

## Memorandum No. 1

To: Mr. Mike Sarona  
 With: MM Construction, LLC  
 Date: October 2, 2013  
 Re: Post-Tensioned Floor Slab Design Recommendations  
 Proposed LaQuinta Inns & Suites  
 Hattiesburg, Mississippi  
 Terracon Project No. EB135010  
 From: Ryan P. Steiner, P.E.  
 Review by: Stephen E. Greaber, P.E. (LA)

Terracon has re-evaluated the post-tensioned floor slab design parameters presented on the table below for the above mentioned project. The parameters are based on the criteria published by the Post Tensioning Institute (PTI) 3<sup>rd</sup> Edition. These are essentially empirical design methods and the recommended design parameters are based on our understanding of the proposed project, our interpretation of the information and data collected as a part of this study, our experience, and the criteria published in the PTI design manual.

Post Tensioning Institute (PTI) Parameters <sup>1</sup>			
Depth of Seasonal Moisture Change <sup>2</sup>		Up to 10 feet	
Plasticity Index <sup>3</sup>		Engineered Fill – 25	
Percent Finer than 2 Microns (estimated) <sup>3</sup>		Engineered Fill – 70	
Soil Fabric Factor		1.0	
Approximate Thornthwaite Moisture Index		40	
Estimated Constant Soil Suction		3.2 pF	
Range of Soil Suction		3.0 to 4.5 pF	
Edge Moisture Variation Distance, $e_m$ <sup>4,5</sup>	Center Lift	8.3 feet <sup>6</sup>	
	Edge Lift	5.1 feet <sup>6</sup>	
Differential Soil Movement, $y_m$ (Center Lift) <sup>5</sup>	Center Lift	1.2 inch <sup>6</sup>	
	Edge Lift	1.8 inch <sup>6</sup>	

1. Based on our analysis of the field and laboratory data, design parameters were computed using the Addendum to the 2004 Post-Tensioning Institute (PTI) method<sup>1</sup> for slab-on-grade design and the subsequent Errata to the Addendum approved by the PTI Slab-on-Grade Committee on February 7, 2008.
2. The moisture beneath a shallow foundation will change in response to wetting and drying conditions around the foundation perimeter. The moisture condition has a significant effect on slab behavior and is highly variable with time, changing seasonally, with annual climate conditions, drainage patterns, ground cover, and vegetation (trees and shrubs).

1. Post-Tensioning Institute, "Addendum No. 1 to the 3<sup>rd</sup> Edition of the Design of Post-Tensioned Slabs-on-Ground", Post-Tensioning Institute, Phoenix, AZ, May 2007.



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**Post Tensioning Institute (PTI) Parameters<sup>1</sup>**

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3. The plasticity index and the clay mineral percentage are values of the soil that can be estimated by laboratory tests, and, although variable from location to location, remain relatively constant with time.
  4. The maximum moisture variation distance is termed the edge moisture variation distance,  $e_m$ , and is an important factor governing the design of post-tensioned floor slabs. The  $e_m$  is related to percent fine clay and climatic conditions as well as other parameters, such as soil fabric factor and unsaturated diffusion coefficient.
  5. The differential movements,  $y_m$ , and edge moisture variation distances,  $e_m$ , were calculated by modeling soil profiles using the commercial software program VOLFLO as recommended by the PTI manual.
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The recommendations presented in this report are not necessarily applicable for any other project or location. The only warranty made in connection with the services provided is that we have used the degree of care and skill ordinarily exercised under similar conditions by reputable members of our profession practicing in the same or similar locality. No other warranty, either express or implied, is made or intended.