

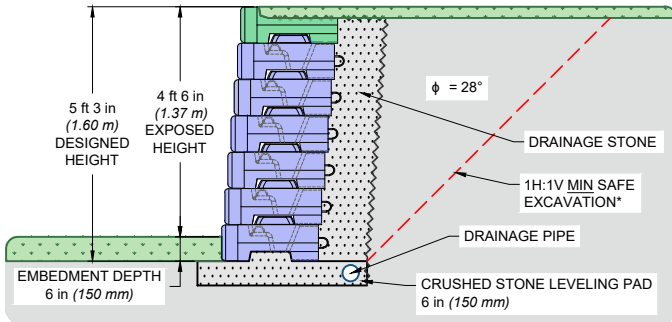
NOVUM WALL™

PRELIMINARY WALL SECTIONS - GRAVITY

The following sections for gravity Novum Wall retaining walls are based on idealized and assumed conditions and are intended for reference and preliminary planning purposes only. They are NOT intended for use or as replacement for site-specific Novum Wall retaining wall design. Seismic, flood, rapid drawdown, toe slopes, and any other loading condition not described have not been evaluated or included in the preliminary wall sections. Final project designs, including all construction details, internal and external stability, and drainage, shall be prepared by a licensed professional engineer using the actual conditions of the proposed site.

SOIL TYPE - SILTY SAND or CLAYEY SAND ($\phi = 28^\circ$)

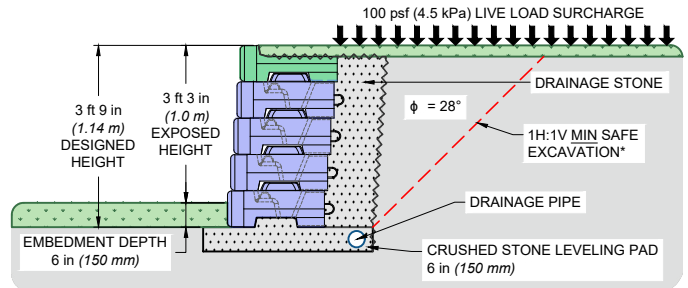
LOAD CONDITION - NO LIVE LOAD SURCHARGE,
NO CREST SLOPE, NO TOE SLOPE



MAXIMUM GRAVITY HEIGHT = 5 ft 3 in (1.60 m)

LOAD CONDITION - 100 psf (4.8 kPa) LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE

NOTE: SURCHARGE APPLIES TO LIGHT VEHICULAR OR PEDESTRIAN LOADING CONDITIONS.



MAXIMUM GRAVITY HEIGHT = 3 ft 9 in (1.14 m)

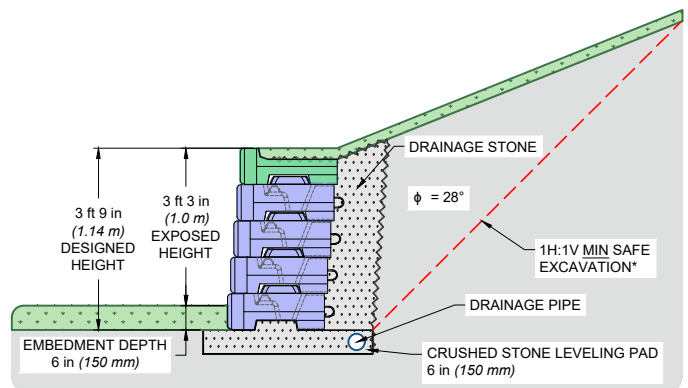
LOAD CONDITION - 250 psf (12 kPa) LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE

NOTE: SURCHARGE APPLIES TO ROADWAY OR PARKING LOT LOADING CONDITIONS.

MAXIMUM GRAVITY HEIGHT = NONE

NOVUM WALL SECTIONS EXHIBING THIS SOIL AND LOAD CONDITION REQUIRE GEOGRID REINFORCEMENT FOR STABILITY.

LOAD CONDITION - NO LIVE LOAD SURCHARGE, 2.5H:1V CREST SLOPE, NO TOE SLOPE



MAXIMUM GRAVITY HEIGHT = 3 ft 9 in (1.14 m)

The maximum gravity wall height shown for each soil and load condition is shown. Wall heights shorter or less than shown per design case are also applicable. Wall heights taller or greater than shown per load case are not applicable and require geogrid reinforcement.

* 1H:1V minimum safe excavation shown for reference, and may be larger or smaller per site specific condition. Consult local geotechnical engineer and/or governing agency for safe excavation requirements.

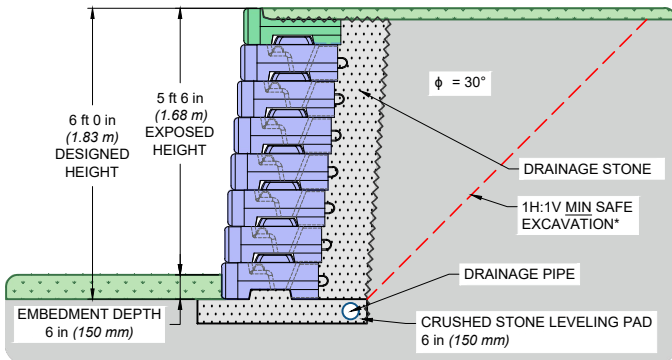
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SOIL TYPE - SILTY SAND or FINE to MEDIUM SAND ($\phi = 30^\circ$)

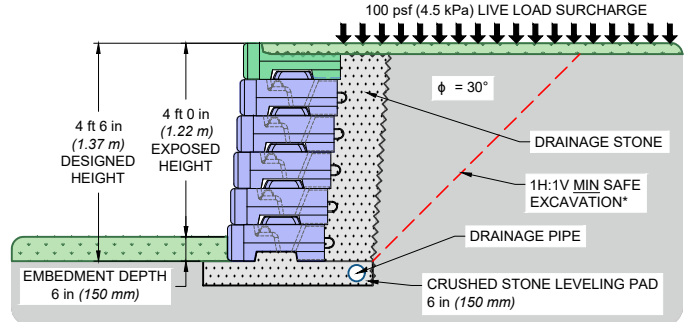
LOAD CONDITION - NO LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE



MAXIMUM GRAVITY HEIGHT = 6 ft 0 in (1.83 m)

LOAD CONDITION - 100 psf (4.8 kPa) LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE

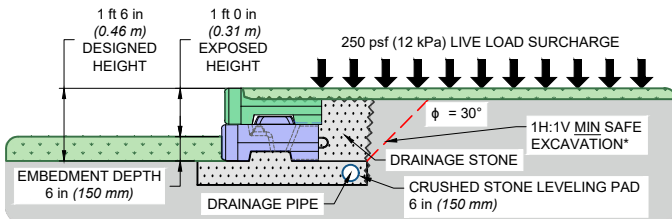
NOTE: SURCHARGE APPLIES TO LIGHT VEHICULAR OR PEDESTRIAN LOADING CONDITIONS.



MAXIMUM GRAVITY HEIGHT = 4 ft 6 in (1.37 m)

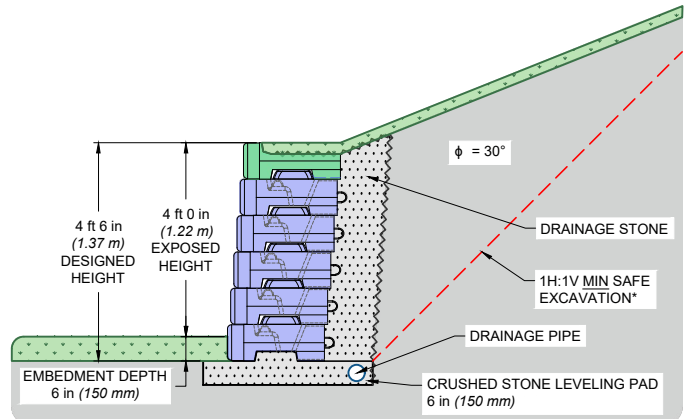
LOAD CONDITION - 250 psf (12 kPa) LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE

NOTE: SURCHARGE APPLIES TO ROADWAY OR PARKING LOT LOADING CONDITIONS.



MAXIMUM GRAVITY HEIGHT = 1 ft 6 in (0.46 m)

LOAD CONDITION - NO LIVE LOAD SURCHARGE, 2.5H:1V CREST SLOPE, NO TOE SLOPE



MAXIMUM GRAVITY HEIGHT = 4 ft 6 in (1.37 m)

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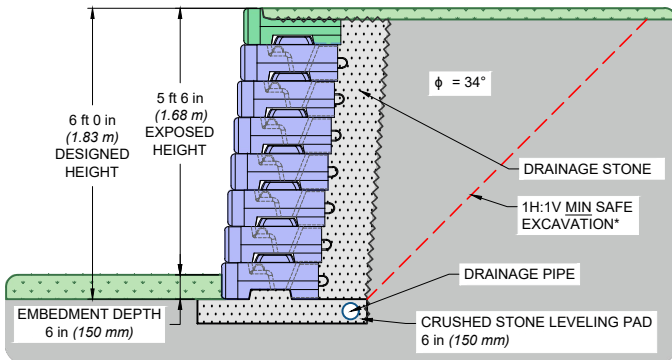
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SOIL TYPE - DENSE WELL GRADED SAND or SAND and GRAVEL ($\phi = 34^\circ$)

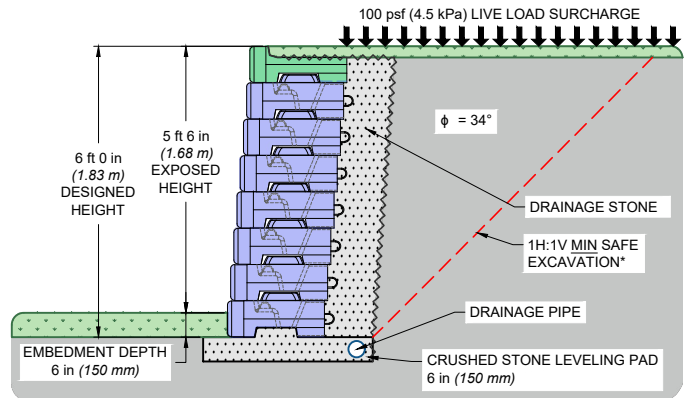
LOAD CONDITION - NO LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE



MAXIMUM GRAVITY HEIGHT = 6 ft 0 in (1.83 m)

LOAD CONDITION - 100 psf (4.8 kPa) LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE

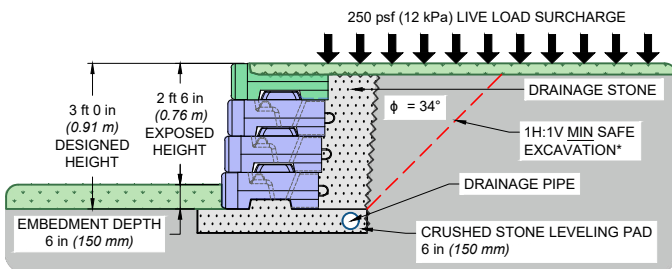
NOTE: SURCHARGE APPLIES TO LIGHT VEHICULAR OR PEDESTRIAN LOADING CONDITIONS.



MAXIMUM GRAVITY HEIGHT = 6 ft 0 in (1.83 m)

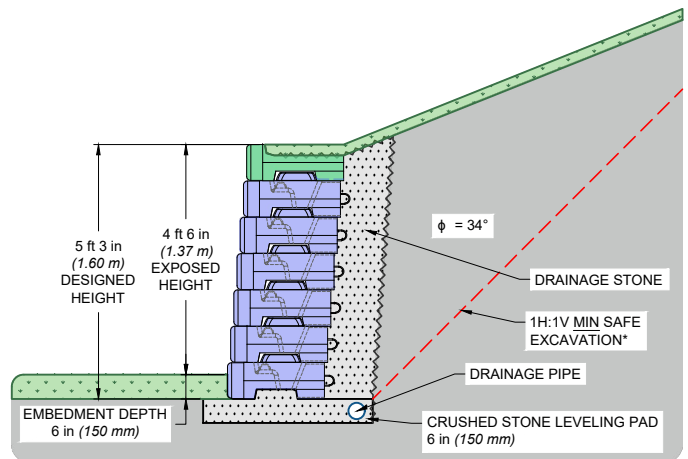
LOAD CONDITION - 250 psf (12 kPa) LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE

NOTE: SURCHARGE APPLIES TO ROADWAY OR PARKING LOT LOADING CONDITIONS.



MAXIMUM GRAVITY HEIGHT = 3 ft 0 in (0.91 m)

LOAD CONDITION - NO LIVE LOAD SURCHARGE, 2.5H:1V CREST SLOPE, NO TOE SLOPE



MAXIMUM GRAVITY HEIGHT = 5 ft 3 in (1.60 m)

The maximum gravity wall height shown for each soil and load condition is shown. Wall heights shorter or less than shown per design case are also applicable. Wall heights taller or greater than shown per load case are not applicable and require geogrid reinforcement.

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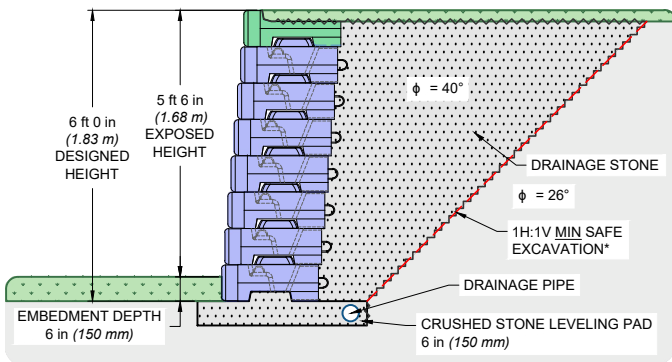
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SOIL TYPE - CRUSHED STONE BACKFILL REPLACING SILTY or CLAYEY SAND ($\phi = 40^\circ$ over 26°)

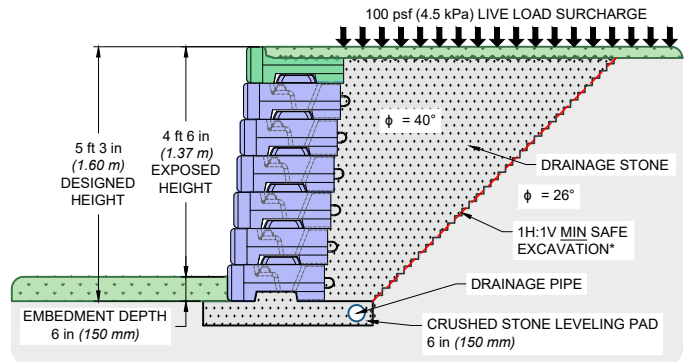
LOAD CONDITION - NO LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE



MAXIMUM GRAVITY HEIGHT = 6 ft 0 in (1.83 m)

LOAD CONDITION - 100 psf (4.8 kPa) LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE

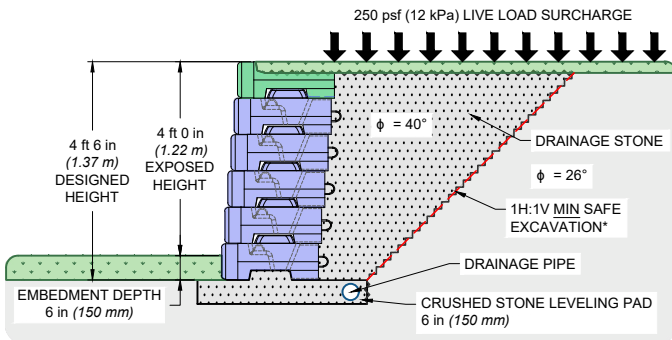
NOTE: SURCHARGE APPLIES TO LIGHT VEHICULAR OR PEDESTRIAN LOADING CONDITIONS.



MAXIMUM GRAVITY HEIGHT = 5 ft 3 in (1.60 m)

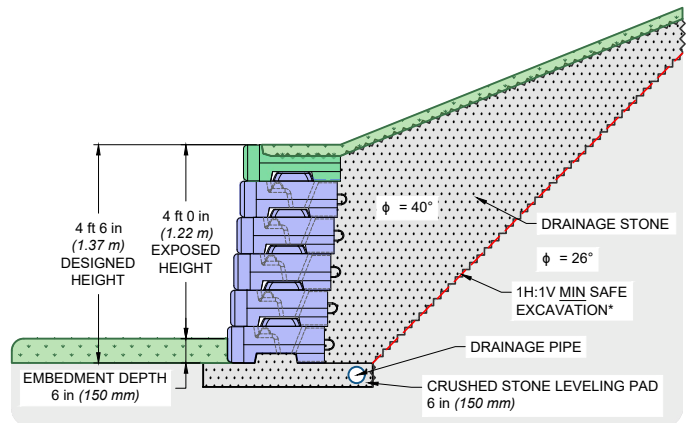
LOAD CONDITION - 250 psf (12 kPa) LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE

NOTE: SURCHARGE APPLIES TO ROADWAY OR PARKING LOT LOADING CONDITIONS.



MAXIMUM GRAVITY HEIGHT = 4 ft 6 in (1.37 m)

LOAD CONDITION - NO LIVE LOAD SURCHARGE, 2.5H:1V CREST SLOPE, NO TOE SLOPE



MAXIMUM GRAVITY HEIGHT = 4 ft 6 in (1.37 m)

The maximum gravity wall height shown for each soil and load condition is shown. Wall heights shorter or less than shown per design case are also applicable. Wall heights taller or greater than shown per load case are not applicable and require geogrid reinforcement.

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EXAMPLE CALCULATIONS

The following pages represent an example background calculation that the preliminary wall sections for gravity Novum Wall retaining walls were based upon. The sample calculation evaluates the first preliminary wall section displayed on page 1 of this document. The soil type is SILTY SAND or CLAYEY SAND ($\phi = 28^\circ$) and the load condition is NO LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE.

The preliminary calculations were completed using National Concrete Masonry Association (NCMA) program SRWall (Version 4) and the designs are in general accordance with *NCMA Design Manual for Segmental Retaining Walls, 3rd Edition*. The analysis considers Novum Wall retaining blocks with standard batter of 5.2° for average block sizes and weights.

The preliminary design minimum factor of safety is 1.5 for sliding and overturning, and 2.0 for bearing capacity. Overall slope (global) stability has NOT been checked and is required to be evaluated for every wall section shown for final design. Seismic, flood, rapid drawdown, toe slopes, and any other loading condition not described in the preliminary wall sections have not been evaluated. If a project exhibits any of those loading scenarios, these preliminary wall sections do not apply.

All other preliminary wall section calculations are available upon request. Please reach out to the Redi-Rock Engineering Team at 866-222-8400, option 2 or engineering@redi-rock.com to request additional preliminary background calculations.

SOIL TYPE		LOAD CONDITION			
		NO LIVE LOAD SURCHARGE, NO CREST SLOPE, NO TOE SLOPE	100 psf (4.8 kPa) LIVE LOAD, NO CREST SLOPE, NO TOE SLOPE	250 psf (12 kPa) LIVE LOAD, NO CREST SLOPE, NO TOE SLOPE	NO LIVE LOAD SURCHARGE, 2.5H:1V CREST SLOPE, NO TOE SLOPE
SILTY SAND or CLAYEY SAND ($\phi = 28^\circ$)	MAX.	5.25 ft (1.60 m)	3.75 ft (1.14 m)	N/A	3.75 ft (1.14 m)
	EMBED	0.5 ft (150 mm)	0.5 ft (150 mm)	N/A	0.5 ft (150 mm)
	BASE	0.5 ft (150 mm)	0.5 ft (150 mm)	N/A	0.5 ft (150 mm)
SILTY SAND or FINE to MEDIUM SAND ($\phi = 30^\circ$)	MAX.	6.0 ft (1.83 m)	4.5 ft (1.37 m)	1.5 ft (0.46 m)	4.5 ft (1.37 m)
	EMBED	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)
	BASE	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)
DENSE WELL-GRADED SAND or SAND and GRAVEL ($\phi = 34^\circ$)	MAX.	6.0 ft (1.83 m)	6.0 ft (1.83 m)	3.0 ft (0.91 m)	5.25 ft (1.60 m)
	EMBED	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)
	BASE	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)
CRUSHED STONE BACKFILL REPLACING SILTY or CLAYEY SAND ($\phi = 40^\circ$ over 26°)	MAX.	6.0 ft (1.83 m)	5.25 ft (1.60 m)	4.5 ft (1.37 m)	4.5 ft (1.37 m)
	EMBED	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)
	BASE	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)	0.5 ft (150 mm)

SRWall (Version 4) Report**Project Identification**

Project ID :
Project Name : **Novum Wall Preliminary Wall Sections**
Owner : **Redi-Rock**
Client :
Prepared By : **LBH**
Company : **Redi-Rock International**
Address : **2940 Parkview Drive, Petoskey, MI 49770**
Telephone : **231-489-7800**
Section : **H=5.25 ft / 28-deg soil / No surcharge, no backslope,
no toe slope**
Project File : **NW_A_28_NR_5.25_calcs.prj**
Vendor Data File :
Date and Time : **01/16/2024 16:54:30**

Type of Structure : **Gravity Wall**

Wall Geometry

Design Wall Height(ft) : **5.25**
Embedment Wall Height(ft) : **0.50**
Exposed Wall Design Height(ft) : **4.75**
Number of Segmental Wall
Units : **7**
Wall Inclination(degrees) : **5.14**

Grades

Top Slope(degrees) : **0.00**

Uniform Distributed Surcharge

Live Load Surcharge(Psf) : **0.00**
Dead Load Surcharge(Psf) : **0.00**

Soil Data

Soil Zone	Description	Cohesion (c) (psf)	Friction Angle(Φ) (degrees)	Unit Weight (γ)(pcf)
Retained Soil	Silty sand, clayey sand	N/A	28.00	120.00
Leveling Pad Soil	Crushed stone	N/A	40.00	130.00
Foundation Soil	Silty sand, clayey sand	0.00	28.00	120.00

Segmental Unit Data

Segmental Unit Name : **Novum Wall Retaining Block**
 Cap Height (Inches) : **0.00**
 Unit Height (Hu)(Inches) : **9.00**
 Unit Width (Wu)(Inches) : **24.00**
 Unit Length (Inches) : **46.12**
 Setback (Inches) : **0.81**
 Weight (Infilled)(lb) : **684.00**
 Unit Weight (Infilled)(pcf) : **118.65**
 Center of Gravity(Inches) : **11.70**

Unit-Unit Interface Properties

Minimum Shear Capacity(lb/ft)	Shear Friction Angle	Maximum Shear Capacity (lb/ft)
1479.00	71.00	4291.00

Vertical Components

Vertical Components of Earth Pressures Used : **Yes**

Coefficients of Earth Pressure and Failure Plane Orientation

Retained Soil(Static)(Ka) : **0.286**
 Retained Soil(Static)(Kah Horizontal Component) : **0.264**
 External Modified Back Slope(Bext) : **0.000**
 Orientation of failure plane from horizontal(degrees) for
 External Stability : **52.854**

Result of External Stability Static Analysis

	Calculated	Design Criteria
FOS Sliding	1.73	> 1.50
FOS Overturning	2.12	> 1.50
FOS Bearing Capacity	2.82	> 2.00
Base Footing (B)(ft)	2.50	

Results of Internal Stability Static Analysis

SRW Unit #	Heel Elev (ft)	FOS Shear >=1.50
7	4.50	212.71
6	3.75	66.95
5	3.00	35.87
4	2.25	23.62
3	1.50	17.32
2	0.75	12.70

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