



CALCULATING THE MAXIMUM GRAVITY WALL HEIGHT FOR SEGMENTAL RETAINING WALLS

From the beginning of the segmental retaining wall business in the late 1980s and early 1990s licensors and manufacturers have promoted a 'maximum gravity' wall height, which is the tallest a retaining wall can be built without reinforcement. In order to calculate the maximum height that a gravity wall could be built, the industry universally adopted the following design assumptions which represent ideal conditions for constructing a gravity wall:

- **There is no slope above the wall.**
- **There is no surcharge above the wall such as a driveway or roadway.**
- **The soil behind the wall (within 1 X the Wall Height) must consist of clean sand and/or gravel.**
- **The soil behind the wall must have a peak effective strength friction angle of at least 34 degrees.**
- **The soil behind the wall must have a maximum moist unit weight of 120 pounds per cubic foot (pcf).**
- **There can be no slope at the toe of the wall.**

If any of these ideal conditions are not met, the gravity wall will have to decrease in height and/or use geogrid reinforcement.

There are several proprietary design methodologies used by different licensors and manufacturers, but for the most part, the gravity wall calculations are done using The National Concrete Masonry Association "Design Manual for Segmental Retaining Walls." This design methodology is the standard of practice in the industry and it is the methodology Anchor Wall Systems and Oldcastle use to determine maximum gravity wall heights.

It is important to keep in mind there is no "typical" gravity wall height for any modular block. The actual maximum gravity wall height of any segmental retaining wall unit, regardless of the brand, is going to be dependent on the actual site-specific soil and geometry conditions.

Below is a table of selected Belgard and Anchor Wall Systems branded products and their published maximum gravity wall heights. These "maximum" heights are only valid for the specific set of "ideal" conditions discussed above. The maximum gravity wall height includes embedment.

| UNIT | UNIT DEPTH (IN) | UNIT BATTER (IN) | MAX GRAVITY HEIGHT |
|----------------------|-----------------|------------------|--------------------|
| Diamond® | 12 | 10.6 | 4.5 feet |
| Highland® | 12 | 10.6 | 4.5 feet |
| Sterling® | 12 | 10.6 | 4.0 feet |
| Diamond® 10D | 10 | 10.6 | 3.5 feet |
| Diamond® 9D | 9 | 10.6 | 3.0 feet |
| Diamond Pro® | 12 | 7.1 | 4.0 feet |
| Diamond Pro® PS | 12 | 7.1 | 4.0 feet |
| Vertica® | 11 | 4.0 | 3.4 feet |
| Vertica Pro® | 20 | 4.0 | 5.0 feet |
| Tandem® Modular | 12 | 2.7 | 3.0 feet |
| Tandem® | 12 | 2.4 | 3.0 feet |
| Mega Tandem™ (7") | 12 | 2.4 | 3.0 feet |
| Mega Tandem™ (22") | 27 | 2.4 | 6.0 feet |
| Mega Tandem™ (41") | 47 | 2.4 | 10.0 feet |
| Belair Wall® 2.0 | 8 | 9.6 | 3.0 feet |
| Castlemanor® | 10 | 9.5 | 3.0 feet |
| Shelton™/Brookshire™ | 10 | 9.5 | 3.0 feet |

This chart is for general information only and reflects the calculated maximum gravity wall heights using the previously discussed ideal conditions. The chart should not be used for design or construction. A professional engineer, licensed in the State where the project is located and familiar with segmental retaining wall design, should be consulted to address site-specific conditions before construction commences and to determine if a permit is required.

The information set forth herein is for general informational purposes only. All such information is provided in good faith, however Oldcastle APG, Inc. and its affiliates make no representation or warranty of any kind, express or implied, regarding the accuracy, adequacy, validity, reliability, availability or completeness of any of the information and shall have no liability to any party for loss or damage incurred as a result of the use or reliance on any information provided herein. Any use of the information is at the user's sole risk.