



LEAD-BASED PAINT INVESTIGATION REPORT

SC-49 (CROSS KEYS HWY.) RBO FAIRFOREST CREEK
SCDOT BRIDGE #444004900200
UNION COUNTY, SOUTH CAROLINA

PREPARED FOR:



C/O Ms. Lila Leon, PE PhD
SC Geotechnical Lead
1201 Main Street, Suite 800
Columbia, SC 29201

PREPARED BY:

F&ME Consultants
1825 Blanding Street
Columbia, South Carolina 29201

February 24, 2024

☒ Yes, LBP was found.
☐ No, LBP was not found.

FME Project No.: G6658.003

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1 EXECUTIVE SUMMARY

This executive summary is intended as an overview for the convenience of the reader. This report should be reviewed in its entirety prior to making any decisions regarding this project.

F&ME Consultants, Inc. (FME) has completed a Lead-Based Paint (LBP) investigation on the SC-49 (Cross Keys Hwy.) Bridge over Fairforest Creek (Bridge), in Union County, South Carolina at the request of HDR (Client). The purpose of the investigation was to locate, identify and test components of the Bridge that are painted or coated with LBP. The field investigation was performed on February 8, 2023, in anticipation of the on-alignment replacement of the existing Bridge. Appendix A – Site Vicinity Map is provided to show the location of the Bridge. Appendix B – General Bridge Plan, is provided to show the lay-out of the Bridge and a reference for locations of XRF scans.

Per an agreed upon scope of work, this LBP Investigation was conducted to identify accessible Bridge components that have been painted or coated with lead-containing materials that have concentrations greater than or equal (\geq) to the regulatory limit of 0.7 mg/cm². This investigation includes both a visual evaluation of the physical condition of painted materials as well as quantitative testing of surfaces using an X-Ray Fluorescence (XRF) LBP analyzer. The XRF documents the concentration of lead, if any, in the overall paint or coating. Bridge components were scanned with a Viken XRF analyzer (Model # Pb200i, Serial #1888, Reference Date: 11/01/22) with a limit of detection (LOD) of 0.1 mg/cm².

LBP is regulated by multiple government agencies, and each requires different response actions when the concentration of lead exceeds specified thresholds. The Occupational Safety and Health Administration (OSHA) regulates worker exposure to lead dust, and as a result considers materials with any lead content to be a potential hazard. Additionally, South Carolina Department of Health and Environmental Control (SCDHEC) requires some waste materials to be disposed of at specific disposal facilities that are able to manage this waste. Appendix C – XRF Data, is provided to present the XRF data in a user-friendly format. Items in **red** text contain lead in concentrations regulated by SCDHEC and these materials must be addressed upon disposal. Items in **blue** and **red** text contain lead in concentrations that must be considered a potential for worker exposure by OSHA.

The results from the XRF quantitative testing of the Bridge components indicate that lead is present in paint and/or coatings in concentrations greater than or equal to (\geq) 0.7 mg/cm² in the following Bridge components:

- **Beam Bearing Plates**
- **Tie-Rod Washers**

For more information regarding the specific descriptions and locations of the items that were scanned, refer to the Appendix C – Summary of XRF Data. On the XRF Data Table, items highlighted in Red are positive and contain lead in concentrations greater than or equal to (\geq) 0.7 mg/cm². Items in Blue text contain lead in concentrations that must be considered a potential for worker exposure by OSHA. See Appendix E – Site Photos for locations and pictures of the materials with concentrations greater than or equal to (\geq) 0.7 mg/cm². Appendix D includes the inspector's EPA lead-based paint inspector certification.

We appreciate the opportunity to assist you in this project. If you have any questions or require additional information, please feel free to contact our office at (803) 254-4540.

Sincerely,

F&ME CONSULTANTS



Jeffrey S. Leary

SC Lead Based Paint Inspector

EPA Certification No. LBP-I-18721-2 (Exp. 7/29/24)



Glynn M. Ellen

Environmental Department Manager

2 LEAD-BASED PAINT BACKGROUND INFORMATION

Housing and Urban Development (HUD) defines “LBP” as any coating that has a lead concentration of 1.0 milligrams of lead per square centimeter (1.0 mg/cm²) or greater, or if the lead concentration is greater than one half of a percent (> 0.5%) by weight. The Consumer Product Safety Commission (CPSC) currently considers paint to be lead-containing if the concentration of lead exceeds 90 ppm (0.009% by weight). In 1978, the CPSC banned the sale of LBP to consumers, and banned its application in areas where consumers have direct access to painted surfaces. Both the CPSC and HUD definitions of lead-containing paint are aimed at protecting the general population from exposure to lead in residential settings.

In contrast, the mission of OSHA with respect to lead-containing paint is to protect workers during construction activities that may generate elevated airborne lead concentrations. OSHA states that construction work (including renovation, maintenance, and demolition) carried-out on structures coated with paint having lead concentrations lower than the HUD or CPSC can still result in airborne lead concentrations in excess of regulatory limits. For this reason, OSHA has not defined lead-containing paint, but states that paint having any measurable level of lead may pose a substantial exposure hazard during construction work, depending upon the work performed. Therefore, in these situations, OSHA guidelines and safety procedures should be followed. By OSHA standards and regulations, the employer shall ensure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air (50 ug/m³) averaged over an 8-hour period.

Additionally, SCDHEC requires the use of specific waste disposal sites if materials contain lead concentrations greater than or equal to (\geq) 0.7 mg/cm². Due to the anticipated demolition of the structure, the SCDHEC lead disposal requirements were used as a threshold.

3 INTRODUCTION

The existing Bridge (~377'.0”L x 32’.6”W inside curb to inside curb), is located on SC-49 (Cross Keys Hwy.) and crosses over Fairforest Creek in Union County, South Carolina. The date of construction for the original Bridge is unknown. It was widened approximately 8.0’ along both sides of the Bridge in the mid-1960’s, according to the date embossed in the concrete quardrail. The overall structure is a two (2) lane, ten (10) span concrete and steel bridge structure with poured-in-place concrete bridge decking and concrete curbing. The bridge deck is supported by four (4) original poured-in-place (PIP) concrete beam spans, and four (4) pre-cast concrete beams that were added



Photo 1: SC-49 (Cross Keys Hwy.) Bridge over Fairforest Creek in Union County, South Carolina.

on each side of the Bridge when it was widened. The structural beams are supported at each bent by PIP concrete bent caps that are supported by a combination PIP concrete piers that were original to the Bridge structure, and pre-cast concrete piles that were installed on each side of the Bridge when it was widened. Transite scuppers were noted along each side of the Bridge to allow for for water drainage. Galvanized metal guardrails are attached to the tops of the concrete curbing along each side of the Bridge. One (1) utility conduit was attached to the southeast side of the Bridge and two (2) lines on the northwest side of the Bridge that run the entire length of the Bridge. In addition, a concrete and steel USGS water level monitoring structure with 1940 embossed in the concrete, along with an elevated steel framed walkway was attached to the Bridge on the southeast side of the structure. This concrete structure was locked and secure and therefore access to the interior of the structure was not possible. Only the exterior of the structure could be investigated. See Appendix A – Site Vicinity Map, for the location of the Bridge. See Appendix B –General Bridge Plan, for a layout of the Bridge.

4 INVESTIGATION PROCEDURES AND RESULTS

FME's LBP Investigation sampling protocol consisted of randomly selecting bridge components and scanning them with a Viken X-Ray Fluorescence (XRF) Portable Analyzer (Model # Pb200i, Serial #1888). The following Bridge components tested positive for lead in concentrations greater than or equal to (\geq) 0.7 mg/cm²:

- **Beam Bearing Plates**
- **Tie-Rod Washers**

For more information regarding the specific descriptions and locations of the items that were scanned, refer to the Appendix C – Summary of XRF Data. On the XRF Data Table, items highlighted in **Red** are positive and contain lead in concentrations greater than or equal to (\geq) 0.7 mg/cm². Items in **Blue** text contain lead in concentrations that must be considered a potential for worker exposure by OSHA. See Appendix D – Site Photos for locations and pictures of the materials with concentrations greater than or equal to (\geq) 0.7 mg/cm². Appendix E includes the inspector's EPA lead-based paint inspector certification.

5 RECOMMENDATIONS

The results, conclusions and recommendations from this investigation are representative of the conditions observed at the site on the date of the field investigation. FME does not assume responsibility for any changes in conditions or circumstances that occur after the date of the field investigation. No other environmental issues were addressed as part of this report.

The results from the XRF quantitative testing of Bridge components scanned indicate that lead was found to be present in paint and/or coatings in concentrations greater than or equal to (\geq) 0.7 mg/cm² in the following Bridge components:

- **Beam Bearing Plates**
- **Tie-Rod Washers**

Therefore, OSHA regulations and procedures should be followed when impacting these components. If possible, they should be removed in whole and disposed of properly. Also, SCDHEC disposal requirements for lead containing materials should also be followed.

As stated previously, OSHA regulates any measurable level of lead, as it may pose a substantial exposure hazard to workers. Therefore, in these situations, OSHA regulations and safety procedures should be followed. These regulations also list the proper personal protective equipment to be used by the workers disturbing the LBP items and the requirements for personal air monitoring. OSHA's exposure action level (AL) for lead, regardless of respirator use, is an airborne concentration of 30µg/cm³, averaged over an eight-hour period. The action level (AL) is the level at which an employer must begin specific compliance activities as outlined in OSHA's lead standards. By OSHA standards and regulations, the employer shall ensure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air (50 µg/m³) averaged over an 8-hour period which is the permissible exposure level (PEL).

SCDHEC regulates the proper disposal of LBP and associated debris. SCDHEC defines two types of LBP debris. The first is LBP *waste*, which is defined as material such as wood, brick and metal that is painted with LBP. The other is LBP *residue* which is defined as residue that is generated from the removal (e.g., scraped, chipped, sandblasted, or chemical) of LBP from a structure. LBP *waste* that comes from a commercial or residential facility may be disposed of in either a class 2 or 3 landfill, while LBP *residue* from a commercial facility must have a toxicity characteristic leaching procedure (TCLP) analysis to determine the lead content. TCLP analysis is used to determine whether or not a waste is a characteristic hazardous waste due to leachability under the South Carolina Hazardous Waste Management Regulations. LBP *residue* with a TCLP analysis result greater than or equal to five milligrams per liter (\geq 5 mg/l) lead must be disposed of in a Subtitle C landfill (Hazardous Waste). However, LBP *residue* from a commercial facility with a TCLP analysis result less than five milligrams per liter (< 5 mg/l) lead is required to be disposed of in a Class 3 landfill.

We sincerely appreciate the opportunity to be of service to HDR on this project. If you have any questions regarding the information presented herein, please contact our office at (803) 254-4540.

APPENDICES

Appendix A – Site Vicinity Map

Appendix B – General Bridge Plan

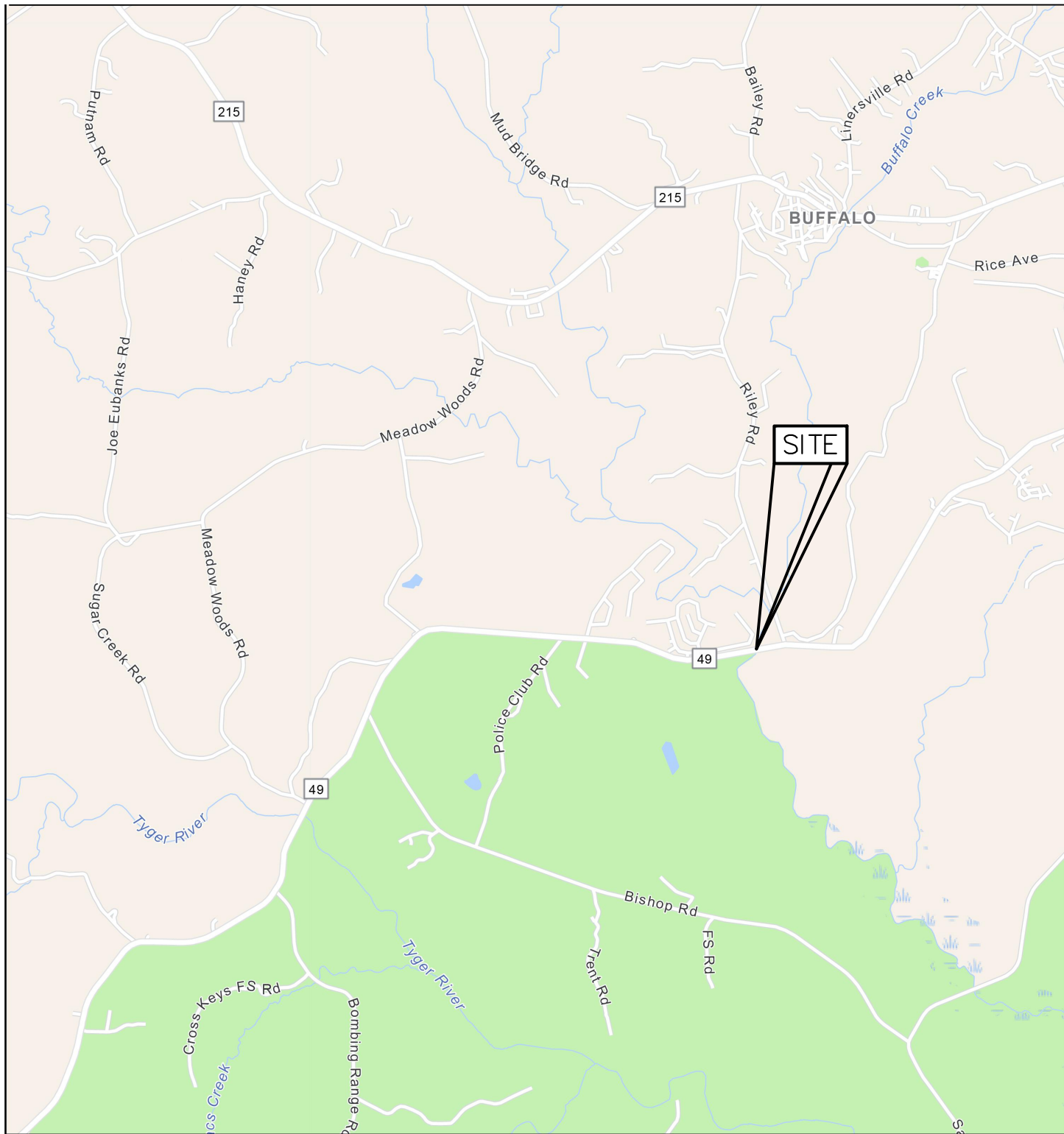
Appendix C – Summary of XRF Data Table

Appendix D – Site Photos

Appendix E – EPA LBP Inspector Certification

Appendix A

Site Vicinity Map



1:72,000



FIGURE
NUMBER:

1

F&ME CONSULTANTS
PROJECT NUMBER:

G6658.003

LEAD-BASED PAINT INVESTIGATION
SC-49 Bridge over Fairforest Creek
Union County, SC
Site Vicinity Map
Prepared for: HDR, Inc.
1201 Main Street, Suite 800
Columbia, SC 29201



1825 BLANDING STREET
COLUMBIA, SC 29201

ORIGINAL:
February 23, 2023

REVISIONS:

1
2
3

SCALE:
AS SHOWN

DRWN. BY: MSM
CHKD. BY: JSL
APPR. BY: GME

NOTES:

Appendix B

General Bridge Plan



(B)

SC-49
CL



(A)

(C)

(D)

FIGURE
NUMBER:

2

F&ME CONSULTANTS
PROJECT NUMBER:

G6658.003

LEAD-BASED PAINT INVESTIGATION
SC-49 Bridge over Fairforest Creek
Union County, SC
General Bridge Plan
Prepared for: HDR, Inc.
1201 Main Street, Suite 800
Columbia, SC 29201



1825 BLANDING STREET
COLUMBIA, SC 29201

ORIGINAL:
February 23, 2023

REVISIONS:

1 _____
2 _____
3 _____

SCALE:
N.T.S.

DRWN. BY: MSM
CHKD. BY: JSL
APPR. BY: GME

NOTES:

Appendix C

Summary of XRF Data Table

Appendix C – XRF Data
Date Scanned: 02/08/2023
SC-49 (Cross Keys Hwy.) Bridge over Fairforest Creek

Scan No.	Pbc (mg/cm ²)	Component	Substrate	Side	Condition	Color
1	0.77	calibrate				
2	0.85	calibrate				
3	0.85	calibrate				
4	13.16	tie-rod washer	Metal	C	Intact	Grey
5	11.33	tie-rod washer	Metal	C	Intact	Grey
6	21.94	tie-rod washer	Metal	A	Intact	Grey
7	31	tie-rod washer	Metal	A	Intact	Grey
8	23.8	beam plate	Metal	A	Deteriorated	Silver
9	0.47	guardrail	Metal	A	Intact	galvanized
10	0.4	guardrail	Metal	A	Intact	galvanized
11	<LOD	USGS ladder	Metal	C	Deteriorated	Grey
12	<LOD	USGS ladder	Metal	C	Deteriorated	Grey
13	<LOD	USGS handrail	Metal	C	Deteriorated	Grey
14	<LOD	USGS door	Metal	C	Deteriorated	Grey
15	<LOD	USGS door	Metal	C	Deteriorated	Grey
16	0.19	USGS door	Metal	C	Deteriorated	Grey
17	<LOD	Utility Pipe	Metal	C	Fair	galvanized
18	0.44	Utility pipe support	Metal	C	Intact	galvanized
19	0.14	beam plate	Metal	C	Deteriorated	Silver
20	6.14	beam plate	Metal	C	Deteriorated	Silver
21	<LOD	Utility pipe support	Metal	A	Deteriorated	Rust
22	0.88	calibrate				
23	0.85	calibrate				
25	0.83	calibrate				

LOD (Limit of Detection) = 0.1 mg/cm²

Blue text indicates any concentrations of LBP which OSHA considers a potential exposure risk when removed.

Red text indicates concentrations of LBP that have specific disposal requirements regulated by SCDHEC.

Side A = North, then go clockwise.

Appendix D

Site Photos



Photo 1. Top View of Bridge Deck.



Photo 2. Underside View of Bridge with view of additions on each side of Bridge.



Photo 3. North Side View of Bridge.



Photo 4. South Side View of Bridge with view of USGS water level monitoring structure.



Photo 5. LBP on Bridge Tie-Rod Washers.



Photo 6. LBP on Bridge Beam Bearing Plates.



Appendix E

EPA LBP Inspector Certification

United States Environmental Protection Agency

This is to certify that



Jeffrey S Leary

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Inspector

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires July 29, 2024

LBP-I-18721-2

Certification #

March 09, 2021

Issued On



Adrienne Priselac, Manager, Toxics Office

Land Division