

Permit No.	Date	DIN
11-07	May 15 2015	24318



BUNNELL-LAMMONS ENGINEERING, INC.
GEOTECHNICAL, ENVIRONMENTAL AND CONSTRUCTION MATERIALS CONSULTANTS

RECEIVED

May 14, 2015

Solid Waste Section
Asheville Regional Office

May 4, 2015

McGill Associates, PA
PO Box 2259
Asheville, North Carolina 28802

Attention: Mr. Mark Cathey, P.E.

Subject: **Evaluation of Potential Deficiencies to Meet Regulatory Requirements
0.5-Acre Lateral Expansion of the Permitted Phase 5 C&D Area**
Buncombe County C&D Landfill
Buncombe County, North Carolina
BLE Project Number J15-9378-02

Dear Mr. Cathey:

As authorized by McGill Associates, PA (McGill), Bunnell-Lammons Engineering, Inc. (BLE) has completed an evaluation of potential deficiencies in the Application for a Permit to Construct (PTC) the Phase 5 C&D area for expansion onto a currently unpermitted 0.5-acre area contiguous to Phase 5. The objective of this project is to: 1) review portions of the PTC Application documents provided by McGill and/or on the NCDENR portal for the Phase 5 C&D area; 2) determine applicability of the existing documents to the 0.5 acre expansion area; 3) identify potential deficiencies in existing documents to meet regulatory requirements for the permit; and 4) prepare a letter of our findings for submittal to McGill. This letter includes a brief summary of our review, evaluation, and findings.

PROJECT INFORMATION

Buncombe County owns and operates a C&D landfill at the subject site. A PTC Application for the Phase 5 C&D landfill expansion area was submitted (by others) and approved by the NCDENR in 2009. The County has identified an additional 0.5 acre area contiguous to the permitted Phase 5 area that they wish to include as part of the Phase 5 expansion. McGill has been tasked with evaluating the existing permit application, permit to construct, and supporting documents thereof to determine if the existing documents meet the regulatory requirements for permitting of the 0.5 acre expansion area. McGill has also been tasked to prepare revisions to the documents to include the 0.5 acre area. BLE has been tasked with an evaluation of potential deficiencies related to the existing Geotechnical Evaluation and Design Hydrogeologic Investigation for inclusion of the 0.5 acre expansion area.



SCOPE OF SERVICE

Documents Provided

BLE was provided the following documents by McGill and/or downloaded the documents from the NCDENR Portal for our review:

A drawing in PDF format titled *Bunc Co CDLF with expanded Phase 5 footprint and grades 11-18-14-Model* which was prepared by McGill.

A document titled *Buncombe County Solid Waste Management Facility, C&D Landfill, Substantial Amendment and Phase 5 Permit to Construction Application – Volume 1 of 2* dated April 2009 by Camp, Dresser, and McKee (CDM).

A document titled *Buncombe County Solid Waste Management Facility, C&D Landfill, Substantial Amendment and Phase 5 Permit to Construction Application – Volume 2 of 2* dated April 2009 by CDM.

A letter by CDM titled *Substantial Amendment and Phase 5 Permit to Construction Application Buncombe County C&D Landfill Facility, Site Hydrogeologic Report, Design Hydrogeologic Report, and Water Quality Plan, Response to Review Comments, Permit No. 11-07* dated July 28, 2009 addressed to the NCDENR.

It is our understanding that the NCDENR reviewed and approved CDM's aforementioned Phase 5 PTC Application. Only applicable portions of these documents were reviewed by BLE with respect to the approximate 0.5 acre expansion (see below).

Geotechnical Evaluation

The Design Geotechnical Evaluation for Phase 5 was included in Appendix B of Part 5 (Engineering Report), which is included in Volume 2 of 2 of the PTC Application prepared by CDM.

The Design Geotechnical Evaluation included analyses of global stability of the 3H:1V final C&D waste slope, veneer sliding stability of the cap soil, and settlement of the foundation soils caused by the landfill load. The global stability analysis used the Spencer method with the SLOPE / W software package to analyze both circular and block type failures. The Spencer method is a suitable application for the project. The global stability analysis used reasonable and typical unit weight and shear strength values for the landfill components and the foundation soils. The veneer sliding stability of the final slope used the Koerner method, which is suitable for a slope of finite length as proposed at the site. The factor of safety for both the global stability and veneer sliding stability were determined to be greater than the typical minimum required 1.5 value.

The compression of the foundation soils caused by the weight of the C&D waste were determined using the elastic Schmertmann method and published relationships between static cone and standard penetration resistance (N-value) obtained from in situ tests in the borings. This method is valid for the sandy foundation soils at the site.



It is our opinion that the global and veneer sliding stability analyses demonstration prepared by CDM would be applicable for the 0.5 acre expansion area assuming that a 3H:1V cap slope is used. The anticipated magnitude of settlement of the foundation soils beneath the proposed landfill loading in the 0.5-acre expansion is expected to be similar to the reported settlement estimate for the Phase 5 C&D area.

Design Hydrogeologic Investigation

The Design Hydrogeologic Report (DHR) for Phase 5 was included in Appendix C of Part 5 (Engineering Report), which is included in Volume 2 of 2 of the PTC Application prepared by CDM.

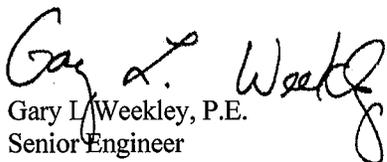
The DHR included descriptions of geologic and hydrogeologic conditions of the Phase 5 study area and provided information for use in designing proposed landfill subgrades (i.e., a bedrock elevation contour map and a seasonal high groundwater elevation contour map). These geologic contour maps cover the proposed 0.5 acre expansion area and can be used for landfill subgrade design in the proposed 0.5 acre expansion area. Over most of the site, groundwater is deeper than bedrock; therefore, the top of bedrock will be the controlling factor in subgrade cell design in the proposed 0.5 acre expansion area. Additionally, downward (recharging) vertical hydraulic gradients extend over the majority of the upland areas, with upward (discharging) vertical gradients in and near the creeks and streams. The geologic and hydrogeologic conditions encountered are typical for sites located in the Blue Ridge Geologic Belt in North Carolina.

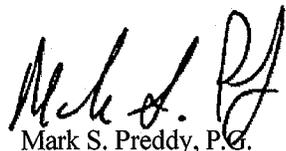
It is our opinion that the Phase 5 DHR contains sufficient information to include the proposed 0.5 acre area as a contiguous expansion area to Phase 5.

CLOSING

We appreciate the opportunity to serve as your geotechnical and hydrogeological consultant at this site. If you have any questions, please do not hesitate contacting us at (864) 288-1265.

Sincerely,
BUNNELL-LAMMONS ENGINEERING, INC.


Gary L. Weekley, P.E.
Senior Engineer
Registered NC No. 8251


Mark S. Preddy, P.G.
Senior Hydrogeologist
Registered NC No. 1043