

## DOOR SYSTEMS INC

### DSI 600 ELEVATOR SMOKE AND FIRE CONTAINMENT

DES. **J. ROBERSON**

JOB NO. **11-1918**

DATE **1/30/20**

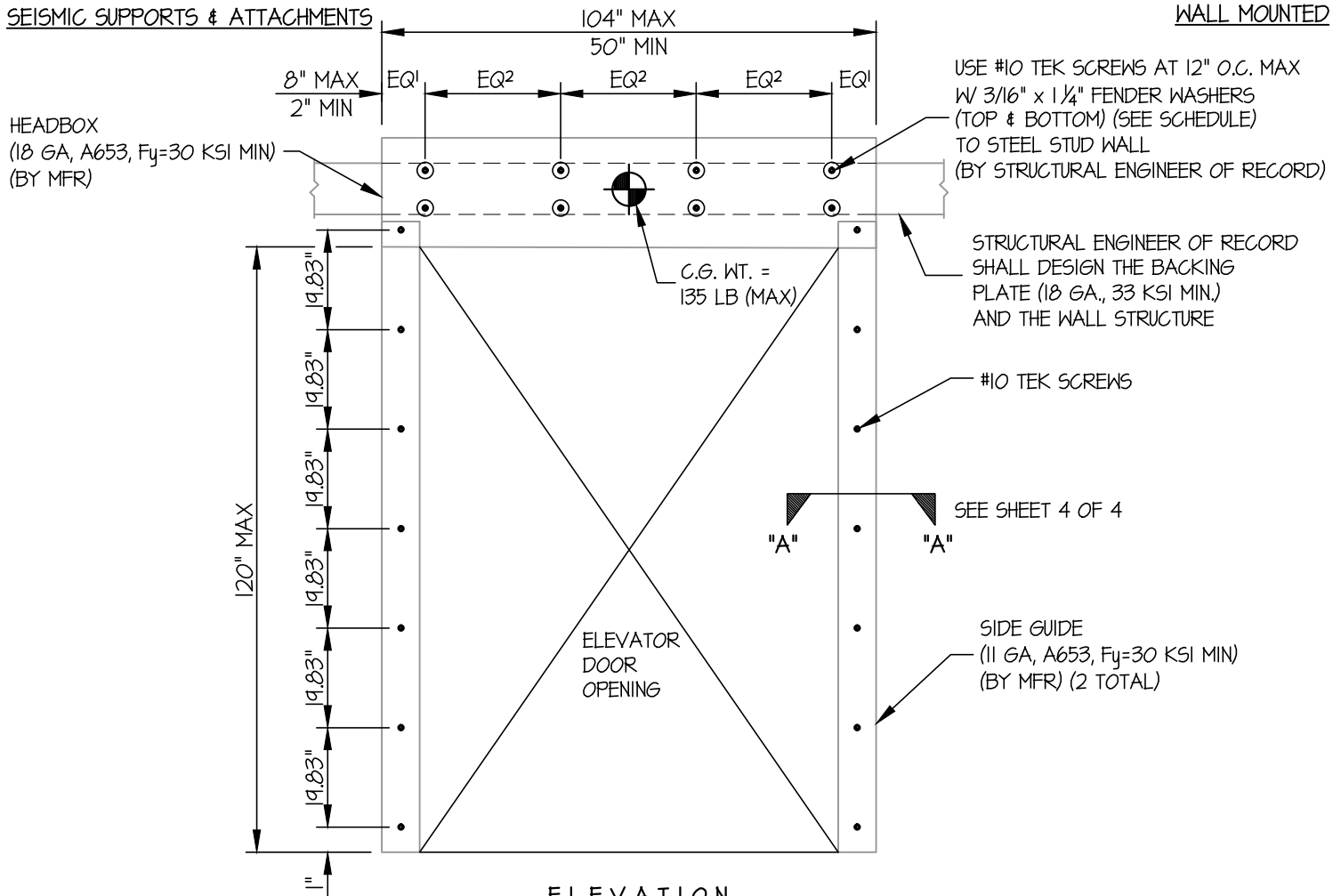
SHEET

**1**

OF **4** SHEETS

SEISMIC SUPPORTS & ATTACHMENTS

WALL MOUNTED



ELEVATION

(STEEL STUD CONDITION SHOWN)

NOTES:

- FORCES ARE DETERMINED PER 2019 CALIFORNIA BUILDING CODE AND ASCE 7-16.**

STRENGTH DESIGN IS USED. (S<sub>Ds</sub> = 2.20, a<sub>p</sub> = 1.0, I<sub>p</sub> = 1.5, R<sub>p</sub> = 1.5, Ω<sub>o</sub> = 1.5, z/h ≤ 1)

HORIZONTAL FORCE (E<sub>h</sub>) = 2.64 W<sub>p</sub>

HORIZONTAL FORCE (E<sub>mh</sub>) = 3.96 W<sub>p</sub> (FOR CONCRETE ANCHORAGE)

VERTICAL FORCE (E<sub>v</sub>) = 0.44 W<sub>p</sub>

- 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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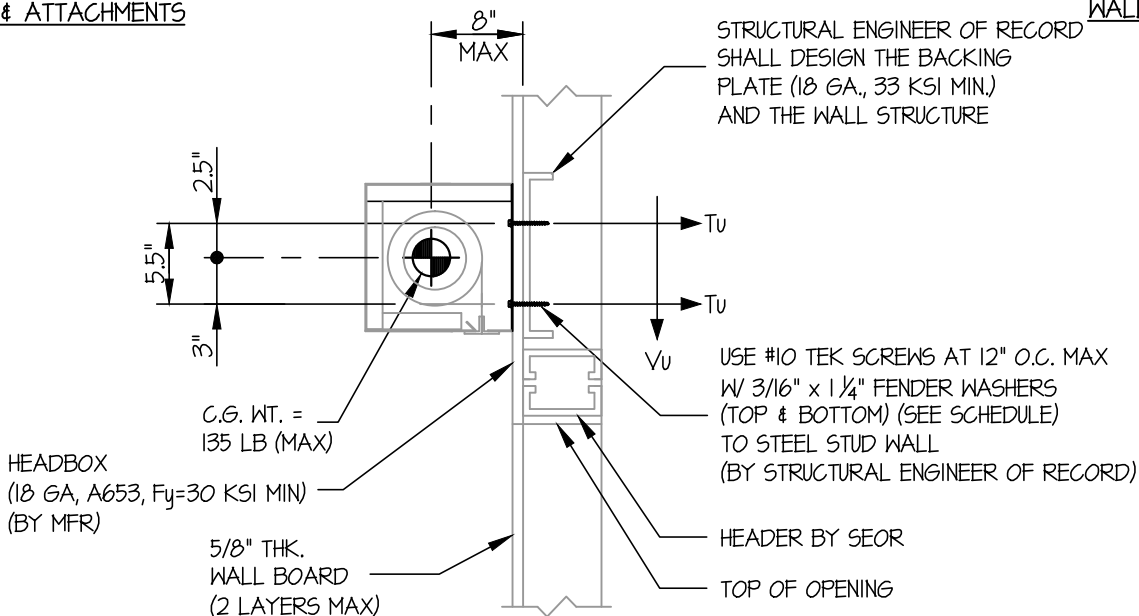
SHEET

2

OF 4 SHEETS

SEISMIC SUPPORTS & ATTACHMENTS

WALL MOUNTED



SECTION AT STEEL STUD WALL

WIDTH (in)	MAX WEIGHT (lb.)	* # SCREWS (MIN) (TOP & BOTTOM)	Tu (lb.)	Vu (lb.)
50	75	8	79	31
56	80	10	68	27
96	125	16	65	26
104	135	18	64	25

\* NUMBER OF SCREWS EX: 8 = 4 TOP & 4 BOTTOM

LOADS: PER 2019 CALIFORNIA BUILDING CODE AND ASCE 7-16.

STRENGTH DESIGN IS USED (Sds = 2.20, ap = 1.0, lp = 1.5, Rp = 1.5, z/h ≤ 1)

WEIGHT = 135 LB MAX

HORIZONTAL FORCE (Eh) = 2.64Wp = 357 LB

VERTICAL FORCE (Ev) = 0.44Wp = 60 LB

SCREW FORCES:

TENSION (T)

$$T_{U \text{ VERTICAL}} = \frac{(12(135\#) + 60\#)(8\#)}{9 \text{ SCREWS}(5.5\#)} = 36 \text{ LB/SCREW}$$

$$T_{U \text{ PARA}} = \frac{357\#(8\#)(3\#)}{1 \text{ SCREW}(88\#)(5.5\#)} = 18 \text{ LB/SCREW}$$

$$T_{U \text{ PERP.}} = \frac{357\#(3\#)}{9 \text{ SCREWS}(5.5\#)} = 22 \text{ LB/SCREW}$$

$$T_{U \text{ MAX}} = 36\# + 18\#(0.3) + 22\# = 64 \text{ LB/SCREW (MAX)}$$

SHEAR (V)

$$V_{U \text{ MAX}} = \sqrt{\left(\frac{(12(135\#) + 60\#)}{18 \text{ SCREWS}}\right)^2 + \left(\frac{357\#(3\#)}{9 \text{ SCREWS}(5.5\#)}\right)^2} = 25 \text{ LB/SCREW (MAX)}$$

STRUCTURAL ENGINEER OF RECORD SHALL DESIGN THE BACKING PLATE (18 GA., 33 KSI MIN.) AND THE WALL STRUCTURE

USE #10 TEK SCREWS AT 12" O.C. MAX W/ 3/16" x 1 1/4" FENDER WASHERS (TOP & BOTTOM) (SEE SCHEDULE) TO STEEL STUD WALL (BY STRUCTURAL ENGINEER OF RECORD)

HEADER BY SEOR  
TOP OF OPENING

#10 TEK SCREWS (18 GA, 33 KSI STEEL STUDS)  
W/ 2 LAYERS GYP BOARD MAX  
φT= 160 LB/SCREW  
φV= 174 LB/SCREW

UNITY CHECK:

$$\left(\frac{T_u}{\phi T}\right) + \left(\frac{V_u}{\phi V}\right) \leq 1.0$$

$$\left(\frac{64}{160}\right) + \left(\frac{25}{174}\right) = 0.55 \leq 1.0 \therefore \text{O.K.}$$

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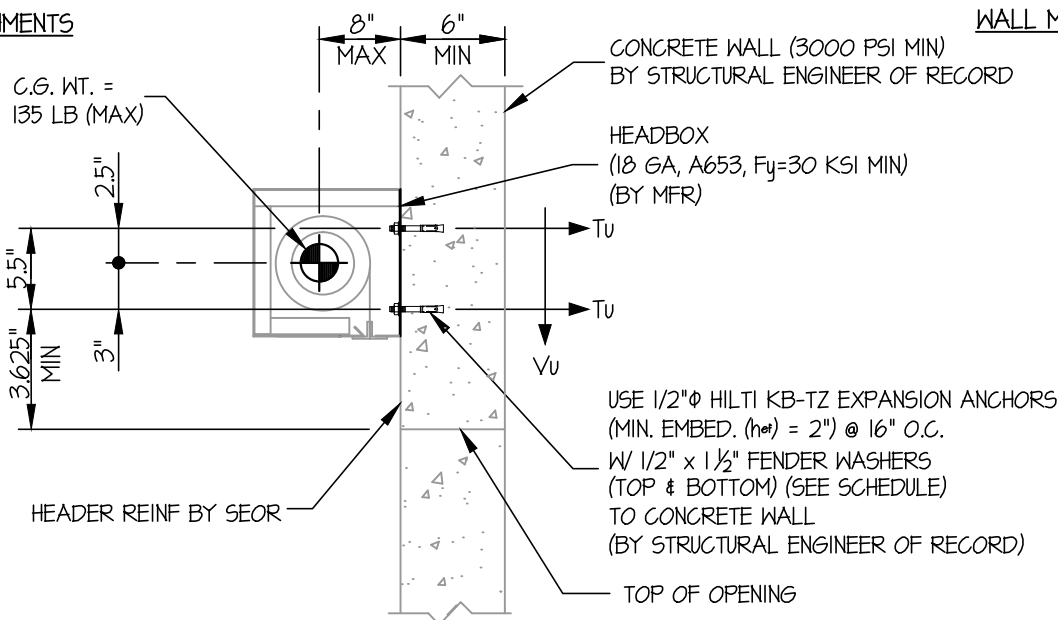
SHEET

3

OF 4 SHEETS

SEISMIC SUPPORTS & ATTACHMENTS

WALL MOUNTED



CONCRETE WALL SECTION

WIDTH (in)	MAX WEIGHT (lb.)	* # ANCHOR (MIN) (TOP & BOTTOM)	**Tu (lb.)	**Vu (lb.)
50"	75	8	97	43
56"	80	8	101	46
96"	125	10	122	58
104"	135	12	111	52

\* NUMBER OF ANCHOR EX: 8 = 4 TOP & 4 BOTTOM

\*\* VALUES INCLUDE  $\Omega_o$

LOADS: PER 2019 CALIFORNIA BUILDING CODE AND ASCE 7-16.

STRENGTH DESIGN IS USED ( $S_{ds} = 2.20, a_p = 1.0, I_p = 15, R_p = 15, \Omega_o = 15, z/h \leq 1$ )

WEIGHT = 135 LB MAX

HORIZONTAL FORCE ( $E_{mh}$ ) =  $3.96W_p = 535$  LB

VERTICAL FORCE ( $E_v$ ) =  $0.44W_p = 60$  LB

BOLT FORCES:

TENSION (T)

$$T_{U \text{ VERTICAL}} = \frac{(12(135\#) + 60\#)(8")}{6 \text{ BOLTS}(5.5")} = 54 \text{ LB/BOLT}$$

$$T_{U \text{ PARA}} = \frac{535\#(8")(3")}{1 \text{ BOLT} (88")(5.5")} = 27 \text{ LB/BOLT}$$

$$T_{U \text{ PERP.}} = \frac{535\#(3")}{6 \text{ BOLTS} (5.5")} = 49 \text{ LB/BOLT}$$

$$T_{U \text{ MAX}} = 54\# + 27\#(0.3) + 49\# = 111 \text{ LB/BOLT (MAX)}$$

SHEAR (V)

$$V_{U \text{ MAX}} = \sqrt{\left(\frac{(12(135\#) + 60\#)}{12 \text{ BOLTS}}\right)^2 + \left(\frac{535\#(3")}{6 \text{ BOLTS} (5.5")}\right)^2} = 52 \text{ LB/BOLT (MAX)}$$

BOLT SPECS: 1/2"  $\phi$  HILTI KB-TZ ( $h_{ef} = 2"$ )

$\phi T = 0.75\phi N_h = 1070$  LB/BOLT (TENSION)

$\phi V = \phi V_h = 934$  LB/BOLT (SHEAR)

UNITY CHECK:

$$\left(\frac{T_u}{\phi T}\right) + \left(\frac{V_u}{\phi V}\right) \leq 1.0$$

$$\left(\frac{111}{1070}\right) + \left(\frac{52}{934}\right) = 0.16 \leq 1.0 \therefore \text{OK}$$

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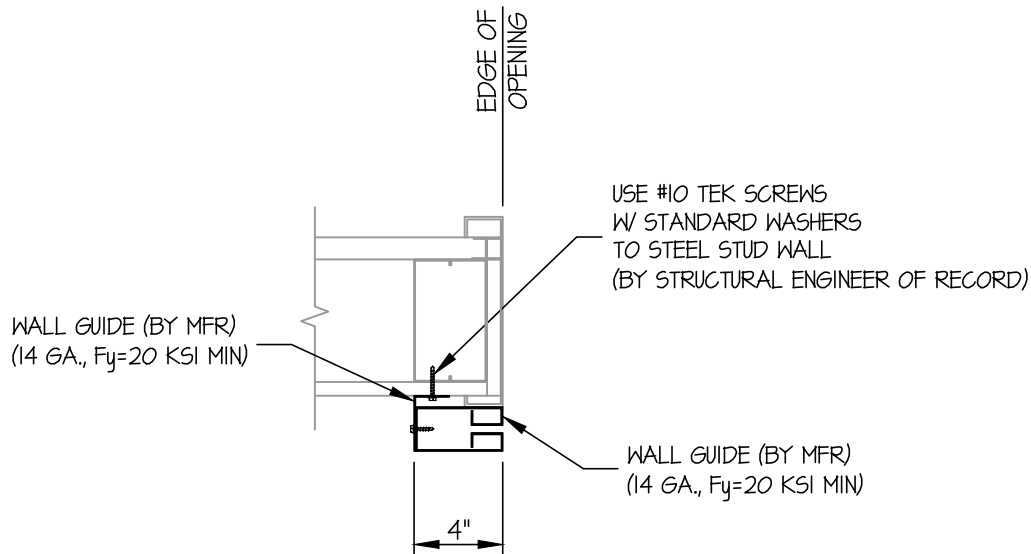
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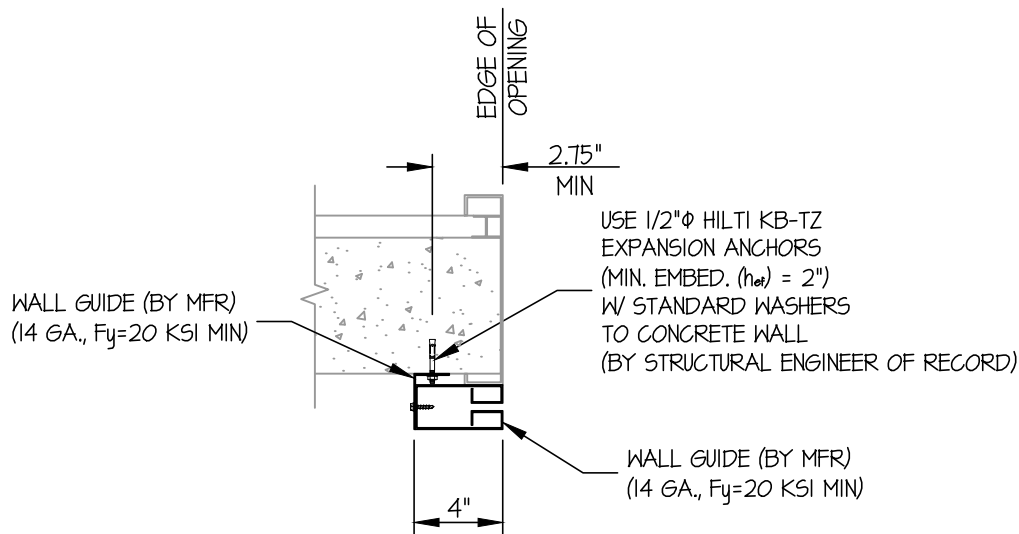
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SEISMIC SUPPORTS & ATTACHMENTS

WALL MOUNTED



SECTION AT STEEL STUD WALL



SECTION AT CONCRETE WALL

SECTION A-A