no
Drooping Sedge	<i>Carex prasina</i>			17	wet ground	yes	no	no
Grass-leaved Lily	<i>Sentanathium gramineum</i>			12	moist woods and along streams	yes	no	no
Halberd-leaved Tearthumb	<i>Tracaulon arifolium</i>			16	wet ground	yes	no	no
Large Sedge	<i>Carex gigantea</i>			14	forested wetlands, open swamps, wet forest openings	yes	no	no
Leatherflower	<i>Clematis viorna</i>			10	along streams, floodplain forests	yes	no	no
Prairie Rose Gentian	<i>Sabatia campestris</i>			13	mesic prairies	no	no	no
Royal Catchfly	<i>Silene regia</i>			4	dry-mesic barrens and prairies	no	no	no
Running Pine	<i>Lycopodium clavatum</i>			17	north facing slopes, sandy soils, below sandstone outcrops, seepage stream banks	no	no	no
Sedge	<i>Carex bromoides</i>			11	swamps and moist woods	yes	no	no
Storax	<i>Styrax americana</i>			12	moist soil	yes	no	no
Tube Beard Tongue	<i>Pensstemon tubaeformis</i>			10	prairies and dry woods	yes	no	no
Winged Sedge	<i>Carex alata</i>			13	swamps and floodplain forests	yes	no	no
Ebonysell	<i>Fusconia ebena</i>			Invertebrate Animal	mussell	8	large rivers in sand and gravel	no
Elephant-ear	<i>Elliptio crassidens</i>	8	large river in mud, sand, or fine gravel			no	no	no
Sheepnose	<i>Plethobasus cyphus</i>			4	current, mud & gravel bottoms, few cm to 2 meters	yes	no	no
Shawnee Rocksnail	<i>Lithasia obovata</i>		snail	10	large rivers and tributaries	no	no	no
American Eel	<i>Anguilla rostrata</i>	Vertebrate Animal	fish	3	rivers, streams, and ponds	no	no	
Bigeye Chub	<i>Hypopsis amblops</i>			9	rocky pools with current	no	no	no
Crystal Darter	<i>Crystallaria asprella</i>			11	small, moderate, and swift rivers	yes	no	no
Eastern Sand Darter	<i>Ammocrypta pellucidum</i>			11	sandy runs in small to medium rivers with high water quality	no	no	no
Gravel Chub	<i>Erimystax x-punctatus</i>			16	deep riffles and channels in small rivers over gravel or sand	no	no	no
Iowa Darter	<i>Etheostoma exile</i>			17	well-vegetated lakes, streams, and quiet pools	no	no	no
Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>			15	clean, clear gravel riffles and runs of small rivers	no	no	no
Redspotted Sunfish	<i>Lepomis miniatus</i>			13	large rivers and backwater lakes	no	no	no
River Chub	<i>Nocomis micropogon</i>			1	rocky runs & flowing pools of small to medium rivers	no	no	no
Four-toed Salamander	<i>Hemidactylium scutatum</i>			17	boggy woodland ponds, sphagnum, springfed headwaters of small woodland streams	no	no	no
Mudpuppy	<i>Necturus maculosus</i>			24	lakes, ponds, rivers, large creeks	yes	no	no
Silvery Salamander	<i>Ambystoma platineum</i>			19	wooded uplands	yes	no	no
Eastern Ribbon Snake	<i>Thamnophis sauritus</i>			10	wet meadows and fields, along lakes, ponds, streams, and marshes	yes	no	no
Ornate Box Turtle	<i>Terrapene ornata</i>		18	sand prairies and open fields	yes	no	no	
Smooth Softshell	<i>Apalone mutica</i>		11	rivers and large streams	no	no	no	
Barn Owl	<i>Tyto alba</i>		11	ag lands, grasslands, marshes, barns, old buildings	yes	yes	yes	
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>		12	low trees or shrubs of woodland edges	yes	no	no	
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>		11	bottomland forests	yes	no	no	
Cerulean Warbler	<i>Dendroica cerulea</i>		12	mature deciduous forests	yes	no	no	
Common Gallinule	<i>Gallinula galeata</i>		9	marshy areas and lakes	no	no	no	
Least Bittern	<i>Icthyophaga exilis</i>	9	shallow freshwater lakes and marshes	no	no	no		
Loggerhead Shrike	<i>Lanius ludovicianus</i>	16	open ag lands, grasslands	yes	no	no		
Upland Sandpiper	<i>Bartramia longicauda</i>	6	tall grass meadows and sedge prairies	no	no	no		
Wilson's Phalarope	<i>Phalaropus tricolor</i>	10	wetlands, wet meadows, upland grasslands	no	no	no		
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	9	swamps, forested wetlands	yes	no	no		
Indiana Bat	<i>Myotis sodalis</i>	8	caves, abandoned mines, forests	see Indiana bat report				
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	7	caves, abandoned mines, forests	see Indiana bat report				

Crawford

Russellville

Lawrence

Legend

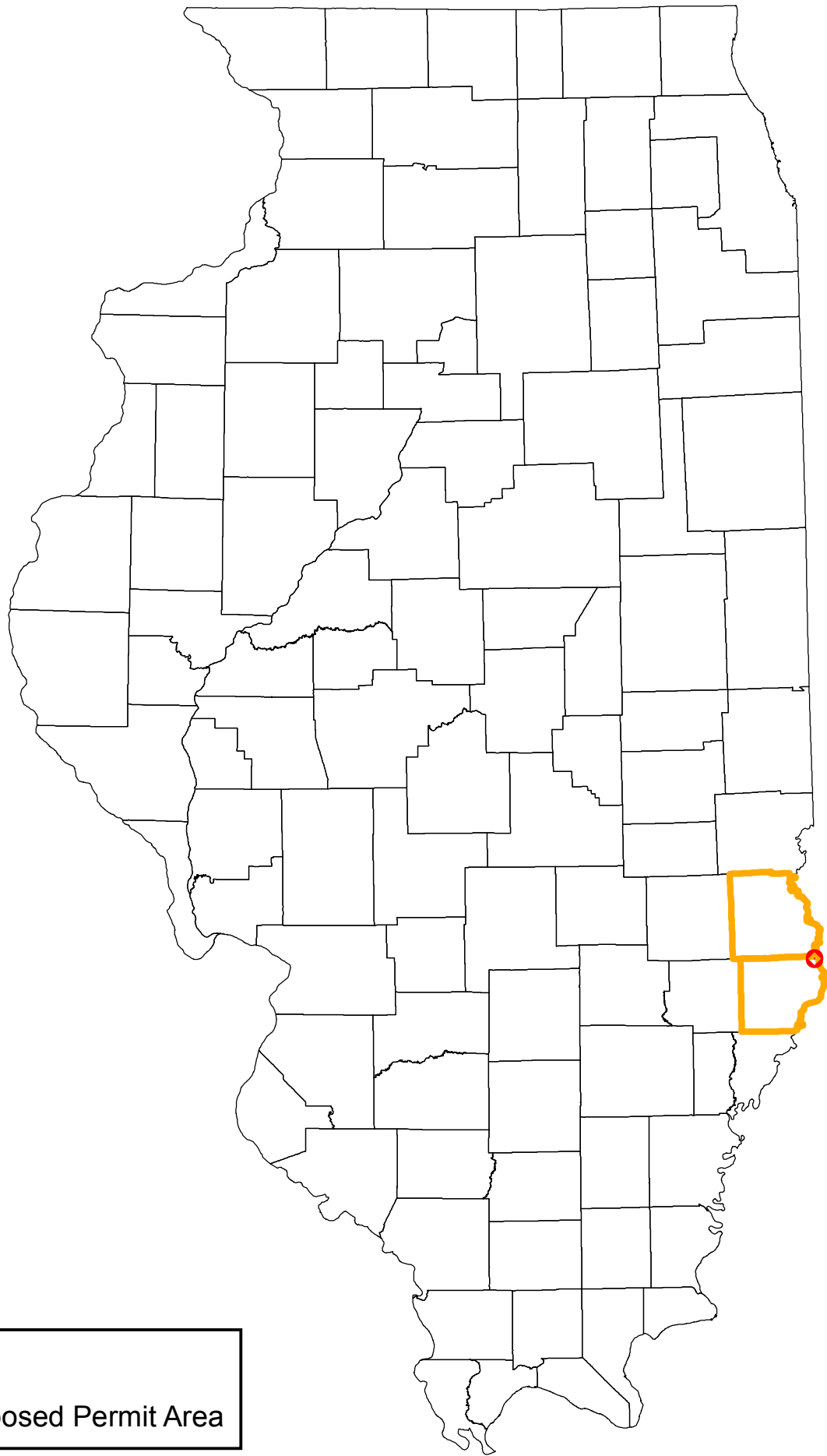
 Proposed Permit Area




0 1 2 Miles



Figure 1. Location map



Legend

 Proposed Permit Area

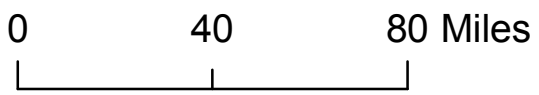
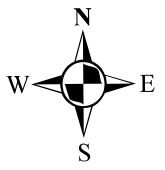


Figure 2. County assessment area

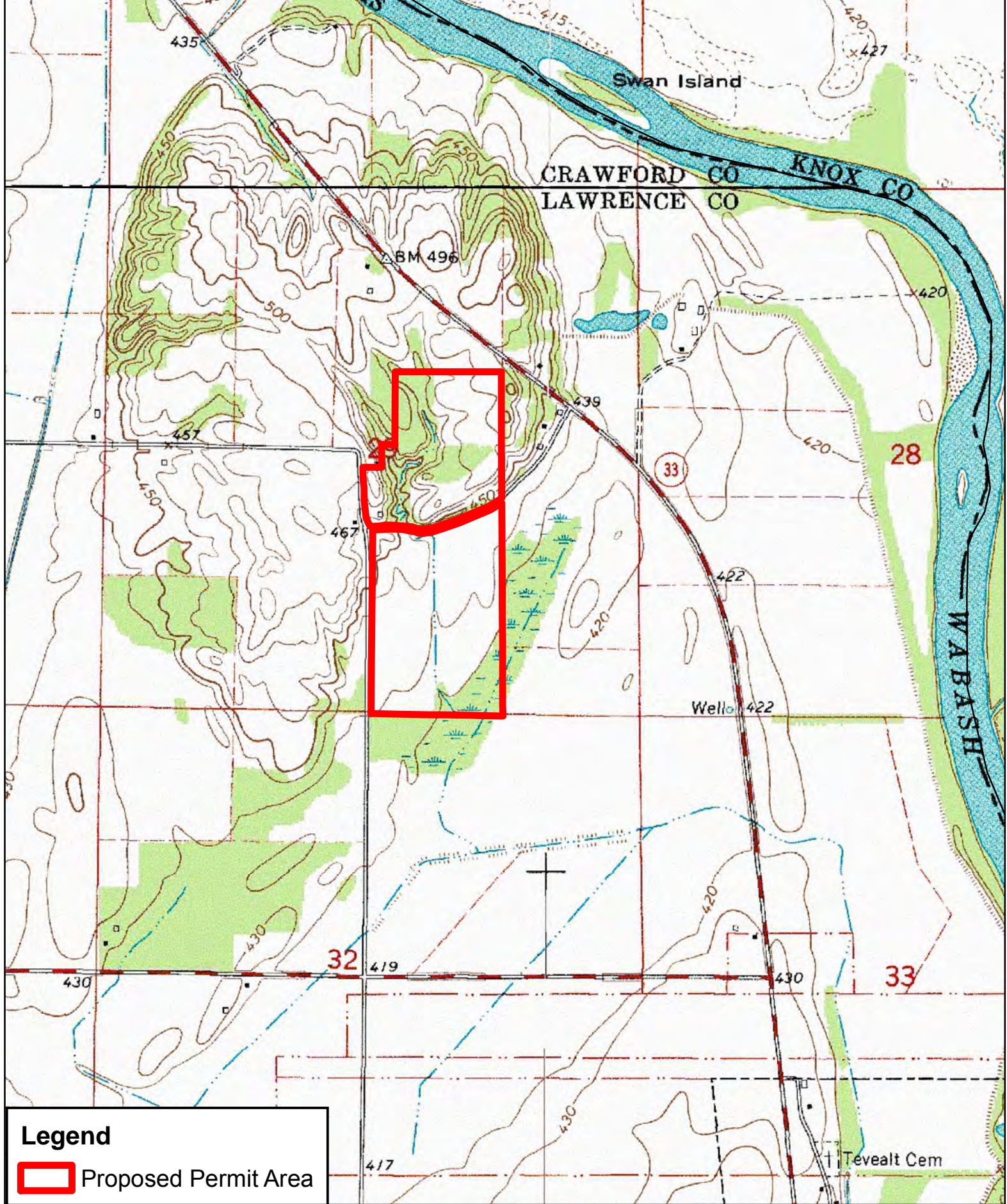


Figure 3. Topography

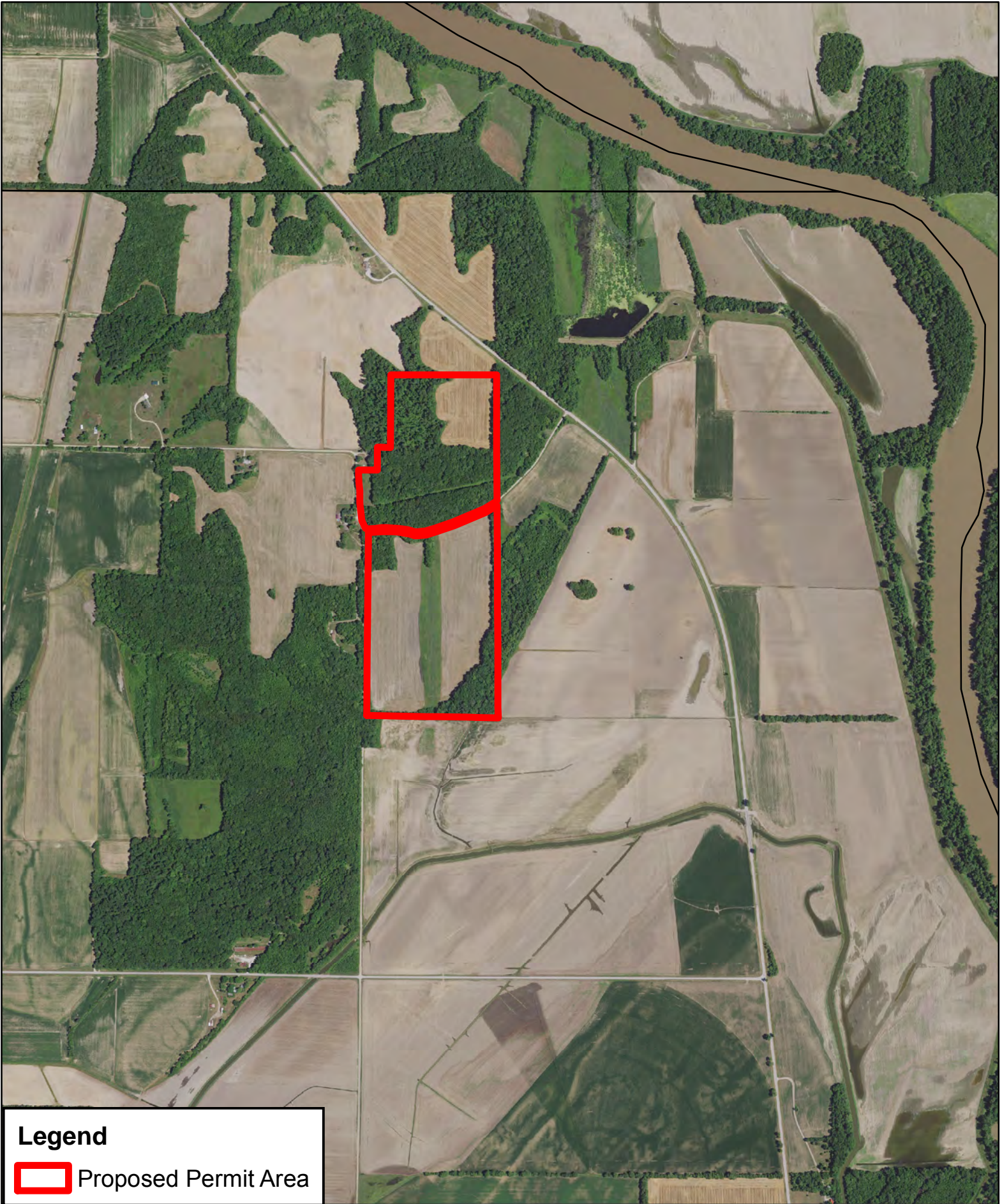
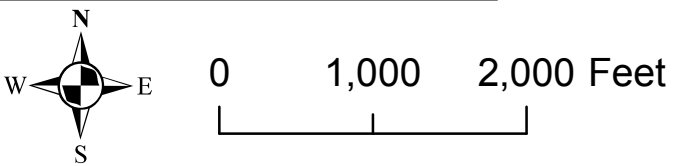
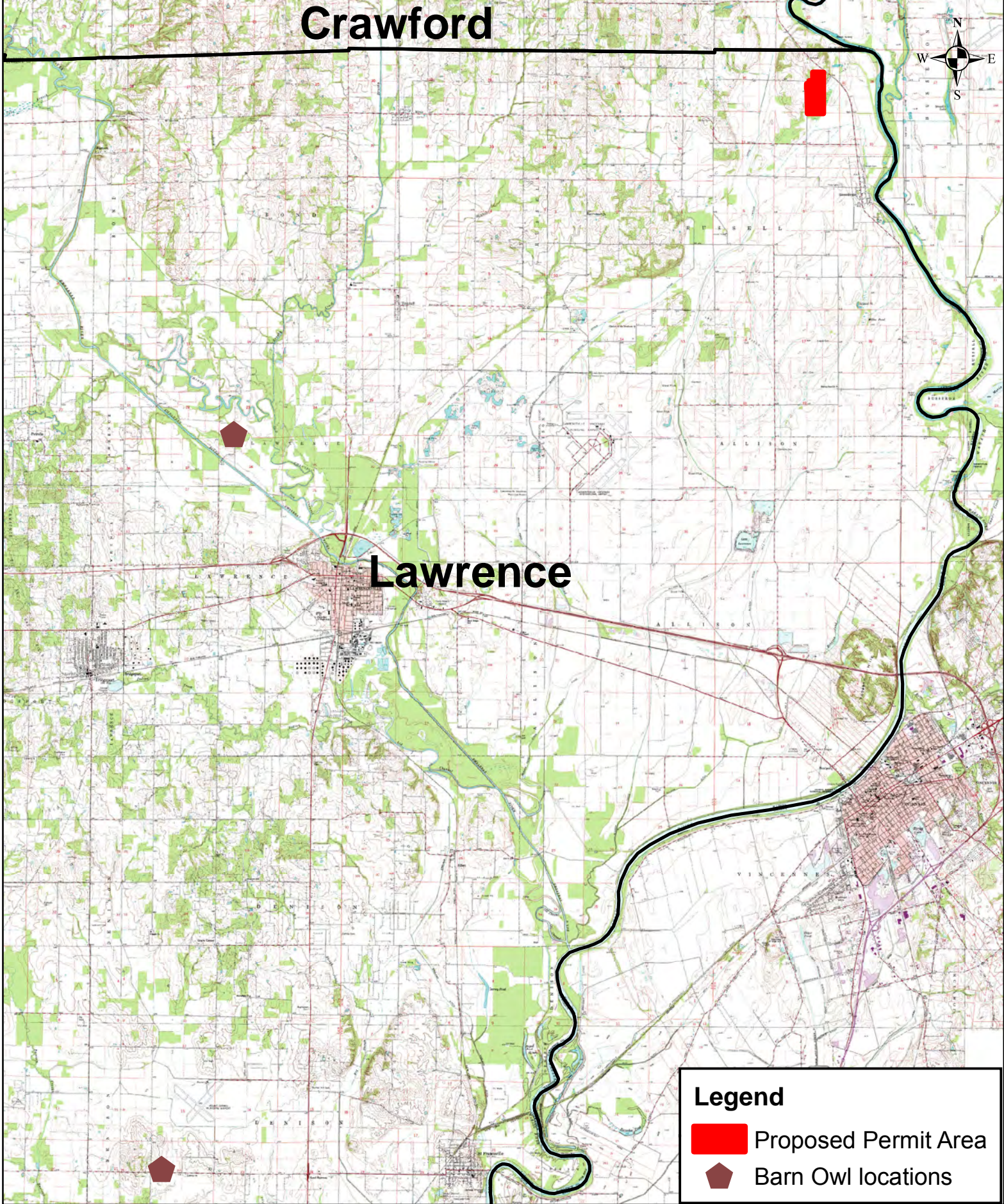


Figure 4. Aerial photography





Crawford



Lawrence

Legend

-  Proposed Permit Area
-  Barn Owl locations

0 6,000 12,000 Feet

Data Source: Illinois Department of Natural Resources, Illinois Nature Preserves Commission, Illinois Endangered Species Protection Board, and the Natural Heritage Database, December 2018

Figure 5. Animals Likely to Occur within the Project or Adjacent Area.

Indiana Bat (*Myotis sodalis*)
and
Northern Long-Eared Bat (*Myotis septentrionalis*)
Information

Sunrise Coal, LLC, Oaktown Mine
Lawrence County, IL

Prepared for:
Sunrise Coal, LLC

Prepared by:
Anthony J. Kitchen, M.S.
and
William O'Leary, M.S.



1032 N. 6th Street
Murphysboro, Illinois 62966

February 2019

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Appendix A. Northern Long-eared Bat

INTRODUCTION

Project Description

Sunrise Coal, LLC (Sunrise) has proposed to develop a satellite portal to support expanding operations at an existing underground mine in Lawrence County northwest of Russellville, Illinois (Figure 1). The proposed mine permit area is approximately 101 acres.

Coal mining operations may affect the Indiana bat in situations where the proposed surface disturbance area is located near documented Indiana bat habitat, or when wooded areas which could provide Indiana bat habitat are cleared to facilitate mining activity (USFWS 2009). Indiana bats are known to occur in several counties in Illinois, and the proposed operations will result in the clearing of forested habitat that could serve as potential habitat for the Indiana bat. In July 2009, the “Range-wide Indiana Bat Protection and Enhancement Plan Guidelines” (hereafter referred to as “the guidelines”) were established in order to set minimum standards for determining the presence of Indiana bat habitat and developing Indiana bat Protection and Enhancement Plans. The guidelines were revised in February 2013. The following report was prepared in accordance with those guidelines.

Incidental take

No incidental take is proposed as part of this permitting action.

Qualifications

The following report was prepared by HMG Engineers, Inc. Senior Environmental Scientist/Mining Specialist, William O’Leary, with assistance from Environmental Scientist, Anthony Kitchen. William O’Leary has a Bachelor’s degree in Biology and Environmental Biology from Indiana State University and a Master’s degree in Zoology and Wildlife Ecology from Southern Illinois University. William is a retired State of Illinois Wildlife and Wetlands Specialist and has 38 years of experience with mining related wildlife issues. Anthony Kitchen holds two Bachelor’s degrees in Environmental Science and Geography from the University of

Wisconsin and a Master's degree from East Carolina University in Biology (specializing in Organismal Biology and Ecology).

STEP 1: INTIAL HABITAT INFORMATION

Land uses identified for the mine permit application included cropland, and undeveloped land. Cropland areas are dominated by corn and soy beans planted in rotation. Woody vegetation is dominated by northern red oak, white oak, pin oak, American elm, sycamore, hickory, and osage orange. Woodland understory is dominated by multiflora rose and blackberry. See pre-mining section of the permit application for exact figures for pre-mining land uses. Wetland and streams have been identified. Information on these are in the permit application.

During a site inspection, numerous trees were observed which meet the size and bark characteristics as potential Indiana bat habitat, according to the guidelines; however the only area where trees will be removed (0.52 acres) do not contain trees identified as bat habitat.

STEP 2: HABITAT DETERMINATION

Known Habitat

Known habitat is defined as “habitat occupied by Indiana bats based on capture records, survey information, or other sources” (USFWS 2009).

There are no documented caves or other underground openings where Indiana bats have been recorded within the mine permit area. Based on this information, the proposed mine permit area does not meet the criteria to be considered “known winter or summer habitat” (USFWS 2009).

Suitable/Potential Habitat

Suitable/potential habitat is defined as habitat that is “within the range of the species and is either (a) currently suitable for habitation by Indiana bats but for which no survey or other data is available showing that Indiana bats are present or (b) may be suitable pending a definitive

analysis of its suitability for Indiana bat use, which is especially relevant for potential winter habitat.” (USFWS 2009)

There are no known caves or other underground openings within the proposed mine permit area. Therefore the area is not “potential winter habitat” (USFWS 2009).

The proposed permit area includes wooded areas containing potential roost trees. Therefore, the wooded area provides “potential swarming habitat” and “potential summer habitat” for the Indiana bat (USFWS 2009); however, none of this habitat is proposed to be disturbed at this time.

STEP 3: APPLICANT ALTERNATIVES

Based on the availability of potential swarming and summer habitat, the presence of Indiana bats within the proposed mine permit area is assumed; however, none of the Indiana bats trees will be disturbed.

Flow Chart Summary

Figure 3 is a flow chart that is included in the guidelines. The flow chart is a graphical representation of the steps described in the guidance and helps to determine the necessity of a Protection and Enhancement Plan. The steps in the flow chart are answered below.

Is there suitable winter habitat? **No.**

Is there suitable forested habitat? **Yes.**

Will the proposed mining impact this habitat? **No.**

Based on the answers above, no “Protection and Enhancement Plan” is required.

Northern Long-eared Bat (*Myotis septentrionalis*) information is included.

LITERATURE CITED

U.S. Fish and Wildlife Service (USFWS). 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 258pp.

U.S. Fish and Wildlife Service (USFWS). 2009. Range-wide Indiana Bat Protection and Enhancement Plan Guidelines.


Crawford



Russellville

Lawrence

Legend

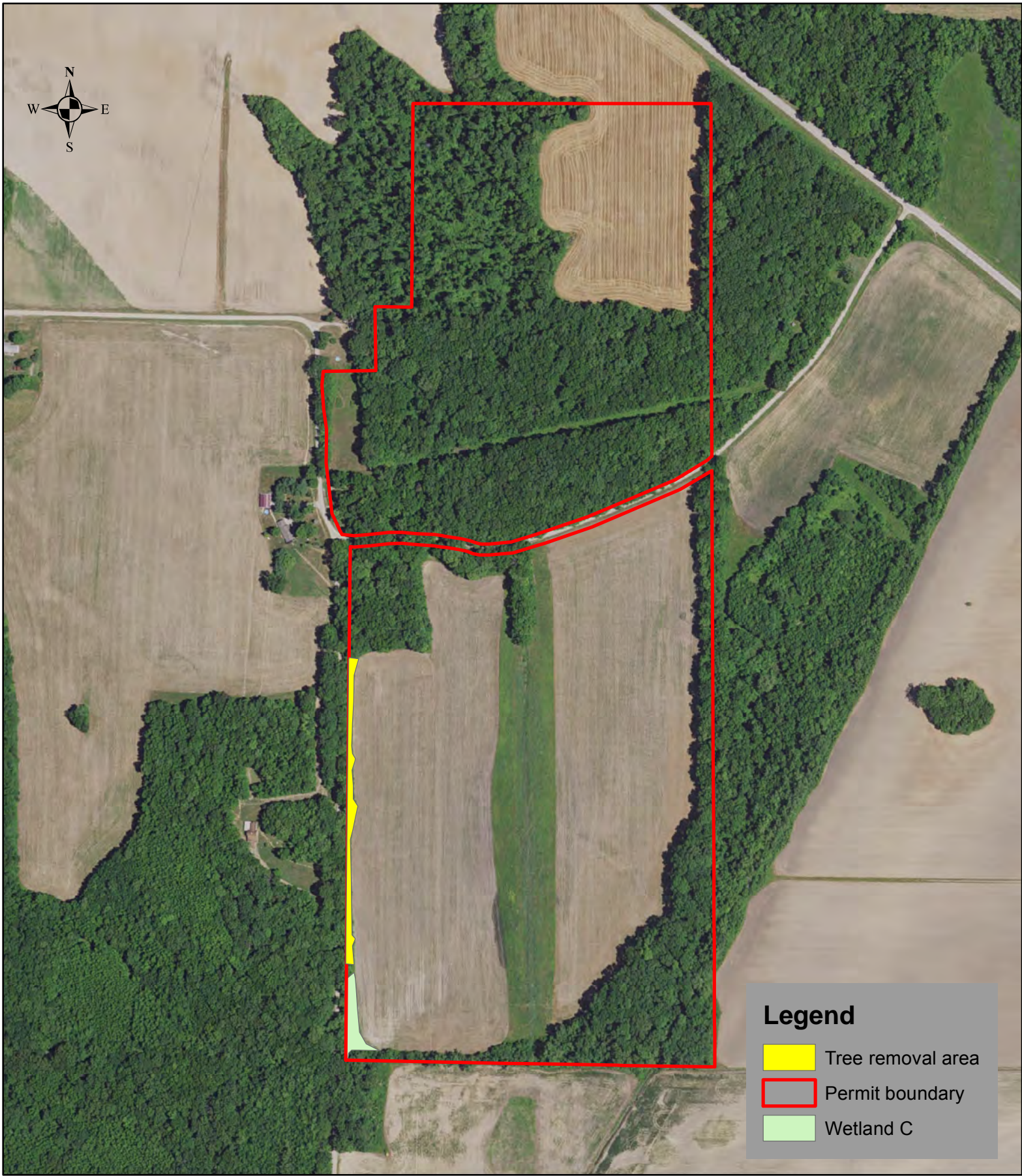
 Proposed Permit Area



0 1 2 Miles

A horizontal scale bar with three segments. The first segment is labeled '0', the second '1', and the third '2 Miles'.

Figure 1. Location map



400 200 0 400 Feet

Figure 2. Tree removal area.

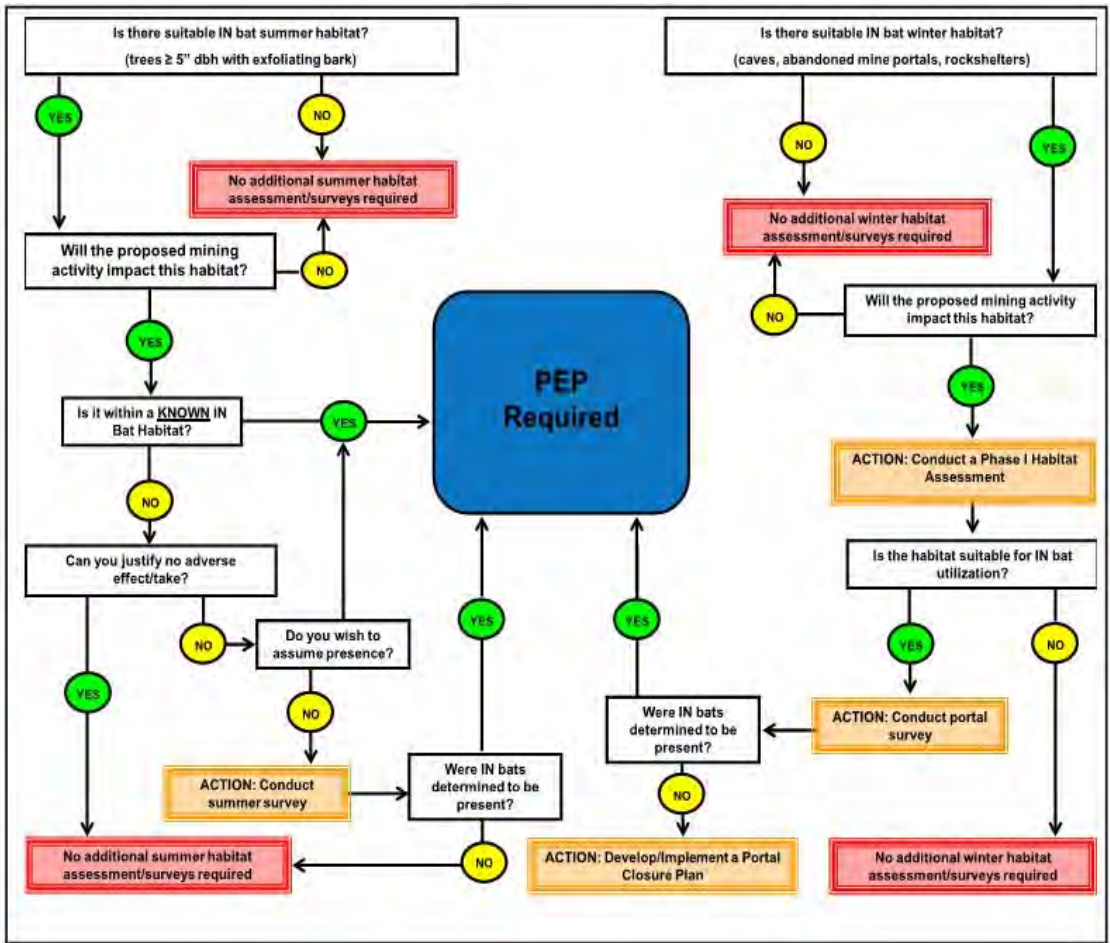


Figure 3. Flow chart of the steps outlined in the “Range-wide Indiana Bat Protection and Enhancement Plan Guidelines. (February 13 Revision)”

Appendix A

Northern Long-eared Bat (*Myotis septentrionalis*)

APPENDIX A

Northern Long-eared bat information

1. Have you determined that the proposed action will have “no effect” on the northern long-eared bat?

The project will impact suitable habitat in NLEB range.

2. Will your activity purposefully take (see Definitions below) northern long-eared bats? For example, are you removing bats from a human structure or capturing bats for research?

No

3. Is the action area (i.e., the area affected by all direct and indirect project effects) located wholly outside the White-nose Syndrome Zone?

No, the project area is in the white-nose syndrome zone.

4. Will the action take affect caves or mines where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

No such habitat is known in the area.

5. Will the action involve tree removal (see definition below)?

Yes

6. Is the action the removal of hazardous trees for protection of human life or property?

No

7. Will the action include one or both of the following: 1) removing a northern long-eared bat known occupied maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31; or 2) removing any trees within 0.25 miles of a northern long-eared bat hibernaculum at any time of year?

No, according to the Illinois Department of Natural Resources, the nearest occurrence is 7.7 miles WSW in the Embarras River watershed.

It is the understanding of the applicant that the Department will complete the streamlined consultation form.

Site Specific Resource Information and Protection and Enhancement Plan

Barn Owl
(*Tyto alba*)

Sunrise Coal, LLC, Oaktown Mine
Lawrence County, IL

Prepared for:
Sunrise Coal, LLC.

Prepared by:
Anthony J. Kitchen, M.S.
and
William O'Leary, M.S.

HMG
Engineers • Surveyors
1032 N. 6th Street
Murphysboro, Illinois 62966

January 2019

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1.0 INTRODUCTION

1.1 Project Description

Sunrise Coal, LLC (Sunrise) has proposed to develop a satellite portal to support expanding operations at an existing underground mine in Lawrence County northwest of Russellville, Illinois (Figure 1). The proposed mine permit area is approximately 101 acres.

The mining operations to be conducted include development of a remote shaft site over the shadow area for a mine whose main facilities are located in Indiana, east of the Wabash River. The site will include two entrance roads, internal facility access roads, a warehouse, laydown yard, parking for 240 vehicles, a bathhouse, a hoist, a rock dust facility, Transformer, and fuel drop. An affected area runoff collection system will be installed including a collection ditch and sedimentation pond.

1.2 Species Description

The barn owl is one of the most widespread vertebrate species on earth, occurring on every continent except Antarctica (WDNR 2006). In southern Illinois, the barn owl is considered a rare year round resident. Barn owls inhabit open areas, including agricultural fields, grasslands and marshes. Their diet is dominated by voles and other small mammals (WDNR 2006). Barn owls nest and roost in a variety of places including hollows or natural cavities in trees, man-made structures, caves, and cliffs.

Populations are stable in some parts of their range, but in the United States seven Midwestern states, including Illinois, list barn owls as threatened or endangered. The most often cited cause of these declines has been the loss of nesting, roosting, and foraging sites resulting from changing agricultural practices and urbanization (WDNR 2006). As agriculture has increased in scale and modern farming techniques have been implemented many farm buildings have disappeared from the landscape, rows of trees have been removed, and production has shifted from mixed grain and forage such as oats and hay to row crops monocultures dominated by corn and soybeans.

Barn owls are known to occur in one location in Lawrence County (Figure 2). The State of Illinois has recently downlisted the species from endangered to threatened because the species is improving. No species specific survey was conducted. Presence of the species is assumed.

2.0 SITE SPECIFIC RESOURCE INFORMATION

The proposed mine permit area is approximately 102 acres. The land uses identified for the mine permit application included cropland, fish and wildlife habitat, forest, undeveloped, and roads. Cropland areas are dominated by corn and soy beans planted in rotation. Woody vegetation is dominated by northern red oak, white oak, pin oak, American elm, sycamore, hickory, and osage orange. Woodland understory is dominated by multiflora rose and blackberry. See pre-mining section of the permit application for exact figures for pre-mining land uses.

Wetland and streams have been identified as to locations, extent, and characteristics. Specific information is included in the permit application. The proposed permit area is located in the northeast corner of Lawrence County. The site is less than a mile west of the Wabash River.

Barn owls use a variety of habitats for foraging including cropland and woodlands. Woodlands are also used for roosting and nesting, where suitable cavities can be found. Most of the proposed permit area and adjacent area could be used by barn owls for some activity.

3.0 PROTECTION AND ENHANCEMENT PLAN

According to 62 Ill. Adm. Code Section 1780.16b)3)A) and B) a “Protection and Enhancement Plan” should include “protective measures” and “enhancement measures”. The “protective measures” are to be used during the active mining phase of the operation and will help the operator to minimize disturbances and adverse impacts to the species or resource. The “enhancement measures” are to be used during reclamation and the post-mining phase of the operation to develop appropriate habitat for the species.

3.1 Objective 1 – Protection Measures

The first objective of the protection and enhancement plan is to provide protective measures during mining that will help the operator minimize disturbances to the barn owl and its habitat.

3.1.1 Incremental advancement and contemporaneous reclamation

The applicant will limit the amount of habitat impacted at any one time by removing vegetation and topsoil incrementally as operations advance, and by practicing contemporaneous reclamation. Impacts to soil and vegetation on the proposed mine permit area will occur in advance of site development to the minimal extent necessary given the operational needs.

Furthermore, the applicant will practice contemporaneous reclamation, meaning backfilling, grading, soil replacement, and revegetation will occur as quickly as possible once operations are completed. Grading will occur generally by October 1 of the year following disturbance. Revegetation will occur during the first normal period favorable for planting conditions after soil replacement. This practice will limit habitat disturbance to the minimum needed for operations and will restore habitats as quickly as practical.

3.2 Objective 2 – Enhancement Measures

The second objective of the PEP is to provide appropriate habitat for the barn owl in the post-mining phase of the operation.

3.2.1 Post mining land use

The post-mine reclamation plan will include replacement of the cropland habitats. See the permit reclamation plan and post mining land use summary for full details. The applicant will utilize the best technology currently available to ensure successful revegetation of the permit area. The replaced cropland will provide potential foraging habitat for the barn owl.

3.2.2 Specialized Habitat Features

Barn owls may use alternate structures such as barns, silos, and abandoned buildings that have an appropriately-sized cavity (USDA 1996, Figure 3). Constructing barn owl nest boxes near areas of foraging habitat may be an effective management strategy (Matteson and Petersen 1988, Schneider and Pence 1992). In order to enhance potential habitat for the barn owl, 1 barn owl box will be incorporated into the post-mine reclamation plan. One barn owl boxes will be erected on the permit area after reclamation has occurred.

The USDA (1996) reports that wooded areas or in open fields and meadows with few trees can provide appropriate conditions for barn owl nest box sites. Oaks (*Quercus spp.*) and the American sycamore (*Platanus occidentalis*) are ideal tree species. The barn owl nest boxes can face any direction and should be hung 3 feet below a stout tree limb suspended by cables or mounted on poles 15 to 30 feet above the ground. The entrance should be unobstructed and boxes should be positioned so they do not attract human attention. USDA (1996) recommends placing approximately 6 boxes per square mile. Boxes mounted high in barns or abandoned buildings also are readily occupied by owls. If the nest box is placed on a post, special caution should be taken by wrapping the post with an 18-inch metal, conical predator guard. Information provided by the USDA on barn owl nest box plans and instructions is attached. The permittee

will consult with a Department wildlife biologist at the time of box installation for specifications on box placement.

4.0 LITERATURE CITED

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Wisconsin Department of Natural Resources. 2006. Common Barn Owl (*Tyto alba*).
https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_063925.pdf

5.0 QUALIFICATIONS

The field work was carried out and this report written by HMG Engineers, Inc. Senior Environmental Scientist/Mining Specialist, William O'Leary with assistance from Environmental Scientist Anthony Kitchen. Mr. O'Leary has a Bachelor's degree in Biology and Environmental Biology from Indiana State University and a Master's degree from Southern Illinois University in Zoology (specializing in Wildlife Ecology). Mr. O'Leary is a retired State of Illinois Wildlife and Wetlands Specialist with 38 years of experience with mining related wildlife issues. Mr. Kitchen holds Bachelor's degrees in Environmental Science as well as Geography from the University of Wisconsin and a Master's degree from East Carolina University in Biology (specializing in Organismal Biology and Ecology).

Crawford

Russellville

Lawrence

Legend

 Proposed Permit Area

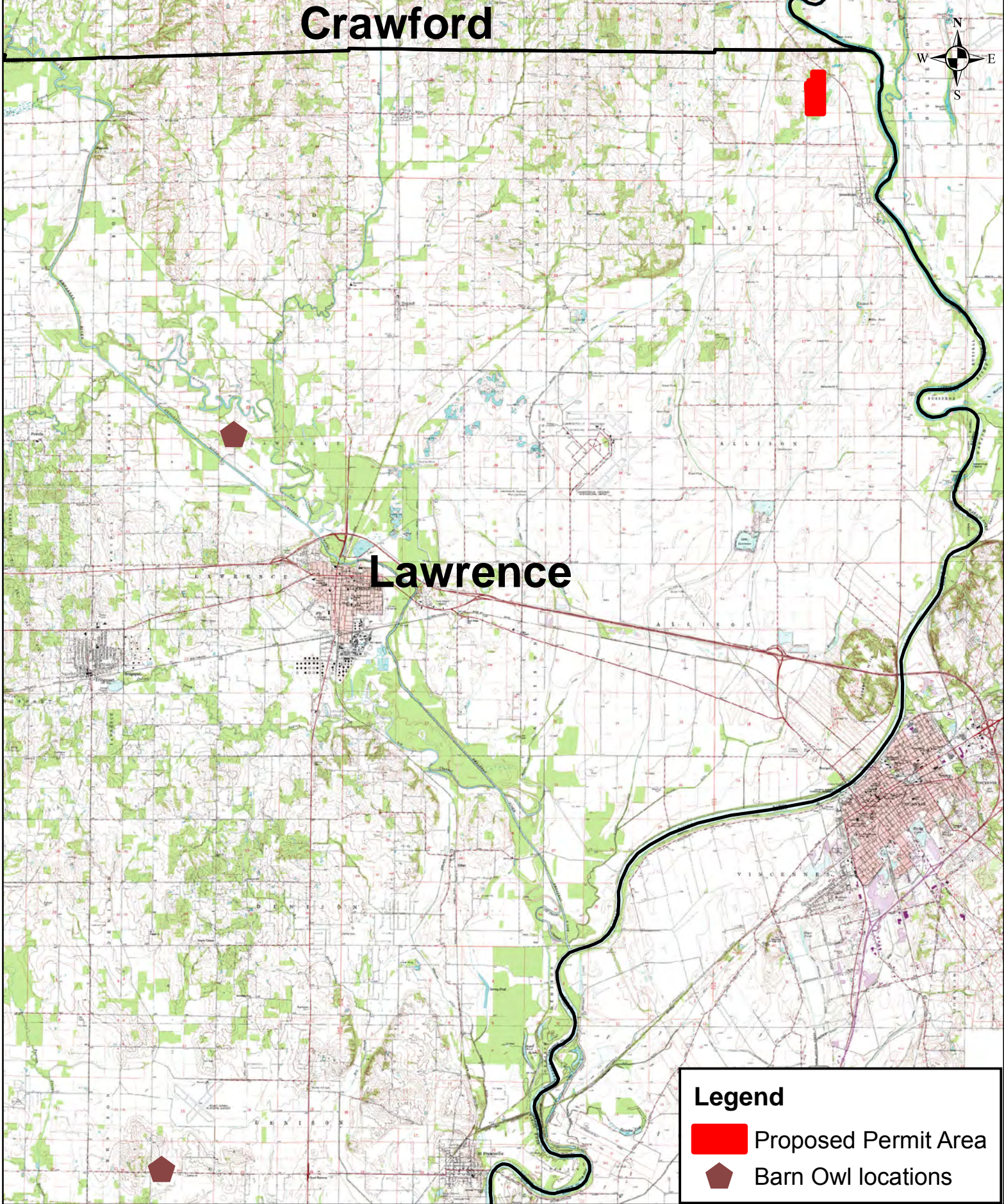


0 1 2 Miles





Figure 1. Location map

Crawford



Lawrence

Legend

-  Proposed Permit Area
-  Barn Owl locations

0 6,000 12,000 Feet

Data Source: Illinois Department of Natural Resources,
Illinois Nature Preserves Commission,
Illinois Endangered Species Protection Board,
and the Natural Heritage Database, December 2018

Figure 2. Animals Likely to Occur within the Project or Adjacent Area.

Figure 3. Example Barn Owl Nest Box Design

BARN OWL NEST BOX Plans and Instructions

United States
Department of
Agriculture

Natural
Resources
Conservation
Service
Davis, CA 95616

The barn owl (*Tyto alba*) is one of the most beneficial owls in the world. Farmers who know the merits of the barn owl strive to keep this "cat with wings" around their crops. One of the common resident owls, the barn owl has a white heart-shaped face and is distinguished by whitish or pale cinnamon underparts (that look ghostly at night) and buffy or rusty upper plumage. Average barn owls weigh about 1 pound, and are approximately 15 inches long with a wingspan of about 40 inches.

Barn owls frequently are seen near roads, vacant fields, and wooded areas at night. Their call is a long, raspy scream. They hunt from perched or flying positions. Velvety feathers with soft fringes allow them to silently approach their prey, which they can find in total darkness. A barn owl's diet consists mainly of rodents, such as gophers, ground squirrels, and meadow mice.

The female lays 1 to 11 white eggs between November and July. Incubation is about 30 days. One to two broods are reared during the season with the young leaving the nest after about 8 weeks.

NESTING SITES

Barn owls do not build nests but lay eggs in holes in rotted trees, rocky cliffs, or bluffs. Alternatively, they may use structures with an appropriate cavity, including barns, silos, and abandoned buildings. You can encourage barn owls by building a nesting box and by establishing perching sites.

PICKING A NEST SITE

Good locations for barn owl nest boxes are wooded areas or in open fields and meadows with a few trees. Oak and sycamore are ideal tree species. The box can face any direction and should be hung 3 feet below a stout tree limb suspended by cables or mounted on poles 15 to 30 feet above the ground. The entrance should be unobstructed and the box positioned so it does not attract human attention. Place about 6 boxes per square mile. Boxes mounted high in barns or abandoned buildings also are readily occupied by owls. If the nest box is placed on a post, the post should be wrapped with an 18-inch metal, conical predator guard.

IMPORTANT FACTS TO CONSIDER

Honey bees frequently take over barn owl nest boxes, making them useless for nesting. About one fourth of the nest boxes in coastal southern California are used by honey bees.



About 85 percent of barn owl nesting attempts produce fledging young. Reasons for mortality include human disturbance, limb breakage, and attacks by raccoons, opossums, skunks, and bobcats.

Summer is the best time to erect a barn owl nest box. Boxes should not be disturbed during the nesting season or owls may desert them.

Barn owl nest boxes can be especially useful on farms and ranches where rodent control is desired.

BUILDING A NEST BOX

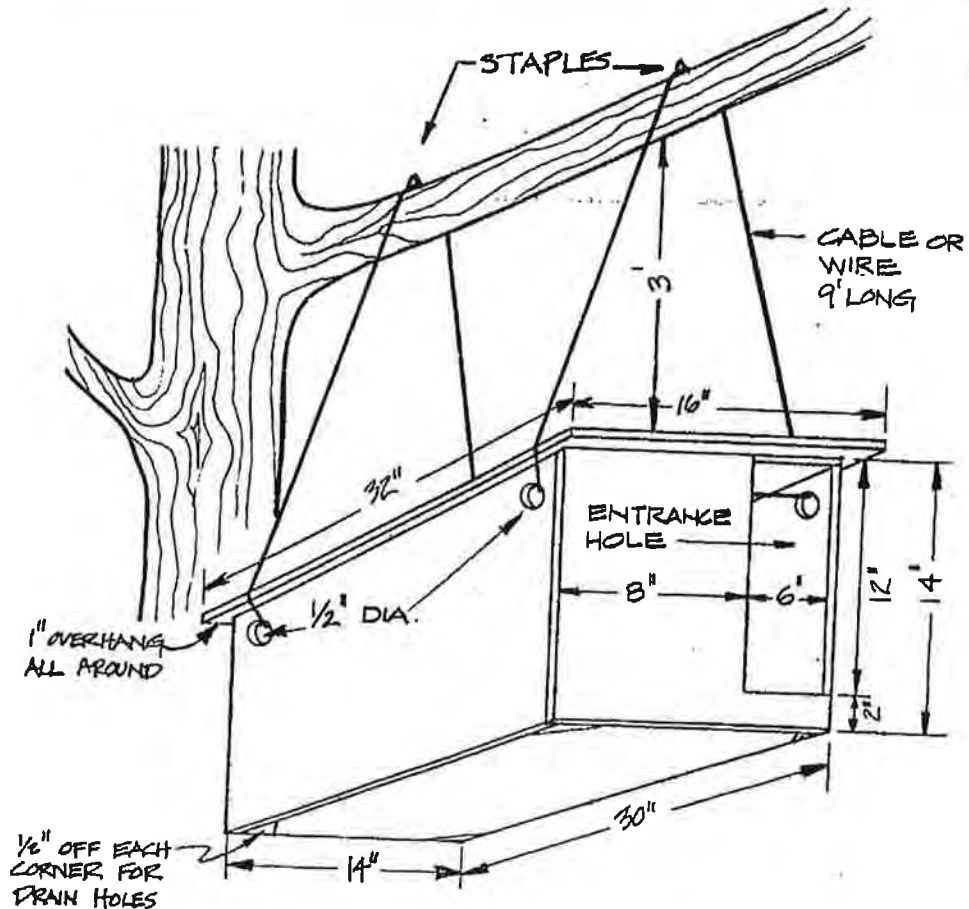
Barn owl nest boxes are easy to build. Ideal material is 3/8-inch or 1/2-inch plywood. Nest boxes should be painted using a camouflage pattern or drab green, black, and brown to minimize human disturbance. Painting also helps prevent warping. Place a 2-inch layer of sawdust or wood chips in the bottom of the box and replace each year.

GUIDE

1. Make the entrance hole 6 inches wide by 12 inches high.
2. Hang or mount the box 15 to 30 feet above the ground and, if in a tree, 3 feet below a sturdy branch.
3. Use scrap exterior grade 3/8-inch or 1/2-inch ply wood.
4. Use #4 or #5 galvanized hot dipped box nails.
5. Use a marine grade plastic resin or exterior wood glue for assembly.
6. Make the roof 16 inches by 26 inches to give a 1-inch overhang all around.
7. Use wire staples to keep the cable from moving on the branch.
8. Use at least a 9-foot long piece of wire to hang boxes.

BARN OWL NEST BOX

Plans



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05/01/2019

PART 8: Cropland Capability Soils

8.1 High Capability Post-Mining Land Use.

8.1.1 Discuss planned final graded slopes of the replaced high capability areas. Include a discussion of slope lengths and slope steepness. [1825.14(c)]

All post mining slopes will be the same as pre-mining slopes.

8.1.2 Discuss planned replacement of soil horizons with respect to horizon thickness and total root zone (mention thickness of each horizon).

Root zone replacement for the 18 ft diameter shaft and for the sediment pond will be 4 feet including subsoil and topsoil. Topsoil will comprise the top 8 inches. All other areas will be reclaimed with topsoil only to a depth of 8 inches, as subsoils will not be disturbed in the these areas.

a) The topsoil replacement thickness will be 8 inches. [1823.14]

b) The root medium replacement thickness will be 40 inches [1825.14]

8.1.3 Discuss how excessive compaction will be avoided. If excessive compaction cannot be avoided, provided a compaction alleviation plan. [1825.14(e)]

Topsoil will be end dumped from dump trucks and spread using a low ground pressure dozer such as a wide pad D-6 or equivalent. Topsoil will be disced prior to seeding.

8.1.4 Discuss how wind and water erosion will be minimized. Include discussions of construction, timing, seeding, seeding equipment to be used and erosion control structures to be used. [1825.14(f)]

Topsoil will be seeded with temporary seed immediately after placement and will be seeded with permanent mixture during the first favorable seeding period following placement. Seeding will be accomplished using a seed spreader as commonly used by seeding services such as FS, after seed bed preparation using a disc. Seed will be harrowed in using a harrow or disc/harrow. Topsoil will allowed to stabilize for at least 2 years prior to return to rowcrop production.

8.1.5 Discuss the management of these areas including crop rotations, green manuring, and levels of fertility. [1780.18(b)/1784.13(b)]

The temporary nurse crop will be allowed to die off and return to the soil as organic matter. Fertilizer will be applied at rates recommended by standard NPK soil testing and recommendations.

8.1.6 Discuss planned timing of the construction and removal, if applicable, of the erosion control structures. If erosion control design and construction is to be coordinated with the Natural Resources Conservation Service, please discuss. [1825.14(f)]

No structures are proposed other than the operational sediment control system.

8.1.7 Discuss the management of positive surface drainage with respect to differential settling. [1825.14]

8.1.8 Discuss the methods of mulching to be used with respect to seasonal variation.
[1780.18(b)/1784.13(b)]

Reclaimed areas will be mulched at a rate of 2 tons/ac straw mulch at the time of permanent seeding.

8.1.9 If the post-mining acreage of high capability land is proposed to be reduced for any individual landowner in the permit area other than the applicant, provide a letter of consultation and response, if received, from those landowners.[1780.23 (b) and (c)/1784.15(b) and (c)]

No high capability soils types are proposed to be disturbed.

8.2 Pre-Mining Prime Farmland Soils. The following information must be given, in order for the regulatory authority to evaluate whether the applicant has the technological capability to restore mined prime farmland to equivalent or greater productivity within a reasonable time. The applicant shall use the Soils Map and Soil Information Chart provided in Part 2.3.9 of the application. The applicant may also choose to include references to the Custom Soil Survey referenced in Part 2.3.

8.2.1 Pre-Mining Soil Profile. The applicant must include a description of the original undisturbed soil profile. The description must discuss the following parameters for each soil horizon that collectively constitutes the root zone unless specific depths or horizons are requested. [1785.17(c)]

See the Web Soil Survey in Attachment 2.2.0.a.

8.2.1.1 Depth and thickness of each horizon (range and average).

See Attachment 8.2.1.1.

8.2.1.2 Moist bulk density of each major horizon (use USDA approved method or reference).

See the Web Soil Survey in Attachment 2.2.0.a.

8.2.1.3 Present pH and state of fertility (P&K) (A horizon only).

See the Web Soil Survey in Attachment 2.2.0.a.

8.2.1.4 Texture analysis of each horizon (use USDA texture classification).

See the Web Soil Survey in Attachment 2.2.0.a.

8.2.1.5 If B&C horizons are proposed to be mixed, submit evidence to support proposal.

See the Web Soil Survey in Attachment 2.2.0.a.

8.2.2 Pre-Mining Soil Samples. Soil samples must be taken on the permit site to obtain the material necessary for the above-required information. Sample site locations must be indicated on the soils map. NRCS established values on bulk density may be used in lieu of field investigation. Use of soil information from related permits may be considered if they are representative of the proposed application area. Underground mine surface disturbances which are not exempt from prime farmland restoration requirements and which propose to leave the subsoil in place, may submit the information provided in a

Custom Soil Survey except that onsite samples must be taken to provide the information required for A horizon thickness.

See Web Soil Survey. See Attachment 8.2.1.1 for on-site topsoil thickness measurements.

8.2.2.1 The applicant shall discuss the history of previous productivity and cropping practices on the prime farmland, if known, or may reference the productivity information from [Bulletin 811](#), provided in response to Part 2.3.1. [1785.17(c)(4)]

See Productivity Indices in Table 2.2.9.

8.2.2.2 The applicant shall provide references or copies of available agricultural school studies, company data or other scientific data for comparable areas to demonstrate that the applicant, using their proposed method of reclamation will achieve, within a reasonable time, equivalent or higher levels of yield after mining as existed before mining. [1785.17(c)(3)]

Subsoils will be undisturbed except for 2 exceptions (18 ft diameter shaft and sediment pond area. Topsoil will be segregated, stockpiled and redistributed on croplands. Redistribution techniques will minimize compaction. Therefore post mining productivity is expected to approximate pre mining productivity.

8.3 Prime Farmland Soil Handling.

8.3.1 Describe the equipment to be used in the removal and replacement of each soil horizon. [1785.17(c)(2)]

Topsoil will be removed and stockpiled using scapers or a track hoe in combination with an endloader and dump trucks.

8.3.2 Discuss how excessive compaction will be avoided. [1823.14(c)]. If excessive compaction cannot be avoided, provide a compaction alleviation plan. [1823.14(d)]

Topsoil will be redistributed using end dump trucks, spread using low ground pressure dozers such as wide pad D-6's or equivalent, and disced. These methods should minimize compaction.

8.3.3 Discuss the timing of the removal and replacement of the horizons with regards to seasons, weather, and regulatory authority testing approval. [1823.12, 1823.14(b) and (e)]

All soils handling for reclamation will be conducted in the months of May-September when soils are dry to avoid unnecessary compaction.

8.3.4 Discuss how mining operation will impact prime farmlands where the B and/or C horizons are to be left in place and how these soils layers will be protected or restored to their original capability [1823.12]

The B and C horizons will not be disturbed except for the shaft site and sediment pond, which are minimal acreage. During reclamation of these 2 areas, subsoil will be end dumped, to minimize compaction.

8.3.5 Discuss how the prime farmland will be identified in the field in order to avoid contamination with non-prime farmland soils. [1823.12]

Prime and non-prime topsoils will be stockpiled separately and so marked in the field.

8.3.6 Are prime farmland topsoil or subsoils to be mixed with non-prime soils?

YES NO

If YES, provide evidence showing how combining will not affect the permittee’s ability to restore the pre-mining prime farmland productivity. [1823.14(e)]

8.3.7 Discuss whether stockpiles will be used or direct placement will be used. If stockpiling will be used, discuss. Locate on Operations Map. [1823.13]

See Operations Map for locations of stockpiles.

8.3.8 Discuss length of time stockpiles are to be in place. [1823.13]

In excess of 20 years.

8.3.9 Discuss how prime land stockpiles are to be identified in the field in terms of different horizons and prime versus non-prime farmland piles. [1823.13]

Topsoil piles will be marked as “Prime Topsoil” and “Non-prime Topsoil”. All stockpiled subsoils will be prime.

8.3.10 Discuss any intermittent stockpile relocations as to how, when and why. [1823.13]

N/A

8.3.11 Discuss temporary and/or permanent seeding and revegetation to prevent wind and water erosion. [1823.13]

Stockpiles will be seeded with temporary and permanent seed mix as described for ditches in Part 10.1.

8.3.12 Discuss how contamination by other soil horizons or by fly rock will be prevented. [1823.13]

No fly rock will be generated. No other soil horizons will be deposited onto any soils except soil stockpile locations. No soils will be deposited on stockpiled soils.

8.4 Prime Farmland Reclamation Plan and Map.

8.4.1 Locate on the Post-Mining Land Use/Capability Reclamation Map the location of the replaced prime farmland. Give acreage totals in Table 11.1. If the post mining acreage of prime farmland is proposed to be reduced for any individual landowner in the permit area other than the applicant, provide a letter of consent from those landowners. [1785.17 (e)(5)]

All prime farmland that is currently being farmed will be put back into crop production after mining support operations are no longer needed.

8.4.2 Discuss how wind and water erosion will be minimized. Include discussions of construction, timing, seeding, seeding equipment to be involved and erosion control structures to be used. [1823.14(e)]

Topsoil will be seeded with temporary seed immediately after placement and will be seeded with permanent mixture during the first favorable seeding period following placement. Seeding will be accomplished using a seed spreader as commonly used by seeding services such as FS, after seed bed preparation using a disc. Seed will be harrowed in using a harrow or disc/harrow. Topsoil will allowed to stabilize for at least 2 years prior to return to rowcrop production. These measures will minimize wind and/or water erosion.

8.4.3 Discuss the management of these areas including crop rotations, green manuring, levels of fertility and personnel responsible for management. Discuss the fertility management. Also, discuss the management in relation to any land leveling needed. [1823.14(f)]

Once the areas are returned to row crop production, the areas will be turned over to the landowners to farm as part of their farming operations. Fertilizing and crop rotations will be at the landowner's discretion.

8.4.4 Discuss the timing of the construction of the erosion control structures and the criteria used to determine the need for and construction design of erosion control systems. If erosion control design and construction is to be coordinated with the Natural Resources Conservation Service, please discuss. [1823.14(g)]

No erosion control structures are planned in excess of the affected area runoff collection system and sedimentation pond.

8.4.5 Discuss the final graded slopes of the replaced prime farmland areas. Include a discussion of slope lengths. [1816.102(a)/1817.102(a); 1823.14]

Post mining slopes will be the same as pre-mining slopes.

8.4.6 Discuss the management of positive surface drainage with respect to differential settling. [1823.14]

Any differential settling causing pooling will be corrected utilizing land leveling techniques.

8.4.7 Discuss the replacement of soil horizons with respect to horizon thickness and the total root zone.

All reclaimed areas will have a rooting zone at least 48 inches thick, with the top 7 inches being topsoil.

a) The topsoil replacement thickness will be 7 inches. [1823.14(e)]

b) The root medium replacement thickness will be 41 inches [1823.14(a)(1)]

8.4.8 Include any other relevant information in support of a possible finding by the regulatory authority that the operator has the technological capability to restore prime farmland areas, within a reasonable time, to equivalent or higher levels of yield, as determined by the regulatory authority. [1785.17(e)]

Most of the affected area will involve only the replacement of topsoil. This is a simple matter which is not technologically complex, and hence easy to achieve.

Attachment 8.2.1.1 Topsoil Thickness Chart

Point	Soil Map Unit	Latitude	Longitude	Web Soil Survey ts Thickness (in)	Field Measurement (in)
1	308B	38.847258	-87.543666	11	7
2	308B	38.846982	-87.544137	11	5
3	131D2	38.846971	-87.545371	8	4
4	131D2	38.846077	-87.543911	8	8
5	131C	38.845995	-87.543487	8	2
6	131B	38.845683	-87.544083	8	4
7	131C	38.845393	-87.543548	8	3
8	8F2	38.845239	-87.543572	6	2
9	131C	38.845512	-87.545080	8	8
10	131D	38.845489	-87.546390	8	4
11	131C	38.844530	-87.548041	8	9
12	131E2	38.844133	-87.547459	8	6
13	131D	38.843826	-87.546325	8	2
14	131C	38.843966	-87.545672	8	2
15	131B	38.844062	-87.545007	8	6
16	8F2	38.843861	-87.543533	6	3
17	131F2	38.843294	-87.546318	8	3
18	131C	38.842822	-87.547692	8	2
19	131F2	38.843248	-87.544409	8	4
20	184B	38.843311	-87.543758	6	3
21	184B	38.843377	-87.543438	6	2
22	200	38.842835	-87.544159	9	7
23	125	38.841976	-87.544565	16	16
24	125	38.841465	-87.546984	16	16
25	131E2	38.841093	-87.547713	8	8
26	184B	38.840475	-87.547404	6	4
27	200	38.840083	-87.546507	9	9
28	327B2	38.840465	-87.543747	11	3
29	184B	38.839591	-87.544961	6	3
30	8071	38.839433	-87.543567	14	14
31	327B2	38.839055	-87.544713	11	11
32	8071+	38.838640	-87.547332	14	14
33	8071+	38.838517	-87.545137	14	6
34	8288	38.838141	-87.543318	8	6
35	8288	38.837773	-87.543351	8	8
36	8071	38.837723	-87.545758	14	3

~~Attachment 8.2.2~~
**List of References Containing Information on
Prime Farmland Reclamation**

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PART 9: Reclamation Plan

9.1 Post-Mining Land Use.

9.1.1 Provide a Post-Mining Land Use/Capability Reclamation Map as required by the General Mapping Requirements.

Provide a detailed description of proposed post-mining land uses and capabilities employing land use and capability categories listed in Table 9.1: Post-Mining Land Use Capability. Complete acreage figures for each post-mining land use proposed and designate its capability classification. This information shall be broken down by landowner in addition to the composite land uses and capabilities. In addition, the applicant shall complete Table 9.1 – GRAND TOTAL: Post-Mining Land Use Capability Summary. This table is a compilation of all Post-Mining Land Use Capability tables filled out for each individual land owner.

For IBR applications complete Table 9.1: Post-Mining Land Use Capability for each landowner and update Table 9.1 – GRAND TOTAL Post-Mining Land Use Capability Summary.

NOTE: For Post-Mining Land Use change IPRs and Significant Revisions see Guidance Document TGD#4 and complete ONLY Tables 9.1.1 and 9.1.2

For surface mines, acreage figures for post-mining land use must differentiate between mined and surface disturbance areas based on the mining line used in Part 2.2.3 of the application. [1777.11(a)(3)]

See Table 9.1

9.1.2 Where a post-mining land use different from a pre-mining land use is proposed, provide:

- a) A discussion explaining the consideration which has been given to making all the proposed surface mining activities consistent with surface owner plans and applicable state and local land use plans and programs. [1780.23/1784.15]

Post mining land uses will be the same as pre mining land uses.

- b) A copy of the comments from the owner of the surface concerning the proposed land use of the proposed permit area and from the state or local government agencies which would have to initiate, implement, approve or authorize the proposed uses of the land following reclamation. In the event the surface land owner does not provide comments; the applicant shall provide proof of mailing to the surface owner soliciting comments to show that a good faith effort was made to provide the surface owner with the opportunity to comment. [1780.23/1784.15]

9.1.3 Provide a detailed timetable for completion for each major step in the proposed reclamation plan. The time table shall include for: [1780.18(b)(1)/1784.13(b)(1)]

9.1.3.1 Surface mine mining areas:

9.1.3.1.1 The timing of the rough grading, root medium, and topsoil during active mining to meet the standards of Section 1816.101(b)(1).

Note: If the plan proposes to reduce the time frames or distance to less than that allowed, it must be stated here and in the reclamation cost estimate section.

9.1.3.1.2 The timing of the planting of initial and permanent vegetation after final grading as it relates to the proposed land use.

9.1.3.2 Surface and underground mines, support areas, including refuse disposal areas:

9.1.3.2.1 The timing of the rough grading, root medium, and topsoil during active mining to meet the standards of Section 1816.101/1817.101

Grading will be completed within 12 months of cessation of use. This will include removal of structures and gravel bases, backfilling all holes and shafts and redistribution of topsoil.

9.1.3.2.2 The timing of the planting of initial and permanent vegetation after final grading as it relates to the proposed land use.

For cropland - Replaced topsoil will be seeded during the first favorable seeding period following placement with 1 bushel per acre of winter wheat for rapid erosion control and 30 pounds/acre of a pasture mix consisting of equal seed rates of orchard grass, redtop, red clover, timothy, Korean lespedeza, and smooth brome for longer term erosion control. Following a sod development period of at least two years, the land will be returned to rowcrop production.

For the road crossing of Stream 1, after removal of road materials and topsoil redistribution, the area will be seeded with reed canary grass, the species present before disturbance and the species present along the remainder of the waterway.

9.1.3.2.3 Any other reclamation proposed activities during the mining to minimize reclamation liability and its associated costs.

9.2 Backfilling and Grading.

9.2.1 Describe the methods to be used for backfilling and grading the proposed permit area, including soil stabilization and compaction practices in accordance with 62 Ill. Adm. Codes 1816.102/1817.102 through 1816.107/1817.107.

Once all development materials are removed such as gravel, road rock, structures like buildings, topsoil will be moved from stockpiles and redistributed over disturbed areas to a minimum depth of 6 inches. Soil will be stabilized with winter wheat for rapid erosion control and a pasture mix as described above for longer erosion control.

9.2.1.1 Provide appropriate cross-sections to illustrate and define the proposed post-mining configuration of the permit area. These cross-sections shall be referenced on the Post-Mining Land Use/Capability Reclamation Map [1780.18(b)(3)/1784.13(b)(3)]

The post mining configuration of the permit area will be to restore the existing

premining configuration.

9.2.2 To achieve the proposed post-mining configuration including cover requirements for refuse disposal areas, the Applicant shall provide soil balancing calculations to ensure an adequate quantity of material is available. These calculations shall include soil shrinkage and swell factors consistent with sound engineering practices as approved by the Department. [1780.23(b)(1)/1784.15(b)(1)]

NOTE: This information may be supplied as Attachment 9.2.2.

Smaller boreholes will be backfilled with grout brought to the site. The large shaft will be backfilled using excess gravel and road rock, site demolition material, concrete, then toppedressed with subsoil and topsoil following installation of a concrete cap, the top of which will be 6 feet below the final grade.

9.2.2.1 Are borrow areas being proposed to provide a sufficient amount of material to achieve the post-mining configuration?

YES NO

If YES, delineate the locations of the borrow areas on the Post-Mining Land Use/Capability Reclamation Map and complete the appropriate items included in Part 5.0: Drainage Control.

9.2.3 For surface mines, does the proposed surface coal mining and reclamation operation require disposal of excess spoil?

YES NO N/A

If YES, provide the following:

9.2.3.1 Each application shall contain descriptions, including appropriate maps and cross-section drawings, of the proposed disposal site and design of the spoil disposal structures according to **62 Ill. Adm. Code 1816.71 through 1816.74**. These plans shall describe the geotechnical investigation, design, construction, operation, maintenance, and removal, if appropriate, of the site and structures. [1780.35(a)]

[Empty box for 9.2.3.1 response]

9.2.3.2 Each application shall contain the results of a geotechnical investigation of the proposed disposal site that include the information outlined in **62 Ill. Adm. Code 1780.35(b)**.

[Empty box for 9.2.3.2 response]

9.2.3.3 If, under 62 Ill. Adm. Code 1816.71(l), rocktoe buttresses or key-way cuts are required, the application shall include information as outlined in **62 Ill. Adm. 1780.35(e)**.

[Empty box for 9.2.3.3 response]

If NO, will the spoil and other waste materials available from the entire permit area be insufficient to restore the disturbed area to its approximate original contour as addressed in **62 Ill. Adm. Code 1816.104**?

N/A

9.2.4 Describe the timing in which all grading and the construction and removal or renovation of water and erosion control structures will be complete and the sequence for accomplishing the work in relation to seasonal weather conditions. [1780.25(a)/1784.16(a)]

All features will be reclaimed the first year, unless time extensions are granted by the Department, except that the affected area runoff collection ditch and sedimentation pond will remain in place until all others areas are stabilized by vegetative growth. The sediment control system will be removed only after approval is obtained by the Department.

9.3 Shaft, Slope and Borehole Sealing. Each shaft, drift, adit, tunnel, exploratory hole, entryway, or other opening to the surface from underground shall be capped, sealed, backfilled, or otherwise properly managed, as required by the Department, in accordance with **62 Ill. Adm. Code Section 1816.13/1817.13**, [Operator Memorandum No. 00-01](#), [Operator Memorandum No. 2015-02](#), [Operator Memorandum No. 17-09](#), consistent with **30 CFR 75.1711**, and provide the following: [1816.15/1817.15]

9.3.1 Temporary Seals. In the event the mine is temporarily closed or abandoned, provide information on temporary seals to be constructed for prevention of entry to all mine openings. Include an appropriate timetable for construction of these seals. [1816.14/1817.14]

No temporary seals are anticipated. Should temporary seals be required, the permittee will obtain Department approval for such before installation.

9.3.2 Permanent Sealing Plans.

9.3.2.1 Provide a description, including appropriate cross-sections and plan views, of the measures to be used to seal or manage mine openings, and to plug, case, or manage exploration holes, other boreholes, wells, and other openings within the proposed permit area, in accordance with **62 Ill. Adm. Code 1816.13/1817.13 through 1816.15/1817.15** and shall reflect the following concerns:

- Completion using a combination of backfilling and sealing.
- The type and grade of materials to be used for backfilling and the intervals in which they will be used.
- Sections of casing, entry linings, or collar to be demolished.
- Design of hydraulic seals, including construction material, reinforcing, method of placement, design thickness, and method of anchoring.
- Design of gas ventilation piping that will be incorporated in seal design.
- Finished grading at land surface.
- A description of a permanent monument marker identifying the seal as a mine opening.
- A description of the location of all sealed shafts, slopes, or other entrance tunnels to be recorded with the appropriate recorder of deeds. This is in Operator Memorandum 00-01 as a RECOMMENDATION.

9.3.2.2 For any deviation from the established guidelines for sealing, backfilling, and capping, provide an engineering and hydrologic justification. [1780.18(b)(8)/1784.13(b)(8); [Operator Memorandum 00-01](#); [Operator Memorandum 17-09](#)]

The main shaft will be reclaimed by backfilling the bottom 20 feet with large riprap, followed by a concrete seal. Fill over the concrete will include demolition material and base rock and road rock to within ten feet of the surface. This fill will be allowed to settle for two years, then a concrete cap will be installed, the top being 6

feet below grade. The last 6 feet will be filled with soil material, the top 7 inches of which will be topsoil and the site put back into rowcrop production.

9.4 Abandonment and Closure of Refuse Disposal Areas. N/A

9.4.1 Describe proposed reclamation for all coal refuse disposal areas in accordance with **62 Ill Adm. Code 1780.18(b)/1784.13(b)**. The proposed reclamation plan shall include the following information:

- Timing of final coverage
- Cross sections of final cover and configuration.
- Type and amount of material proposed to be used for cover, including any coarse refuse used to provide a base over slurry prior to soil cover.
- Construction details of cover and caps, including the proposed soil depths and long-term groundwater protection measures.
- Design details of all proposed drowndrain, terraces, benches or any other permanent surface drainage structure.
- Relationship of the refuse disposal area to the post-mining land use.
- Any plans of access roads and other use related facilities.

NOTE: This information shall be provided as Attachment 9.4.1.



9.5 Bond Estimation.

9.5.1 Provide a detailed estimate of the cost of reclamation for the proposed operation required to be covered by a performance bond. Provide calculations and/or drawings, cross sections, etc., to support the reclamation cost estimate. Provide extra calculations for multiple pits or refuse areas. Complete the appropriate Table 9.5 sections. At a minimum, delineate all buildings, reinforced concrete structures and pavement/gravel areas to be reclaimed on the Bond Calculation Map. **[1780.18(b)(2)/1784.13(b)(2); 1800.14]**

The estimate of the cost of reclamation shall be based on:

- Bond Calculation Acreage (*Table 9.5.1.1*)
- Surface Mining Soil Reclamation (*Table 9.5.1.2*)
- Interior Grading (*Table 9.5.1.3*)
- Boxcut Outslope Grading (*Table 9.5.1.4*)
- Incline/Highwall Reclamation (*Table 9.5.1.5*)
- Gob Pile/Gob Impounding Structure/Slurry Reclamation (*Table 9.5.1.6*)
- Incised Slurry Pond or Refuse Reclamation (*Table 9.5.1.7*)
- Support Area Reclamation (*Table 9.5.1.8*)
- Building Reclamation (*Table 9.5.1.9*)
- Reinforced Concrete Structure Reclamation (*Table 9.5.1.10*)
- Pavement/Gravel Area Reclamation (*Table 9.5.1.11*)
- Borehole/Monitoring Well Backfilling (*Table 9.5.1.12*)
- Shaft/Slope Backfilling (*Table 9.5.1.13*)
- Public Road Reclamation (*Table 9.5.1.14*)

NOTE: If incremental bonding is requested, provide a Bond Increment Map as required by the General Mapping Requirements of the Instructions and complete all appropriate Tables of this part.

9.5.2 If applicable, provide the location of buried volatile material storage facilities on the Bond Calculation Map and list the size of each facility. **[1800.14]**



Table 9.1
Post-Mining Land Use Capability

Revised 1/9/2019

Land Owner: *Jodi Andriana & Joe Weger*

DISTURB CATEGORY	LAND CAPABILITY	POST-MINE LAND USE ACREAGE													Subtotal	
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads		Cemetery
Mining Area	Prime															0.00
	High Cap.		0.73													0.73
	Limited Capability															0.00
	Subtotal	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73
Unaffected (Optional)	Prime	12.47														12.47
	Neg. Det.										5.76					5.76
	High Cap.															0.00
	Limited Capability		0.30													0.30
	Subtotal	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.76	0.00	0.00	0.00	0.00	18.53
Support	Prime															0.00
	High Cap.															0.00
	Limited Capability															0.00
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Area	Prime	12.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.47
	Neg. Det.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.76	0.00	0.00	0.00	0.00	5.76
	High Cap.	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73
	Limited Capabil	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
	Subtotal	12.47	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.76	0.00	0.00	0.00	0.00	19.26

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

Table 9.1
Post-Mining Land Use Capability

Revised 1/9/2019

Land Owner: *Marian & Dan Weger*

DISTURB CATEGORY	LAND CAPABILITY	POST-MINE LAND USE ACREAGE														Subtotal
		Cropland	Pasture	Forest	Wildlife - Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads	Cemetery	
Mining Area	Prime															
	High Cap.		5.30													
	Limited Capability		0.17													
	Subtotal	0.00	5.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.47
Unaffected (Optional)	Prime	12.88														12.88
	Neg. Det.										1.76					1.76
	High Cap.															0.00
	Limited Capability										0.15					0.15
	Subtotal	12.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.91	0.00	0.00	0.00	0.00	14.79
Support	Prime															0.00
	High Cap.															0.00
	Limited Capability															0.00
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Area	Prime	12.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.88
	Neg. Det.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.76	0.00	0.00	0.00	0.00	1.76
	High Cap.	0.00	5.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.30
	Limited Capability	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.32
	Subtotal	12.88	5.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.91	0.00	0.00	0.00	0.00	20.26

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

Table 9.1
Post-Mining Land Use Capability

Revised 1/9/2019

Land Owner: *Jerry Weger*

DISTURB CATEGORY	LAND CAPABILITY	POST-MINE LAND USE ACREAGE													Subtotal	
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads		Cemetery
Mining Area	Prime															0.00
	High Cap.		13.40													13.40
	Limited Capability		1.54													1.54
	Subtotal	0.00	14.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.94
Unaffected (Optional)	Prime	1.43														1.43
	Neg. Det.		0.50								0.80					1.30
	High Cap.															0.00
	Limited Capability		0.29								1.54					1.83
	Subtotal	1.43	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.34	0.00	0.00	0.00	0.00	4.56
Support	Prime															0.00
	High Cap.															0.00
	Limited Capability															0.00
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Area	Prime	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43
	Neg. Det.	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.00	0.00	1.30
	High Cap.	0.00	13.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.40
	Limited Capability	0.00	1.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.54	0.00	0.00	0.00	0.00	3.37
	Subtotal	1.43	15.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.34	0.00	0.00	0.00	0.00	19.50

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

Table 9.1
Post-Mining Land Use Capability

Revised 1/9/2019

Land Owner: *Joe, Jerry, & Dan Weger*

DISTURB CATEGORY	LAND CAPABILITY	POST-MINE LAND USE ACREAGE													Subtotal	
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads		Cemetery
Mining Area	Prime															
	High Cap.															
	Limited Capability															
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unaffected (Optional)	Prime															
	Neg. Det.		1.03								8.53					
	High Cap.															
	Limited Capability										14.15					
Subtotal	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.68	0.00	0.00	0.00	0.00	23.71	
Support	Prime															
	High Cap.															
	Limited Capability															
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Area	Prime	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Neg. Det.	0.00	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.53	0.00	0.00	0.00	0.00	9.56
	High Cap.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Limited Cap.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.15	0.00	0.00	0.00	0.00	14.15
	Subtotal	0.00	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.68	0.00	0.00	0.00	0.00	23.71

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

Table 9.1
Post-Mining Land Use Capability

Revised 1/9/2019

Land Owner: *Vennard*

DISTURB CATEGORY	LAND CAPABILITY	POST-MINE LAND USE ACREAGE													Subtotal	
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads		Cemetery
Mining Area	Prime															0.00
	High Cap.															0.00
	Limited Capability															0.00
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unaffected (Optional)	Prime	3.58														3.58
	Neg. Det.										0.50					0.50
	High Cap.															0.00
	Limited Capability	6.18									8.01					14.19
	Subtotal	9.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.51	0.00	0.00	0.00	0.00	18.27
Support	Prime															0.00
	High Cap.															0.00
	Limited Capability															0.00
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Area	Prime	3.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.58
	Neg. Det.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.50
	High Cap.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Limited Capability	6.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.01	0.00	0.00	0.00	0.00	14.19
	Subtotal	9.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.51	0.00	0.00	0.00	0.00	18.27

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

**Table 9.1 - Grand Total
Post-mining Land Use Capability Summary**

Revised 1/9/2019

NOTE: This table must reflect the summary of all individual Pre-Mining Land Use Capability tables

DISTURB CATEGORY	LAND CAPABILITY	POST-MINE LAND USE ACREAGE														Subtotal
		Cropland	Pasture	Forest	Wildlife -Herb	Wildlife - Woody	Wildlife - Wetland	Wildlife - Water	Residential	Industrial/ Commercial	Undeveloped	Developed Water Resources	Recreation	Public Roads	Cemetery	
Mining Area	Prime															
	High Cap.		19.29													
	Limited Capability		1.85													
	Subtotal	0.00	21.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.14
Unaffected (Optional)	Prime	30.36														30.36
	Neg. Det.		1.53									17.35				18.88
	High Cap.															0.00
	Limited Capability	6.18	0.59									23.85				30.62
	Subtotal	36.54	2.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.20	0.00	0.00	0.00	79.86
Support	Prime															0.00
	High Cap.															0.00
	Limited Capability															0.00
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Area	Prime	30.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.36
	Neg. Det.	0.00	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.35	0.00	0.00	0.00	0.00	18.88
	High Cap.	0.00	19.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.29
	Limited Capability	6.18	2.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.85	0.00	0.00	0.00	0.00	32.47
	Subtotal	36.54	23.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.20	0.00	0.00	0.00	0.00	101.00

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

Table 9.5.1.1
Bond Calculation Acreages

Revised 1/9/2019

Land Use/Operation	Acres	Cost
Prime Farmland (surface mined)		\$0.00
High Capability (surface mined)		\$0.00
Non-Cropland Capability (surface mined)		\$0.00
Incline/Highwall Slopes (surface mined)		\$0.00
Boxcut Spoil Area (surface mined)		\$0.00
Water		\$0.00
Support Facilities	21.14	\$0.00
Refuse Disposal Area* (above grade)		\$0.00
Refuse Disposal Area (below grade)		\$0.00
Placeland/Unaffected	79.86	\$0.00
Roads (to remain)		\$0.00
Total (should equal Permitted acres)	101.00	\$0.00

*Includes slurry inside refuse area

NOTE: All acreage numbers must be reported to the hundredth of an acre (x.xx)

**Table 9.5.1.8
Support Area Reclamation**

Average thickness of grading entire support area:	1 feet	COST \$0.00
Lime application for non-refuse area:	_____ tons/acre	\$0.00
Haul Road Removal		
Width of road:	30 feet	
Average thickness of road:	2 feet	
Length of road:	1727 feet	
Haul distance to dispose of road material:	_____ feet	\$0.00
Railroad Removal		
Total length of railroad:	_____ feet	
Haul distance to dispose of fill material:	_____ feet	
Ballast Thickness:	_____ inches	
Width:	_____ feet	\$0.00
Subgrade Thickness:	_____ feet	
Width:	_____ feet	
Conveyor Removal		
Total length of conveyor:	_____ feet	\$0.00

Sediment Pond Backfill / Dam Removal			
Pond ID	Backfill / Dam Removal	Yardage	Cost
Sediment Pond	backfill	9,000	\$0.00
			\$0.00
			\$0.00
			\$0.00
			\$0.00
			\$0.00
			\$0.00

Temporary Diversion			
Diversion ID	Backfill	Yardage	Cost
DD-1A	backfill	1,800	\$0.00
DD-1B	backfill	150	\$0.00
			\$0.00
			\$0.00

Table 9.5.1.9 Building Reclamation

Note: All buildings must be located on the Bond Calculation Map

Building (name/ID): Bathhouse

Building Type	Height (ft)	Length (ft)	Width (ft)	Concrete floor thickness (in.)	Cost
Preparation Plant					\$0.00
Steel					\$0.00
Wood/Metal					\$0.00
Masonry					\$0.00
Pole Barn					\$0.00
Other	20	120	75	12	\$0.00

Building (name/ID): Warehouse

Building Type	Height (ft)	Length (ft)	Width (ft)	Concrete floor thickness (in.)	Cost
Preparation Plant					\$0.00
Steel					\$0.00
Wood/Metal					\$0.00
Masonry					\$0.00
Pole Barn					\$0.00
Other	20	230	50	12	\$0.00

Building (name/ID): _____

Building Type	Height (ft)	Length (ft)	Width (ft)	Concrete floor thickness (in.)	Cost
Preparation Plant					\$0.00
Steel					\$0.00
Wood/Metal					\$0.00
Masonry					\$0.00
Pole Barn					\$0.00
Other					\$0.00

Table 9.5.1.10 Reinforced Concrete Structure Reclamation

Note: All reinforced concrete structures must be located on the Bond Calculation Map

Structure (name/ID): Hoist supports (x4)

Structure Type	Height (ft)	Length (ft)	Width (ft)	Concrete Floor Thickness (in.)	Cost
Pads					\$0.00
Footings	5	6	3		\$0.00
Concrete Structures					\$0.00

Structure (name/ID): _____

Structure Type	Height (ft)	Length (ft)	Width (ft)	Concrete Floor Thickness (in.)	Cost
Pads					\$0.00
Footings					\$0.00
Concrete Structures					\$0.00

Structure (name/ID): _____

Structure Type	Height (ft)	Length (ft)	Width (ft)	Concrete Floor Thickness (in.)	Cost
Pads					\$0.00
Footings					\$0.00
Concrete Structures					\$0.00

Structure (name/ID): _____

Structure Type	Height (ft)	Length (ft)	Width (ft)	Concrete Floor Thickness (in.)	Cost
Pads					\$0.00
Footings					\$0.00
Concrete Structures					\$0.00

Silos / Thickeners

Type	Height (ft)	Outside Diameter (ft)	Wall Thickness (ft)	Concrete Floor Thickness (in.)	Cost
					\$0.00
					\$0.00
					\$0.00
					\$0.00

Table 9.5.1.11

Pavement / Gravel Area Reclamation

Note: All pavement/gravel areas must be located on the Bond Calculation Map

Name/ID: roads

Type: <i>(Concrete/Asphalt/Gravel)</i>	Thickness (in)	Length (ft)	Width (ft)	Cost
				\$0.00

Name/ID: rock pads (laydown yard, parking area)

Type: <i>(Concrete/Asphalt/Gravel)</i>	Thickness (in)	Length (ft)	Width (ft)	Cost
	12	630	500	\$0.00

Name/ID: _____

Type: <i>(Concrete/Asphalt/Gravel)</i>	Thickness (in)	Length (ft)	Width (ft)	Cost
				\$0.00

Name/ID: _____

Type: <i>(Concrete/Asphalt/Gravel)</i>	Thickness (in)	Length (ft)	Width (ft)	Cost
				\$0.00

Name/ID: _____

Type: <i>(Concrete/Asphalt/Gravel)</i>	Thickness (in)	Length (ft)	Width (ft)	Cost
				\$0.00

Name/ID: _____

Type: <i>(Concrete/Asphalt/Gravel)</i>	Thickness (in)	Length (ft)	Width (ft)	Cost
				\$0.00

Name/ID: _____

Type: <i>(Concrete/Asphalt/Gravel)</i>	Thickness (in)	Length (ft)	Width (ft)	Cost
				\$0.00

Name/ID: _____

TOTAL COST: \$0.00

**Table 9.5.1.13
Shaft / Slope Backfilling**

Shaft Name/ID:		men/materials shaft	
Is MSHA acceptable fill available on site?	Yes	<input checked="" type="checkbox"/>	No <input type="checkbox"/>
Depth of removal of concrete below grade:		6	feet
Depth of shaft/slope:		460	feet
If round:	Diameter:	18	feet
If rectangular, provide	Length:		feet
		Width:	
			feet
		COST:	\$0.00

Shaft Name/ID:			
Is MSHA acceptable fill available on site?	Yes	<input type="checkbox"/>	No <input type="checkbox"/>
Depth of removal of concrete below grade:			feet
Depth of shaft/slope:			feet
If round:	Diameter:		feet
If rectangular, provide	Length:		feet
		Width:	
			feet
		COST:	\$0.00

Shaft Name/ID:			
Is MSHA acceptable fill available on site?	Yes	<input type="checkbox"/>	No <input type="checkbox"/>
Depth of removal of concrete below grade:			feet
Depth of shaft/slope:			feet
If round:	Diameter:		feet
If rectangular, provide	Length:		feet
		Width:	
			feet
		COST:	\$0.00

Slope Name/ID:			
Is MSHA acceptable fill available on site?	Yes	<input type="checkbox"/>	No <input type="checkbox"/>
Percentage (%) slope:			%
Distance from Surface to Toe of Seal:			feet
If round:	Diameter:		feet
If rectangular, provide	Height:		feet
		Width:	
			feet
		COST:	\$0.00

PART 10: Revegetation (*Excluding Cropland and Streams*)

10.1 Revegetation of Drainage Control Ditches. Describe plans for revegetation of ditches associated with construction of roads, conveyer systems, rail systems, and associated with controlling overland flow drainage. For responses that are identical to other parts, “see response to question number X” is acceptable. The following information is required: [1780.18(b)(5)/1784.13(b)(5); 1816.43/1817.43; 1816.45/1817.45; 1816.111/1817.111; 1816.114/1817.114]

10.1.1 Describe the methods for the use of temporary seeding/mulching to control erosion, discuss the species, seeding rate by species per acre, and mulching methods and type of mulch. [1816.111(c)/1817.111(c); 1816.114/0817.114; 1780.18(b)(5)/1784.13(b)(5)]

After construction of ditches the areas will be seeded with 1 bushel/acre of winter wheat and mulched with 2 tons/acre straw mulch. During the first favorable seeding period, the area will be seeded with 30 pounds/ac of a pasture mix consisting of equal seed rates of orchard grass, redtop, red clover, timothy, Korean lespedeza, and smooth brome for longer term erosion control.

10.1.2 Describe the timing and methods proposed to transition from the temporary vegetation to the semi-permanent or permanent vegetative cover. [1816.111(c)/1817.111(c)]

Temporary vegetation will be established immediately following construction. Permanent vegetation will be seeded during the first favorable seeding period following construction.

10.1.3 Provide a semi-permanent or permanent grass and forbs species list that is diverse, native, capable of controlling erosion, and capable of self-regeneration. If non-native species are proposed, provide adequate justification that the species are desirable, necessary to achieve the approved post-mining land use, and are required to control erosion. [1816.111 (a) and (b)/1817.111 (a) and (b); 1816.111(c)/1817.111(c)]

The area will be seeded with 30 pounds/ac of a pasture mix consisting of equal seed rates of orchard grass, redtop, red clover, timothy, Korean lespedeza, and smooth brome for longer term erosion control. Use of non-native species is justified as they provide better erosion control than native species, are quicker to establish, they are common agricultural species in the area, easy to manage, and cost effective.

10.1.4 Describe seeding rate by species per acre, methods of planting and seeding, mulching and fertilizer plan and rates for the semi-permanent or permanent grass and forbs list. [1780.18(b)(5)/1784.13(b)(5)]

Rates are as described above. Method is to spread fertilizer and seed using a spreader. Using a light disc, disc in the fertilizer and prepare a seed bed. Then spread mulch using a mulch blower or spread by hand.

10.2 Revegetation of Faces of Embankments. Describe plans for revegetation of faces of embankments of sediment ponds and other water structures. For responses that are identical to other parts, “see response to question number X” is acceptable. The following information is required: [1780.18(b)(5)/1784.13(b)(5); 1816.46(b)(1) and (4)/1817.46(b)(1) and (4); 1816.49(a)(8)/1817.49(a)(8); 1816.111/1817.111]

10.2.1 Describe the methods for the use of temporary seeding/mulching to control erosion, discuss the species, seeding rate by species per acre, and mulching methods and type of mulch. [1816.111(c)/1817.111(c); 1816.114/0817.114; 1780.18(b)(5)/1784.13(b)(5)]

Any pond slopes or road slopes will be seeded as described for ditches.

10.2.2 Describe the timing and methods proposed to transition from the temporary vegetation to the semi-permanent or permanent vegetative cover. [1816.111(c)/1817.111(c)]

Same as for ditches.

10.2.3 Provide a semi-permanent or permanent grass and forbs species list that is diverse, native, capable of controlling erosion, and capable of self-regeneration. If non-native species are proposed, provide adequate justification that the species are desirable, necessary to achieve the approved post-mining land use, and are required to control erosion. [1816.111 (a) and (b)/1817.111 (a) and (b); 1816.111(c)/1817.111(c)]

Same as for ditches.

10.2.4 Describe seeding rate by species per acre, methods of planting and seeding, mulching and fertilizer plan and rates for the semi-permanent or permanent grass and forbs list. [1780.18(b)(5)/1784.13(b)(5)]

Same as for ditches.

10.3 Revegetation of Soil Stockpiles. Describe plans for revegetation of subsoil and topsoil stockpiles. For responses that are identical to other parts, “see response to question number X” is acceptable. The following information is required: [1780.18(b)(5)/1784.13(b)(5); 1816.22(c)(2)(C)/1817.22(c)(2)(C); 1816.111/1817.111]

10.3.1 Describe the methods for the use of temporary seeding/mulching to control erosion, discuss the species, seeding rate by species per acre, and mulching methods and type of mulch. [1816.111(c)/1817.111(c); 1816.114/1817.114; 1780.18(b)(5)/1784.13(b)(5)]

Same as for ditches.

10.3.2 Describe the timing and methods proposed to transition from the temporary vegetation to the semi-permanent vegetative cover. [1816.111(c)/1817.111(c)]

Same as for ditches.

10.3.3 Provide a semi-permanent grass and forbs species list that is capable of controlling erosion and capable of self-regeneration. If non-native species are proposed, provide adequate justification that the species are desirable and necessary to control erosion. [1816.111 (a) and (b)/1817.111 (a) and (b); 1816.111(c)/1817.111(c)]

Same as for ditches.

10.3.4 Describe seeding rate by species per acre, methods of planting and seeding, mulching and fertilizer plan and rates for the semi-permanent grass and forbs list. [1780.18(b)(5)/1784.13(b)(5)]

Same as for ditches.

10.4 Revegetation of Refuse Disposal Facilities. Describe plans for revegetation of refuse disposal facilities. The revegetation plan must conform to the standards of success outlined in the regulations and adhere to the Illinois Noxious Weed Law. For responses that are identical to other parts, “see response to question number X” is acceptable. The following information is required: [1780.18(b)(5)/1784.13(b)(5); 1816.22(c)(2)(C)/1817.22(c)(2)(C); 1816.111/1817.111]

N/A

10.4.1 Provide the proposed post-mining land use designation for refuse disposal facilities and a justification for the necessity of that land use. [1780.23(b)/1784.15(b)]

10.4.2 Describe proposed soil preparation and a soil testing plan related to reclamation and re-vegetation procedures. [1780.18(b)(5)(G)/1784.13(b)(5)(G)]

10.4.3 Describe the methods for the use of temporary seeding/mulching to control erosion, discuss the species, seeding rate by species per acre, and mulching methods and type of mulch. [1816.111(c)/1817.111(c); 1816.114/0817.114]

10.4.4 Describe the timing and methods proposed to transition from the temporary vegetation to the permanent vegetative cover. [1816.111(c)/1817.111(c)]

10.4.5 Provide a permanent grass and forbs species list that is diverse, native, capable of controlling erosion, and capable of self-regeneration. If non-native species are proposed to achieve the post-mining land use, provide adequate justification that the species are desirable, necessary to achieve the approved post-mining land use, and are required to control erosion. Specify if the proposed seed mix contains different species for the slopes and the top of the structure. Describe seeding rate by species per acre, methods of planting and seeding, mulching and fertilizer plan and rates. [1780.18(b)(5)/1784.13(b)(5); 1816.111(a) and (b)/1817.111(a) and (b); 1816.111(a)(2)/1817.111(a)(2); 1816.97(g)/1817.97(g)]

10.4.6 Describe a periodic measurement plan of the vegetation that will be used to identify if remedial actions are necessary to achieve the approved species and / or post-mining land use vegetation success standards during the applicable period of liability. Information provided shall also describe a remedial action plan to achieve the approved vegetative species, invasive species management, or post-Mining Land Use success. Remedial actions may include but are not limited to mowing, burning, undesirable invasive species control, irrigation and pest and disease control. [1816.116(b)(1)/1817.116(b)(1); 1816.111(a) and (b)/1817.111(a) and (b)]

10.5 Pasture Reclamation Plan. Describe plans for reclamation and revegetation of Pasture. The revegetation plan must conform to the standards of success outlined in the regulations and adhere to the Illinois Noxious Weed Law. For responses that are identical to other parts, “see response to question number X” is acceptable. The following information is required: [1780.18(b)(5)/1784.13(b)(5); 1816.111/1817.111; 1816.116/1817.116]

N/A

10.5.1 Describe proposed soil preparation and a soil testing plan related to reclamation and re-vegetation procedures. [1780.18(b)(5)(G)/1784.13(b)(5)(G)]

[REDACTED]

10.5.2 Describe the methods for the use of temporary seeding/mulching to control erosion, discuss the species, seeding rate by species per acre, and mulching methods and type of mulch.

[1816.111(c)/1817.111(c); 1816.114/0817.114]

[REDACTED]

10.5.3 Describe the timing and methods proposed to transition from the temporary vegetation to the permanent vegetative cover. [1816.111(c)/1817.111(c)]

[REDACTED]

10.5.4 Provide a permanent pasture grass species list, describe seeding rate by species per acre, methods of planting and seeding, mulching and fertilizer plan and rates. [1780.13(b)(5)/1784.18(b)(5)]

[REDACTED]

10.5.5 Describe a periodic measurement plan of the vegetation that will be used to identify if remedial actions are necessary to achieve the approved species and / or post-mining land use vegetation success standards during the applicable period of liability. Information provided shall also describe a remedial action plan to achieve the approved vegetative species, invasive species management, or post-Mining Land Use success. Remedial actions may include but are not limited to mowing, burning, undesirable invasive species control, irrigation and pest and disease control. [1816.116(b)(1)/1817.116(b)(1); 1816.111(a) and (b)/1817.111(a) and (b)]

[REDACTED]

10.6 Fish and Wildlife-Herbaceous Reclamation Plan. Describe plans for reclamation and revegetation of Wildlife Herbaceous areas. The revegetation plan must conform to the standards of success outlined in the regulations and adhere to the Illinois Noxious Weed Law. For responses that are identical to other parts, “see response to question number X” is acceptable. The following information is required:

[1780.18(b)(5)/1784.13(b)(5); 1816.111/1817.111; 1816.97/1817.97; 1816.116/1817.116; 1816.117/1817.117]

N/A

10.6.1 Describe proposed soil preparation and a soil testing plan related to reclamation and revegetation procedures. [1780.18(b)(5)(G)/1784.13(b)(5)(G)]

[REDACTED]

10.6.2 Describe the methods for the use of temporary seeding/mulching to control erosion, discuss the species, seeding rate by species per acre, and mulching methods and type of mulch.

[1816.111(c)/1817.111(c); 1816.114/0817.114]

[REDACTED]

10.6.3 Describe the timing and methods proposed to transition from the temporary vegetation to the permanent vegetative cover. [1816.111(c)/1817.111(c)]

10.6.4 Provide a permanent grass and forbs species list that is diverse, native, capable of controlling erosion, and capable of self-regeneration. If non-native species are proposed to achieve the post-mining land use, provide adequate justification that the species are desirable, necessary to achieve the approved post-mining land use, and are required to control erosion. Describe seeding rate by species per acre, methods of planting and seeding, mulching and fertilizer plan and rates. [1780.18(b)(5)/1784.13(b)(5); 1816.111(a) and (b)/1817.111(a) and (b); 1816.111(a)(2)/1817.111(a)(2); 1816.97(g)/1817.97(g)]

10.6.5 Describe a periodic measurement plan of the vegetation that will be used to identify if remedial actions are necessary to achieve the approved species and / or post-mining land use vegetation success standards during the applicable period of liability. Information provided shall also describe a remedial action plan to achieve the approved vegetative species, invasive species management, or post-mining land use success. Remedial actions may include but are not limited to mowing, burning, undesirable invasive species control, irrigation and pest and disease control. [1816.116(b)(1)/1817.116(b)(1); 1816.111(a) and (b)/1817.111(a) and (b)]

10.7 Fish and Wildlife-Woody Reclamation Plan. Describe plans for reclamation and revegetation of Wildlife Woody areas. The revegetation plan must conform to the standards of success outlined in the regulations and adhere to the Illinois Noxious Weed Law. If a bat Protection and Enhancement Plan (PEP) is part of the application, the applicant shall ensure consistency between this part and the bat PEP. For responses that are identical to other parts, “see response to question number X” is acceptable. The following information is required: [1780.18(b)(5)/1784.13(b)(5); 1816.111/1817.111; 1816.97/1817.97; 1816.116/1817.116; 1816.117/1817.117; [OSM Directives TSR-16 Directive 931](#)]

N/A

10.7.1 Describe proposed soil preparation and a soil testing plan related to reclamation and revegetation procedures. [1780.18(b)(5)(G)/1784.13(b)(5)(G)]

10.7.2 Describe the methods for the use of temporary seeding/mulching to control erosion, discuss the species, seeding rate by species per acre, and mulching methods and type of mulch. [1816.111(c)/1817.111(c); 1816.114/0817.114]

10.7.3 Describe the timing and methods proposed to transition from the temporary vegetation to the permanent vegetative cover. [1816.111(c)/1817.111(c)]

10.7.4 Provide a permanent herbaceous ground cover species list and a woody species list that is diverse, native, capable of controlling erosion, capable of self-regeneration, and that has growth habits compatible with woody species success. If non-native species are proposed to achieve the post-mining land use, provide adequate justification that the species are desirable, necessary to achieve the approved post-mining

land use, and are required to control erosion. Describe seeding rate by species per acre, methods of planting and seeding, mulching and fertilizer plan and rates. [1780.18(b)(5)/1784.13(b)(5); 1816.111(a) and (b)/1817.111(a) and (b); 1816.111(a)(2)/1817.111(a)(2); 1816.97(g)/1817.97(g); [Operator Memorandum No. 2017-02](#)]

10.7.5 Describe a periodic measurement plan of the vegetation that will be used to identify if remedial actions are necessary to achieve the approved species and / or post-mining land use vegetation success standards during the applicable period of liability. Refer to [Operator Memorandum No. 2017-02](#) for additional information regarding tree and shrub planting maintenance. Information provided shall also describe a remedial action plan to achieve the approved vegetative species, invasive species management, or post-mining land use success. Remedial actions may include but are not limited to mowing, burning, undesirable invasive species control, irrigation and pest and disease control. [1816.116(b)(1)/1817.116(b)(1); 1816.111(a) and (b)/1817.111(a) and (b)]

10.8 Fish and Wildlife-Wetland Reclamation Plan. Describe plans for reclamation and revegetation of Wildlife Wetland areas. The revegetation plan must conform to the standards of success outlined in the regulations and adhere to the Illinois Noxious Weed Law. The following information is required: [1701.5; 1816.111/1817.111; 1816.97/1817.97; 1816.116/1817.116; 1816.117/1817.117; 1816.102(h)/1817.102(h); [OSM Directives System TSR-14 Directive 828](#)]

N/A

10.8.1 Is the wetland a managed, engineered area that functions as part of a drainage control plan, a sediment control plan, or is not a fully incised wetland?

YES NO

If NO, complete Part 10.8.2, If YES, the following information is required:

10.8.1.1 Describe how the soil type(s) in the proposed wetland area will support hydrophytic vegetation. If hydric soils are not present, describe how the area will function as a wetland without this wetland parameter. [1701.5 Appendix A]

10.8.1.2 Discuss the potential for the area to be inundated or saturated by surface or groundwater at a frequency to support hydrophytic vegetation on at least 30% of the surface acres of the wetland. [1701.5 Appendix A]

10.8.1.3 Provide a permanent wetland vegetation species list that is compatible with the Corp of Engineers Wetland Delineation Manual as described in the regulations. The species list must also be diverse, capable of controlling erosion, and capable of self-regeneration. If non-native species are proposed to achieve the post-mining land use, provide adequate justification that the species are desirable, necessary to achieve the approved post-mining land use, and are required to control erosion.

[1816.116(a)(5)(A)/1817.116(a)(5)(A); 1816.111 (a) and (b)/1817.111 (a) and (b); 1816.97(g)/1817.97(g)]

10.8.1.4 Provide a description of how the requirements for permanent impoundments will be met. [1816.49(b)/1817.49(b)]

10.8.2 Is the wetland a depression created by removal of soil for the purposes of a borrow area or enhancement of wildlife habitat and not an engineered portion of a drainage control plan or sediment control plan?

YES NO

If YES, the following information is required:

10.8.2.1 Describe how the soil type(s) in the proposed will support hydrophytic vegetation. If hydric soils are not present, describe how the area will function as a wetland without this wetland parameter. [1701.5 Appendix A]

10.8.2.2 Discuss the potential for the area to be inundated or saturated by surface or groundwater at a frequency to support hydrophytic vegetation on at least 30% of the surface acres of the wetland. [1701.5 Appendix A]

10.8.2.3 Provide a permanent wetland vegetation species list that is compatible with the Corp of Engineers Wetland Delineation Manual as described in the regulations. The species list must also be diverse, capable of controlling erosion, and capable of self-regeneration. Adequate justification that the species are desirable, necessary to achieve the approved post-mining land use, and are required to control erosion.

[1816.116(a)(5)(A)/1817.116(a)(5)(A); 1816.111 (a) and (b)/1817.111 (a) and (b); 1816.97(g)/1817.97(g)]

10.9 Fish and Wildlife-Water and/or Developed Water Resources Reclamation Plan. Describe plans for reclamation and revegetation of Wildlife Water and/or Developed Water Resources areas. The revegetation plan must conform to the standards of success outlined in the regulations and adhere to the Illinois Noxious Weed Law. The following information is required: [1816.49(b)/1817.49(b); 1816.56/1817.56; 1816.97/1817.97]

N/A

10.9.1 For Developed Water Resources, provide a description of the future quality of the impounded water including the following: assurance that it will meet water quality standards, it will not degrade the quality

of the receiving water, and it will not diminish the quality/quantity of water utilized by adjacent land owners. [1816.49(b)/1817.49(b)]

10.9.2 For Fish and Wildlife - Water, discuss how the area will support and enhance fish and wildlife habitat, describe the future water quality, and describe how the water level will be capable of supporting the intended use. [1816.49(b)/1817.49(b); 1816.97/1817.97]

10.10 Forest Reclamation Plan. Describe plans for reclamation and revegetation of Forest areas. The revegetation plan must conform to the standards of success outlined in the regulations and adhere to the Illinois Noxious Weed Law. If a bat Protection and Enhancement Plan (PEP) is part of the application, the applicant shall ensure consistency between this part and the bat PEP. For responses that are identical to other parts, “see response to question number X” is acceptable. The following information is required: [1816.111/1817.111; 1816.97/1817.97; 1816.116/1817.116; 1816.117/1817.117; [OSM Directives TSR-16 Directive 931](#)]

N/A

10.10.1 Describe proposed soil preparation and a soil testing plan related to reclamation and revegetation procedures. [1780.18(b)(5)(G)/1784.13(b)(5)(G)]

10.10.2 Describe the methods for the use of temporary seeding/mulching to control erosion, discuss the species, seeding rate by species per acre, and mulching methods and type of mulch. [1816.111(c)/1817.111(c); 1816.114/1817.114]

10.10.3 Describe the timing and methods proposed to transition from the temporary herbaceous cover vegetation to the permanent vegetative cover. [1816.111(c)/1817.111(c)]

10.10.4 Provide a permanent herbaceous ground cover species list and a woody species list that is diverse, native, capable of controlling erosion, capable of self-regeneration, and that has growth habits compatible with woody species success. If non-native species are proposed to achieve the post-mining land use, provide adequate justification that the species are desirable, necessary to achieve the approved post-mining land use, and are required to control erosion. Describe seeding rate by species per acre, methods of planting and seeding, mulching and fertilizer plan and rates. [1780.18(b)(5)/1784.13(b)(5); 1816.111(a) and (b)/1817.111(a) and (b); 1816.111(a)(2)/1817.111(a)(2); 1816.97(g)/1817.97(g); [Operator Memorandum No. 2017-02](#)]

10.10.5 Describe a periodic measurement plan of the vegetation that will be used to identify if remedial actions are necessary to achieve the approved species and / or post-mining land use vegetation success standards during the applicable period of liability. Refer to [Operator Memorandum No. 2017-02](#) for additional information regarding tree and shrub planting maintenance. Information provided shall also

describe a remedial action plan to achieve the approved vegetative species, invasive species management, or post-mining land use success. Remedial actions may include but are not limited to mowing, burning, undesirable invasive species control, irrigation and pest and disease control.

[1816.116(b)(1)/1817.116(b)(1); 1816.111(a) and (b)/1817.111(a) and (b)]

10.11 Industrial/Commercial Reclamation Plan. Describe plans for reclamation and revegetation of Industrial/Commercial areas. The revegetation plan must conform to the standards of success outlined in the regulations and adhere to the Illinois Noxious Weed Law. For responses that are identical to other parts, “see response to question number X” is acceptable. The following information is required: [1816.111/1817.111; 1816.97/1817.97; 1816.116/1817.116; 1816.117/1817.117]

N/A

10.11.1 Describe plans for utilization of the area for Industrial or Commercial purposes at the time of bond release.

10.11.2 Provide a ground cover species list and a woody species list, if applicable that is diverse, native, capable of controlling erosion, and capable of self-regeneration. If non-native species are proposed to achieve the post-mining land use, provide adequate justification that the species are desirable, necessary to achieve the approved post-mining land use, and are required to control erosion. [1816.111 (a) and (b)/1817.111 (a) and (b); 1816.97(i)/1817.97(i)]

10.12 Recreation Reclamation Plan. Describe plans for reclamation and revegetation of Recreation areas. The revegetation plan must conform to the standards of success outlined in the regulations and adhere to the Illinois Noxious Weed Law. For responses that are identical to other parts, “see response to question number X” is acceptable. The following information is required: [1816.111/1817.111; 1816.97/1817.97; 1816.116/1817.116; 1816.117/1817.117]

N/A

10.12.1 Describe plans for utilization of the area for recreational purposes at the time of bond release.

10.12.2 Provide a ground cover species list and a woody species list, if applicable that is diverse, native, capable of controlling erosion, and capable of self-regeneration. If non-native species are proposed to achieve the post-mining land use, provide adequate justification that the species are desirable, necessary to achieve the approved post-mining land use, and are required to control erosion [1816.111 (a) and (b)/1817.111 (a) and (b); 1816.97(i)/1817.97(i)]

10.13 Habitat Diversification in Cropland. Describe plans to intersperse crop fields with trees, hedges, conservation drainage ways, or fence rows that will break up crop monocultures and diversify habitat, where appropriate and compatible with crop management and wildlife management practices. [1816.97(h)/1817.97(h); 1816.111/1817.111]

Cropland will be restored to reflect current pre-mining conditions as much as possible.

05/01/2019

PART 12: Shaft, Slope and Miscellaneous Borehole Construction

12.1 Shafts and/or Slopes.

12.1.1 For the shafts and/or slopes being proposed, describe the measures to be implemented to minimize disturbance to the prevailing hydrologic balance and to ensure the safety of people, livestock, fish and wildlife, and machinery in the permit area and adjacent area. [1816.13/1817.13]

All construction activities, including material and equipment storage for shaft construction will be at locations that are within the watershed that reports to the proposed sediment control pond. This will assure that the hydrologic balance with regard to surface water will not be impacted. With regard to the safety of people, livestock, and wildlife, all construction will be done by only personnel trained for this type of work and will be done in accordance with applicable MSHA regulations. The area will be surrounded by fencing or other barrier material to preclude unauthorized entry by persons and livestock or large wildlife.

With regard to protection of groundwater, shaft construction methods will assure no exchange of water from within the mine with the groundwater regime around the shaft will occur. Shaft will be lined with solid concrete of nine inch minimum thickness, with the any annulus void filled with concrete by pumping.

For each shaft and/or slope, provide a drawing showing those features which are relevant to protecting the hydrologic balance. The drawing shall include:

- The physical dimensions of excavations and entry lining material;
- The type of entry lining material;
- The measures which will be used to seal the annulus between the entry lining and adjacent rock;
- Water rings and conductor pipes;
- Elevation of land surface, coal seam, and any other mine workings penetrated by the structure; and
- Provide the latitude and longitude (in decimal degrees) for each shaft and/or slope.

Provide reference to each drawing below.

Attachment 12.1.1 illustrates construction drawings from a previous permit submittal. The plan and layout will be similar; however, dimensions may vary. Construction drawings of the actual shaft are under development and will be provided at a later date. The following narrative responses are intended to provide the requested information on an interim basis:

Shaft finished diameter = 18 feet, excavation diameter 20 feet, lining material concrete

Annulus seal to be of concrete, pumped in place.

A single water ring with associated piping is planned.

Surface elevation = 440 msl

Coal elevation = +4 msl

12.1.3 Will the Applicant be conducting any surface blasting activities incidental to underground mining, including, but not limited to, initial rounds of slopes and/or shafts that are within 50 vertical feet of the original ground surface? **[1817.61(a)]**

YES NO

If YES, complete the appropriate items in Part 11: Blasting.

12.2 Miscellaneous Boreholes.

12.2.1 For each borehole or group of boreholes being proposed, describe the measures to be implemented to minimize disturbance to the prevailing hydrologic balance and ensure the safety of people, livestock, fish and wildlife, and machinery in the permit area and adjacent area. **[1816.13/1817.13]**

Boreholes are constructed of metal pipes with the annulus of drilled hole filled with concrete. This will prevent any disruption to the hydrologic balance. Other listed concerns will be managed by fencing.

12.2.2 For each borehole or group of boreholes which will be constructed in a similar manner, provide a borehole log with the following: [\[Operator Memorandum 2017-01\]](#)

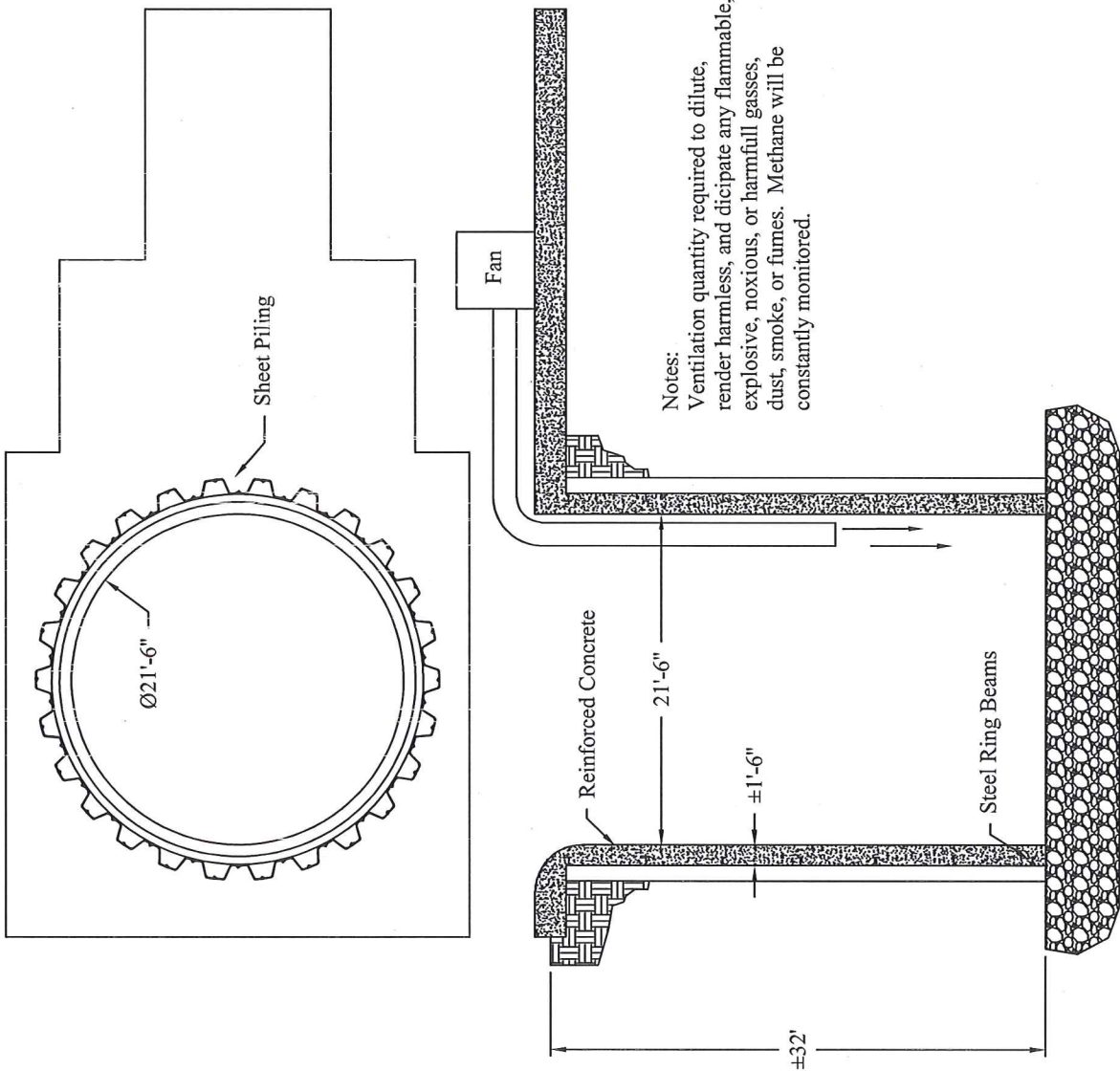
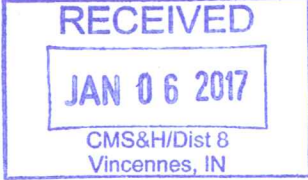
- The depth (or depth range) and diameter of each drill hole;
- The depth (or depth range) and diameter of each casing string, type and thickness of casing material in each string, and spacing of collars and any centralizers;
- Intervals to be cemented, grouted, or otherwise sealed and the method of placement;
- Any geophysical logging which is proposed;
- The names and numbers of boreholes to which the sketch applies; and
- Provide the latitude and longitude (in decimal degrees) for each borehole.

Provide reference to each borehole log below.

Logging of the respective boreholes will be provided upon completion in accordance with Operator Memorandum 2017-01. Borehole locations and borehole purpose are indicated on the Operations Map, Map 6. Nearby drill holes (RU219C and RU221C) will serve to indicate the lithology for the various strata expected to be encountered in drilling the referenced boreholes. Please refer to the borehole logs for these holes, included as Attachment 4.2.2 herein. Actual locations and installation of the boreholes will be provided upon completion in accordance with Operator Memorandum 2017-01.

ATTACHMENT 12.1.1

1 OF 5



Collar Plan

Collar Plan
Exhibit C

Date	Description	Drafted By:
1/13/2016	Collar Plan	JW
Divg. Path: E:\MCSI - Active - Insh8103.01 Callown Feels Shaft Options\Shing Plans\18.5 Finish Collar-Phase\Exhibits Drawing: ShingPlan-CadFiles.dwg Layout: Exhibit C - Collar Plan Plot Date: Friday, December 16, 2016 12:55:02 PM		

MILLER
 5905 Walnut Grove Road
 Carrier Mills, IL 62917
 618.994.4616

ATTACHMENT 12.1.1

SHAFT SINKING PLAN – 30 CFR Part 77.1900

2 OF 5

Sunrise Coal LLC – 18' Finish Diameter Shaft Excavation Plan



EXHIBIT D

Raise Drill Equipment Layout

ATTACHMENT 12.1.1

SHAFT SINKING PLAN – 30 CFR Part 77.1900

4 OF 5

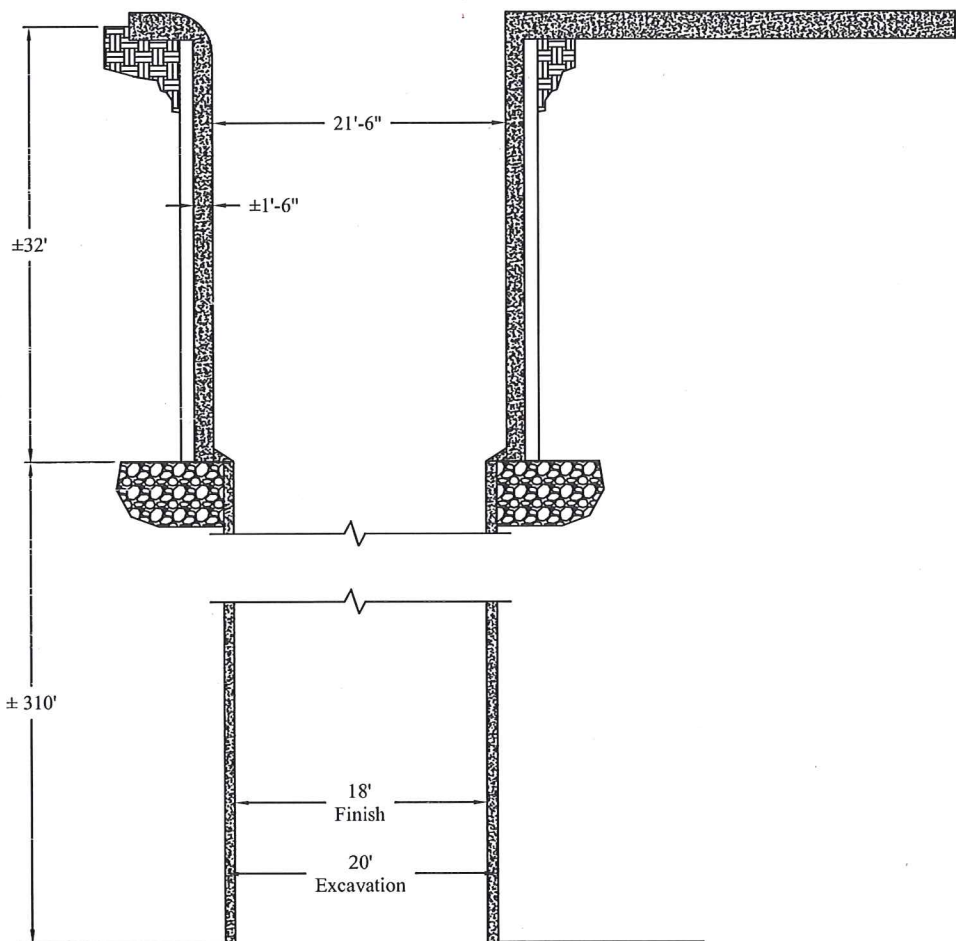
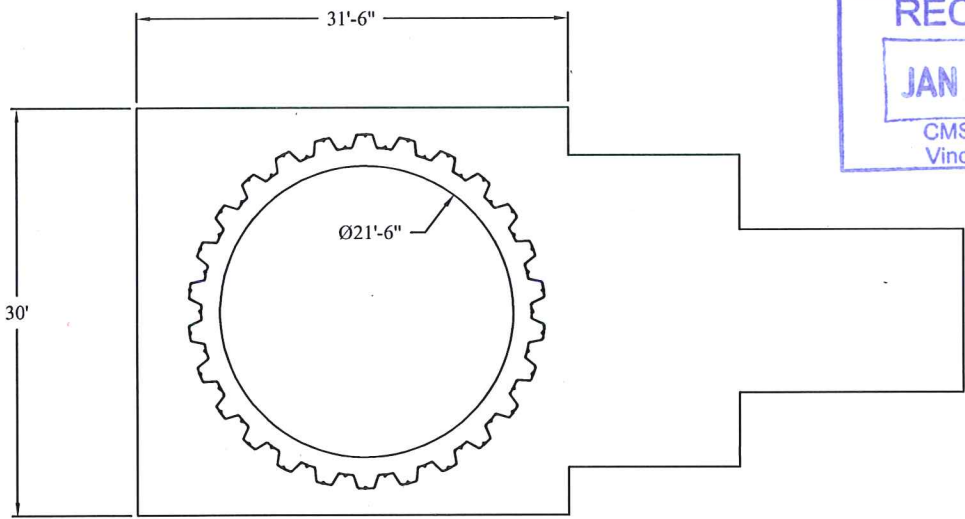
Sunrise Coal LLC – 18' Finish Diameter Shaft Excavation Plan



EXHIBIT E

Shaft Dimensions

RECEIVED
 JAN 06 2017
 CMS&H/Dist 8
 Vincennes, IN



Shaft Dimensions

NTS

Shaft Dimensions Exhibit E

MILLER
 5905 Walnut Grove Road
 Carrier Mills IL 62917
 618.994.4616

Date	Description	Drafted By:

Dwg: Pzfx F1_MCSI - Active Jobs\8103.01 Oakcove Fuels Shaft Options\Sinking Plans\18.5' Finish Collar-Raise Ckfr
 Drawing: SinkingPlanCadFiles.dwg Sheet
 Layout: Exhibit E - Shaft Dimensions 21 of 31
 Plot Date: Friday, December 16, 2016 1:17:30 PM