

KCI TECHNOLOGIES, INC.
936 Ridgebrook Rd
Sparks, MD 21152
(410)316-7800

Title : Long Island NC
Engineer: NDB
Project Desc.:

Job # 28133363.03A

2/4

General Footing

File: m:\2013\28133363.03\Engn\Structural\2813336303a.ec6
ENERCALC, INC. 1983-2011, Build: 6.12.5.30, Ver: 6.12.12.31

Lic. #: KW-06007602

Licensee : KCI

Description : Footing F-1 Frame Columns (D1, D4, C1, C4, B1, B4)

DESIGN SUMMARY

Design OK

	Mln. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.5980	Soil Bearing	1.794 ksf	3.0 ksf	+D+S+H
PASS	1.276	Overturning - X-X	99.940 k-ft	127.488 k-ft	0.6D+W+H
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	1.447	Sliding - Z-Z	7.570 k	10.952 k	D
PASS	2.211	Uplift	44.610 k 15.62 k w/c SUR	32.304 k ✓	+0.60D+W+H
PASS	0.2919	Z Flexure (+X)	3.542 k-ft	12.131 k-ft	+1.20D+0.50L+1.60S
PASS	0.2919	Z Flexure (-X)	3.542 k-ft	12.131 k-ft	+1.20D+0.50L+1.60S
PASS	0.6286	X Flexure (+Z)	7.625 k-ft	12.131 k-ft	+1.20D+0.50L+1.60S
PASS	0.1295	X Flexure (-Z)	1.572 k-ft	12.131 k-ft	+1.20D+0.50L+0.50S+1.60W
PASS	0.2296	1-way Shear (+X)	18.867 psi	82.158 psi	+1.20D+0.50L+1.60S
PASS	0.2296	1-way Shear (-X)	18.867 psi	82.158 psi	+1.20D+0.50L+1.60S
PASS	0.3806	1-way Shear (+Z)	31.270 psi	82.158 psi	+1.20D+0.50L+1.60S
PASS	0.1343	1-way Shear (-Z)	11.034 psi	82.158 psi	+1.20D+0.50L+0.50S+1.60W
PASS	0.3058	2-way Punching	50.244 psi	164.317 psi	+1.20D+0.50L+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc	+Z	Actual Soil Bearing Stress +Z	-X	-X	Actual / Allowable Ratio
X-X, +D	3.0	n/a	15.193	0.0	1.209	n/a	n/a	0.403
X-X, +D+L+H	3.0	n/a	7.446	0.4298	1.787	n/a	n/a	0.596
X-X, +D+Lr+H	3.0	n/a	2.542	1.173	1.792	n/a	n/a	0.597
X-X, +D+S+H	3.0	n/a	1.649	1.365	1.794	n/a	n/a	0.598
X-X, +D+0.750Lr+0.750L+H	3.0	n/a	3.520	0.9869	1.791	n/a	n/a	0.597
X-X, +D+0.750L+0.750S+H	3.0	n/a	2.748	1.131	1.792	n/a	n/a	0.597
X-X, +D+W+H	3.0	n/a	-1.009	0.7610	0.6444	n/a	n/a	0.254
X-X, +D+0.70E+H	3.0	n/a	8.168	0.3510	1.787	n/a	n/a	0.596
X-X, +D+0.750Lr+0.750L+0.750W+H	3.0	n/a	-1.690	1.235	0.9338	n/a	n/a	0.412
X-X, +D+0.750L+0.750S+0.750W+H	3.0	n/a	-2.338	1.380	0.9348	n/a	n/a	0.460
X-X, +D+0.750Lr+0.750L+0.5250E+H	3.0	n/a	3.860	0.9278	1.791	n/a	n/a	0.597
X-X, +D+0.750L+0.750S+0.5250E+H	3.0	n/a	3.055	1.072	1.792	n/a	n/a	0.597
X-X, +0.60D+W+H	3.0	n/a	-8.154	0.8210	0.1620	n/a	n/a	0.274
X-X, +0.60D+0.70E+H	3.0	n/a	6.333	0.4111	1.304	n/a	n/a	0.435
Z-Z, +D	3.0	0.0	n/a	n/a	n/a	0.5280	0.5280	0.176
Z-Z, +D+L+H	3.0	0.0	n/a	n/a	n/a	1.109	1.109	0.370
Z-Z, +D+Lr+H	3.0	0.0	n/a	n/a	n/a	1.482	1.482	0.494
Z-Z, +D+S+H	3.0	0.0	n/a	n/a	n/a	1.579	1.579	0.526
Z-Z, +D+0.750Lr+0.750L+H	3.0	0.0	n/a	n/a	n/a	1.389	1.389	0.463
Z-Z, +D+0.750L+0.750S+H	3.0	0.0	n/a	n/a	n/a	1.462	1.462	0.487
Z-Z, +D+W+H	3.0	0.0	n/a	n/a	n/a	0.7027	0.7027	0.234
Z-Z, +D+0.70E+H	3.0	0.0	n/a	n/a	n/a	1.069	1.069	0.356
Z-Z, +D+0.750Lr+0.750L+0.750W+H	3.0	0.0	n/a	n/a	n/a	1.085	1.085	0.362
Z-Z, +D+0.750L+0.750S+0.750W+H	3.0	0.0	n/a	n/a	n/a	1.157	1.157	0.386
Z-Z, +D+0.750Lr+0.750L+0.5250E+H	3.0	0.0	n/a	n/a	n/a	1.359	1.359	0.453
Z-Z, +D+0.750L+0.750S+0.5250E+H	3.0	0.0	n/a	n/a	n/a	1.432	1.432	0.477
Z-Z, +0.60D+W+H	3.0	0.0	n/a	n/a	n/a	0.4915	0.4915	0.164
Z-Z, +0.60D+0.70E+H	3.0	0.0	n/a	n/a	n/a	0.8577	0.8577	0.286

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, D	37.850 k-ft	70.130 k-ft	1.853	OK
X-X, D+Lr+H	37.850 k-ft	186.670 k-ft	4.932	OK
X-X, D+S	37.850 k-ft	137.930 k-ft	3.644	OK
X-X, 0.6D+S+W/2+H	51.930 k-ft	193.328 k-ft	3.723	OK
X-X, 0.6D+W+S/2+H	99.940 k-ft	161.388 k-ft	1.615	OK
X-X, 0.6D+W+H	99.940 k-ft	127.488 k-ft	1.276	OK
X-X, 0.6D+0.7E+H	28.422 k-ft	104.778 k-ft	3.687	OK
Z-Z, D	None	0.0 k-ft	Infinity	OK

KCI TECHNOLOGIES, INC.
936 Ridgebrook Rd
Sparks, MD 21152
(410)316-7800

Title : Long Island NC
Engineer: NDB
Project Desc.:

Job # 28133363.03A

2/4

General Footing File: m:\2013\28133363.03\Eng\Structural\2813336303a.ec6
ENERCALC, INC. 1983-2011, Build: 6.12.5.30, Ver: 6.12.12.31 Licensee: KCI

Lic. #: KW-06007602

Description : Footing F-1 Frame Columns (D1, D4, C1, C4, B1, B4)

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, D+L+H	None	0.0 k-ft	Infinity	OK
Z-Z, D+S	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+S+W/2+H	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+W+S/2+H	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+W+H	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+0.7E+H	None	0.0 k-ft	Infinity	OK
Sliding Stability				All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding Safety Ratio	Status
X-X, D	0.0 k	10.952 k	No Sliding	OK
X-X, D+L+H	0.0 k	21.260 k	No Sliding	OK
X-X, D+S	0.0 k	16.037 k	No Sliding	OK
X-X, 0.6D+S+W/2+H	0.0 k	17.835 k	No Sliding	OK
X-X, 0.6D+W+S/2+H	0.0 k	13.101 k	No Sliding	OK
X-X, 0.6D+W+H	0.0 k	10.558 k	No Sliding	OK
X-X, 0.6D+0.7E+H	0.0 k	14.513 k	No Sliding	OK
Z-Z, D	7.570 k	10.952 k	1.447	OK
Z-Z, D+L+H	7.570 k	21.260 k	2.808	OK
Z-Z, D+S	7.570 k	16.037 k	2.118	OK
Z-Z, 0.6D+S+W/2+H	0.3920 k	17.835 k	45.497	OK
Z-Z, 0.6D+W+S/2+H	-3.758 k	13.101 k	3.486	OK
Z-Z, 0.6D+W+H	-3.758 k	10.558 k	2.810	OK
Z-Z, 0.6D+0.7E+H	4.542 k	14.513 k	3.195	OK

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gym. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	6.891	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.40D	0.2116	-Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+1.60L+1.60H	6.202	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+1.60L+1.60H	0.08302	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60L+0.50S+1.60H	6.317	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.183	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60L+0.50L	7.258	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60L+0.50L	0.9952	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60L+0.80W	3.031	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60L+0.80W	1.19	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+1.60S	7.625	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+1.60S	1.315	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60S+0.80W	3.4	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60S+0.80W	1.51	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+0.50L+1.60W	1.066	+Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+0.50L+1.60W	0.1957	-Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+0.50S+1.60W	1.066	+Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+0.50S+1.60W	1.572	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+0.20S+E	5.939	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+0.20S+E	0.1434	-Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +0.90D+1.60W+1.60H	4.168	+Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +0.90D+1.60W+1.60H	0.1511	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +0.90D+E+1.60H	4.146	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +0.90D+E+1.60H	0.3553	-Z	Top	0.26	Bending	0.31	12.131	OK
Z-Z, +1.40D	1.566	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.40D	1.566	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50L+1.60L+1.60H	1.797	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50L+1.60L+1.60H	1.797	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.938	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.938	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60L+0.50L	3.089	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60L+0.50L	3.089	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60L+0.80W	2.141	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60L+0.80W	2.141	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50L+1.60S	3.542	-X	Bottom	0.26	Bending	0.31	12.131	OK

KCI TECHNOLOGIES, INC.
936 Ridgebrook Rd
Sparks, MD 21152
(410)316-7800

Title : Long Island NC
Engineer: NDB
Project Desc.:

Job # 28133363.03A

4/4

General Footing

File: m:\2013\28133363.03\EngStruc\2813336303a.ec6
ENERCALC, INC. 1983-2011, Build: 6.12.6.30, Ver: 6.12.12.31

Fig. #: KW-06007602

Licensee : KCI

Description : Footing F-1 Frame Columns (D1, D4, C1, C4, B1, B4)

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in ²	Gvrm. As in ²	Actual As in ²	Phi*Mn k-ft	Status
Z-Z. +1.20D+0.50L+1.60S	3.542	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z. +1.20D+1.60S+0.80W	2.594	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z. +1.20D+1.60S+0.80W	2.594	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z. +1.20D+0.50L+0.50L+1.60W	0.008273	-X	Top	0.26	Bending	0.31	12.131	OK
Z-Z. +1.20D+0.50L+0.50L+1.60W	0.008273	+X	Top	0.26	Bending	0.31	12.131	OK
Z-Z. +1.20D+0.50L+0.50S+1.60W	0.1333	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z. +1.20D+0.50L+0.50S+1.60W	0.1333	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z. +1.20D+0.50L+0.20S+E	1.451	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z. +1.20D+0.50L+0.20S+E	1.451	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z. +0.90D+1.60W+1.60H	0.9805	-X	Top	0.26	Bending	0.31	12.131	OK
Z-Z. +0.90D+1.60W+1.60H	0.9805	+X	Top	0.26	Bending	0.31	12.131	OK
Z-Z. +0.90D+E+1.60H	0.7501	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z. +0.90D+E+1.60H	0.7501	+X	Bottom	0.26	Bending	0.31	12.131	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	8.34 psi	8.34 psi	1.353 psi	26.724 psi	26.724 psi	82.158 psi	0.3253	OK
+1.20D+0.50L+1.60L+1.60H	9.573 psi	9.573 psi	0.289 psi	24.448 psi	24.448 psi	82.158 psi	0.2976	OK
+1.20D+1.60L+0.50S+1.60H	10.327 psi	10.327 psi	0.8966 psi	25.002 psi	25.002 psi	82.158 psi	0.3043	OK
+1.20D+1.60L+0.50L	16.454 psi	16.454 psi	5.834 psi	29.499 psi	29.499 psi	82.158 psi	0.3591	OK
+1.20D+1.60L+0.80W	11.404 psi	11.404 psi	7.175 psi	13.095 psi	13.095 psi	82.158 psi	0.1594	OK
+1.20D+0.50L+1.60S	18.867 psi	18.867 psi	7.778 psi	31.27 psi	31.27 psi	82.158 psi	0.3806	OK
+1.20D+1.60S+0.80W	13.817 psi	13.817 psi	9.119 psi	14.866 psi	14.866 psi	82.158 psi	0.1809	OK
+1.20D+0.50L+0.50L+1.60W	0.04407 psi	0.04407 psi	1.16 psi	4.382 psi	4.382 psi	82.158 psi	0.05334	OK
+1.20D+0.50L+0.50S+1.60W	0.7099 psi	0.7099 psi	11.034 psi	4.382 psi	11.034 psi	82.158 psi	0.1343	OK
+1.20D+0.50L+0.20S+E	7.732 psi	7.732 psi	1.064 psi	23.155 psi	23.155 psi	82.158 psi	0.2818	OK
+0.90D+1.60W+1.60H	5.223 psi	5.223 psi	1.072 psi	16.226 psi	16.226 psi	82.158 psi	0.1975	OK
+0.90D+E+1.60H	3.996 psi	3.996 psi	2.321 psi	15.935 psi	15.935 psi	82.158 psi	0.194	OK

Punching Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	23.611 psi	164.317 psi	0.1437	OK
+1.20D+0.50L+1.60L+1.60H	26.342 psi	164.317 psi	0.1603	OK
+1.20D+1.60L+0.50S+1.60H	28.281 psi	164.317 psi	0.1721	OK
+1.20D+1.60L+0.50L	44.039 psi	164.317 psi	0.268	OK
+1.20D+1.60L+0.80W	30.326 psi	164.317 psi	0.1846	OK
+1.20D+0.50L+1.60S	50.244 psi	164.317 psi	0.3058	OK
+1.20D+1.60S+0.80W	36.742 psi	164.317 psi	0.2236	OK
+1.20D+0.50L+0.50L+1.60W	7.198 psi	164.317 psi	0.0438	OK
+1.20D+0.50L+0.50S+1.60W	2.779 psi	164.317 psi	0.01691	OK
+1.20D+0.50L+0.20S+E	21.64 psi	164.317 psi	0.1317	OK
+0.90D+1.60W+1.60H	14.659 psi	164.317 psi	0.08921	OK
+0.90D+E+1.60H	11.563 psi	164.317 psi	0.07037	OK

KCI TECHNOLOGIES, INC.
936 Ridgebrook Rd
Sparks, MD 21152
(410)316-7800

Title : Long Island NC
Engineer: NDB
Project Desc.:

Job # 28133363.03A

1/4

KLH 1-8-14

General Footing

File: m:\2013\28133363.03\Engr\Structural\2813336303a.ec6
ENERCALC, INC. 1983-2011, Build: 6.12.5.30, Ver: 6.12.12.31

Lic.#: KW-06007602

Licensee: KCI

Description: Footing F-2 End Columns (E1, A1, E2, A2, E3, A3, E4, A4)

General Information

Calculations per ACI 318-08, IBC 2009, CBC 2010, ASCE 7-05

Material Properties

f_c : Concrete 28 day strength	=	3.0 ksi
f_y : Rebar Yield	=	60.0 ksi
E_c : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
ϕ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	0.00140
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Include Pedestal Weight as DL	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	4.0 ft
Allowable pressure increase per foot of dept = when footing base is below	=	ksf ft

Increases based on footing plan dimension

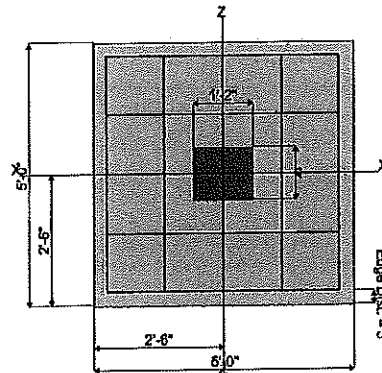
Allowable pressure increase per foot of dept = when maximum length or width is greater 4	=	ksf ft
--	---	--------

Dimensions

Width parallel to X-X Axis	=	5.0 ft
Length parallel to Z-Z Axis	=	5.0 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

p_x : parallel to X-X Axis	=	14.0 in
p_z : parallel to Z-Z Axis	=	12.0 in
Height	=	48.0 in
Rebar Centerline to Edge of Concrete.. at Bottom of footing	=	3.0 in

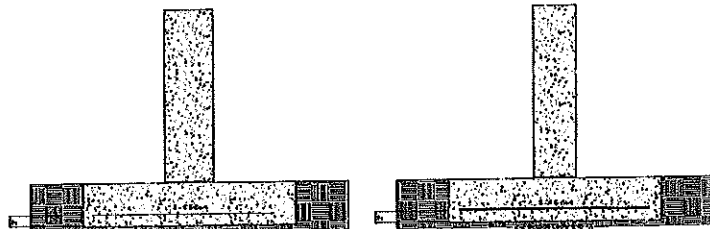


Reinforcing

Bars parallel to X-X Axis	=	5.0
Number of Bars	=	# 5
Reinforcing Bar Size	=	# 5
Bars parallel to Z-Z Axis	=	5.0
Number of Bars	=	# 5
Reinforcing Bar Size	=	# 5

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	=	n/a
# Bars required within zone	=	n/a
# Bars required on each side of zone	=	n/a



Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=	6.220	6.170	7.770	-9.890	-0.870	k
OB : Overburden	=						0.60 ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=				-3.770		k

56

KCI TECHNOLOGIES, INC.
936 Ridgebrook Rd
Sparks, MD 21152
(410)316-7800

Title : Long Island NC
Engineer: NDB
Project Desc.:

Job # 28133363.03A

2/4

General Footing

File: m:\2013\28133363.03\Engn\Structural\2813336303a.ec6
ENERCALC, INC. 1983-2011, Build 6.12.6.30, Ver 6.12.12.31

License #: KW-06007602

Licensee : KCI

Description : Footing F-2 End Columns (E1, A1, E2, A2, E3, A3, E4, A4)

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6327	Soil Bearing	1.898 ksf	3.0 ksf	+0.60D+W+H
PASS	1.183	Overturning - X-X	43.575 k-ft	51.533 k-ft	0.6D+W+H
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	2.014	Sliding - Z-Z	3.770 k	7.592 k	0.6D+W+H
PASS	2.084	Uplift	-9.890 k	20.613 k	+0.60D+W+H
PASS	0.1254	Z Flexure (+X)	1.521 k-ft	12.131 k-ft	+1.20D+0.50L+1.60S
PASS	0.1254	Z Flexure (-X)	1.521 k-ft	12.131 k-ft	+1.20D+0.50L+1.60S
PASS	0.1798	X Flexure (+Z)	2.181 k-ft	12.131 k-ft	+0.90D+1.60W+1.60H
PASS	0.1811	X Flexure (-Z)	2.197 k-ft	12.131 k-ft	+0.90D+1.60W+1.60H
PASS	0.1058	1-way Shear (+X)	8.692 psi	82.158 psi	+1.20D+0.50L+1.60S
PASS	0.1058	1-way Shear (-X)	8.692 psi	82.158 psi	+1.20D+0.50L+1.60S
PASS	0.1557	1-way Shear (+Z)	12.790 psi	82.158 psi	+0.90D+1.60W+1.60H
PASS	0.1646	1-way Shear (-Z)	13.522 psi	82.158 psi	+0.90D+1.60W+1.60H
PASS	0.1370	2-way Punching	22.507 psi	164.317 psi	+1.20D+0.50L+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc	+Z	Actual Soil Bearing Stress +Z	-X	-X	Actual / Allowable Ratio
X-X, +D	3.0	n/a	0.0	0.4209	0.4209	n/a	n/a	0.140
X-X, +D+L+H	3.0	n/a	0.0	0.9929	0.9929	n/a	n/a	0.331
X-X, +D+Lr+H	3.0	n/a	0.0	1.240	1.240	n/a	n/a	0.413
X-X, +D+S+H	3.0	n/a	0.0	1.304	1.304	n/a	n/a	0.435
X-X, +D+0.750Lr+0.750L+H	3.0	n/a	0.0	1.178	1.178	n/a	n/a	0.393
X-X, +D+0.750L+0.750S+H	3.0	n/a	0.0	1.226	1.226	n/a	n/a	0.409
X-X, +D+W+H	3.0	n/a	-15.149	1.594	0.0	n/a	n/a	0.531
X-X, +D+0.70E+H	3.0	n/a	0.0	0.9685	0.9685	n/a	n/a	0.323
X-X, +D+0.750Lr+0.750L+0.750W+H	3.0	n/a	-7.70	1.551	0.2117	n/a	n/a	0.517
X-X, +D+0.750L+0.750S+0.750W+H	3.0	n/a	-7.303	1.599	0.2597	n/a	n/a	0.533
X-X, +D+0.750Lr+0.750L+0.5250E+H	3.0	n/a	0.0	1.160	1.160	n/a	n/a	0.387
X-X, +D+0.750L+0.750S+0.5250E+H	3.0	n/a	0.0	1.208	1.208	n/a	n/a	0.403
X-X, +0.60D+W+H	3.0	n/a	-21.095	1.898	0.0	n/a	n/a	0.633
X-X, +0.60D+0.70E+H	3.0	n/a	0.0	0.8002	0.8002	n/a	n/a	0.267
Z-Z, +D	3.0	0.0	n/a	n/a	n/a	0.4209	0.4209	0.140
Z-Z, +D+L+H	3.0	0.0	n/a	n/a	n/a	0.9929	0.9929	0.331
Z-Z, +D+Lr+H	3.0	0.0	n/a	n/a	n/a	1.240	1.240	0.413
Z-Z, +D+S+H	3.0	0.0	n/a	n/a	n/a	1.304	1.304	0.435
Z-Z, +D+0.750Lr+0.750L+H	3.0	0.0	n/a	n/a	n/a	1.178	1.178	0.393
Z-Z, +D+0.750L+0.750S+H	3.0	0.0	n/a	n/a	n/a	1.226	1.226	0.409
Z-Z, +D+W+H	3.0	0.0	n/a	n/a	n/a	0.5973	0.5973	0.199
Z-Z, +D+0.70E+H	3.0	0.0	n/a	n/a	n/a	0.9685	0.9685	0.323
Z-Z, +D+0.750Lr+0.750L+0.750W+H	3.0	0.0	n/a	n/a	n/a	0.8813	0.8813	0.294
Z-Z, +D+0.750L+0.750S+0.750W+H	3.0	0.0	n/a	n/a	n/a	0.9293	0.9293	0.310
Z-Z, +D+0.750Lr+0.750L+0.5250E+H	3.0	0.0	n/a	n/a	n/a	1.160	1.160	0.387
Z-Z, +D+0.750L+0.750S+0.5250E+H	3.0	0.0	n/a	n/a	n/a	1.208	1.208	0.403
Z-Z, +0.60D+W+H	3.0	0.0	n/a	n/a	n/a	0.4289	0.4289	0.143
Z-Z, +0.60D+0.70E+H	3.0	0.0	n/a	n/a	n/a	0.8002	0.8002	0.267

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
X-X, D	None	0.0 k-ft	Infinity	OK
X-X, D+Lr+H	None	0.0 k-ft	Infinity	OK
X-X, D+S	None	0.0 k-ft	Infinity	OK
X-X, 0.6D+S+W/2+H	21.788 k-ft	70.958 k-ft	3.257	OK
X-X, 0.6D+W+S/2+H	43.575 k-ft	61.245 k-ft	1.406	OK
X-X, 0.6D+W+H	43.575 k-ft	51.533 k-ft	1.183	OK
X-X, 0.6D+0.7E+H	None	0.0 k-ft	Infinity	OK
Z-Z, D	None	0.0 k-ft	Infinity	OK

KCI TECHNOLOGIES, INC.
936 Ridgebrook Rd
Sparks, MD 21152
(410)316-7800

Title : Long Island NC
Engineer: NDB
Project Desc.:

Job # 28133363.03A

3/4

General Footing

File: m:\2013\28133363.03\EnginStructural\2813336303a.ec6
ENERCALC, INC. 1983-2011, Build 6.12.6.30, Ver. 6.12.12.31

Lic. #: KW-06007602

Licensee : KCI

Description : Footing F-2 End Columns (E1, A1, E2, A2, E3, A3, E4, A4)

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Z-Z, D+Lr+H	None	0.0 k-ft	Infinity	OK
Z-Z, D+S	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+S+W/2+H	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+W+S/2+H	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+W+H	None	0.0 k-ft	Infinity	OK
Z-Z, 0.6D+0.7E+H	None	0.0 k-ft	Infinity	OK
Sliding Stability				All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding Safety Ratio	Status
X-X, D	0.0 k	7.532 k	No Sliding	OK
X-X, D+Lr+H	0.0 k	13.673 k	No Sliding	OK
X-X, D+S	0.0 k	9.863 k	No Sliding	OK
X-X, 0.6D+S+W/2+H	0.0 k	11.406 k	No Sliding	OK
X-X, 0.6D+W+S/2+H	0.0 k	8.757 k	No Sliding	OK
X-X, 0.6D+W+H	0.0 k	7.592 k	No Sliding	OK
X-X, 0.6D+0.7E+H	0.0 k	10.376 k	No Sliding	OK
Z-Z, D	0.0 k	7.532 k	No Sliding	OK
Z-Z, D+Lr+H	0.0 k	13.673 k	No Sliding	OK
Z-Z, D+S	0.0 k	9.863 k	No Sliding	OK
Z-Z, 0.6D+S+W/2+H	-1.885 k	11.406 k	6.051	OK
Z-Z, 0.6D+W+S/2+H	-3.770 k	8.757 k	2.323	OK
Z-Z, 0.6D+W+H	-3.770 k	7.592 k	2.014	OK
Z-Z, 0.6D+0.7E+H	0.0 k	10.376 k	No Sliding	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvm. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.7724	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.40D	0.7724	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.8193	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.8193	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.8833	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.8833	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60Lr+0.50L	1.452	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60Lr+0.50L	1.452	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60Lr+0.80W	0.2104	+Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60Lr+0.80W	1.903	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+1.60S	1.657	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+1.60S	1.657	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60S+0.80W	0.03584	+Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+1.60S+0.80W	2.086	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50Lr+0.50L+1.60W	0.348	+Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50Lr+0.50L+1.60W	0.348	-Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50Lr+0.50S+1.60W	0.348	+Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50Lr+0.50S+1.60W	0.348	-Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+0.20S+E	0.7168	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +1.20D+0.50L+0.20S+E	0.7168	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +0.90D+1.60W+1.60H	2.181	+Z	Top	0.26	Bending	0.31	12.131	OK
X-X, +0.90D+1.60W+1.60H	2.197	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +0.90D+E+1.60H	0.3374	+Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +0.90D+E+1.60H	0.3374	-Z	Bottom	0.26	Bending	0.31	12.131	OK
X-X, +0.90D+E+1.60H	0.7093	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.40D	0.7093	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.40D	0.7093	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.7524	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.7524	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.8111	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.8111	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60Lr+0.50L	1.333	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60Lr+0.50L	1.333	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60Lr+0.80W	0.752	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60Lr+0.80W	0.752	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50L+1.60S	1.521	-X	Bottom	0.26	Bending	0.31	12.131	OK

KCI TECHNOLOGIES, INC.
936 Ridgebrook Rd
Sparks, MD 21152
(410)316-7800

Title : Long Island NC
Engineer: NDB
Project Desc.:

Job # 28133363.03A

4/4

General Footing

File: m:\2013\28133363.03\Engl\Structural\2813336303a.ec6
ENERCALC, INC. 1983-2011, Build: 6.12.6.30, Ver: 6.12.12.31

File #: KW-06007602

Licensee : KCI

Description : Footing F-2 End Columns (E1, A1, E2, A2, E3, A3, E4, A4)

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd ln ²	Gvrm. As ln ²	Actual As ln ²	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50L+1.60S	1.521	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60S+0.80W	0.9401	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+1.60S+0.80W	0.9401	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50L+0.50L+1.60W	0.3279	-X	Top	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50L+0.50L+1.60W	0.3279	+X	Top	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50L+0.50S+1.60W	0.2691	-X	Top	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50L+0.50S+1.60W	0.2691	+X	Top	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50L+0.20S+E	0.6583	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +1.20D+0.50L+0.20S+E	0.6583	+X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +0.90D+1.60W+1.60H	0.7888	-X	Top	0.26	Bending	0.31	12.131	OK
Z-Z, +0.90D+1.60W+1.60H	0.7888	+X	Top	0.26	Bending	0.31	12.131	OK
Z-Z, +0.90D+E+1.60H	0.3098	-X	Bottom	0.26	Bending	0.31	12.131	OK
Z-Z, +0.90D+E+1.60H	0.3098	+X	Bottom	0.26	Bending	0.31	12.131	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	4.053 psi	4.053 psi	4.53 psi	4.53 psi	4.53 psi	82.158 psi	0.05513	OK
+1.20D+0.50L+1.60L+1.60H	4.299 psi	4.299 psi	4.804 psi	4.804 psi	4.804 psi	82.158 psi	0.05848	OK
+1.20D+1.60L+0.50S+1.60H	4.634 psi	4.634 psi	5.18 psi	5.18 psi	5.18 psi	82.158 psi	0.06305	OK
+1.20D+1.60L+0.50L	7.618 psi	7.618 psi	8.514 psi	8.514 psi	8.514 psi	82.158 psi	0.1036	OK
+1.20D+1.60L+0.80W	4.297 psi	4.297 psi	11.277 psi	1.423 psi	11.277 psi	82.158 psi	0.1373	OK
+1.20D+0.50L+1.60S	8.692 psi	8.692 psi	9.715 psi	9.715 psi	9.715 psi	82.158 psi	0.1182	OK
+1.20D+1.60S+0.80W	5.371 psi	5.371 psi	12.35 psi	0.3309 psi	12.35 psi	82.158 psi	0.1503	OK
+1.20D+0.50L+0.50L+1.60W	1.873 psi	1.873 psi	2.041 psi	2.041 psi	2.041 psi	82.158 psi	0.02484	OK
+1.20D+0.50L+0.50S+1.60W	1.538 psi	1.538 psi	2.041 psi	2.041 psi	2.041 psi	82.158 psi	0.02484	OK
+1.20D+0.50L+0.20S+E	3.761 psi	3.761 psi	4.203 psi	4.203 psi	4.203 psi	82.158 psi	0.05116	OK
+0.90D+1.60W+1.60H	4.507 psi	4.507 psi	13.522 psi	12.79 psi	13.522 psi	82.158 psi	0.1646	OK
+0.90D+E+1.60H	1.77 psi	1.77 psi	1.978 psi	1.978 psi	1.978 psi	82.158 psi	0.02408	OK

All units k

Punching Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	10.494 psi	164.317 psi	0.06387	OK
+1.20D+0.50L+1.60L+1.60H	11.131 psi	164.317 psi	0.06774	OK
+1.20D+1.60L+0.50S+1.60H	12 psi	164.317 psi	0.07303	OK
+1.20D+1.60L+0.50L	19.724 psi	164.317 psi	0.12	OK
+1.20D+1.60L+0.80W	11.173 psi	164.317 psi	0.068	OK
+1.20D+0.50L+1.60S	22.507 psi	164.317 psi	0.137	OK
+1.20D+1.60S+0.80W	13.91 psi	164.317 psi	0.08465	OK
+1.20D+0.50L+0.50L+1.60W	4.851 psi	164.317 psi	0.02952	OK
+1.20D+0.50L+0.50S+1.60W	4.728 psi	164.317 psi	0.02877	OK
+1.20D+0.50L+0.20S+E	9.738 psi	164.317 psi	0.05927	OK
+0.90D+1.60W+1.60H	11.67 psi	164.317 psi	0.07102	OK
+0.90D+E+1.60H	4.583 psi	164.317 psi	0.02789	OK

KCI TECHNOLOGIES, INC.
936 Ridgebrook Rd
Sparks, MD 21152
(410)316-7800

Title : Long Island NC
Engineer: NDB
Project Desc.:

Job # 28133363.03A

1/2

Cantilevered Retaining Wall

File: m:\2013\28133363.03\Eng\Structural\2813336303a.ec6
ENERCALC, INC. 1983-2011, Build 6.12.6.30, Ver: 6.12.12.31

Lic. #: KW-06007602

Licensee: KCI

Description : Edge Wall During Construction

Calculations per ACI 318-08, ACI 530-08, IBC 2009,
CBC 2010, ASCE 7-05

Criteria

Retained Height	=	3.00 ft
Wall height above soil	=	6.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft
Vertical component of active		
Lateral soil pressure options:		
NOT USED for Soil Pressure.		
NOT USED for Sliding Resistance.		
NOT USED for Overturning Resistance.		

Soil Data

Allow Soil Bearing	=	3,000.0 psf
Coulomb Soil Pressure calculation		
Soil Friction Angle	=	30.0 deg
Active Pressure: $K_a \cdot \gamma$	=	34.9 psf/ft
Passive Pressure: $K_p \cdot \gamma$	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	0.00 pcf
Friction Coeff btwn Fig & Soil	=	0.400
Soil height to ignore for passive pressure	=	12.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 plf
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Wind on Exposed Stem = 25.0 psf

Design Summary

Wall Stability Ratios		
Overturning	=	1.78 OK
Sliding	=	1.61 OK
Total Bearing Load	=	1,662 lbs
...resultant ecc.	=	8.07 in
Soil Pressure @ Toe	=	1,672 psf OK
Soil Pressure @ Heel	=	0 psf OK
Allowable	=	3,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	2,006 psf
ACI Factored @ Heel	=	0 psf
Footing Shear @ Toe	=	4.8 psi OK
Footing Shear @ Heel	=	5.4 psi OK
Allowable	=	75.0 psi
Sliding Calcs (Vertical Component NOT Used)		
Lateral Sliding Force	=	412.0 lbs
less 100% Passive Force	=	0.0 lbs
less 100% Friction Force	=	668.0 lbs
Added Force Req'd	=	0.0 lbs OK
...for 1.5 : 1 Stability	=	0.0 lbs OK

Load Factors

Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

Design Height Above Ftg	ft =	0.00
Wall Material Above "H"	=	Concrete
Thickness	in =	8.00
Rebar Size	=	# 5
Rebar Spacing	in =	14.00
Rebar Placed at	=	Center

Design Data

$f_u/FB + f_a/F_a$	=	0.378
Total Force @ Section	lbs =	491.6
Moment.....Actual	ft-lb =	1,691.6
Moment.....Allowable	ft-lb =	4,470.4
Shear.....Actual	psi =	10.2
Shear.....Allowable	psi =	82.2
Wall Weight	psf =	100.0
Rebar Depth 'd'	in =	4.00
Lap splice if above	in =	21.36
Lap splice if below	in =	6.00
Hook embed into footing	in =	6.00

Concrete Data

f'_c	psi =	3,000.0
F_y	psi =	60,000.0

Top Stem

Stem OK

KCI TECHNOLOGIES, INC.
936 Ridgebrook Rd
Sparks, MD 21152
(410)316-7800

Title : Long Island NC
Engineer: NDB
Project Desc.:

Job # 28133363.03A

2 / 2

Cantilevered Retaining Wall

File: m:\2013\28133363.03\Eng\Structural\28133363.03a.ec6
ENERCALC, INC. 1983-2011, Build: 6.12.6.30, Ver: 6.12.12.31

Lic. #: KW-06007602

Licensee: KCI

Description : Edge Wall During Construction

Footing Dimensions & Strengths

Toe Width = 1.00 ft
Heel Width = 1.67 ft
Total Footing Width = 2.67 ft
Footing Thickness = 12.00 in
Key Width = 0.00 in
Key Depth = 0.00 in
Key Distance from Toe = 0.00 ft
 $f_c = 2,500$ psi $F_y = 60,000$ psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm. = 3.00 in

Footing Design Results

	Toe	Heel
Factored Pressure	2,006	0 psf
Mu' : Upward	835	0 ft-lb
Mu' : Downward	90	308 ft-lb
Mu: Design	745	308 ft-lb
Actual 1-Way Shear	4.80	5.39 psi
Allow 1-Way Shear	75.00	75.00 psi
Toe Reinforcing	# 5 @ 12.00 in	
Heel Reinforcing	None Spec'd	
Key Reinforcing	None Spec'd	

Other Acceptable Sizes & Spacings

Toe: Not req'd, $M_u < S * F_r$
Heel: Not req'd, $M_u < S * F_r$
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

ItemOVERTURNING.....			RESISTING.....				
	Force lbs	Distance ft	Moment ft-lb		Force lbs	Distance ft	Moment ft-lb		
Heel Active Pressure	=	279.5	1.33	372.7	Soil Over Heel	=	361.2	2.17	783.2
Surcharge over Heel	=				Sloped Soil Over Heel	=			
Toe Active Pressure	=	-17.5	0.33	-5.8	Surcharge Over Heel	=			
Surcharge Over Toe	=				Adjacent Footing Load	=			
Adjacent Footing Load	=				Axial Dead Load on Stem	=			
Added Lateral Load	=				* Axial Live Load on Stem	=			
Load @ Stem Above Soil	=	150.0	7.00	1,050.0	Soil Over Toe	=			
					Surcharge Over Toe	=			
					Stem Weight(s)	=	900.0	1.33	1,200.0
					Earth @ Stem Transitions	=			
					Footing Weight	=	400.5	1.34	534.7
					Key Weight	=			
					Vert. Component	=			
Total	=	412.0	O.T.M. =	1,416.8					
Resisting/Overturning Ratio			=	1.78					
Vertical Loads used for Soil Pressure =				1,661.7 lbs					

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

28133363, 03A - LUNA ISLAND N.C. - ANCHOR AT ADMIN CLUB

1/2

HIT-HY 200 Adhesive Anchoring System

HILTI

HIT-HY 200 Adhesive Anchoring System

Table 16 — Hilti HIT-HY 200 Adhesive Design Strength (Factored Resistance) with Concrete / Bond Failure for US Rebar
in Uncracked Concrete^{1,2,3,4,5,6,7,8}

Nominal Rebar Size	Effective Embedment Depth in. (mm)	Tension — ϕN_n or N_t				Shear — ϕV_n or V_s			
		$f'_c = 2500$ psi (17.2 Mpa) lb (kN)	$f'_c = 3000$ psi (20.7 Mpa) lb (kN)	$f'_c = 4000$ psi (27.6 Mpa) lb (kN)	$f'_c = 6000$ psi (41.4 Mpa) lb (kN)	$f'_c = 2500$ psi (17.2 Mpa) lb (kN)	$f'_c = 3000$ psi (20.7 Mpa) lb (kN)	$f'_c = 4000$ psi (27.6 Mpa) lb (kN)	$f'_c = 6000$ psi (41.4 Mpa) lb (kN)
#3	3-3/8 (88)	4,315 (19.2)	4,315 (19.2)	4,315 (19.2)	4,575 (20.4)	9,295 (41.3)	9,295 (41.3)	9,295 (41.3)	9,855 (43.8)
	4-1/2 (114)	6,755 (25.6)	6,755 (25.6)	6,755 (25.6)	6,100 (27.1)	12,395 (55.1)	12,395 (55.1)	12,395 (55.1)	13,140 (58.4)
	7-1/2 (191)	9,590 (42.7)	9,590 (42.7)	9,590 (42.7)	10,185 (45.2)	20,660 (91.9)	20,660 (91.9)	20,660 (91.9)	21,895 (97.4)
#4	4-1/2 (114)	7,445 (33.1)	7,675 (34.1)	7,675 (34.1)	8,135 (36.2)	16,035 (71.3)	16,525 (73.5)	16,525 (73.5)	17,520 (77.9)
	6 (152)	10,230 (45.5)	10,230 (45.5)	10,230 (45.5)	10,845 (48.2)	22,035 (98.0)	22,035 (98.0)	22,035 (98.0)	23,355 (103.9)
	10 (254)	17,050 (75.8)	17,050 (75.8)	17,050 (75.8)	18,075 (80.4)	36,725 (163.4)	36,725 (163.4)	36,725 (163.4)	38,930 (173.2)
#5	6-5/8 (143)	10,405 (46.3)	11,400 (50.7)	11,990 (53.3)	12,710 (56.5)	22,415 (99.7)	24,550 (109.2)	25,820 (114.9)	27,370 (121.7)
	7-1/2 (191)	15,985 (71.1)	15,985 (71.1)	15,985 (71.1)	16,845 (75.4)	34,430 (153.2)	34,430 (153.2)	34,430 (153.2)	36,495 (162.3)
	12-1/2 (318)	26,640 (118.5)	26,640 (118.5)	26,640 (118.5)	28,240 (125.6)	57,385 (255.3)	57,385 (255.3)	57,385 (255.3)	60,825 (270.6)
#6	6-3/4 (171)	13,680 (60.9)	14,985 (66.7)	17,265 (76.8)	18,300 (81.4)	29,460 (131.0)	32,275 (143.6)	37,185 (165.4)	39,415 (175.3)
	9 (229)	21,060 (93.7)	23,020 (102.4)	23,020 (102.4)	24,400 (108.5)	45,380 (201.6)	49,580 (220.5)	49,580 (220.5)	52,555 (233.6)
	15 (381)	36,365 (170.7)	36,365 (170.7)	36,365 (170.7)	40,665 (180.9)	82,630 (367.6)	82,630 (367.6)	82,630 (367.6)	87,590 (389.6)
#7	7-7/8 (200)	17,235 (76.7)	18,885 (84.0)	21,805 (97.0)	24,910 (110.8)	37,125 (165.1)	40,670 (180.9)	46,960 (208.9)	53,650 (238.6)
	10-1/2 (267)	26,640 (118.1)	29,070 (129.3)	31,330 (139.4)	33,210 (147.7)	57,160 (254.3)	62,615 (278.5)	67,485 (300.2)	71,530 (318.2)
	17-1/2 (445)	52,220 (232.3)	52,220 (232.3)	52,220 (232.3)	55,350 (246.2)	112,470 (500.3)	112,470 (500.3)	112,470 (500.3)	118,220 (530.3)
#8	9 (229)	21,060 (93.7)	23,070 (102.6)	26,640 (118.5)	32,535 (144.7)	45,380 (201.6)	48,690 (216.0)	57,375 (255.2)	70,070 (311.7)
	12 (305)	32,425 (144.2)	35,520 (158.0)	40,920 (182.0)	43,380 (193.0)	69,835 (310.6)	76,500 (340.3)	88,140 (392.1)	93,430 (415.6)
	20 (508)	68,205 (303.4)	68,205 (303.4)	68,205 (303.4)	72,295 (321.6)	146,900 (653.4)	146,900 (653.4)	146,900 (653.4)	155,715 (692.7)
#9	10-1/8 (257)	25,130 (111.8)	27,530 (122.5)	31,785 (141.4)	38,930 (173.2)	54,125 (240.8)	59,290 (263.7)	68,465 (304.5)	83,850 (373.0)
	13-1/2 (343)	38,690 (172.1)	42,380 (188.5)	48,940 (217.7)	54,900 (244.2)	83,330 (370.7)	91,285 (406.1)	105,405 (468.9)	118,245 (526.0)
	22-1/2 (572)	83,245 (370.3)	86,320 (384.0)	86,320 (384.0)	91,500 (407.0)	179,300 (797.6)	185,920 (827.0)	185,920 (827.0)	197,075 (876.6)
#10	11-1/4 (288)	29,430 (130.9)	32,240 (143.4)	37,230 (165.6)	45,595 (202.8)	63,395 (282.0)	69,445 (308.9)	80,185 (356.7)	98,205 (436.8)
	15 (381)	45,315 (201.6)	49,640 (220.8)	57,320 (255.0)	67,780 (301.5)	97,600 (434.1)	106,915 (475.6)	123,455 (549.2)	145,985 (649.4)
	25 (635)	97,500 (433.7)	106,670 (474.0)	106,670 (474.0)	112,865 (502.6)	210,000 (934.1)	229,535 (1021.0)	229,535 (1021.0)	243,305 (1082.3)

1 Tested in accordance with AC308, ESR pending. See Section 2.4 for explanation on development of load values.

2 See Section 2.4.6 to convert design strength (factored resistance) value to ASD value.

3 Linear interpolation between embedment depths and concrete compressive strengths is not permitted.

4 Apply spacing, edge distance, and concrete thickness factors in tables 19 - 34 as necessary. Compare to the steel values in table 16. The lesser of the values is to be used for the design.

5 Data is for temperature range A: Max. short term temperature = 104° F (40° C), max. long term temperature = 75° F (24° C).

For temperature range B: Max. short term temperature = 176° F (80° C), max. long term temperature = 122° F (50° C) multiply above value by 0.80.

For temperature range C: Max. short term temperature = 248° F (120° C), max. long term temperature = 162° F (72° C) multiply above value by 0.70.

Short term elevated concrete temperatures are those that occur over brief intervals, e.g., as a result of diurnal cycling. Long term concrete temperatures are roughly constant over significant periods of time.

6 Tabular values are for dry concrete conditions. For water saturated concrete multiply design strength (factored resistance) by 0.85.

7 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 2.4.8.

8 Tabular values are for normal weight concrete only. For lightweight concrete multiply design strength (factored resistance) by λ_s as follows:

For sand-lightweight, $\lambda_s = 0.81$. For all-lightweight, $\lambda_s = 0.85$.

HIT-HY 200 Adhesive Anchoring System

Table 21 — Load Adjustment Factors for #4 US Rebar in Uncracked Concrete ^{1,2}

#4 Uncracked Concrete	Embedment h_{ef} in (mm)	Spacing Factor In Tension f_{st}			Edge Distance Factor In Tension f_{ed}			Spacing Factor In Shear ² f_{sv}			Edge Distance in Shear						Conc. Thickness Factor In Shear ⁴ f_{ct}		
											⊥ Toward Edge f_{sv}			 To Edge f_{sv}					
		4-1/2 (114)	6 (152)	10 (254)	4-1/2 (114)	6 (152)	10 (254)	4-1/2 (114)	6 (152)	10 (254)	4-1/2 (114)	6 (152)	10 (254)	4-1/2 (114)	6 (152)	10 (254)	4-1/2 (114)	6 (152)	10 (254)
Spacing (s) / Edge Distance (e) / Concrete Thickness (h) — in (mm)	1-3/4 (44)	n/a	n/a	n/a	0.31	0.23	0.13	n/a	n/a	n/a	0.05	0.04	0.02	0.11	0.08	0.05	n/a	n/a	n/a
	2-1/2 (64)	0.59	0.57	0.54	0.35	0.26	0.15	0.53	0.53	0.52	0.09	0.07	0.04	0.18	0.13	0.08	n/a	n/a	n/a
	3 (76)	0.61	0.58	0.55	0.39	0.28	0.16	0.54	0.53	0.52	0.12	0.09	0.05	0.24	0.17	0.10	n/a	n/a	n/a
	4 (102)	0.65	0.61	0.57	0.45	0.33	0.19	0.55	0.54	0.53	0.18	0.13	0.08	0.37	0.27	0.16	n/a	n/a	n/a
	5 (127)	0.69	0.64	0.58	0.52	0.38	0.22	0.57	0.55	0.54	0.26	0.19	0.11	0.51	0.37	0.22	n/a	n/a	n/a
	5-3/4 (146)	0.71	0.66	0.60	0.57	0.42	0.24	0.58	0.56	0.54	0.32	0.23	0.14	0.58	0.46	0.28	0.56	n/a	n/a
	6 (152)	0.72	0.67	0.60	0.59	0.43	0.25	0.58	0.57	0.55	0.34	0.25	0.16	0.60	0.48	0.29	0.57	n/a	n/a
	7 (178)	0.76	0.69	0.62	0.68	0.50	0.29	0.59	0.58	0.55	0.42	0.31	0.19	0.68	0.53	0.37	0.61	n/a	n/a
	7-1/4 (184)	0.77	0.70	0.62	0.70	0.51	0.30	0.60	0.58	0.56	0.45	0.33	0.20	0.70	0.54	0.39	0.62	0.56	n/a
	8 (203)	0.80	0.72	0.63	0.78	0.57	0.33	0.61	0.59	0.58	0.52	0.38	0.23	0.78	0.58	0.41	0.66	0.59	n/a
	9 (229)	0.83	0.75	0.65	0.87	0.64	0.37	0.62	0.60	0.57	0.62	0.45	0.27	0.87	0.64	0.44	0.70	0.63	n/a
	10 (254)	0.87	0.78	0.67	0.97	0.71	0.41	0.63	0.61	0.58	0.72	0.53	0.32	0.97	0.71	0.47	0.73	0.66	n/a
	11-1/4 (286)	0.92	0.81	0.69	1.00	0.80	0.47	0.65	0.62	0.59	0.86	0.63	0.38	1.00	0.80	0.50	0.78	0.70	0.59
	12 (305)	0.94	0.83	0.70		0.85	0.50	0.66	0.63	0.59	0.95	0.69	0.42		0.85	0.62	0.80	0.72	0.61
	14 (356)	1.00	0.89	0.73		0.99	0.58	0.69	0.65	0.61	1.00	0.87	0.52		0.99	0.69	0.87	0.78	0.66
	16 (406)		0.94	0.77		1.00	0.66	0.72	0.67	0.62		1.00	0.64		1.00	0.66	0.93	0.83	0.70
	18 (457)		1.00	0.80			0.74	0.74	0.70	0.64			0.76			0.74	0.98	0.89	0.75
	20 (508)			0.83			0.83	0.77	0.72	0.65						0.83	1.00	0.93	0.79
	22 (559)			0.87			0.91	0.80	0.74	0.67			1.00			0.91		0.88	0.83
	24 (610)			0.90			0.99	0.82	0.76	0.69						0.99		1.00	0.86
	30 (762)			1.00			1.00	0.90	0.83	0.73						1.00			0.96
	36 (914)							0.98	0.89	0.78									1.00
	>48 (1219)							1.00	1.00	0.87									

Table 22 — Load Adjustment Factors for #4 US Rebar in Cracked Concrete ^{1,2}

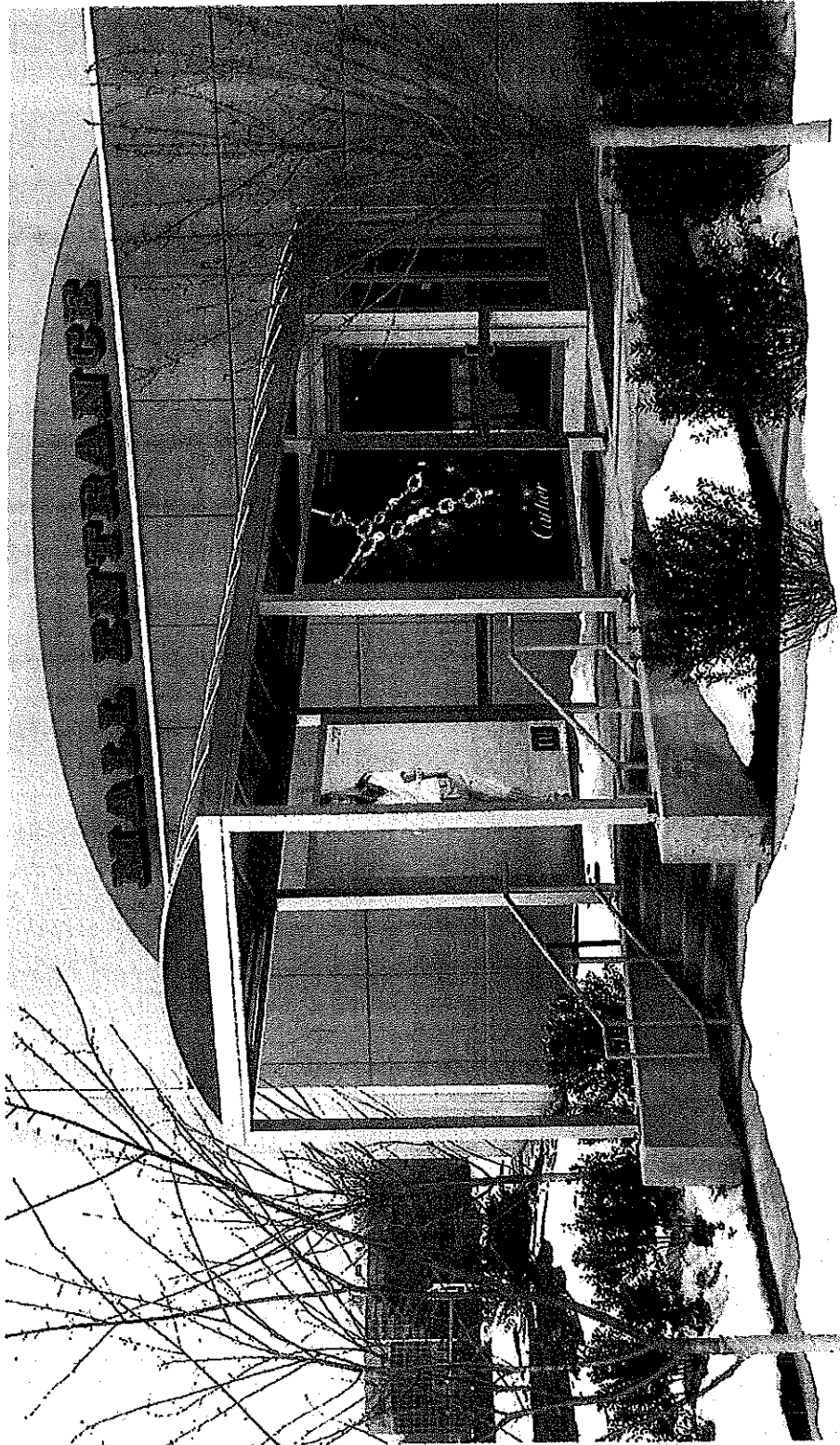
#4 Cracked Concrete	Embedment h_{ef} in (mm)	Spacing Factor In Tension f_{st}			Edge Distance Factor In Tension f_{ed}			Spacing Factor In Shear ² f_{sv}			Edge Distance in Shear						Conc. Thickness Factor In Shear ⁴ f_{ct}		
											⊥ Toward Edge f_{sv}			 To Edge f_{sv}					
		4-1/2 (114)	6 (152)	10 (254)	4-1/2 (114)	6 (152)	10 (254)	4-1/2 (114)	6 (152)	10 (254)	4-1/2 (114)	6 (152)	10 (254)	4-1/2 (114)	6 (152)	10 (254)	4-1/2 (114)	6 (152)	10 (254)
Spacing (s) / Edge Distance (e) / Concrete Thickness (h) — in (mm)	1-3/4 (44)	n/a	n/a	n/a	0.49	0.45	0.41	n/a	n/a	n/a	0.06	0.04	0.03	0.12	0.09	0.05	n/a	n/a	n/a
	2-1/2 (64)	0.59	0.57	0.54	0.56	0.50	0.44	0.54	0.53	0.52	0.10	0.07	0.04	0.20	0.15	0.09	n/a	n/a	n/a
	3 (76)	0.61	0.58	0.55	0.60	0.53	0.46	0.54	0.54	0.53	0.13	0.10	0.06	0.26	0.20	0.12	n/a	n/a	n/a
	4 (102)	0.65	0.61	0.57	0.70	0.60	0.49	0.56	0.55	0.53	0.20	0.15	0.09	0.40	0.30	0.18	n/a	n/a	n/a
	5 (127)	0.69	0.64	0.58	0.80	0.67	0.53	0.57	0.56	0.54	0.28	0.21	0.13	0.56	0.42	0.25	n/a	n/a	n/a
	5-3/4 (146)	0.71	0.66	0.60	0.88	0.73	0.56	0.58	0.57	0.55	0.35	0.26	0.16	0.69	0.52	0.31	0.57	n/a	n/a
	6 (152)	0.72	0.67	0.60	0.91	0.75	0.57	0.59	0.57	0.55	0.37	0.28	0.17	0.74	0.55	0.33	0.59	n/a	n/a
	7 (178)	0.76	0.69	0.62	1.00	0.83	0.62	0.60	0.58	0.56	0.47	0.35	0.21	0.83	0.70	0.42	0.63	n/a	n/a
	7-1/4 (184)	0.77	0.70	0.62		0.85	0.63	0.60	0.59	0.56	0.49	0.37	0.22	0.98	0.74	0.44	0.64	0.59	n/a
	8 (203)	0.80	0.72	0.63		0.91	0.66	0.61	0.59	0.57	0.57	0.43	0.26	1.00	0.85	0.51	0.68	0.61	n/a
	9 (229)	0.83	0.75	0.65		1.00	0.70	0.63	0.61	0.58	0.68	0.51	0.31		1.00	0.61	0.72	0.65	n/a
	10 (254)	0.87	0.78	0.67			0.75	0.64	0.62	0.58	0.79	0.60	0.36			0.72	0.78	0.69	n/a
	11-1/4 (286)	0.92	0.81	0.69			0.81	0.66	0.63	0.59	0.95	0.71	0.43			0.81	0.80	0.73	0.61
	12 (305)	0.94	0.83	0.70			0.85	0.67	0.64	0.60	1.00	0.78	0.47			0.85	0.83	0.75	0.63
	14 (356)	1.00	0.89	0.73			0.95	0.70	0.67	0.62		0.99	0.59			0.95	0.89	0.81	0.69
	16 (406)		0.94	0.77			1.00	0.73	0.69	0.63		1.00	0.72			1.00	0.96	0.87	0.73
	18 (457)		1.00	0.80				0.76	0.71	0.65			0.86				1.00	0.92	0.78
	20 (508)			0.83				0.79	0.74	0.67			1.00					0.97	0.82
	22 (559)			0.87				0.81	0.76	0.68								1.00	0.86
	24 (610)			0.90				0.84	0.78	0.70									0.90
	30 (762)			1.00				0.93	0.85	0.75									1.00
	36 (914)							1.00	0.82	0.80									
	>48 (1219)							1.00	0.90										

1 Linear interpolation not permitted

2 Shaded area with reduced edge distance is permitted provided rebar has no installation torque.

3 Spacing factor reduction in shear, f_{sv} , assumes an influence of a nearby edge. If no edge exists, then $f_{sv} = f_{sv}$.4 Concrete thickness reduction factor in shear, f_{ct} , assumes an influence of a nearby edge. If no edge exists, then $f_{ct} = 1.0$.

ENTRY CANOPY WITH ADVERTISING PANELS



handi-hut inc.

Fax 973-614-8011

1-800-603-6635

Web: www.handi-hut.com

973-614-1800



SHELTER SPECIFICATIONS

GENERAL DESCRIPTION: The work specified includes the design and fabrication of modular shelters, including frame, glazed wall panels, glazed roof and benches if required.

DESIGN REQUIREMENTS: Each shelter shall consist of a structural aluminum frame with glazed rear, side walls, windscreen if required and glazed domed roof. The walls shall be glazed full height with 10" ventilation space at bottom. Benches shall be furnished as indicated. The shelter shall be fabricated in the minimum number of parts or sections which can be transported to each site in their preglazed sections. Fabrication methods shall provide for ease in erection.

The frame shall be designed to be stable with or without wall glazing and plastic roof domes. The shelter, including connections, components and anchorage, shall be tamperproof.

The shelter, including the structural frame, glazing and roof domes, shall be capable of withstanding a windload of 75 MPH. The roof including the dome shall be capable of supporting a uniformly distributed load of 40 pounds per square foot or a separate concentrated load of 200 pounds placed at any location on the roof or fascia without permanent deformation.

ALUMINUM: All structural and framing members including the fascia shall be extruded aluminum of 6063-T52 alloy not less than 1/8 inch in thickness.

GLAZING: All wall and roof glazing shall be 1/4 inch thick. Wall panels shall be tempered glass, acrylic or coated polycarbonate (as specified). Roof domes shall be thermo formed white translucent acrylic, 1/4 inch thick. Barrel roof shall be glazed with twin-wall polycarbonate. Gasketing around windows and domes shall be extruded PVC dry set splines, which shall be black in color. Hot or cold poured sealants will not be permitted.

SHELTER CONSTRUCTION: Maximum horizontal span of any panel shall not exceed 27".

All wall panels shall be factory glazed into aluminum sub-frames with minimum depth engagement of 3/4". Panel sub-frames shall be attached to vertical and horizontal structural mullions with 3/16" diameter rivets on approximately 13" centers.

Each shelter shall be supported by four vertical 2 1/2" x 2 1/2" aluminum tube corner mullions anchored at base and supporting the roof, rear wall and side walls. Intermediate vertical mullions shall be 2 1/2" x 1 1/2" aluminum tubing.

Mullion connections shall be by means of extruded aluminum "U" channels 2 1/4" x 2 1/4" or 1 1/4" x 2 1/4" with tapered edges.

All wall sections shall have structural horizontal members along top and bottom edges. Horizontal and vertical mullions shall be factory attached directly to each other. The fasteners shall be completely hidden when shelter is field installed. The final assembly shall provide a clean, neat, unobtrusive and tamperproof structure free of sharp or irregular edges or corners.

Anchor flanges shall be aluminum with minimum height of 5" to provide up to 3" vertical adjustment for possible unlevel site conditions. All mounting hardware shall be factory supplied.

Roof shall be completely assembled if roof is no larger than 15' long by 7'-6" deep. Roof domes shall be factory glazed 1 1/4" deep all around. Roof fascia shall be 1/8" extruded aluminum 6" high. Fascia shall incorporate an integral gutter with 5/8" x 1 1/4" deep holes in back of shelter for drainage.

Roof fascia shall have both corner keys and alignment plates secured with 3/16" diameter rivets. Under no circumstances will corner keys be dependent upon mere pressure fit. Each corner key shall be secured with a total of six rivets, three on each face, through both the roof fascia and corner key. Rivet shall match the finish of roof fascia.

The roof fascia extrusion shall have an inside lip facing downward which shall overlap the inside surface of the wall assembly. This lip shall have factory drilled clearance holes for factory supplied 3/16" diameter rivets on 20" centers. Through these holes, holes shall be chased into the top horizontal wall mullion in the field, then the roof assembly secured to the wall assembly with the factory supplied rivets. Any subsequent upward windload force under the roof shall be resisted by shear strength of the rivets. The roof assembly shall not be fastened down to the top of the wall sections with sheet metal screws whereby any upward force is resisted by the screw threads in tension.

FINISH: All aluminum components shall be either one of the following finishes, depending which is specified:

Clear anodize AMM10C22A21204R1
Dark bronze 313AMM10C22A44 hard coat anodic film
Powder Coat finish

BENCH/BACKREST: If bench/backrest is specified, materials shall be extruded aluminum consisting of two contoured sections for bench and one section for backrest. Included shall be aluminum brackets and hardware. Bench/backrest shall be supported along inside of shelter rear wall.

WARRANTY: Shelters shall be guaranteed against any defects in material and/or workmanship for one full year from time of delivery. Handi Hut limits its liability to replacement of parts only.

Handi-Hut Inc.
3 Grunwald Street, Clifton, New Jersey 07013 973-614-1800 Fax 973-614-8011 1-800-603-6635
Web: www.handi-hut.com

LONG ISLAND NATIONAL CEMETERY

Administration / Public Restroom Renovation
And New Equipment Building

MECHANICAL DESIGN CALCULATIONS

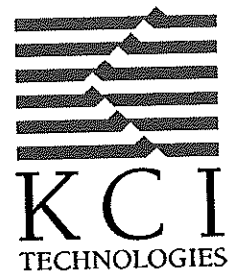
Project 815CM 3038

Mechanical Engineer:

KCI Technologies, Inc

Contact – Marc Frias, EIT
936 Ridgebrook Road
Sparks, MD 21152

KCI Project No: 28133363.03A



January 13, 2014

Air System Sizing Summary for VRF - OA - OU-101

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:10PM

Air System Information

Air System Name VRF - OA - OU-101
Equipment Class TERM
Air System Type VRF

Number of zones 5
Floor Area 1790.0 ft²
Location New York La Guardia, New York

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM Sum of space airflow rates
Space CFM Individual peak space loads

Calculation Months Jan to Dec
Sizing Data Calculated

Ventilation Fan Sizing Data

Actual max CFM 192 CFM
Standard CFM 192 CFM
Actual max CFM/ft² 0.11 CFM/ft²

Fan motor BHP 0.03 BHP
Fan motor kW 0.02 kW
Fan static 0.50 in wg

Outdoor Ventilation Air Data

Design airflow CFM 192 CFM
CFM/ft² 0.11 CFM/ft²

CFM/person 11.32 CFM/person

Zone Sizing Summary for VRF - OA - OU-101

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:10PM

Air System Information

Air System Name VRF - OA - OU-101
Equipment Class TERM
Air System Type VRF

Number of zones 5
Floor Area 1790.0 ft²
Location New York La Guardia, New York

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM Sum of space airflow rates
Space CFM Individual peak space loads

Calculation Months Jan to Dec
Sizing Data Calculated

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft ²)	Zone CFM/ft ²
Zone 1	10.6	492	492	Jun 1700	12.2	620.0	0.79
Zone 2	16.3	763	763	Jul 1700	6.2	500.0	1.53
Zone 3	10.5	484	484	Jul 1700	3.9	180.0	2.69
Zone 4	11.3	522	522	Aug 1700	1.2	60.0	8.69
Zone 5	13.5	627	627	Oct 1400	7.3	430.0	1.46

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Load
Zone 1	13.2	10.7	77.6 / 65.3	57.5 / 56.4	-	Jul 1400
Zone 2	20.5	17.5	78.1 / 64.6	56.8 / 55.6	-	Jul 1600
Zone 3	13.0	11.3	78.0 / 64.2	56.3 / 55.0	-	Jul 1600
Zone 4	11.7	11.5	76.6 / 62.6	56.2 / 54.8	-	Sep 1600
Zone 5	15.1	13.4	76.7 / 63.8	56.9 / 55.7	-	Oct 1300

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @ 20.0 °F (gpm)	Fan Design AirFlow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design AirFlow (CFM)
Zone 1	13.9	64.9 / 91.1	-	492	0.073	0.058	37
Zone 2	10.3	65.0 / 77.5	-	763	0.113	0.089	70
Zone 3	6.8	64.2 / 77.3	-	484	0.072	0.057	51
Zone 4	1.2	69.6 / 71.7	-	522	0.077	0.061	4
Zone 5	8.7	66.9 / 79.7	-	627	0.093	0.074	31

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
100 Vestibule / Lobby	1	3.1	Jun 1700	145	3.6	190.0	0.76
101 Public Toilet F	1	4.4	Jun 1700	202	5.1	210.0	0.96
126 Public Toilet M	1	3.0	Jun 1700	138	3.4	200.0	0.69
118 Kiosk	1	0.2	Aug 1400	7	0.1	20.0	0.36
Zone 2							
124 Lounge / Kitchenette	1	12.8	Jul 1700	592	4.0	210.0	2.82
119 Corridor	1	2.6	Jul 1600	121	1.8	150.0	0.81
120 HAC	1	0.3	Jul 1400	14	0.1	40.0	0.35

Zone Sizing Summary for VRF - OA - OU-101

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:10PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
121 Staff Tlt	1	0.4	Aug 1400	18	0.1	50.0	0.36
125 Staff Tlt	1	0.4	Jul 1400	18	0.1	50.0	0.35
Zone 3							
123 Meeting Rm	1	10.5	Jul 1700	484	3.9	180.0	2.69
Zone 4							
106 IT Closet	1	11.3	Aug 1700	522	1.2	60.0	8.69
Zone 5							
116 Reception Wkst	1	6.0	Oct 1300	279	2.7	130.0	2.14
117 Lobby	1	7.5	Oct 1400	348	4.6	300.0	1.16

Air System Design Load Summary for VRF - OA - OU-101

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:10PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 91.6 °F / 73.9 °F			HEATING OA DB / WB 13.0 °F / 10.4 °F		
	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
ZONE LOADS						
Window & Skylight Solar Loads	395 ft²	13761	-	395 ft²	-	-
Wall Transmission	1790 ft²	3629	-	1790 ft²	6912	-
Roof Transmission	1780 ft²	4949	-	1780 ft²	4779	-
Window Transmission	395 ft²	3892	-	395 ft²	15558	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	1790 ft²	0	-	1790 ft²	3565	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	2148 W	7329	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	4000 W	13648	-	0	0	-
People	17	4165	3485	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	5615	1910	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	56987	5395	-	30814	0
Zone Conditioning	-	56055	5395	-	30433	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	192 CFM	0	-	192 CFM	0	-
Ventilation Load	192 CFM	3216	3550	192 CFM	11724	0
Ventilation Fan Load	192 CFM	71	-	192 CFM	-71	-
Space Fan Coil Fans	-	1156	-	-	-1156	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	60498	8945	-	40929	0
Terminal Unit Cooling	-	60498	8959	-	0	0
Terminal Unit Heating	-	0	-	-	40931	-
>> Total Conditioning	-	60498	8959	-	40931	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Air System Sizing Summary for VRF - OA - OU-102

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:11PM

Air System Information

Air System Name VRF - OA - OU-102
Equipment Class TERM
Air System Type VRF

Number of zones 4
Floor Area 1465.0 ft²
Location New York La Guardia, New York

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM Sum of space airflow rates
Space CFM Individual peak space loads

Calculation Months Jan to Dec
Sizing Data Calculated

Ventilation Fan Sizing Data

Actual max CFM 163 CFM
Standard CFM 163 CFM
Actual max CFM/ft² 0.11 CFM/ft²

Fan motor BHP 0.02 BHP
Fan motor kW 0.02 kW
Fan static 0.50 in wg

Outdoor Ventilation Air Data

Design airflow CFM 163 CFM
CFM/ft² 0.11 CFM/ft²

CFM/person 10.86 CFM/person

Zone Sizing Summary for VRF - OA - OU-102

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:11PM

Air System Information

Air System Name: VRF - OA - OU-102
Equipment Class: TERM
Air System Type: VRF

Number of zones: 4
Floor Area: 1465.0 ft²
Location: New York La Guardia, New York

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM: Sum of space airflow rates
Space CFM: Individual peak space loads

Calculation Months: Jan to Dec
Sizing Data: Calculated

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft ²)	Zone CFM/ft ²
Zone 1	12.4	574	574	Jun 1700	8.7	400.0	1.44
Zone 2	21.4	999	999	Oct 1300	6.8	340.0	2.94
Zone 3	12.7	588	588	Jun 1700	8.1	360.0	1.63
Zone 4	12.4	601	601	Sep 1300	6.6	365.0	1.65

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Load
Zone 1	15.7	13.1	78.2 / 65.0	57.1 / 55.8	-	Jul 1400
Zone 2	23.2	21.5	76.8 / 63.5	56.8 / 55.6	-	Sep 1400
Zone 3	14.9	13.1	77.0 / 63.7	56.3 / 55.0	-	Jul 1400
Zone 4	15.0	12.8	77.7 / 65.0	57.9 / 56.7	-	Jul 1400

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @ 20.0 °F (gpm)	Fan Design AirFlow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design AirFlow (CFM)
Zone 1	12.2	64.1 / 83.9	-	574	0.085	0.067	59
Zone 2	8.6	68.7 / 76.7	-	999	0.148	0.117	30
Zone 3	8.9	67.4 / 81.4	-	588	0.087	0.069	22
Zone 4	9.6	65.1 / 79.9	-	601	0.089	0.071	52

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
102 Directors Office	1	4.6	Jun 1700	214	3.0	185.0	1.16
103 Assistant Director	1	4.2	Jun 1700	194	2.8	120.0	1.62
104 Cemetery Rk Wkst	1	3.6	Jun 1700	166	2.8	95.0	1.74
Zone 2							
112 Kitchenette	1	6.9	Jul 1400	318	0.2	80.0	3.98
113 Clerk Wkst	1	6.2	Oct 1300	289	2.7	105.0	2.75
114 Clerk Wkst	1	8.5	Oct 1300	392	3.9	155.0	2.53
Zone 3							
105 Operational Center	1	12.7	Jun 1700	588	8.1	360.0	1.63
Zone 4							
109 Office Supply	1	2.3	Jul 1000	106	1.4	125.0	0.85

Zone Sizing Summary for VRF - OA - OU-102

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:11PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
110 Budget Analyst	1	5.2	Aug 1300	243	2.7	120.0	2.02
111 Office Supervisor	1	5.5	Oct 1300	253	2.5	120.0	2.11

Air System Design Load Summary for VRF - OA - OU-102

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:11PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1400			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 91.6 °F / 73.9 °F			HEATING OA DB / WB 13.0 °F / 10.4 °F		
	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
ZONE LOADS						
Window & Skylight Solar Loads	457 ft²	12974	-	457 ft²	-	-
Wall Transmission	1468 ft²	2721	-	1468 ft²	5669	-
Roof Transmission	1465 ft²	4470	-	1465 ft²	3933	-
Window Transmission	457 ft²	4393	-	457 ft²	18000	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	1185 ft²	0	-	1185 ft²	2591	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	1758 W	5998	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	2300 W	7848	-	0	0	-
People	15	3675	3075	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	11615	1910	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	53693	4985	-	30193	0
Zone Conditioning	-	53310	4985	-	30448	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	163 CFM	0	-	163 CFM	0	-
Ventilation Load	163 CFM	2733	3102	163 CFM	9948	0
Ventilation Fan Load	163 CFM	60	-	163 CFM	-60	-
Space Fan Coil Fans	-	1106	-	-	-1106	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	57209	8087	-	39229	0
Terminal Unit Cooling	-	57209	8077	-	0	0
Terminal Unit Heating	-	0	-	-	39229	-
>> Total Conditioning	-	57209	8077	-	39229	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Air System Sizing Summary for ERV - OA - ERV-101

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:16PM

Air System Information

Air System Name ERV - OA - ERV-101
Equipment Class TERM
Air System Type VRF

Number of zones 4
Floor Area 620.0 ft²
Location New York La Guardia, New York

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM Sum of space airflow rates
Space CFM Individual peak space loads

Calculation Months Jan to Dec
Sizing Data Calculated

Ventilation Fan Sizing Data

Actual max CFM 37 CFM
Standard CFM 37 CFM
Actual max CFM/ft² 0.06 CFM/ft²

Fan motor BHP 0.01 BHP
Fan motor kW 0.00 kW
Fan static 0.50 in wg

Outdoor Ventilation Air Data

Design airflow CFM 37 CFM
CFM/ft² 0.06 CFM/ft²

CFM/person 0.00 CFM/person

Zone Sizing Summary for ERV - OA - ERV-101

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:16PM

Air System Information

Air System Name ERV - OA - ERV-101
Equipment Class TERM
Air System Type VRF

Number of zones 4
Floor Area 620.0 ft²
Location New York La Guardia, New York

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM Sum of space airflow rates
Space CFM Individual peak space loads

Calculation Months Jan to Dec
Sizing Data Calculated

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft ²)	Zone CFM/ft ²
Zone 1	3.1	145	145	Jun 1700	3.6	190.0	0.76
Zone 2	4.4	202	202	Jun 1700	5.1	210.0	0.96
Zone 3	3.0	138	138	Jun 1700	3.4	200.0	0.69
Zone 4	0.2	7	7	Aug 1400	0.1	20.0	0.36

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Load
Zone 1	3.4	3.2	77.8 / 64.2	57.5 / 56.2	-	Jul 1500
Zone 2	4.7	4.4	77.3 / 63.6	57.0 / 55.7	-	Jun 1700
Zone 3	3.3	3.0	77.9 / 64.3	57.5 / 56.2	-	Jul 1600
Zone 4	0.2	0.2	79.3 / 65.3	57.6 / 56.3	-	Jul 1500

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design AirFlow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design AirFlow (CFM)
Zone 1	4.2	64.7 / 91.3	-	145	0.021	0.017	11
Zone 2	5.6	65.5 / 91.1	-	202	0.030	0.024	13
Zone 3	4.0	64.3 / 91.1	-	138	0.020	0.016	12
Zone 4	0.1	60.6 / 76.5	-	7	0.001	0.001	1

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
100 Vestibule / Lobby	1	3.1	Jun 1700	145	3.6	190.0	0.76
Zone 2							
101 Public Toilet F	1	4.4	Jun 1700	202	5.1	210.0	0.96
Zone 3							
126 Public Toilet M	1	3.0	Jun 1700	138	3.4	200.0	0.69
Zone 4							
118 Kiosk	1	0.2	Aug 1400	7	0.1	20.0	0.36

Air System Design Load Summary for ERV - OA - ERV-101

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:16PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 92.0 °F / 74.0 °F			HEATING OA DB / WB 13.0 °F / 10.4 °F		
	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
ZONE LOADS						
Window & Skylight Solar Loads	190 ft²	3682	-	190 ft²	-	-
Wall Transmission	480 ft²	612	-	480 ft²	1854	-
Roof Transmission	620 ft²	1641	-	620 ft²	1665	-
Window Transmission	190 ft²	1889	-	190 ft²	7484	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	620 ft²	0	-	620 ft²	1226	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	744 W	2538	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	10363	0	-	12228	0
Zone Conditioning	-	9813	0	-	11832	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	37 CFM	0	-	37 CFM	0	-
Ventilation Load	37 CFM	633	794	37 CFM	2234	0
Ventilation Fan Load	37 CFM	14	-	37 CFM	-14	-
Space Fan Coil Fans	-	197	-	-	-197	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	10657	794	-	13855	0
Terminal Unit Cooling	-	10657	793	-	13857	-
Terminal Unit Heating	-	0	-	-	13857	0
>> Total Conditioning	-	10657	793	-	13857	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Air System Sizing Summary for ERV - OA - ERV-102

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:28PM

Air System Information

Air System Name ERV - OA - ERV-102
Equipment Class TERM
Air System Type VRF

Number of zones 19
Floor Area 2635.0 ft²
Location New York La Guardia, New York

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM Sum of space airflow rates
Space CFM Individual peak space loads

Calculation Months Jan to Dec
Sizing Data Calculated

Ventilation Fan Sizing Data

Actual max CFM 318 CFM
Standard CFM 318 CFM
Actual max CFM/ft² 0.12 CFM/ft²

Fan motor BHP 0.04 BHP
Fan motor kW 0.03 kW
Fan static 0.50 in wg

Outdoor Ventilation Air Data

Design airflow CFM 318 CFM
CFM/ft² 0.12 CFM/ft²

CFM/person 9.94 CFM/person

Zone Sizing Summary for ERV - OA - ERV-102

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:28PM

Air System Information

Air System Name ERV - OA - ERV-102
Equipment Class TERM
Air System Type VRF

Number of zones 19
Floor Area 2635.0 ft²
Location New York La Guardia, New York

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM Sum of space airflow rates
Space CFM Individual peak space loads

Calculation Months Jan to Dec
Sizing Data Calculated

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft ²)	Zone CFM/ft ²
Zone 1	5.5	253	253	Oct 1300	2.5	120.0	2.11
Zone 2	5.2	243	243	Aug 1300	2.7	120.0	2.02
Zone 3	2.3	106	106	Jul 1000	1.4	125.0	0.85
Zone 4	12.7	588	588	Jun 1700	8.1	360.0	1.63
Zone 5	8.5	392	392	Oct 1300	3.9	155.0	2.53
Zone 6	6.2	289	289	Oct 1300	2.7	105.0	2.75
Zone 7	6.9	318	318	Jul 1400	0.2	80.0	3.98
Zone 8	3.6	166	166	Jun 1700	2.8	95.0	1.74
Zone 9	4.2	194	194	Jun 1700	2.8	120.0	1.62
Zone 10	4.6	214	214	Jun 1700	3.0	185.0	1.16
Zone 11	6.0	279	279	Oct 1300	2.7	130.0	2.14
Zone 12	7.5	348	348	Oct 1400	4.6	300.0	1.16
Zone 13	12.8	592	592	Jul 1700	4.0	210.0	2.82
Zone 14	2.6	121	121	Jul 1600	1.8	150.0	0.81
Zone 15	0.4	18	18	Jul 1400	0.1	50.0	0.35
Zone 16	0.4	18	18	Aug 1400	0.1	50.0	0.36
Zone 17	0.3	14	14	Jul 1400	0.1	40.0	0.35
Zone 18	10.5	484	484	Jul 1700	3.9	180.0	2.69
Zone 19	11.3	522	522	Aug 1700	1.2	60.0	8.69

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Load
Zone 1	6.5	5.7	77.5 / 64.3	56.7 / 55.5	-	Sep 1400
Zone 2	6.4	5.5	78.2 / 64.9	57.2 / 56.0	-	Aug 1300
Zone 3	3.0	2.3	77.4 / 65.2	56.9 / 55.8	-	Jul 1200
Zone 4	15.0	13.1	77.0 / 63.8	56.3 / 55.0	-	Jul 1400
Zone 5	9.2	8.4	76.9 / 63.7	56.9 / 55.7	-	Oct 1300
Zone 6	6.8	6.3	76.8 / 63.5	56.7 / 55.4	-	Oct 1300
Zone 7	7.6	7.1	76.7 / 62.8	55.9 / 54.6	-	Jul 1500
Zone 8	4.2	3.7	77.7 / 64.6	57.2 / 56.0	-	Jul 1500
Zone 9	5.4	4.5	78.3 / 65.0	56.8 / 55.6	-	Jul 1600
Zone 10	6.3	5.1	78.6 / 65.3	56.6 / 55.4	-	Jul 1500
Zone 11	6.7	5.9	77.0 / 64.1	57.3 / 56.1	-	Sep 1300
Zone 12	8.7	7.3	77.1 / 64.9	57.7 / 56.5	-	Sep 1300
Zone 13	15.6	13.6	78.1 / 64.4	56.7 / 55.5	-	Jul 1600
Zone 14	3.4	2.7	77.7 / 65.6	57.4 / 56.3	-	Aug 1600
Zone 15	0.6	0.4	79.1 / 68.1	57.4 / 56.5	-	Jul 1300
Zone 16	0.6	0.4	79.3 / 68.2	57.6 / 56.6	-	Jul 1500
Zone 17	0.5	0.3	79.3 / 68.1	57.2 / 56.2	-	Jul 1400
Zone 18	13.2	11.3	78.0 / 64.3	56.3 / 55.1	-	Jul 1600

Zone Sizing Summary for ERV - OA - ERV-102

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:28PM

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Load
Zone 19	11.8	11.5	76.6 / 62.7	56.2 / 54.8	-	Sep 1600

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design AirFlow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design AirFlow (CFM)
Zone 1	3.7	65.1 / 78.8	-	253	0.037	0.030	22
Zone 2	4.0	64.7 / 79.8	-	243	0.036	0.028	22
Zone 3	1.8	65.6 / 81.4	-	106	0.016	0.012	8
Zone 4	8.9	67.4 / 81.4	-	588	0.087	0.069	22
Zone 5	4.6	67.9 / 78.8	-	392	0.058	0.046	14
Zone 6	3.2	67.5 / 77.7	-	289	0.043	0.034	11
Zone 7	0.4	69.2 / 70.3	-	318	0.047	0.037	5
Zone 8	3.4	65.9 / 84.8	-	166	0.024	0.019	11
Zone 9	4.1	63.3 / 82.6	-	194	0.029	0.023	22
Zone 10	4.5	62.8 / 82.1	-	214	0.032	0.025	26
Zone 11	3.3	67.2 / 78.1	-	279	0.041	0.033	13
Zone 12	5.5	66.9 / 81.5	-	348	0.051	0.041	18
Zone 13	6.8	64.8 / 75.5	-	592	0.088	0.069	53
Zone 14	2.3	65.5 / 82.9	-	121	0.018	0.014	9
Zone 15	0.3	60.4 / 76.8	-	18	0.003	0.002	3
Zone 16	0.3	60.5 / 76.2	-	18	0.003	0.002	3
Zone 17	0.2	60.4 / 76.8	-	14	0.002	0.002	2
Zone 18	6.8	64.2 / 77.3	-	484	0.072	0.057	51
Zone 19	1.2	69.6 / 71.7	-	522	0.077	0.061	4

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
111 Office Supervisor	1	5.5	Oct 1300	253	2.5	120.0	2.11
Zone 2							
110 Budget Analyst	1	5.2	Aug 1300	243	2.7	120.0	2.02
Zone 3							
109 Office Supply	1	2.3	Jul 1000	106	1.4	125.0	0.85
Zone 4							
105 Operational Center	1	12.7	Jun 1700	588	8.1	360.0	1.63
Zone 5							
114 Clerk Wkst	1	8.5	Oct 1300	392	3.9	155.0	2.53
Zone 6							
113 Clerk Wkst	1	6.2	Oct 1300	289	2.7	105.0	2.75
Zone 7							
112 Kitchenette	1	6.9	Jul 1400	318	0.2	80.0	3.98
Zone 8							
104 Cemetery Rk Wkst	1	3.6	Jun 1700	166	2.8	95.0	1.74
Zone 9							
103 Assistant Director	1	4.2	Jun 1700	194	2.8	120.0	1.62
Zone 10							
102 Directors Office	1	4.6	Jun 1700	214	3.0	185.0	1.16
Zone 11							
116 Reception Wkst	1	6.0	Oct 1300	279	2.7	130.0	2.14
Zone 12							

Zone Sizing Summary for ERV - OA - ERV-102

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:28PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
117 Lobby	1	7.5	Oct 1400	348	4.6	300.0	1.16
Zone 13							
124 Lounge / Kitchenette	1	12.8	Jul 1700	592	4.0	210.0	2.82
Zone 14							
119 Corridor	1	2.6	Jul 1600	121	1.8	150.0	0.81
Zone 15							
125 Staff Tlt	1	0.4	Jul 1400	18	0.1	50.0	0.35
Zone 16							
121 Staff Tlt	1	0.4	Aug 1400	18	0.1	50.0	0.36
Zone 17							
120 HAC	1	0.3	Jul 1400	14	0.1	40.0	0.35
Zone 18							
123 Meeting Rm	1	10.5	Jul 1700	484	3.9	180.0	2.69
Zone 19							
106 IT Closet	1	11.3	Aug 1700	522	1.2	60.0	8.69

Air System Design Load Summary for ERV - OA - ERV-102

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:28PM

ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 92.0 °F / 74.0 °F			HEATING OA DB / WB 13.0 °F / 10.4 °F		
	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	662 ft²	24046	-	662 ft²	-	-
Wall Transmission	2778 ft²	5669	-	2778 ft²	10727	-
Roof Transmission	2625 ft²	7818	-	2625 ft²	7048	-
Window Transmission	662 ft²	6580	-	662 ft²	26074	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	2355 ft²	0	-	2355 ft²	4930	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	3162 W	10789	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	6300 W	21496	-	0	0	-
People	32	7840	6560	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	17230	3820	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	101467	10380	-	48779	0
Zone Conditioning	-	98800	10380	-	47994	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	318 CFM	0	-	318 CFM	0	-
Ventilation Load	318 CFM	5387	5322	318 CFM	19356	0
Ventilation Fan Load	318 CFM	118	-	318 CFM	-118	-
Space Fan Coil Fans	-	2065	-	-	-2065	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	106370	15702	-	65167	0
Terminal Unit Cooling	-	106359	15824	-	0	0
Terminal Unit Heating	-	0	-	-	65184	-
>> Total Conditioning	-	106359	15824	-	65184	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

Air System Sizing Summary for Heating Only - Mech Rm

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:26PM

Air System Information

Air System Name Heating Only - Mech Rm
Equipment Class UNDEF
Air System Type SZCAV

Number of zones 1
Floor Area 275.0 ft²
Location New York La Guardia, New York

Sizing Calculation Information

Zone and Space Sizing Method:
Zone CFM Sum of space airflow rates
Space CFM Individual peak space loads

Calculation Months Jan to Dec
Sizing Data Calculated

Central Cooling Coil Sizing Data

Total coil load 0.5 Tons
Total coil load 5.7 MBH
Sensible coil load 5.4 MBH
Coil CFM at Jul 1300 298 CFM
Max block CFM 298 CFM
Sum of peak zone CFM 298 CFM
Sensible heat ratio 0.951
ft³/Ton 575.9
BTU/(hr-ft²) 20.8
Water flow @ 10.0 °F rise 1.15 gpm

Load occurs at Jul 1300
OA DB / WB 90.4 / 73.6 °F
Entering DB / WB 76.9 / 65.1 °F
Leaving DB / WB 60.0 / 58.9 °F
Coil ADP 58.1 °F
Bypass Factor 0.100
Resulting RH 54 %
Design supply temp. 58.0 °F
Zone T-stat Check 1 of 1 OK
Max zone temperature deviation 0.0 °F

Central Heating Coil Sizing Data

Max coil load 5.4 MBH
Coil CFM at Des Htg 298 CFM
Max coil CFM 298 CFM
Water flow @ 20.0 °F drop 0.55 gpm

Load occurs at Des Htg
BTU/(hr-ft²) 19.8
Ent. DB / Lvg DB 66.0 / 82.9 °F

Supply Fan Sizing Data

Actual max CFM 298 CFM
Standard CFM 298 CFM
Actual max CFM/ft² 1.09 CFM/ft²

Fan motor BHP 0.00 BHP
Fan motor kW 0.00 kW
Fan static 0.00 in wg

Outdoor Ventilation Air Data

Design airflow CFM 17 CFM
CFM/ft² 0.06 CFM/ft²

CFM/person 0.00 CFM/person

Zone Sizing Summary for Heating Only - Mech Rm

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:26PM

Air System Information

Air System Name Heating Only - Mech Rm
Equipment Class UNDEF
Air System Type SZCAV

Number of zones 1
Floor Area 275.0 ft²
Location New York La Guardia, New York

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM Sum of space airflow rates
Space CFM Individual peak space loads

Calculation Months Jan to Dec
Sizing Data Calculated

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft ²)	Zone CFM/ft ²
Zone 1	5.5	298	298	Jul 1000	4.6	275.0	1.09

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft ²)	Space CFM/ft ²
Zone 1							
122 Mechanical Rm	1	5.5	Jul 1000	298	4.6	275.0	1.09

Air System Design Load Summary for Heating Only - Mech Rm

Project Name: 28133363.03 - Long Island National Cemetery
Prepared by: KCI Technologies Inc.

11/13/2013
04:26PM

ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1300			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 90.4 °F / 73.6 °F			HEATING OA DB / WB 13.0 °F / 10.4 °F		
	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	42 ft²	2066	-	42 ft²	-	-
Wall Transmission	403 ft²	920	-	403 ft²	1556	-
Roof Transmission	275 ft²	876	-	275 ft²	738	-
Window Transmission	42 ft²	376	-	42 ft²	1654	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	275 ft²	0	-	275 ft²	691	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	330 W	1126	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	0	0	0	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	5364	0	-	4640	0
Zone Conditioning	-	5196	0	-	4452	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	298 CFM	0	-	298 CFM	0	-
Ventilation Load	17 CFM	254	280	17 CFM	998	0
Supply Fan Load	298 CFM	0	-	298 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	5450	280	-	5449	0
Central Cooling Coil	-	5450	280	-	0	0
Central Heating Coil	-	0	-	-	5449	-
>> Total Conditioning	-	5450	280	-	5449	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

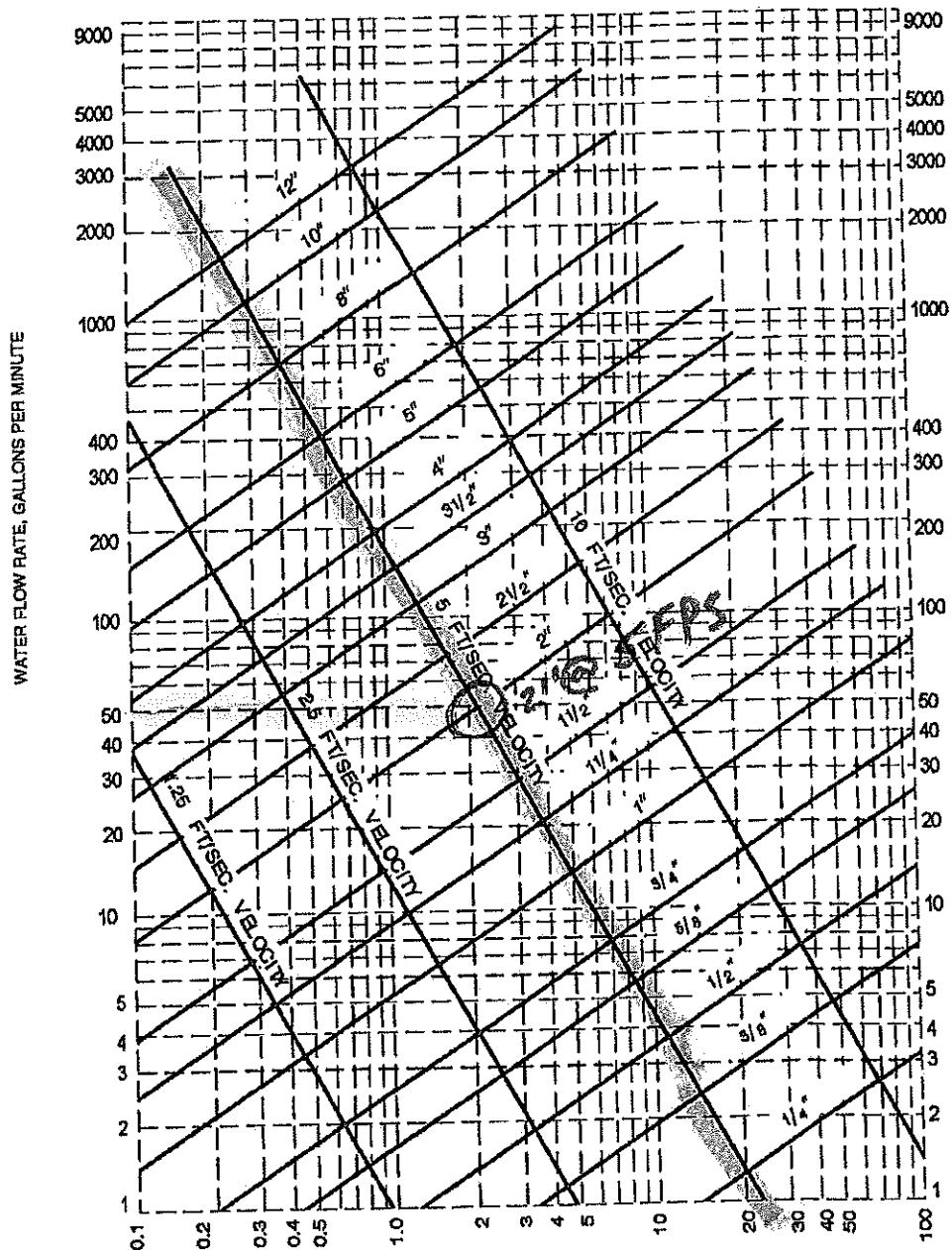
Long Island Cemetary - DOMESTIC WATER

Type	GPM/GPF/GPH	Quantity	WSFU EACH	WSFU
Water Closet	LF, FV 1.28	6	5.0	30.0
Urinal	1.0	2	2.0	4.0
Lavatory	0.5	6	0.5	3.0
Kitchen Sink	1.5	2	1.5	3.0
Service Sink	3.0	1	3.0	3.0
Hose Bib	2.5	1	2.5	2.5
Water Cooler	8 GPH	1	1.0	1.0

Total WSFU	46.5
-------------------	-------------

Domestic Water Feed 46.5 WSFU = 50 GPM Use 2" @ 5.0FPS

****NOTES:** SEE ATTACHED CHART
WSFU - WATER SUPPLY FIXTURE UNITS



Note: Fluid velocities in excess of 5 to 8 feet/second are not usually recommended.

FIGURE E103.3(3)
FRICTION LOSS IN SMOOTH PIPE* (TYPE L, ASTM B 88 COPPER TUBING)

SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gpm = 3.785 L/m, 1 psi = 6.895 kPa,
1 foot per second = 0.305 m/s.

- a. This chart applies to smooth new copper tubing with recessed (streamline) soldered joints and to the actual sizes of types indicated on the diagram.

LONG ISLAND NATIONAL CEMETERY

Administration / Public Restroom Renovation
And New Equipment Building

ELECTRICAL DESIGN CALCULATIONS

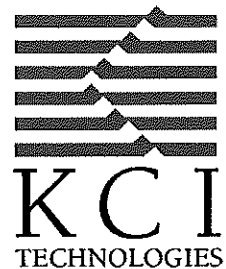
Project 815CM 3038

Electrical Engineer:

KCI Technologies, Inc

Contact – Case Smeenck, PE
936 Ridgebrook Road
Sparks, MD 21152

KCI Project No: 28133363.03A



January 13, 2014

SERVICE LOAD CALCULATIONS - LINC

31-Dec-13

BUILDING SQUARE FOOTAGE = 4,220 SQFT

Lighting Loads (per ASHRAE 90.1-2007) 1 VA/SF 4,220
 Demand Factor (per NEC Table 220.42) 4,220
 Total Lighting Loads

First	3,000	@	100%	3,000
From 3,001 to 120,000		@	35%	427
Remainder over 120,000		@	25%	0
Final Lighting Load =				3,427

General Receptacle Loads

General Receptacle Loads (per NEC Table 220.44)

Duplex Receptacles	180	53	9540
Quad Receptacles	360	10	3600
Total Receptacle Loads			13,140

First	10,000VA	@	100%	10000
Remainder Over 10,000VA		@	50%	1570
Final Receptacle Load =				11570

<u>Motor Loads</u>	<u>Pole</u>	<u>Load</u>	<u>Voltage</u>	<u>VA</u>
IU-101-120	2	1.727kW	208	1,727
ERV-101	1	18.3A	120	2,196
ERV-102	1	8.1A	120	972
EF-1	2	7.5A	208	1,560
UH-101	2	10A	208	2,080
WH-1	2	4500W	208	4,500
Total motor loads				13,035

Largest	@	125%	2812.5
Sum of all other motors	@	100%	10785
Total motor loads			13597.5

Average connected load 28,594 VA



ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS
936 RIDGEBROOK ROAD • SPARKS, MD 21152 • 410-316-7800 • (FAX) 410-316-7868

LIGHTNING PROTECTION CALCULATIONS - LINC

20-Dec-13

C1	0.25	Location Factor - Structure surrounded by taller structures or trees within a distance of 3H
Ng	3	Lightning Flash Density - Farmingdale, NY
	Length	128
	Width	57
	Height	22
Ae	45401	Equivalent Collection Area
Nd	0.034	Annual Threat of Occurrence $Nd=(Ng)(Ae)(C1)(10^{-6})$
C2	1.00	Construction Coefficient - Non-metallic roof, non-metallic structure
C3	1.00	Structure Contents Coefficient - Standard Value and noncombustible
C4	1.00	Structure Occupancy Coefficient - Normally occupied
C5	1.00	Lightning Consequence Coefficient - Continuity of facility services not required, no environmental impact
C	1.00	
Nc	0.296	Tolerable Lightning Frequency
Nc>Nd		
0.296>0.034		Lightning Protection Optional

Project Schedule

Date Dec 31, 2013
Project Name LINC
Project Number 3363.03
Project File LINC Litepro.PZP
Group Name <All Groups>
Power Density 1.00 Watts/Sq. Ft

Luminaires Used

TYPE	QTY	TEST#	DESCRIPTION
A	63	2PM3N_2_	Lithonia Lighti, 2PM3N 2 24T5HO 9LD PARAMAX PARABOLIC NARROW TROFF <i>LAMPS: (2) F24T5/HO, 1750 LUMENS</i> <i>BLST: QTP2x39-24T5HO/, WATTS= 41</i>
BE	2	11934RE_	Lithonia Lighti, 11934RE WH WIDE BAND VANITY WALL BRACKET <i>LAMPS: (2) F17T8/ADV835, 725 LUMENS</i> <i>BLST: , WATTS= 10</i>
CE	2	11934RE_	Lithonia Lighti, 11936RE WH WIDE BAND VANITY WALL BRACKET <i>LAMPS: (2) F32T8/ADV835, 925 LUMENS</i> <i>BLST: , WATTS= 18</i>
D	3	C_2_32_M	Lithonia Lighti, C 2 32 MVOLT GEB10IS GENERAL PURPOSE CHANNEL, 4' 2L <i>LAMPS: (2) F32T8, 2900 LUMENS</i> <i>BLST: , WATTS= 70</i>
E	17	LF6N_1_3	Lithonia Lighti, LF6N 1/32TRT MVOLT F6B5 6" BLACK BAFFLE DOWNLIGHT <i>LAMPS: (1) CF32DT/E/IN/835, 2400 LUMENS</i> <i>BLST: , WATTS= 36</i>

Project Area Summary

Date Dec 31, 2013
Project Name LINC
Project Number 3363.03
Project File LINC Litepro.PZP
Group Name <All Groups>
Power Density 1.00 Watts/Sq. Ft

Project Area Summary

AREA NAME	I/O	DIMENSIONS	LUMS/ASMS	WATTS/SQ FT	QTY
124 Lounge	IN	12.71x18.97x9.00Ft	A (Lum) (3) E (Lum) (2)	0.93	1
Corridor	IN	32.00x4.50x9.00Ft	A (Lum) (3)	0.85	1
123 Meeting	IN	11.06x17.84x9.00Ft	A (Lum) (4)	0.93	1
108 IT	IN	10.75x5.65x9.00Ft	A (Lum) (2)	1.40	1
122 Mech	IN	12.30x22.38x9.00Ft	D (Lum) (3)	0.76	1
125 Staff Tlt	IN	7.69x6.26x9.00Ft	BE (Lum) (1) E (Lum) (1)	0.96	1
121 Staff Tlt	IN	7.51x6.26x9.00Ft	BE (Lum) (1) E (Lum) (1)	0.98	1
126 Pub Tlt M	IN	18.32x10.94x9.00Ft	CE (Lum) (1) E (Lum) (3)	0.63	1
120 HAC	IN	5.28x7.67x9.00Ft	E (Lum) (1)	0.89	1
118 Kiosk	IN	5.78x3.24x9.00Ft	E (Lum) (1)	1.92	1
100 Lobby	IN	16.42x12.90x9.00Ft	A (Lum) (6)	1.31	1
117 Lobby	IN	39.83x12.52x9.00Ft	A (Lum) (8) E (Lum) (2)	0.96	1
101 Pub Tlt F	IN	19.10x10.90x9.00Ft	CE (Lum) (1) E (Lum) (3)	0.61	1
102 Office	IN	10.09x18.49x9.00Ft	A (Lum) (6)	1.32	1
115 Corrd	IN	28.92x15.40x9.00Ft	A (Lum) (7) E (Lum) (1)	0.96	1
103 Office	IN	10.00x11.80x9.00Ft	A (Lum) (4)	1.39	1
104 Work St	IN	11.91x8.07x9.00Ft	A (Lum) (3)	1.28	1
111 Office	IN	12.48x10.63x9.00Ft	A (Lum) (4)	1.41	1
110 Office	IN	11.82x10.63x9.00Ft	A (Lum) (4)	1.40	1

Prepared By:

Prepared For:

Generated by LitePro version 2.030, which is provided and supported by Columbia Lighting, Alera, and Prescolite. Calculations are performed in accordance with IESNA procedures. Columbia, Alera, and Prescolite are not responsible for the light output of lamps and ballasts, or design variables not shown.

LitePro

Project Area Summary**(continued)**

AREA NAME	I/O	DIMENSIONS	LUMS/ASMS	WATTS/SQ FT	QTY
127 Corridor	IN	22.47x5.43x9.00Ft	A (Lum) (3)	1.01	1
105 Op Center	IN	22.65x15.35x9.00Ft	A (Lum) (6)	0.76	1
107 Urn	IN	4.05x2.00x9.00Ft	E (Lum) (1)	4.44	1
108 Uni Stor	IN	4.00x2.00x9.00Ft	E (Lum) (1)	4.50	1

Project Calculation Summary

Date Dec 31, 2013
Project Name LINC
Project Number 3363.03
Project File LINC Litepro.PZP
Group Name <All Groups>
Power Density 1.00 Watts/Sq. Ft

Project Calc Summary

AREA NAME	I/O	DIMENSIONS	GRID / TYPE / GROUP	# PTS	SPAC	AVE	MAX	MIN	Mx/Mn	Av/Mn
124 Lounge	IN	12.71x18.97x9.00Ft	New Grid / H-H / <+>	205	1.00	32.24	54.77	7.52	7.28	4.29
Corridor	IN	32.00x4.50x9.00Ft	New Grid / H-H / <+>	160	1.00	18.27	24.70	7.90	3.13	2.31
123 Meeting	IN	11.06x17.84x9.00Ft	New Grid / H-H / <+>	178	1.00	29.74	45.78	2.10	21.77	14.14
108 IT	IN	10.75x5.65x9.00Ft	New Grid / H-H / <+>	64	1.00	26.11	33.79	15.79	2.14	1.65
122 Mech	IN	12.30x22.38x9.00Ft	New Grid / H-H / <+>	299	1.00	28.48	53.16	7.77	6.84	3.67
125 Staff Tlt	IN	7.69x6.26x9.00Ft	New Grid / H-H / <+>	56	1.00	21.71	32.25	10.83	2.98	2.01
121 Staff Tlt	IN	7.51x6.26x9.00Ft	New Grid / H-H / <+>	56	1.00	22.00	32.95	10.66	3.09	2.06
126 Pub Tlt M	IN	18.32x10.94x9.00Ft	New Grid / H-H / <+>	209	1.00	23.58	38.92	8.72	4.46	2.70
120 HAC	IN	5.28x7.67x9.00Ft	New Grid / H-H / <+>	48	1.00	19.81	29.77	10.27	2.90	1.93
118 Kiosk	IN	5.78x3.24x9.00Ft	New Grid / H-H / <+>	24	1.00	26.63	33.65	18.00	1.87	1.48
100 Lobby	IN	16.42x12.90x9.00Ft	New Grid / H-H / <+>	197	1.00	37.58	49.29	13.58	3.63	2.77
117 Lobby	IN	39.83x12.52x9.00Ft	New Grid / H-H / <+>	434	1.00	32.82	62.32	8.72	7.15	3.76
101 Pub Tlt F	IN	19.10x10.90x9.00Ft	New Grid / H-H /	---	---	---	---	---	---	---
102 Office	IN	10.09x18.49x9.00Ft	New Grid / H-H / <+>	190	1.00	37.68	48.97	16.89	2.90	2.23
115 Corrd	IN	28.92x15.40x9.00Ft	New Grid / H-H / <+>	347	1.00	30.89	41.59	11.17	3.73	2.77
103 Office	IN	10.00x11.80x9.00Ft	New Grid / H-H / <+>	120	1.00	35.47	43.49	23.03	1.89	1.54
104 Work St	IN	11.91x8.07x9.00Ft	New Grid / H-H / <+>	96	1.00	31.27	43.10	14.21	3.03	2.20
111 Office	IN	12.48x10.63x9.00Ft	New Grid / H-H / <+>	122	1.00	34.69	44.05	13.39	3.29	2.59
110 Office	IN	11.82x10.63x9.00Ft	New Grid / H-H / <+>	124	1.00	36.07	47.40	14.05	3.37	2.57
127 Corridor	IN	22.47x5.43x9.00Ft	New Grid / H-H / <+>	138	1.00	21.83	27.10	9.92	2.73	2.20
105 Op Center	IN	22.65x15.35x9.00Ft	New Grid / H-H / <+>	339	1.00	25.79	37.13	5.74	6.47	4.50
107 Urn	IN	4.05x2.00x9.00Ft	New Grid / H-H / <+>	8	1.00	31.68	33.25	30.11	1.10	1.05
108 Uni Stor	IN	4.00x2.00x9.00Ft	New Grid / H-H / <+>	8	1.00	31.67	33.28	30.02	1.11	1.05

Prepared By:

Prepared For:

Generated by LitePro version 2.030, which is provided and supported by Columbia Lighting, Alera, and Prescolite. Calculations are performed in accordance with IESNA procedures. Columbia, Alera, and Prescolite are not responsible for the light output of lamps and ballasts, or design variables not shown.

LitePro

Project Schedule

Date Jan 08, 2014
Project Name LINC
Project Number 3363.03
Project File LINC Litepro.PZP
Group Name <All Groups>
Power Density 0.37 Watts/Sq. Ft

Luminaires Used

TYPE	QTY	TEST#	DESCRIPTION
J	24	VAP_79LE	Lithonia Lighti, VAP 79LED/57 SYM 79W LED ARCHWAY? PASSAGE? POLY 350mA LAMPS: (1) PHILIPS REBEL ES, 6116 LUMENS BLST: LED DRIVER, WATTS= 79

Project Area Summary

Date Jan 08, 2014
Project Name LINC
Project Number 3363.03
Project File LINC Litepro.PZP
Group Name <All Groups>
Power Density 0.37 Watts/Sq. Ft

Project Area Summary

AREA NAME	I/O	DIMENSIONS	LUMS/ASMS	WATTS/SQ FT	QTY
ESB	IN	57.10x90.60x14.00Ft	J (Lum) (24)	0.37	1

Prepared By:

Prepared For:

Generated by LitePro version 2.030, which is provided and supported by Columbia Lighting, Alera, and Prescolite. Calculations are performed in accordance with IESNA procedures. Columbia, Alera, and Prescolite are not responsible for the light output of lamps and ballasts, or design variables not shown.

LitePro

Project Calculation Summary

Date Jan 08, 2014
Project Name LINC
Project Number 3363.03
Project File LINC Litepro.PZP
Group Name <All Groups>
Power Density 0.37 Watts/Sq. Ft

Project Calc Summary

AREA NAME	I/O	DIMENSIONS	GRID / TYPE / GROUP	# PTS	SPAC	AVE	MAX	MIN	Mx/Mn	Av/Mn
ESB	IN	57.10x90.60x14.00Ft	New Grid / H-H / <+>	5130	1.00	20.49	41.94	4.32	9.70	4.74

Prepared By:

Prepared For:

Generated by LitePro version 2.030, which is provided and supported by Columbia Lighting, Alera, and Prescolite. Calculations are performed in accordance with IESNA procedures. Columbia, Alera, and Prescolite are not responsible for the light output of lamps and ballasts, or design variables not shown.

LitePro

PV Life Cycle Cost (Simple Payback Straight Line)

Based on the roof configuration a 25kW PV system would be the optimal size PV System to install. Building loads are estimated to be 42,100Kwh per year with a cost of \$0.133 per Kwh or \$5600.68 per year. A 25Kw PV system is estimated to produce 31,814 Kwh per year resulting in a savings of \$4,231.26 per year. Cost of a PV installation is estimated to be \$5.00 per watt or \$125,000.00 for a 25Kw system. If LIPA provides a \$2.25 credit for each watt installed the cost to install is reduced to \$68,750.00. Payback based on avoided electric cost is calculated to be 29.54 years without the LIPA credit and 16.25 years with the LIPA credit. Refer to the attachments for further information.

Attachments:

- Excel Spread sheet of calculations
- PvWatt Energy Cost Saving Analysis
- Berkeley Lab Installed Cost Article
- LIPA Electric bill
- Panasonic HIT Solar Cell

Assumed Electrical Useage	Quantity	Hrs /day	Days /yr.	Total power Per year
Lighting @ 1.5watts/sq ft.	7728	10	260	20092800
CCTV 1 Watt /hr	1	24	365	8760
Equipment Heaters 4 each at 750	3000	12	89	3204000
Missalaneous load @ 1.o Watts per Sq ft	5152	10	365	18804800
Total KWH per year				42110.36
Cost per kWh				\$0.13
Annual Bill				\$5,600.68
 PV Production				 31814
Cost per kWh				\$0.13
Savings				\$4,231.26

Cost of 25Kw PV installed without credits	25,000
use \$5.00 per watt	\$5.00
System cost	\$125,000.00

Cost of 25Kw PV Installed with credits	25,000
use \$5.00 per watt - \$2.25 credit	\$2.75
System cost	\$68,750.00

Simple payback with out credits	125,000
Divide by saving per year	\$4,231.26
Years Payback	29.54

Simple payback with credits	68,750
Divide by saving per year	\$4,231.26
Years Payback	16.25



AC Energy & Cost Savings



Long Island National Cemetery 25 KW PV install

Station Identification		Results			
Cell ID:	0270370	Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
State:	New York	1	3.33	2056	272.98
Latitude:	40.8 ° N	2	4.19	2325	308.69
Longitude:	73.2 ° W	3	5.19	3066	407.07
PV System Specifications		4	5.29	2921	387.82
DC Rating:	25.0 kW	5	5.59	3123	414.64
DC to AC Derate Factor:	0.770	6	5.80	3052	405.21
AC Rating:	19.2 kW	7	5.47	2909	386.23
Array Type:	Fixed Tilt	8	5.48	2933	389.41
Array Tilt:	40.8 °	9	5.31	2823	374.81
Array Azimuth:	180.0 °	10	4.73	2696	357.95
Energy Specifications		11	3.54	1998	265.27
Cost of Electricity:	13.3 ¢/kWh	12	3.17	1913	253.99
		Year	4.76	31814	4223.94
<input type="button" value="Output Hourly Performance Data"/>		<input type="button" value="Output Results as Text"/>			
(Gridded data is monthly, hourly output not available.)		Saving Text from a Browser			
<input type="button" value="Run PVWATTS v.2 for another location"/>		<input type="button" value="Run PVWATTS v.1"/>			

Please send questions and comments to Webmaster
Disclaimer and copyright notice.

RReDC home page (<http://rredc.nrel.gov>)