

PATTERSON-KELLY

SOLIS SL1000 BOILER

DES. J. ROBERSON

JOB NO. 11-2205

DATE 5/24/22

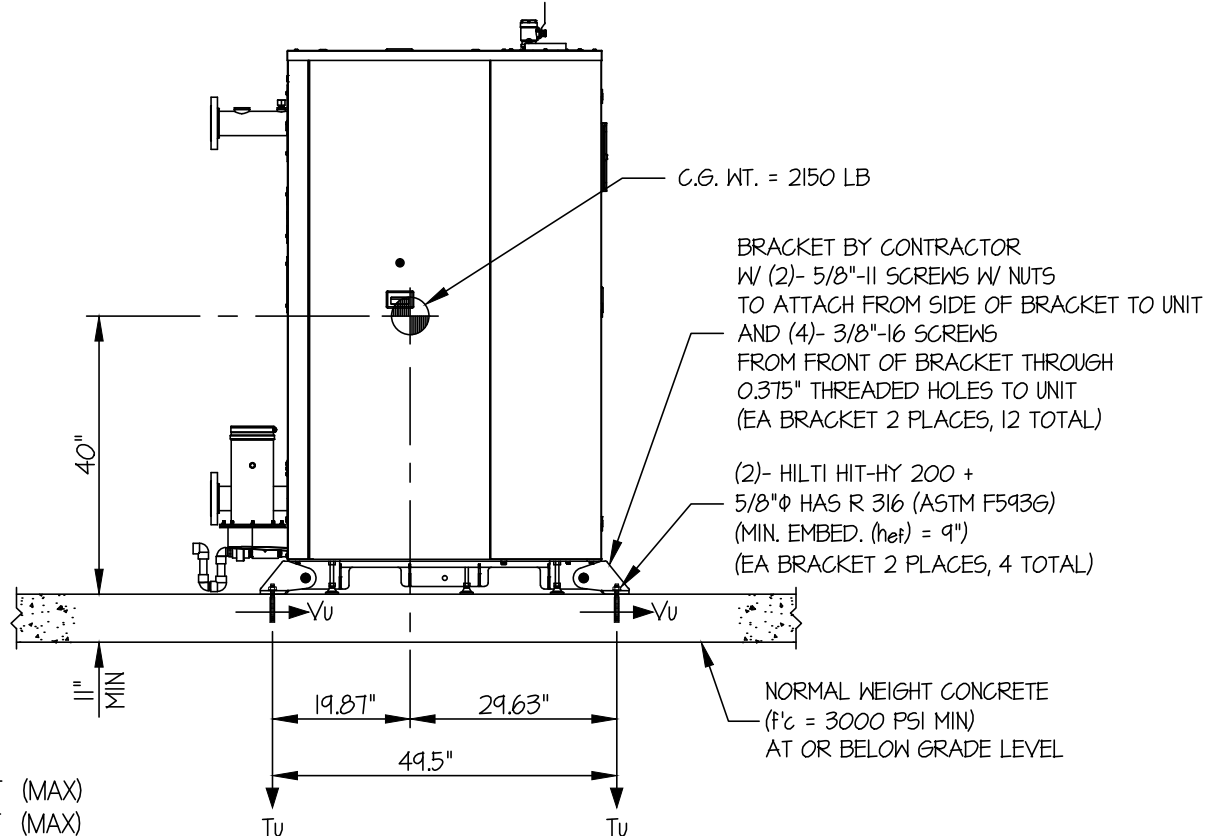
SHEET

1

OF 2 SHEETS

SEISMIC ANCHORAGE

SLAB ON GRADE



Tu = 7367 LB/BOLT (MAX)

Vu = 1694 LB/BOLT (MAX)

FRONT ELEVATION

NOTES:

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

STRENGTH DESIGN IS USED. (Sds = 2.30, ap = 1.0, lp = 1.5, Rp = 1.5, Ωe = 2.0, z/h = 0)

HORIZONTAL FORCE (Eh) = 1.035 Wp

HORIZONTAL FORCE (Emh) = 2.07 Wp (FOR CONCRETE ANCHORAGE)

VERTICAL FORCE (Ev) = 0.46 Wp

2. CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.

3. STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL VERIFY ALL CONDITIONS, EVALUATE INTERACTION WITH ADJACENT EQUIPMENT AND ANCHORS, AND PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.



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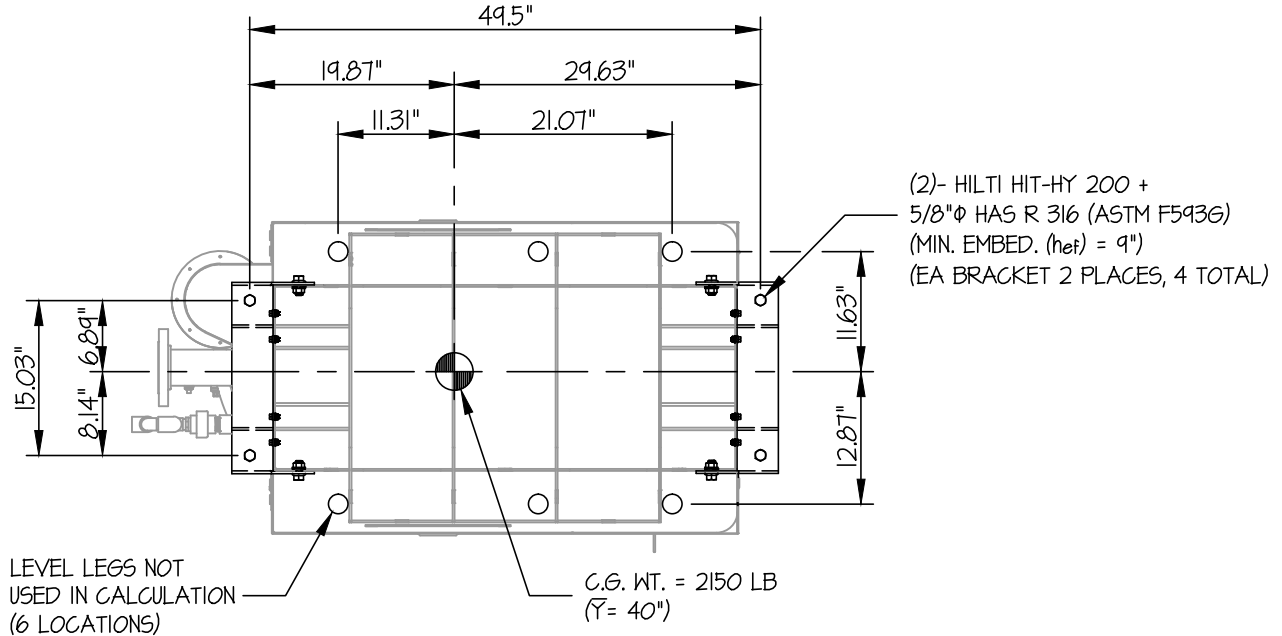
SHEET

2

OF 2 SHEETS

SEISMIC ANCHORAGE

SLAB ON GRADE



BOTTOM VIEW

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

STRENGTH DESIGN IS USED ($S_{Ds} = 2.30$, $a_p = 1.0$, $I_p = 1.5$, $R_p = 1.5$, $\Omega_o = 2.0$, $z/h = 0$)

WEIGHT = 2150 LB

HORIZONTAL FORCE (E_{mh}) = 2.07 W_p = 4451 LB

VERTICAL FORCE (E_v) = 0.46 W_p = 989 LB

BOLT FORCES:

BOLT SPECS: HILTI HIT-HY 200 + 5/8"φ HAS R 316

(ASTM F593G) THREADED ROD ($h_{ef} = 9"$)

SPACING = 15"

EDGE DISTANCE = 32" MIN:

$\phi T = 0.75 \phi N_n = 9354$ LB/BOLT (TENSION)

$\phi V = \phi V_n = 5695$ LB/BOLT (SHEAR)

TENSION (T)

$$T_u \text{ MAXIMUM} = \left[\frac{4451\#(40")\#(8.14")}{1_{\text{BOLT}}(49.5")\#(15.03")} \times (0.3) \right] + \frac{4451\#(40")\#(29.63")}{1_{\text{BOLT}}(15.03")\#(49.5")} - \frac{(2150\#(0.9) - 989\#)\#(29.63")\#(8.14")}{1_{\text{BOLT}}(49.5")\#(15.03")} = 7367 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_u \text{ MAXIMUM} = \left[\frac{4451\#(8.14")}{2_{\text{BOLTS}}(15.03")} \times (0.3) \right] + \frac{4451\#(29.63")}{2_{\text{BOLTS}}(49.5")} = 1694 \text{ LB/BOLT (MAX)}$$

UNITY CHECK:

$$\left(\frac{T_u}{\phi T} \right) + \left(\frac{V_u}{\phi V} \right) \leq 1.2 \quad \left(\frac{7367}{9354} \right) + \left(\frac{1694}{5695} \right) = 1.08 \leq 1.2 \therefore \text{O.K.}$$

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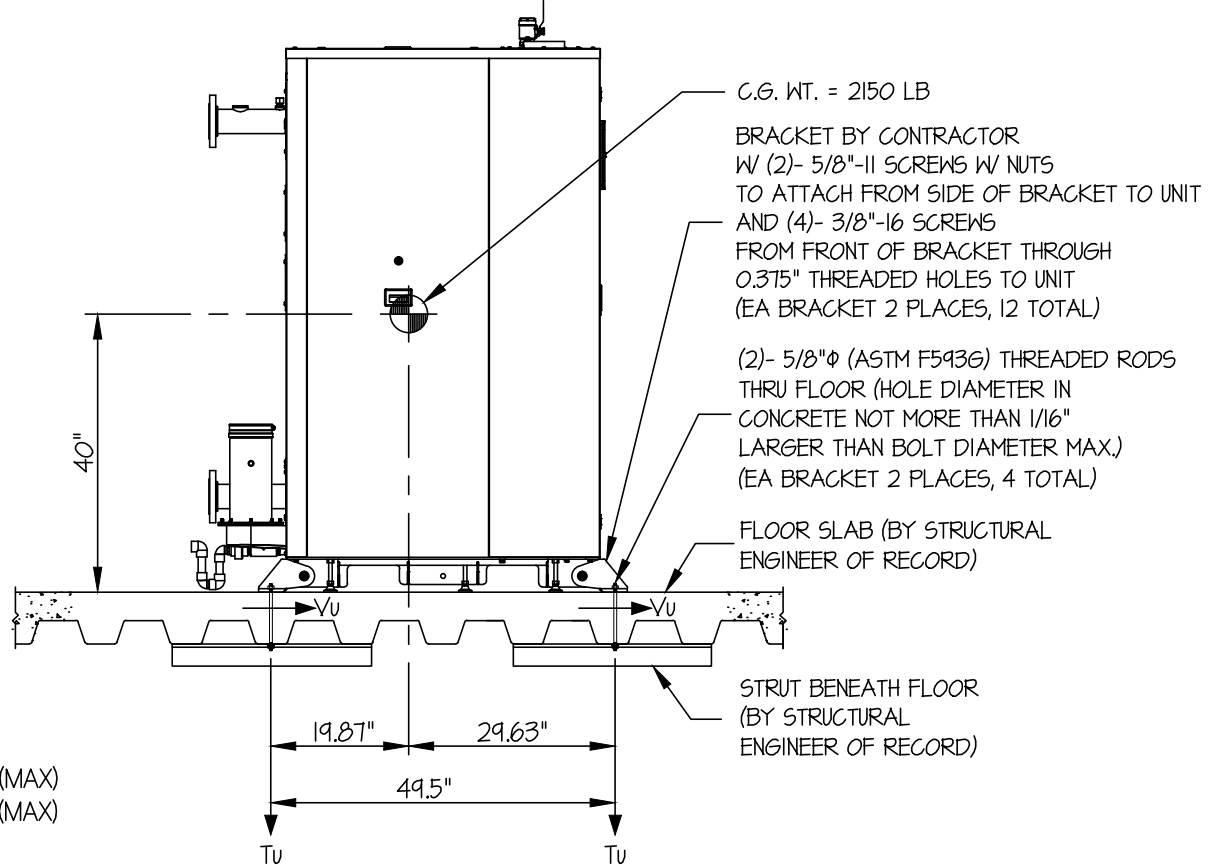
SHEET

1

OF **2** SHEETS

SEISMIC ANCHORAGE

UPPER FLOOR



$T_u = 9926 \text{ LB/BOLT (MAX)}$
 $V_u = 2258 \text{ LB/BOLT (MAX)}$

FRONT ELEVATION

NOTES:

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

STRENGTH DESIGN IS USED. ($S_{ds} = 2.30$, $a_p = 1.0$, $I_p = 1.5$, $R_p = 1.5$, $z/h < 1$)

HORIZONTAL FORCE (E_h) = $2.76 W_p$

VERTICAL FORCE (E_v) = $0.46 W_p$

2. CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.

3. STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL VERIFY ALL CONDITIONS, EVALUATE INTERACTION WITH ADJACENT EQUIPMENT AND ANCHORS, AND PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.



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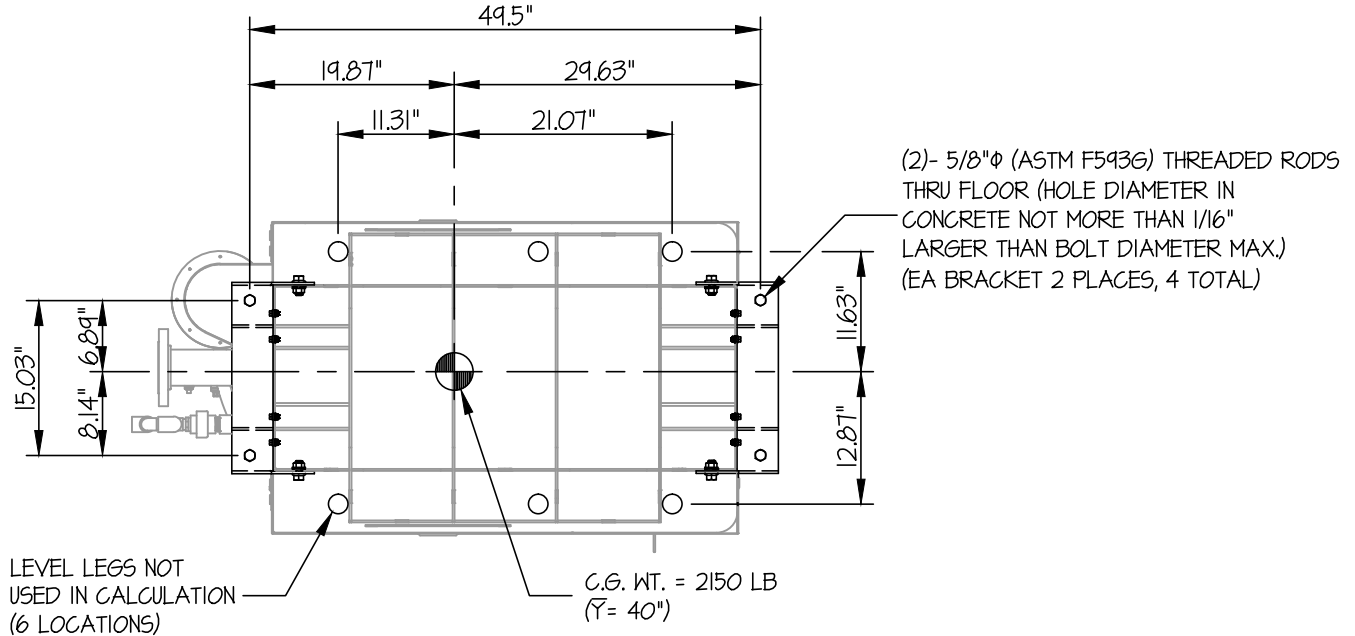
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SEISMIC ANCHORAGE

UPPER FLOOR



BOTTOM VIEW

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

STRENGTH DESIGN IS USED ($S_{ds} = 2.30$, $a_p = 1.0$, $I_p = 1.5$, $R_p = 1.5$, $z/h \leq 1$)

WEIGHT = 2150 LB

HORIZONTAL FORCE (E_h) = $2.76 W_p = 5934$ LB

VERTICAL FORCE (E_v) = $0.46 W_p = 989$ LB

BOLT FORCES:

BOLT SPECS: 5/8" ϕ (ASTM F593G) THREADED ROD

$\phi T = 17,257$ LB/BOLT (TENSION)

$\phi V = 10,354$ LB/BOLT (SHEAR)

TENSION (T)

$$T_u \text{ MAXIMUM} = \left[\frac{5934\#(40\")(8.14\"){}}{1_{\text{BOLT}}(49.5\")(15.03\"){}} \times (0.3) \right] + \frac{5934\#(40\")(29.63\"){}}{1_{\text{BOLT}}(15.03\")(49.5\"){}} - \frac{(2150\#(0.9) - 989\#)(29.6\")(8.14\"){}}{1_{\text{BOLT}}(49.5\")(15.03\"){}} = 9926 \text{ LB/BOLT (MAX)}$$

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

SHEAR (V)

$$V_u \text{ MAXIMUM} = \left[\frac{5934\#(8.14\"){}}{2_{\text{BOLTS}}(15.03\"){}} \times (0.3) \right] + \frac{5934\#(29.63\"){}}{2_{\text{BOLTS}}(49.5\"){}} = 2258 \text{ LB/BOLT (MAX)}$$