

- NOTES**
- All concrete shall be Class 4000, except as noted.
 - For backfill requirements, see Standard Plan D-4.
 - When Wall Type 4SW (saltwater) is specified, the concrete cover over steel in the front face and the total wall thickness shall be increased by 1".
 - When Wall Type 4SW (saltwater) is specified, concrete in the table column "Material Quantity" shall be increased by $(0.003 \times H)$ CY/LF.
 - Concrete in the 48 foot wall sections shall be placed separately between expansion joints with a minimum 24 hour period before placing concrete in the adjacent section.
 - This wall has been designed in accordance with the requirements of the AASHTO LRFD Bridge Design Specifications 4th Edition 2007 and interims through 2008. The seismic design of these walls has been completed using an effective PGA of 0.32 g.

SLOPING FACE WALL DESIGN WITH 2 :1 BACKSLOPE



REINFORCED CONCRETE RETAINING WALL TYPE 4 AND 4SW STANDARD PLAN D-10.25-01

SHEET 1 OF 2 SHEETS

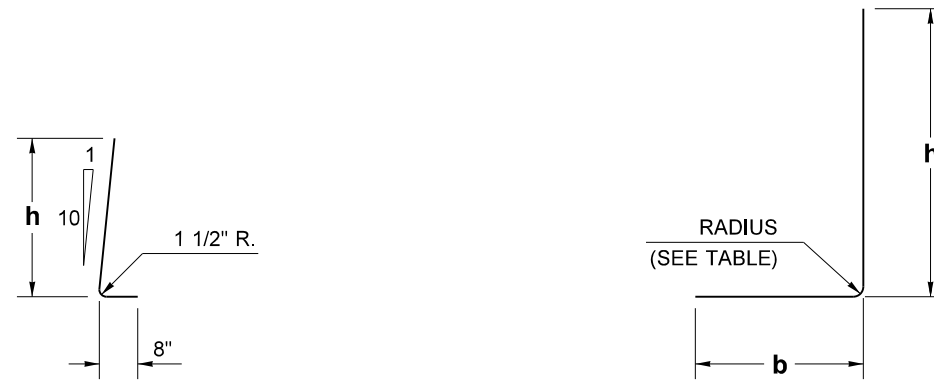
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STATE DESIGN ENGINEER
 Washington State Department of Transportation

BAR Q #4		
LOCATION	WALL HEIGHT (H)	QTY.
TOP OF FOOTING	≤ 11'	4
	12' ≤ 15'	6
	16' ≤ 21'	8
	22' ≤ 25'	10
	26' ≤ 29'	12
BOTTOM OF FOOTING	≤ 11'	4
	12' ≤ 15'	6
	16' ≤ 21'	8
	22' ≤ 25'	10
	26' ≤ 29'	12
	30' ≤ 35'	14

① OFFSET ~ SET TOP OF WALL BACK:
 $H \leq 20'$ OFFSET = 1/2"
 $H \geq 20'$ OFFSET (inches) = $\frac{H(ft)}{8} - 2$

WALL HT H	DIMENSIONS					FOOTING REINFORCEMENT															STEM REINFORCEMENT				MATERIAL QUANTITY		MAXIMUM SOIL PRESSURE (PSF)				
						BAR (E) #4		BAR (F)			BAR (H)			BAR (K)				BAR (M)					BAR (J)				(G) #4	SERVICE	STRENGTH	EXTREME EVENT 1	
	B	C _v	D	h _k	A	LENGTH	h	SIZE	SPA.	LENGTH	SIZE	SPA.	LENGTH	h	b	SIZE	SPA.	LENGTH	h	b	SIZE	SPA.	LENGTH	LENGTH	CONC. CY / LF	STEEL LBS / LF					
5'	4'-3"	2'-9"	1'-0"	N/A	1'-3"	3'-4"	2'-9"	#4	1'-6"	4'-0"	#4	1'-6"	4'-0"	#4	1'-6"	5'-1 1/2"	4'-7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3'-10"	0.31	20.6	552	718	856
6'	4'-3"	3'-0"	1'-0"	N/A	1'-4 1/2"	3'-4"	2'-9"	#4	1'-6"	4'-0"	#4	1'-6"	4'-0"	#4	1'-6"	6'-1 1/2"	5'-7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4'-10"	0.35	23.0	666	864	1030
7'	4'-3"	3'-0"	1'-0"	N/A	1'-6"	3'-4"	2'-9"	#4	1'-6"	4'-0"	#4	1'-6"	4'-0"	#4	1'-6"	7'-1 1/2"	6'-7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5'-10"	0.41	25.5	771	998	1335
8'	4'-6"	3'-3"	1'-0"	N/A	1'-7 1/2"	3'-4"	2'-9"	#4	1'-6"	4'-3"	#4	1'-6"	4'-3"	#4	1'-6"	8'-1 1/2"	7'-7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6'-10 1/2"	0.47	28.2	862	1112	1612
9'	5'-0"	3'-3"	1'-0"	N/A	1'-9"	3'-4"	2'-9"	#4	1'-6"	4'-9"	#4	1'-6"	4'-9"	#4	1'-6"	9'-1 1/2"	8'-7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7'-10 1/2"	0.56	31.1	969	1281	2056
10'	5'-6"	3'-6"	1'-0"	N/A	1'-10 1/2"	3'-4"	2'-9"	#4	1'-6"	5'-3"	#4	1'-6"	5'-3"	#4	1'-0"	10'-1 1/2"	9'-7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8'-10 1/2"	0.64	36.2	1067	1440	2383
11'	6'-0"	3'-9"	1'-0"	N/A	2'-0"	3'-4"	2'-9"	#4	1'-6"	5'-9"	#4	1'-6"	5'-9"	#4	11"	11'-1 1/2"	10'-7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9'-10 1/2"	0.73	40.0	1184	1605	2732
12'	6'-9"	4'-0"	1'-0"	N/A	2'-1 1/2"	3'-4"	2'-9"	#4	1'-0"	6'-6"	#4	1'-0"	6'-6"	#4	8"	12'-1 1/2"	11'-7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10'-10 1/2"	0.84	51.0	1301	1767	2989
13'	7'-0"	4'-6"	1'-0"	1'-0"	2'-3"	3'-4"	2'-9"	#4	1'-0"	6'-9"	#4	1'-0"	6'-9"	#4	7"	13'-1 1/2"	12'-7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11'-10 1/2"	1.00	57.5	1388	1896	3229
14'	7'-9"	4'-9"	1'-3"	1'-3"	2'-4"	3'-7"	3'-0"	#4	1'-0"	7'-6"	#4	11"	7'-6"	#5	8"	14'-3"	13'-7"	9"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12'-7 1/2"	1.19	66.8	1539	2104	3537
15'	8'-3"	5'-0"	1'-3"	1'-3"	2'-5 1/2"	3'-7"	3'-0"	#4	11"	8'-0"	#4	9"	8'-0"	#5	7"	15'-3"	14'-7"	9"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13'-7 1/2"	1.31	77.7	1657	2271	3915
16'	9'-0"	5'-3"	1'-6"	1'-6"	2'-6 1/2"	3'-10"	3'-3"	#4	9"	8'-9"	#4	7"	8'-9"	#5	6"	16'-3"	15'-7"	9"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14'-8"	1.53	92.5	1809	2480	4220
17'	9'-9"	5'-6"	1'-6"	1'-6"	2'-8"	3'-10"	3'-3"	#4	6"	9'-6"	#4	6"	9'-6"	#6	7"	17'-4"	16'-7"	11"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15'-8"	1.67	113.0	1927	2642	4489
18'	10'-6"	5'-6"	1'-6"	1'-6"	2'-9 1/2"	3'-10"	3'-3"	#5	8"	10'-3"	#4	6"	10'-3"	#7	8"	18'-6"	17'-7"	1'-1"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16'-5"	1.81	132.6	2121	2909	5006
19'	11'-0"	6'-3"	1'-9"	1'-9"	2'-10 1/2"	4'-1"	3'-6"	#5	8"	10'-9"	#4	6"	10'-9"	#7	7"	19'-6"	18'-7"	1'-1"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17'-2"	2.06	146.5	2126	2921	4937
20'	11'-9"	6'-6"	1'-9"	1'-9"	3'-0"	4'-1"	3'-6"	#5	8"	11'-6"	#5	8"	11'-6"	#7	6"	20'-6"	19'-7"	1'-1"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18'-2"	2.22	170.2	2245	3085	5207
21'	12'-6"	6'-6"	2'-0"	2'-0"	3'-1 1/2"	4'-4"	3'-9"	#5	7"	12'-3"	#5	8"	12'-3"	#8	1'-2"	14'-2"	13'-1 1/2"	1'-3"	#8	1'-2"	7'-0"	5'-11"	1'-3"	#8	1'-2"	18'-10"	2.51	185.2	2472	3396	5756
22'	13'-6"	6'-6"	2'-3"	2'-3"	3'-2 1/2"	4'-7"	4'-0"	#5	6"	13'-3"	#5	8"	13'-3"	#9	1'-0"	14'-5 1/2"	13'-4"	1'-6"	#9	1'-0"	8'-7"	7'-3"	1'-6"	#9	1'-0"	19'-7"	2.85	227.4	2698	3703	6200
23'	13'-9"	7'-0"	2'-3"	2'-3"	3'-4"	4'-7"	4'-0"	#5	6"	13'-6"	#5	8"	13'-6"	#9	1'-2"	15'-10"	14'-8 1/2"	1'-6"	#9	1'-2"	8'-7"	7'-3"	1'-6"	#9	1'-2"	20'-7"	2.99	237.4	2746	3778	6450
24'	14'-6"	7'-3"	2'-6"	2'-6"	3'-5"	4'-10"	4'-3"	#6	7"	14'-3"	#5	8"	14'-3"	#9	1'-0"	15'-10 1/2"	14'-9"	1'-6"	#9	1'-0"	8'-10"	7'-6"	1'-6"	#9	1'-0"	21'-4"	3.33	275.9	2899	3989	6759
25'	15'-0"	7'-9"	2'-6"	2'-6"	3'-6 1/2"	4'-10"	4'-3"	#6	7"	14'-9"	#5	6"	14'-9"	#10	1'-2"	17'-7 1/2"	16'-4 1/2"	1'-8"	#10	1'-2"	10'-2 1/2"	8'-9"	1'-8"	#10	1'-2"	22'-4"	3.51	316.5	2944	4056	6897
26'	15'-9"	7'-9"	2'-6"	2'-6"	3'-8"	4'-10"	4'-3"	#6	6"	15'-6"	#5	6"	15'-6"	#10	1'-0"	17'-7"	16'-4"	1'-8"	#10	1'-0"	10'-2 1/2"	8'-9"	1'-8"	#10	1'-0"	23'-4"	3.71	364.9	3141	4328	7416
27'	16'-3"	8'-3"	2'-9"	2'-9"	3'-9"	5'-1"	4'-6"	#6	6"	16'-0"	#6	8"	16'-0"	#10	10"	17'-0 1/2"	15'-9 1/2"	1'-8"	#10	10"	10'-5 1/2"	9'-0"	1'-8"	#10	10"	24'-1"	4.07	418.8	3219	4439	7593
28'	16'-9"	8'-9"	3'-0"	3'-0"	3'-10 1/2"	5'-4"	4'-9"	#6	6"	16'-6"	#6	7"	16'-6"	#10	10"	18'-5 1/2"	17'-2 1/2"	1'-8"	#10	10"	10'-8 1/2"	9'-3"	1'-8"	#10	10"	24'-10"	4.45	441.3	3298	4552	7773
29'	17'-6"	9'-0"	3'-3"	3'-3"	3'-11 1/2"	5'-7"	5'-0"	#6	6"	17'-3"	#6	7"	17'-3"	#10	9"	18'-8 1/2"	17'-5 1/2"	1'-8"	#10	9"	10'-11 1/2"	9'-6"	1'-8"	#10	9"	25'-7"	4.87	485.7	3451	4763	8081
30'	18'-0"	9'-3"	3'-6"	3'-6"	4'-0 1/2"	5'-10"	5'-3"	#6	6"	17'-9"	#6	7"	17'-9"	#10	9"	20'-1 1/2"	18'-10 1/2"	1'-8"	#10	9"	11'-2 1/2"	9'-9"	1'-8"	#10	9"	26'-4"	5.28	505.6	3606	4982	8510
31'	18'-9"	9'-6"	4'-0"	4'-0"	4'-1 1/2"	6'-4"	5'-9"	#6	6"	18'-6"	#6	7"	18'-6"	#10	8"	20'-1 1/2"	18'-10 1/2"	1'-8"	#10	8"	11'-8 1/2"	10'-3"	1'-8"	#10	8"	26'-10"	5.96	559.9	3793	5241	8856
32'	19'-6"	9'-9"	3'-9"	3'-9"	4'-3"	6'-1"	5'-6"	#7	7"	19'-3"	#6	6"	19'-3"	#10	7"	19'-10 1/2"	18'-7 1/2"	1'-8"	#10	7"	11'-5 1/2"	10'-0"	1'-8"	#10	7"	28'-1"	6.00	643.8	3879	5357	9087
33'	20'-0"	10'-0"	4'-0"	4'-0"	4'-4 1/2"	6'-4"	5'-9"	#7	7"	19'-9"	#6	6"	19'-9"	#10	7"	21'-3 1/2"	20'-0 1/2"	1'-8"	#10	7"	11'-8 1/2"	10'-3"	1'-8"	#10	7"	28'-10"	6.46	668.3	4034	5577	9518
34'	20'-9"	10'-3"	4'-1"	4'-1"	4'-5 1/2"	6'-6"	5'-11"	#7	6"	20'-6"	#6	6"	20'-6"	#10	6"	19'-10 1/2"	18'-7 1/2"	1'-8"	#10	6"	11'-2 1/2"	9'-9"	1'-8"	#10	6"	29'-9"	6.81	831.8	4324	5833	9880
35'	21'-3"	10'-6"	4'-2"	4'-2"	4'-7"	6'-8"	6'-1"	#7	6"	21'-0"	#7	7"	21'-0"	#10	6"	20'-8"	19'-5"	1'-8"	#10	6"	10'-10"	9'-5"	1'-8"	#10	6"	30'-8"	7.13	969.0	4611	6094	10364



BAR (E)
@ 1' - 6" CENTERS

BAR	RADIUS
#4	1 1/2"
#5	1 7/8"
#6	2 1/4"
#7	2 5/8"
#8	3"
#9	4 3/4"
#10	5 3/8"
#11	6"

BARS (K) AND (M)

BAR	MIN. SPLICE
#4	2' - 0"
#5	2' - 0"
#6	2' - 0"
#7	2' - 6"
#8	3' - 3"
#9	4' - 2"
#10	5' - 3"

VERTICAL FACE WALL DESIGN
WITH 2 :1 BACKSLOPE



REINFORCED CONCRETE
RETAINING WALL
TYPE 4 AND 4SW
STANDARD PLAN D-10.25-01

SHEET 2 OF 2 SHEETS

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