EASE EQUIPMENT ANCHORAGE & SEISMIC ENGINEERING
www.equipmentanchorage.com

CHATSWORTH PRODUCTS, INC.

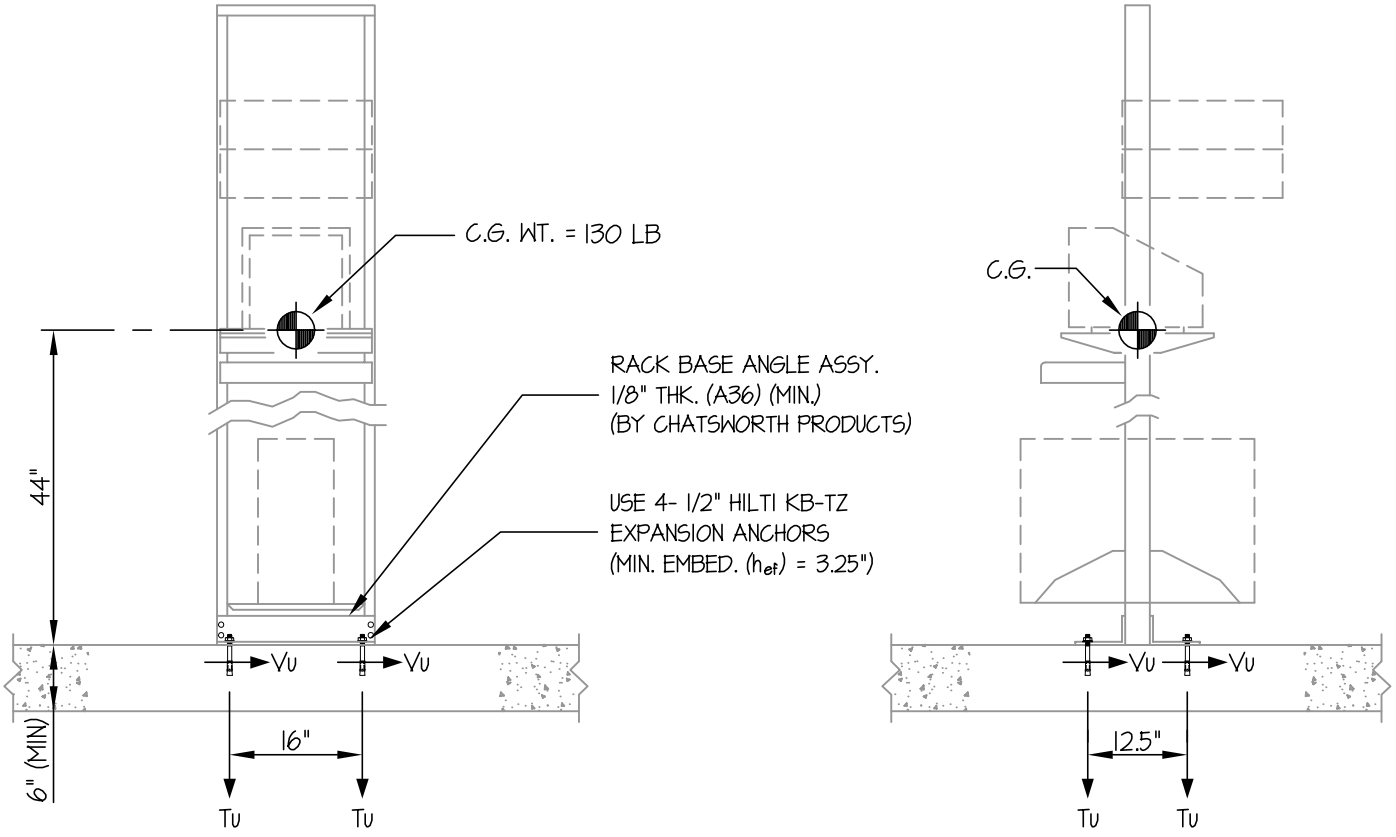
STANDARD RACK

DES. J. ROBERSON
JOB NO. 11-1131
DATE 6/19/12

SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE

CONCRETE SLAB



FRONT ELEVATION

SIDE ELEVATION

NOTES:

1. FORCES ARE DETERMINED PER 2010 CALIFORNIA BUILDING CODE AND ASCE 7-05
   STRENGTH DESIGN IS USED.

   HORIZONTAL FORCE (Eh) = 1.20 Wp (S_{DS} = 2.00, a_p = 2.5, Ip = 1.5, Rp = 2.5, z/h = 0.0)
   VERTICAL FORCE (Ev) = 0.40 Wp

2. CENTER OF GRAVITY (C.G.) WEIGHT IS A MAXIMUM. THIS PRE-APPROVAL ENCOMPASSES
   ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.

3. STRUCTURAL ENGINEER OF RECORD SHALL PROVIDE SUPPORT
   STRUCTURE TO SUPPORT WEIGHTS AND FORCES SHOWN.

REGISTERED PROFESSIONAL ENGINEER
JONATHAN ROBERSON
No. 4197
EXP. 6-30-2014
STRUCTURAL
STATE OF CALIFORNIA
6/19/12

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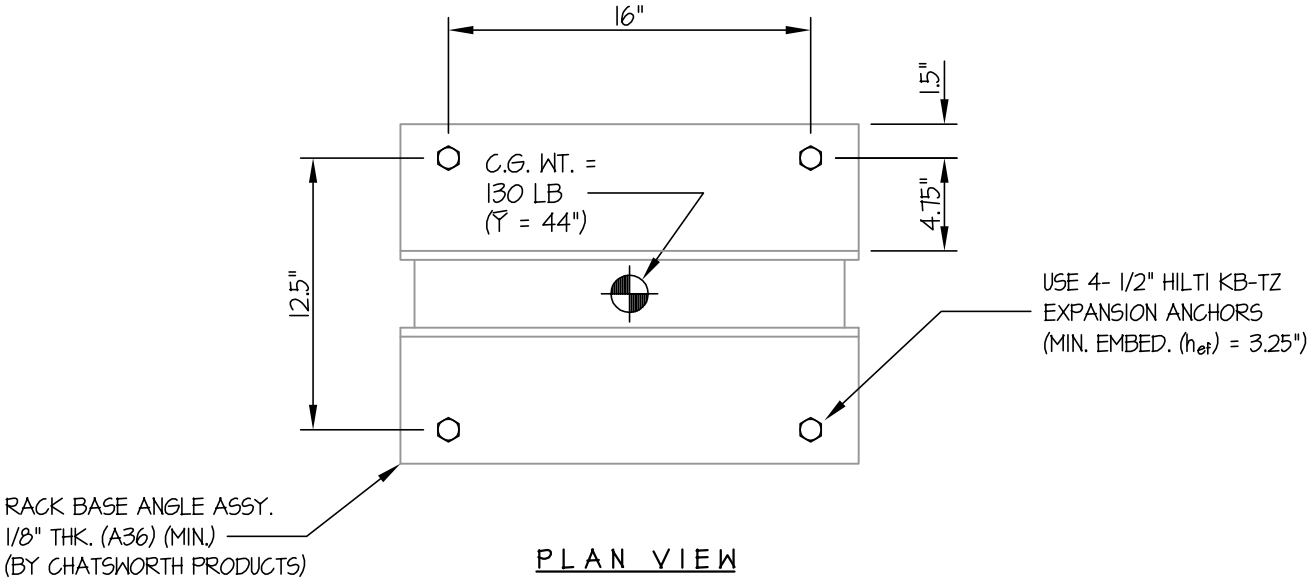
SHEET 2 OF 2 SHEETS

SEISMIC ANCHORAGE — CONCRETE SLAB



PLAN VIEW

LOADS: PER 2010 CALIFORNIA BUILDING CODE AND ASCE 7-05
(STRENGTH DESIGN IS USED) (S_{DS} = 2.00, a_p = 2.5, I_p = 1.5, R_p = 2.5, z/h = 0.0)

WEIGHT = 130 LB

HORIZONTAL FORCE (E_h) = $1.20W_p$ = 156 LB

VERTICAL FORCE (E_v) = $0.40W_p$ = 52 LB

BOLT SPECS : 1/2"ø HILTI KB-TZ (h_{ef}=3.25")

$\phi T = 0.75\phi N_n$ = 2396 LB/BOLT (TENSION)

$\phi V = 0.75\phi V_n$ = 3232 LB/BOLT (SHEAR)

BOLT FORCES:

TENSION (T)

$$T_{U\ MAXIMUM} = \left[\frac{156\#(44'')}{2_{BOLTS}(16'')} \times (0.3)\right] + \frac{156\#(44'')}{2_{BOLTS}(12.5'')} - \frac{130\#(0.9) - 52\#}{4_{BOLTS}} = 325\ \text{LB/BOLT (MAX)}$$

(HORIZ. - SIDE TO SIDE) (HORIZ. - FRONT TO BACK) (WEIGHT (0.9) - E_v)

SHEAR (V) (ASSUMES HALF THE NUMBER OF BOLTS)

$$V_{U\ MAXIMUM} = \frac{156\#}{2\ BOLTS} = 78\ \text{LB/BOLT (MAX)}$$

PRYING

M_{PRYING} = 325#(4.75") = 1594"#

T_{PRYING} = 1594"#/1.5" = 1029"#

T_{MAX} = 1029"# + 325# = 1354 LB/BOLT (MAX)

UNITY CHECK:

$$\left(\frac{T_U}{\phi T}\right) + \left(\frac{V_U}{\phi V}\right) \le 1.2 \quad \left(\frac{1354}{2396}\right) + \left(\frac{78}{3232}\right) = 0.59 \le 1.2 \ \therefore \ \text{O.K.}$$

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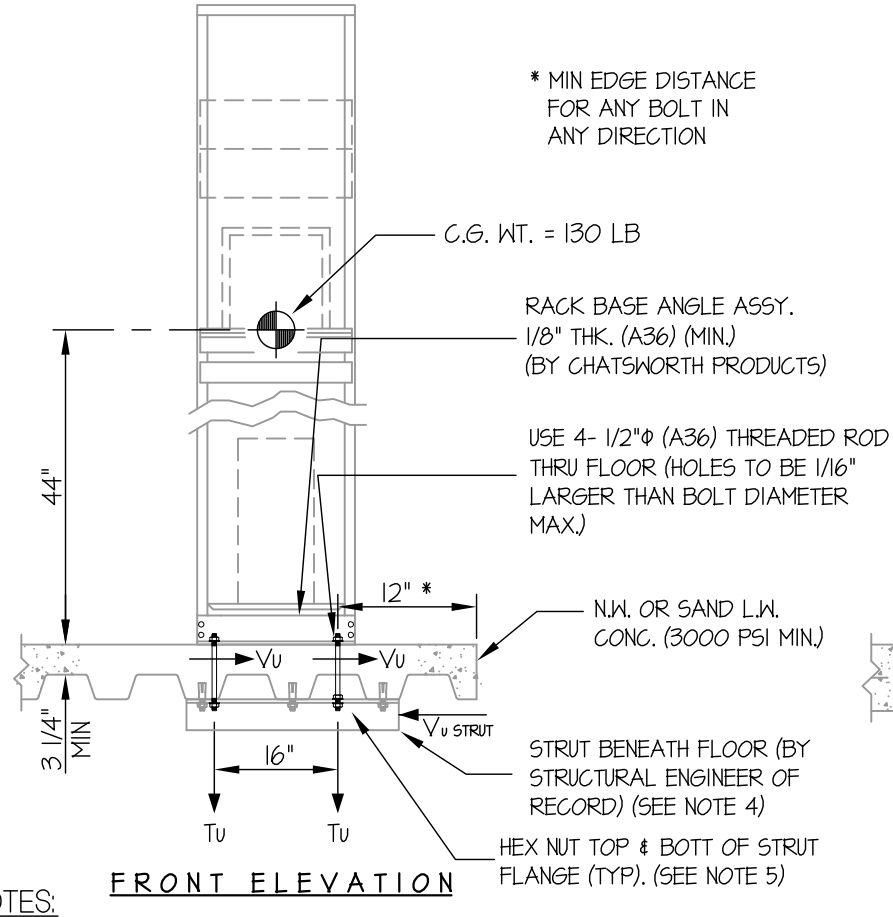
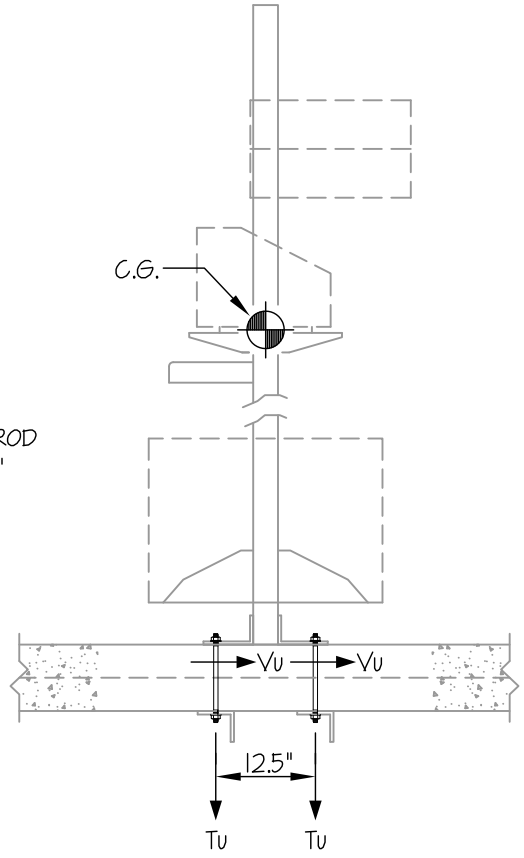
SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE



FRONT ELEVATION

CONCRETE SLAB ON METAL DECK



SIDE ELEVATION

NOTES:

1. FORCES ARE DETERMINED PER 2010 CALIFORNIA BUILDING CODE AND ASCE 7-05 STRENGTH DESIGN IS USED.
   HORIZONTAL FORCE (E_h) = 3.60 W_p (S_{DS} = 2.00, a_p = 2.5, I_p = 1.5, R_p = 2.5, $z/h \leq 1.0$)
   VERTICAL FORCE (E_v) = 0.40 W_p
2. CENTER OF GRAVITY (C.G.) WEIGHT IS A MAXIMUM. THIS PRE-APPROVAL ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
3. STRUCTURAL ENGINEER OF RECORD SHALL PROVIDE STRUCTURE TO SUPPORT WEIGHTS AND FORCES SHOWN.
4. STRUCTURAL ENGINEER OF RECORD SHALL DESIGN THE STRUT(S) AND ITS ATTACHMENTS TO RESIST A LOAD NOT LESS THAN $V_{u\,STRUT}$ IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT, WHERE $V_{u\,STRUT} = 0.6V_{u\,MAX}$ X (NO. OF ANCHORS ENGAGED BY STRUT) (MIN)
5. AT CONDITIONS WHERE NUT CANNOT BE PROVIDED AT TOP SIDE OF STRUT, PROVIDE TAPPED HOLE THROUGH STRUT FLANGE.

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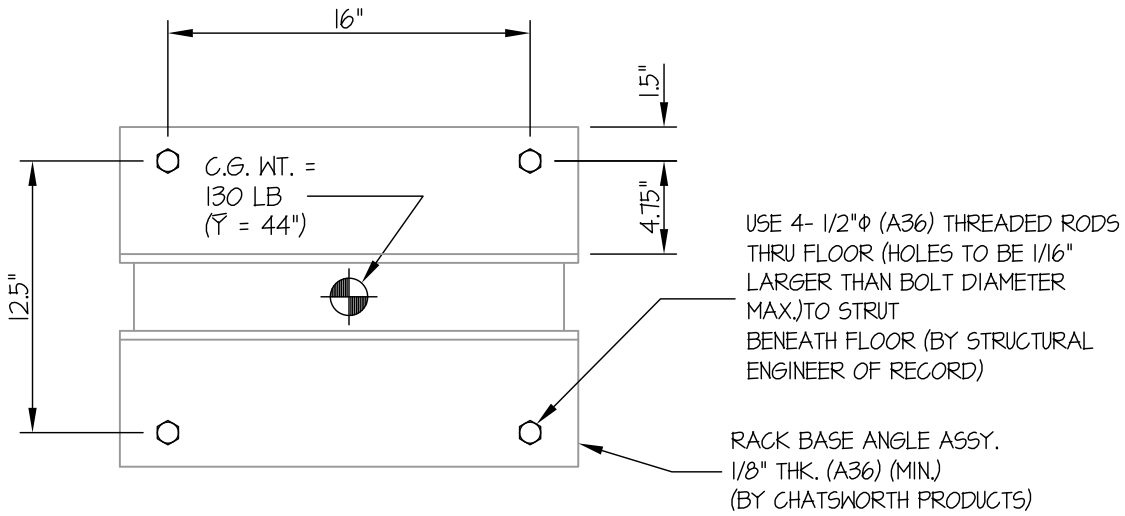
CHATSWORTH PRODUCTS, INC.	DES. J. ROBERSON	SHEET 2
	JOB NO. 11-1131	
STANDARD RACK	DATE 6/19/12	OF 2 SHEETS

SEISMIC ANCHORAGE

CONCRETE SLAB ON METAL DECK



PLAN VIEW

LOADS: PER 2010 CALIFORNIA BUILDING CODE AND ASCE 7-05
(STRENGTH DESIGN IS USED) (S_{DS} = 2.00, a_p = 2.5, I_p = 1.5, R_p = 2.5, $z/h \leq 1.0$)

WEIGHT = 130 LB

HORIZONTAL FORCE (E_h) = $3.60W_p$ = 468 LB

VERTICAL FORCE (E_v) = $0.40W_p$ = 52 LB

BOLT FORCES:

BOLT SPECS : 1/2"ϕ THREADED ROD

ϕT = 6610 LB/BOLT

ϕV = 3530 LB/BOLT

TENSION (T)

$$T_{U\ MAXIMUM} = \left[\frac{468\#(44'')}{2_{BOLTS}(16'')} \times (0.3)\right] + \frac{468\#(44'')}{2_{BOLTS}(12.5'')} - \frac{130\#(0.9) - 52\#}{4_{BOLTS}} = 1007\ LB/BOLT\ (MAX)$$

(HORIZ. - SIDE TO SIDE) (HORIZ. - FRONT TO BACK) (WEIGHT (0.9) - E_v)

SHEAR (V)

$$V_{U\ MAXIMUM} = \frac{468\#}{4_{BOLTS}} = 117\ LB/BOLT\ (MAX)\ (PER\ AISC\ J3.7,\ LESS\ THAN\ 20\%\ STRESS)$$

PRYING

M_{PRYING} = 1007#(4.75") = 4784"#

T_{PRYING} = 4784"#/1.5" = 3189"#

T_{MAX} = 3789"# + 1007# = 4196 LB/BOLT (MAX)