

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
X	X	X	X	X	X

REGISTERED CIVIL ENGINEER DATE _____

PLANS APPROVAL DATE _____

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TABLE OF PILE SPACING: CLASS 45 - CONCRETE PILES

DESIGN H	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'
W	6'-9"	7'-0"	7'-6"	8'-3"	9'-3"	10'-3"	11'-0"	12'-0"	13'-0"	14'-3"	16'-3"	16'-9"	18'-0"	20'-6"
C	2'-9"	2'-9"	3'-0"	3'-3"	3'-6"	4'-0"	4'-3"	4'-9"	5'-0"	5'-6"	6'-3"	6'-9"	7'-3"	7'-9"
B	4'-0"	4'-3"	4'-6"	5'-0"	5'-9"	6'-3"	6'-9"	7'-3"	8'-0"	8'-9"	10'-0"	10'-0"	10'-9"	12'-9"
F	1'-6"	1'-6"	1'-6"	1'-9"	1'-9"	2'-0"	2'-6"	2'-9"	3'-0"	3'-0"	3'-3"	3'-6"	3'-9"	4'-0"
M	1'-3"	1'-3"	1'-6"	1'-9"	2'-0"	2'-6"	2'-9"	3'-3"	3'-6"	4'-0"	4'-9"	5'-3"	5'-9"	6'-3"
N	2'-6"	2'-9"	3'-0"	3'-6"	4'-3"	4'-9"	5'-3"	5'-9"	6'-6"	7'-3"	8'-6"	8'-6"	9'-3"	11'-3"
ROW 1	16'-0"	14'-0"	12'-0"	10'-0"	8'-0"	6'-6"	5'-6"	4'-6"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"
ROW 2	24'-0"	21'-0"	18'-0"	15'-0"	14'-0"	13'-0"	11'-0"	9'-0"	8'-0"	12'-0"	10'-0"	6'-0"	4'-0"	4'-0"
ROW 3										8'-0"	5'-0"	4'-0"	4'-0"	6'-0"
ROW 4														6'-0"
CONFIGURATION	I	I	I	I	I	I	I	I	I	II	II	II	II	III

TABLE 1: TABLE OF REINFORCING STEEL DIMENSIONS AND DATA

DESIGN H	STEM WITH HAUNCH													
	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'
STEM BATTER	0	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	5/8:12	3/4:12	7/8:12	1:12	1:12
STEM THICKNESS @ TOP	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"
STEM THICKNESS @ HAUNCH	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
(a) BARS				#6@18**	#7@18**	#8@18**	#9@18**	#10@18**	#8 @ 9*	#8 @ 9*	#7 @ 6*	#10@12**	#9 @ 9*	#11@12**
X				CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT
Y				8'-0"	6'-6"	7'-6"	8'-6"	9'-6"	9'-6"	11'-0"	11'-6"	13'-0"	14'-0"	15'-6"
(b) BARS	#5 @ 12	#5 @ 12	#5 @ 9	#6@18**	#7@18**	#8@18**	#9@18**	#10@18**	#8 @ 9*	#8 @ 9*	#7 @ 6*	#10@12**	#9 @ 9*	#11@12**
X	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT
Y	CONT	CONT	CONT	CONT	10'-6"	13'-0"	15'-0"	17'-6"	19'-6"	21'-0"	18'-6"	19'-0"	25'-6"	23'-6"
(c) BARS				#6 @ 18	#6 @ 18	#6 @ 18	#6 @ 18	#6 @ 18	#6 @ 18	#6 @ 18	#6 @ 12	#7 @ 12	#7 @ 18	#7 @ 12
(d) BARS	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 9	#5 @ 9	#6 @ 9	#5 @ 6	#7 @ 9	#7 @ 9	#6 @ 6	#7 @ 6
TOTAL (e) BARS	6 #5	6 #5	6 #5	6 #5	8 #5	8 #5	10 #5	10 #5	10 #5	10 #5	12 #5	12 #5	12 #5	14 #5
TOTAL (f) BARS	6 #5	6 #5	6 #5	6 #5	6 #5	8 #5	8 #5	8 #5	8 #5	10 #5	10 #5	10 #5	12 #5	12 #5

TABLE 2: TABLE OF REINFORCING STEEL DIMENSIONS AND DATA

DESIGN H	STEM WITH HAUNCH							STEM WITHOUT HAUNCH						
	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'
BATTER	0	0	0	0	0	0	0	0	0	0	1/4:12	1/2:12	1/2:12	1/2:12
STEM THICKNESS @ TOP	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"
STEM THICKNESS @ HAUNCH	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-3"	1'-3"							
(a) BARS				#6@12**	#5 @ 6*	#9@18**	#9@12**	#9@12**	#9@12**	#7 @ 6*	#7 @ 6*	#7 @ 6*	#9 @ 9*	#11@12**
X				CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT
Y				5'-6"	5'-6"	8'-6"	8'-6"	8'-6"	8'-6"	9'-6"	11'-0"	12'-6"	13'-6"	14'-6"
(b) BARS	#5 @ 12	#5 @ 9	#6 @ 9	#6@12**	#5 @ 6*	#9@18**	#9@12**	#9@12**	#9@12**	#7 @ 6*	#7 @ 6*	#7 @ 6*	#9 @ 9*	#11@12**
X	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT
Y	CONT	CONT	CONT	CONT	CONT	11'-6"	11'-6"	12'-0"	12'-0"	17'-6"	20'-0"	21'-6"	24'-0"	24'-0"
(c) BARS						#7 @ 18	#7 @ 12	#7 @ 12	#7 @ 12	#6 @ 12	#6 @ 12	#6 @ 12	#7 @ 18	#7 @ 12
(d) BARS	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 9	#5 @ 9	#6 @ 9	#5 @ 6	#7 @ 9	#7 @ 9	#6 @ 6	#7 @ 6
TOTAL (e) BARS	6 #5	6 #5	6 #5	6 #5	8 #5	8 #5	10 #5	10 #5	10 #5	10 #5	12 #5	12 #5	12 #5	14 #5
TOTAL (f) BARS	6 #5	6 #5	6 #5	6 #5	6 #5	8 #5	8 #5	8 #5	8 #5	10 #5	10 #5	10 #5	12 #5	12 #5

CONT = CONTINUOUS

* = (a) AND (b) BARS ARE BUNDLED TOGETHER.

** = ALTERNATE (a) AND (b) BARS AS SHOWN IN DETAIL A.

DESIGN DATA

DESIGN: LOAD FACTOR DESIGN (LFD)

CONCRETE: REINFORCED CONCRETE, f'c = 3600 psi
fy = 60000 psi

LOADING CASE:
LEVEL GROUND WITH 240 psf LIVE LOAD SURCHARGE AND 16' SOUNDWALL.
SEISMIC LOAD = 0.3 DEAD LOAD
WIND LOAD = 30 psf
DEAD LOAD OF SOUNDWALL = 1414 lb/lf
DEAD LOAD OF BARRIER = 372 lb/lf

SEISMIC LOAD: SOIL
Kh = 0.3g
Kv = 0.0
Kae : MONONOBE-OKABE METHOD

SOIL: $\phi = 34^\circ$ $\gamma = 120$ pcf
EQUIVALENT FLUID PRESSURE:
= 36 pcf FOR DETERMINATION OF TOE PRESSURE
= 27 pcf FOR DETERMINATION OF HEEL PRESSURE

LOAD COMBINATIONS:
GROUP A : $\beta D + 1.7E + 1.7SC$
GROUP B : $\beta D + 1.7E + 1.3W$
GROUP C :
STEM : $1.0D + 1.0E + 1.0EQD + 1.0EQE$
FOOTING : D+PYM
WHERE : $\beta = 1.0$ OR 1.3 WHICHEVER CONTROLS DESIGN
D = DEAD LOAD
E = LATERAL EARTH PRESSURE
SC = SURCHARGE
W = WIND LOAD
EQD = SEISMIC DEAD LOAD
EQE = SEISMIC LATERAL EARTH PRESSURE
PYM = PROBABLE YIELD MOMENT (1.3* NOMINAL YIELD MOMENT OF STEM)

- GENERAL NOTES**
- CLASS 45-CONCRETE PILES WERE USED FOR THE DESIGN.
 - PILE BATTER SHOWN ARE 1:3.
 - MINIMUM DISTANCE BETWEEN CENTER PILE AND EDGE OF FOOTING IS 1'-6".
 - REDUCTION FACTORS:
GROUPS A & B : $\phi = 0.75$
GROUP C : $\phi = 1.0$
 - LATERAL RESISTANCE OF EACH PILE:
GROUPS A & B : = 30 kip
GROUP C : = 40 kip
 - MAXIMUM SPACING BETWEEN PILES IS SHOWN IN THE TABLE. REDUCE TO SUIT THE LENGTH OF FOOTING.
 - MINIMUM DISTANCE BETWEEN ANY TWO PILES IS 3'-0".
 - LIMIT OF NO SPLICING FOR REBARS = 3 TIMES THE BOTTOM THICKNESS OF STEM.

STANDARD DRAWING	FILE NO. xs14-320-1x	APPROVAL DATE <u>July 2011</u>	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES	BRIDGE NO.	X	RETAINING WALL TYPE 1SWBP - DETAILS NO. 1								
					POST MILE			X							
DS OSD 2147A (ENGLISH STANDARD DRAWING "XS" BORDER REV. [02-02-11])			ORIGINAL SCALE IN INCHES FOR REDUCED PLANS		0	1	2	3	UNIT: X	PROJECT NUMBER & PHASE: X	CONTRACT NO.: X	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES	SHEET	OF
														X	X