

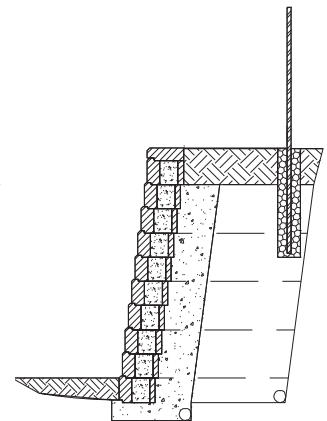
## Fences Above Retaining Walls

Fences and railings are a common sight around retaining walls. At Allan Block we are frequently asked how to properly install various types of fencing along the top of our walls. This question has a variety of answers depending on the fence application. The best way to address installation of a fence is to consider the plan, design, and construction of the fence and wall structure together as one system before the project begins. Usually what happens is that the fence or railing is overlooked and not discussed until the wall is completed. For anybody that has been associated with projects like this, they know that installing a railing after the wall is constructed is more work and more expensive.

All fences have the ability to withstand some type of load. A typical fence has the capacity to withstand loads from wind, pedestrians, or even vehicles in the case of commercial projects. By installing a fence or railing above the wall you are adding a requirement for the wall to withstand the additional overturning force in the top courses when somebody or something is pushing on the railing. If the wall has not been properly designed and built, this creates a potential that the load from the fence footing could move, bulge, or even worse, topple the top portion of the wall. The key is to consider the fence during the design phase of the wall project to ensure the retaining wall has an adequate amount of resistance to the additional force that the fence will apply.

### Installed 3 feet (0.9 m) Behind the Block

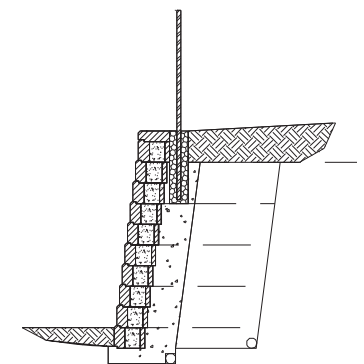
Placing the fence or railing a minimum of 3 feet (0.9 m) or further behind the wall is the preferred location. This configuration applies minimal overturning forces to the back of the wall. The design can utilize the resistance from the soil mass between the wall and post footing to reduce the forces from the fence.



### Installed Behind the Block

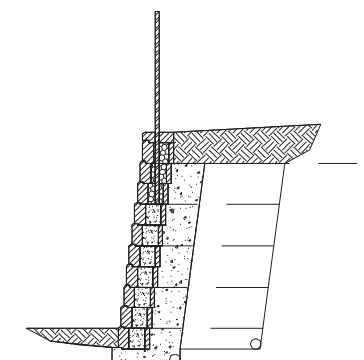
Installing the fence or railing directly behind the block is a common application. Fences can be placed closer to the wall than 3 feet, but a design professional should be involved with the project to ensure that the top of the retaining wall can withstand the forces from the fence.

As a fence gets closer to the wall, the excess strength from the geogrid reinforcement is required to withstand the overturning forces applied by the fence or railing post footing. In most cases, gravity walls (walls designed without geogrid) cannot be used once the fence is within 3 feet (0.9 m) from the back of the block. This is due to the fact that there is no additional resistance provided by geogrid reinforcement layers, there is only the weight of the wall itself which typically is not enough to resist both the soil pressure and the force applied by the fence.



### Installed Within the Block

Installing a fence or railing within the block itself is by far the most challenging application and an engineer should analyze the wall. For this type of installation the cores around each post, or even the entire top few courses of block, must be grouted solid to add enough stability to the top of the wall. Using geogrid within the top three courses of block is required to aid in the resistance of the overturning force created by the posts. This application should not be used for fences where large wooden posts are used.



### Installing a construction tube for the fence during retaining wall construction

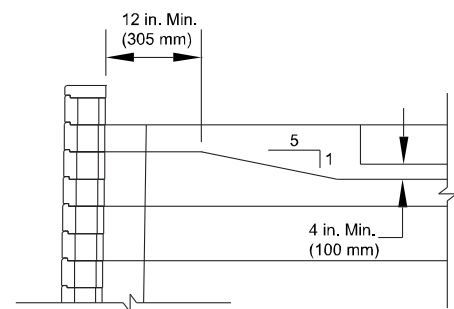
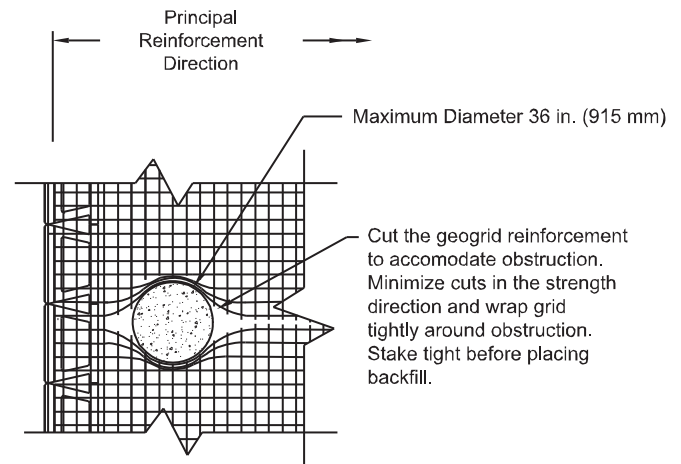
The wall installer and fencing contractor should coordinate the locations of all fence post footings prior to completing the top of the wall. Knowing these locations allows the wall installer to place the construction tubes while completing the top courses. This coordination eliminates the need to hand dig fence footings after the wall is complete. When placing the fence post footings the installer needs to account for geogrid obstructions where the fence posts will occur. Careful layout of the geogrid can allow for the post location to occur at a seam between geogrid rolls so that minimal cutting of the roll is necessary.

It may be permissible to make a small cut in the reinforcement to accommodate the obstruction. Talk to your geogrid supplier to confirm the process for cutting the reinforcement. Care should be taken to minimize the cutting of the geogrid strands that run in the strength direction and the geogrid should be wrapped tightly around the obstruction. Stake the grid tightly before placing any backfill.

Finally, if the penetration is relatively shallow it may be possible to splay the reinforcements below the obstruction. The angle of splay in the reinforcement should be less than a 5 to 1 slope or roughly 11 degrees.

### Installing a fence after the wall is built

Installing a fence after the wall is built becomes a more challenging application than if the construction tubes are installed during retaining wall construction. As with all fence applications behind the wall, the installer must be aware of the geogrid location and avoid the use of a power auger where there is a potential to snag the geogrid and pull it out of the soil. The locations for the fence posts will need to be carefully dug by hand so that damage to the geogrid is minimized. Also, it becomes extremely challenging for a fence installer to build the fence directly into the block. Allan Block does not recommend installing a fence post directly within the block cores after the retaining wall is built.



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