

## CHATSWORTH PRODUCTS, INC.

### SEISMIC FRAME CABINET

DES. **J. ROBERSON**

JOB NO. **11-1453**

DATE **6/16/16**

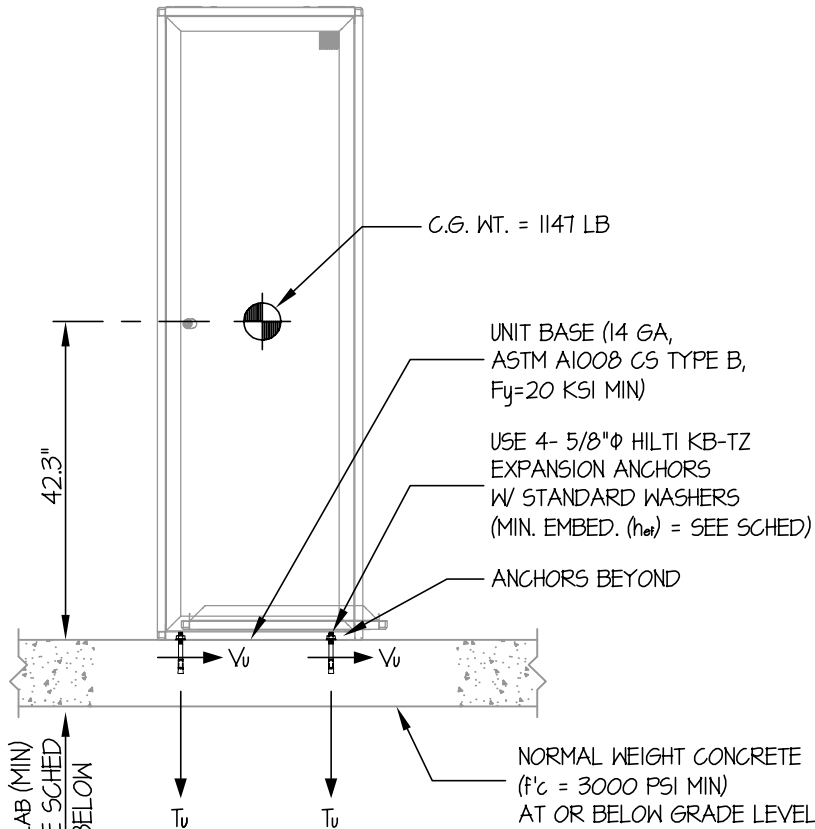
SHEET

**1**

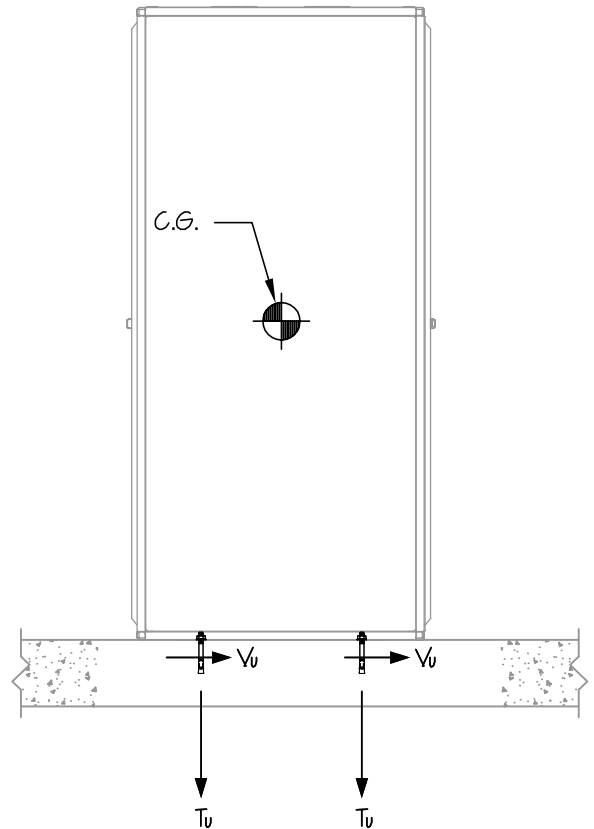
OF **6** SHEETS

SEISMIC SUPPORTS & ATTACHMENTS

CONCRETE SLAB



FRONT ELEVATION

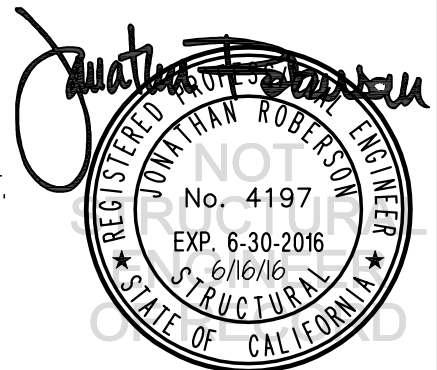


SIDE ELEVATION

ANCHORS					
MAX Sps	TYPE	DIAM	MIN. EMBED. ( $h_{ef}$ )	QTY	T <sub>SLAB</sub>
135	HILTI KB-TZ	5/8"	3.125"	4	5"
190	HILTI KB-TZ	5/8"	4"	4	6"

NOTES:

- FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10 STRENGTH DESIGN IS USED. ( $a_p = 2.5$ ,  $l_p = 1.5$ ,  $R_p = 6.0$ ,  $\Omega_o = 2.5$ ,  $z/h = 0$ )
- CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THIS PREAPPROVAL ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
- STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.



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**2**

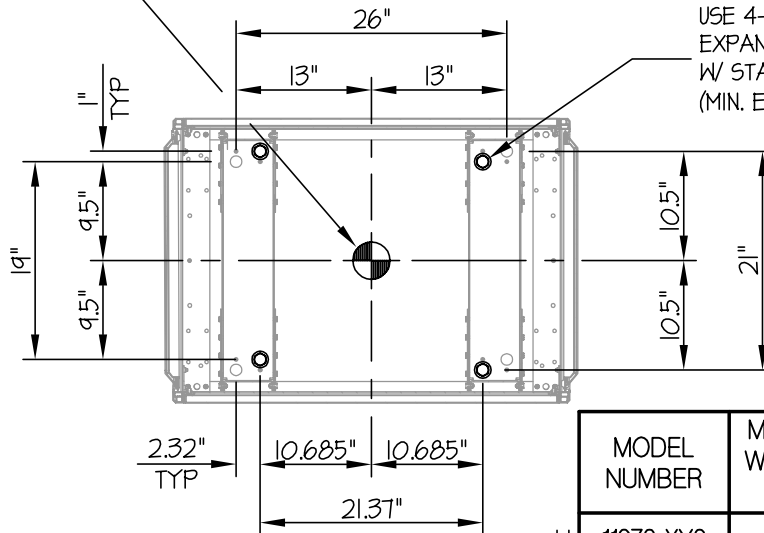
OF **6** SHEETS

SEISMIC SUPPORTS & ATTACHMENTS

MAX  $S_{ds} \leq 1.35$

CONCRETE SLAB

C.G. WT. = 1147 LB  
( $\bar{Y} = 42.3"$ )



USE 4- 5/8"  $\phi$  HILTI KB-TZ  
EXPANSION ANCHORS  
W/ STANDARD WASHERS  
(MIN. EMBED. ( $h_{ef}$ ) = 3.125")

PLAN VIEW

MODEL NUMBER	MODEL WEIGHT (lb.)	*** LOADED WEIGHT (lb.)	* $T_u$ (lb.)	* $V_u$ (lb.)
** 11972-XY2	347	1147	2278	436
11973-XY2	308	1108	2200	421
11974-X02	255	1055	2095	401

\* VALUES INCLUDE  $\Omega_0$

\*\* THIS UNIT USED IN CALCULATION BELOW

\*\*\* INCLUDES UNIT + CONTENT WEIGHT

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.

STRENGTH DESIGN IS USED ( $S_{ds} = 1.35$ ,  $a_p = 2.5$ ,  $I_p = 15$ ,  $R_p = 6.0$ ,  $\Omega_0 = 2.5$ ,  $z/h = 0$ )

WEIGHT = 1147 LB

HORIZONTAL FORCE ( $E_{mh}$ ) = 152  $W_p = 1743$  LB

VERTICAL FORCE ( $E_v$ ) = 0.27  $W_p = 310$  LB

BOLT FORCES:

BOLT SPECS: 5/8"  $\phi$  HILTI KB-TZ

$\phi T = 0.75 = \phi N_n = 2508$  LB/BOLT (TENSION)

$\phi V = \phi V_n = 4940$  LB/BOLT (SHEAR)

TENSION (T)

$$T_{u \text{ MAXIMUM}} = \left[ \frac{1743\#(42.3")}{2 \text{ BOLTS } (21.37")} \times (0.3) \right] + \frac{1743\#(42.3")}{2 \text{ BOLTS } (19")} - \frac{(1147\#(0.9) - 310\#)}{4 \text{ BOLTS}} = 2278 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_{u \text{ MAXIMUM}} = \frac{1743\#}{4 \text{ BOLTS}} = 436 \text{ LB/BOLT (MAX)}$$

UNITY CHECK:

$$\left( \frac{T_u}{\phi T} \right) + \left( \frac{V_u}{\phi V} \right) \leq 1.2 \quad \left( \frac{2278}{2508} \right) + \left( \frac{436}{4940} \right) = 1.00 \leq 1.2 \therefore \text{O.K.}$$

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SHEET

**3**

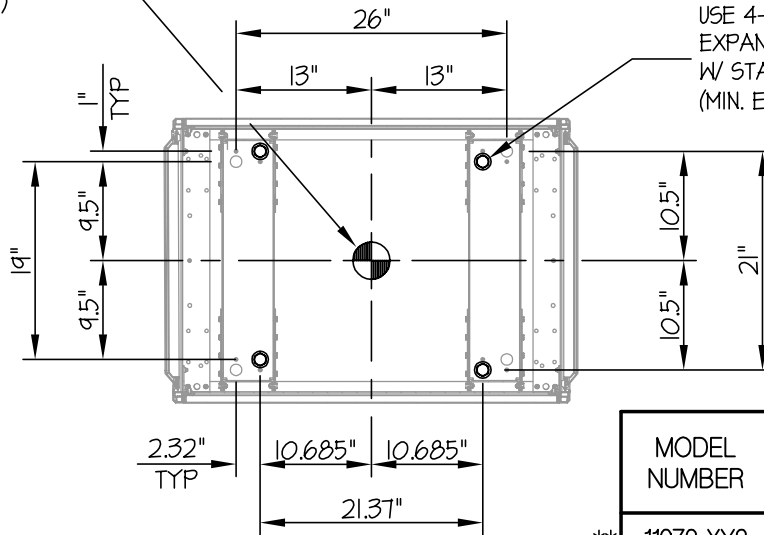
OF **6** SHEETS

SEISMIC SUPPORTS & ATTACHMENTS

1.35 < MAX S<sub>ds</sub> ≤ 1.90

CONCRETE SLAB

C.G. WT. = 1147 LB  
( $\bar{Y} = 42.3"$ )



USE 4- 5/8"Φ HILTI KB-TZ  
EXPANSION ANCHORS  
W/ STANDARD WASHERS  
(MIN. EMBED. ( $h_{ef}$ ) = 4")

PLAN VIEW

MODEL NUMBER	MODEL WEIGHT (lb.)	*** LOADED WEIGHT (lb.)	* T <sub>u</sub> (lb.)	* V <sub>u</sub> (lb.)
** 11972-XY2	347	1147	3312	614
11973-XY2	308	1108	3199	593
11974-X02	255	1055	3046	564

\* VALUES INCLUDE  $\Omega_0$

\*\* THIS UNIT USED IN CALCULATION BELOW

\*\*\* INCLUDES UNIT + CONTENT WEIGHT

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.

STRENGTH DESIGN IS USED ( $S_{ds} = 1.90$ ,  $a_p = 2.5$ ,  $I_p = 15$ ,  $R_p = 6.0$ ,  $\Omega_0 = 2.5$ ,  $z/h = 0$ )

WEIGHT = 1147 LB

HORIZONTAL FORCE ( $E_{mh}$ ) =  $2.14 W_p = 2455$  LB

VERTICAL FORCE ( $E_v$ ) =  $0.38 W_p = 436$  LB

BOLT FORCES:

BOLT SPECS: 5/8"Φ HILTI KB-TZ

$\Phi T = 0.75 \Phi N_n = 3632$  LB/BOLT (TENSION)

$\Phi V = \Phi V_n = 4940$  LB/BOLT (SHEAR)

TENSION (T)

$$T_{u \text{ MAXIMUM}} = \left[ \frac{2455\#(42.3")}{2 \text{ BOLTS } (21.37")} \times (0.3) \right] + \frac{2455\#(42.3")}{2 \text{ BOLTS } (19")} - \frac{(1147\#(0.9) - 436\#)}{4 \text{ BOLTS}} = 3312 \text{ LB/BOLT (MAX)}$$

(HORIZ - SIDE TO SIDE)                      (HORIZ - FRONT TO BACK)                      (WEIGHT(0.9) - E<sub>v</sub>)

SHEAR (V)

$$V_{u \text{ MAXIMUM}} = \frac{2455\#}{4 \text{ BOLTS}} = 614 \text{ LB/BOLT (MAX)}$$

UNITY CHECK:

$$\left( \frac{T_u}{\Phi T} \right) + \left( \frac{V_u}{\Phi V} \right) \leq 1.2 \quad \left( \frac{3312}{3632} \right) + \left( \frac{614}{4940} \right) = 1.04 \leq 1.2 \therefore \text{O.K.}$$

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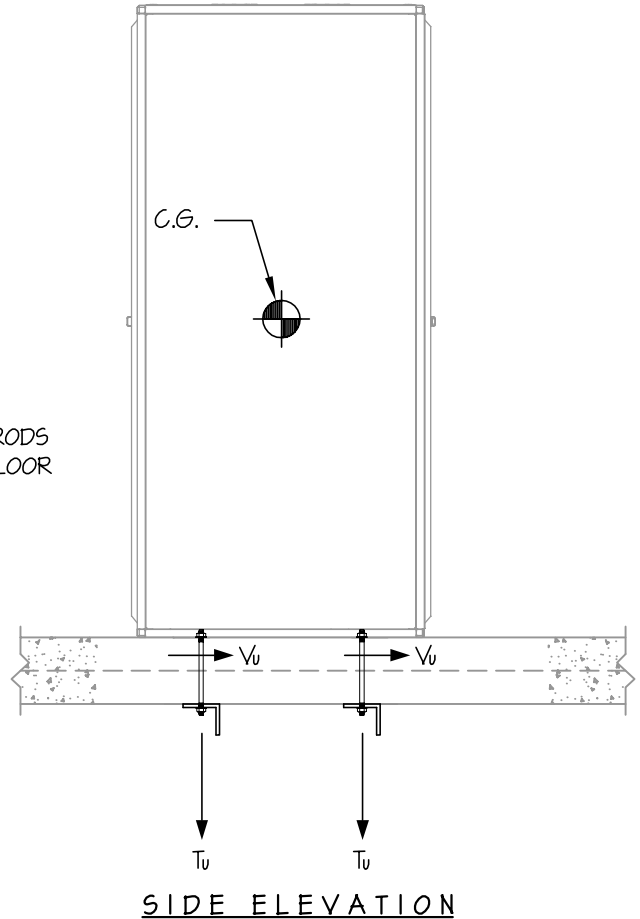
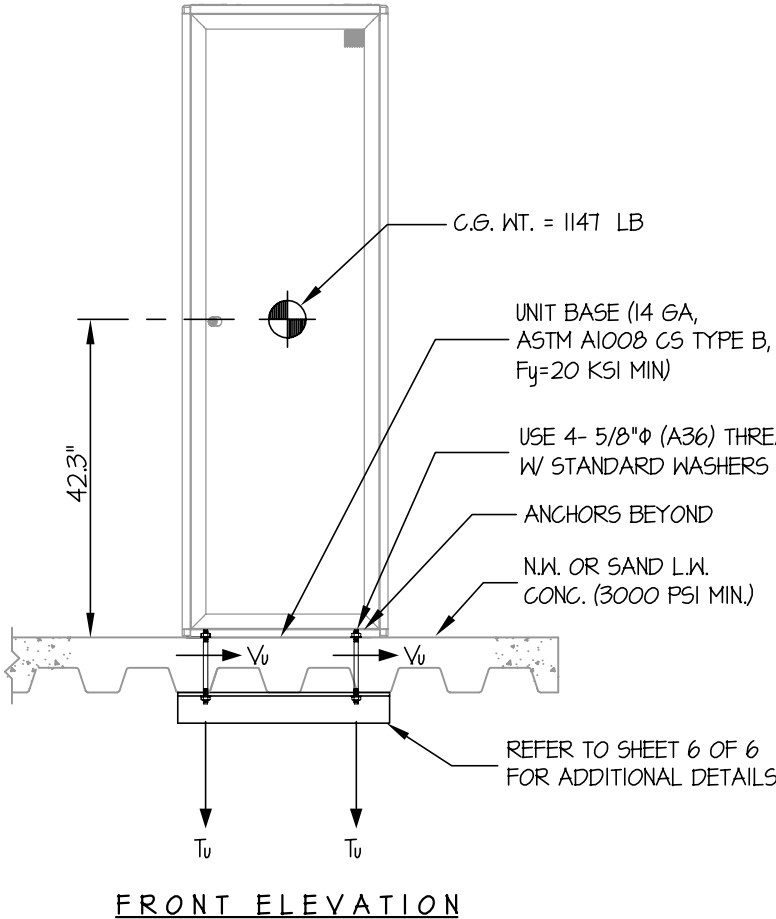
SHEET

4

OF 6 SHEETS

SEISMIC SUPPORTS & ATTACHMENTS

CONCRETE SLAB ON METAL DECK



NOTES:

- FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10. STRENGTH DESIGN IS USED. ( $S_{Ds} = 2.20$ ,  $a_p = 2.5$ ,  $I_p = 1.5$ ,  $R_p = 6.0$ ,  $\Omega_o = 2.5$ ,  $z/h \leq 1$ )  
 HORIZONTAL FORCE ( $E_h$ ) =  $1.65 W_p$   
 HORIZONTAL FORCE ( $E_{mh}$ ) =  $4.13 W_p$  (FOR CONCRETE ANCHORAGE)  
 VERTICAL FORCE ( $E_v$ ) =  $0.44 W_p$
- CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THIS PREAPPROVAL ENCOMPASSES ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.
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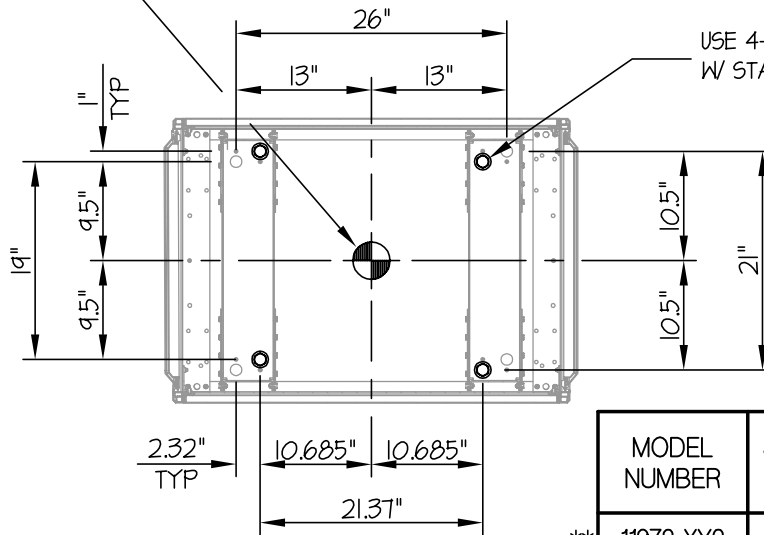
**5**

OF **6** SHEETS

SEISMIC SUPPORTS & ATTACHMENTS

CONCRETE SLAB ON METAL DECK

C.G. WT. = 1147 LB  
( $\bar{Y}$  = 42.3")



USE 4- 5/8"Φ (A36) THREADED RODS  
W/ STANDARD WASHERS THRU FLOOR

PLAN VIEW

MODEL NUMBER	MODEL WEIGHT (lb.)	*** LOADED WEIGHT (lb.)	* Tu (lb.)	* Vu (lb.)
** 11972-XY2	347	1147	2537	473
11973-XY2	308	1108	2450	452
11974-X02	255	1055	2333	435

\* VALUES DO NOT INCLUDE  $\Omega_o$

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\*\*\* INCLUDES UNIT + CONTENT WEIGHT

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.

STRENGTH DESIGN IS USED ( $S_{Ds} = 2.20$ ,  $a_p = 2.5$ ,  $I_p = 15$ ,  $R_p = 6.0$ ,  $\Omega_o = 2.5$ ,  $z/h \leq 1$ )

WEIGHT = 1147 LB

HORIZONTAL FORCE ( $E_h$ ) =  $1.65W_p = 1893$  LB

HORIZONTAL FORCE ( $E_{mh}$ ) =  $4.13W_p = 4737$  LB

VERTICAL FORCE ( $E_v$ ) =  $0.44W_p = 505$  LB

BOLT SPECS: 5/8"Φ (A36) THREADED ROD

ΦT = 10,016 LB/BOLT (TENSION)

ΦV = 5342 LB/BOLT (SHEAR)

BOLT FORCES:

TENSION (T)

$$T_u \text{ MAXIMUM} = \left[ \frac{1893\#(42.3'')}{2 \text{ BOLTS } (21.37'')} \times (0.3) \right] + \frac{1893\#(42.3'')}{2 \text{ BOLTS } (19'')} - \frac{(1147\#(0.9) - 505\#)}{4 \text{ BOLTS}} = 2537 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_u \text{ MAXIMUM} = \frac{1893\#}{4 \text{ BOLTS}} = 473 \text{ LB/BOLT (MAX) (PER AISC J3.7, LESS THAN 20% STRESS)}$$

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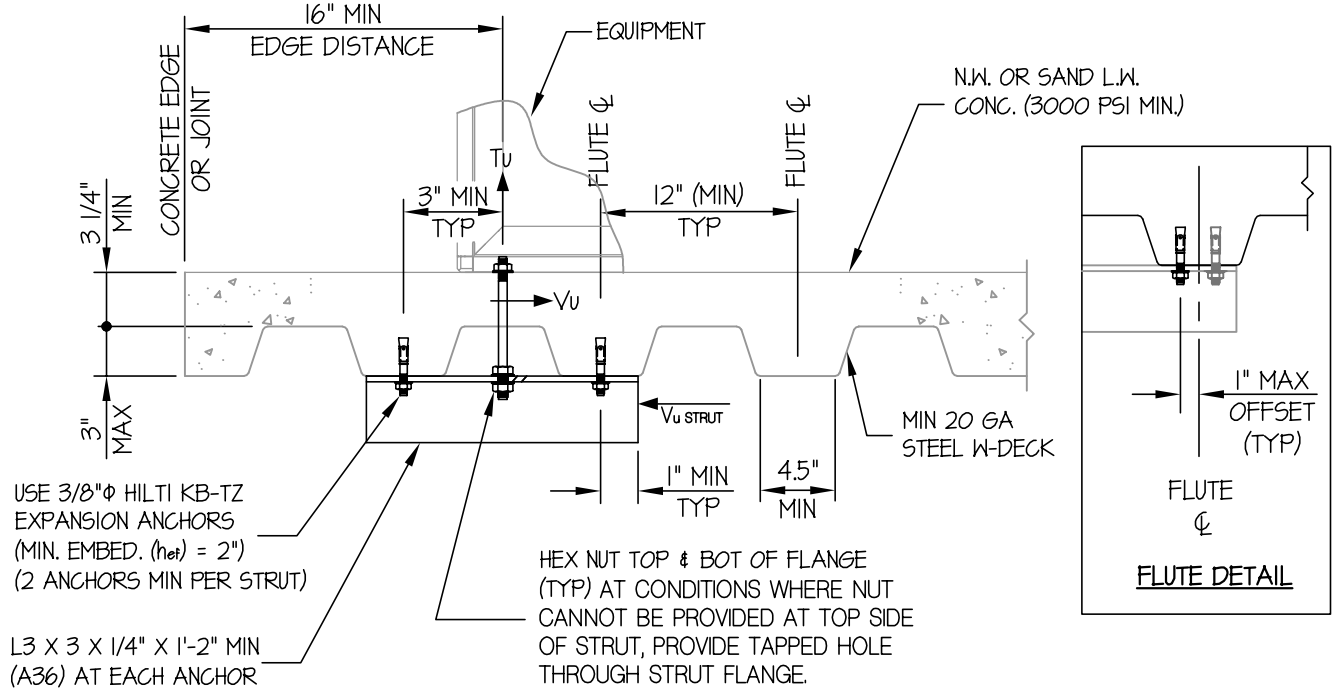
SHEET

6

OF 6 SHEETS

SEISMIC SUPPORTS & ATTACHMENTS

CONCRETE DETAILS



MIN STEEL DECK REQUIREMENTS AND STRUT DETAIL

DEMANDS: (BASED ON UPPER FLOOR)

$$T_u = 2537 \text{ LB/BOLT}$$

$$V_u = 473 \text{ LB/BOLT}$$

$$V_{u \text{ STRUT}} = 0.7V_u = 0.7(473\#) = 331 \text{ LB/STRUT}$$

CONCRETE ANCHORS AT STRUT

$$V'_u \text{ STRUT} = \Omega_c V_{u \text{ STRUT}} = 2.5(331\#) = 828 \text{ LB/STRUT}$$

USE 2 BOLTS MIN

$$V'_u \text{ BOLT} = 828\# / (2 \text{ BOLTS}) = 414 \text{ LB/BOLT}$$

BOLT SPEC: 3/8"  $\phi$  HILTI KB-TZ: ( $h_{ef} = 2"$  MIN)

$$\phi V = 871 \text{ LB/BOLT}$$

STRUT DESIGN (L3 X 3 X 1/4" : S = 0.569 in<sup>3</sup>, A36)

$$M_u \text{ STRUT} = \frac{2537\#(14")}{4} = 8880 \text{ in}\cdot\#$$

$$\frac{b}{t} = \frac{3}{0.25} = 12 \leq 0.54 \sqrt{\frac{E}{F_y}} = 0.54 \sqrt{\frac{29000}{36}} = 15$$

$$\begin{aligned} \therefore M_n &= 1.5 F_y S_c \\ &= 1.5(36000)(0.8 \times 0.569) \\ &= 2458 \text{ in}\cdot\# \end{aligned}$$

$$\phi M_n = 0.9 M_n = 0.9(2458 \text{ in}\cdot\#) = 22123 \text{ in}\cdot\# > 8880 \text{ in}\cdot\# \therefore \text{OK}$$