Transportation

PAT McCRORY
Governor

NICHOLAS J. TENNYSON
Secretary

December 4, 2015

Mathew Thompson, P.E.
GeoStructures, Inc.
413 Browning Court
Purcellville, VA 20132

Subject: Renewal of EarthTec's EarthTrac HA MSE System

Dear Mr. Thompson:

The Geotechnical Engineering Unit (GEU) has reviewed the renewal submittal for EarthTec's EarthTrac HA MSE System in accordance with the *NCDOT Policy for Mechanically Stabilized Earth Retaining Walls* and the GEU Standard *Mechanically Stabilized Earth (MSE) Retaining Walls* Provision. Based on the information submitted, EarthTec's EarthTrac MSE wall system is **approved for use** on North Carolina Department of Transportation (NCDOT) projects in accordance with the MSE wall policy and standard provision. This policy and provision may be obtained from:
https://connect.ncdot.gov/resources/Geological/Pages/Products.aspx

This letter includes the approved facing elements, bearing pads, reinforcements and connectors with design parameter tables and miscellaneous components for the EarthTrac HA system in accordance with the GEU standard MSE wall provision.

Facing Elements
10 ft x 5 ft x 5 ½" thick Rectangular Precast Concrete Panels

Bearing Pads
5" x 3" x 1.15" thick EPDM Double Bearing Pads (2 pads per location in teeth-to-teeth orientation) per the table below:

Maximum Wall Height Above Horizontal Panel Joint	Minimum Number of Pads per Horizontal Panel Joint
25 ft	4
35 ft[1]	6

1. Additional bearing pads per horizontal panel joint may be required for wall heights above joints greater than 35 ft.

Reinforcements and Connectors
60 mm wide x 4, 5 and 6 mm thick Ribbed Steel Strips with Double Lug Connectors in accordance with the design parameter tables on the following page:

- 75-Year Design Life

STEEL REINFORCEMENT TABLE - COARSE AGGREGATE CORROSION RATE - 75 YEAR DESIGN LIFE												
Reinforcement	Abutment?	F_y (ksi)	E_n (in)	b (in)	S_h (in)	A_c (in^2)	R_c	F^*_{top}	$F^*_{20\,ft}$	α	Connection (Name & Type)	CR
4mm	N/A	65	0.157	2.362	VAR.	0.240	VAR.	1.978	0.781	1.0	DOUBLE LUG	0.84
5mm	N/A	65	0.197	2.362	VAR.	0.333	VAR.	1.978	0.781	1.0	DOUBLE LUG	0.84
6mm	N/A	65	0.236	2.362	VAR.	0.426	VAR.	1.978	0.781	1.0	DOUBLE LUG	0.69

STEEL REINFORCEMENT TABLE - FINE AGGREGATE (EXCEPT ABUTMENT WALLS) CORROSION RATE - 75 YEAR DESIGN LIFE												
Reinforcement	Abutment?	F_y (ksi)	E_n (in)	b (in)	S_h (in)	A_c (in^2)	R_c	F^*_{top}	$F^*_{20\,ft}$	α	Connection (Name & Type)	CR
4mm	NO	65	0.157	2.362	VAR.	0.207	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.84
5mm	NO	65	0.197	2.362	VAR.	0.300	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.84
6mm	NO	65	0.236	2.362	VAR.	0.393	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.70

STEEL REINFORCEMENT TABLE - FINE AGGREGATE (ABUTMENT WALLS) CORROSION RATE - 75 YEAR DESIGN LIFE												
Reinforcement	Abutment?	F_y (ksi)	E_n (in)	b (in)	S_h (in)	A_c (in^2)	R_c	F^*_{top}	$F^*_{20\,ft}$	α	Connection (Name & Type)	CR
4mm	YES	65	0.157	2.362	VAR.	0.174	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.84
5mm	YES	65	0.197	2.362	VAR.	0.267	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.84
6mm	YES	65	0.236	2.362	VAR.	0.360	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.71

- 100-Year Design Life

STEEL REINFORCEMENT TABLE - COARSE AGGREGATE CORROSION RATE - 100 YEAR DESIGN LIFE												
Reinforcement	Abutment?	F_y (ksi)	E_n (in)	b (in)	S_h (in)	A_c (in^2)	R_c	F^*_{top}	$F^*_{20\,ft}$	α	Connection (Name & Type)	CR
4mm	N/A	65	0.157	2.362	VAR.	0.185	VAR.	1.978	0.781	1.0	DOUBLE LUG	0.84
5mm	N/A	65	0.197	2.362	VAR.	0.278	VAR.	1.978	0.781	1.0	DOUBLE LUG	0.84
6mm	N/A	65	0.236	2.362	VAR.	0.371	VAR.	1.978	0.781	1.0	DOUBLE LUG	0.71

STEEL REINFORCEMENT TABLE - FINE AGGREGATE (EXCEPT ABUTMENT WALLS) CORROSION RATE - 100 YEAR DESIGN LIFE												
Reinforcement	Abutment?	F_y (ksi)	E_n (in)	b (in)	S_h (in)	A_c (in^2)	R_c	F^*_{top}	$F^*_{20\,ft}$	α	Connection (Name & Type)	CR
4mm	NO	65	0.157	2.362	VAR.	0.138	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.84
5mm	NO	65	0.197	2.362	VAR.	0.231	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.84
6mm	NO	65	0.236	2.362	VAR.	0.324	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.74

STEEL REINFORCEMENT TABLE - FINE AGGREGATE (ABUTMENT WALLS) CORROSION RATE - 100 YEAR DESIGN LIFE												
Reinforcement	Abutment?	F_y (ksi)	E_n (in)	b (in)	S_h (in)	A_c (in^2)	R_c	F^*_{top}	$F^*_{20\,ft}$	α	Connection (Name & Type)	CR
4mm	YES	65	0.157	2.362	VAR.	0.091	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.84
5mm	YES	65	0.197	2.362	VAR.	0.184	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.84
6mm	YES	65	0.236	2.362	VAR.	0.277	VAR.	1.802	0.674	1.0	DOUBLE LUG	0.78

<u>Miscellaneous Components</u>
Heavy Hex Structural Bolts and Nuts for strip connections as required by EarthTec

A renewal is required if the EarthTrac HA system changes or 5 years from the date of this letter for the system to stay on the NCDOT list of approved MSE wall systems. If there are any questions, I can be reached at (919) 707-6850.

Sincerely,

DocuSigned by:
John Pilipchuk
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John L. Pilipchuk, L.G., P.E.
State Geotechnical Engineer

cc: Mohammed Mulla, P.E., Geotechnical Contracts & Statewide Services Manager

K. J. Kim, Ph.D., P.E., Eastern Regional Geotechnical Manager
Eric Williams, P.E., Western Regional Geotechnical Manager
Brian Hanks, P.E., Assistant State Structures Engineer
Chris Peoples, P.E., State Materials Engineer
Jessica Kuse, P.E., State Value Management Engineer
Kevin Bowen, P.E., State Bridge Construction Engineer