



PORTLAND OFFICE
9400 SW Barnes Rd.
Suite 100
Portland, OR 97225
Phone: 503.292.1635

Structural Design Calculations

Portland Airport DAS Rack Anchorage
Portland, OR

Client Information

Michael Smith
CTS, LLC
8309 SW Cirrus Dr
Beaverton, OR 97005

Project Site

Portland International Airport
7000 NE Airport Way
Portland, OR 97218
45.5914°N, 122.5971°W

Prepared By:

Peterson Structural Engineers
September 4, 2019
Job No. 1901-0239

Endorsement



www.pseengineers.com
Portland, OR | Tacoma, WA | San Diego, CA

Base Reactions (LRFD)

min. embedment into 4" concrete slab, min Fc = 3000psi, Is			
Axial (P _u) =	443 lb	per SH. 6	(0.90 + E)
Shear (V _u) =	187 lb	per SH. 6	(E)
Moment (M _u) =	875 lb-ft	per SH. 6	(E)
Shear w/ D _c (D _c V _u) =	469 lb	per SH. 6	(D _c E)
Moment w/ D _c (D _c M _u) =	2187 lb-ft	per SH. 6	(D _c E)
	26241 in-lb		

Live			
Axial (P _u) =	102 lb	per SH. 7	(0.90)
Shear (V _u) =	115 lb	per SH. 7	(1.6L)
Moment (M _u) =	404 lb-ft	per SH. 7	(1.6L)



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Project: 1901-0239 Date: 09/04/19
Designer: STS Sheet: 8 of 12

Anchor Design

(4) 1/2" Ø x Power-Stud® SD1 wedge expansion anchors w/ 2.5" embedment into 4" concrete slab, min Fc = 3000psi, Is adequate.

*See Sheets 10 to 12 for design checks.



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Designer: STS Sheet: 9 of 12

Anchor Design (cont.)

DEWALT Design Assist Ver: 1.4.2.0		Page 1
Sep 03 2019		
1. Project Information		
Company:		
Project Engineer:		
Address:		
Phone:		
Email:		
Project Name:		
Project Address:		
Notes:		
2. Selected Anchor Information		
Selected Anchor:	Power-Stud® SD1	
Brand:	DEWALT	
Material:	1/2" Ø Medium Carbon Steel	
Embedment:	h _{ef} 2 in h _{min} 2.5 in	
Approval:	ICC-ES ESR-2818	
Issued / Revision:	Dec 2018	
Drill Method:	Hammer Drilled	
3. Design Principles		
Design Method:	ACI 318-11	
Load Combinations:	Section 9.2	
Seismic Loading:	Tension D.3.3.4.3(c) Shear D.3.3.5.3(c) D _{min} User Defined	
4. Base Material Information		
Concrete:	Checked Normal Weight Concrete	
Type:	3000 psi	
Strength:		
Reinforcement:	None or < #4 Rebar	
Edge Reinforcement:	None	
Spacing:	No (Condition B)	
Controls Breakout:	Tension True Shear True	
Base Plate:		
Size:	Thickness 0.1875 in Length 9 in Width 24.75 in	
Standoff:	None	
Height:	0 in	
Strength:	36000 psi	
Profile:	None	



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Anchor Design (cont.)

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5. Geometric Conditions		
h _{min} 4.000 in c _{min} 3.250 in c _{max} 0.000 in p _{min} 4.500 in		
6. Summary Results		
Tension Loading		
Design Proof	Demand (lb)	Capacity (lb)
Steel Strength	968.00	6810.00
Concrete Breakout Strength	1936.00	2566.00
Utilization	0.142	0.754
Status	OK	OK
Critical		Controls
Shear Loading		
Design Proof	Demand (lb)	Capacity (lb)
Steel Strength	117.00	2574.00
Concrete Breakout Strength	469.00	7374.00
Pryout Strength		
Utilization	0.045	0.064
Status	OK	OK
Critical		Controls
7. Warnings and Remarks		
ANCHOR DESIGN CRITERIA IS SATISFIED		
<ul style="list-style-type: none">The results of the calculations carried out by means of the DSA Software are based primarily on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data so as to put it to use. Moreover, you have sole responsibility for having the results of the calculations checked and cleared by an design professional/engineer, particularly with regard to compliance with applicable standards, norms and permits, prior to using them for your specific project. The DSA Software serves only as an aid to interpret standards, norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.Calculations including seismic design requirements in accordance with ACI 318 are required for structures assigned to seismic design categories C, D, E and F.Under these seismic conditions, the direction of shear may not be predictable. In accordance with ACI 318 the full shear force should be assumed also in reverse direction for a full design. Load reversal may influence the direction of the controlling concrete breakout strength.		



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Designer: STS Sheet: 11 of 12

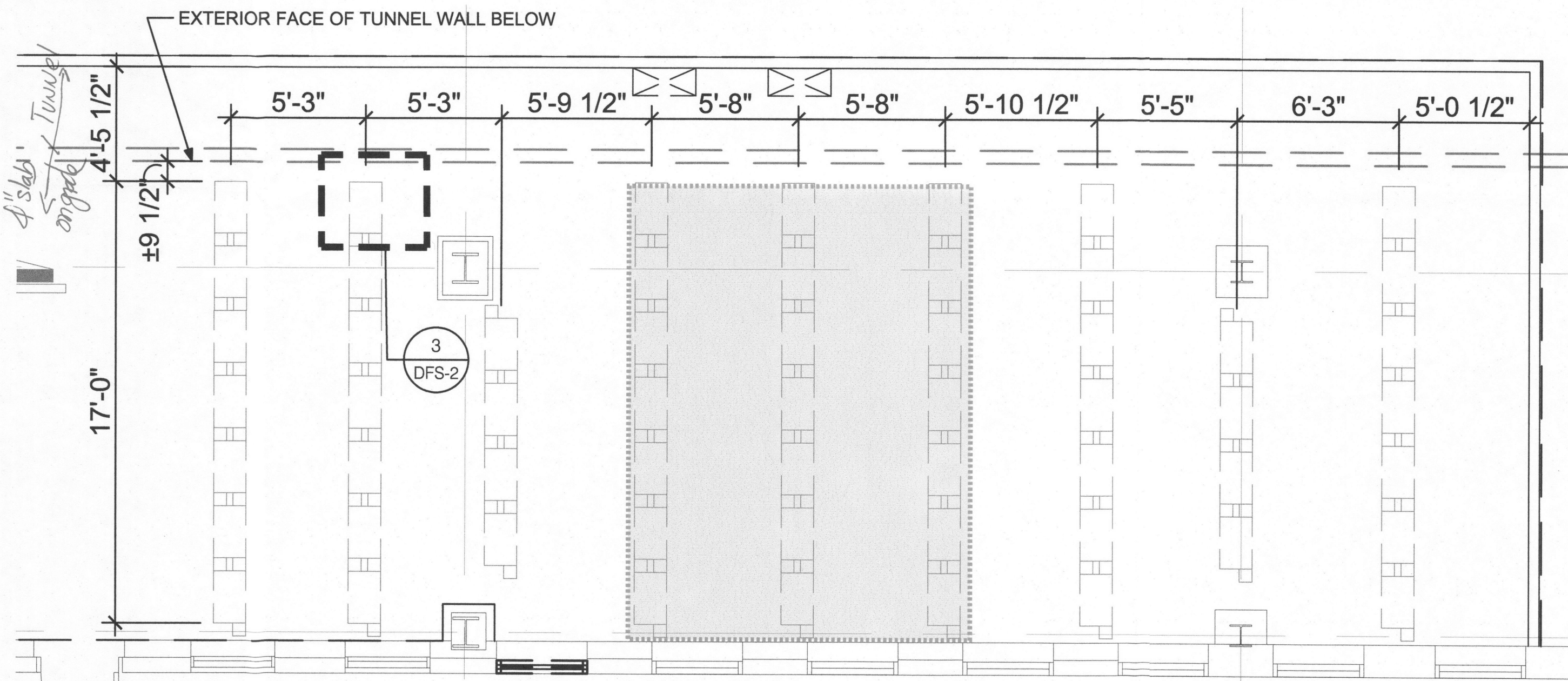
Anchor Design (cont.)

DEWALT Design Assist Ver: 1.4.2.0		Page 3
2019_09_03 Anchorage on Idealized Base PL 1901-0239		Sep 03 2019
8. Load Conditions		
Design Loads / Actions		
No	443 lb	V _u 0 lb
M _u	0 in-lb	M _u 26241 in-lb
Consider Load Reversal	X Direction 100%	Y Direction 100%
9. Load Distribution		
Max. concrete compressive strain: 0.072 %		
Max. concrete compressive stress: 311.403 psi		
Resulting anchor forces / Load distribution		
Anchor	Tension Load (lb)	Shear Load (lb)
	Share X	Share Y
	X	Y
	X	Y
1	967.97	117.3
2	0.00	117.3
3	967.97	117.3
4	0.00	117.3

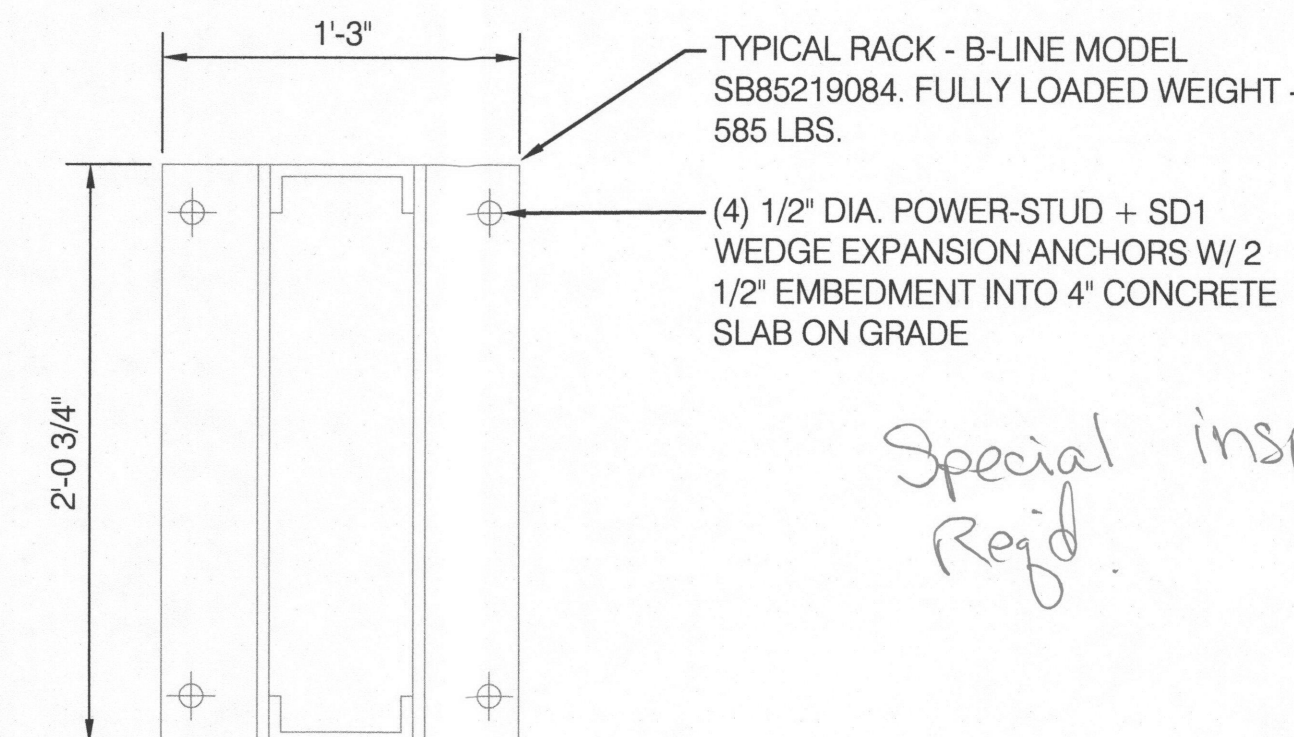


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Designer: STS Sheet: 12 of 12

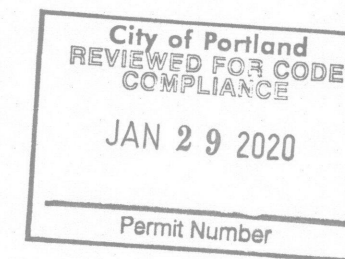


2 RACK LAYOUT PLAN
SCALE: 1/4" = 1'-0"



3 RACK ATTACHMENT PLAN, TYPICAL
SCALE: 1 1/2" = 1'-0"

Do not
Anchor racks over tunnel.



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JAN 08 2020
FACILITIES PERMITS

PDX - DAS - BOINGO
PORTLAND INTERNATIONAL AIRPORT
PORTLAND, OREGON

DEFERRED SUBMITAL

RACK INSTALLATION DETAILS

PROJ. NO.
17096
11.20.2019

DFS-2

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CARLETON HART ARCHITECTURE P.C.
830 SW 10th Avenue #200 Portland Oregon 97205
503.243.2252
www.carletohart.com



City of Portland, Oregon - Bureau of Development Services

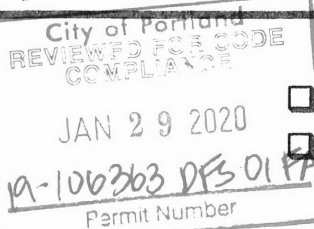
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Deferred Submittal Requirements and Application

Applicants will provide:

- ☒ A copy of this application
- ☒ Three (3) sets of plans
- ☒ Two (2) set of calculations
- ☒ Two (2) sets of product information
- ☒ Drawings and calculations must be stamped and signed by an Engineer registered in Oregon and approved by the Architect/Engineer of record for the building.
- ☐ Permit fee (paid at time of submittal)
- ☐ If the DFS includes exterior elements, plan views and elevations identifying the location(s) as approved by the Architect and Engineer of Record must be submitted.
- ☐ One (1) copy of your main building permit approved plans (NOTE: Approved plans do not need to be submitted if your project has a development liaison assigned.)



Contractor submittal information:

Contact name Michael Smith JEFFREY
 Address 8309 SW Cirrus Dr TODD B 3
 City Beaverton State OR Zip Code 97008
 Phone 541-520-4342 E-mail msmith@cts1.com CHRIS 1
 Value of deferred submittal 1000.00 Issued main building permit # 19-106364FA
 Job Site Address 7000 NE Airport Wy Portland OR 97218
 Description/Scope of work Equipment Racks PDX Terminal DAS Head End Room

Fees

Deferred submittal (DFS) fees are collected in addition to the standard building review fee paid on the main building permit. DFS fees cover the cost of the additional processing and review time associated with the design build element.

The DFS fee for processing and reviewing deferred plan submittals is 10 percent of the building permit fee calculated using the value of the particular deferred portion of the project.,

Minimum fee: Residential, one and two family dwelling ...\$195 for DFS with valuation of less than or equal to \$222,000

Commercial and all other projects\$510 for DFS with valuation of less than or equal to \$680,000

The Bureau of Development Services (BDS) fee schedule is also available on the BDS web site at www.portlandoregon.gov/bds | select the Fees tab.

Helpful Information

Bureau of Development Services
 1900 SW 4th Avenue, Portland, OR 97201

Submit your plans to:

Development Services Center (DSC), First Floor,
 For Hours Call 503-823-7310 | Select option 1
 or visit www.portlandoregon.gov/bds

Important Telephone Numbers

BDS main number 503-823-7300
 DSC automated information line 503-823-7310
 Building code information 503-823-1456
 BDS 24 hour inspection request line 503-823-7000
 Residential information for
 one and two family dwellings 503-823-7388
 City of Portland TTY 503-823-6868

DEFERRED SUBMITTAL REQUIREMENTS AND APPLICATION

Information is subject to change.

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