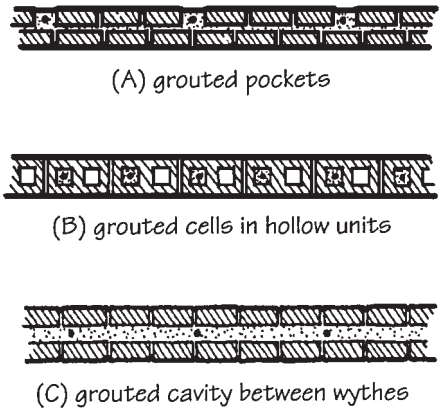
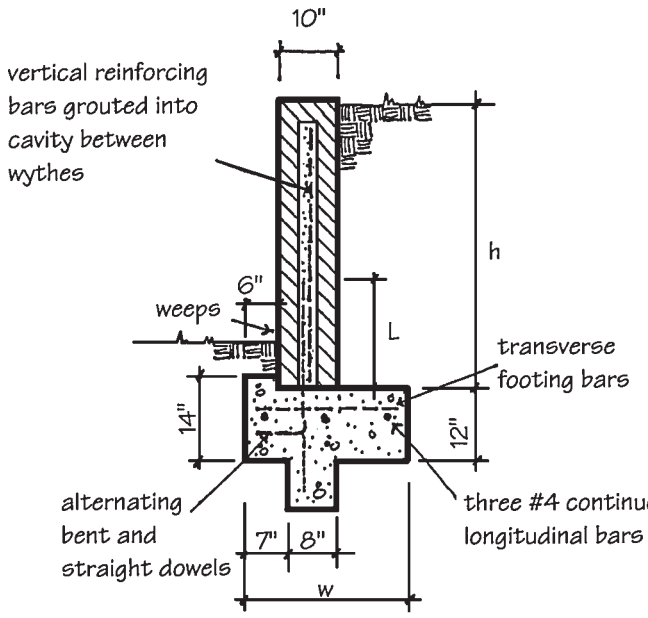


Figure 13-18 Three methods of placing reinforcing steel in brick retaining walls. (*From BIA* Technical Note 17N.)

Both conventional and soil-reinforced SRWs function as gravity retaining walls. To be stable, a gravity retaining wall must have sufficient weight (mass) and width to resist both sliding at the base and overturning of the mass about the toe of the structure. Stability calculations that involve forces acting on the boundary of the gravity structure are called external stability calculations. For soil-reinforced SRWs and multiple-depth conventional SRWs, a set of internal stability calculations are also required to ensure that there is adequate strength and width to create the stable monolithic gravity mass. The local stability of the dry-stacked column of units must also be analyzed. The NCMA *Design Manual for Segmental Retaining Walls* provides complete engineering calculations, soil information, test methods, guide specifications, and design tables.

Segmental retaining walls are typically installed in a shallow trench with a sand leveling bed and gravel backfill (*see Fig. 13-26*). In poorly drained soils, a 4- to 6-in. gravel or crushed stone drainage bed should be installed in a slightly deeper trench, then a layer of filter fabric before the sand leveling bed is placed. Getting the base course of units level is critical to the strength and stability of the wall. The gravel backfill should be added in lifts as the wall is built.



Equivalent Fluid Pressure for Retained Slopes	
Surface Slope of Retained Soil (vertical : horizontal)	Equivalent Fluid Pressure (pcf)
Level	30
1 : 5	32
1: 4	35
1 : 3	38
1 : 2	43
1 : 1-1/2	55
1 : 1	80

Dimensions and Reinforcement for Double-Wythe Brick Retaining Walls*

Wall Stem Height, *h* (ft.-in.)	Footing Width, *w* (ft.-in.)	Reinforcing Dowels	Length of Dowel Lap, *L* (ft.-in.)	Vertical Reinforcement	Transverse Footing Reinforcement
2'-0"	1'-9"	#3 @ 40" o.c.	1'-10"	—	#3 @ 40" o.c.
2'-6"	1'-9"	#3 @ 40" o.c.	2'-4"	—	#3 @ 40" o.c.
3'-0"	2'-0"	#3 @ 40" o.c.	2'-10"	—	#3 @ 40" o.c.
3'-6"	2'-0"	#3 @ 40" o.c.	3'-4"	—	#3 @ 40" o.c.
4'-0"	2'-4"	#3 @ 27" o.c. or #4 @ 40" o.c.	1'-4"	#3 @ 27" o.c. or #3 @ 40" o.c.	#3 @ 27" o.c. or #3 @ 40" o.c.
4'-6"	2'-8"	#3 @ 19" o.c. or #4 @ 35" o.c.	1'-6"	#3 @ 38" o.c. or #3 @ 35" o.c.	#3 @ 19" o.c. or #3 @ 35" o.c.
5'-0"	3'-0"	#3 @ 14" o.c. or #4 @ 25" o.c. or #5 @ 40" o.c.	1'-8"	#3 @ 28" o.c. or #3 @ 25" o.c. or #4 @ 40" o.c.	#3 @ 14" o.c. or #3 @ 25" o.c. or #4 @ 40" o.c.
5'-6"	3'-3"	#3 @ 1" o.c. or #4 @ 20" o.c. or #5 @ 31" o.c.	1'-10"	#3 @ 22" o.c. or #4 @ 40" o.c. or #4 @ 31" o.c.	#3 @ 11" o.c. or #3 @ 20" o.c. or #4 @ 31" o.c.
6'-0"	3'-6"	#3 @ 8" o.c. or #4 @ 14" o.c. or #5 @ 20" o.c.	2'-0"	#3 @ 16" o.c. or #4 @ 28" o.c. or #5 @ 40" o.c.	#3 @ 8" o.c. or #3 @ 14" o.c. or #4 @ 20" o.c.

* Design based on zero slope soil backfill with equivalent fluid pressure of 30 psf, with no surcharge load. Masonry is fully grouted, and reinforcing steel has a yield strength of 40,000 psi.

Figure 13-19 Double-wythe brick retaining walls. (*Adapted from BIA* Technical Note 17N.)