DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

July 1, 2002
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Overcomer Y. Hor
No. C45803
EXP. 12-31-02
CIVIL
STATE OF CALIFORNIA

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DESIGN EXAMPLES

Example No. 1

Given: Wall height 6100 mm (20')
1:2 (2 :1) cut slope to be retained. Foundation site investigation indicates lateral pressure from material above will be equivalent to Design Loading Case II condition and an allowable soil bearing capacity of 240 kPa (5 Kips/SQFT).

Select: Battered Type C or Type D wall. Actual H=6200 mm (20'-8") Type D vertical wall can be used by increasing the allowable bearing capacity of the original ground.

Example No. 2

Given: Wall height 2750 mm (9')
Design Loading Case I; 600 mm (2') level ground surcharge plus 11.5 kPa (0.25 Kips/SQFT) of surcharge to be retained. Base founded in embankment.

Select: Battered or vertical Type A or Type B wall. Actual H=2900 mm (9'-8").

Example No. 3

Given: Wall height 3050 mm (10')
Design Loading Case III; 1:1.5 (1½:1) embankment slope to be retained. Base in original ground, sloping away from toe of wall at 1:2 (2 :1). Foundation investigation determined the allowable soil bearing capacity is 190 Kpa (4 Kips/SQFT), considering the sloping ground in front of wall.

Select: Battered Type B or Type C wall or Vertical Type C wall. Actual H=3175 mm (10'-5").

Example No. 4

Given: Wall height 9150 mm (30')
Design Loading Case II; 1:2 (2 :1) embankment slope to be retained. Base in embankment 1525 mm (5') depth minimum.

Select: Battered Type D, Type E or Type F wall or Vertical Type F wall. Actual H=9375 (30'-9"). For all types the foundation pressure is between 240 and 385 kPa (5.0 and 8.0 Kips/SQFT). Embankment material below the wall must be "Structure Backfill", See Design Example Footnote 1.

FOUNDATION PRESSURE - BATTERED WALL

TYPE	LOADING CASE	WALL HEIGHT 425 mm (1'-5")	700 mm (2'-4")	975 mm (3'-3")	1250 mm (4'-2")	1525 mm (5'-1")	1800 mm (6'-0")	2075 mm (6'-11")	2350 mm (7'-10")	2625 mm (8'-9")	2900 mm (9'-8")	3175 mm (10'-7")	3450 mm (11'-6")	3725 mm (12'-5")	4000 mm (13'-4")	4275 mm (14'-3")	4550 mm (15'-2")
A	I	35 kPa* (0.73-kips/SQFT*)	40 kPa* (0.88-kips/SQFT*)	50 kPa* (1.02-kips/SQFT*)	55 kPa* (1.16-kips/SQFT*)	60 kPa* (1.28-kips/SQFT*)	65 kPa* (1.37-kips/SQFT*)	70 kPa* (1.45-kips/SQFT*)	70 kPa* (1.49-kips/SQFT*)	70 kPa* (1.50-kips/SQFT*)	75 kPa* (1.57-kips/SQFT*)	90 kPa (1.88-kips/SQFT)	110 kPa (2.25-kips/SQFT)	130 kPa (2.67-kips/SQFT)	150 kPa (3.13-kips/SQFT)	175 kPa (3.67-kips/SQFT)	
	II	40 kPa* (0.81-kips/SQFT*)	45 kPa* (0.95-kips/SQFT*)	50 kPa* (1.09-kips/SQFT*)	60 kPa* (1.22-kips/SQFT*)	65 kPa* (1.34-kips/SQFT*)	70 kPa* (1.43-kips/SQFT*)	75 kPa* (1.51-kips/SQFT*)	75 kPa* (1.56-kips/SQFT*)	75 kPa* (1.59-kips/SQFT*)	75 kPa* (1.58-kips/SQFT*)	85 Kpa (1.78-kips/SQFT)	100 Kpa (2.13-kips/SQFT)	120 Kpa (2.52-kips/SQFT)	140 Kpa (2.96-kips/SQFT)	165 Kpa (3.46-kips/SQFT)	
	III	45 kPa* (0.94-kips/SQFT*)	50 kPa* (1.02-kips/SQFT*)	50 kPa* (1.08-kips/SQFT*)	55 kPa* (1.11-kips/SQFT*)	55 kPa* (1.10-kips/SQFT*)	65 kPa (1.33-kips/SQFT)	80 kPa (1.70-kips/SQFT)	100 kPa (2.13-kips/SQFT)	125 kPa (2.64-kips/SQFT)	155 kPa (3.22-kips/SQFT)						
B	I									65 kPa* (1.34-kips/SQFT*)	70 Kpa (1.50-kips/SQFT)	80 Kpa (1.69-kips/SQFT)	90 Kpa (1.88-kips/SQFT)	105 kPa (2.14-kips/SQFT)	120 kPa (2.45-kips/SQFT)	130 kPa (2.73-kips/SQFT)	145 kPa (3.05-kips/SQFT)
	II									65 Kpa (1.40-kips/SQFT)	80 Kpa (1.64-kips/SQFT)	90 Kpa (1.90-kips/SQFT)	105 Kpa (2.18-kips/SQFT)	120 Kpa (2.49-kips/SQFT)	135 kPa (2.83-kips/SQFT)	155 kPa (3.18-kips/SQFT)	170 kPa (3.57-kips/SQFT)
	III									105 kPa (2.16-kips/SQFT)	125 kPa (2.61-kips/SQFT)	150 kPa (3.10-kips/SQFT)	175 kPa (3.64-kips/SQFT)				
C	I											75 Kpa* (1.59-kips/SQFT*)	85 kPa (1.75-kips/SQFT)	95 kPa (1.95-kips/SQFT)	105 kPa (2.15-kips/SQFT)	110 kPa (2.33-kips/SQFT)	120 kPa (2.52-kips/SQFT)
	II											90 kPa* (1.83-kips/SQFT*)	85 kPa (1.81-kips/SQFT)	100 kPa (2.07-kips/SQFT)	115 kPa (2.35-kips/SQFT)	125 kPa (2.59-kips/SQFT)	135 Kpa (2.85-kips/SQFT)
	III											110 Kpa* (2.26-kips/SQFT*)	120 kPa (2.49-kips/SQFT)	140 kPa (2.92-kips/SQFT)	160 kPa (3.38-kips/SQFT)	185 Kpa (3.83-kips/SQFT)	205 kPa (4.32-kips/SQFT)
D	I																105 kPa (2.16-kips/SQFT)
	II																125 Kpa* (2.65-kips/SQFT*)
	III																180 kPa* (3.76-kips/SQFT*)
E	I																
	II																
	III																
F	I																
	II																
	III																

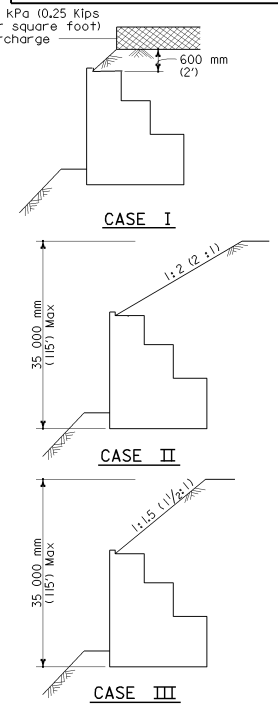
*Indicates pressure at heel

▮ Heavy vertical line indicates maximum allowable wall height for particular wall type and particular loading case.

DESIGN EXAMPLE FOOTNOTES

1. To constitute a "wall base in embankment" condition, a minimum of 1525 mm (5') of embankment at 95% relative compaction is required below the base of the wall. When the foundation pressure is between 240 and 385 kPa (5.0 and 8.0 Kips/SQFT), the embankment below the wall shall be constructed with structure backfill material to the limits specified for embankments constructed with relative compaction of 95%. The maximum allowable soil bearing capacity is 385 kPa (8 Kips/SQFT).

2. For walls with "wall base in original ground" condition, the allowable soil bearing capacity, design lateral loads, and slope stability shall be determined by a foundation site investigation and by an analysis. Walls shall not be founded in original ground having an allowable soil bearing capacity of less than 145 kPa (3 Kips/SQFT).



DETAIL OF DESIGN LOADING CASES

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DESIGN DATA FOR REINFORCED CONCRETE CRIB WALL FOUNDATION PRESSURE - BATTERED WALL

These "Standard Plans for Construction of Local Streets and Roads" contain units in two systems of measurement: International System of Units (SI or "metric") and United States Standard Measures shown in the parentheses (). The measurements expressed in the two systems are not necessarily equal or interchangeable. See the "Foreword" at the beginning of this publication.

NO SCALE

C7F

2002 DUAL UNITS STD PLAN C7F