

# CMRC PROPANE TANKS

## CASE STUDY

“With **STELCOR**, we were able to decrease the pile depth and achieve greater loads. Then we cut material costs by 30%”



**LOCATION:** Bellows Falls, VT

**PROJECT SIZE:** 24 Piles

**PRODUCT:** 2200 STELCOR - 12”  
STELCOR 16/12/9 SDH 10’ x 5.5” x  
.304w x 55KSI w/8RA Steel Core

**PILE DEPTH:** 35’

**LOAD:** 75 kip design

**ENGINEER:** Geodesign, Inc.

### **ABOUT:**

ECI, an IDEAL Certified Installer, was contracted by Dead River Company to construct the foundations for three 60,000 gallon propane tanks.

### **CHALLENGE:**

The foundation had to be designed to resist both vertical gravity loads and lateral wind and earthquake loads. This was particularly challenging because the loose soil conditions were unsuitable for supporting the heavy loads.

### **IDEAL SOLUTION:**

Each tank foundation was designed using eight 75-kip capacity STELCOR DDM's with a 45' long x 8' wide x 3' thick pile cap. The 35' long piles are battered at 1H:6V to resist both vertical gravity loads and lateral wind and earthquake loads. (cont.)



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STELCOR DDM's are Drilled-In Displacement Micropiles installed by advancing the piles with a rotary drive motor. The lead piece of the STELCOR DDM has a screw head that advances the pile and expands the ground. The following sections have a smaller diameter reverse helical auger that act as a pump to push grout downward as the pile advances. The grout is added at the top of the borehole behind the screw head.

ECI is a certified IDEAL Foundation Systems Installer of STELCOR DDM's.



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 <b>GEODESIGN</b> INCORPORATED Geotechnical / Construction / Environmental Engineers and Scientists P.O. Box 699 1233 Shelburne Rd., Suite 360 Windsor, VT 05089 So. Burlington, VT 05403 Phone: 802-674-2033/Fax: 802-674-5943 Phone: 802-652-5140										<b>BORING LOG</b> Project Name <b>Bellows Falls LPG Tank</b> <b>6 Bezanson Rd</b> <b>Bellows Falls, VT</b>			Boring No.: <b>B-2</b> Page No.: <b>1 of 1</b> File No.: <b>1252-01</b> Checked By:		
Boring Company: Platform Drilling Foreman: Chris Aldrich GeoDesign Rep.: Alan Baribault Date Started: August 12, 2013 Date Finished: August 12, 2013 N. Coordinate: E. Coordinate: Ground Surface Elevation (feet): 297 Station: Offset: ft					Casing: Sampler: Type: Flush SS I.D.: 4.0 in. 1.38 in. Hammer Wt.: 140 lbs 140 lbs Hammer Fall: 30 in. 30 in. Rig Type: Ingersol Rand A300 Hammer Type: Wireline Safety		Groundwater Observations Date Depth (ft) Elev. (ft) Notes 8/12/13, 8:45 5.0 292.0 Wet sample 8/12/13, 12:40 4.0 293.0 In open Hole								
Depth (ft)	Sample Information										Strata Description	Symbol	Sample Description		
	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval							Coring Time (min./ft)	Moisture Content (%)
							0 - 6	6 - 12	12 - 18	18 - 24					
0	S1	SS	24	14	0	1	2	2	2			1.8	Fill (Silty Sand)	S1) Loose, light brown SILT, some fine Sand, trace fine Gravel, trace Roots, moist. Lower 2" similar to S2A, no sample collected.	
2	S2	SS	24	20	2	2	3	5	5			3.5	Fill (Old topsoil)	S2) Loose:	
5												5	Sandy Silt	S2A (upper 14"): dark brown SILT, some fine to coarse Sand, trace fine Gravel, trace Sawdust, trace Roots, moist (old topsoil/disturbed topsoil). S2B (lower 6"): brown to olive SILT, little fine Sand, trace Roots, very moist (subsoil).	
10	S3	SS	24	15	5	3	3	1	2				Sand / Silt	S3) Loose, gray fine to medium SAND, some Silt, wet. Approximate 3" thick layer of fine to medium SAND, trace Silt in middle of sample.	
15	S4	SS	24	8	7	5	3	2	1					S4) Loose;	
	S5	SS	24	20	10	2	1	1/12"						S4A (upper 7.5"): brown SILT, little fine Sand (some pcs coarse sand and fine Gravel in sample from above), wet.	
	S6	SS	24	18	12	2	1	1	2					S4B (lower 1/2"): brown fine to coarse SAND and fine Gravel, some Silt, wet.	
	S7	SS	24	18	15	4	2	1	2					S5) Very loose, brown fine SAND and SILT, wet.	
														S6) Very loose, light brown with brown and olive brown layering SILT and fine SAND, wet.	
20	S8	SS	24	24	20	2	2	2	2					S7) Very loose, light brown with olive layering SILT, little fine Sand, wet.	
25														S8) Loose, gray with brown (organics) layering SILT, trace fine Sand, trace Wood and Organics (typically 1/16 to 1/8" spaced approx. 1/4 to 1", wet.	
30	S9	SS	24	24	25	3	2	1	2					S9) Very loose, gray fine to medium SAND, some Silt, trace Organics (decayed leaves/bark, mostly in lower 4"), wet.	
32	S10	SS	24	11	30	8	8	11	14					S10) Medium dense, light brown to tan (with orange and dark brown layering) fine to medium SAND, trace Silt, trace fine to coarse Gravel, wet.	
35															
Remarks 1) Sample S2 advanced without cleaning borehole per ASTM D1586. Sample S2 driven 2 blows before sampling. 2) Samples S1 and S2 taken with AW rods. All other samples taken with NW rods. 3) Borehole advanced using geoprobe pneumatic hammer, 4" casing with drive shoe. Wash water light brown to 2 feet, turning brown below. Powdered bentonite and polymer added to wash water at beginning, approximately 1 quart for tub. 4) Noted organics (leaves and twigs 1/4" or less diameter in wash water between 17 and 20 feet. Infer transition approximately at 18 feet bgs. Continued to observe organics in wash water to 30 feet. 5) Infer transition from siltwith organics to silty sand and gravel at 29 feet based on increased resistance of casing and roller bit during advance. 6) Ground Surface elevation estimated based on existing condition plans dated August 12 with survey prior to site work.										Notes: 1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual. 2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made. A.C. = After casing; N.R. = Not Recorded. 3) Sample Type Coding: A=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo-GeoProbe V=Vane; WOR/H=Weight of Rod/Hammer 4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50% 5) Stratification lines represent approximate boundary between material types, transitions may be gradual.					
SMALL REMARK FONT STANDARD 1252-01 BF LPG TANK GPJ GEODESIGN STANDARD GDT 8/27/13												Boring No.: <b>B-2</b>			



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