HEADWATERS INC.
NATURAL RESOURCES CONSULTING

TRANSMITTAL

To: Ms. Florance Bass
Mississippi Department of Environmental Quality
P.O. Box 2261
Jackson, MS 39225-2261

Date: April 13, 2020

Subject: Standard Construction Company
Three Sisters Mine

Copies	Description
1	MNOI & SWPPP

___ For your signature ___ For your files ___ Return as delivered

___ For your use ___ Approved as submitted _X_ For review and comment

___ As requested _X_ For approval ___ Remit for payment

Remarks:

Florance,

Please find the MNOI and SWPPP for the referenced project. We have attached a letter from the Corps concerning this site. The supporting documentation is included in this submittal. Please let me know if you have any questions or need additional information.

Thanks!

DATE: 4/13/2020 SIGNED: _____
Tim Parrish

CORPORATE OFFICE
PO Box 2836, Ridgeland, MS 39158-2836
601-634-0097(p) 601-630-9778 (f)

www.headwaters-inc.com

TUPELO, MS OFFICE
PO Box 3658 Tupelo, MS 38803-3658

MISSISSIPPI DEPARTMENT OF
ENVIRONMENTAL QUALITY

MINING NOTICE OF INTENT (MNOI)
FOR COVERAGE UNDER
MINING STORM WATER, DEWATERING AND NO DISCHARGE
GENERAL PERMIT MSR32 _ _ _ _
(Number to be assigned by State)

File at least 30 days prior to the commencement of mining; 15 days if a Storm Water Pollution Prevention Plan (SWPPP) is already on file and mine dewatering is not proposed. Lateral expansion of an existing mine that has general permit coverage requires the submittal of the Major Modification Form, not a new MNOI. However, modification of the existing SWPPP to include the expansion is required. Discharge of storm water or impounded water associated with mining or the operation of a wastewater recirculation system with no discharge without written notification of coverage from MDEQ is a violation of State Law.

If the company seeking coverage is a corporation, a limited liability company, a partnership, or a business trust, attach proof of its registration with the Mississippi Secretary of State and/or its Certificate of Good Standing. This registration or Certificate of Good Standing must be dated within twelve (12) months of the date of the submittal of this coverage form. Coverage will be issued in the company name as it is registered with the Mississippi Secretary of State.

Please indicate the activities to be covered by this MNOI (check all that apply).

☑ **Storm Water Discharges Associated with Mining** ☐ **Mine Dewatering**

☑ **Wastewater Recirculation System with No Discharge**

The appropriate section of the MNOI must be completed if the applicant proposes to discharge storm water, discharge impounded mine water (dewatering) and/or operate a wastewater recirculation system with no discharge.

A site-specific Storm Water Pollution Prevention Plan (SWPPP) developed in accordance with ACT5 of the General Permit and a United States Geological Survey (USGS) quadrangle map or photocopy, indicating the site location and outfalls must be included with the MNOI submittal. The name of the quadrangle map must be shown on all copies. Quadrangle maps can be obtained from the MDEQ, Office of Geology at 601-961-5523. Additional submittals may include the following (check all that apply).

☑ **Section 404 Documentation** ☐ **Notice of Exempt Operations Form**

☐ **Dam/Reservoir Safety Permit or Written Authorization**

ALL INFORMATION MUST BE COMPLETED (indicate "N/A" where not applicable)

MSR32 __ __ __ __

(NUMBER TO BE ASSIGNED BY STATE)

APPLICANT IS THE: ☐ OWNER ☑ OPERATOR

OWNER CONTACT INFORMATION

OWNER CONTACT PERSON: _____

OWNER COMPANY LEGAL NAME: _____

OWNER STREET OR P. O. BOX: _____

OWNER CITY: _____ STATE: _____ ZIP: _____

OWNER PHONE #: (_____)_____ OWNER EMAIL: _____

OPERATOR CONTACT INFORMATION

OPERATOR CONTACT PERSON: Harrison Hunt

OPERATOR COMPANY LEGAL NAME: Standard Construction Company

OPERATOR STREET OR P. O. BOX: P.O. Box 38289

OPERATOR CITY: Germantown STATE: TN ZIP: 38183

OPERATOR PHONE #: (901) 754-5181 OPERATOR EMAIL: harrisonh@stdconst.com

MINE INFORMATION

MINE NAME: Three Sisters Pit

MINE SITE ADDRESS (If the physical address is not available, please indicate nearest named road.)

Street: Hwy 305

City: Olive Branch State: MS County: Desoto Zip: _____

_____/4 OF _____/4 OF SECTION 22, TOWNSHIP 2S, RANGE 6W

MINE SITE TRIBAL LAND ID (N/A If not applicable): N/A

ATTACH A USGS QUAD MAP, EXTENDING ½ MILE BEYOND FACILITY, OUTLINING THE MINE BOUNDARIES
(Maps can be obtained from the Mississippi Office of Geology. For information call 601-961-5523).

LATITUDE: 34 degrees 53 minutes 40 seconds LONGITUDE: -89 degrees 49 minutes 3 seconds

LAT & LONG DATA SOURCE (GPS (*Please GPS Entrance Gate*) or Map Interpolation): Google Earth

TOTAL ACREAGE: 192.35 MATERIAL TO BE MINED: Sand & Gravel

WILL HYDRAULIC DREDGING BE USED? ☐ YES ☑ NO

WASHING OF SAND/GRAVEL? ☑ YES ☐ NO

ESTIMATED START DATE: 2020-11 (YYYY-MM-DD)

ESTIMATED END DATE: 2033-12 (YYYY-MM-DD)

SIC CODE 1442

NAICS CODE 212321

RECEIVING STREAM INFORMATION

NEAREST NAMED RECEIVING STREAM: unnamed tributary to Coldwater River

IS RECEIVING STREAM ON MISSISSIPPI'S 303(D) LIST OF IMPAIRED WATER BODIES? (The 303(d) list of impaired waters and TMDL stream segments may be found of MDEQ's website: http://www.deq.state.ms.us/MDEQ.nsf/page/TWB_Total_Maximum_Daily_Load_Section) ☐ YES ☑ NO

HAS A TMDL BEEN ESTABLISED FOR THE RECEIVING STREAM SEGMENT? ☐ YES ☑ NO

COMPLETE IF STORM WATER DISCHARGE IS PROPOSED

ATTACH A STORM WATER POLLUTION PREVENTION PLAN (SEE PERMIT FOR REQUIREMENTS)

IDENTIFY THE ASSOCIATION OR GENERIC SWPPP ON FILE AT MDEQ: See attached

COMPLETE IF WASTEWATER RECIRCULATION SYSTEM WITH NO DISCHARGE IS PROPOSED

DISTANCE BETWEEN RECIRCULATION POND(S) AND PROPERTY LINE: 150 (FT)
(MUST BE AT LEAST 150 FEET)

NUMBER OF RECIRCULATION POND(S): 3

STORAGE CAPACITY OF EACH RECIRCULATION POND(S): 1,306,800 (FT^3)

COMPLETE IF MINE DEWATERING IS PROPOSED

ESTIMATED DEWATERING VOLUME: _____ (GAL/DAY)

NAME AND ADDRESS OF THE RECIPIENT OF THE DISCHARGE MONITORING REPORTS (DMRs), IF DIFFERENT FROM SIGNATORY: _____

DOCUMENTATION OF COMPLIANCE WITH OTHER REGULATIONS/REQUIREMENTS

Coverage under this general permit will not be granted until all other required MDEQ permits and approvals are addressed.

WILL THE CONSTRUCTION OR OPERATION OF THIS MINE INVOLVE THE RE-ROUTING, FILLING OR CROSSING OF A WATER CONVEYANCE OF ANY KIND? ☐ YES ☑ NO

If yes, contact the U.S. Army Corps of Engineers' Regulatory Branch for permitting requirements. If the mine requires a Corps of Engineers Section 404 permit, provide appropriate documentation with this MNOI that:

- The mine has been approved by individual permit, or
- The work will be covered by a nationwide permit and NO NOTIFICATION to the Corps is required, or
- The work will be covered by a nationwide or general permit and NOTIFICATION to the Corps is required.

LIST ANY NPDES PERMIT NO(s)._____ GEOLOGY APPLICATION/PERMIT NO. _____

LIST OTHER GEOLOGY PERMIT NUMBERS THAT APPLY TO COVERAGE AREA Mining application has been submitted to the Office of Geology.

IS THE MINE LESS THAN 4 ACRES AND GREATER THAN 1320 FEET FROM ANOTHER MINE?

☐ YES A "Notice of Exempt Operations" Form must be included with the MNOI or proof of prior submission, if previously submitted to the Office of Geology.

☑ NO A "Notice of Intent to Mine Class I or Class II Materials" Form must be filed before coverage will be granted under the Mining General Permit. For information on Office of Geology requirements, call 601-961-5515.

LIST ANY LOCAL STORM WATER ORDINANCES WITH WHICH THE OPERATIONS MUST COMPLY AND SUBMIT ANY ASSOCIATED APPROVAL DOCUMENTATION. N/A

IF IMPOUNDMENTS WILL BE CONSTRUCTED ABOVE NATURAL SURFACE ELEVATIONS, INDICATE WHICH, IF ANY, OF THE FOLLOWING APPLY.

☐ The impoundment will be constructed with a peripheral dam or levee 8 feet or greater in height, measured from the lowest elevation of its toe.

☐ The impoundment will have a maximum storage volume greater than 25 acre-feet.

☐ The impoundment will impound a watercourse with a continuous flow.

☐ The impoundment has the potential to threaten downstream lives or man-made structures.

If any of the impoundments meet any of the above criteria, the applicant will be required to obtain written authorization from MDEQ, Dam Safety Division before coverage will be granted under the Mining General Permit.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Harrison Hunt — **Authorized Signature**[1]

4-9-20 — **Date**

Harrison Hunt — **Printed Name**

Vice President — **Title**

[1]This application shall be signed according to the General Permit, Act 15, T-4 as follows:

- For a corporation, by a responsible corporate officer.
- For a partnership, by a general partner.
- For a sole proprietorship, by the proprietor.
- For a municipal, state or other public facility, by either a principal executive officer, the mayor, or ranking elected official.
- Duly Authorized Representative

Please submit this form to: Chief, Environmental Permits Division
MDEQ, Office of Pollution Control
P.O. Box 2261
Jackson, Mississippi 39225

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)
PART I

MINING STORM WATER, DEWATERING and NO DISCHARGE GENERAL NPDES PERMIT

FOR

Standard Construction Company, Inc.
Three Sisters Mine
Desoto County, Mississippi

April 2020

PREPARED BY:

Headwaters, Inc.
P. O. Box 2836
Ridgeland, Mississippi 39158
(601) 634-0097

HEADWATERS INC.
NATURAL RESOURCES CONSULTING

TABLE OF CONTENTS

I. INTRODUCTION

The purpose of the Storm Water Pollution Prevention Plan (SWPPP) is to provide a site-specific description of the best management practices to prevent contamination of the site storm water flows from potential pollutants associated with mining activities. The SWPPP has been prepared for Standard Construction Company, Inc., as required by the Mississippi Department of Environmental Quality (MDEQ) in compliance with the applicable regulations for coverage under the Mining Storm Water, Dewatering and No Discharge General NPDES Permit. Headwaters, Inc. has developed this SWPPP to be incorporated into the routine mining activities associated with the Three Sisters Mine. The plan also outlines implementation, inspection, and maintenance requirements. The erosion and sediment control practices should be monitored, and the plan should be revised if storm water compliance is not achieved.

II. SITE ASSESSMENT

A. **Location**: The site is an existing mine located on the east side of Hwy 305, the north side of Bethel Road and the south side of Woolsey Road in Desoto County, Mississippi. The project site may also be referenced by Global Positioning System (GPS) coordinates 34.894507N, -89.817522W.

B. **Description of Work**: The project area will include roughly 192.35 acres including mining area, haul roads, stockpiles and the washing operation.

C. **Potential Pollution Sources**: The most significant potential pollutants are soil particles subject to removal by storm water. Other potential pollutants subject to removal by storm water are spilled fuel and lubricants. Material may also be inadvertently tracked off-site or blown off-site when distributed by hauling equipment. The storm water, which leaves the site, shall meet the non-numeric limitations of being free from oil, scum, debris, other floating materials, and eroded soils.

D. **Non-Storm Water Solid Materials**: The on-site generation of solid materials will be minimal, and its proper disposal will be closely monitored. All solid waste will be taken off-site for proper disposal.

E. **Drainage Patterns**: Most of the rainwater that falls on areas disturbed by mining activities will flow south and east off the property to an unnamed tributary of the Coldwater River.

F. **Receiving Waters**: A Tributary of the Coldwater River will be the main

receiving water for this project. Extensive measures will be taken to prevent any silt and sediment contamination from entering this receiving stream.

G. **Wetlands:** The entire property has been delineated and a Preliminary Jurisdictional Determination has been received from the Corps of Engineers. Extensive measures will be taken to avoid impacts to the streams that have been identified on the property and to prevent any silt or sediment contamination from entering these streams.

III. BEST MANAGEMENT PRACTICES (BMPs)

A. **Erosion and Sediment Control:** Mining activities shall not cause more than minimal and/or temporal water quality degradation of any adjacent wetlands, stream or water body. Appropriately chosen and installed erosion and sediment control BMPs will be used to prevent sediment from leaving the site or entering adjacent other waters. All BMPs implemented for the site will be in accordance with the standards set forth in the most current edition of the MDEQ "Planning and Design Manual for the Control of Erosion, Sediment and Storm Water." The owner will be responsible for installing, inspecting, and maintaining the erosion and sediment controls for the duration of the project. Practices shall be designed to divert flows away from exposed soils. The site plan found in Appendix II will detail where each BMP will be used.

1. Structural Practices

- Construction Entrance/Exit (Rock) (Temporary Practice) - There will be one (1) entrance as shown on the plans. Aggregate should be at least six (6) inches thick and 50 feet long using DOT#1 coarse aggregate. The entrances will be inspected weekly and periodic top dressing with new gravel may be necessary when it becomes clogged with dirt and/or debris to prevent the tracking of mud and dirt onto the roadway. In addition, dirt and debris that accumulates on the roadway should be removed immediately.
- Silt Fence (Temporary Practice) - Silt fence will be installed as shown on the site plan. It will be placed between the area to be mined, and stream crossings as needed and at any other locations deemed necessary. The fence will be maintained, and the sediment will be removed when the deposits reach one-half the fence height. Silt fence used must be wire-backed silt fence and must be trenched into the ground a minimum of six (6) inches.

- Fueling and Vehicle Maintenance Locations – Fueling and vehicle maintenance areas shall use BMPs for industrial activities to ensure that pollutants do not impact the storm water runoff. Impervious dikes and berms shall be used to contain potential spills. Drums and containers for holding and transporting contaminated materials should be on site.

2. **Structural Integrity**

- Any lagoon, sedimentation pond or dredge pit must have an emergency discharge structure installed at least 24 inches above the normal operating fluid level, with structure being at least 24 inches below the lowest point on the top of the containment dike.
- There will be no dikes, levees or any other appurtenant structures constructed at this site.
- No sediment basins have been constructed for control of storm water run-off from this site.
- The coverage recipient shall develop and maintain a daily inspection log for this facility. The log should include the following:
    1. Volume of wastewater accumulating within the impoundment.
    2. Date, time and person making the inspection.
    3. An indication if a follow-up action is required or not.

- **Vegetative Practices**

- Vegetated Buffers – A fifty (50) feet wide vegetative buffer must remain in place along each top bank of any intermittent stream. In areas where tree clearing is required adjacent to the top bank of a stream, stumps must remain in place and grading must be avoided to maintain a fifty (50) feet wide vegetative buffer. Stream buffers are required to avoid potential damage to stream bank slopes causing excessive sediment discharge throughout the life of the project.
- Temporary Seeding (Temporary Practice) – When a disturbed area will be left undisturbed for thirty (30) days or more, the appropriate temporary or permanent vegetative practices shall be implemented within seven (7) calendar days.
- Permanent Seeding - Permanent stabilization measures shall be initiated in a project area as soon as mining activities have permanently ceased. When weather and/or logistical factors prevent immediate stabilization, measures will be initiated no later than 14 days after the mining activity in that portion of the site has permanently ceased.

B. **Spill Prevention and Response Procedures:** If single wall tanks are used, then secondary containment measures shall be implemented. Double-wall tanks do not require secondary containment measures. If on-site above ground oil storage (gasoline, diesel, hydraulic, transformer, etc.) exceeds either 660 gallons in a single container or exceeds 1,320 gallons in aggregate storage, a SPCC plan would be required.

C. **Operation and Maintenance**: The best management practices must be properly installed and maintained as designed and inspected monthly. Any poorly functioning erosion or sediment controls, non-compliant discharges, or any other deficiencies observed during the inspections shall be corrected as soon as possible, but not to exceed 24 hours of the inspection unless prevented by unsafe weather conditions as documented on the inspection form.

D. **Record Keeping:** Records shall be retained for three years of all maintenance activities, spills, and inspections, including a description of the quality and quantity of storm water.

E. **Employee Training:** Initial training for all personnel that are responsible for implementing and/or complying with the requirements of the GP shall be performed within twelve (12) months of issuance of coverage. Newly hired employees responsible for implementing and/or complying with the requirements of the GP shall receive initial training prior to performing such responsibilities. Training shall at a minimum address the following elements:

- SWPPP goals and plan components identified in ACTs 5 through 7 of the GP; including housekeeping and pollution prevention requirements, spill prevention and response procedures and installation, maintenance and inspection of erosion and sediment controls BMPs.
- Procedures to ensure compliance with the "no discharge" requirement of ACT 11
- Recordkeeping, reporting and record retention requirements

F. **Housekeeping Practices:** Pollutants that may enter storm water from mining sites because of poor housekeeping include oils, grease, paints, gasoline, solvents, litter, debris, and sanitary waste. During construction activities, the contractor is required to:

1. designate areas for equipment maintenance and repair
2. provide waste receptacles at convenient locations and provide regular

collection of waste
3. provide protected storage areas for chemicals, paints, solvents, fertilizers, and other potentially toxic materials
4. provide adequately maintained sanitary facilities
5. provide secondary containment around on-site fuel tanks
6. implement spill and leak prevention practices and response procedures if spills and leaks do occur
7. minimize the exposure of mining/construction materials and equipment

IV. IMPLEMENTATION SEQUENCE

Below is the mining sequence for this project. This sequence could change depending on the need for material. An updated implementation sequence will be submitted to MDEQ if changes occur.

1. Obtain plan approval and all other permits as needed.
2. Conduct employee conference to review all needed BMPs.
3. Install the construction entrance as shown on the plans.
4. Install all erosion and sediment controls as indicated on the site plan.
5. Continue site work.
6. Perform monthly reviews of site conditions along with erosion and sediment practices to ensure compliance with the SWPPP. Inspection reports will be kept on site with an updated SWPPP.
7. As site is mined, maintain BMPs as needed to ensure minimal erosion and sedimentation problems.
8. Perform any temporary seeding as needed and instructed throughout the construction process.
9. Final grading, seeding, sodding, mulching, and fertilizing.
10. Ensure final stabilization is achieved within the project site.
11. Removal of any temporary measures.

V. IMPLEMENTATION SCHEDULE

A. The coverage recipient shall:

1. Implement the SWPPP and retain a copy of the SWPPP at the site or locally available.
2. Ensure that appropriate BMPs are in place
3. Amend SWPPP as necessary to address changes in design, construction, operation or maintenance or as required by MDEQ.
4. Submit the Major Modification form for mine expansions.

5. Maintain all existing BMPs. Install additional erosion and sediment controls when existing controls prove to be ineffective.
6. Minimize off-site tracking of sediment.
7. Comply with applicable State and local was disposal, sanitary sewer or septic system regulations

B. **Proof of Coverage**: A copy of the Mining Construction Storm Water General Permit certificate and a copy of the Storm Water Pollution Prevention Plan should be kept onsite or locally available.

VI. INSPECTIONS AND REPORTING

A. Inspections: Inspections of the best management practices and other storm water pollution prevention plan requirements shall be performed as follows:

1. At least monthly for a minimum of twelve (12) inspections per year.

2. Within 24 hours after commencement of a rainfall event equal to or greater than a 2-year, 24-hour storm event (approximately 4 inches in Marshall County).
3. As necessary to ensure that erosion controls have been constructed, maintained and function adequately to satisfy the requirements of this permit and to ensure that pollutants are not leaving the site.

The minimum inspection requirement in no way relieves the permittee of performing whatever inspections are needed to ensure safe and pollution free facility operation.

B. Reporting: The owner and/or contractor must inspect, as described in the section above, and maintain controls and prepare monthly reports noting damages or deficiencies and corrective measures. These inspection reports are kept on-site until the Request for Termination (RFT) form is submitted.

As previously stated, all records, reports, and information resulting from activities required by this plan and the issued permit shall be retained for at least three years from the date of the MNOI, inspection, or report.

A rain gauge shall be placed in a central location on the site and used to obtain rainfall amounts. This information will be needed for proper

completion of the inspection report.

VII. REVISIONS

The storm water pollution prevention plan will be kept current by the company representative and will be revised as changes in site conditions warrant. The company representative may notify the SWPPP developer for assistance when necessary. Factors that would compel the SWPPP to be modified include:

- Inadequacies revealed by routine inspections.
- Changes in identified sources, non-storm water discharges, or non-storm water solid wastes.
- MDEQ Office of Pollution Control notification that the plan does not meet one or more of the minimum requirements.
- Changes in design, construction, operation, or maintenance, which has affected the discharge of pollutants to waters of the State and which were not otherwise addressed in the SWPPP.
- Identification of any new contractor and/or subcontractor that will implement a measure of the SWPPP.
- Install additional erosion and sediment controls when existing controls prove to be ineffective.
- Any additions, removals, or modifications to construction entrances as shown on the site plans.

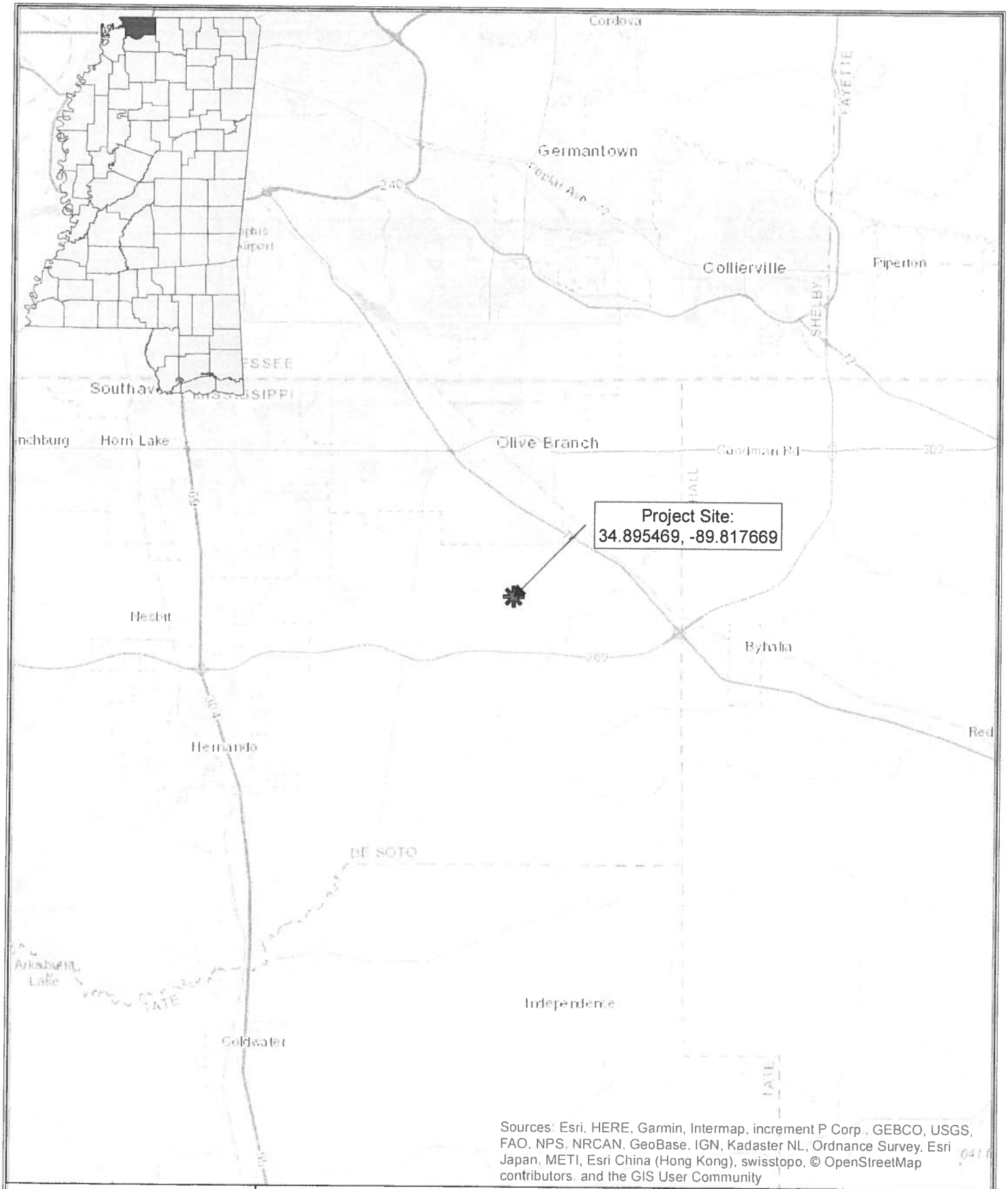
A plan revision will be completed within 30 days of the date if determined that a revision is warranted. If the modification is in response to a request by the Office of Pollution Control (OPC), the permittee must submit to the OPC certification that the requested changes have been made.

VIII. TERMINATION OF COVERAGE

For non-exempt mining operations, the Office of Pollution Control must be notified by a completed Request for Termination (RFT) of Coverage form (copy provided) and a copy of the Permit Board Order, authorizing 90% or final release of the mining performance bond. MDEQ staff will inspect the site and if no sediment or erosion problems are identified and adequate permanent controls are established, the owner or operator will receive a termination letter. Coverage is not terminated until notified in writing by MDEQ. Failure to submit an RFT form is a violation of permit conditions.

Beginning December 21, 2020, the RFT must be submitted electronically to MDEQ.

IX. APPENDIX I - LOCATION MAPS



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WWW.HEADWATERS-INC.COM

Date Created: 4/7/2020 | Created by: PGH

Three Sisters Pit

Section 22, Township 2S, Range 6W
Desoto County, Mississippi

General Location Map

0 12,500 25,000 Feet

1:250,000

N

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USGS 1982 Olive Branch (MS) Quad Basemap

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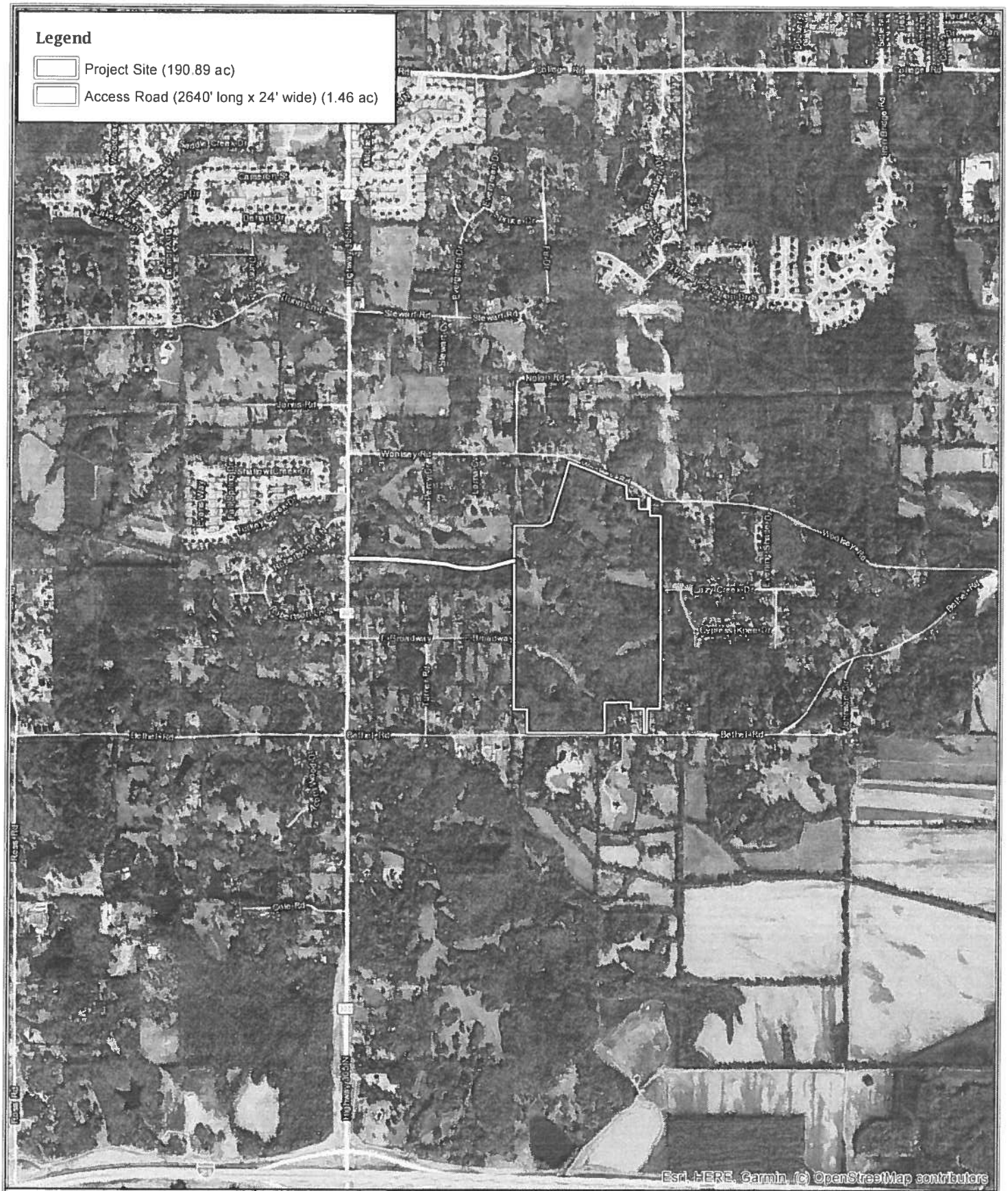

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Three Sisters Pit

Section 22, Township 2S, Range 6W
Desoto County, Mississippi

Site Location Map

0 1,200 2,400 Feet

1:24,000

N

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2018 Imagery Basemap

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Three Sisters Pit

Section 22, Township 2S, Range 6W
Desoto County, Mississippi

Site Location Map

0 1,200 2,400 Feet

1:24,000

N

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USGS 1982 Olive Branch (MS) Quad Basemap

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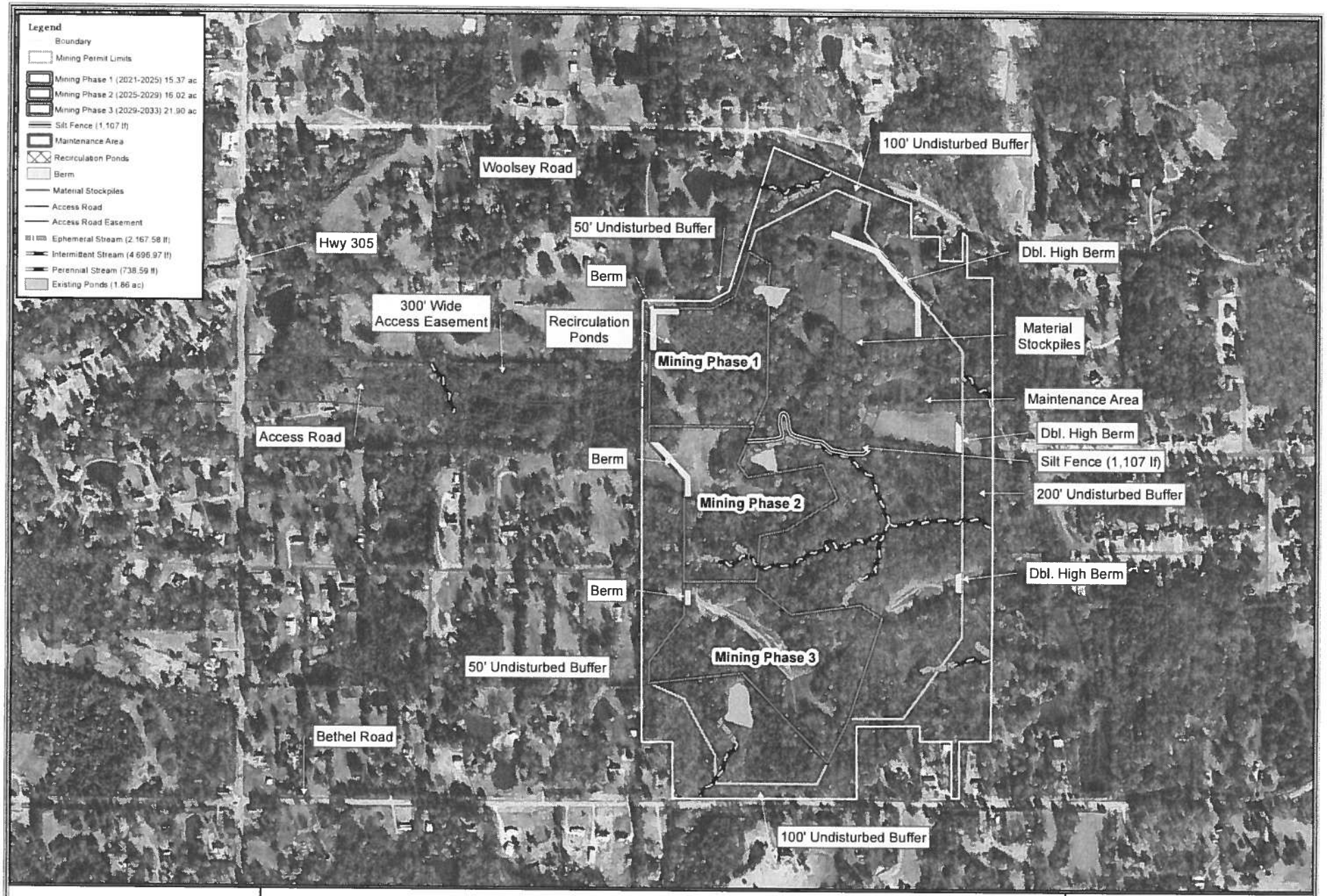
X. APPENDIX II – STORM WATER MANAGEMENT PLANS



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Three Sisters Pit

Section 22, Township 2S, Range 6W
Desoto County, Mississippi

BMP Location Map

0 500 1,000 Feet
1:10,000

N

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2018 Imagery Basemap

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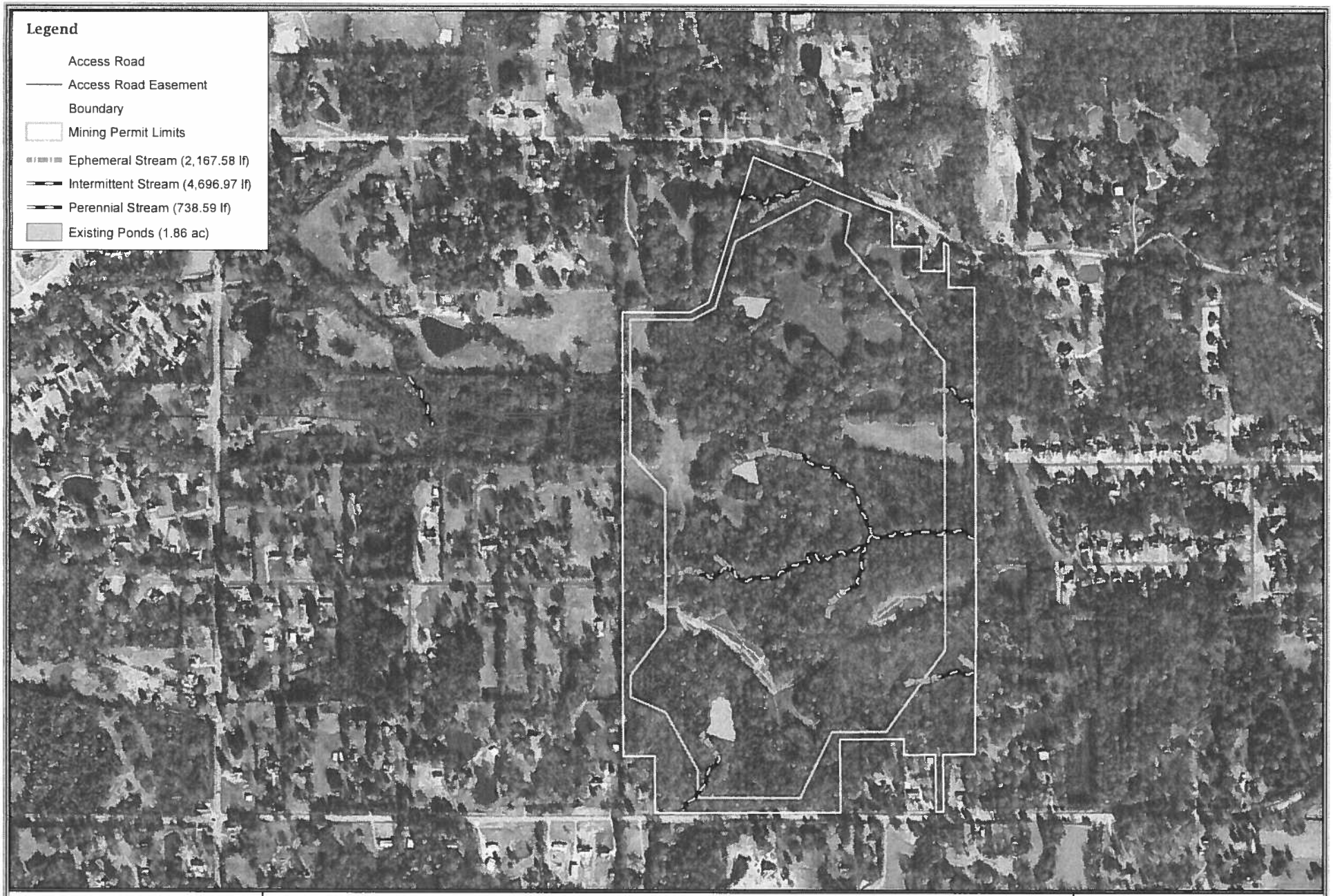

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Three Sisters Pit

Section 22, Township 2S, Range 6W
Desoto County, Mississippi

Wetland Location Map

0 500 1,000 Feet
1:10,000

N

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2018 Imagery Basemap

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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, VICKSBURG DISTRICT
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183-3435

November 22, 2019

Operations Division

SUBJECT: Jurisdictional Determination - Standard Construction Company, Incorporated, 3 Sisters Site, DeSoto County, Mississippi; MVK-2019-888

Mr. Cullen D. Dendy
Headwaters, Incorporated
Post Office Box 2836
Ridgeland, Mississippi 39158-2836

Dear Mr. Dendy:

I refer to your letter dated November 7, 2019, requesting a jurisdictional determination for the 3 Sisters site in DeSoto County, Mississippi.

Based upon the information provided, it appears there are jurisdictional areas within the property boundary subject to regulation pursuant to Section 404 of the Clean Water Act. The approximate location and extent of jurisdictional waters of the United States is depicted on the enclosed map (enclosure 1). Any work involving the discharge of dredged or fill material (land clearing, ditching, filling, leveeing, culvert crossings, etc.) within the identified jurisdictional waters will require a Department of the Army Section 404 permit prior to beginning work. For your information, I have enclosed a copy of our appeals form for the preliminary jurisdictional determination (enclosure 2).

In addition, the existing stock ponds are not considered waters of the United States and therefore, not regulated by the Corps of Engineers. Thus, for your information, I have enclosed a copy of the basis of our determination (enclosure 3) and an appeals form (enclosure 4) for the non-jurisdictional stock ponds.

This approved jurisdictional determination for the stock ponds is valid for a period not to exceed five years from the date of this letter unless superseded by law or regulation. If the proposed work is not completed by this time, or if project plans change, you should contact this office for a reevaluation of permit requirements and refer to Identification No. MVK-2019-888, when submitting the information.

This determination of Department of the Army regulatory requirements does not convey any property rights, either in real estate or material or any exclusive privileges, and does not authorize any injury to property or invasion of rights or local laws or regulations, or obviate the requirement to obtain state or local assent required by law for the activity discussed herein.

The decision regarding this action is based on information found in the administrative record, which documents the District's decision-making process, the basis for the decision and the final decision.

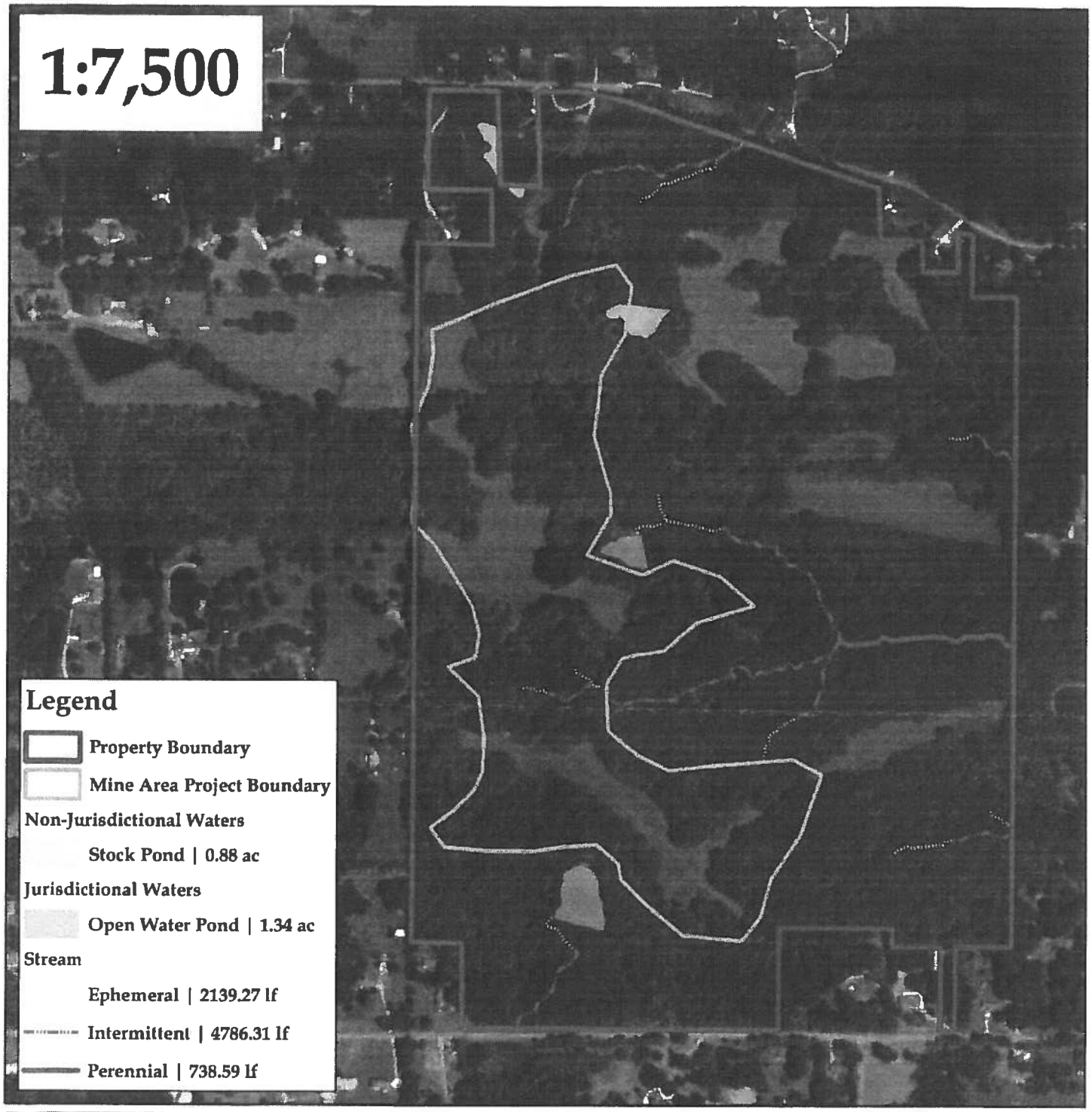
An application may be obtained at our official Regulatory Program webpage: http://www.mvk.usace.army.mil/Missions/Regulatory/Permits.aspx. An application for work in wetlands or other waters of the United States should be submitted at least 90 to 120 days in advance of the proposed starting date. In order to expedite the evaluation process, please refer to Identification No. MVK-2019-888 when submitting the application.

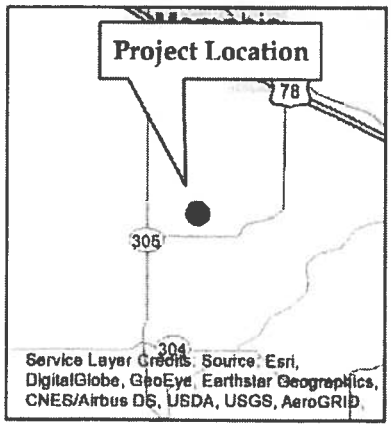
If we may be of any further assistance in this matter, please contact Ms. Eli Polzer of this office, telephone (601) 631-5721, or e-mail address: Eli.L.Polzer@usace.army.mil.

Sincerely,

Charles R. Allred, Jr.
Chief, Enforcement Section
Regulatory Branch

Enclosures





MVK-2019-888

Project:
Standard Construction Company, Inc.
3 Sisters Site
Location:
Section 22, T2S-R6W
Olive Branch Quadrangle
DeSoto County, MS

Aerial Imagery:
ESRI World Imagery

Jurisdictional Determination

US Army Corps of Engineers.

N W E S

Regulatory Branch

Enforcement Section

0 180 360 720
Feet

Prepared by: Eli L. Polzer
22 November 2019

Enclosure 1

XI. APPENDIX III - SOIL REPORT

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 DeSoto County, Mississippi

Three Sisters Pit

May 24, 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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Contents

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

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

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 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 1:24,000.

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: DeSoto County, Mississippi
Survey Area Data: Version 17, Sep 17, 2018

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

Date(s) aerial images were photographed: May 12, 2015—Dec 10, 2017

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
Bd	Brandon-Loring silt loams, strongly sloping phases	4.0	2.0%
Cl	Collins and Falaya silt loams, local alluvium phases	30.6	15.0%
Ga	Grenada silt loam, eroded, very gently sloping phase	4.1	2.0%
Gd	Grenada silt loam, severely eroded, gently sloping phase	4.2	2.1%
Gf	Grenada silt loam, severely eroded sloping phase (loring)	6.8	3.3%
Gh	Gullied land, Grenada soil material	65.9	32.2%
Gk	Gullied land, Loring soil material	14.5	7.1%
Lf	Loring silt loam, strongly sloping phase	4.3	2.1%
Ll	Loring silty clay loam, severely eroded gently sloping phase	61.2	29.9%
Lm	Loring silty clay loam, severely eroded sloping phase	3.0	1.5%
Ln	Loring silty clay loam, severely eroded strongly sloping phase	4.9	2.4%
W	Water	1.0	0.5%
Totals for Area of Interest		**204.4**	**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. 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 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.

DeSoto County, Mississippi

Bd—Brandon-Loring silt loams, strongly sloping phases

Map Unit Setting

National map unit symbol: m1rh
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition

Brandon and similar soils: 70 percent
Loring and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brandon

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess deposits

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 25 inches: silty clay loam
H3 - 25 to 42 inches: gravelly clay loam

Properties and qualities

Slope: 12 to 17 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): 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
Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups

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

Description of Loring

Setting

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Loess deposits

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 26 inches: silty clay loam
H3 - 26 to 48 inches: silt loam

Properties and qualities

Slope: 12 to 17 percent
Depth to restrictive feature: 14 to 35 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

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

Cl—Collins and Falaya silt loams, local alluvium phases

Map Unit Setting

National map unit symbol: m1rt
Elevation: 10 to 450 feet
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Collins and similar soils: 50 percent
Falaya and similar soils: 40 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Collins

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium deposits

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 42 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately 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: About 24 to 60 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 9.1 inches)

Interpretive groups

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

Description of Falaya

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Silty alluvium

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 40 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

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

Minor Components

Unnamed hydric soils (134de)

Percent of map unit: 3 percent

Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Ga—Grenada silt loam, eroded, very gently sloping phase

Map Unit Setting

National map unit symbol: m1sg
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Grenada and similar soils: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grenada

Setting

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess deposits

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 24 inches: silt loam
H3 - 24 to 42 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 18 to 36 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

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

Gd—Grenada silt loam, severely eroded, gently sloping phase

Map Unit Setting

National map unit symbol: m1sj
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition

Grenada, severely eroded, and similar soils: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grenada, Severely Eroded

Setting

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess deposits

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 24 inches: silt loam
H3 - 24 to 42 inches: silt loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 18 to 36 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

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

Gf—Grenada silt loam, severely eroded sloping phase (loring)

Map Unit Setting

National map unit symbol: m1sl
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition

Grenada, severely eroded, and similar soils: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grenada, Severely Eroded

Setting

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess deposits

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 24 inches: silt loam
H3 - 24 to 42 inches: silt loam

Properties and qualities

Slope: 8 to 12 percent
Depth to restrictive feature: 18 to 36 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

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

Gh—Gullied land, Grenada soil material

Map Unit Setting

National map unit symbol: m1sn
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition

Gullied land: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gullied Land

Setting

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Silty loess

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 23 inches: silty clay loam
H3 - 23 to 80 inches: silt loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydric soil rating: No

Gk—Gullied land, Loring soil material

Map Unit Setting

National map unit symbol: m1sp
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition

Gullied land: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gullied Land

Setting

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Silty loess

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 23 inches: silty clay loam
H3 - 23 to 80 inches: silt loam

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Ecological site: Northern Deep Loess Backslope Mesophytic Forest (F134XY001TN)
Hydric soil rating: No

Lf—Loring silt loam, strongly sloping phase

Map Unit Setting

National map unit symbol: m1sy
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition

Loring and similar soils: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loring

Setting

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess deposits

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 26 inches: silty clay loam
H3 - 26 to 48 inches: silt loam

Properties and qualities

Slope: 12 to 17 percent
Depth to restrictive feature: 14 to 35 inches to fragipan
Natural drainage class: Moderately well drained

Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

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

LI—Loring silty clay loam, severely eroded gently sloping phase

Map Unit Setting
National map unit symbol: m1t2
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition
Loring, severely eroded, and similar soils: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loring, Severely Eroded

Setting
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess deposits

Typical profile
H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 26 inches: silty clay loam
H3 - 26 to 48 inches: silt loam

Properties and qualities
Slope: 5 to 8 percent
Depth to restrictive feature: 14 to 35 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

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

Lm—Loring silty clay loam, severely eroded sloping phase

Map Unit Setting

National map unit symbol: m1t3
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition

Loring, severely eroded, and similar soils: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loring, Severely Eroded

Setting

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess deposits

Typical profile

H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 26 inches: silty clay loam
H3 - 26 to 48 inches: silt loam

Properties and qualities

Slope: 8 to 12 percent
Depth to restrictive feature: 14 to 35 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

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

Ln—Loring silty clay loam, severely eroded strongly sloping phase

Map Unit Setting

National map unit symbol: m1t4
Mean annual precipitation: 45 to 55 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 230 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition

Loring, severely eroded, and similar soils: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loring, Severely Eroded

Setting

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess deposits

Typical profile

H1 - 0 to 5 inches: silty clay loam
H2 - 5 to 26 inches: silty clay loam
H3 - 26 to 48 inches: silt loam

Properties and qualities

Slope: 12 to 17 percent
Depth to restrictive feature: 14 to 35 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Rating by Map Unit

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

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Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Map—Hydric Rating by Map Unit

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

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 1:24,000.

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: DeSoto County, Mississippi
Survey Area Data: Version 17, Sep 17, 2018

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

Date(s) aerial images were photographed: May 12, 2015—Dec 10, 2017

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.

Table—Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Bd	Brandon-Loring silt loams, strongly sloping phases	0	4.0	2.0%
Cl	Collins and Falaya silt loams, local alluvium phases	3	30.6	15.0%
Ga	Grenada silt loam, eroded, very gently sloping phase	0	4.1	2.0%
Gd	Grenada silt loam, severely eroded, gently sloping phase	0	4.2	2.1%
Gf	Grenada silt loam, severely eroded sloping phase (loring)	0	6.8	3.3%
Gh	Gullied land, Grenada soil material	0	65.9	32.2%
Gk	Gullied land, Loring soil material	0	14.5	7.1%
Lf	Loring silt loam, strongly sloping phase	0	4.3	2.1%
Ll	Loring silty clay loam, severely eroded gently sloping phase	0	61.2	29.9%
Lm	Loring silty clay loam, severely eroded sloping phase	0	3.0	1.5%
Ln	Loring silty clay loam, severely eroded strongly sloping phase	0	4.9	2.4%
W	Water	0	1.0	0.5%
Totals for Area of Interest			**204.4**	**100.0%**

Rating Options—Hydric Rating by Map Unit

Aggregation Method: Percent Present

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic

map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Percent Present" returns the cumulative percent composition of all components of a map unit for which a certain condition is true. For example, attribute "Hydric Rating by Map Unit" returns the cumulative percent composition of all components of a map unit where the corresponding hydric rating is "Yes". Conditions may be simple or complex. At runtime, the user may be able to specify all, some or none of the conditions in question.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

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