- No wiring, conduits, plumbing, or utility components may be placed behind or fastened to breakaway walls or panels.
- Areas below an elevated building should be designed and constructed in accordance with FEMA's Technical Bulletin 5-93, *Free-Of-Obstruction Requirements for Buildings Located in Coastal High Hazard Areas* (FEMA 1993c).

Figures 3-10 and 3-11 show recommended designs for breakaway wall systems.

3.5.7 Stairs, Decks, and Porches

These structures are frequently damaged by floods and storms. Much of this damage can be prevented by the application of a few simple techniques:

- Support elevated decks on piles rather than posts or piers. If a pile foundation is not used for the deck, use knee bracing connected to the foundation piles that support the main structure; however, do not notch the foundation piles to seat the knee bracing.
- Design and construct stairs to hinge at the top, so they can be raised prior to a storm.
- Design and construct fixed steps and walkovers with piles and sturdy structural members. Consider steps and horizontal decks to be sacrificial, and construct them so that they will break loose in small sections when acted on by flood forces.

3.5.8 Utilities

All utility components (including electric meters) should be located on the landward side of the structure and, according to NFIP requirements for V-Zones, must be elevated to or above the BFE and anticipated flood level (including wave effects and runup) whenever possible. In A-Zones, utilities may be below the BFE provided that the CCCL requirements are also adhered to. Utility components below the BFE should be contained in floodproof enclosures. Figures 3-12 and 3-13 show recommended designs for mechanical platforms

3.5.9 Seawalls and Erosion Control Structures

Although permitted in many states and jurisdictions, seawalls, bulkheads, and other erosion control structures should not be relied on to contain soil required for support of a habitable structure. The structure should be supported on a foundation that can withstand or accommodate erosion and loss of support.

Where used, seawalls, bulkheads, and erosion control devices should be designed to resist failure due to wave and flood forces, overtopping, undermining, and debris impact. Wing walls or return walls should extend landward to a point beyond that affected by storm-induced erosion.

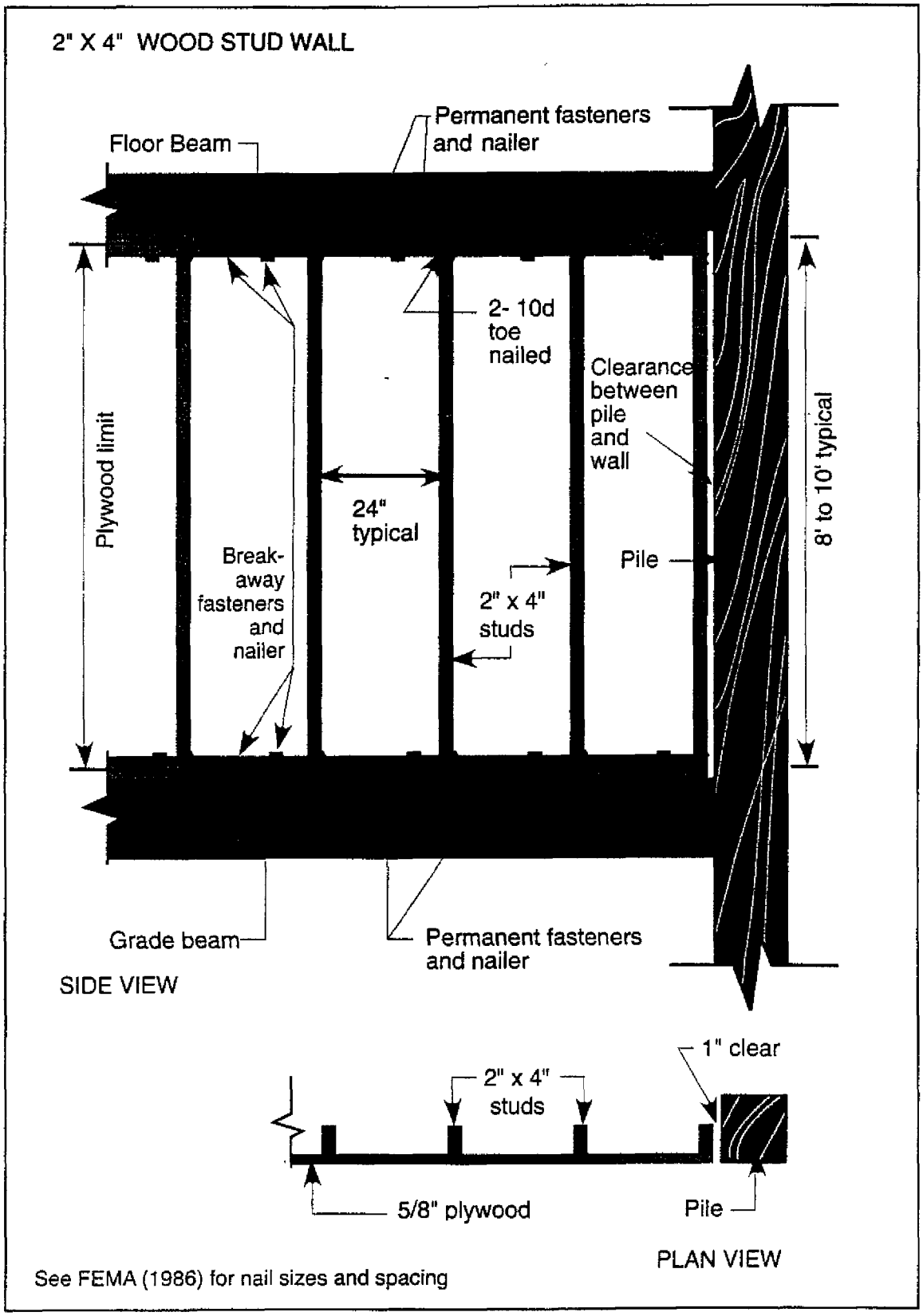

Figure 3-10 Wood stud breakaway wall (after FEMA 1986).

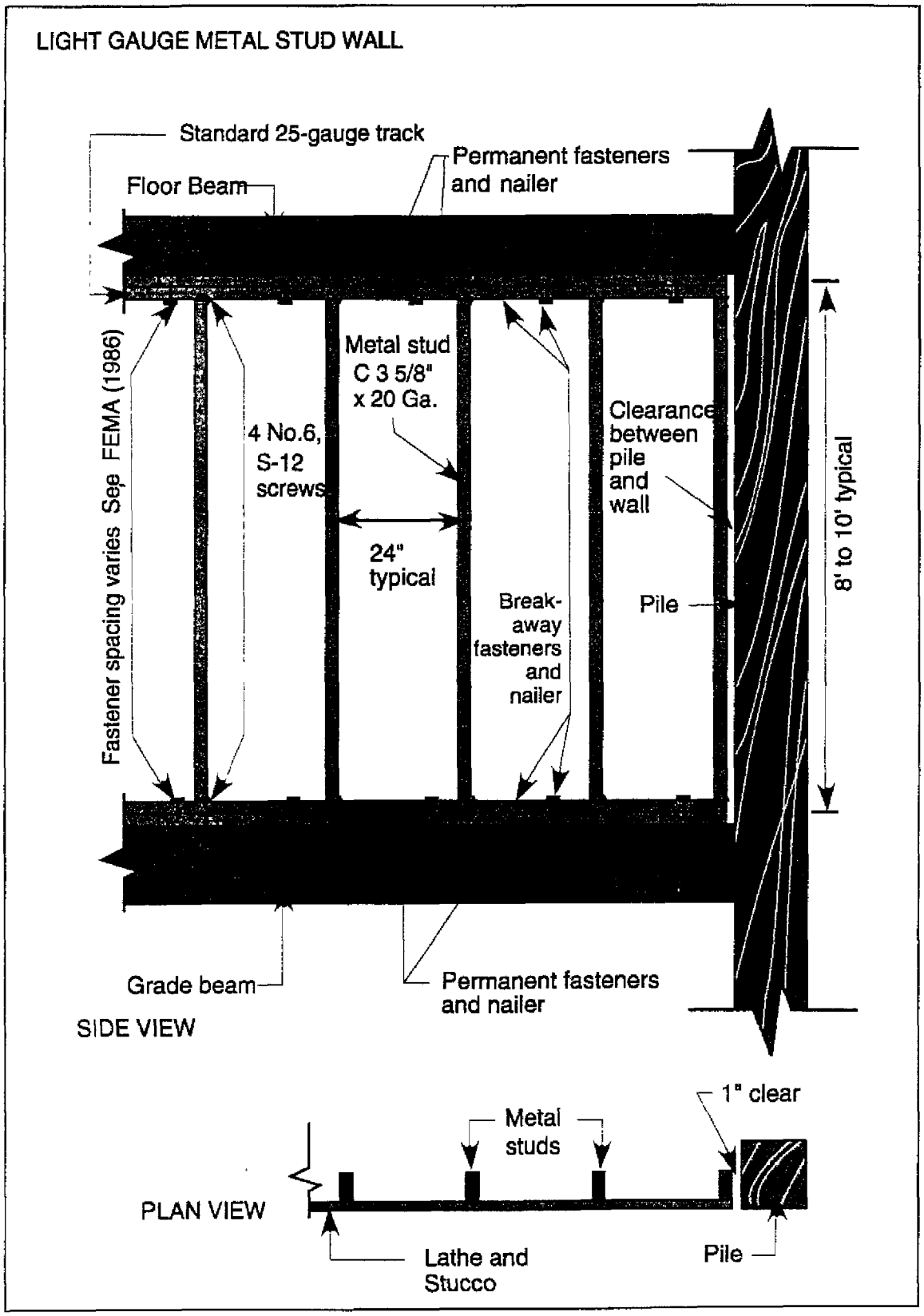

Figure 3-11 Light-gauge metal stud breakaway wall (after FEMA 1986).