

December 6, 2022

Mr. Dennis W. Koerner
ITN, LLC
5865 Ridgeway Center Parkway, Suite 300
Memphis, TN 38120

Re: ANSI Testing of In-Ground Vaults
Building & Earth Project Number: DF220111

Mr. Koerner,

Building and Earth Sciences, Inc. (Building & Earth) was contracted by Terra-Vaults, Inc. to evaluate Underground Enclosure integrity in accordance with ANSI/SCTE 77 2017, *Specifications for Underground Enclosure Integrity* for TIER 15 and TIER 22 ratings. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at the Terra-Vaults facility at 4701 S. Edgewood Terrace in Fort Worth, TX on November 4, 2022. Testing was conducted at the same location, again, on December 2, 2022.

The five (5) enclosures of various sizes tested on November 4, 2022, were selected by the Owner of the facility. The Official Observers were Muhamad A. Khan, P.E. with Building & Earth and Dennis W. Koerner, Ph.D. with ITN. The following table represents testing values from November 4, 2022.

SAMPLE #	Required (lbs)	Actual (lbs)	Results
1 - Tier 22	Size in inches (Length x Width x Depth) 17x30x24		
Cover Vertical Load Test	33,750	33,750	Pass
Vertical Sidewall Load Test	33,750	35,270	Pass
Lateral Sidewall Load Test	3,600	3,636	Pass
2 - Tier 22	Size in inches (Length x Width x Depth) 24x36x36		
Cover Vertical Load Test	33,750	34,500	Pass
Vertical Sidewall Load Test	33,750	34,000	Pass
Lateral Sidewall Load Test	3,600	3,710	Pass

SAMPLE #	Required (lbs)	Actual (lbs)	Results
3 - Tier 22	Size in inches (Length x Width x Depth) 30x48x36		
Cover Vertical Load Test	33,750	34,650	Pass
Vertical Sidewall Load Test	33,750	34,600	Pass
Lateral Sidewall Load Test	3,600	3,620	Pass
4 - Tier 22	Size in inches (Length x Width x Depth) 30x48x24		
Cover Vertical Load Test	33,750	35,750	Pass
Vertical Sidewall Load Test	33,750	34,000	Pass
Lateral Sidewall Load Test	3,600	3,640	Pass
5 - Tier 22	Size in inches (Length x Width x Depth) 24x36x24		
Cover Vertical Load Test	33,750	33,850	Pass
Vertical Sidewall Load Test	33,750	34,500	Pass
Lateral Sidewall Load Test	3,600	3,820	Pass

On December 2, 2022, Mr. Koerner requested some additional testing. The four (4) enclosures of various sizes tested on December 2, 2022, were selected by the Owner of the facility. The Official Observers were Muhamad A. Khan, P.E. with Building & Earth and Dennis W. Koerner, Ph.D. with ITN. The following table represents testing values from December 2, 2022.

SAMPLE #	Required (lbs)	Actual (lbs)	Results
6 - Tier 15	Size in inches (Length x Width x Depth) 36 x 60 x 36		
Cover Vertical Load Test	22,500	25,700	Pass
Vertical Sidewall Load Test	22,500	22,950	Pass
Lateral Sidewall Load Test	3,600	3,650	Pass
6 - Tier 22	Size in inches (Length x Width x Depth) 36 x 60 x 36		
Cover Vertical Load Test	33,750	33,850	Pass
Vertical Sidewall Load Test	33,750	34,200	Pass
Lateral Sidewall Load Test	3,600	3,650	Pass
7 - Tier 15	Size in inches (Length x Width x Depth) 13 x 24 x 18		
Cover Vertical Load Test	22,500	23,100	Pass
Vertical Sidewall Load Test	22,500	22,550	Pass
Lateral Sidewall Load Test	3,600	3,720	Pass
7 - Tier 22	Size in inches (Length x Width x Depth) 13 x 24 x 18		
Cover Vertical Load Test	33,750	33,900	Pass
Vertical Sidewall Load Test	33,750	34,000	Pass
Lateral Sidewall Load Test	3,600	3,720	Pass
8 - Tier 15	Size in inches (Length x Width x Depth) 12 x 12 x 12		
Cover Vertical Load Test	22,500	22,950	Pass
Vertical Sidewall Load Test	22,500	23,700	Pass
Lateral Sidewall Load Test	3,600	3,640	Pass

SAMPLE #	Required (lbs)	Actual (lbs)	Results
8 - Tier 22	Size in inches (Length x Width x Depth) 12 x 12 x 12		
Cover Vertical Load Test	33,750	34,100	Pass
Vertical Sidewall Load Test	33,750	33,900	Pass
Lateral Sidewall Load Test	3,600	3,640	Pass
9 - Tier 15	Size in inches (Length x Width x Depth) 11 x 18 x 18		
Cover Vertical Load Test	22,500	23,200	Pass
Vertical Sidewall Load Test	22,500	23,100	Pass
Lateral Sidewall Load Test	3,600	3,670	Pass
9 - Tier 22	Size in inches (Length x Width x Depth) 11 x 18 x 18		
Cover Vertical Load Test	33,750	33,800	Pass
Vertical Sidewall Load Test	33,750	33,750	Pass
Lateral Sidewall Load Test	3,600	3,670	Pass

Cover Vertical Test & Vertical Test Load Requirement = 22,550 lbs. for Tier 15.

Cover Vertical Test & Vertical Test Load Requirement = 33,750 lbs. for Tier 22.

Lateral Test Load Requirement = 3,600 lbs. for both Tier 15 and Tier 22.

***Pass indicates that the products tested met the standards for both Tier 15 and Tier 22 rating as defined by ANSI/SCTE 77 2017 Standards.**

This letter does not constitute certification of this product nor an opinion or endorsement by this laboratory.

We appreciate the opportunity to work with you on this project. If you have any questions regarding the information contained in this report, please do not hesitate to call.

Respectfully submitted,

12/06/2022

Muhammad A. Khan, P.E.
 Geotechnical Manager

