



Groundwater Monitoring Plan
Enoree Hannah Site
Enoree, Spartanburg County, South Carolina
S&ME Project No. 4261-19-156

PREPARED FOR:

Luck Companies
Post Office Box 29682
Richmond, Virginia 23242

PREPARED BY:

S&ME, Inc.
134 Suber Road
Columbia, South Carolina 29210

February 26, 2021



February 26, 2021

Luck Companies
Post Office Box 29862
Richmond, Virginia 23242

Attention: Mr. Bruce Smith

Submitted via email: brucesmith@luckcompanies.com

Reference: **Groundwater Monitoring Plan
Enoree Hannah Site**
Enoree, Spartanburg County, South Carolina
S&ME Project No. 4261-19-156

Dear Mr. Smith:

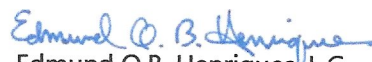
S&ME, Inc. (S&ME) has prepared the Groundwater Monitoring Plan in association with the proposed Luck Companies aggregate mine in Spartanburg County, South Carolina. The Plan provides details as to how Luck Companies will monitor groundwater prior to and during operation of the proposed mine. The approved Plan will be considered and evolve into the Groundwater Monitoring Program for the Enoree Hannah mine.

Please contact us at your convenience if there are questions regarding the information contained in this document.

Sincerely,
S&ME, Inc.


David R. Loftis, P.E.
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Edmund Q.B. Henriques, L.G.
Principal Geologist
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cc: South Carolina Department of Health and Environmental Control
Mining Reclamation
2600 Bull Street
Columbia, South Carolina 29201
Attention: Mr. Joe Koon (via email koonjm@dhec.sc.gov)



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1.0 INTRODUCTION

S&ME has prepared the Groundwater Monitoring Plan (Plan) on behalf of Luck Companies in association with the proposed aggregate mine located at Highway 92, Frontier Road, and Hanna Creek Road in Spartanburg County, South Carolina. The Plan was prepared for submittal to the Mining Reclamation Section of the South Carolina Department of Health and Environmental Control (SCDHEC) to supplement the previously submitted Application For A Mine Operating Permit (Form MR-400). The purpose of the Plan is to measure static groundwater levels on a regular basis to establish a pre-mining baseline for groundwater levels and to document any changes to groundwater levels during the mining operations. The information gathered will provide a basis to assess if observed changes indicate a potential to impact water supply wells on neighboring properties.

2.0 GROUNDWATER MONITORING

2.1 Proposed Well Installations

The Plan includes installation of four monitoring wells to a maximum depth of 450 feet to serve as points to monitor groundwater occurrence within the bedrock aquifer. The planned bedrock wells are identified as monitoring wells MW-9, MW-10, MW-11 and MW-12, and their approximate locations are depicted on **Figure 1, Monitoring Wells – Groundwater Monitoring Plan**. Where applicable, available geophysical data will be used to target potential water bearing fractures. The wells will be constructed with a surface casing from near ground surface to the top of bedrock. The remaining portions of each well will be open borehole within the bedrock – no well screen will be installed.

The plan includes using one existing shallow monitoring well, MW-2, and two existing bedrock wells, MW-1 and MW-3A, installed in the approximate locations depicted on **Figure 1, Monitoring Wells – Groundwater Monitoring Plan**. Monitoring well MW-2 was installed to a depth of 25 feet below ground surface (bgs), with a static depth to water recorded at 22 feet bgs. Monitoring wells MW-1 and MW-3A were each installed to a depth of 400 feet bgs, with static depth to water recorded at approximately 30 feet bgs and 26.5 feet bgs, respectively.

2.2 Proposed Monitoring Locations

The following monitoring wells will be included as part of the Plan: MW-1, MW-2, MW-3A, MW-9, MW-10, MW-11 and MW-12. As noted previously, monitoring wells MW-1, MW-3A, MW-9, MW-10, MW-11 and MW-12, will be used as points to monitor groundwater occurrence within the bedrock aquifer. Monitoring well MW-2, screened within the surficial aquifer, will serve as monitoring point for the surficial aquifer northwest of the planned mining area, respectively. Monitoring wells MW-9, MW-10, MW-11 and MW-12 will be used as points to monitor groundwater occurrence on the property at locations between the mining area and off-site water supply wells located generally northwest, northeast, southwest and southeast of the mining area, respectively. This well set for purposes of the Plan are referred to moving forward as the Plan wells.

As was detailed in S&ME's *Hydrogeologic Assessment* report dated February 26, 2021, the bedrock fractures, as identified by the geophysical survey, tend to be oriented in a northeast-southwest direction and a northwest-southeast direction. The Plan bedrock wells are located northwest, east, southwest and south of the planned



mining operation and should be sufficient in providing a monitoring tool for the bedrock aquifer in each of these directions relative to the mining area.

2.3 Monitoring Intervals and Data Collection

The monitoring locations detailed in Section 2.2 will be monitored for depth to water to determine the groundwater elevation. The depth to water will be measured with an electronic water probe and relative to the top of the well casing. The depth to water to water measurements will be obtained on a monthly basis and reported to SCDHEC on a quarterly basis.

The groundwater elevation will be calculated by subtracting the depth to water measurement from the top of casing elevation. The locations of the Plan wells and top of casing elevations will be measured by a South Carolina licensed surveyor.

Each quarterly report will be submitted to SCDHEC within 30 days and will summarize the current and historical groundwater elevation dataset. If a statistically significant decrease in groundwater elevation occurs, which is determined by a South Carolina licensed geologist or professional engineer to be an indicator that potential impacts to neighboring wells has occurred, the licensed professional will prepare and submit a written report to SCDHEC within five business days from when the determination is made.

Table 2-1 – Plan Sampling Summary

Well ID	Casing Length (feet)	Total Depth (feet)	Estimated Yield (gpm)	Monitoring Parameters <i>Monthly up to one year prior to operations; Monthly after operations begin</i>	Elevation
MW-1	101	400	0.5	Depth to water	Requires Survey
MW-2	NA	25	<0.1	Depth to water	Requires Survey
MW-3A	36	400	7	Depth to water	Requires Survey
MW-9	TBD	450	TBD	Depth to water	Requires Survey
MW-10	TBD	450	TBD	Depth to water	Requires Survey
MW-11	TBD	450	TBD	Depth to water	Requires Survey
MW-12	TBD	450	TBD	Depth to water	Requires Survey

TBD = to be determined

gpm = gallons per minute

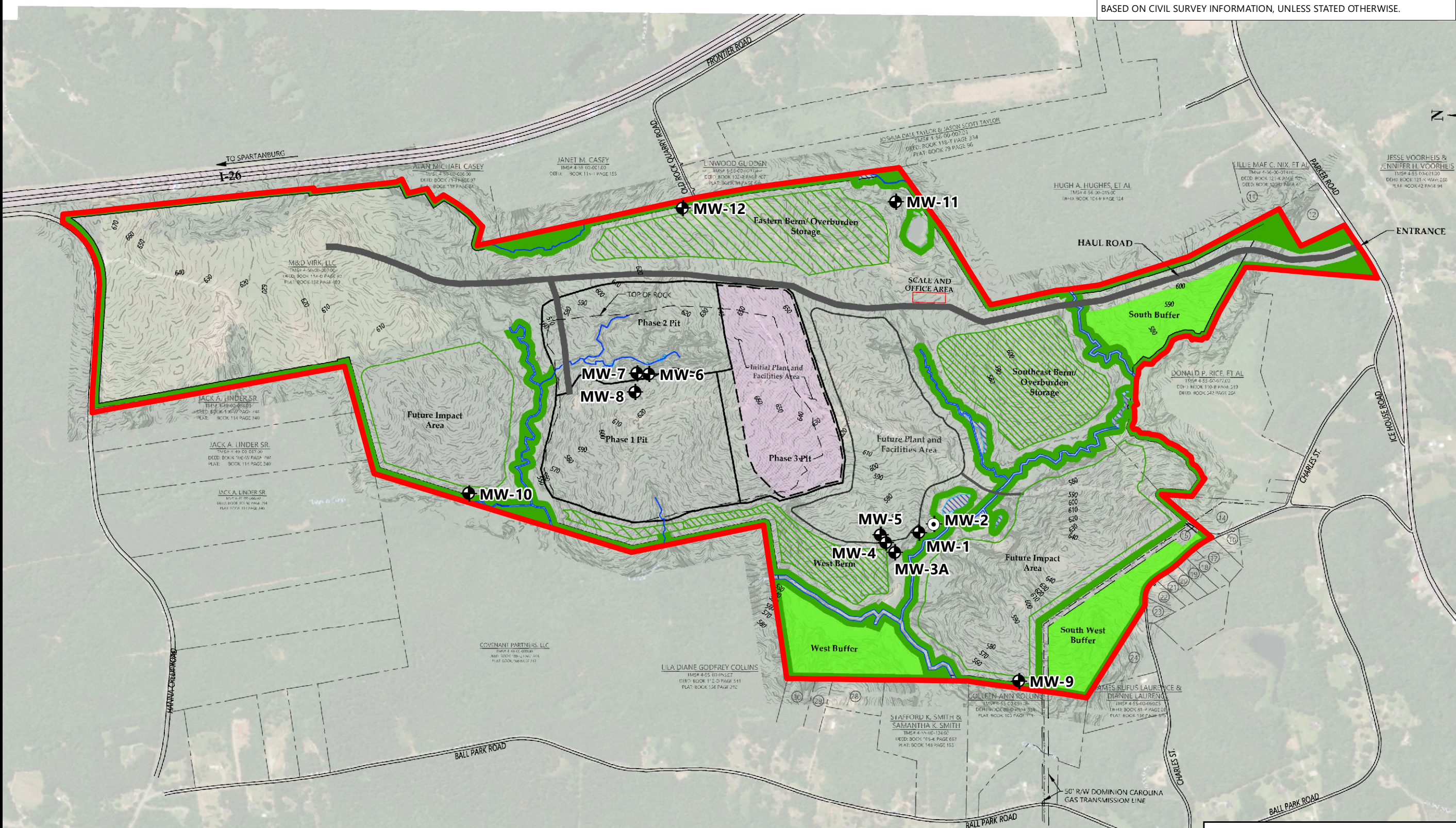
NA = not applicable

Appendices

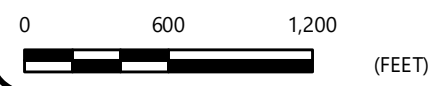
Appendix I – Figure



REFERENCE:
 BASE MAP INFORMATION WAS OBTAINED FROM THE FEBRUARY 2021 GENERAL DEVELOPMENT PLAN AS DEPICTED IN THE "EROSION AND SEDIMENT CONTROL PLAN - INITIAL PHASE" BY S&ME. THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED. THEY ARE NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.



Drawing Path: R:\CADData\Charlottesville\4261\19\083 Luck Enoree\data\monitoringplan\01_ProposedMineOperations.mxd plotted by DHomans 02-12-2021



GROUNDWATER MONITORING PLAN WELL LOCATIONS

LUCK STONE - HANNA SITE
 ENOREE, SPARTANBURG COUNTY, SOUTH CAROLINA

SCALE:
 1" = 800'
 DATE:
 2-12-21
 PROJECT NUMBER
 4261-19-156

- BEDROCK OBSERVATION WELL
- SHALLOW OBSERVATION WELL
- SITE BOUNDARY

FIGURE NO.
1