first floor
ENERGY POSITIVE

Change Order

Order#: 8

Order Date: 07/11/2016

333 Fayetteville Street
Suite 225
Raleigh NC 27601

To: Horry County Schools
1160 E HWY 501
Conway SC 29526

Project: 4015006
Socastee Middle School
335 Four Mills Rd
Conway SC 29526

The contractor agrees to perform and the owner agrees to pay for the following changes to this contract.

Plans Attached ☐

Ordered By: **Customer Order:** Specifications Attached ☐

Description of Work	**Amount**
Aggregate Piers	795,585.00
All assumptions/clarifications stated in the subcontractors proposal are to be considered incase site conditions are not as detailed in the soils report.	
Added General Conditions	141,057.00
No soil remediation were accounted for based on site being selected prior to contract execution. Current claim is for 48 additional days as highlighted in the attached subcontractor proposal. Any days over/under this assumption shall be debited/credited appropriately.	

Notes

Negative changes will lower the overall contract price requiring no additional payment by owner.

Requested Amount of Change **936,642.00**

The original Contract Sum was	42,488,116.00
Net change by previous Change Orders	-2,474,012.65
The Contract Sum prior to this Change Order	40,014,103.35
The Contract Sum will be changed by this Change Order	936,642.00
The new Contract Sum including this Change Order will be	40,950,745.35
The Contract Time will be changed by	48 Days

Owner: _____ Date: _____

Contractor: [signature] Date: 7/12/16

On Behalf of FFEP

Hayward Baker Inc.
4 Carriage Lane, Suite 203
Charleston, SC 29407

Tel: 843-804-4000

HAYWARD BAKER
A Keller Company

June 23, 2016

Metcon / TA Loving Joint Venture
763 Comtech Drive
Pembroke, NC 28372

Attention: **Mr. Ryan Parker**
rparker@metconus.com

Subject: **Ground Improvement Proposal**
Sayebrook Middle School
Myrtle Beach, SC

Mr. Parker:

Hayward Baker Inc. (HBI) is pleased to present this proposal for ground improvement at the proposed Sayebrook Middle School site in Myrtle Beach, South Carolina. The proposed school will be located north of the intersection of SC Highway 544 and Highway 17 Bypass in Myrtle Beach. HBI has reviewed the Geotechnical Engineering Report and foundation drawings and believes that supporting the building on aggregate piers and earthquake drains will provide the school district with a sound technical solution that also saves money and time. Specifically, HBI believes the combination of aggregate piers and earthquake drains will offer the following benefits:

1. Lower cost than driven piles
2. Faster schedule than surcharging
3. Allow for typical spread footings instead of pile caps and grade beams
4. Reduce static settlement beneath foundations
5. Reduce dynamic (i.e., liquefaction-related) settlement beneath slabs and foundations

Aggregate Piers (APs), also known as stone columns, reinforce the ground to increase bearing capacity, reduce settlement, and decrease seismic deformations. Earthquake drains (EQD) consist of high flow capacity, prefabricated vertical drains wrapped with a geotextile fabric. They provide a drainage path for the dissipation of pore pressures during a seismic event; thereby reducing liquefaction-related settlement. EQDs are frequently used to reduce liquefaction-related settlement in the Low Country. Terracon, the project Geotechnical Engineer, is very familiar with both APs and EQDs. Technical literature for both APs and EQDs are attached to this proposal for you.

HBI performed a preliminary design for the building based on the available project reports and drawings, as well as our experience with similar structures. This proposal is based upon the following:

- *Sayebrook Middle School Foundation Plans* (Sheets S-111A through S-111DSM), prepared by LHC Structural Engineers, dated June 2, 2016.
- *Mass Grading Plans*, prepared by Thomas & Hutton, dated June 4, 2016.
- *Geotechnical Engineering Report – Horry County Socastee School Site*, prepared by Terracon (EN165090), dated April 29, 2016.
- Structural loading information provided by LHC Structural Engineers via email on June 3, 2016.

Based on the *Geotechnical Engineering Report*, the subsurface conditions at the site consist of soft to medium sandy clay in the upper 15 feet. The Cone Penetration Test (CPT) and Dilatometer Test (DMT) soundings then encountered medium dense to very dense sands from 15 to 25 feet, followed by loose sands to a depth of approximately 32 feet. The deeper CPT soundings encountered medium stiff to stiff clays at approximately 32 feet, and the deeper soundings were terminated in the clay at a maximum depth of 59 feet. Groundwater was encountered at depths of approximately 1½ to 4½ feet below existing ground surface.

Based on the site grading plans, it appears that 2 to 3 ft of new fill will be required to grade the site. Finished floor elevation (FFE) will be +21 ft. Based on information provided by LHC Structural, column loads range from approximately 30 kips to 180 kips and foundations are sized based on an allowable bearing pressure of 2,500 psf. For wall footings, LHC provided the following information:

Shear walls :

- Plan north-south walls are non-load bearing: design for 10 k/ft (lateral force due to overturning) over final 4 feet of each wall. In the middle region, design for dead plus live equals 1 kip/foot.
- East-west walls on lines 16.3 and 18.8, between A and D, as well as the one on 18 between NN and QQ. Design for dead load of 8 k/ft and live 2 k/ft.
- All other east-west shear walls: Dead load of 4.5 k/ft and live load of 1.5 k/ft

Non shear walls range from about 2.5 k/ft at WF1 up to 6 k/ft at WF5. HBI has assumed that thickened slabs are non-load bearing; therefore, we have not included AP support beneath them. HBI has also assumed that AP support of the slab or fill is not required; therefore, we have not included APs beneath the slab.

The geotechnical report also indicated that liquefaction-induced settlement was expected to be about 3 inches, and static settlement due to the assumed fill and structural loads was expected to be 3 to 4 inches. Surcharging the site with 5 to 10 feet of fill for 3 to 4 months was given as one option to reduce static settlement. Surcharging will not measurably reduce liquefaction settlement. Aggregate piers and driven piles were given as additional foundation support options.

Scope of Work

Static Load Support

HBI will provide design, personnel, equipment, and materials to install Aggregate Piers (APs) to support the isolated column and load bearing continuous wall foundations. The proposed AP system is intended to provide 2,500 psf bearing capacity and limit the total settlement of the structure to less than 1 inch and differential settlement to less than 0.5 inches at foundations supported by APs.

HBI has included an AP sacrificial length of 2 feet at foundation locations for each pier based on a working elevation of slab subgrade (approximately +20 ft). The sacrificial length is the portion of the AP that extends from the AP construction elevation to the bottom of the proposed foundation. This length of AP will be excavated during foundation construction.

Earthquake Liquefaction Mitigation and Dynamic Load Support
HBI will provide design, personnel, equipment, and materials to install earthquake drains (EQDs) beneath and around the slab and foundations of the building. The EQDs will extend through the liquefiable soils at the site, and will extend a nominal distance beyond the building footprint. The EQDs are intended to limit liquefaction-induced foundation and slab settlements to less than 2 inches.

Anticipated Construction Sequence

Based on the scope of work detailed above and our experience with this type of work, HBI's preliminary construction sequence is described below. We anticipate the APs will be installed first, followed by the EQD.

- CAD drawings of the Structural Foundation Plan and service loading conditions are provided by the general contractor for HBI's design submittal.
- HBI's design submittal is approved by the project design team including the structural and geotechnical engineers.
- The general contractor will grade the site to one lift lower than slab subgrade elevation. Any new fill required to accomplish slab subgrade elevation should be 'controlled' fill and placed in a manner consistent with the project geotechnical engineer's recommendations.
- The general contractor locates and protects/removes any existing utilities within the construction area.
- The general contractor will supply a clean water source capable of providing 100 gallons per minute flow at 80 psi pressure (a standard fire hydrant is sufficient) for the EQD installation.
- The general contractor locates the center of all isolated column foundation APs and the center of specific APs at wall foundations to facilitate HBI's AP layout. HBI can perform all of the pier layout for an additional lump sum fee.
- Upon receipt of notice to proceed, HBI mobilizes to the project site and EQD and AP elements are installed per the HBI approved shop drawings. If obstructions are encountered during EQD or AP construction, the General Contractor will remove the obstructions to allow for the completion of the EQD and AP.
- The general contractor will handle, stockpile, load, haul off, or reuse the spoils generated as a result of the AP work. HBI will stockpile all spoils within 100 feet of a completed pier. HBI expects approximately 200 cubic yards of spoils (not including swell) will be generated from the ground improvement in the base scope. This material could probably be used in green areas.
- HBI will conduct a single AP field modulus test during AP construction. Sacrificial reaction anchors or an onsite rig/crane will be used for the testing reaction frame. All other testing methods will be determined as required by the AP design engineer.
- Once the AP and EQD work is complete, HBI anticipates that foundation construction can commence immediately. Standard shallow spread footing subgrade preparation should be followed and verified by the geotechnical engineer of record. A mechanical tamp is required to tamp the surface of the APs prior to placing footing steel and concrete.

Exclusions / Clarifications

- Others will provide and maintain a suitable work pad for the AP and EQD work. HBI is specifically excluding returning the site to its original condition/grade and any required subgrade preparation/remediation following the AP and EQD work. Any soft or excessively wet areas of the site should be remediated at the direction of the project

geotechnical engineer per the project specifications by others at no additional cost to HBI.

- HBI is excluding layout of foundations, moving or hauling predrill spoil and stone waste, locating and protecting existing utilities, foundation design, excavation, and construction (following HBI construction), permitting, and third party inspection.
- EQDs mitigate liquefaction by providing a drainage path for pore pressures to dissipate during the design earthquake. They are installed by a high-frequency vibratory hammer that densifies the in-situ soils as well. We anticipate as much as 2 to 3 in. of settlement could occur across the building pad as a result of the EQD installation process. The general contractor should make an allowance in his budget and schedule to bring the site back up to grade after the EQD installation is complete. HBI specifically excludes the cost of fill or equipment to bring the site back up to grade.
- AP support of the fill or slab loads is specifically excluded.

Pricing and Schedule Details

The price to perform this work is shown below. Onsite construction of the EQD will required approximately 30 days, and APs will require approximately 18 days. Included in the price above is the Ground Improvement design, a single mobilization to and from the site, EQD materials, AP backfill material, equipment, labor, and one AP modulus test. A typical HBI work week consists of roughly 10 to 12 hours day, Monday through Saturday.

Item No.	Description	Quantity	Unit	Unit Price	Total
1	Mobilization	1	EA	$26,900	$26,900
2	EQD and AP Design and Installation*	1	LS	$730,800	$730,800
3	P&P Bonding (1% of Total Subcontract)	0	LS	$7,577	$0
	Total Lump Sum Price				**$757,700**

The following are optional items for your use with unit pricing.

- **Remobilization:** includes mobilization and demobilization of labor, and equipment to and from the project site. **Add price $18,500 for AP rig/crew and $8400 for EQD rig/crew.**
- **Additional Modulus Testing:** if required, includes labor, equipment, and engineering necessary to complete additional testing. **Add price $7,000 each.**
- **Stone Column Layout:** includes labor and surveying of stone columns using site control points and general contractor provided foundation drawings. **Add price $6,800 lump sum.**
- **Additional Stone Columns:** if required by a change in scope, additional stone columns will be charged at the unit rate of $33.50 per vertical foot. Stone columns will be deducted at the unit rate of $23 per linear foot.

In closing, we look forward to working with you and contributing to the success of this project. Thank you for keeping this letter confidential and understanding that our engineering efforts and details are proprietary and should not be shared with others outside of the project team.

Sincerely,
HAYWARD BAKER INC.

Dan Holley, P.E.
Project Manager

Attachments: HBI Earthquake Drain Brochure, HBI Aggregate Pier Brochure
Specific Terms and Conditions

first floor ENERGY POSITIVE

metcon BUILDINGS + INFRASTRUCTURE TA LOVING
A JOINT VENTURE

SMS – CO#8

General Conditions Break Down

- Stated Lump Sum General Conditions - $1,430,323.00
  - Stated General Conditions period 16 Months.
  - Cost per Month - $89,395.00
  - Cost Per Day - $2,939.00